

**Springbank Off-Stream
Storage Project Preliminary
Geotechnical Assessment
Report**

Volume 3 of 4



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Project No. 110773396

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“VOLUME 3, SPRINGBANK OFF-STREAM STORAGE PROJECT PRELIMINARY GEOTECHNICAL ASSESSMENT REPORT

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**SPRINGBANK OFF-STREAM
STORAGE PROJECT
SUPPLEMENTARY 2018
GEOTECHNICAL
INVESTIGATION REPORT**



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FINAL

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SPRINGBANK OFF-STREAM STORAGE PROJECT SUPPLEMENTARY 2018 GEOTECHNICAL INVESTIGATION REPORT

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1.0 INTRODUCTION

This report summarizes the factual data collected from the supplementary 2018 geotechnical investigation undertaken for the Springbank Off-stream Storage Project (herein, referred to as SR1). The objectives of this investigation were to further characterize the ground conditions for the Debris Barrier (DB) in the Elbow River, and Low Level Outlet (LLO) alignment options, and to address Review Board comments for further characterization of the glaciolacustrine and glacial till units underlying the dam footprint. This report summarizes all information, borehole and test pit records, laboratory testing results, and groundwater level monitoring completed between April and December 2018 for the project.

The intent of this report is to document data that supports the preliminary and final design of the SR1 Project and is supplemental to the report titled "Springbank Off-Stream Storage Project Geotechnical Investigation Report" dated December 8, 2020 (herein referred to as the 2016 Investigation Report). This report contains no geological interpretations, site characterization, geotechnical parameter derivations or geotechnical design. The project description, physiography, published geological descriptions can be found in the 2016 Investigation Report.

The investigation was undertaken by Stantec for Alberta Transportation (AT) using the sub-contractors listed in **Section 2.2**. The Statement of General Conditions for this geotechnical investigation is contained in **Appendix A**.

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2.0 FIELD WORK

2.1 DURATION OF FIELDWORK

The fieldwork was completed in two (2) mobilizations. The first mobilization was between April 21 and May 9, 2018. The first mobilization consisted of three (3) boreholes within the Elbow River (DB1 to DB3) for the proposed Debris Barrier and 11 boreholes and 6 Seismic Cone Penetration Test soundings within the dam footprint to assess proposed Low-Level Outlet alignment options.

The second mobilization was between September 24 and October 31, 2018. The second mobilization consisted of four (4) boreholes to further characterize the glaciolacustrine and glacial till units within the dam footprint, two (2) boreholes to assess an alternate LLO alignment as requested by Alberta Environment and Parks (AEP), and 14 test pits and trenches throughout the dam footprint. Delays were encountered during the second mobilization fieldwork due to inclement weather which required demobilization of the test-pitting excavator on October 4, 2018 and re-mobilizing on October 29, 2018.

2.2 SUB-CONTRACTORS

The geotechnical explorations were executed using the following sub-contractors:

- The auger drilling, rotary coring, vibrating wire piezometer installation, and logger station platform construction was performed by All-Service Drilling Ltd.
- The Seismic Cone Penetration Testing (SCPT) soundings were performed by Conetec Investigations Ltd.
- The first test pitting mobilization was performed by KLS Earthworks and Environmental (KLS) and the second test pitting mobilization was performed by Great West Resources Ltd (GWRL)
- Direct simple shear (DSS) laboratory testing was performed by Tetra Tech

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2.3 EXPLORATORY HOLE LOCATIONS

The fieldwork completed for this scope of work includes:

- Three (3) boreholes within the Elbow River completed using solid stem auger, and rotary coring for the Debris Barrier.
- Thirteen (13) boreholes completed using solid stem auger, and rotary coring for the Low Level Outlet.
 - A twinned borehole was advanced at one location for collection of additional Shelby Tube and SPT samples.
- Four (4) boreholes completed using solid stem and hollow stem auger for characterization of glaciolacustrine materials.
 - Twinned boreholes were advanced at two (2) locations for collection of additional Shelby Tube and SPT samples.
- Six (6) SCPT soundings within the dam footprint along the proposed Low Level Outlet alignments.
- Fourteen (14) test pits and test trenches completed using a track mounted excavator within the dam footprint and LLO locations.

The boreholes and test pits are referenced by the SR1 project components as follows:

- D# – Storage Dam
 - o LLO# – Low Level Outlet
 - o GL# – Glaciolacustrine: boreholes completed to assess the glaciolacustrine and glacial till deposits within the dam footprint
 - o TP# - Test pits completed within the dam footprint
 - o TT# - Test trenches completed between two points along key features and alignments underlying the dam footprint
- DC# – Diversion Channel
- DB# - Debris Barrier
- DS# – River Structures (Service Spillway and Diversion Inlet)
- FB# – Floodplain Berm

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- BS# – Borrow Source
- H# – Highway embankment and bridge
- GW# – Groundwater wells

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The borehole identification system follows a numerical sequence. Several boreholes proposed in the original Work Plan were deleted due to land access issues encountered during the program. The boreholes have been renumbered in some instances, but occasional gaps in numbering may remain in the completed boreholes. During future proposed geotechnical investigation, gaps in the borehole numbering will be filled in as remaining boreholes are completed.

Figures of the as-built exploratory hole locations are presented in **Appendix C** and summarized in **Appendix B**.

2.4 LOGGING AND DESCRIPTIONS

The site works were supervised by Stantec personnel. All boreholes were logged on site by Stantec personnel using the Modified Unified Soils Classification System (MUSCS). The logging terminology and symbols used is presented in **Appendix D**.

2.5 METHODOLOGY

2.5.1 Auger Drilling

For the 2018 drilling, two (2) drilling rigs were utilized; only one (1) drilling rig was on-site at any given time. The following rigs were used:

- Acker Soil-Max Junior: drill rig is mounted on 24" tracks and is set up for hollow and solid-stem augering, direct push, and rotary core operations. The length of the rig is 6.9 m (22.6 feet) with a mast-down height of 2.9 m (9.6 ft).
- Acker Soil-Max: drill rig is mounted on a Go-Tract 1600 Carrier with 36" wide tracks and is set up for hollow and solid-stem augering, and rotary core operations. The length of the rig is 7.6 m (25 feet) with a mast-down height of 3.5 m (11.4 ft);

The intervals of sampling varied depending on the encountered unit, location, and purpose of the borehole. The following sampling methodology was used for these boreholes:

- Undisturbed Shelby tube samples were obtained to provide specimens for laboratory testing. Sampling was in accordance with ASTM D1587 'Standard Practice for Thin-Walled Tube Sampling of Soils for Geotechnical Purposes'. After the tube was removed from the boring, the Stantec field representative measured the recovery, visually classified the soil, recorded the information on the boring logs, and sealed the tube to retain moisture.
- Standard Penetration Testing (SPT) sampling (continuous or at specific intervals) was performed to characterize soil stiffness and relative density. SPT specimens were used for subsequent laboratory index testing to assist in characterizing the soil profiles. The sampling was performed in accordance with ASTM D1586 'Standard Test Method of Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils'.

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- Bulk samples of representative auger cuttings were collected and bagged for use in the laboratory testing program.

All collected samples were stored in moisture-tight containers and delivered daily to the Stantec laboratory in Calgary for testing. Where bedrock was encountered during augering and SPT's, it has been identified as inferred on the borehole records.

The borehole logs developed from the auger drilling are presented in **Appendix D**. Borehole logs for the Debris Barrier (DB) are presented in **Appendix D.1**; borehole logs for the Low Level Outlet (LLO) are presented in **Appendix D.2**; borehole logs for the Glaciolacustrine (GL) materials are presented in **Appendix D.3**.

2.5.2 Rotary Coring

All three (3) boreholes completed for the Debris Barrier and three (3) of the LLO boreholes were extended into bedrock using rotary coring following overburden drilling using a combination of solid and hollow-stem augering. All-Service Drilling Ltd. used HQ3 triple-tube, wireline rock coring equipment to recover rock core specimens for logging and testing. This system uses a cable to retrieve the core barrel, which avoids the need for connecting rods. The core barrel assembly has inner and outer tubes. The inner tube collects the rock core sample during drilling and is independent of the outer tube. Coring was completed in accordance with the ASTM D2113 'Standard Practice for Rock Core Drilling and Sampling of Rock for Site Investigation'.

The borehole logs developed from the rotary coring are presented with the soil borehole logs in **Appendix D**. Logs for the Debris Barrier (DB) are presented in **Appendix D.1**; logs for the Low Level Outlet (LLO) are presented in **Appendix D.2**.

2.5.3 Test Pitting

Test pitting was split into two mobilizations due to a significant snow event on October 2, 2018 that restricted access to site; the snowfall event was followed by a warming trend which resulted in soft ground conditions and required equipment demobilization to prevent unnecessary damage to access infrastructure.

Test pitting was carried out using a track mounted John Deere 135D excavator owned and operated by KLS during the first mobilization; a track mounted John Deere 210G rented and operated by GWRL was used during the second mobilization. Test pitting was carried out to the maximum reach of the excavator (typically 4.5 m), or the presence of sloughing materials which impeded further excavation. During test pitting, the topsoil was stripped and stockpiled for replacement following backfill of the test pit.

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Crews entered the test pit while the excavation was shallower than 1.5 m in height, and soil conditions permitted. Following advancement beyond 1.5 m Stantec personnel logged the soil from the bucket of the excavator once moved outside and away from the test pit, as well as from the spoil pile. Upon reaching the base of the test pit and terminating the excavating, the excavation was backfilled with excavated materials and used a bucket to lightly compact materials.

The logs developed from the test pitting are presented in **Appendix D**; in **Appendix D.4**.

2.5.4 Cone Penetration Testing

CPTs were completed by ConeTec at six (6) locations within the dam footprint and were completed adjacent to LLO boreholes as shown in below **Table 1**, below. Testing involved pushing a cone penetrometer into the ground at a constant rate to provide a continuous subsurface soil profile. The cone tip resistance (q_t), pore-water pressure (u), and sleeve friction (f_s) are measured as the cone is advanced. CPT was completed in accordance with the ASTM Standard D5778-07, 'Standard Test Method for Performing Electronic Friction Cone and Piezocone Penetration Testing of Soils'. Pore water dissipation and seismic shear wave velocity tests were performed at selected locations.

Table 1 Summary of CPT Sounding Locations

CPT Sounding	Approximate 3TM		Approximate UTM		Adjacent Borehole	Completion Depth
	Easting	Northing	Easting	Northing		
SCPT18-01	-29094	5657548	681169	5658948	LLO01	13.8
SCPT18-03	-29026	5657492	681239	5658895	LLO03	11.8
SCPT18-05	-28871	5657320	681401	5658729	LLO05	16.4
SCPT18-10	-28894	5657791	681359	5659199	LLO10	17.7
SCPT18-12	-28817	5657762	681437	5659173	LLO12	9.8
SCPT18-15	-28732	5657663	681526	5659078	LLO15	9.5

The report supplied by ConeTec upon completion of the work is presented in **Appendix G**.

2.6 LABORATORY TESTING

Laboratory tests were conducted on selected soil and rock samples at the Stantec laboratory in Calgary. The testing results are presented in **Appendix E**, and are shown in **Appendix D** on borehole logs where practical. Direct simple shear testing was undertaken on selected Shelby tube samples of the glaciolacustrine deposits by Tetra Tech Inc. Their laboratory testing results can be found in **Appendix F**.

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Table 2 Summary of Laboratory Testing

Test Symbol	Test	Standard
	Moisture content	ASTM D2216 CSA A23.2-11A
	Particle size distribution (sieve analysis)	ASTM D422
	Particle size distribution (Hydrometer)	ASTM D422
	Atterberg limits	ASTM D4818 Method B – 1 Point
k	Permeability test, flexible wall/falling head	ASTM D5084
Y	Unit weight	ASTM D2166
UU	Unconsolidated undrained triaxial	ASTM D2850
CU	Consolidated undrained triaxial with Pore Pressure Measurements	ASTM D4767
SW	Swell test	ASTM 4546 Method C
DS	Direct shear	ASTM 3080
DSS	Direct simple shear	ASTM D6528
C	1D consolidation	ASTM D2435
PT	Standard proctor	ASTM D698
	Unconfined compressive strength test	ASTM D2938
Qu	Unconfined compressive strength with strain measurements	ASTM D2166

2.7 GROUNDWATER MONITORING

The groundwater monitoring program is ongoing but at this time is only being completed on Government of Alberta (GoA) lands due to ongoing land access agreement discussions for private lands.

In addition to the eight (8) standpipe piezometers previously installed on GoA lands, two (2) standpipe piezometers were installed along two of the LLO alignments during the May 2018 investigation. The standpipe piezometer installation details for the 2016 and 2018 investigations that were accessible (i.e. on GoA lands) are presented below in **Table 3**. The installation details for remaining boreholes are provided in the 2016 Investigation Report; groundwater readings in these remaining piezometers have not been completed following the original 2016 investigation.

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Table 3 Summary of Standpipe Piezometer Installation

Borehole	Installation Details			Target Unit	Groundwater Elevation (El. m)			
	Original Ground (masl)	Screen Top (mbgs)	Screen Base (mbgs)		2016 Readings 26/09/2016 to 04/10/2016	2017 Readings 13/01/2017 to 28/01/2018	2018 Readings 17/12/2018	2019 Readings 07/02/2019
D27	1190.7	1167.8	1164.8	fill	1182.8	N/A	1182.6	N/A
D28 - shallow	1190.4	N/A	1185.3	clay	N/A	1189.3	1188.6	1188.6
D28 - deep	1190.4	N/A	1176.6	fill	N/A	1189.4	1188.4	1188.5
D36 - shallow	1190.5	1178.0	1176.5	silt and clay	1186.7	1185.9	1186.1	N/A
D36 - deep	1190.5	1150.9	1147.8	sedimentary bedrock	1187.1	1182.7	1182.7	1182.7
D45	1185.1	1173.4	1172.0	sedimentary bedrock	N/A	1182.5	1181.8	N/A
D51	1194.4	1165.4	1163.9	sedimentary bedrock	1186.3	1186.1	1185.6	N/A
D62	1190.7	1180.7	1177.7	fill	N/A	1184.8	1183.7	1183.4
LLO01	1192.15	11.1	14.4	silty sand above bedrock interface	N/A	N/A	1179.9	N/A
LLO16	1192.25	8.5	15.5	gravel at bedrock interface	N/A	N/A	1179.9	N/A
BS3	1197.4	1191.3	1188.3	fill	1190.5	N/A	1190.2	1190.22
GW12	1189.9	1188.4	1186.9	fill	1187.2	N/A	Dry	Dry

In addition to standpipe piezometers, a series of three (3) vibrating wire piezometers were installed in three (3) of the boreholes, one targeting the glaciolacustrine materials, one targeting the glacial till materials, and one at the glacial till and bedrock interface. The vibrating wire Piezometer installation details and recorded maximum and minimum water elevations are

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presented in **Table 4**.

Table 4 Summary of Vibrating Wire Piezometer Installation

Borehole	Installation Details			Target Unit	Groundwater Elevation (El. m)	
	Original Ground (masl)	Filter Depth (mbgs)	Filter Elevation (masl)		Maximum [Date]	Minimum [Date]
GL1	1191.938	7.0	1184.94	Glaciolacustrine	1188.1 [06/01/2019]	1188.5 [16/11/2018]
		14.0	1177.94	Glacial Till	1187.9 [06/01/2019]	1188.4 [11/12/2018]
		16.5	1175.44	Bedrock Interface	1187.7 [06/01/2019]	1188.2 [11/12/2018]
GL3	1191.023	3.0	1188.02	Glaciolacustrine	Dry	Dry
		12.0	1179.02	Glacial Till	1186.2 [06/01/2019]	1186.6 [11/11/2018]
		15.8	1175.22	Bedrock Interface	1184.7 [01/02/2019]	1185.2 [19/10/2018]
LLO17	1191.159	2.9	1188.26	Glaciolacustrine	1188.5 [17/11/2018]	Dry ¹ [14/01/2019]
		10.0	1181.16	Glacial Till	1186.1 [02/02/2019]	1186.7 [12/11/2018]
		12.85	1178.31	Bedrock Interface	1185.0 [02/02/2019]	1185.6 [12/11/2018]
Notes:						
1) Piezometer began reading dry consistently after January 14, 2019. Intermittent dry recordings noted between December 18, 2018 and January 14, 2019.						

Plots showing the trend of the phreatic surface over the monitoring period from installation and baseline to readings take on February 7, 2019 are attached in **Appendix H**. The VWP's will be monitored monthly for a period of one year up to October 2019.

2.8 PACKER TESTING

Packer permeability testing was carried out within the Debris Barrier boreholes (DB1 to DB3) to determine the permeability of the bedrock within the Elbow River. The equipment used for these tests, provided by All Service Drilling, consisted of pneumatic packer assembly and related accessory equipment. Due to complications with the equipment the packer seal would release part way through testing, and as such only five (5) of ten (10) test intervals provided valid permeability information. All Service attempted to diagnose the issues with the packer assembly, however they were unable to diagnose the main cause of the issue and packer testing was abandoned.

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The tests were completed in a zone at the base of the borehole, as the borehole was advanced. The bedrock was tested in approximately 3 m long increments as the borehole was advanced. The results of these individual tests that were deemed a valid test are presented in **Appendix I**.

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3.0 CLOSURE

This report has been prepared for the sole benefit of Alberta Transportation and their agents, and may not be used by any third party without the express written consent of Stantec Consulting Ltd. and Alberta Transportation. Any use, which a third party makes of this report, is the responsibility of such third party. Use of this report is subject to the Statement of General Conditions provided in **Appendix A**. It is the responsibility of Alberta Transportation, who is identified as "the Client" within the Statement of General Conditions, and its agents to review the conditions and to notify Stantec Consulting Ltd. should any of these not be satisfied. The Statement of General Conditions addresses the following:

- Use of the report
- Basis of the report
- Standard of care
- Interpretation of site conditions
- Varying or unexpected site conditions
- Planning, design or construction

We trust the above information meets with your present requirements. Should you have any questions or require further information, please contact us. This report has been prepared by Jason Warners, P.Eng. and reviewed by Andrew Bayliss, M.Sc., P.Eng.

Respectfully submitted,

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**APPENDIX A:
STATEMENT OF GENERAL
CONDITIONS**

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BASIS OF THE REPORT: The information, opinions, and/or recommendations made in this report are in accordance with Stantec's present understanding of the site-specific project as described by the Client. The applicability of these is restricted to the site conditions encountered at the time of the investigation or study. If the proposed site specific project differs or is modified from what is described in this report or if the site conditions are altered, this report is no longer valid unless Stantec is requested by the Client to review and revise the report to reflect the differing or modified project specifics and/or the altered site conditions.

STANDARD OF CARE: Preparation of this report, and all associated work, was carried out in accordance with the normally accepted standard of care in the state or province of execution for the specific professional service provided to the Client. No other warranty is made.

INTERPRETATION OF SITE CONDITIONS: Soil, rock, or other material descriptions, and statements regarding their condition, made in this report are based on site conditions encountered by Stantec at the time of the work and at the specific testing and/or sampling locations. Classifications and statements of condition have been made in accordance with normally accepted practices which are judgmental in nature; no specific description should be considered exact, but rather reflective of the anticipated material behaviour. Extrapolation of in situ conditions can only be made to some limited extent beyond the sampling or test points. The extent depends on variability of the soil, rock and groundwater conditions as influenced by geological processes, construction activity, and site use.

VARYING OR UNEXPECTED CONDITIONS: Should any site or subsurface conditions be encountered that are different from those described in this report or encountered at the test locations, Stantec must be notified immediately to assess if the varying or unexpected conditions are substantial and if reassessments of the report conclusions or recommendations are required. Stantec will not be responsible to any party for damages incurred as a result of failing to notify Stantec that differing site or sub-surface conditions are present upon becoming aware of such conditions.

PLANNING, DESIGN, OR CONSTRUCTION: Development or design plans and specifications should be reviewed by Stantec, sufficiently ahead of initiating the next project stage (property acquisition, tender, construction, etc), to confirm that this report completely addresses the elaborated project specifics and that the contents of this report have been properly interpreted. Specialty quality assurance services (field observations and testing) during construction are a necessary part of the evaluation of sub-subsurface conditions and site preparation works. Site work relating to the recommendations included in this report should only be carried out in the presence of a qualified geotechnical engineer; Stantec cannot be responsible for site work carried out without being present.

APPENDIX B: BOREHOLE SUMMARY

Borehole ID	Surveyed Coordinates (3TM)		Surveyed Elevation (masl)	Drilling Method	Depth Drilled	Installation	In-situ Testing	Investigation Year and Report
	Northing	Eastng						
FB3	5654227	-33399	1214.65	ODEX/Rotary Coring	7.8			2016
FB4	5654314	-33531	1214.23	ODEX/Rotary Coring	7.5			2016
FB5	5654374	-33408	1213.26	ODEX/Rotary Coring	7.7			2016
FB6	5654471	-33472	1212.90	ODEX/Rotary Coring	7.7			2016
FB7	5654569	-33538	1212.40	ODEX/Rotary Coring	15.0			2016
DS-1	5654611	-33587	1210.45	ODEX/Rotary Coring	15.4			2016
DS-2	5654614	-33612	1210.41	ODEX/Rotary Coring	15.4			2016
DS-3	5654631	-33624	1210.44	ODEX/Rotary Coring	15.4			2016
DS-4	5654596	-33645	1210.50	ODEX/Rotary Coring	9.4			2016
DS-5	5654546	-33672	1211.30	ODEX/Rotary Coring	12.3			2016
DS-6	5654668	-33673	1233.30	Auger/Rotary Coring	41.3			2016
DS-6A	5654668	-33673	1233.30	Auger	7.6			2016
DS-7	5654625	-33704	1233.10	Auger/Rotary Coring	16.3			2016
DS-7A	5654625	-33704	1233.10	Auger/Rotary Coring	38.0			2016
DS-8	5654582	-33713	1234.41	Auger/Rotary Coring	39.8			2016
DS-8A	5654582	-33713	1234.41	Auger	6.0			2016
DS-9	5654660	-33603	1210.31	ODEX/Rotary Coring	9.3			2016
DS-10	5654634	-33568	1210.24	ODEX/Rotary Coring	15.4			2016
DB-1	5654469	-33716	1211.68	Auger/Rotary Coring	35.2		Packer Testing	2018
DB-2	5654543	-33667	1211.57	Auger/Rotary Coring	35.2		Packer Testing	2018
DB-3	5654604	-33645	1210.52	Auger/Rotary Coring	35.1		Packer Testing	2018
DC-1	5654706	-33749	1235.80	Auger/Rotary Coring	30.5			2016
DC-2	5654722	-33618	1233.32	Auger	12.2			2016
DC-2A	5654722	-33618	1233.32	Auger	14.0			2016
DC-3	5654804	-33806	1239.76	Auger	16.0			2016
DC-4	5654847	-33657	1238.00	Auger/Rotary Coring	30.8			2016
DC-4A	5654847	-33657	1238.00	Auger	9.0			2016
DC-5	5654920	-33742	1242.05	Auger/Rotary Coring	23.1			2016
DC-6	5654893	-33490	1230.13	Auger/Rotary Coring	26.2	1" Well		2016
DC-7	5655025	-33659	1240.99	Auger/Rotary Coring	27.6			2016
DC-7A	5655025	-33659	1240.99	Auger/Rotary Coring	36.4	1" Well		2016
DC-8	5655037	-33532	1232.37	Auger/Rotary Coring	27.6			2016
DC-9	5655153	-33452	1227.39	Auger/Rotary Coring	23.2			2016
DC-9A	5655153	-33452	1227.39	Auger	11.0	2" Well		2016
DC-10	5655287	-33389	1225.84	Auger/Rotary Coring	21.6			2016
DC-11	5655542	-33424	1224.04	Auger/Rotary Coring	23.2			2016
DC-12	5655745	-33424	1221.97	Auger/Rotary Coring	26.2			2016
DC-13	5655943	-33424	1219.14	Auger/Rotary Coring	20.1			2016
DC-14	5656070	-33313	1215.00	Auger/Rotary Coring	22.0			2016
DC-15	5656141	-33226	1213.43	Auger	11.2	2" Well		2016
DC-15A	5656141	-33226	1213.43	Auger/Rotary Coring	21.5			2016
DC-15B	5656141	-33226	1213.43	Auger	13.7	2" Well		2016
DC-16	5656222	-33112	1213.87	Auger/Rotary Coring	18.5			2016
DC-17	5656288	-33011	1213.39	Auger/Rotary Coring	11.0			2016
DC-18	5656375	-32817	1213.88	Auger/Rotary Coring	12.5			2016
DC-19	5656515	-32522	1217.63	Auger/Rotary Coring	17.0			2016
DC-20	5656631	-32401	1216.26	Auger/Rotary Coring	15.4			2016
DC-21 D	5656748	-32404	1215.77	Auger/Rotary Coring	12.5	2" Well		2016
DC-21 S	5656748	-32404	1215.77	Auger/Rotary Coring	6.1	2" Well		2016
DC-22	5656930	-32263	1211.94	Auger/Rotary Coring	12.5			2016
DC-23	5657060	-32121	1213.89	Auger/Rotary Coring	12.5			2016
DC-24	5657234	-31942	1211.20	Auger/Rotary Coring	11.1			2016
DC-25	5657338	-31844	1205.05	Auger/Rotary Coring	15.5			2016
DC-25 D	5657338	-31844	1205.05	Auger/Rotary Coring	23.2	2" Well		2016
DC-25 S	5657338	-31844	1205.05	Auger	7.6	2" Well		2016
DC-26	5657318	-31720	1203.84	CPT	10.8			2016
DC-27	5657263	-31684	1202.74	Auger/Rotary Coring	23.2	2" Well		2016
DC-28	5657428	-31635	1217.79	Auger/Rotary Coring	15.4			2016
DC-29	5657579	-31512	1213.98	CPT	3.6			2016
DC-30	5657731	-31469	1211.37	Auger/Rotary Coring	12.6			2016
DC-31	5657960	-31448	1207.38	CPT	11.1			2016
DC-32	5657930	-31415	1207.12	Auger/Rotary Coring	23.0			2016
DC-33	5657180	-31654	1199.48	Auger/Rotary Coring	15.6			2016
DC-34	5657113	-31594	1198.48	Auger/Rotary Coring	17.1			2016
D1	5657424	-31438	1209.77	CPT	7.5			2016
D2	5657499	-31218	1206.57	Auger/Rotary Coring	21.5	2" Well		2016
D3*	5657527	-31028	1208	Auger/Rotary Coring	11.2			2016
D5	5657316	-30682	1206.84	Auger	7.3			2016
D5B	5657316	-30682	1206.84	Auger/Rotary Coring	12.4			2016
D6	5657183	-30503	1205.53	Auger/Rotary Coring	10.9			2016
D7	5657101	-30325	1202.13	Auger/Rotary Coring	14.0			2016

Borehole ID	Surveyed Coordinates (3TM)		Surveyed Elevation (masl)	Drilling Method	Depth Drilled	Installation	In-situ Testing	Investigation Year and Report
	Northing	Eastng						
D8	5657051	-30325	1203.18	Auger/Rotary Coring	14.0			2016
D9	5657001	-30358	1202.55	Auger/Rotary Coring	14.1	2" Well		2016
D10	5657000	-30226	1200.68	Auger/Rotary Coring	23.1			2016
D11	5656973	-30119	1199.59	Auger/Rotary Coring	13.9			2016
D12	5656944	-30010	1198.15	Auger/Rotary Coring	27.6	2" Well		2016
D13	5656958	-29898	1195.87	Auger	13.1			2016
D14	5657050	-29792	1193.69	Auger/Rotary Coring	20.2			2016
D16	5656870	-29781	1195.49	Auger/Rotary Coring	36.6			2016
D17	5656973	-29676	1193.07	Auger/Rotary Coring	23.1			2016
D18	5656995	-29568	1192.76	Auger/Rotary Coring	50.2			2016
D19	5656742	-29470	1190.62	Auger/Rotary Coring	29.3	2" Well		2016
D20	5657144	-29997	1195.85	Auger/Rotary Coring	50.1			2016
D26	5657133	-29442	1192.03	CPT	18.8			2016
D27	5656909	-29330	1190.71	Auger/Rotary Coring	35.4	2" Well		2016
D28	5657045	-29452	1190.44	Auger/Rotary Coring	50.6			2016
D29	5657082	-29334	1191.02	Sonic/Rotary Coring	42.7		Packer Testing	2016
D30	5657199	-29301	1192.01	Auger/Rotary Coring	44.5			2016
D31	5657045	-29211	1191.00	CPT	20.8			2016
D32	5656996	-29113	1190.66	Auger/Rotary Coring	35.4			2016
D34	5657183	-29165	1190.89	CPT	14.7			2016
D35	5657228	-29082	1190.61	Auger/Rotary Coring	44.2		Packer Testing	2016
D36 D	5657309	-29020	1190.50	Auger/Rotary Coring	45.6	2" Well		2016
D36 S	5657309	-29020	1190.50	Auger	14.6	2" Well		2016
D37	5657115	-28953	1190.70	Sonic/Rotary Coring	35.4			2016
D38	5657380	-29073	1190.84	Sonic/Rotary Coring	45.7		Packer Testing	2016
D39	5657254	-28945	1191.43	CPT	13.1			2016
D40	5657387	-28945	1191.05	CPT	15.8			2016
D41	5657472	-28877	1186.35	Auger/Rotary Coring	50.5			2016
D41	5657472	-28879	1186.58	CPT	5.4			2016
D42	5657273	-28768	1191.96	Auger/Rotary Coring	35.2			2016
D43	5657489	-28705	1186.53	Sonic/Rotary Coring	55.3			2016
D44	5657513	-28743	1188.62	CPT	8.0			2016
D45	5657536	-28839	1185.12	Auger/Rotary Coring	45.7	2" Well		2016
D46	5657593	-28938	1187.18	Auger/Rotary Coring	39.6			2016
D47	5657562	-28923	1187.42	CPT	6.3			2016
D48	5657602	-28714	1191.25	Auger/Rotary Coring	46.0			2016
D49	5657660	-28776	1187.29	CPT	6.8			2016
D50	5657694	-28896	1189.77	Auger/Rotary Coring	49.1			2016
D50	5657688	-28892	1188.61	CPT	11.8			2016
D51	5657740	-28762	1194.40	Auger/Rotary Coring	30.8	2" Well	Packer Testing	2016
D52	5657829	-28684	1204.25	Auger/Rotary Coring	49.1			2016
D57	5657316	-29385	1191.58	CPT	15.6			2016
D58	5657461	-29145	1190.20	Auger/Rotary Coring	40.0			2016
D58	5657461	-29145	1190.20	CPT	16.6			2016
D59	5657206	-29444	1190.78	Auger/Rotary Coring	40.0			2016
D60	5657257	-29224	1191.68	Auger/Rotary Coring	45.1		Packer Testing	2016
D60	5657257	-29224	1191.68	CPT	17.3			2016
D61	5657330	-29131	1190.36	CPT	17.8			2016
D62	5657438	-28988	1190.67	Auger/Rotary Coring	45.7	2" Well		2016
D63	5657181	-29218	1191.66	CPT	18.6			2016
D64	5657689	-28698	1193.60	CPT	10.1			2016
D68	5657384	-29238	1191.37	Auger/Rotary Coring	44.5			2016
GL1	5657279	-29453	1191.94	Auger	17.2	VWP*		2018
GL2	5657124	-29451	1191.85	Auger	12.0			2018
GL3	5657126	-29192	1191.02	Auger	18.1	VWP*		2018
GL4	5657267	-29158	1190.51	Auger	5.1			2018
LLO01	5657550	-29080	1192.15	Auger/Rotary Coring/CPT	24.5	1" Well		2018
LLO03	5657494	-29030	1190.36	Auger/CPT	17.3			2018
LLO05	5657323	-28868	1192.89	Auger/CPT	18.3			2018
LLO06	5657364	-28736	1192.61	Auger/Rotary Coring	18.3			2018
LLO07	5657507	-28958	1185.92	Auger	12.7			2018
LLO08	5657439	-28912	1188.47	Auger	15.3			2018
LLO09	5657810	-28989	1193.06	Auger	18.2			2018
LLO10	5657791	-28888	1193.21	Auger/Rotary Coring/CPT	23.3			2018
LLO12	5657767	-28806	1193.36	Auger/CPT	16.8			2018
LLO15	5657669	-28734	1190.63	Auger/CPT	14.1			2018
LLO16	5657672	-28737	1192.25	Auger	16.8	1" Well		2018
LLO17	5657384	-28996	1191.16	Auger	14.3	VWP*		2018
LLO18	5657414	-29022	1191.66	Auger	14.1			2018
BS1	5658021	-28966	1198.92	Auger	15.4			2016
BS2	5658229	-29022	1204.09	Auger	10.7			2016

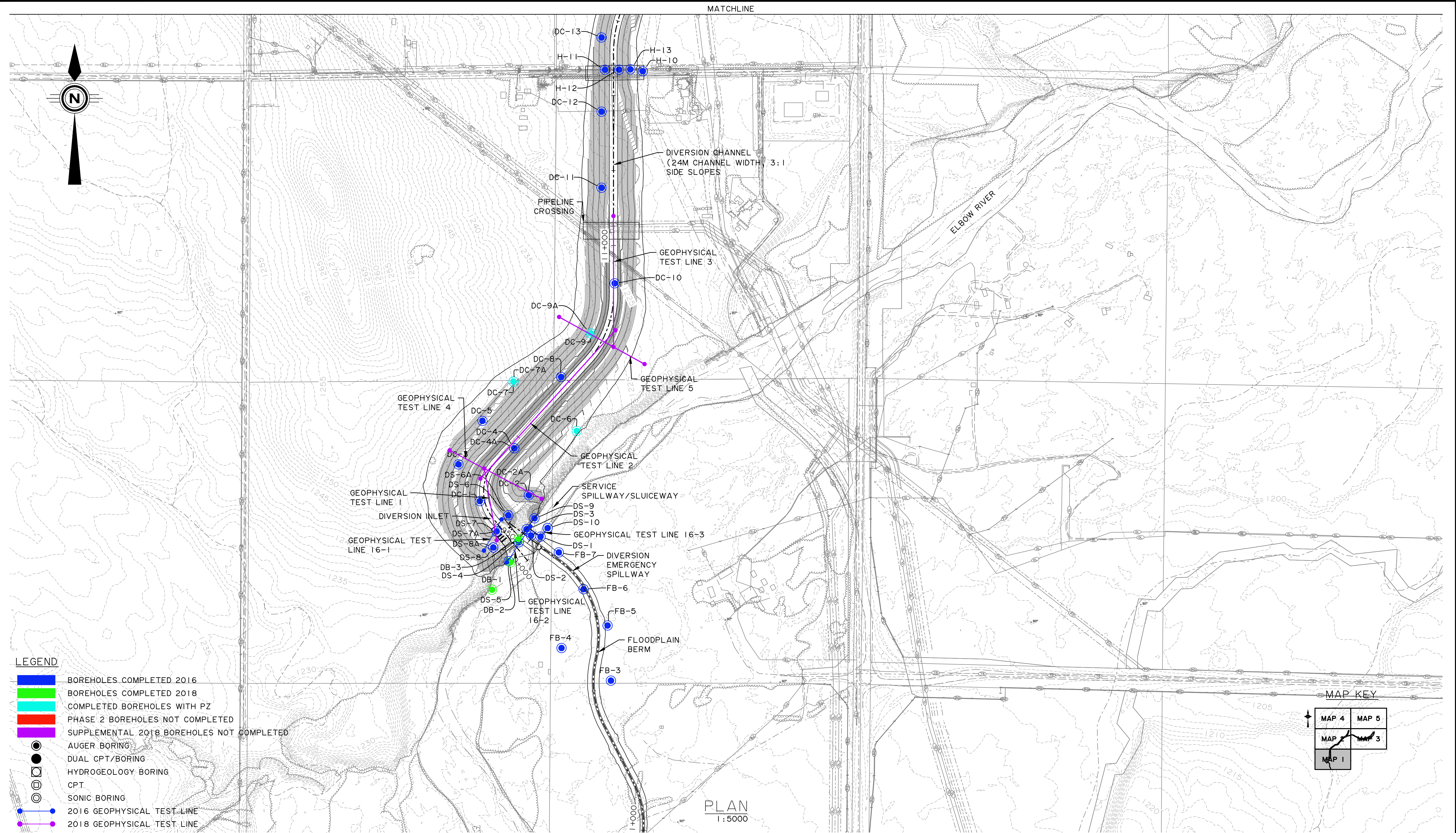
Borehole ID	Surveyed Coordinates (3TM)		Surveyed Elevation (masl)	Drilling Method	Depth Drilled	Installation	In-situ Testing	Investigation Year and Report
	Northing	Easting						
BS3	5658231	-29274	1197.45	Auger	9.3	2" Well		2016
BS4	5658398	-29457	1199.44	Auger	12.2			2016
BS5	5657579	-29358	1190.45	Auger/Rotary Coring	18.6			2016
GW1	5659966	-33327	1211.70	Auger/Rotary Coring	16.8	2" Well		2016
GW2	5659717	-31933	1206.03	Auger	13.7	2" Well		2016
GW3	5659072	-31903	1201.06	Auger	7.6	2" Well		2016
GW4	5658718	-32259	1204.25	Auger/Rotary Coring	22.9	2" Well		2016
GW5	5658166	-31864	1210.56	Auger/Rotary Coring	22.9	2" Well		2016
GW6 D	5658208	-31083	1196.50	Auger/Rotary Coring	22.9	2" Well		2016
GW6 S	5658208	-31083	1196.50	Auger	10.7	2" Well		2016
GW7	5658895	-31095	1199.10	Auger	9.1	2" Well		2016
GW8 D	5659624	-30875	1216.74	Auger/Rotary Coring	20.4	2" Well		2016
GW8 S	5659624	-30875	1216.74	Auger	7.9	2" Well		2016
GW9	5659077	-30236	1204.47	Auger	6.1	2" Well		2016
GW10	5658475	-30462	1195.26	Auger	18.3	2" Well		2016
GW11*	5657743	-30270	1222	Auger	15.2	2" Well		2016
GW12	5657859	-29160	1189.92	Auger	12.2	2" Well		2016
GW13	5659064	-29610	1222.34	ODEX	36.6	2" Well		2016
GW14	5659032	-28585	1203.61	ODEX	33.5	2" Well		2016
GW15	5658219	-27816	1189.67	Auger/Rotary Coring	35.1	2" Well		2016
H1	5656427	-32713	1214.11	Auger	30.0			2016
H2	5656458	-32713	1214.91	Auger	30.1			2016
H3	5656489	-32714	1215.55	Auger	30.5			2016
H4	5656520	-32714	1215.90	Auger	30.0			2016
H5	5658967	-32699	1206.49	Auger	15.2			2016
H6	5659178	-32703	1204.50	Auger	18.3	2" Well		2016
H7	5659357	-32699	1202.02	Auger	16.8			2016
H8	5659585	-32702	1205.31	Auger	18.3			2016
H9	5659766	-32702	1207.64	Auger	18.9	2" Well		2016
H10	5655853	-33314	1217.42	Auger/Rotary Coring	30.2			2016
H11	5655857	-33415	1219.53	Auger	21.4			2016
H12	5655857	-33377	1217.63	Auger/Rotary Coring	34.7			2016
H13	5655858	-33347	1217.08	Auger/Rotary Coring	34.8			2016
TP-2	5657158	-29452	1191.96	Excavator	4.1			2018
TP-5	5657262	-29173	1190.89	Excavator	5.2			2018
TP-7	5657525	-28962	1186.05	Excavator	4.7			2018
TP-8	5657500	-28847	1184.62	Excavator	4.0			2018
TP-9	5657424	-28810	1184.16	Excavator	4.5			2018
TP-11	5657645	-28783	1186.80	Excavator	5.6			2018
TP-12	5657761	-28803	1193.33	Excavator	5.8			2018
TP-13	5657311	-28886	1192.75	Excavator	4.5			2018
TP-16	5657944	-28867	1198.66	Excavator	4.0			2018
TT2a*	5657503	-28894	1186.68	Excavator	5.2			2018
TT2b*	5657449	-28926	1190.92	Excavator	3.2			2018
TT2c*	5657481	-28896	1189.08	Excavator	5.3			2018
TT3a	5657592	-28845	1187.90	Excavator	5.1			2018
TT3b	5657544	-28875	1185.21	Excavator	4.5			2018

*As-built not taken, drilled at approximate location based on hand-held GPS

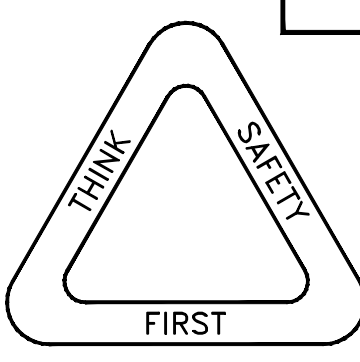
* Vibrating Wire Piezometer Installation

**APPENDIX C:
BOREHOLE LAYOUT PLAN**

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- LEGEND**
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 - BOREHOLES COMPLETED 2018
 - COMPLETED BOREHOLES WITH PZ
 - PHASE 2 BOREHOLES NOT COMPLETED
 - SUPPLEMENTAL 2018 BOREHOLES NOT COMPLETED
 - AUGER BORING
 - DUAL CPT/BORING
 - HYDROGEOLOGY BORING
 - CPT
 - SONIC BORING
 - 2016 GEOPHYSICAL TEST LINE
 - 2018 GEOPHYSICAL TEST LINE



THIS DRAWING MAY HAVE BEEN REDUCED.
 ALL SCALE NOTATIONS INDICATED (i.e. 1:1000 etc) ARE
 BASED ON 22" X 34" FORMAT DRAWINGS

Stantec
 Project No.: 110773396
 200 - 325 25th Street SE
 Calgary AB Canada T2A 7H8
 Tel. 403.716.8000
 www.stantec.com

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 2017 MARCH 31
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DESIGNER	CHECKER
DATE	DATE



SPRINGBANK OFF-STREAM STORAGE PROJECT SR1		
GEOTECHNICAL EXPLORATION BOREHOLE, TEST PIT, TEST TRENCH, AND GEOPHYSICAL LAYOUT (1 OF 5)		
SHEET	CONSULTANT DRAWING	TRANSPORTATION DRAWING
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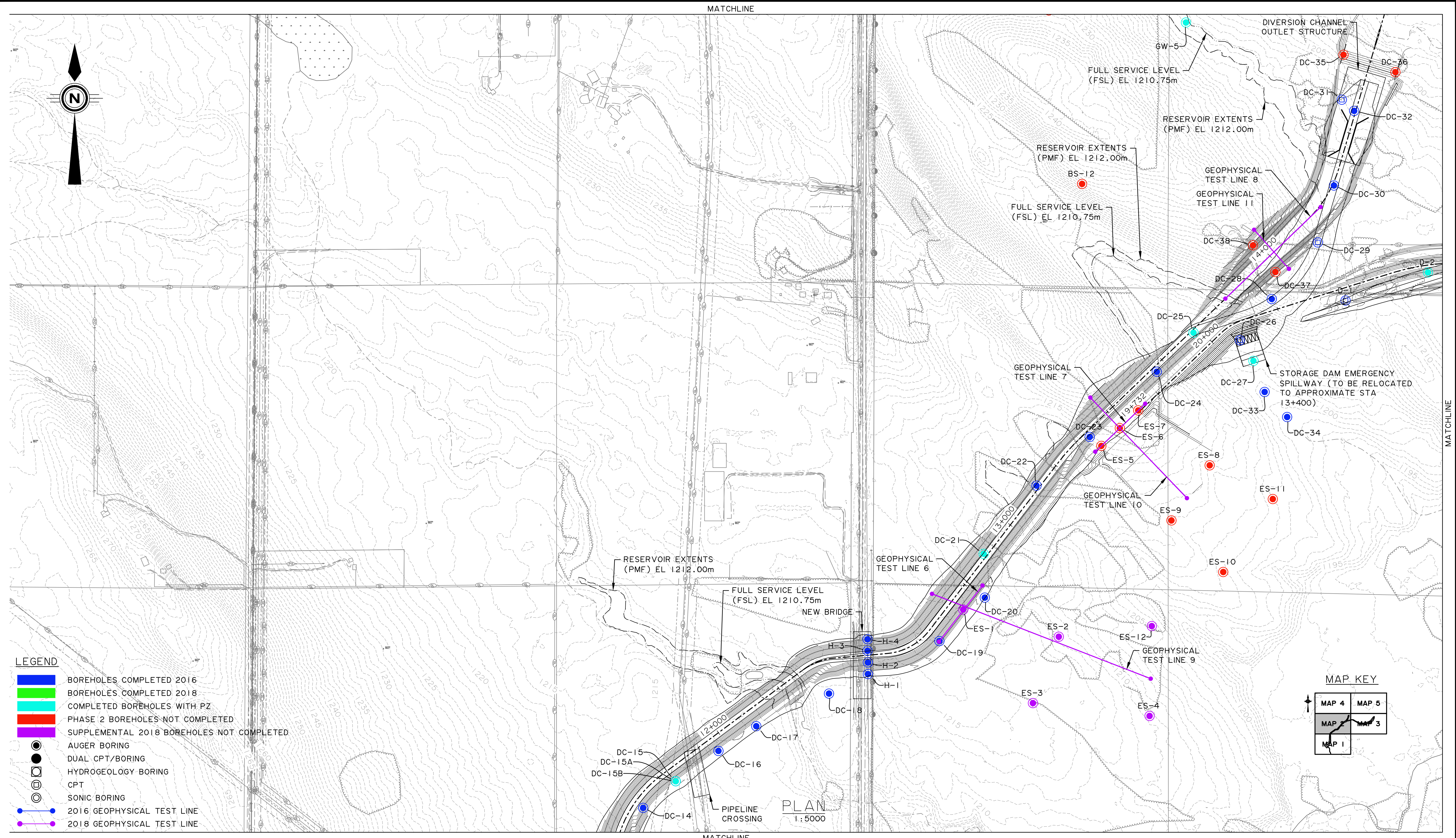
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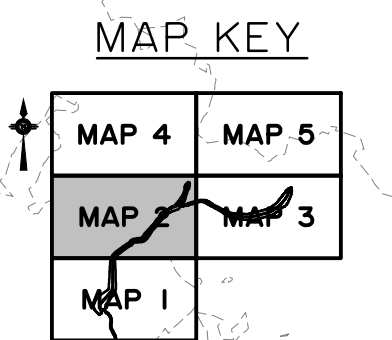
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DATE

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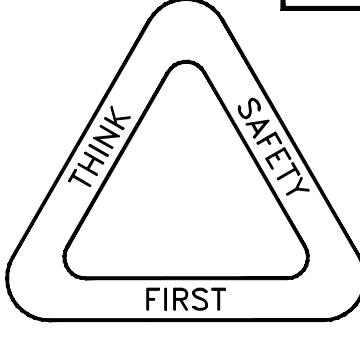


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 - SONIC BORING
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PLAN
1:5000

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REV	DATE	REVISIONS	BY

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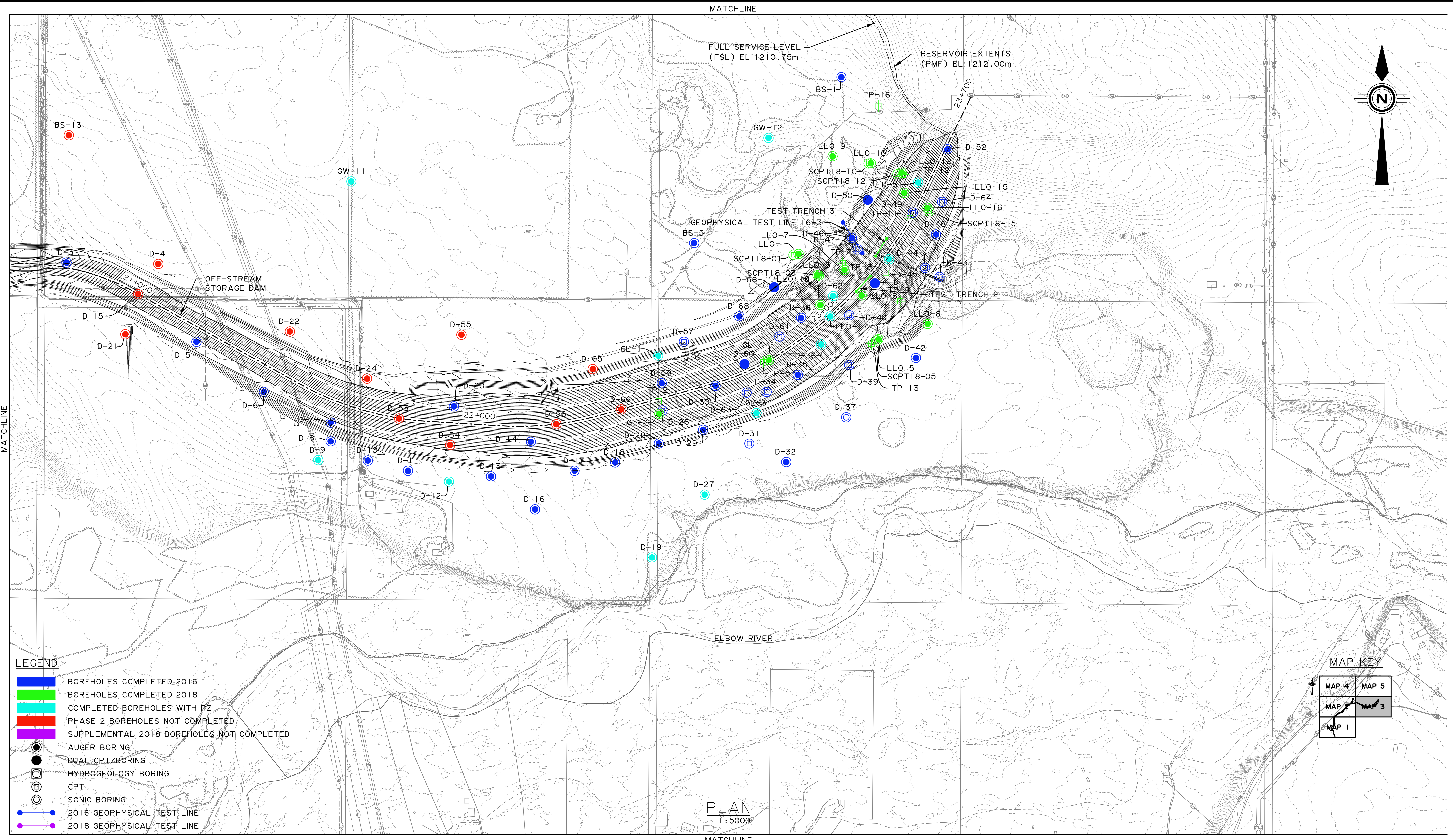
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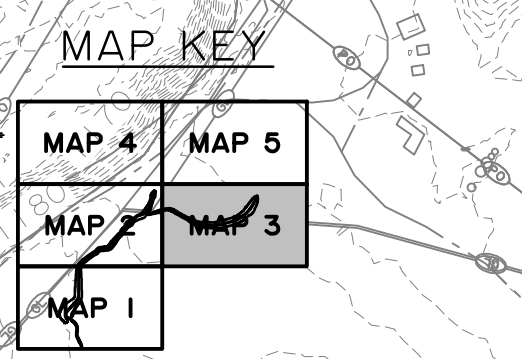
SPRINGBANK OFF-STREAM STORAGE PROJECT SR1		
GEOTECHNICAL EXPLORATION BOREHOLE, TEST PIT, TEST TRENCH, AND GEOPHYSICAL LAYOUT (2 OF 5)		
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DEPARTMENT BAR CODE

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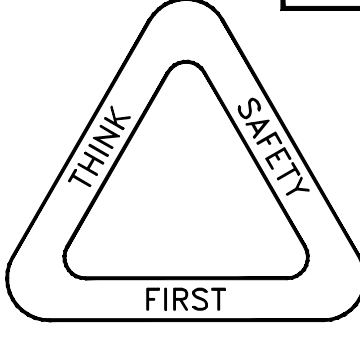


- LEGEND**
- BOREHOLES COMPLETED 2016
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 - SONIC BORING
 - 2016 GEOPHYSICAL TEST LINE
 - 2018 GEOPHYSICAL TEST LINE



PLAN
1:5000

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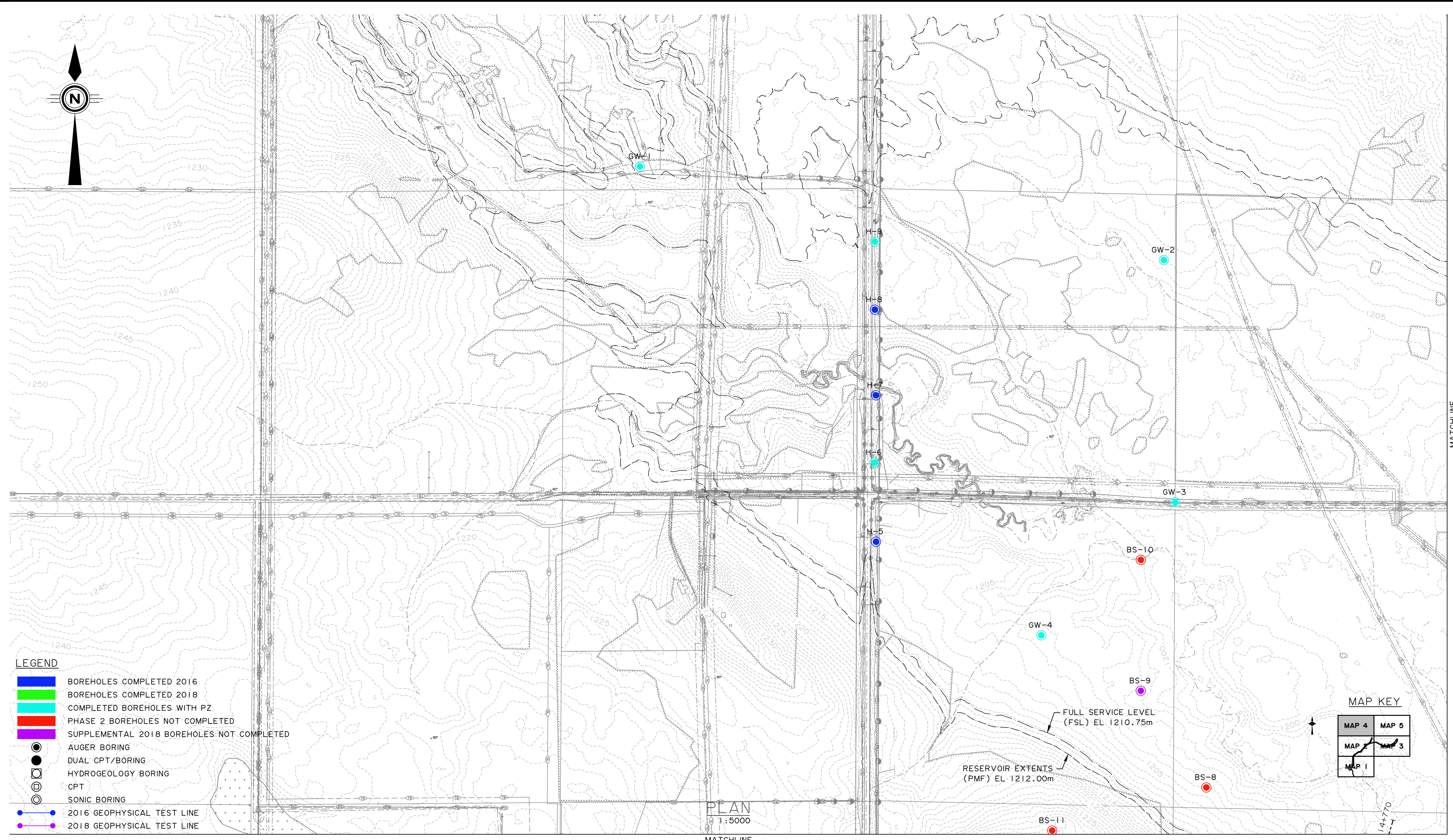
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DATE	DATE
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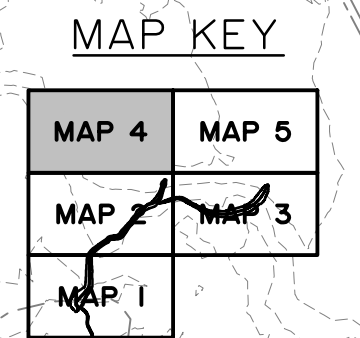
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Transportation

SPRINGBANK OFF-STREAM STORAGE PROJECT SR1		
GEOTECHNICAL EXPLORATION BOREHOLE, TEST PIT, TEST TRENCH, AND GEOPHYSICAL LAYOUT (3 OF 5)		
SHEET 1	CONSULTANT DRAWING 73396S-370	TRANSPORTATION DRAWING ?????-P

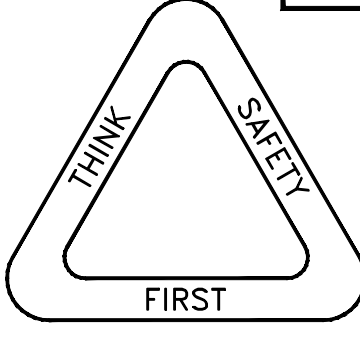
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- LEGEND**
- BOREHOLES COMPLETED 2016
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 - CPT
 - SONIC BORING
 - 2016 GEOPHYSICAL TEST LINE
 - 2018 GEOPHYSICAL TEST LINE



THIS DRAWING MAY HAVE BEEN REDUCED.
 ALL SCALE NOTATIONS INDICATED (i.e. 1:1000 etc) ARE
 BASED ON 22" X 34" FORMAT DRAWINGS



Stantec
 Project No.: 110773396
 200 - 325 25th Street SE
 Calgary AB Canada T2A 7H8
 Tel. 403.716.8000
 www.stantec.com

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△	2016-01-26	ISSUED FOR	SS	DATE	ALBERTA ENVIRONMENT AND PARKS CAPITAL PROJECTS NUMBER
△		REVISIONS	BY	2016-01-26	

DRAFT
 PRELIMINARY DESIGN
 2017 MARCH 31
NOT FOR CONSTRUCTION

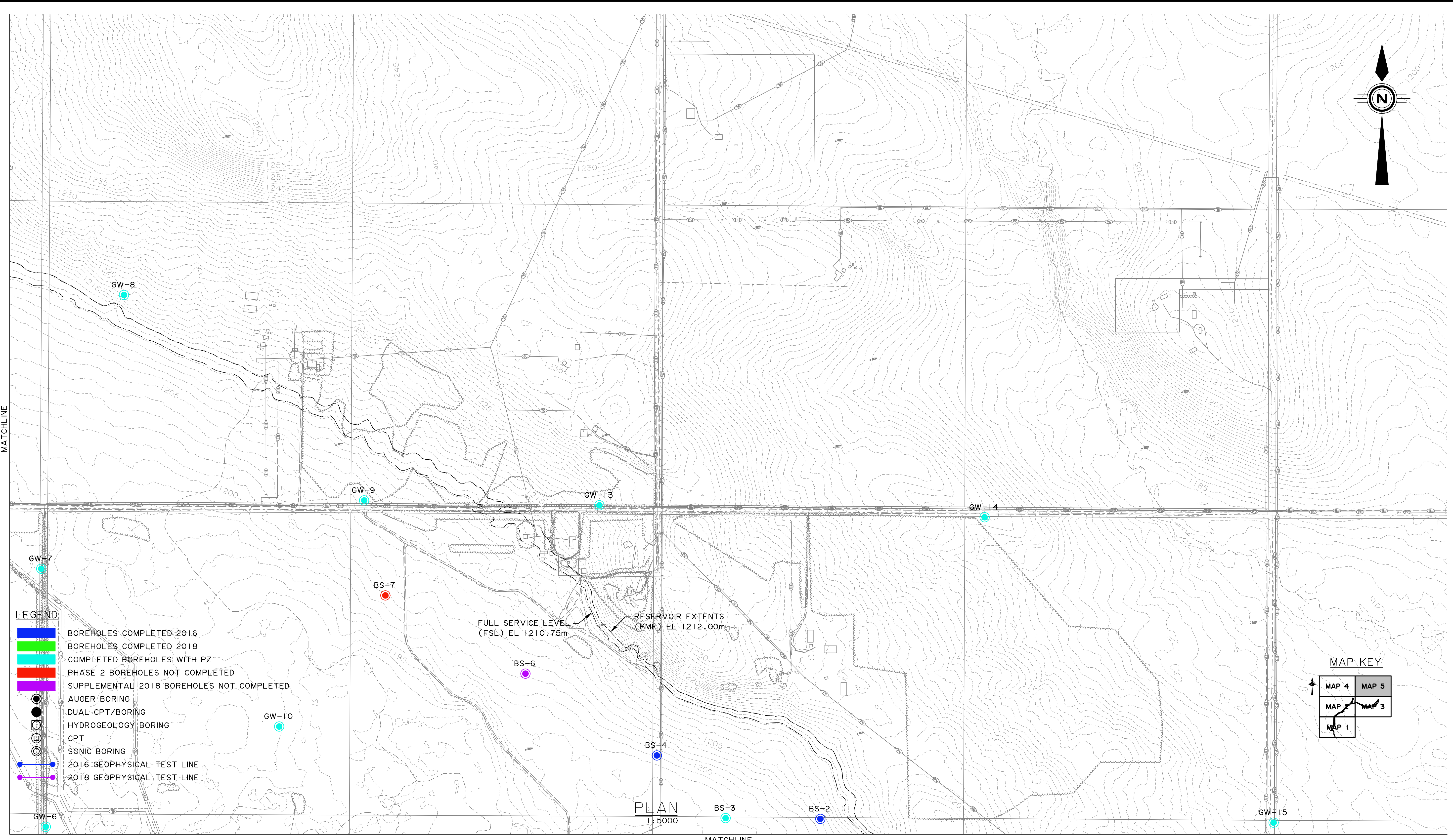
DESIGNER	CHECKER
DATE	DATE



SPRINGBANK OFF-STREAM STORAGE PROJECT SR1		
GEOTECHNICAL EXPLORATION BOREHOLE, TEST PIT, TEST TRENCH, AND GEOPHYSICAL LAYOUT (4 OF 5)		
SHEET 1	CONSULTANT DRAWING 73396S-370	TRANSPORTATION DRAWING ?????-P

DEPARTMENT BAR CODE

PlotDate: 2018.12.13 8:49 AM
 Login: Johnson, Tracy
 AUTOCAD FILE No. U:\110773396\CAD\water\b_boring_layout_bw.dwg TENDER No. ?

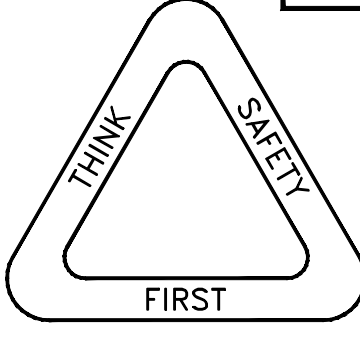


LEGEND

	BOREHOLES COMPLETED 2016
	BOREHOLES COMPLETED 2018
	COMPLETED BOREHOLES WITH PZ
	PHASE 2 BOREHOLES NOT COMPLETED
	SUPPLEMENTAL 2018 BOREHOLES NOT COMPLETED
	AUGER BORING
	DUAL CPT/BORING
	HYDROGEOLOGY BORING
	CPT
	SONIC BORING
	2016 GEOPHYSICAL TEST LINE
	2018 GEOPHYSICAL TEST LINE

PLAN
 1: 5000

THIS DRAWING MAY HAVE BEEN REDUCED.
 ALL SCALE NOTATIONS INDICATED (i.e. 1:1000 etc) ARE
 BASED ON 22" X 34" FORMAT DRAWINGS



 Project No.: 110773396 200 - 325 25th Street SE Calgary AB Canada T2A 7H8 Tel. 403.716.8000 www.stantec.com	2016-01-26 ISSUED FOR SS	DRAFT PRELIMINARY DESIGN 2017 MARCH 31 NOT FOR CONSTRUCTION	DESIGNER CHECKER DATE DATE		SPRINGBANK OFF-STREAM STORAGE PROJECT SR1	
	REV DATE REVISIONS BY 2016-01-26 ISSUED FOR SS	DATE 2016-01-26	ALBERTA ENVIRONMENT AND PARKS CAPITAL PROJECTS NUMBER -	SITE -	SHEET 1	CONSULTANT DRAWING 73396S-370

APPENDIX D: BOREHOLE LOGS

APPENDIX D.1: DEBRIS BARRIER (DB)

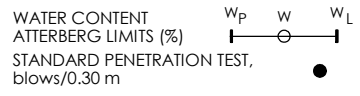


BOREHOLE RECORD

DB1

CLIENT Alberta Transportation NORTHING 5654469 PROJECT NO. 110773396
 PROJECT Springbank, Alberta EASTING -33716 BH SIZE SS (150 mm)
 DATES BORING 2018/04/21 to 2018/04/24 WATER LEVEL 4/24/2018 (0.9 m) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				ADVANCED LAB TESTS	GRAIN SIZE ANALYSIS				UNDRAINED SHEAR STRENGTH (kPa)					
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	40	80	120	160		
														20	40	60	80		
0	1211.68	Brown poorly graded GRAVEL (GP) - some clay, some sand, frequent cobbles																	
2.4	1209.28	Bedrock encountered at 2.4 m - coring commenced at 3.3 m (see rock coring log for details) - borehole advanced with solid stem augers to 2.4 m, casing installation to 3.1 m																	
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			



(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.
 (3) Grainsize results showing only percent SILT represent percent FINES (passing No. 200 sieve)

■ Undrained Shear Strength - Field (kPa)
 ▲ Undrained Shear Strength - Laboratory (kPa)

App'd by:



BOREHOLE RECORD

DB1

CLIENT Alberta Transportation NORTHING: 5655683.8 PROJECT No. 110773396
 PROJECT SRI Off-Stream Storage Reservoir EASTING: 676670.1 BH SIZE 96.3 mm (HQ3)
 DRILLING DATE 4/24/2018 to 4/24/2018 WATER LEVEL 0.9 m (4/24/2018) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLE TYPE	RUN NO.	FX-FRACTURE CL-CLEAVAGE SH-SHEAR VN-VEIN		F-FAULT JN-JOINT P-POLISHED S-SLICKENSIDED			SM-SMOOTH R-ROUGH ST-STEPPED PL-PLANAR		FL-FLEXURED UE-UNEVEN W-WAVY C-CURVED		BC-BROKEN CORE CONT-CONTACT B-BEDDING FOL-FOLIATION		LABORATORY TESTING											
							RECOVERY		R.Q.D. %	FRACT. INDEX PER 1m	ROCK STRENGTH INDEX		WEATHERING INDEX																
							TOTAL CORE %	SOLID CORE %			R1	R2	R3	R4	W1	W2	W3		W4	W5	W6								
0		Refer to soil log for overburden description					20	40	60	80	20	40	60	80	5	10	15	20	R1	R2	R3	R4	W1	W2	W3	W4	W5	W6	
2.4	209.3	Inferred SEDIMENTARY BEDROCK - lost core from 2.4 m to 3.1 m during casing installation																											
2.8	208.4	Fair quality brown MUDSTONE interbedded with SILTSTONE - 20 mm to 570 mm thick beds - fresh, extremely to very weak, sandy, silty, high plastic, horizontal fractures			HQ 1		100	79	74																				
4.2		- 20 mm thick fault with siltstone fragments at 4.2 m																											
4.6		- fractured siltstone with calcite on joints below 4.6 m																											

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.

App'd by:



BOREHOLE RECORD

DB1

CLIENT Alberta Transportation NORTHING: 5655683.8 PROJECT No. 110773396
 PROJECT SRI Off-Stream Storage Reservoir EASTING: 676670.1 BH SIZE 96.3 mm (HQ3)
 DRILLING DATE 4/24/2018 to 4/24/2018 WATER LEVEL 0.9 m (4/24/2018) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLE TYPE RUN NO.	RECOVERY		R.Q.D. %	FRACT. INDEX PER 1m	ROCK STRENGTH INDEX				WEATHERING INDEX				LABORATORY TESTING	
						TOTAL CORE %	SOLID CORE %			R1	R2	R3	R4	W1	W2	W3	W4		W5
						20	40	60	80	20	40	60	80	5	10	15	20		
5		Continued: Fair quality brown MUDSTONE interbedded with SILTSTONE - 40 mm thick fragmented siltstone layer at 5.0 m			HQ 2	100	82	57		R0.5				W1					
6		- 50 mm thick fragmented grey siltstone seam at 5.7 m - 570 mm thick grey siltstone layer with orthogonal fractures at 5.7 m - 50 mm thick horizontal fault zone at 5.8 m - 270 mm thick siltstone layer with calcite solutioned in tight joints at 6.2 m - poor quality from 6.3 m to 7.8 m			HQ 3	100	84	34		R0.5				W1					
7		- inclined fracture at 6.9 m and 7.3 m - 80 mm thick fractured siltstone at 7.0 m			HQ 4	100	80	54		R0				W1					
8		- carbonaceous from 7.5 m to 8.1 m - highly fractured with sandy infill below 7.7 m - 250 mm thick carbonaceous clay shale at 7.8 m - slickensides with calcite coating on contact at 7.8 m - near vertical fault with sandy infill 140 mm long at 7.9 m - 30 mm thick horizontal fault at 8.4 m - 20 mm inclined fault with sandstone fragments at 8.6 m - inclined contact, carbonaceous below 8.7 m - 100 mm thick dark grey siltstone with coal at 8.9 m			HQ 5	100	6	0		R0.5				W1					
9		- 100 mm thick fault with coal and calcite at 9.2 m																	
10		Very poor quality carbonaceous CLAY SHALE - fresh, extremely to very weak, extremely close joint spacing, inferred coal laminations throughout																	

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.

App'd by:



BOREHOLE RECORD

DB1

CLIENT Alberta Transportation NORTHING: 5655683.8 PROJECT No. 110773396
 PROJECT SRI Off-Stream Storage Reservoir EASTING: 676670.1 BH SIZE 96.3 mm (HQ3)
 DRILLING DATE 4/24/2018 to 4/24/2018 WATER LEVEL 0.9 m (4/24/2018) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLE TYPE RUN NO.	RECOVERY		R.Q.D. %	FRACT. INDEX PER 1m	ROCK STRENGTH INDEX				WEATHERING INDEX				LABORATORY TESTING	
						TOTAL CORE %	SOLID CORE %			R1	R2	R3	R4	W1	W2	W3	W4		W5
						20	40	60	80	20	40	60	80	5	10	15	20		
-10		Continued: Very poor quality carbonaceous CLAY SHALE																	
	201.3	Poor to excellent quality brown to brownish grey SILTSTONE - fresh, very weak, with calcite inclusions, up to 10 mm thick inclined coal laminations throughout			HQ 5			100	100	100			R1		W1				
-11		- vertical coal seam at 11.3 m																	
					HQ 6			100	63	40			R1		W1				
-12		- inclined very thin siltstone interbedded with laminated coal from 12.0 m to 12.6 m																	
		- inclined, polished fracture with slickensides at 12.6 m																	
-13		- 130 mm thick fault with sandy infill at 12.9 m																	
	198.3	Very poor quality grey CLAY SHALE - fresh, very weak, very close joint spacing, horizontal and inclined - stepped fracture at 13.5 m - undulating fracture at 13.6 m			HQ 7			100	82	66			R1		W1				
-14																			
					HQ 8			48	40	0			R1		W1				
-15		- very close to close spaced horizontal fault zones up to 30 mm thick from 14.3 m to 15.2 m, inclined below 14.9 m																	
	197.3	Poor quality dark brown SILTSTONE - fresh, very weak - calcite and polished fracture at 14.3 m			HQ 8			100	79	36			R1		W1				

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.

App'd by:



BOREHOLE RECORD

DB1

CLIENT Alberta Transportation NORTHING: 5655683.8 PROJECT No. 110773396
 PROJECT SRI Off-Stream Storage Reservoir EASTING: 676670.1 BH SIZE 96.3 mm (HQ3)
 DRILLING DATE 4/24/2018 to 4/24/2018 WATER LEVEL 0.9 m (4/24/2018) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLE TYPE RUN NO.	FX-FRACTURE CL-CLEAVAGE SH-SHEAR VN-VEIN		F-FAULT JN-JOINT F-POLISHED S-SLICKENSIDED			SM-SMOOTH R-ROUGH ST-STEPPED PL-PLANAR				FL-FLEXURED UE-UNEVEN W-WAVY C-CURVED			BC-BROKEN CORE CONT-CONTACT B-BEDDING FOL-FOLIATION										
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 1m	ROCK STRENGTH INDEX	WEATHERING INDEX	LABORATORY TESTING																
						TOTAL CORE %	SOLID CORE %					R1	R2	R3	R4	W1	W2	W3	W4	W5	W6							
-15	196.3	Continued: Poor quality dark brown SILTSTONE - 10 mm thick inclined coal seam at 14.3 m - 200 mm thick inclined soft light brown clay at 14.7 m				20	40	60	80	20	40	60	80	5	10	15	20	R1	R2	R3	R4	W1	W2	W3	W4	W5	W6	
-16		Excellent quality dark grey CLAY SHALE - fresh, very weak, very close to moderate joint spacing laminated with inclined light grey sandstone, tight inclined to vertical calcite solutioned in joints - stepped fracture at 16.0 m			HQ 9	100	100	100										R1				W1						
-17		- good quality with inclined siltstone concretions, silty, sandy below 17.0 m - WATER RETURNING AT SURFACE UPON ADVANCEMENT TO 17.0 m - calcite on joint at 17.2 m			HQ10	97	97	89										R1.5				W1						
-18	193.2	Excellent quality brownish grey SILTSTONE - fresh, very weak, sandy, low angle fractures, very close to moderate joint spacing, laminated with light grey fine grained sandstone - 400 mm thick grey sandstone layer, weak to medium strong, well cemented, with inclined thin coal laminations at 19.7 m			HQ11	100	100	92										R2				W1						

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.

App'd by:



BOREHOLE RECORD

DB1

CLIENT Alberta Transportation NORTHING: 5655683.8 PROJECT No. 110773396
 PROJECT SRI Off-Stream Storage Reservoir EASTING: 676670.1 BH SIZE 96.3 mm (HQ3)
 DRILLING DATE 4/24/2018 to 4/24/2018 WATER LEVEL 0.9 m (4/24/2018) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLE TYPE RUN NO.	FX-FRACTURE		F-FAULT			SM-SMOOTH			FL-FLEXURED			BC-BROKEN CORE		
						CL-CLEAVAGE		JN-JOINT			R-ROUGH			UE-UNEVEN			CONT-CONTACT		
						SH-SHEAR	VN-VEIN	P-POLISHED	S-SLICKENSIDED	ST-STEPPED	FL-PLANAR	W-WAVY	C-CURVED	B-BEDDING	FOL-FOLIATION				
RECOVERY		R.Q.D. %	FRACT. INDEX PER 1m	ROCK STRENGTH INDEX			WEATHERING INDEX			LABORATORY TESTING									
TOTAL CORE %	SOLID CORE %			R1	R2	R3	R4	W1	W2		W3	W4	W5	W6					
20		Continued: Good quality dark grey SILTSTONE - inclined tight calcite solutioned joints, extremely close spacing below 20.1 m - inclined slickensides at 20.4 m			HQ12	100	100	79			3		W1						
21		- inclined irregular fracture at 21.0 m - inclined transition to light grey sandstone below 21.1 m																	
190.2		Fair quality dark grey CLAY SHALE - fresh, very weak to weak with inclined sandstone laminations, low angle joints, close joint spacing			HQ13	98	81	68			R1.5		W1						
22		- undulating joint at 22.1 m - silty to 22.5 m - 30 mm thick horizontal fault at 22.5 m																	
23		- 30 mm thick inclined bentonitic seam at 22.9 m - moderately weathered, extremely weak from 22.9 m to 23.0 m - high angle to verticle fractures from 23.0 m to 23.4 m - good quality below 23.0 m - inclined irregular fracture at 23.2 m			HQ14	100	89	81			R1		W1						
24	187.6	- inclined fault zone at 23.8 m - inclined coal fragments and fault zone at 23.9 m																	
25		Good to excellent quality brown SILTSTONE - fresh, very weak, horizontal close to moderate joint spacing with moderately spaced coal laminations - grey, weak to medium strong, sandy below 24.6 m																	

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.

App'd by:



BOREHOLE RECORD

DB1

CLIENT Alberta Transportation NORTHING: 5655683.8 PROJECT No. 110773396
 PROJECT SRI Off-Stream Storage Reservoir EASTING: 676670.1 BH SIZE 96.3 mm (HQ3)
 DRILLING DATE 4/24/2018 to 4/24/2018 WATER LEVEL 0.9 m (4/24/2018) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLE TYPE RUN NO.	RECOVERY		R.Q.D. %	FRACT. INDEX PER 1m	ROCK STRENGTH INDEX				WEATHERING INDEX				LABORATORY TESTING		
						TOTAL CORE %	SOLID CORE %			R1	R2	R3	R4	W1	W2	W3	W4		W5	W6
-25		Continued: Excellent quality grey SILTSTONE - fresh, weak to medium strong - light brown siltstone concretions up to 30 mm to 25.1 m - inclined irregular fractures with slickensides at 25.6 m			HQ15	100	100	100		2.5					W1					
-26		- tight inclined fracture with horizontal slickensides and coal at 26.0 m - moderate to wide joint spacing below 26.1 m - inclined fracture with high plastic clay infill and subrounded nodules at 26.1 m - slickensides at 26.2 m - inclined, rough, planar joint at 26.6 m			HQ16	99	99	91		2.5					W1					
-27																				
-28					HQ17	100	98	98		R1.5					W1					
-29	183.1	Good to excellent quality brown MUDSTONE - fresh, very weak, close to moderate joint spacing, low angle, tight horizontal fractures - conchoidal fracture with slickensides at 28.9 m - inclined coal stringers below 29.1 m, calcite on inclined joint at 29.1 m - siltstone concretions from 29.5 m to 29.9 m - inclined planar joint at 29.9 m			HQ17	100	100	100		R1.5					W1					
-30					HQ18	99	97	89		R1.5					W1					

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.

App'd by:



BOREHOLE RECORD

DB1

CLIENT Alberta Transportation NORTHING: 5655683.8 PROJECT No. 110773396
 PROJECT SRI Off-Stream Storage Reservoir EASTING: 676670.1 BH SIZE 96.3 mm (HQ3)
 DRILLING DATE 4/24/2018 to 4/24/2018 WATER LEVEL 0.9 m (4/24/2018) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLE TYPE RUN NO.	FX-FRACTURE CL-CLEAVAGE SH-SHEAR VN-VEIN		F-FAULT JN-JOINT P-POLISHED S-SLICKENSIDED			SM-SMOOTH R-ROUGH ST-STEPPED PL-PLANAR				FL-FLEXURED UE-UNEVEN W-WAVY C-CURVED			BC-BROKEN CORE CONT-CONTACT B-BEDDING FOL-FOLIATION			LABORATORY TESTING
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 1m	ROCK STRENGTH INDEX				WEATHERING INDEX							
						TOTAL CORE %	SOLID CORE %			R1	R2	R3	R4	W1	W2	W3	W4	W5	W6		
30		Continued: Good to excellent quality brown MUDSTONE - high coal content below 30.3 m - 300 mm long 10 mm thick coal seam at 30.3 m - laminated with coal below 30.3 m																			
31	181.0	Good quality grey SILTSTONE - fresh, weak to medium strong, sandy, very close to moderate joint spacing - inclined planar joints at 31.0 m, 31.2 m, and 32.0 m - horizontal 10 mm thick coal seam at 31.1 m			HQ19	100	100	84			2.5				W1						
32		- excellent quality, very weak, low angle fractures below 32.2 m																			
33		- 240 mm long inclined planar fracture at 33.2 m			HQ20	100	100	100			R1				W1						
34	178.0	Good quality dark grey CLAY SHALE - fresh, weak to medium strong, silty, close to moderate spaced joints with inclined siltstone concretions - 3 mm inclined coal and planar fracture at 33.8 m - 50 mm horizontal fault at 33.8 m - horizontal stepped fracture at 34.2 m - 140 mm inclined planar joint at 34.7 m			HQ21	100	97	89			2.5				W1						
35		- undulating fracture at 35.0 m																			

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.

App'd by:



BOREHOLE RECORD

DB1

CLIENT Alberta Transportation NORTHING: 5655683.8 PROJECT No. 110773396
 PROJECT SR1 Off-Stream Storage Reservoir EASTING: 676670.1 BH SIZE 96.3 mm (HQ3)
 DRILLING DATE 4/24/2018 to 4/24/2018 WATER LEVEL 0.9 m (4/24/2018) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLE TYPE	RUN NO.	FX-FRACTURE		F-FAULT			SM-SMOOTH		FL-FLEXURED		BC-BROKEN CORE																	
							CL-CLEAVAGE	VN-VEIN	JN-JOINT	P-POLISHED	S-SLICKENSIDED	R-ROUGH	ST-STEPPED	PL-PLANAR	UE-UNEVEN	W-WAVY	C-CURVED	CONT-CONTACT	B-BEDDING	FOL-FOLIATION													
							SH-SHEAR	SH-SHEAR	SH-SHEAR	SH-SHEAR	SH-SHEAR	SH-SHEAR	SH-SHEAR	SH-SHEAR	SH-SHEAR	SH-SHEAR	SH-SHEAR	SH-SHEAR	SH-SHEAR	SH-SHEAR	SH-SHEAR	SH-SHEAR											
RECOVERY		R.Q.D. %	FRACT. INDEX PER 1m	ROCK STRENGTH INDEX			WEATHERING INDEX			LABORATORY TESTING																							
TOTAL CORE %	SOLID CORE %			R1	R2	R3	R4	W1	W2		W3	W4	W5	W6																			
35	176.5	Continued: Good quality dark grey CLAY SHALE					20	40	60	80	20	40	60	80	20	40	60	80	5	10	15	20	R1	R2	R3	R4	W1	W2	W3	W4	W5	W6	
		End of borehole (35.2 m) - borehole slough to 35.1 m upon drilling completion - water observed in casing at 0.9 m on April 23 2018, and at 0.9 m on April 24 2018 - borehole backfilled with bentonite from 0.3 m to 35.1 m, backfilled with cuttings from surface to 0.3 m - borehole moved 14 m d/s from surveyed location "6.5 m O/S stake" - PACKER TEST: 21.5 m to 24.5 m - PACKER TEST: 32.2 m to 35.2 m																															
36																																	
37																																	
38																																	
39																																	
40																																	

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.

App'd by:



BOREHOLE RECORD

DB2

CLIENT Alberta Transportation NORTHING 5654543 PROJECT NO. 110773396
 PROJECT Springbank, Alberta EASTING -33667 BH SIZE SS (150 mm)
 DATES BORING 2018/04/25 to 2018/04/27 WATER LEVEL 4/26/2018 (2.1 m) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				ADVANCED LAB TESTS	GRAIN SIZE ANALYSIS				UNDRAINED SHEAR STRENGTH (kPa)						
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	WATER CONTENT ATTERBERG LIMITS (%)						
														Wp	w	WL	STANDARD PENETRATION TEST, blows/0.30 m			
0	1211.57	Brownish grey poorly graded GRAVEL (GP) - some sand, some clay, some silt, frequent cobbles																		
2	1210.07	Inferred brownish grey SEDIMENTARY BEDROCK - mudstone																		
3	1209.17	Bedrock encountered at 1.5 m - coring commenced at 2.4 m (see rock coring log for details) - borehole advanced with solid stem augers to 2.4 m, casing installation to 3.0 m																		
4																				
5																				
6																				
7																				
8																				
9																				
10																				

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.
 (3) Grainsize results showing only percent SILT represent percent FINES (passing No. 200 sieve)

■ Undrained Shear Strength - Field (kPa)
 ▲ Undrained Shear Strength - Laboratory (kPa)

App'd by:



BOREHOLE RECORD

DB2

CLIENT Alberta Transportation NORTHING: 5655758.7 PROJECT No. 110773396
 PROJECT SRI Off-Stream Storage Reservoir EASTING: 676721.4 BH SIZE 96.3 mm (HQ3)
 DRILLING DATE 4/27/2018 to 4/27/2018 WATER LEVEL 2.1 m (4/26/2018) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLE TYPE RUN NO.	FX-FRACTURE		F-FAULT			SM-SMOOTH		FL-FLEXURED		BC-BROKEN CORE				
						CL-CLEAVAGE	VN-VEIN	JN-JOINT	P-POLISHED	S-SLICKENSIDED	R-ROUGH	ST-STEPPED	PL-PLANAR	UE-UNEVEN	W-WAVY	C-CURVED	CONT-CONTACT	B-BEDDING	FOL-FOLIATION
						SH-SHEAR	SH-SHEAR	SH-SHEAR	SH-SHEAR	SH-SHEAR	SH-SHEAR	SH-SHEAR	SH-SHEAR	SH-SHEAR	SH-SHEAR	SH-SHEAR	SH-SHEAR	SH-SHEAR	SH-SHEAR
RECOVERY		R.Q.D. %	FRACT. INDEX PER 1m	ROCK STRENGTH INDEX				WEATHERING INDEX				LABORATORY TESTING							
TOTAL CORE %	SOLID CORE %			R1	R2	R3	R4	W1	W2	W3	W4		W5	W6					
0		Refer to soil log for overburden description				20	40	60	20	40	60	20	40	60	20	40	60		
2.10		Inferred brownish grey SEDIMENTARY BEDROCK - mudstone - casing installed to 3.0 m				20	40	60	20	40	60	20	40	60	20	40	60		
2.08		Fair quality grey SANDSTONE - fresh, very weak to weak, fine to medium grained, moderately to well cemented, inclined and horizontal very close to moderate joint spacing				97	95	69											
4.4		- 60 mm thick fault zone with sand infill at 4.4 m																	

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.

App'd by:



BOREHOLE RECORD

DB2

CLIENT Alberta Transportation NORTHING: 5655758.7 PROJECT No. 110773396
 PROJECT SRI Off-Stream Storage Reservoir EASTING: 676721.4 BH SIZE 96.3 mm (HQ3)
 DRILLING DATE 4/27/2018 to 4/27/2018 WATER LEVEL 2.1 m (4/26/2018) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLE TYPE RUN NO.	RECOVERY		R.Q.D. %	FRACT. INDEX PER 1m	ROCK STRENGTH INDEX				WEATHERING INDEX						LABORATORY TESTING	
						TOTAL CORE %	SOLID CORE %			R1	R2	R3	R4	W1	W2	W3	W4	W5	W6		
						20	40	60	80	20	40	60	80	5	10	15	20				
5		Continued: Fair quality grey SANDSTONE - 50 mm fault at 5.2 m			HQ 2	100	97	70		R1				W1							
6		- poor quality below 6.3 m			HQ 3	84	73	48		R1				W1							
7		- inclined coal laminations below 7.0 m			HQ 3	100	73	17		R0				W1							
204.5		Very poor to poor quality brown MUDSTONE - fresh, extremely weak, very close to close joint spacing - 30 mm and 50 mm thick inclined fault at 7.1 m and 7.4 m respectively - 100 mm thick coal laminated grey sandstone at 1.5 m			HQ 3	0	0	0		R				W							
203.8		- INFERRED LOST CORE 7.8 m to 8.3 m			HQ 4	0	0	0		R				W							
203.3		Poor quality brown MUDSTONE - fresh, extremely weak, very close to close joint spacing - highly fractured zone at 8.3 m - 230 mm thick siltstone layer with 30 mm inclined coal seam at 8.3 m			HQ 4	68	50	39		R0				W1							
9		- 100 mm thick fault with coal fragments and clay infill at 9.2 m - close to moderate joint spacing below 9.4 m - fault at 9.5 m - 180 mm thick fault at 9.6 m - calcite on fracture at 9.8 m																			

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.

App'd by:



BOREHOLE RECORD

DB2

CLIENT Alberta Transportation NORTHING: 5655758.7 PROJECT No. 110773396
 PROJECT SRI Off-Stream Storage Reservoir EASTING: 676721.4 BH SIZE 96.3 mm (HQ3)
 DRILLING DATE 4/27/2018 to 4/27/2018 WATER LEVEL 2.1 m (4/26/2018) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLE TYPE RUN NO.	RECOVERY		R.Q.D. %	FRACT. INDEX PER 1m	ROCK STRENGTH INDEX				WEATHERING INDEX				LABORATORY TESTING		
						TOTAL CORE %	SOLID CORE %			R1	R2	R3	R4	W1	W2	W3	W4		W5	W6
						20 40 60 80	20 40 60 80			20 40 60 80	5 10 15 20	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4					
-10		Continued: Poor quality brown MUDSTONE - high plastic below 10.1 m			HQ 5	90	64	39		R0				W1						
		- 40 mm thick inclined fault at 10.6 m																		
		- laminated with thin coal seams below 10.8 m																		
-11		- laminated with coal from 11.2 m to 11.3 m																		
		- 50 mm thick clay shale seam at 11.1 m, 100 mm thick clay shale layer at 11.4 m																		
		- 250 mm thick siltstone layer at 11.6 m			HQ 6	100	66	47		R0				W1						
		- 230 mm thick clay shale layer at 12.2 m																		
		- very close inclined joint spacing with siltstone concretions below 12.4 m																		
-13		- 130 mm, 50 mm, and 70 mm faults at 13.1 m, 13.3 m, and 13.5 m, respectively			HQ 7	79	35	31		R0.5				W1						
		- 110 mm thick clay infill with siltstone fragments at 13.7 m																		
-14		- highly fractured from 13.9 m to 14.4 m																		
		- inclined slickensides at 14.3 m																		
		- 430 mm thick sandy siltstone at 14.4 m			HQ 8	95	74	46		R0.5				W1						
		- carbonaceous below 14.8 m																		

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.

App'd by:



BOREHOLE RECORD

DB2

CLIENT Alberta Transportation NORTHING: 5655758.7 PROJECT No. 110773396
 PROJECT SR1 Off-Stream Storage Reservoir EASTING: 676721.4 BH SIZE 96.3 mm (HQ3)
 DRILLING DATE 4/27/2018 to 4/27/2018 WATER LEVEL 2.1 m (4/26/2018) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLE TYPE RUN NO.	LABORATORY TESTING															
						RECOVERY		R.Q.D.	FRACT. INDEX	ROCK STRENGTH INDEX				WEATHERING INDEX							
						TOTAL CORE %	SOLID CORE %	%	PER 1m	R1	R2	R3	R4	W1	W2	W3	W5	W6			
-15		Continued: Poor quality brown MUDSTONE - 60 mm thick fault zone at 15.3 m - 400 mm thick poor quality siltstone layer with inclined faults and clay infill				94	94	47					R0.5			W1					
195.6		Poor quality grey SANDSTONE - fresh, weak to medium strong, fine grained, well cemented, laminated with inclined coal, inclined moderate joint spacing - 10 mm thick inclined calcite in joint at 16.2 m - 50 mm fault with sandy clay at 16.3 m, horizontal stepped fracture at 16.5 m, 20 mm thick fault with sandy clay at 16.7 m - 20 mm thick undulating joint with sandy clay infill at 16.9 m				94	94	47								2.5	W1				
194.6		- INFERRED LOST CORE 17.0 m to 17.4 m				0	0	0						R			W				
194.2		Poor quality brown SILTSTONE - fresh, weak, very close to close spaced fault zones, sandy				67	48	41						R2			W1				
193.4		Very poor quality CLAY SHALE - moderately weathered, extremely weak, carbonaceous, high plastic, low angle, close joint spacing - good quality below 18.5 m				67	48	41						R0			W3				
19		- 80 mm coal seam at 19.0 m				100	90	84						R0			W3				
192.3		Fair to excellent quality grey SANDSTONE - fresh, very weak, clayey, fine to medium grained, poor to moderately cemented, low angle close joint spacing - clay infill on inclined fracture at 19.8 m and below 20.3 m				99	89	56						R1			W1				
20																					

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.

App'd by:



BOREHOLE RECORD

DB2

CLIENT Alberta Transportation NORTHING: 5655758.7 PROJECT No. 110773396
 PROJECT SR1 Off-Stream Storage Reservoir EASTING: 676721.4 BH SIZE 96.3 mm (HQ3)
 DRILLING DATE 4/27/2018 to 4/27/2018 WATER LEVEL 2.1 m (4/26/2018) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLE TYPE RUN NO.	RECOVERY		R.Q.D. %	FRACT. INDEX PER 1m	ROCK STRENGTH INDEX				WEATHERING INDEX				LABORATORY TESTING	
						TOTAL CORE %	SOLID CORE %			R1	R2	R3	R4	W1	W2	W3	W4		W5
						20	40	60	80	20	40	60	80	5	10	15	20		
		Continued: Fair to excellent quality grey SANDSTONE			HQ12	100	100	100		R1				W1					
	191.0	Fair to good quality dark brown CLAY SHALE - moderately weathered, extremely weak, up to 30 mm thick horizontal faults, close to moderate joint spacing, bedding generally inclined			HQ12	99	86	76		R0				W3					
					HQ13	97	97	60		R0				W1					
					HQ14	100	97	92		R0				W1					
		- inclined very close to moderate joint spacing below 24.6 m - 200 mm thick inclined fault with siltstone fragments and calcite at 24.8 m																	

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.

App'd by:



BOREHOLE RECORD

DB2

CLIENT Alberta Transportation NORTHING: 5655758.7 PROJECT No. 110773396
 PROJECT SRI Off-Stream Storage Reservoir EASTING: 676721.4 BH SIZE 96.3 mm (HQ3)
 DRILLING DATE 4/27/2018 to 4/27/2018 WATER LEVEL 2.1 m (4/26/2018) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLE TYPE RUN NO.	RECOVERY		R.Q.D. %	FRACT. INDEX PER 1m	ROCK STRENGTH INDEX				WEATHERING INDEX				LABORATORY TESTING	
						TOTAL CORE %	SOLID CORE %			R1	R2	R3	R4	W1	W2	W3	W4		W5
						20	40	60	80	20	40	60	80	5	10	15	20		
-25		Continued: Fair to good quality dark brown CLAY SHALE - very close to moderate joint spacing, bedding inclined			HQ15	100	89	56		R0				W1					
-26		- 150 mm thick siltstone layer at 26.1 m - carbonaceous from 26.1 m to 26.9 m			HQ16	99	97	77		R0				W1					
-27		- poor quality below 27.6 m			HQ17	97	74	43		R0				W1					
-28		- 30 mm thick inclined fault at 28.5 m - 60 mm thick inclined fault with siltstone fragments at 28.8 m, 20 mm thick at 28.9 m, and 100 mm thick at 29.0 m			HQ18	100	87	43		R1				W1					
-29		- 20 mm thick horizontal fault, and 40 mm thick low angle fault at 29.8 m																	
-30																			

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.

App'd by:



BOREHOLE RECORD

DB2

CLIENT Alberta Transportation NORTHING: 5655758.7 PROJECT No. 110773396
 PROJECT SR1 Off-Stream Storage Reservoir EASTING: 676721.4 BH SIZE 96.3 mm (HQ3)
 DRILLING DATE 4/27/2018 to 4/27/2018 WATER LEVEL 2.1 m (4/26/2018) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLE TYPE RUN NO.	RECOVERY		R.Q.D. %	FRACT. INDEX PER 1m	ROCK STRENGTH INDEX				WEATHERING INDEX				LABORATORY TESTING			
						TOTAL CORE %	SOLID CORE %			R1	R2	R3	R4	W1	W2	W3	W4		W5	W6	
																					FX-FRACTURE
30		Continued: Poor quality dark brown CLAY SHALE - coal and carbonaceous from 30.2 m to 30.4 m - very weak with near vertical bedding below 30.4 m - brownish grey below 30.6 m - fair to excellent quality below 30.6 m																			
31		- low angle irregular fractures at 31.5 m - 30 mm inclined fault at 31.7 m			HQ19		96	86	74			R1		W1							
32		- horizontal 60 mm coal fragments and fault zone at 31.8 m - 380 mm thick siltstone layer at 31.9 m - inclined fracture with slickensides at 32.0 m - brown, very close to moderate inclined joints below 32.2 m - 20 mm thick low angle faults at 32.4 m and 32.5 m - undulating fracture at 32.6 m			HQ20		100	93	66			R1		W1							
33		- stepped fracture at 33.1 m																			
34		- 20 mm thick low angle fault at 33.7 m, near vertical coal laminations and a siltstone concretion at 33.7 m			HQ21		99	97	96			R1		W1							
35																					

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.

App'd by:



BOREHOLE RECORD

DB2

CLIENT Alberta Transportation NORTHING: 5655758.7 PROJECT No. 110773396
 PROJECT SR1 Off-Stream Storage Reservoir EASTING: 676721.4 BH SIZE 96.3 mm (HQ3)
 DRILLING DATE 4/27/2018 to 4/27/2018 WATER LEVEL 2.1 m (4/26/2018) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLE TYPE	RUN NO.	FX-FRACTURE		F-FAULT			SM-SMOOTH		FL-FLEXURED		BC-BROKEN CORE																	
							CL-CLEAVAGE	SH-SHEAR	JN-JOINT	P-POLISHED	R-ROUGH	ST-STEPPED	UE-UNEVEN	W-WAVY	CONT-CONTACT	B-BEDDING	FOL-FOLIATION																
							VN-VEIN	S-SLICKENSIDED	PL-PLANAR	C-CURVED																							
RECOVERY		R.Q.D. %	FRACT. INDEX PER 1m	ROCK STRENGTH INDEX			WEATHERING INDEX			LABORATORY TESTING																							
TOTAL CORE %	SOLID CORE %			R1	R2	R3	R4	W1	W2		W3	W4	W5	W6																			
35	176.4	Continued: Fair to excellent quality dark brown CLAY SHALE - very weak					20	40	60	80	20	40	60	80	20	40	60	80	5	10	15	20	R1	R2	R3	R4	W1	W2	W3	W4	W5	W6	
		End of borehole (35.2 m) - borehole bridged/slough to 8.2 m upon drilling completion - water observed at 0.9 m on April 25 2018, and at 2.1 on April 26 2018 upon removal of the drill rods - borehole backfilled with bentonite from 3.3 m to 8.2 m, three additional bags of bentonite poured down hole prior to hole bridging at 8.2 m - slough from surface to 3.3 m - PACKER TEST: 12.4 m to 15.4 m - PACKER TEST: 15.4 m to 18.4 m - PACKER TEST: 18.5 m to 21.5 m																															
36																																	
37																																	
38																																	
39																																	
40																																	

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.

App'd by:

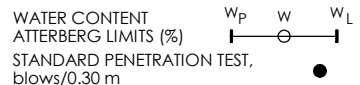


BOREHOLE RECORD

DB3

CLIENT Alberta Transportation NORTHING 5654604 PROJECT NO. 110773396
 PROJECT Springbank, Alberta EASTING -33645 BH SIZE SS (150 mm)
 DATES BORING 2018/04/18 to 2018/04/21 WATER LEVEL 4/27/2018 (0.3 m) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				ADVANCED LAB TESTS	GRAIN SIZE ANALYSIS				UNDRAINED SHEAR STRENGTH (kPa)					
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	40	80	120	160		
														20	40	60	80		
0	1210.52	Grey poorly graded GRAVEL (GP) - some sand, frequent cobbles, wet																	
1	1209.82	Inferred grey SEDIMENTARY BEDROCK - mudstone																	
1	1209.52	Bedrock encountered at 0.7 m - coring commenced at 1.0 m (see rock coring log for details) - borehole advanced with solid stem augers to 1.0 m, casing installation to 3.0 m																	
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			



(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.
 (3) Grainsize results showing only percent SILT represent percent FINES (passing No. 200 sieve)

■ Undrained Shear Strength - Field (kPa)
 ▲ Undrained Shear Strength - Laboratory (kPa)

App'd by:



BOREHOLE RECORD

DB3

CLIENT Alberta Transportation NORTHING: 5655821.3 PROJECT No. 110773396
 PROJECT SR1 Off-Stream Storage Reservoir EASTING: 676740.7 BH SIZE 96.3 mm (HQ3)
 DRILLING DATE 4/21/2018 to 4/21/2018 WATER LEVEL 0.3 m (4/27/2018) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLE TYPE	RUN NO.	RECOVERY		R.Q.D. %	FRACT. INDEX PER 1m	ROCK STRENGTH INDEX				WEATHERING INDEX				LABORATORY TESTING
							TOTAL CORE %	SOLID CORE %			R1	R2	R3	R4	W1	W2	W3	W4	
							FX-FRACTURE CL-CLEAVAGE SH-SHEAR VN-VEIN	F-FAULT JN-JOINT P-POLISHED S-SLICKENSIDED	SM-SMOOTH R-ROUGH ST-STEPPED PL-PLANAR	FL-FLEXURED UE-UNEVEN W-WAVY C-CURVED	BC-BROKEN CORE CONT-CONTACT B-BEDDING FOL-FOLIATION								
0		Refer to soil log for overburden description					20	40	60	20	40	60	20	40	60	20	40	60	
209.8		Inferred grey SEDIMENTARY BEDROCK - mudstone - lost core from 0.7 m to 1.5 m during casing installation																	
209.0		Fair quality grey MUDSTONE - high sand content, fine grain - fresh, very weak to weak - 200 mm thick high plastic clay infill at 1.7 m - calcite mineralization at 2.1 m - 10 mm thick siltstone fragment at 2.3 m			HQ 1		97	74	68		R0.5		W1						
		- 40 mm thick light grey inclined sandstone beds from 3.0 m to 3.7 m - poor quality, dark grey with inclined fractures below 3.0 m - slickensides at 3.7 m			HQ 2		89	58	38		R1		W1						
206.0		Poor quality dark grey SILTSTONE - fresh, very weak - 50 mm thick rubble zone at 4.9 m																	

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.

App'd by:



BOREHOLE RECORD

DB3

CLIENT Alberta Transportation NORTHING: 5655821.3 PROJECT No. 110773396
 PROJECT SRI Off-Stream Storage Reservoir EASTING: 676740.7 BH SIZE 96.3 mm (HQ3)
 DRILLING DATE 4/21/2018 to 4/21/2018 WATER LEVEL 0.3 m (4/27/2018) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLE TYPE RUN NO.	FX-FRACTURE CL-CLEAVAGE SH-SHEAR VN-VEIN		F-FAULT JN-JOINT P-POLISHED S-SLICKENSIDED		SM-SMOOTH R-ROUGH ST-STEPPED PL-PLANAR		FL-FLEXURED UE-UNEVEN W-WAVY C-CURVED		BC-BROKEN CORE CONT-CONTACT B-BEDDING FOL-FOLIATION		LABORATORY TESTING
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 1m	ROCK STRENGTH INDEX		WEATHERING INDEX				
						TOTAL CORE %	SOLID CORE %			R1 R2 R3 R4	W1 W2 W3 W4 W5 W6					
5		Continued: Poor quality dark grey SILTSTONE - 200 mm thick inclined rubble zone with clay infill at 5.2 m - slickensides on inclined fracture at 5.4 m			HQ 3	88	61	39		R1		W1				
6	204.6	Poor quality dark grey CLAY SHALE - fresh, very weak, inclined very close to close joint spacing - slickensides at 6.1 m, 6.3 m, and 6.5 m			HQ 4	89	63	36		R1		W1				
7		- polished inclined joint at 6.9 m - 100 mm thick inclined rubble and clay infill zone at 7.0 m														
8	203.0	- LOST CORE from 7.6 m to 9.1 m - returning water dark brown/black - inferred coal and carbonaceous clay shale			HQ 5	0	0	0		R		W				
9	201.4	Good quality grey SANDSTONE - fresh, weak to medium strong, fine grain - 10 mm thick inclined clay shale layer at 9.3 m - 30 mm thick inclined siltstone layer at 9.8 m - inclined laminations to 9.8 m			HQ 6	99	98	88		2.5		W1				

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.

App'd by:



BOREHOLE RECORD

DB3

CLIENT Alberta Transportation NORTHING: 5655821.3 PROJECT No. 110773396
 PROJECT SRI Off-Stream Storage Reservoir EASTING: 676740.7 BH SIZE 96.3 mm (HQ3)
 DRILLING DATE 4/21/2018 to 4/21/2018 WATER LEVEL 0.3 m (4/27/2018) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLE TYPE RUN NO.	RECOVERY		R.Q.D. %	FRACT. INDEX PER 1m	ROCK STRENGTH INDEX				WEATHERING INDEX				LABORATORY TESTING
						TOTAL CORE %	SOLID CORE %			R1	R2	R3	R4	W1	W2	W3	W4	
						20 40 60 80	20 40 60 80	20 40 60 80	5 10 15 20	R1 R2 R3 R4	W1 W2 W3 W4 W5 W6							
10		Continued: Good quality grey SANDSTONE - dark brown with calcite from 10.0 m to 10.2 m - calcite on inclined joints below 10.4 m - undulating joint at 10.9 m																
					HQ 7	100	93	85			2.5		W1					
		- 120 mm thick fault with high plastic clay infill at 12.0 m - fair quality below 12.1 m			HQ 8	95	75	68			2.5		W1					
12.8		Very poor to poor quality brown interbedded SILTSTONE and CLAY SHALE - 10 mm to 150 mm thick beds - fresh, very weak, extremely to very close jointed - 10 mm and 30 mm thick fault zones at 13.1 m - 150 mm thick fault zone at 13.3 m			HQ 8	74	26	0			R1		W1					
		- 40 mm thick sandstone layer at 13.6 m - slickensides at 13.7 m - 60 mm thick fault zone at 14.0 m			HQ 9	100	58	25			R1		W1					
13.6		Excellent quality grey SANDSTONE - fresh, very weak to weak, fine grain, inclined thin coal laminations, moderately to well cemented, close joint spacing			HQ 9	100	100	100			R1.5		W1					

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.

App'd by:



BOREHOLE RECORD

DB3

CLIENT Alberta Transportation NORTHING: 5655821.3 PROJECT No. 110773396
 PROJECT SRI Off-Stream Storage Reservoir EASTING: 676740.7 BH SIZE 96.3 mm (HQ3)
 DRILLING DATE 4/21/2018 to 4/21/2018 WATER LEVEL 0.3 m (4/27/2018) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLE TYPE RUN NO.	RECOVERY		R.Q.D. %	FRACT. INDEX PER 1m	ROCK STRENGTH INDEX				WEATHERING INDEX				LABORATORY TESTING	
						TOTAL CORE %	SOLID CORE %			R1	R2	R3	R4	W1	W2	W3	W4		W5
						20	40	60	80	20	40	60	80	5	10	15	20		1
-15		Continued: Fair to excellent quality grey SANDSTONE - ARTESIAN CONDITIONS at 15.2 m - slickenside at approximately 15.2 m - inclined contact between sandstone and siltstone at 15.8 m			HQ10	98	71	54		R1.5				W1					
-16	194.7	Good quality dark brown SILTSTONE - fresh, very weak to weak, very close to moderate joint spacing - carbonaceous to 16.7 m - 20 mm high plastic clay infill at 16.1 m - 10 mm clay infill/calcite at 16.2 m - slickenside at 16.7 m - grey, high sand content, inclined joints, calcite/coal/sandstone laminations below 16.7 m			HQ10	100	88	79		R1.5				W1					
-17					HQ11	93	90	85		R1				W1					
-18	192.5	Good to excellent quality grey SANDSTONE - fresh, very weak, inclined brown laminations - undulating fracture at 18.6 m			HQ12	100	100	100		R1				W1					
-19	191.8	Fair quality greyish brown CLAY SHALE - fresh, very weak - inclined irregular fracture at 18.9 m, 90 mm thick highly fractured with calcite slickensides at 19.1 m - 110 mm thick high plastic infill at 19.1 m - LOST CIRCULATION at 19.2 m, circulation regained at 19.4 m - 30 mm thick fault with clay infill at 19.3 m, inclined fracture with 1 mm clay infill at 19.5 m			HQ12	100	80	58		R1				W1					
-20	190.6	Excellent quality grey SANDSTONE - fresh, very weak, well cemented,																	

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.

App'd by:



BOREHOLE RECORD

DB3

CLIENT Alberta Transportation NORTHING: 5655821.3 PROJECT No. 110773396
 PROJECT SRI Off-Stream Storage Reservoir EASTING: 676740.7 BH SIZE 96.3 mm (HQ3)
 DRILLING DATE 4/21/2018 to 4/21/2018 WATER LEVEL 0.3 m (4/27/2018) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLE TYPE RUN NO.	FX-FRACTURE CL-CLEAVAGE SH-SHEAR VN-VEIN		F-FAULT JN-JOINT P-POLISHED S-SLICKENSIDED		SM-SMOOTH R-ROUGH ST-STEPPED PL-PLANAR		FL-FLEXURED UE-UNEVEN W-WAVY C-CURVED		BC-BROKEN CORE CONT-CONTACT B-BEDDING FOL-FOLIATION		LABORATORY TESTING
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 1m	ROCK STRENGTH INDEX		WEATHERING INDEX				
						TOTAL CORE %	SOLID CORE %	5 10 15 20	R1 R2 R3 R4	W1 W2 W3 W4 W5 W6						
20	189.4	fine grain, inclined coal seams and partings throughout - calcite coating at 19.8 m Continued: Excellent quality grey SANDSTONE - calcite infill at 20.8 m			HQ13	100	100	96		R1		W1				
21		Very poor to fair quality brown CLAY SHALE - fresh, inclined very close to moderate joint spacing with calcite on joints throughout - siltstone concretions from 21.2 m to 22.3 m - extremely to very weak, carbonaceous to 21.3 m - brownish grey, very weak, sandy below 21.3 m - stepped fracture at 21.6 m - calcite/slickensides at 21.8 m			HQ13	15	15	0		R0.5		W1				
22		- calcite inclusions at 22.3 m - inclined 5 mm thick coal laminations at 22.5 m			HQ14	97	83	51		R1		W1				
23		- polished with slickensides at 22.8 m - carbonaceous/high coal content, moderately weathered, extremely weak, high plastic below 22.9 m			HQ15	100	93	55		R0		W3				
24	186.6	COAL with carbonaceous CLAY SHALE - inclined, orthogonal, very close to moderate joint spacing														
25																

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.

App'd by:



BOREHOLE RECORD

DB3

CLIENT Alberta Transportation NORTHING: 5655821.3 PROJECT No. 110773396
 PROJECT SRI Off-Stream Storage Reservoir EASTING: 676740.7 BH SIZE 96.3 mm (HQ3)
 DRILLING DATE 4/21/2018 to 4/21/2018 WATER LEVEL 0.3 m (4/27/2018) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLE TYPE RUN NO.	FX-FRACTURE		F-FAULT		SM-SMOOTH		FL-FLEXURED		BC-BROKEN CORE		
						CL-CLEAVAGE	SH-SHEAR	JN-JOINT	P-POLISHED	R-ROUGH	ST-STEPPED	UE-UNEVEN	W-WAVY	CONT-CONTACT	B-BEDDING	FOL-FOLIATION
						VN-VEIN	S-SLICKENSIDED	PL-PLANAR	C-CURVED							
RECOVERY		R.Q.D. %	FRACT. INDEX PER 1m	ROCK STRENGTH INDEX			WEATHERING INDEX			LABORATORY TESTING						
TOTAL CORE %	SOLID CORE %			R1	R2	R3	R4	W1	W2		W3	W4	W5	W6		
25		Continued: COAL with carbonaceous CLAY SHALE - highly fractured below 25.7 m - inferred coal below 26.0 m			HQ16	97	88	50			R			W		
26	184.2	Very poor to fair quality dark brownish grey CLAY SHALE - fresh, very weak, sandy, inclined very thin to moderately spaced coal and calcite laminations			HQ17	68	56	23			R1			W1		
27		- 200 mm thick carbonaceous bed at 27.5 m - 360 mm thick high plastic clay bed at 27.7 m - brownish grey, extremely weak to very weak thin coal laminations, 3 mm rounded blue/green inclusions below 29.0 m														
28	182.4	Fair quality brown MUDSTONE - fresh, very weak, close to moderate joint spacing - 40 mm thick coal and clay infill at 28.3 m			HQ18	95	79	56			R1			W1		
29		- 30 mm thick clay shale layer at 29.0 m - 70 mm thick rubble zone at 29.7 m														
30	180.6	Fair to good quality brownish grey SILTSTONE - fresh, very weak, sandy, close			HQ19	100	89	70			R1			W1		

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.

App'd by:



BOREHOLE RECORD

DB3

CLIENT Alberta Transportation NORTHING: 5655821.3 PROJECT No. 110773396
 PROJECT SRI Off-Stream Storage Reservoir EASTING: 676740.7 BH SIZE 96.3 mm (HQ3)
 DRILLING DATE 4/21/2018 to 4/21/2018 WATER LEVEL 0.3 m (4/27/2018) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLE TYPE RUN NO.	RECOVERY		R.Q.D. %	FRACT. INDEX PER 1m	ROCK STRENGTH INDEX				WEATHERING INDEX						LABORATORY TESTING						
						TOTAL CORE %	SOLID CORE %			R1	R2	R3	R4	W1	W2	W3	W4	W5	W6							
																					FX-FRACTURE	CL-CLEAVAGE	SH-SHEAR	VN-VEIN	F-FAULT	JN-JOINT
30		to moderate joint spacing Continued: Fair to good quality brownish grey SILTSTONE																								
		- grey to dark grey inclined thin laminations below 30.6 m																								
		- inclined fracture with 1 mm thick clay infill at 31.0 m																								
		- 5 mm thick horizontal coal lamination at 31.3 m			HQ20		99	94	76			R1														
		- inclined thin coal laminations below 31.3 m																								
		- light brown siltstone concretions below 31.3 m																								
		- 30 mm thick rubble zone with calcite at 31.9 m																								
		- slickensided at 32.0 m																								
		- dark grey with inclined sandstone interbeds and orthogonal fractures with calcite laminations below 32.1 m																								
		- 10 mm rubble zone at 32.3 m																								
					HQ21		99	92	83			R1														
		- fresh to slightly weathered, with calcite solutioned tightly in joints below 33.5 m																								
					HQ22		98	91	73			R1														

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.

App'd by:



BOREHOLE RECORD

DB3

CLIENT Alberta Transportation NORTHING: 5655821.3 PROJECT No. 110773396
 PROJECT SRI Off-Stream Storage Reservoir EASTING: 676740.7 BH SIZE 96.3 mm (HQ3)
 DRILLING DATE 4/21/2018 to 4/21/2018 WATER LEVEL 0.3 m (4/27/2018) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLE TYPE	RUN NO.	RECOVERY		R.Q.D. %	FRACT. INDEX PER 1m	ROCK STRENGTH INDEX				WEATHERING INDEX						LABORATORY TESTING														
							TOTAL CORE %	SOLID CORE %			R1	R2	R3	R4	W1	W2	W3	W4	W5	W6															
							FX-FRACTURE CL-CLEAVAGE SH-SHEAR VN-VEIN	F-FAULT JN-JOINT P-POLISHED S-SLICKENSIDED	SM-SMOOTH R-ROUGH ST-STEPPED PL-PLANAR	FL-FLEXURED UE-UNEVEN W-WAVY C-CURVED	BC-BROKEN CORE CONT-CONTACT B-BEDDING FOL-FOLIATION																								
35	175.4	Continued: Fair to good quality grey SILTSTONE					20	40	60	80	20	40	60	80	20	40	60	80	5	10	15	20	R1	R2	R3	R4	W1	W2	W3	W4	W5	W6			
		End of borehole (35.1 m) - borehole slough to 27.9 m upon drilling completion - water observed at 0.3 m in casing on April 27, 2018 - borehole backfilled with bentonite from 5.0 m to 27.9 m - slough from surface to 5.0 m - borehole relocated 2.0 m southeast of surveyed location - PACKER TEST: 1.5 m to 4.5 m - PACKER TEST: 3.0 m to 4.5 m - PACKER TEST: 4.6 m to 5.3 m - PACKER TEST: 4.6 m to 7.6 m - PACKER TEST: 9.1 m to 12.1 m - PACKER TEST: 12.1 m to 15.1 m - PACKER TEST: 15.2 m to 18.2 m - PACKER TEST: 18.3 m to 21.3 m																																	
36																																			
37																																			
38																																			
39																																			
40																																			

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.

App'd by:

APPENDIX D.2: LOW LEVEL OUTLET (LLO)



BOREHOLE RECORD

LLO01

CLIENT Alberta Transportation NORTHING 5657550 PROJECT NO. 110773396
 PROJECT Springbank, Alberta EASTING -29080 BH SIZE SS (150 mm)
 DATES BORING 2018/05/05 to 2018/05/06 WATER LEVEL 5/5/2018 (12.3 m) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				ADVANCED LAB TESTS	GRAIN SIZE ANALYSIS				UNDRAINED SHEAR STRENGTH (kPa)				
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	WATER CONTENT ATTERBERG LIMITS (%) STANDARD PENETRATION TEST, blows/0.30 m				
														40	80	120	160	
0	1192.15	TOPSOIL																
	1191.95																	
1		Stiff to very stiff brown to grey medium to high plastic CLAY (CI/CH) - trace sand, moist																
2																		
3		- trace gravel below 2.4 m																
4		- brown and mottled with dark brown below 3.0 m																
5																		
6	1186.25	Very stiff brown sandy low to medium plastic clay (CL-CI) TILL - some sand, some gravel, moist																
7																		
8		- hard below 7.6 m																
9		- increased sand and gravel content between 8.6 m to 9.1 m																
10		- grey below 9.8 m																

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.
 (3) Grainsize results showing only percent SILT represent percent FINES (passing No. 200 sieve)

■ Undrained Shear Strength - Field (kPa)
 ▲ Undrained Shear Strength - Laboratory (kPa)

App'd by:

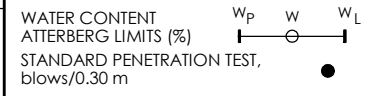


BOREHOLE RECORD

LLO01

CLIENT Alberta Transportation NORTHING 5657550 PROJECT NO. 110773396
 PROJECT Springbank, Alberta EASTING -29080 BH SIZE SS (150 mm)
 DATES BORING 2018/05/05 to 2018/05/06 WATER LEVEL 5/5/2018 (12.3 m) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				ADVANCED LAB TESTS	GRAIN SIZE ANALYSIS				UNDRAINED SHEAR STRENGTH (kPa)				
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	WATER CONTENT ATTERBERG LIMITS (%)				
														40	80	120	160	
10		Continued: Very stiff brown sandy low to medium plastic clay (CL-CI) TILL - some sand, some gravel, moist - trace coal and bedrock fragments below 10.6 m			BS	15												
11	1181.05		SS	16	450	26												
12		Dense grey silty SAND (SM) to sandy SILT (ML) interbedded with clayey SAND (SC) - some gravel, wet - inferred seepage at 12.3 m			BS	17												
13			SS	18	300	40	0.6	30.8	61.9	6.7								
14		- very dense below 13.7 m			BS	19												
14	1177.75		SS	20	350	95												
15		Inferred brown SEDIMENTARY BEDROCK - sandstone - highly weathered, extremely weak, fine grained, poorly cemented			BS	21												
16	1175.95		SS	22	300	47												
17		Bedrock encountered at 14.4 m - coring commenced at 16.2 m (see rock coring log for details) - borehole advanced with solid stem augers to 15.2 m			BS	23												
18																		
19																		
20																		



(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.
 (3) Grain size results showing only percent SILT represent percent FINES (passing No. 200 sieve)

■ Undrained Shear Strength - Field (kPa)
 ▲ Undrained Shear Strength - Laboratory (kPa)

App'd by:



BOREHOLE RECORD

LLO01

CLIENT Alberta Transportation NORTHING: _____ PROJECT No. 110773396
 PROJECT SRI Off-Stream Storage Reservoir EASTING: _____ BH SIZE 96.3 mm (HQ3)
 DRILLING DATE 5/6/2018 to 5/6/2018 WATER LEVEL 18.0 m (5/06/2018) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLE TYPE RUN NO.	FX-FRACTURE CL-CLEAVAGE SH-SHEAR VN-VEIN		F-FAULT JN-JOINT F-POLISHED S-SLICKENSIDED		SM-SMOOTH R-ROUGH ST-STEPPED PL-PLANAR		FL-FLEXURED UE-UNEVEN W-WAVY C-CURVED		BC-BROKEN CORE CONT-CONTACT B-BEDDING FOL-FOLIATION		LABORATORY TESTING
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 1m	ROCK STRENGTH INDEX		WEATHERING INDEX				
						TOTAL CORE %	SOLID CORE %			R1	R2	R3	R4	W1	W2	
-15		Refer to soil log for overburden description				20 40 60 80	20 40 60 80	20 40 60 80	5 10 15 20	R1 R2 R3 R4	W1 W2 W3 W4 W5 W6					
-16		Poor quality grey SANDSTONE - fine-grained - slightly to moderately weathered, very weak to weak			HQ24	100	86	31		R2	W3.5					
-17		Very poor quality grey MUDSTONE - completely weathered, extremely to very weak			HQ25	100	30	7		R0.5	W5					
-18		- LOST CORE BETWEEN 18.4 m to 19.9 m. - Inferred mudstone			HQ26	23	0	0		R	W					
-20		Very poor quality grey MUDSTONE														

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.

App'd by:



BOREHOLE RECORD

LLO01

CLIENT Alberta Transportation NORTHING: _____ PROJECT No. 110773396
 PROJECT SRI Off-Stream Storage Reservoir EASTING: _____ BH SIZE 96.3 mm (HQ3)
 DRILLING DATE 5/6/2018 to 5/6/2018 WATER LEVEL 18.0 m (5/06/2018) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLE TYPE RUN NO.	RECOVERY		R.Q.D. %	FRACT. INDEX PER 1m	ROCK STRENGTH INDEX				WEATHERING INDEX				LABORATORY TESTING		
						TOTAL CORE %	SOLID CORE %			R1	R2	R3	R4	W1	W2	W3	W4		W5	W6
						20	40			60	80	20	40	60	80	5	10		15	20
	-20	- completely weathered, extremely to very weak			HQ27	94	41	11		R0				W4.5			- Atterberg limits: PL20 - LL41			
	-22	Poor quality grey SANDSTONE - slightly weathered, medium strong			HQ28	96	55	26		R2				W3			- direct shear from 21.99 to 22.16 m - Atterberg limits: PL21 - LL44			
	-23	Very poor to poor quality MUDSTONE - high silt content - highly weathered, extremely weak - approx. 60 mm thick rubble zones at 23.1 m, 23.3 m, and 23.6 m			HQ29	94	30	10		R1.5				W3			- direct shear from 23.95 to 24.17 m - Atterberg limits: PL21 - LL45			
	-24	Very poor quality grey SANDSTONE - slightly weathered, medium strong																		
	-25	End of borehole (24.5 m) - water observed at 12.3 m upon drilling completion - 25 mm standpipe hand-slotted from 10.1 m to 13.8 m - borehole backfilled with cuttings																		

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.

App'd by:



BOREHOLE RECORD

LLO01

CLIENT Alberta Transportation NORTHING: _____ PROJECT No. 110773396
 PROJECT SRI Off-Stream Storage Reservoir EASTING: _____ BH SIZE 96.3 mm (HQ3)
 DRILLING DATE 5/6/2018 to 5/6/2018 WATER LEVEL 18.0 m (5/06/2018) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLE TYPE	RUN NO.	FX-FRACTURE		F-FAULT			SM-SMOOTH		FL-FLEXURED		BC-BROKEN CORE																			
							CL-CLEAVAGE	VN-VEIN	JN-JOINT	P-POLISHED	S-SLICKENSIDED	R-ROUGH	ST-STEPPED	PL-PLANAR	UE-UNEVEN	W-WAVY	C-CURVED	CONT-CONTACT	B-BEDDING	FOL-FOLIATION															
							SH-SHEAR	SH-SHEAR	SH-SHEAR	SH-SHEAR	SH-SHEAR	SH-SHEAR	SH-SHEAR	SH-SHEAR	SH-SHEAR	SH-SHEAR	SH-SHEAR	SH-SHEAR	SH-SHEAR	SH-SHEAR	SH-SHEAR	SH-SHEAR													
RECOVERY		R.Q.D. %	FRACT. INDEX PER 1m	ROCK STRENGTH INDEX				WEATHERING INDEX				LABORATORY TESTING																							
TOTAL CORE %	SOLID CORE %			R1	R2	R3	R4	W1	W2	W3	W4		W5	W6																					
25		and a bentonite seal near surface					20	40	60	80	20	40	60	80	20	40	60	80	5	10	15	20	R1	R2	R3	R4	W1	W2	W3	W4	W5	W6			
26																																			
27																																			
28																																			
29																																			
30																																			

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.

App'd by:



BOREHOLE RECORD

LLO03

CLIENT Alberta Transportation

NORTHING 5657494 PROJECT NO. 110773396

PROJECT Springbank, Alberta

EASTING -29030 BH SIZE SS (150 mm)

DATES BORING 2018/05/04 to 2018/05/04 WATER LEVEL

5/4/2018 (7.2 m) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				ADVANCED LAB TESTS	GRAIN SIZE ANALYSIS				UNDRAINED SHEAR STRENGTH (kPa)					
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	WATER CONTENT ATTERBERG LIMITS (%)					
														40	80	120	160		
0	1190.36	TOPSOIL																	
0	1190.06	Very stiff brown to grey low plastic clay (CL) TILL - some sand, trace gravel, moist			BS 1														
1																			
2		- trace bedrock fragments below 1.5 m			SS 2	400	20												
3		- trace to some gravel below 2.4 m			BS 3														
4					ST 4	225													
4		- trace coal at 4.6 m - inferred cobble at 4.6 m			SS 5	100	42												
5	1185.66	Very stiff to hard gravelly low plastic clay (CL) TILL - some sand, trace coal, moist			SS 6	50	50+												
6					BS 7														
7																			
8		- some sand to sandy below 7.6 m			SS 8	300	40												
8		- grey below 8.2 m																	
9					BS 9														
9		- some gravel below 9.1 m																	
10		- moist to wet below 9.8 m			SS 10	450	33												
					BS 11														
					SS 12	300	24												

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.
 (3) Grainsize results showing only percent SILT represent percent FINES (passing No. 200 sieve)

App'd by:

■ Undrained Shear Strength - Field (kPa)
 ▲ Undrained Shear Strength - Laboratory (kPa)



BOREHOLE RECORD

LLO03

CLIENT Alberta Transportation

NORTHING 5657494

PROJECT NO. 110773396

PROJECT Springbank, Alberta

EASTING -29030

BH SIZE SS (150 mm)

DATES BORING 2018/05/04 to 2018/05/04

WATER LEVEL 5/4/2018 (7.2 m)

DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				ADVANCED LAB TESTS	GRAIN SIZE ANALYSIS				UNDRAINED SHEAR STRENGTH (kPa)					
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	WATER CONTENT ATTERBERG LIMITS (%)					
														W _p	W	W _L	STANDARD PENETRATION TEST, blows/0.30 m		
10		Continued: Very stiff to hard low plastic clay (CL) TILL - some sand to sandy, some gravel, trace coal, moist - inferred seepage at 11.1 m			BS 13														
11	1179.26	Grey poorly graded GRAVEL (GP) - sandy, wet			SS 14	300	20		12.3	26.6	48.8	12.3							
12	1178.36	Inferred brown SEDIMENTARY BEDROCK - sandstone - highly to completely weathered, extremely to very weak, fine grained, oxidized			BS 15				65.0	33.5	1.5								
13	1177.56	Inferred brown SEDIMENTARY BEDROCK - mudstone - highly weathered, extremely to very weak			SS 16	100	34												
14	1176.56	Inferred brown SEDIMENTARY BEDROCK - sandstone - highly weathered, very weak, fine grain - refusal on SS20: 50 for 25 mm			BS 17														
15		Inferred brown SEDIMENTARY BEDROCK - mudstone - highly weathered, extremely to very weak			SS 18	150	60												
16	1174.56	Inferred brown SEDIMENTARY BEDROCK - sandstone - highly weathered, very weak, fine grain			BS 19														
17	1173.06	Inferred brown SEDIMENTARY BEDROCK - mudstone - highly weathered, extremely to very weak - refusal on SS22: 45/50 for 125 mm			SS 20	0	50+												
18		End of borehole (17.3 m) - borehole open, water observed at 7.2 m upon completion - borehole backfilled with cuttings to 17.3 m, bentonite seal near surface - borehole advanced with solid stem augers			BS 21														
19																			
20																			

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.
 (3) Grainsize results showing only percent SILT represent percent FINES (passing No. 200 sieve)

■ Undrained Shear Strength - Field (kPa)
 ▲ Undrained Shear Strength - Laboratory (kPa)

App'd by:



BOREHOLE RECORD

LLO05

CLIENT Alberta Transportation NORTHING 5657323 PROJECT NO. 110773396
 PROJECT Springbank, Alberta EASTING -28868 BH SIZE SS (150 mm)
 DATES BORING 2018/05/01 to 2018/05/02 WATER LEVEL 5/2/2018 (14.6 m) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				ADVANCED LAB TESTS	GRAIN SIZE ANALYSIS				UNDRAINED SHEAR STRENGTH (kPa)					
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	WATER CONTENT ATTERBERG LIMITS (%)					
														Wp	w	WL	Standard Penetration Test, blows/0.30 m		
0	1192.89	TOPSOIL																	
0.5	1192.59	Very stiff grey medium to high plastic CLAY (CI-CH) - some sand, trace gravel, trace rootlets, moist																	
1.5		- mottled with brown below 1.5 m																	
2.5		- brown, mottled with grey below 2.4 m																	
3.5																			
4.5																			
5.5		- trace coal below 4.6 m																	
5.5	1187.69	Very stiff to hard brown low plastic clay TILL (CL) - some sand, some gravel, coal, bedrock fragments, moist																	
6.5																			
7.5																			
8.5		- grey and mottled brown below 7.6 m																	
8.5		- trace oxidation below 8.5 m																	
9.5		- inferred cobble at 8.8 m																	
9.5		- brown below 9.0 m																	
10.0																			

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.
 (3) Grainsize results showing only percent SILT represent percent FINES (passing No. 200 sieve)

App'd by:

■ Undrained Shear Strength - Field (kPa)
 ▲ Undrained Shear Strength - Laboratory (kPa)



BOREHOLE RECORD

LLO05

CLIENT Alberta Transportation NORTHING 5657323 PROJECT NO. 110773396
 PROJECT Springbank, Alberta EASTING -28868 BH SIZE SS (150 mm)
 DATES BORING 2018/05/01 to 2018/05/02 WATER LEVEL 5/2/2018 (14.6 m) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				ADVANCED LAB TESTS	GRAIN SIZE ANALYSIS				UNDRAINED SHEAR STRENGTH (kPa)						
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	WATER CONTENT ATTERBERG LIMITS (%)						
														Wp	w	WL	STANDARD PENETRATION TEST, blows/0.30 m			
10		Continued; Very stiff to hard brown sandy low plastic clay TILL (CL) - trace gravel, coal, bedrock fragments, moist - grey below 10.4 m - refusal on SS17: 50 for 75 mm			X BS 14															
11					■ SS 15	400	27													
12						X BS 16														
13	1179.99	Very dense brown poorly graded GRAVEL (GP) and sand - angular and rounded, wet - inferred seepage at 12.9 m - grey silty sand layer from 13.0 m to 13.2 m, fine to medium grained, wet - refusal on SS19: 50 for 150 mm			X BS 18															
14	1178.79					■ SS 19	100	50+	51.4	47.9	0.7									
15		Grey to green SEDIMENTARY BEDROCK - siltstone/mudstone - highly to completely weathered, extremely to very weak - grey siltstone below 15.0 m, highly weathered, extremely to very weak - refusal on SS21: 32/50 for 100 mm - refusal on SS23: 50 for 0 mm - grey siltstone/mudstone below 17.4 m, moderately weathered, very weak - grey siltstone below 18.3 m, moderately weathered, very weak - refusal on SS25: 50 for 100 mm			▽ BS 20															
16						■ SS 21	100	50+												
17						X BS 22														
18						■ SS 23	0	50+												
19						X BS 24														
20	1174.59	End of borehole (18.3 m) - borehole open, water observed at 14.6 m upon drilling completion - borehole backfilled with cuttings to 18.3 m, bentonite seal near surface - borehole advanced with solid stem augers			■ SS 25	25	50+													

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.
 (3) Grainsize results showing only percent SILT represent percent FINES (passing No. 200 sieve)

■ Undrained Shear Strength - Field (kPa)
 ▲ Undrained Shear Strength - Laboratory (kPa)

App'd by:



BOREHOLE RECORD

LLO06

CLIENT Alberta Transportation NORTHING 5657364 PROJECT NO. 110773396
 PROJECT Springbank, Alberta EASTING -28736 BH SIZE SS (150 mm)
 DATES BORING 2018/05/02 to 2018/05/03 WATER LEVEL 5/3/2018 (10.1 m) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				ADVANCED LAB TESTS	GRAIN SIZE ANALYSIS				UNDRAINED SHEAR STRENGTH (kPa)				
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	WATER CONTENT ATTERBERG LIMITS (%)				
														40	80	120	160	
0	1192.61	TOPSOIL																
0	1192.41	Very stiff brown sandy low plastic CLAY (CL) - dry - moist below 0.7 m - trace sand, mottled with grey below 0.8 m																
1																		
2	1190.51	Very stiff to hard brown low to medium plastic clay TILL (CL-CI) - some sand, trace gravel, trace coal, oxidation, moist																
3																		
4																		
5		- trace coal to 4.6 m - seepage encountered at 5.0 m - trace to some gravel below 5.2 m								5.4	18.5	49.0	27.1					
6																		
7		- gravelly low plastic clay TILL (CL), some sand layer from 6.7 m to 9.1 m																
8																		
9																		
10	1183.01	Very dense poorly graded GRAVEL (GP)																

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.
 (3) Grainsize results showing only percent SILT represent percent FINES (passing No. 200 sieve)

■ Undrained Shear Strength - Field (kPa)
 ▲ Undrained Shear Strength - Laboratory (kPa)

App'd by:

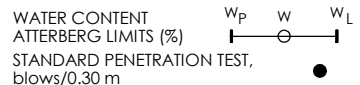


BOREHOLE RECORD

LLO06

CLIENT Alberta Transportation NORTHING 5657364 PROJECT NO. 110773396
 PROJECT Springbank, Alberta EASTING -28736 BH SIZE SS (150 mm)
 DATES BORING 2018/05/02 to 2018/05/03 WATER LEVEL 5/3/2018 (10.1 m) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				ADVANCED LAB TESTS	GRAIN SIZE ANALYSIS				UNDRAINED SHEAR STRENGTH (kPa)					
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	WATER CONTENT ATTERBERG LIMITS (%)					
														40	80	120	160		
10		- sandy, some silt, some clay, moist Continued: Very dense poorly graded GRAVEL (GP)																	
11		- sandy, some silt, some clay, moist - refusal on SS14: 50 for 125 mm - sloughed to 11.0 m following drilling to 12.2 m								11.3	32.3	56.4							
12																			
13	1179.41	- inferred rafted sandstone bedrock below 12.3 m - inferred cobbles at 13.0 m								52.4	17.5	19.4	10.7						
14	1178.51	Inferred grey SEDIMENTARY BEDROCK - sandstone - moderately to highly weathered, extremely to very weak, moderately cemented - well cemented below 13.7 m - refusal on SS18: 50 for 125 mm																	
15	1177.41	Inferred brown SEDIMENTARY BEDROCK - siltstone/mudstone - highly weathered, extremely to very weak																	
16		Bedrock encountered at 13.2 m - coring commenced at 15.2 m (see rock coring log for details) - borehole advanced with solid stem augers to 15.2 m - borehole slough to 11.7 m and water at 10.1 m prior to coring																	
17																			
18																			
19																			
20																			



(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.
 (3) Grainsize results showing only percent SILT represent percent FINES (passing No. 200 sieve)

■ Undrained Shear Strength - Field (kPa)
 ▲ Undrained Shear Strength - Laboratory (kPa)

App'd by:



BOREHOLE RECORD

LLO06

CLIENT Alberta Transportation NORTHING: _____ PROJECT No. 110773396
 PROJECT SRI Off-Stream Storage Reservoir EASTING: _____ BH SIZE 96.3 mm (HQ3)
 DRILLING DATE 5/3/2018 to 5/3/2018 WATER LEVEL 10.1 m (5/03/2018) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLE TYPE RUN NO.	FX-FRACTURE CL-CLEAVAGE SH-SHEAR VN-VEIN		F-FAULT JN-JOINT P-POLISHED S-SLICKENSIDED		SM-SMOOTH R-ROUGH ST-STEPPED PL-PLANAR		FL-FLEXURED UE-UNEVEN W-WAVY C-CURVED		BC-BROKEN CORE CONT-CONTACT B-BEDDING FOL-FOLIATION		LABORATORY TESTING	
						RECOVERY		R.Q.D. %	FRACT. INDEX PER 1m	ROCK STRENGTH INDEX		WEATHERING INDEX					
						TOTAL CORE %	SOLID CORE %			R1	R2	R3	R4	W1	W2		W3
-15		Refer to soil log for overburden description				20 40 60 80	20 40 60 80	20 40 60 80	5 10 15 20	R1 R2 R3 R4	W1 W2 W3 W4 W5 W6						
-16		Very poor quality brown MUDSTONE - completely to highly weathered, extremely weak, lean, high silt content - bedrock and joint oxidized between 16.5 m and 17.5 m			HQ20	100	25	13		R0	W4.5						
-17		Very poor quality brown SANDSTONE - moderately weathered, very weak, fine to medium grain, moderately to well cemented - poor quality below 16.8 m			HQ20	100	25	13		R1	W3						
-17					HQ21	100	60	35		R1	W3						
-18		Poor quality brown MUDSTONE - completely to highly weathered, extremely to very weak, lean, high silt content			HQ21	100	60	35		R0.5	W4.5						- direct shear from 17.53 to 18.03 m - Atterberg limits: PL19 - LL38
-18		Poor quality brown SANDSTONE - moderately weathered, very weak, fine to medium grain, moderately to well cemented - 30 mm rubble with infill zone at 18.1 m			HQ21	100	60	35		R1	W3						
-19		End of borehole (18.3 m) - water observed at 10.7 m upon drilling completion - borehole backfilled with cuttings and a bentonite seal near surface															

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.

App'd by:



BOREHOLE RECORD

LLO07

CLIENT Alberta Transportation

NORTHING 5657507

PROJECT NO. 110773396

PROJECT Springbank, Alberta

EASTING -28958

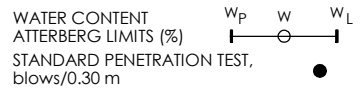
BH SIZE HS (200 mm)

DATES BORING 2018/05/04 to 2018/05/05

WATER LEVEL 5/5/2018 (0.2 m)

DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				ADVANCED LAB TESTS	GRAIN SIZE ANALYSIS				UNDRAINED SHEAR STRENGTH (kPa)					
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	WATER CONTENT ATTERBERG LIMITS (%)					
														40	80	120	160		
0	1185.92	TOPSOIL		IV															
0.5	1185.57	Very stiff to hard brown to grey sandy low plastic clay TILL (CL) - trace gravel, oxidation, bedrock fragments, wet			X	BS	1												
1.5		- some gravel below 1.5 m																	
2.0																			
2.5		- brown, gravelly, some sand below 2.4 m			X	BS	3												
3.0																			
3.5		- inferred cobble at 3.5 m																	
4.0																			
4.5		- trace brown sandstone bedrock fragments at 4.6 m																	
5.0	1180.82	Very dense brown poorly graded sandy GRAVEL (GP) - wet, trace clay			X	BS	5												
5.5																			
6.0																			
6.5																			
6.5									65.5	34.1	0.4								
7.0																			
7.5																			
8.0		- refusal on SS10: 50 for 125 mm - sloughed to 5.0 following drilling to 7.6 m, switch to hollow stem																	
8.5																			
9.0	1177.12	Inferred dark grey SEDIMENTARY BEDROCK - sandstone - moderately weathered, extremely weak, fine grained, moderately cemented																	
9.5																			
10.0																			



(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.
 (3) Grainsize results showing only percent SILT represent percent FINES (passing No. 200 sieve)

■ Undrained Shear Strength - Field (kPa)
 ▲ Undrained Shear Strength - Laboratory (kPa)

App'd by:



BOREHOLE RECORD

LLO07

CLIENT Alberta Transportation

NORTHING 5657507

PROJECT NO. 110773396

PROJECT Springbank, Alberta

EASTING -28958

BH SIZE HS (200 mm)

DATES BORING 2018/05/04 to 2018/05/05

WATER LEVEL 5/5/2018 (0.2 m)

DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				ADVANCED LAB TESTS	GRAIN SIZE ANALYSIS				UNDRAINED SHEAR STRENGTH (kPa)							
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	WATER CONTENT ATTERBERG LIMITS (%)							
														Wp	w	WL	STANDARD PENETRATION TEST, blows/0.30 m				
10		- refusal on SS11: 8/22/50 for 125 mm Continued: Inferred dark grey SEDIMENTARY BEDROCK - sandstone - moderately weathered, extremely weak, fine grained, moderately cemented - light grey to green below 10.6 m - refusal on SS12: 23/50 for 125 mm																			
11			SS	12		50+															
12																					
12.7	1173.27																				
13		End of borehole (12.7 m) - borehole slough to 5.8 m, water observed at 0.2 m upon drilling completion - borehole backfilled with cuttings to 5.8 m, bentonite seal near surface - borehole advanced with solid stem augers to 7.6 m, hollow stem augers to 12.7 m																			
14																					
15																					
16																					
17																					
18																					
19																					
20																					

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.
 (3) Grainsize results showing only percent SILT represent percent FINES (passing No. 200 sieve)

■ Undrained Shear Strength - Field (kPa)
 ▲ Undrained Shear Strength - Laboratory (kPa)

App'd by:



BOREHOLE RECORD

LLO08

CLIENT Alberta Transportation

NORTHING 5657439

PROJECT NO. 110773396

PROJECT Springbank, Alberta

EASTING -28912

BH SIZE SS (150 mm)

DATES BORING 2018/05/03 to 2018/05/03

WATER LEVEL 5/3/2018 (7.0 m)

DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				ADVANCED LAB TESTS	GRAIN SIZE ANALYSIS				UNDRAINED SHEAR STRENGTH (kPa)					
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	WATER CONTENT ATTERBERG LIMITS (%)					
														W _p	W	W _L	STANDARD PENETRATION TEST, blows/0.30 m		
0	1188.47	TOPSOIL																	
0.6	1188.37	Brown sandy low plastic CLAY (CL) - dry - moist below 0.6 m																	
1.7	1187.17	Stiff to very stiff brown medium plastic clay TILL (CL) - trace to some sand, trace gravel, mottled with brown, moist - some sand, trace coal below 2.4 m - trace oxidation below 3.5 m																	
1.7			BS	1															
1.7			SS	2	350	22													
2.7			BS	3															
3.7			ST	4	450														
3.7			SS	5	250	13													
4.7			BS	6															
4.7			ST	7	450														
5.7			SS	8	450	19													
5.7			BS	9	200	54													
6.7			SS	10															
6.7	1181.77	Compact brown clayey SAND (SC) - trace gravel, moist																	
7.7			BS	11	450	26													
7.7			SS	12															
8.7			BS	13	225	63													
8.7			SS	14															
9.7	1179.27	Very dense poorly graded GRAVEL (GP) with sand - trace clay, bedrock fragments, wet																	
9.7			SS	15															

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.
 (3) Grainsize results showing only percent SILT represent percent FINES (passing No. 200 sieve)

■ Undrained Shear Strength - Field (kPa)
 ▲ Undrained Shear Strength - Laboratory (kPa)

App'd by:



BOREHOLE RECORD

LLO08

CLIENT Alberta Transportation

NORTHING 5657439 PROJECT NO. 110773396

PROJECT Springbank, Alberta

EASTING -28912 BH SIZE SS (150 mm)

DATES BORING 2018/05/03 to 2018/05/03 WATER LEVEL

5/3/2018 (7.0 m) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				ADVANCED LAB TESTS	GRAIN SIZE ANALYSIS				UNDRAINED SHEAR STRENGTH (kPa)					
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	WATER CONTENT ATTERBERG LIMITS (%)					
														Wp	w	WL	STANDARD PENETRATION TEST, blows/0.30 m		
10		- refusal on SS15: 17/50 for 125 mm			X BS 14														
11	1177.17				SS 15	200	50+												
12		Inferred grey SEDIMENTARY BEDROCK - siltstone/mudstone - highly to completely weathered, extremely to very weak			X BS 16														
13					SS 17	100	43												
14		- refusal on SS19: 37/44/50 for 125 mm			X BS 18														
15		- siltstone below 15.2 m - refusal on SS21: 5/50 for 125 mm			SS 19	200	50+												
16	1173.17				X BS 20														
17		End of borehole (15.3 m) - borehole slough to 12.3 m, water observed at 7.0 m upon drilling completion - borehole backfilled with cuttings, bentonite seal near surface surface - borehole advanced with solid stem augers			SS 21	5	50+												

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.
 (3) Grainsize results showing only percent SILT represent percent FINES (passing No. 200 sieve)

■ Undrained Shear Strength - Field (kPa)
 ▲ Undrained Shear Strength - Laboratory (kPa)

App'd by:



BOREHOLE RECORD

LLO09

CLIENT Alberta Transportation NORTHING 5657810 PROJECT NO. 110773396
 PROJECT Springbank, Alberta EASTING -28989 BH SIZE SS (150 mm)
 DATES BORING 2018/05/07 to 2018/05/07 WATER LEVEL 5/7/2018 (12.7 m) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				ADVANCED LAB TESTS	GRAIN SIZE ANALYSIS				UNDRAINED SHEAR STRENGTH (kPa)				
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	WATER CONTENT ATTERBERG LIMITS (%)				
														40	80	120	160	
0	1193.06	Topsoil																
	1192.96	Brown clayey SAND (SC) - dry to moist																
	1192.36	Very stiff brown high plastic CLAY (CH) - trace sand, mottled grey, moist																
1																		
	1190.86	Very stiff brown medium plastic clay TILL (CI) - some sand, trace gravel, mottled grey, moist								1.7	9.0	38.6	50.7					
2																		
3																		
4																		
5																		
6		- trace coal below 6.1 m																
7																		
8																		
										5.7	16.1	45.2	33.0					
9																		
10		- sandy, trace to some gravel below 9.7 m																

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.
 (3) Grainsize results showing only percent SILT represent percent FINES (passing No. 200 sieve)

■ Undrained Shear Strength - Field (kPa)
 ▲ Undrained Shear Strength - Laboratory (kPa)

App'd by:



BOREHOLE RECORD

LLO09

CLIENT Alberta Transportation NORTHING 5657810 PROJECT NO. 110773396
 PROJECT Springbank, Alberta EASTING -28989 BH SIZE SS (150 mm)
 DATES BORING 2018/05/07 to 2018/05/07 WATER LEVEL 5/7/2018 (12.7 m) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				ADVANCED LAB TESTS	GRAIN SIZE ANALYSIS				UNDRAINED SHEAR STRENGTH (kPa)					
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	WATER CONTENT ATTERBERG LIMITS (%)					
														40	80	120	160		
10		Continued: Hard brown medium plastic clay TILL (CI) - sandy, trace to some gravel, mottled grey, moist			BS 13														
11					SS 14	450	50												
12					BS 15														
13	1180.36	- dark grey, dry to moist below 12.2 m - refusal on SS16: 28/30/50 for 125 mm			SS 16	450	50+												
14		Interbedded very dense brown poorly graded clayey GRAVEL (GP) with hard gravelly CLAY (CL) - some sand to sandy, some silt to silty, wet - refusal on SS18: 50 for 125 mm			BS 17														
15		- gravelly CLAY (CL), some sand, some silt between 14.4 and 15.1 m			SS 18	0	50+												
16		- sandy GRAVEL (GP), trace silt, trace clay below 15.1 m - clayey gravel below 15.8 m			BS 19				23.0	11.6	34.0	31.4							
17					SS 20	100	84		55.0	34.3	10.7								
18	1176.56	Inferred very poor quality SEDIMENTARY BEDROCK - siltstone and sandstone - highly weathered, extremely to very weak - fine grained - refusal on SS22: 40/50 for 75 mm			BS 21														
19					SS 22	125	50+												
20	1174.86	End of borehole (17.3 m) - borehole slough to 14.5 m water observed at 8.5 m upon drilling completion - borehole backfilled with cuttings to 14.5 m, bentonite seal near surface - borehole advanced with solid stem augers			BS 23														

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.
 (3) Grainsize results showing only percent SILT represent percent FINES (passing No. 200 sieve)

App'd by:

■ Undrained Shear Strength - Field (kPa)
 ▲ Undrained Shear Strength - Laboratory (kPa)



BOREHOLE RECORD

LLO10

CLIENT Alberta Transportation

NORTHING 5657791

PROJECT NO. 110773396

PROJECT Springbank, Alberta

EASTING -28888

BH SIZE SS (150 mm)

DATES BORING 2018/05/09 to 2018/05/09

WATER LEVEL 5/9/2018 (Dry)

DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				ADVANCED LAB TESTS	GRAIN SIZE ANALYSIS				UNDRAINED SHEAR STRENGTH (kPa)					
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	WATER CONTENT ATTERBERG LIMITS (%)					
														40	80	120	160		
0	1193.21	Topsoil																	
0	1193.01	Very stiff brown high plastic CLAY (CH) - trace sand, trace gravel, moist			BS 1														
1																			
2					SS 2	300	18		4.1	9.1	40.8	46.0							
3		- trace to some sand below 3.0 m			BS 3														
3	1190.01	Very stiff brown low plastic clay TILL (CL) - some sand, trace gravel, moist			ST 4	225													
4					SS 5	250	19												
4					BS 6														
5		- trace coal below 4.6			SS 7	450	16												
5					BS 8														
6					SS 9	450	19												
7					BS 10														
8		- trace to some gravel below 8.2 m			SS 11	250	23												
8					BS 12														
9		- hard below 9.1 m			SS 13	450	38												
10																			

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.
 (3) Grainsize results showing only percent SILT represent percent FINES (passing No. 200 sieve)

App'd by:

■ Undrained Shear Strength - Field (kPa)
 ▲ Undrained Shear Strength - Laboratory (kPa)



BOREHOLE RECORD

LLO10

CLIENT Alberta Transportation

NORTHING 5657791

PROJECT NO. 110773396

PROJECT Springbank, Alberta

EASTING -28888

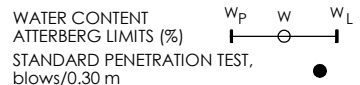
BH SIZE SS (150 mm)

DATES BORING 2018/05/09 to 2018/05/09

WATER LEVEL 5/9/2018 (Dry)

DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				ADVANCED LAB TESTS	GRAIN SIZE ANALYSIS				UNDRAINED SHEAR STRENGTH (kPa)					
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	WATER CONTENT ATTERBERG LIMITS (%)					
														40	80	120	160		
10		Continued: Hard brown low plastic clay TILL (CL) - some sand, trace to some gravel, moist - some sand to sandy below 10.6 m			BS	14													
11	1181.91		SS	15	450	34													
12		Hard brown silty SAND (SM) - trace to some clay, trace gravel, frequent coal, dry to moist			BS	16													
13	1179.81		SS	17	450	54	8.5	58.4	23.8	9.3									
14		Inferred very poor quality SEDIMENTARY BEDROCK - siltstone - highly weathered, extremely weak - refusal on SS19: 27/36/50 for 125 mm			BS	18													
15	1178.01		SS	19	300	50+													
16		Bedrock encountered at 13.4 m - coring commenced at 15.2 m (see rock coring log for details) - borehole advanced with solid stem augers to 15.2 m - borehole slough to 11.7 m and water at 10.1 m prior to coring			BS	20													
17																			
18																			
19																			
20																			



STANDARD PENETRATION TEST, blows/0.30 m

20 40 60 80

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.
 (3) Grainsize results showing only percent SILT represent percent FINES (passing No. 200 sieve)

■ Undrained Shear Strength - Field (kPa)
 ▲ Undrained Shear Strength - Laboratory (kPa)

App'd by:



BOREHOLE RECORD

LLO10

CLIENT Alberta Transportation NORTHING: _____ PROJECT No. 110773396
 PROJECT SRI Off-Stream Storage Reservoir EASTING: _____ BH SIZE 96.3 mm (HQ3)
 DRILLING DATE _____ to _____ WATER LEVEL 10.7 m (5/09/2018) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLE TYPE RUN NO.	RECOVERY		R.Q.D. %	FRACT. INDEX PER 1m	ROCK STRENGTH INDEX				WEATHERING INDEX						LABORATORY TESTING
						TOTAL CORE %	SOLID CORE %			R1	R2	R3	R4	W1	W2	W3	W4	W5	W6	
						FX-FRACTURE CL-CLEAVAGE SH-SHEAR VN-VEIN	F-FAULT JN-JOINT P-POLISHED S-SLICKENSIDED			SM-SMOOTH R-ROUGH ST-STEPPED PL-PLANAR	FL-FLEXURED UE-UNEVEN W-WAVY C-CURVED	BC-BROKEN CORE CONT-CONTACT B-BEDDING FOL-FOLIATION								
-15		Refer to soil log for overburden description				20 40 60 80	20 40 60 80	20 40 60 80	5 10 15 20	R1 R2 R3 R4	W1 W2 W3 W4 W5 W6									
		Poor quality grey MUDSTONE - high silt content - highly weathered, extremely weak - approx. 75 mm thick rubble zone at 15.6 m			HQ21	86	46	29		R0	W4									
-16		- sandstone/siltstone partings at 16.4 m and 16.5 m			HQ22	100	42	26		R0	W4									
-17		- highly to completely weathered below 17.2 m			HQ23	90	30	26		R0	W4.5									
-18		Very poor quality grey SANDSTONE - fine-grained, oxidized joints - moderately weathered, weak - rubble zone from 17.8 m to 18.1 m			HQ23	90	30	26		R2	W3									
-19		Very poor quality grey SILTSTONE/MUDSTONE - lean, high silt content - completed to moderately weathered, extremely to very weak			HQ24	77	12	0		R0.5	W4									
-20																				

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.

App'd by:



BOREHOLE RECORD

LLO10

CLIENT Alberta Transportation NORTHING: _____ PROJECT No. 110773396
 PROJECT SRI Off-Stream Storage Reservoir EASTING: _____ BH SIZE 96.3 mm (HQ3)
 DRILLING DATE _____ to _____ WATER LEVEL 10.7 m (5/09/2018) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLE TYPE RUN NO.	RECOVERY		R.Q.D. %	FRACT. INDEX PER 1m	ROCK STRENGTH INDEX			WEATHERING INDEX			LABORATORY TESTING				
						TOTAL CORE %	SOLID CORE %			R1	R2	R3	R4	W1	W2		W3	W4	W5	W6
						20	40			60	80	20	40	60	80		5	10	15	20
	-20	Continued: Very poor quality grey SILTSTONE/MUDSTONE - majority siltstone from 20.2 m to 20.9 m - approx. 100 mm thick rubble zone at 20.3 m - approx. 125 mm thick rubble zone at 20.4 m																		
					HQ25	83	35	16		R0.5			W4							
	-21	Very poor quality grey SANDSTONE - fine-grained - slightly weathered, weak																		
					HQ25	83	35	16		R2			W2							
	-22	- poor quality below 21.8 m																		
					HQ26	100	55	38		R2			W2							
	-23																			
	-24	End of borehole (23.3 m) - borehole slough to 6.6 m, water observed at 10.7 m upon drilling completion - borehole backfilled with cuttings and a bentonite seal near surface																		
	-25																			

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.

App'd by:



BOREHOLE RECORD

LLO12

CLIENT Alberta Transportation NORTHING 5657767 PROJECT NO. 110773396
 PROJECT Springbank, Alberta EASTING -28806 BH SIZE SS (150 mm)
 DATES BORING 2018/05/06 to 2018/05/07 WATER LEVEL 5/7/2018 (13.1 m) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				ADVANCED LAB TESTS	GRAIN SIZE ANALYSIS				UNDRAINED SHEAR STRENGTH (kPa)				
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	WATER CONTENT ATTERBERG LIMITS (%)				
														40	80	120	160	
0	1193.36	Topsoil																
0	1193.26	Very stiff brown high plastic CLAY (CH) - trace to some sand, trace bedrock fragments, moist			BS 1													
2					SS 2	350	19											
3					BS 3													
4		- trace sand below 3.5 m			ST 4	450		CU	0.1	3.5	39.4	57.0						
5		- some sand below 4.6 m			SS 5	225	16											
5	1188.36	Very stiff brown medium plastic clay TILL (CI) - trace to some sand, trace to some gravel, trace coal, moist			ST 6	450		c. CU	16.8	13.2	44.3	25.7						
6					SS 7	400	15											
7					SS 8	400	18											
8					BS 9													
8					ST 10	450		c. CU	11.1	6.1	75.8	7.0						
9		- sandy below 8.8 m - inferred cobbles between 8.8 m and 9.6 m			SS 11	450	22											
9					BS 12													
10	1183.66	Brown poorly graded SAND (SP)			SS 13	450	43											

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.
 (3) Grainsize results showing only percent SILT represent percent FINES (passing No. 200 sieve)

■ Undrained Shear Strength - Field (kPa)
 ▲ Undrained Shear Strength - Laboratory (kPa)

App'd by:



BOREHOLE RECORD

LLO12

CLIENT Alberta Transportation NORTHING 5657767 PROJECT NO. 110773396
 PROJECT Springbank, Alberta EASTING -28806 BH SIZE SS (150 mm)
 DATES BORING 2018/05/06 to 2018/05/07 WATER LEVEL 5/7/2018 (13.1 m) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				ADVANCED LAB TESTS	GRAIN SIZE ANALYSIS				UNDRAINED SHEAR STRENGTH (kPa)					
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	WATER CONTENT ATTERBERG LIMITS (%)					
														W _p	w	W _L	STANDARD PENETRATION TEST, blows/0.30 m		
10	1182.76	- gravelly, some silt, trace clay, moist			BS 14														
11		Very dense poorly graded GRAVEL (GP) - and sand, some silt, trace clay, dry - refusal on SS15: 50 for 100 mm			SS 15	100	50+		34.6	41.5	16.8	7.1							
12		- refusal on SS17: 50 for 75 mm			BS 16				45.7	34.1	13.8	6.4							
13					SS 17	75	50+												
14	1179.26	- refusal on SS19: 35/50 for 75 mm			BS 18														
15	1178.16	Very dense brown clayey GRAVEL (GC) - some sand, moist to wet			SS 19	100	50+												
16		Inferred very poor quality SEDIMENTARY BEDROCK - siltstone - extremely to very weak, highly weathered - refusal on SS21: 30/50 for 125 mm - refusal on SS23: 50 for 100 mm			BS 20														
17	1176.56	grey below 16.7 m			SS 21	150	50+												
18		End of borehole (16.8 m) - borehole slough to 14.1 m water observed at 13.1 m upon drilling completion - borehole backfilled with cuttings to 14.1 m, bentonite seal near surface - borehole advanced with solid stem augers			BS 22														
19					SS 23	100	50+												
20																			

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.
 (3) Grainsize results showing only percent SILT represent percent FINES (passing No. 200 sieve)

■ Undrained Shear Strength - Field (kPa)
 ▲ Undrained Shear Strength - Laboratory (kPa)

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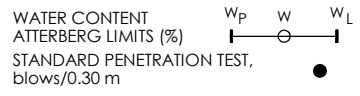


BOREHOLE RECORD

LLO15

CLIENT Alberta Transportation NORTHING 5657669 PROJECT NO. 110773396
 PROJECT Springbank, Alberta EASTING -28734 BH SIZE SS (150 mm)
 DATES BORING 2018/05/01 to 2018/05/07 WATER LEVEL 5/7/2018 (10.0 m) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				ADVANCED LAB TESTS	GRAIN SIZE ANALYSIS				UNDRAINED SHEAR STRENGTH (kPa)					
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	WATER CONTENT ATTERBERG LIMITS (%)					
														40	80	120	160		
0	1190.63	Topsoil																	
0	1190.28	Very stiff to hard brown to grey medium plastic clay TILL (CI) - some sand, trace gravel, trace coal, moist																	
1			BS 1																
2			SS 2	300	35		3.4	11.7	45.2	39.7									
3			BS 3																
4			SS 4	400	21														
5			BS 5																
6			SS 6	250	28														
7			BS 7																
8			SS 8	0	50+														
9			BS 9																
10			SS 10	100	50+														
11		BS 11				67.4	17.2	10.1	5.3										
12		SS 12	200	85															



STANDARD PENETRATION TEST, blows/0.30 m

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.
 (3) Grain size results showing only percent SILT represent percent FINES (passing No. 200 sieve)

■ Undrained Shear Strength - Field (kPa)
 ▲ Undrained Shear Strength - Laboratory (kPa)

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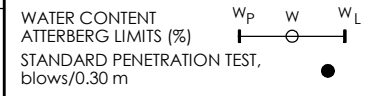


BOREHOLE RECORD

LLO15

CLIENT Alberta Transportation NORTHING 5657669 PROJECT NO. 110773396
 PROJECT Springbank, Alberta EASTING -28734 BH SIZE SS (150 mm)
 DATES BORING 2018/05/01 to 2018/05/07 WATER LEVEL 5/7/2018 (10.0 m) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				ADVANCED LAB TESTS	GRAIN SIZE ANALYSIS				UNDRAINED SHEAR STRENGTH (kPa)						
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	WATER CONTENT ATTERBERG LIMITS (%)						
														40	80	120	160			
10	1178.43	Continued: Interbedded very dense poorly graded GRAVEL (GP), some sand to poorly graded SAND (SP), some gravel - trace silt, trace clay, dry - refusal on SS14: 49/50 for 25 mm			BS 13				7.8	69.5	22.7									
11					SS 14	150	50+													
12					BS 15															
13		Inferred very poor quality SEDIMENTARY BEDROCK - siltstone to mudstone - very weak, moderately weathered - refusal on SS16: 30/32/50 for 100 mm			SS 16	75	50+													
14	1176.53	- refusal on SS18: 23/43/50 for 125 mm			BS 17															
15		End of borehole (14.1 m) - borehole slough to 10.5 m, water observed at 10.0 m upon drilling completion - borehole backfilled with cuttings to 14.1 m, bentonite seal near surface - borehole advanced with solid stem augers			SS 18	250	50+													
16																				
17																				
18																				
19																				
20																				



(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.
 (3) Grainsize results showing only percent SILT represent percent FINES (passing No. 200 sieve)

■ Undrained Shear Strength - Field (kPa)
 ▲ Undrained Shear Strength - Laboratory (kPa)

App'd by:



BOREHOLE RECORD

LLO16

CLIENT Alberta Transportation

NORTHING 5657672

PROJECT NO. 110773396

PROJECT Springbank, Alberta

EASTING -28737

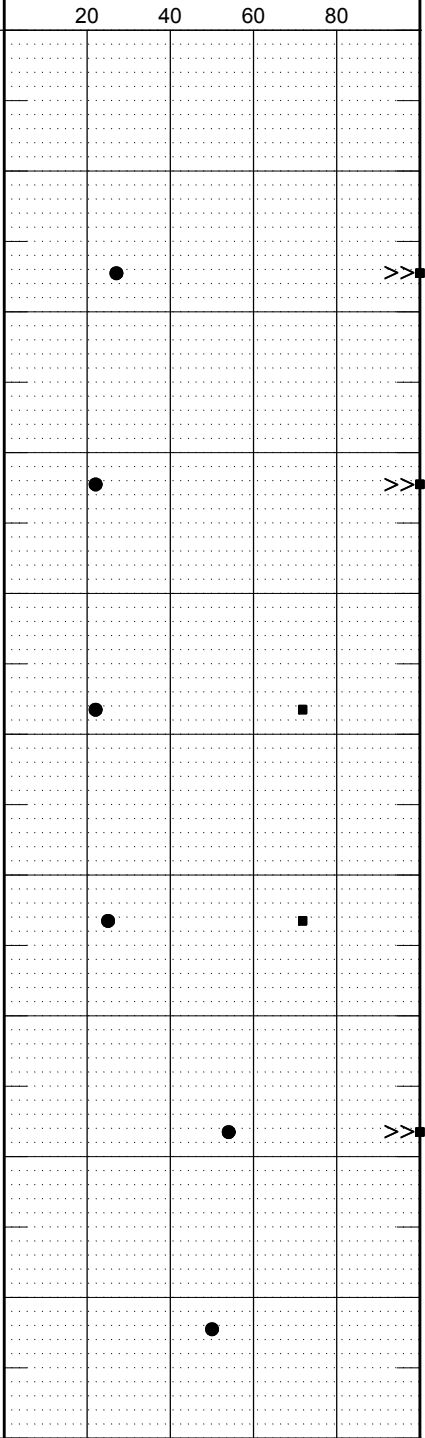
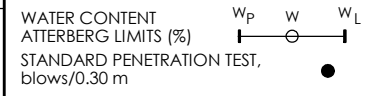
BH SIZE SS (150 mm)

DATES BORING 2018/05/07 to 2018/05/07

WATER LEVEL 5/7/2018 (14.7 m)

DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				ADVANCED LAB TESTS	GRAIN SIZE ANALYSIS				UNDRAINED SHEAR STRENGTH (kPa)				
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	WATER CONTENT ATTERBERG LIMITS (%)				
														40	80	120	160	
0	1192.25	Topsoil																
0.5	1191.95	Brown sandy medium plastic CLAY (CI) - trace gravel, dry			BS	1												
1	1191.25	Very stiff brown sandy low to medium plastic clay TILL (CL-CI) - moist			SS	2	200	27										
2.5		- trace bedrock fragments below 2.4 m			BS	3												
3.5					SS	4	380	22										
4.5		- sand partings and layers below 3.8 m (up to 50 mm thick)			BS	5												
5.5		- trace coal below 4.7 m			SS	6	350	22										
6.5					BS	7												
7.5					SS	8	450	25										
8.5					BS	9												
8.5					SS	10	450	54										
9	1183.85	Very dense brown poorly graded GRAVEL (GP) - some sand, dry to moist			BS	11												
9.1		- borehole slough to 8.4 m following drilling to 9.1 m - refusal on SS12: 25/50 for 100 mm			SS	12	100	50+										



(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.
 (3) Grainsize results showing only percent SILT represent percent FINES (passing No. 200 sieve)

■ Undrained Shear Strength - Field (kPa)
 ▲ Undrained Shear Strength - Laboratory (kPa)

App'd by:



BOREHOLE RECORD

LLO16

CLIENT Alberta Transportation

NORTHING 5657672

PROJECT NO. 110773396

PROJECT Springbank, Alberta

EASTING -28737

BH SIZE SS (150 mm)

DATES BORING 2018/05/07 to 2018/05/07

WATER LEVEL 5/7/2018 (14.7 m)

DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				ADVANCED LAB TESTS	GRAIN SIZE ANALYSIS				UNDRAINED SHEAR STRENGTH (kPa)						
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	WATER CONTENT ATTERBERG LIMITS (%)						
														W _p	w	W _L	STANDARD PENETRATION TEST, blows/0.30 m			
10		Very dense brown poorly graded GRAVEL (GP) - some sand, dry to moist - refusal on SS14: 50 for 125 mm - borehole slough to 10.5 m following drilling to 12.2 m - refusal on SS18: 38/50 for 125 mm			BS	13														
						SS	14	50	50+											
						BS	15													
						SS	16	300	80											
						BS	17													
						SS	18	100	50+											
15	1177.25	Inferred very poor quality grey SEDIMENTARY BEDROCK - sandstone - extremely to very weak, moderately to highly weathered - refusal on SS20: 50 for 50 mm - refusal on SS22: 50 for 75 mm			BS	19														
						SS	20	50	50+											
						BS	21													
17	1175.45	End of borehole (16.8 m) - borehole slough to 15.5 m, water observed at 14.7 m upon drilling completion - 25 mm piezometer slotted from 8.5 m to 15.5 m - annulus backfilled with cuttings and bentonite seal near surface - borehole advanced with solid stem augers			SS	22	75	50+												
18																				
19																				
20																				

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.
 (3) Grainsize results showing only percent SILT represent percent FINES (passing No. 200 sieve)

■ Undrained Shear Strength - Field (kPa)
 ▲ Undrained Shear Strength - Laboratory (kPa)

App'd by:



BOREHOLE RECORD

LLO17

CLIENT Alberta Transportation NORTHING 5657384 PROJECT NO. 110773396
 PROJECT Springbank, Alberta EASTING -28996 BH SIZE HS (83 mm)
 DATES BORING 2018/09/25 to 2018/09/26 WATER LEVEL 9/26/2018 (12.6 m) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				ADVANCED LAB TESTS	GRAIN SIZE ANALYSIS				UNDRAINED SHEAR STRENGTH (kPa)					
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	WATER CONTENT ATTERBERG LIMITS (%)					
														40	80	120	160		
0	1191.16	TOPSOIL																	
0	1191.02	Stiff to very stiff brown high plastic CLAY (CH) - trace sand, trace gravel, rootlets to 0.9 m, dry			SS	1	180	13											
1					SS	2	80	16	7.8	9.6	82.6								
2		- moist below 1.8 m			SS	3	300	23											
2		- mottled with light brown below 2.3 m			SS	4	330	18											
3		- 90 mm thick sand with gravel layer at 2.5 m			SS	5	390	14											
3	1187.96	- mottled with grey below 3.1 m			SS	6	450	14											
4		Very stiff brown low to medium plastic clay TILL (CL-CI) - some gravel, some sand, moist			SS	7	400	15											
4					SS	8	350	18											
5		- mottled with light brown below 4.8 m			SS	9	290	24											
5					SS	10	450	17	17.9	17.6	64.5								
6		- trace oxidation below 5.4 m			SS	11	385	16											
6					SS	12	400	25											
7					SS	13	450	25											
7					SS	14	430	23											
7					SS	15	450	25											
8					SS	16	440	24											
8					SS	17	450	23	15.7	19	65.3								
9		- greyish brown below 8.6 m - trace oxidation from 8.6 m to 8.9 m			SS	18	40	30											
9					SS	19	450	26											
9					SS	20	320	27											
10		- sandstone fragments at 9.6 m			SS	21	450	22											
10					SS	22	450	18											

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.
 (3) Grainsize results showing only percent SILT represent percent FINES (passing No. 200 sieve)

■ Undrained Shear Strength - Field (kPa)
 ▲ Undrained Shear Strength - Laboratory (kPa)

App'd by:



BOREHOLE RECORD

LLO17

CLIENT Alberta Transportation NORTHING 5657384 PROJECT NO. 110773396
 PROJECT Springbank, Alberta EASTING -28996 BH SIZE HS (83 mm)
 DATES BORING 2018/09/25 to 2018/09/26 WATER LEVEL 9/26/2018 (12.6 m) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				ADVANCED LAB TESTS	GRAIN SIZE ANALYSIS				UNDRAINED SHEAR STRENGTH (kPa)								
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	WATER CONTENT ATTERBERG LIMITS (%)								
														W _p	w	W _L	STANDARD PENETRATION TEST, blows/0.30 m					
10		Very stiff brown low to medium plastic clay TILL (CL-CI) - some gravel, some sand, moist - some gravel to gravelly, some sand to sandy below 10.4 m - moist to wet below 11.7 m - sandstone fragments at 12.1 m - grey below 12.3 m			SS	23	400	18														
					SS	24	450	22	22.8	21.1	56.1											
					SS	25	380	21														
					SS	26	450	22														
					SS	27	390	20														
	1178.76				SS	28	420	62+														
					SS	29	70	50+														
					SS	30	450	48														
	1176.91	SS	31	430	47																	
15		End of borehole (14.3 m) - borehole advanced using hollow stem augers - borehole slough to 13.6 m upon completion - three vibrating wire piezometers installed to depths of 2.9 m, 10.0 m and 12.85 m - borehole backfilled using sand and grout																				

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.
 (3) Grainsize results showing only percent SILT represent percent FINES (passing No. 200 sieve)

■ Undrained Shear Strength - Field (kPa)
 ▲ Undrained Shear Strength - Laboratory (kPa)

App'd by:



BOREHOLE RECORD

LLO17A

CLIENT Alberta Transportation

NORTHING 5657384

PROJECT NO. 110773396

PROJECT Springbank, Alberta

EASTING -28994

BH SIZE HS (83 mm)

DATES BORING 2018/09/26 to 2018/09/26

WATER LEVEL 9/26/2018 (Dry)

DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				ADVANCED LAB TESTS	GRAIN SIZE ANALYSIS				UNDRAINED SHEAR STRENGTH (kPa)					
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	WATER CONTENT ATTERBERG LIMITS (%)					
														40	80	120	160		
0	1191.16	TOPSOIL																	
0	1191.02	Brown medium to high plastic CLAY (CI-CH) - trace sand, trace gravel, rootlets to 0.9 m, dry - moist below 0.9 m - trace oxidation from 0.9 m to 1.8 m - trace coal from 1.4 m to 1.8 m																	
1					ST	1	260												
1					ST	2	415												
2					ST	3	220												
2					ST	4	340												
3					ST	5	350		0.4	10.8	88.8								
3	1187.96	Brown low to medium plastic clay TILL (CL-CI) - some gravel, some sand, moist - mottled with light brown to 3.6 m			ST	6	355												
4					ST	7	395												
4					ST	8	375												
5		ORIGINAL TARGET DEPTH 5m - Borehole extended to retrieve shelly tubes at 9.5 m to 10.0 m			ST	9	365		13.9	15.2	70.9								
10		- brownish grey below 9.5 m			ST	10	310												

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.
 (3) Grainsize results showing only percent SILT represent percent FINES (passing No. 200 sieve)

App'd by:

■ Undrained Shear Strength - Field (kPa)
 ▲ Undrained Shear Strength - Laboratory (kPa)



BOREHOLE RECORD

LLO18

CLIENT Alberta Transportation NORTHING 5657414 PROJECT NO. 110773396
 PROJECT Springbank, Alberta EASTING -29022 BH SIZE HS (83 mm)
 DATES BORING 2018/09/24 to 2018/09/25 WATER LEVEL 9/25/2018 (14.0 m) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				ADVANCED LAB TESTS	GRAIN SIZE ANALYSIS				UNDRAINED SHEAR STRENGTH (kPa)					
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	WATER CONTENT ATTERBERG LIMITS (%) STANDARD PENETRATION TEST, blows/0.30 m					
														40	80	120	160		
0	1191.66	TOPSOIL																	
0	1191.52	Stiff to very stiff brown high plastic CLAY (CH) - trace gravel, trace to some sand, rootlets to 1.0 m, dry			SS	1	340	13											
0.5					SS	2	290	18	2.4	33.7	63.9								
1					SS	3	360	27											
1.5		- moist below 1.4 m			SS	4	310	24											
2		- trace coal from 1.5 m to 3.2 m - mottled with light brown below 1.8 m			SS	5	450	19											
2.5					SS	6	360	13	0.8	7.2	92.0								
3		- trace oxidation from 2.7 m to 3.2 m - 2 mm thick sand seam with coal at 2.9 m			SS	7	450	12											
3.5					SS	8	410	9											
4		- 70 mm thick moist to wet sand seam with coal at 3.4 m			SS	9	430	11											
4.5		- trace oxidation at 3.9 m			SS	10	370	14											
4.5	1187.26	- 20 mm thick sand and gravel seam at 4.2 m			SS	11	370	17											
5		Stiff to very stiff brown low to medium plastic clay (CL) TILL - some gravel, some sand, trace coal, oxidation, moist			SS	12	0	30											
6		- sandstone fragments at 5.7 m			SS	13	400	12	16.4	17.1	66.5								
6.5					SS	14	140	23											
7		- 90 mm thick gravelly seam at 6.7 m			SS	15	450	21											
7.5					SS	16	240	26											
8					SS	17	440	26											
8.5					SS	18	80	28											
9		- trace coal from 8.2 m to 10.0 m			SS	19	240	25											
9.5					SS	20	0	31											
10		- gravelly below 9.1 m			SS	21	370	23	30.7	17.8	51.5								
10					SS	22	400	25											

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.
 (3) Grainsize results showing only percent SILT represent percent FINES (passing No. 200 sieve)

■ Undrained Shear Strength - Field (kPa)
 ▲ Undrained Shear Strength - Laboratory (kPa)

App'd by:



BOREHOLE RECORD

LLO18

CLIENT Alberta Transportation NORTHING 5657414 PROJECT NO. 110773396
 PROJECT Springbank, Alberta EASTING -29022 BH SIZE HS (83 mm)
 DATES BORING 2018/09/24 to 2018/09/25 WATER LEVEL 9/25/2018 (14.0 m) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				ADVANCED LAB TESTS	GRAIN SIZE ANALYSIS				UNDRAINED SHEAR STRENGTH (kPa)				
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	WATER CONTENT ATTERBERG LIMITS (%)				
														40	80	120	160	
10		Continued: Stiff to very stiff brown low to medium plastic clay (CL) TILL - gravelly, some sand, trace coal, oxidation, moist - 200 mm thick gravelly layer at 10.6 m - dark brown from 10.9 m to 11.1 m - brownish grey below 11.5 m - moist to wet from 11.8 m to 12.7 m - trace gravel, sandy below 12.3 m		1178.26	SS	23	440	27	25.5	18.5	56.0	20	40	60	80			
11	SS				24	350	30											
11	SS				25	320	28											
12	SS				26	400	23											
12	SS				27	150	20											
13	SS				28	340	20											
13	SS				29	450	18											
14	SS				30	450	56											
14	SS				31	370	85											
14	1177.56				Inferred brown SEDIMENTARY BEDROCK - highly to completely weathered siltstone - inferred seepage at 14.0 m End of borehole (14.1 m) - borehole advanced using hollow stem augers - borehole open, water level at 14.0 m upon drilling completion - borehole backfilled with cuttings, bentonite seal near surface		1177.56											
15																		
16																		
17																		
18																		
19																		
20																		

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.
 (3) Grainsize results showing only percent SILT represent percent FINES (passing No. 200 sieve)

■ Undrained Shear Strength - Field (kPa)
 ▲ Undrained Shear Strength - Laboratory (kPa)

App'd by:

APPENDIX D.3: GLACIOLACUSTRINE (GL)



BOREHOLE RECORD

GL1

CLIENT Alberta Transportation NORTHING 5657279 PROJECT NO. 110773396
 PROJECT Springbank, Alberta EASTING -29450 BH SIZE HS (83mm)
 DATES BORING 2018/09/27 to 2018/09/28 WATER LEVEL 10/01/2018 (9.1 m) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				ADVANCED LAB TESTS	GRAIN SIZE ANALYSIS				UNDRAINED SHEAR STRENGTH (kPa)					
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	WATER CONTENT ATTERBERG LIMITS (%)					
														40	80	120	160		
0	1191.94	Inferred TOPSOIL			SS	1	170	11											
1	1191.14	Stiff to very stiff brown medium to high plastic CLAY (CI-CH) - some sand, trace gravel, dry - moist below 1.4 m			SS	2	140	16											
2		- 20 mm thick precipitate layer at 2.1 m - mottled with light brown below 2.3 m			SS	3	90	13											
3		- 3 mm thick coal with organics layer at 2.3 m - mottled with grey below 3.2 m			SS	4	340	15											
4		- trace coal from 3.6 m to 4.1 m			SS	5	340	13											
5		- trace sandstone fragments at 4.5 m			SS	6	320	13	5.4	16.5	78.1								
6		- 30 mm thick organics with rootlets seam at 5.0 m - trace white precipitates, sandstone fragments at 5.1 m			SS	7	400	15											
7		- mottled with grey from 5.5 m to 7.3 m			SS	8	410	17											
8					SS	9	450	16											
9		- some gravel to gravelly below 8.5 m			SS	10	370	15											
10					SS	11	450	18											
					SS	12	300	28											
					SS	13	450	18											
					SS	14	450	17	5.0	20.6	74.4								
					SS	15	430	18											
					SS	16	450	17											
					SS	17	415	25											
					SS	18	405	19											
					SS	19	60	22	20.8	20.5	58.7								
					SS	20	430	18											
					SS	21	425	21											

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.
 (3) Grainsize results showing only percent SILT represent percent FINES (passing No. 200 sieve)

App'd by:

■ Undrained Shear Strength - Field (kPa)
 ▲ Undrained Shear Strength - Laboratory (kPa)



BOREHOLE RECORD

GL1

CLIENT Alberta Transportation NORTHING 5657279 PROJECT NO. 110773396
 PROJECT Springbank, Alberta EASTING -29450 BH SIZE HS (83mm)
 DATES BORING 2018/09/27 to 2018/09/28 WATER LEVEL 10/01/2018 (9.1 m) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				ADVANCED LAB TESTS	GRAIN SIZE ANALYSIS				UNDRAINED SHEAR STRENGTH (kPa)					
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	WATER CONTENT ATTERBERG LIMITS (%)					
														40	80	120	160		
10	1180.14	Continued: Very stiff brown medium to high plastic CLAY (CI-CH)			SS	22	440	22											
11					SS	23	450	20											
12		Very stiff brown low to medium plastic clay (CL-CI) TILL - some gravel, some sand, moist - 20 mm thick gravelly seam at 12.4 m			SS	24	450	16											
13		- trace coal from 13.1 m to 13.8 m - 25 mm thick sandy, wet seam at 13.6 m			SS	25	450	20											
14		- sandstone fragments at 14.0 m			SS	26	450	25											
15		- trace coal below 14.7 m			SS	27	450	20	20.6	17.7	61.7								
16		- brownish grey below 15.5 m			SS	28	450	21											
17	1175.44	Greyish brown SEDIMENTARY BEDROCK - moderately to highly weathered, trace oxidation - claystone			SS	29	390	25											
18	1174.74	End of borehole (17.2 m) - borehole advanced used hollow stem augers - sloughed to 11.2 m upon drilling completion, re-drilled borehole for installation of piezometers - water level at 9.1 m on October 1st - three vibrating wire piezometers installed at 7.0 m, 14.0 m and 16.5 m - borehole backfilled with grout			SS	30	320	25											
19					SS	31	260	41											
20					SS	32	400	27	16.3	19.0	64.7								

■ Undrained Shear Strength - Field (kPa)
 ▲ Undrained Shear Strength - Laboratory (kPa)

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.
 (3) Grainsize results showing only percent SILT represent percent FINES (passing No. 200 sieve)

App'd by:



BOREHOLE RECORD

GL1A

CLIENT Alberta Transportation

NORTHING 5657281

PROJECT NO. 110773396

PROJECT Springbank, Alberta

EASTING -29450

BH SIZE HS (83mm)

DATES BORING 2018/09/28 to 2018/09/29

WATER LEVEL 09/29/2018 (dry)

DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				ADVANCED LAB TESTS	GRAIN SIZE ANALYSIS				UNDRAINED SHEAR STRENGTH (kPa)						
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	WATER CONTENT ATTERBERG LIMITS (%)						
														W _p	w	W _L	STANDARD PENETRATION TEST, blows/0.30 m			
0	1191.94	Inferred TOPSOIL (based on GL1)																		
1	1191.14	Very stiff brown medium to high plastic CLAY (CI-CH) - sandy, trace rootlets, dry - mottled with light brown, moist below 1.1 m - trace gravel, trace sand below 2.4 m - trace coal below 3.2 m - trace precipitates at 4.1 m - mottled with light brown and grey below 5.0 m																		
			ST 1	260																
			ST 2	330																
			ST 3	260	c			0.0	49.9	50.1										
			ST 4	350																
			ST 5	230																
			ST 6	300																
			ST 7	350																
			ST 8	280																
			ST 9	355	c			8.4	4.6	87.0										
			ST 10	335																
			ST 11	370																
			ST 12	235	c			6.8	7.0	86.2										>>
			ST 13	390																
			ST 14	350																
			ST 15	300																
			ST 16	345	c			6.5	8.4	85.1										
			ST 17	370																
			ST 18	350																>>
			ST 19	335																
		ST 20	360																	
	1182.34	Very stiff to hard brown low to medium plastic clay (CL-CI) TILL	ST 21	380															>>	

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.
 (3) Grainsize results showing only percent SILT represent percent FINES (passing No. 200 sieve)

■ Undrained Shear Strength - Field (kPa)
 ▲ Undrained Shear Strength - Laboratory (kPa)

App'd by:



BOREHOLE RECORD

GL1A

CLIENT Alberta Transportation NORTHING 5657281 PROJECT NO. 110773396
 PROJECT Springbank, Alberta EASTING -29450 BH SIZE HS (83mm)
 DATES BORING 2018/09/28 to 2018/09/29 WATER LEVEL 09/29/2018 (dry) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				ADVANCED LAB TESTS	GRAIN SIZE ANALYSIS				UNDRAINED SHEAR STRENGTH (kPa)									
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	40	80	120	160						
														WATER CONTENT ATTERBERG LIMITS (%)				STANDARD PENETRATION TEST, blows/0.30 m					
										W_p w W_L ○-----●-----													
10	1179.94	- trace gravel, trace sand, mottled with light brown and grey, moist - some sand, trace coal, oxidation below 9.6 m - greyish brown, sandy below 10.5 m - brown, mottled with light brown below 10.9 m - some sand below 11.5 m			ST	22	380		c	6.8	9.5	83.7											
					ST	23	375																
					ST	24	280										40	80					80
					ST	25	335																
12		End of borehole (12.0 m) - borehole advanced using hollow stem augers - borehole open and dry upon drilling completion - borehole backfilled with cuttings, bentonite seal from 11.35 m to 12.0 m and 0.6 m to 1.5 m																					
13																							
14																							
15																							
16																							
17																							
18																							
19																							
20																							

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.
 (3) Grainsize results showing only percent SILT represent percent FINES (passing No. 200 sieve)

■ Undrained Shear Strength - Field (kPa)
▲ Undrained Shear Strength - Laboratory (kPa)

App'd by:



BOREHOLE RECORD

GL2

CLIENT Alberta Transportation

NORTHING 5657124 PROJECT NO. 110773396

PROJECT Springbank, Alberta

EASTING -29451 BH SIZE HS (83mm)

DATES BORING 2018/09/26 to 2018/09/27 WATER LEVEL

09/27/2018 (dry) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				ADVANCED LAB TESTS	GRAIN SIZE ANALYSIS				UNDRAINED SHEAR STRENGTH (kPa)						
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	WATER CONTENT ATTERBERG LIMITS (%)						
														W _p	W	W _L	STANDARD PENETRATION TEST, blows/0.30 m			
0	1191.85	Inferred TOPSOIL																		
1	1190.75	Brown medium to high plastic CLAY (CI-CH) - trace to some sand, trace gravel, mottled with light brown, moist - trace rootlets to 2.0 m - trace coal from 2.0 m to 2.4 m, from 4.7 m to 5.1 m and from 7.8 m to 8.3 m - mottled with light brown and grey from 2.9 m to 3.3 m - trace gravel below 7.3 m - inferred cobble at 8.7 m																		
			ST 1	200																
			ST 2	420																
			ST 3	405																
			ST 4	390					c	1.5	17.7	80.8								
			ST 5	410																
			ST 6	395					DSS											
			ST 7	390																
			ST 8	400																
			ST 9	395																
			ST 10	380																
			ST 11	435					c	4.5	10.4	85.1								
			ST 12	400																
			ST 13	390					DSS											
		ST 14	340																	
		ST 15	400					c	3.2	15.3	81.5									
		ST 16	355																	
		ST 17	340					c	4.3	7.4	88.3									
		ST 18	280																	
		ST 19	415					DSS												
		ST 20	395																	
9	1182.65	Brown low to medium plastic clay (CL-CI) TILL - some sand, trace gravel, coal, oxidation, moist																		
10																				

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.
 (3) Grainsize results showing only percent SILT represent percent FINES (passing No. 200 sieve)

■ Undrained Shear Strength - Field (kPa)
 ▲ Undrained Shear Strength - Laboratory (kPa)

App'd by:



BOREHOLE RECORD

GL2

CLIENT Alberta Transportation

NORTHING 5657124 PROJECT NO. 110773396

PROJECT Springbank, Alberta

EASTING -29451 BH SIZE HS (83mm)

DATES BORING 2018/09/26 to 2018/09/27 WATER LEVEL

09/27/2018 (dry) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				ADVANCED LAB TESTS	GRAIN SIZE ANALYSIS				UNDRAINED SHEAR STRENGTH (kPa)									
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	WATER CONTENT ATTERBERG LIMITS (%)									
														W _p	w	W _L	STANDARD PENETRATION TEST, blows/0.30 m						
10		Continued: Brown low to medium plastic clay (CL-CI) TILL - some sand, trace gravel, coal, oxidation, moist			ST	21	440																
					ST	22	450	c	7.5	14.0	78.5												
					ST	23	445																
					ST	24	450	c															
12	1179.85	End of borehole (12.0 m) - borehole advanced using hollow stem augers - borehole open and dry upon drilling completion - borehole backfilled with cuttings, bentonite seal from 0.9 m to 1.2 m																					
13																							
14																							
15																							
16																							
17																							
18																							
19																							
20																							

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.
 (3) Grainsize results showing only percent SILT represent percent FINES (passing No. 200 sieve)

■ Undrained Shear Strength - Field (kPa)
 ▲ Undrained Shear Strength - Laboratory (kPa)

App'd by:



BOREHOLE RECORD

GL3

CLIENT Alberta Transportation NORTHING 5657126 PROJECT NO. 110773396
 PROJECT Springbank, Alberta EASTING -29192 BH SIZE HS (83mm)
 DATES BORING 2018/09/29 to 2018/10/01 WATER LEVEL 10/01/2018 (14.9 m) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				ADVANCED LAB TESTS	GRAIN SIZE ANALYSIS				UNDRAINED SHEAR STRENGTH (kPa)						
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	WATER CONTENT ATTERBERG LIMITS (%)						
														40	80	120	160			
0	1191.02	TOPSOIL																		
1	1190.12	Stiff to very stiff brown medium plastic CLAY (CI) - trace to some sand, trace gravel, dry - moist below 1.3 m - 10 mm thick silty sand seam at 1.4 m - mottled with light brown - coal at 1.9 m - trace oxidation at 2.8 m - trace precipitates from 2.8 m to 2.9 m - light brown from 3.2 m to 4.0 m																		
2			SS 3	150	21		2.9	11.9	85.2											
3			SS 4	160	14															
4			SS 5	280	13															
5			SS 6	370	15															
6			SS 7	260	13															
7			SS 8	410	15															
8			SS 9	330	13															
9			SS 10	380	16															
10			SS 11	360	16															
11			SS 12	415	19															
12			SS 13	370	18															
13			SS 14	415	24															
14		SS 15	100	21					2.3	40.3	57.4									
15		SS 16	420	19																
16		SS 17	440	19																
17		SS 18	420	18																
18		SS 19	430	18																
19		SS 20	400	28																
20		SS 21	30	32																
21		SS 22	330	33																

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.
 (3) Grainsize results showing only percent SILT represent percent FINES (passing No. 200 sieve)

■ Undrained Shear Strength - Field (kPa)
 ▲ Undrained Shear Strength - Laboratory (kPa)

App'd by:



BOREHOLE RECORD

GL3

CLIENT Alberta Transportation NORTHING 5657126 PROJECT NO. 110773396
 PROJECT Springbank, Alberta EASTING -29192 BH SIZE HS (83mm)
 DATES BORING 2018/09/29 to 2018/10/01 WATER LEVEL 10/01/2018 (14.9 m) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				ADVANCED LAB TESTS	GRAIN SIZE ANALYSIS				UNDRAINED SHEAR STRENGTH (kPa)					
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	WATER CONTENT ATTERBERG LIMITS (%)					
														W _p	W	W _L	STANDARD PENETRATION TEST, blows/0.30 m		
10		Continued: Very stiff to hard light brown medium plastic clay (CI) TILL - sandy, trace gravel, trace coal, oxidation, moist - sandstone fragments from 10.3 to 11.0 m - some gravel below 10.6 m - hard below 11.0 m - gravelly below 11.9 m			SS	23	450	22		11.5	21.0	67.5							
11			SS	24	450	23													
			SS	25	450	37													
			SS	26	240	49													
			SS	27	450	48													
			SS	28	60	52													
			SS	29	450	42													
			SS	30	450	39				15.7	24.3	60.0							
			SS	31	450	59													
			SS	32	320	52													
15		- 90 mm thick sand layer at 14.8 m - trace bedrock fragments below 14.9 m - inferred seepage at 14.9 m - 300 mm thick sandy, gravelly layer at 15.3 m - grey below 15.6 m Light brown SEDIMENTARY BEDROCK - residual soil - mudstone and siltstone - grey below 15.9 m - highly to completely weathered below 16.2 m - bluish grey below 16.8 m - moderately weathered, brownish grey below 17.6 m			SS	33	410	70		19.3	42.2	38.5							
			SS	34	350	43													
	1175.22		SS	35	250	42													
			SS	36	260	52													
			SS	37	300	65													
			SS	38	360	70													
			SS	39		50+													
18	1172.92	End of borehole (18.1 m) - borehole advanced using hollow stem augers - inferred water seepage at 14.9 m - three vibrating wire piezometers installed to depths of 3.0 m, 12.0 m and 15.0 m - borehole backfilled with grout through hollow stem																	
19																			
20																			

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.
 (3) Grainsize results showing only percent SILT represent percent FINES (passing No. 200 sieve)

■ Undrained Shear Strength - Field (kPa)
 ▲ Undrained Shear Strength - Laboratory (kPa)

App'd by:



BOREHOLE RECORD

GL3A

CLIENT Alberta Transportation

NORTHING 5657125 PROJECT NO. 110773396

PROJECT Springbank, Alberta

EASTING -29193 BH SIZE HS (83mm)

DATES BORING 2018/10/01 to 2018/10/01 WATER LEVEL

10/01/2018 (dry) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				ADVANCED LAB TESTS	GRAIN SIZE ANALYSIS				UNDRAINED SHEAR STRENGTH (kPa)						
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	WATER CONTENT ATTERBERG LIMITS (%)						
														W _p	W	W _L	STANDARD PENETRATION TEST, blows/0.30 m			
0	1191.02	Inferred TOPSOIL																		
1	1190.22	Brown medium plastic CLAY (CI) - trace to some sand, mottled with light brown, moist - trace gravel below 1.4 m Brown low to medium plastic clay (CL-CI) TILL - some sand, trace gravel, mottled with light brown, moist - some gravel from 5.1 m to 5.6 m																		
			ST 1	390																
			ST 2	335																
			ST 3	360																
			ST 4	370																
			ST 5	370																
			ST 6	390																
			ST 7	340																
			ST 8	330																
			ST 9	380																
			ST 10	335																
		ST 11	300																	
6	1185.02	End of borehole (6.0 m) - borehole advanced using hollow stem augers - sloughed to 3.7 m upon drilling completion - borehole backfilled with cuttings, bentonite seal from 0.6 m to 2.0 m																		

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.
 (3) Grainsize results showing only percent SILT represent percent FINES (passing No. 200 sieve)

■ Undrained Shear Strength - Field (kPa)
 ▲ Undrained Shear Strength - Laboratory (kPa)

App'd by:



BOREHOLE RECORD

GL4

CLIENT Alberta Transportation

NORTHING 5657267

PROJECT NO. 110773396

PROJECT Springbank, Alberta

EASTING -29158

BH SIZE HS (83mm)

DATES BORING 2018/09/25 to 2018/09/25

WATER LEVEL 09/25/2018 (dry)

DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				ADVANCED LAB TESTS	GRAIN SIZE ANALYSIS				UNDRAINED SHEAR STRENGTH (kPa)																				
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	WATER CONTENT ATTERBERG LIMITS (%)																				
														W _p	W	W _L	STANDARD PENETRATION TEST, blows/0.30 m																	
0	1190.51	TOPSOIL																																
0.5	1190.31	Brown high plastic CLAY (CH) - trace sand, trace oxidation, moist - trace rootlets to 1.1 m - mottled with grey, moist below 1.5 m - trace gravel from 2.0 m to 2.4 m		-	ST 1	270			DSS	0.3	1.6	98.1																						
1	ST 2				205																													
1.5	ST 3				410																													
2	ST 4				370																													
2.5	ST 5				380																													
3	ST 6				420																													
3.5	1187.21	Brown low to medium plastic clay (CL-CI) TILL - some sand, trace gravel, moist - mottled with grey to 4.7 m		-	ST 7	405			C	0	11.5	88.5																						
4	ST 8				410																													
4.5	ST 9				360																													
5	ST 10				405																													
5.1	1185.41	End of borehole (5.1 m) - borehole advanced using hollow stem augers - borehole open and dry upon completion - borehole backfilled with cuttings, bentonite seal from 2.1 m to 2.4 m and 0.5 m and 0.9 m																																

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.
 (3) Grainsize results showing only percent SILT represent percent FINES (passing No. 200 sieve)

■ Undrained Shear Strength - Field (kPa)
 ▲ Undrained Shear Strength - Laboratory (kPa)

App'd by:

APPENDIX D.4: TEST PITS (TP) AND TEST TRENCHES (TT)



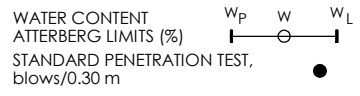
TEST PIT RECORD

TP02

CLIENT Alberta Transportation
 PROJECT Springbank, Alberta
 DATE EXCAVATED 2018/10/01

NORTHING 5657158 PROJECT NO. 110773396
 EASTING -29452 EXCAVATOR JD: 135D
 WATER LEVEL 10/01/2018 (dry) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				ADVANCED LAB TESTS	GRAIN SIZE ANALYSIS				UNDRAINED SHEAR STRENGTH (kPa)					
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	40	80	120	160		
														WATER CONTENT ATTERBERG LIMITS (%)	W _p	W	W _L		
0	1191.96	TOPSOIL - thickness varies from 0.3 to 0.4 m																	
	1191.66	Brown high plastic CLAY (CH) - trace gravel, trace sand, oxidation, dry, mottled with grey - moist below 0.9 m																	
					BS	1													
					BS	2													
					BS	3													
4	1187.86	End of test pit (4.1 m) - test pit dry upon completion - test pit back filled with excavated material and bucket packed - topped with stripped topsoil																	
5																			
6																			
7																			
8																			



(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.
 (3) Grainsize results showing only percent SILT represent percent FINES (passing No. 200 sieve)

■ Undrained Shear Strength - Field (kPa)
 ▲ Undrained Shear Strength - Laboratory (kPa)

App'd by:



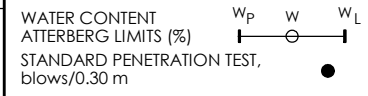
TEST PIT RECORD

TP05

CLIENT Alberta Transportation
 PROJECT Springbank, Alberta
 DATE EXCAVATED 2018/10/31

NORTHING 5657262 PROJECT NO. 110773396
 EASTING -29173 EXCAVATOR JD: 210G
 WATER LEVEL 10/31/2018 (Dry) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				ADVANCED LAB TESTS	GRAIN SIZE ANALYSIS				UNDRAINED SHEAR STRENGTH (kPa)				
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	WATER CONTENT ATTERBERG LIMITS (%)				
														40	80	120	160	
0	1190.89	TOPSOIL																
	1190.59	Brown medium to high plastic CLAY (CI-CH) - dry to moist - moist below 1.1 m																
		- 850 mm wide rafted sandstone boulder at 2.0 m																
3	1187.89	- transitioning to till-like material between 3.0 and 4.9 m																
					BS	1												
5	1185.99	Brown low plastic clay TILL (CL) - trace to some sand, trace gravel, trace coal, moist																
	1185.69																	
		End of test pit (5.2 m) - trench open and dry upon completion - test pit back filled with excavated material and bucket packed																
6																		
7																		
8																		



(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.
 (3) Grainsize results showing only percent SILT represent percent FINES (passing No. 200 sieve)

- Undrained Shear Strength - Field (kPa)
- ▲ Undrained Shear Strength - Laboratory (kPa)

App'd by:

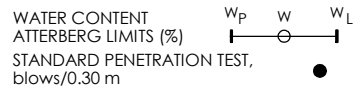


TEST PIT RECORD

TP07

CLIENT Alberta Transportation NORTHING 5657525 PROJECT NO. 110773396
 PROJECT Springbank, Alberta EASTING -28963 EXCAVATOR JD: 210G
 DATE EXCAVATED 2018/10/29 WATER LEVEL 10/29/2018 (4.3 m) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				ADVANCED LAB TESTS	GRAIN SIZE ANALYSIS				UNDRAINED SHEAR STRENGTH (kPa)					
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	WATER CONTENT ATTERBERG LIMITS (%)					
														40	80	120	160		
0	1186.05	TOPSOIL																	
	1185.8	TOPSOIL																	
	1185.5	- some gravel, coarse grain, sub-angular																	
	1185.3	Grey medium plastic CLAY (CI) - trace gravel, moist																	
1		Brown and grey, poorly graded GRAVEL (GP) - some sand, trace clay, trace silt, dry				BS	1												
2		Brown low plastic clay (CL) TILL - some sand, trace gravel, trace coal, frequent oxidation, dry to moist				BS	2												
3																			
4	1182.4	Brown silty SAND (SM) - trace gravel, moist to wet				BS	3												
	1181.75	Brown poorly graded GRAVEL (GP) - some sand, trace cobbles, wet, subrounded to rounded				BS	4												
5		End of test pit (4.7 m) - test pit open upon completion - seepage at the base of test pit upon completion - test pit back filled with excavated material and bucket packed																	
6																			
7																			
8																			



(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.
 (3) Grainsize results showing only percent SILT represent percent FINES (passing No. 200 sieve)

■ Undrained Shear Strength - Field (kPa)
 ▲ Undrained Shear Strength - Laboratory (kPa)

App'd by:

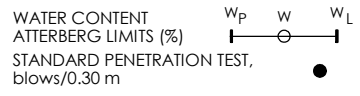


TEST PIT RECORD

TP08

CLIENT Alberta Transportation NORTHING 5657484 PROJECT NO. 110773396
 PROJECT Springbank, Alberta EASTING -28839 EXCAVATOR JD: 135D
 DATE EXCAVATED 2018/10/01 WATER LEVEL 10/01/2108 (3.2 m) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				ADVANCED LAB TESTS	GRAIN SIZE ANALYSIS				UNDRAINED SHEAR STRENGTH (kPa)				
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	WATER CONTENT ATTERBERG LIMITS (%)				
														40	80	120	160	
0	1184.62	TOPSOIL																
	1184.22	Light grey ORGANIC SILT (OL) - some sand, frequent rootlets, dry																
	1183.82	Brown silty SAND (SM) - some gravel, moist																
	1183.72	Black ORGANIC sandy SILT (OL) - some gravel, fine to coarse grain, subangular, moist																
	1183.47	Brown well graded sand (SW) - some gravel, fine to coarse grain, rounded to subrounded, trace silt, occasional cobbles, moist																
	1183.12	Brown low to medium plastic sandy clay (CL-CI) TILL - some gravel, fine to coarse grain, subangular to subrounded, trace to occasional cobbles, moist																
	1181.42	Brown well graded SAND (SW) with gravel - fine to coarse grain, rounded to subrounded, trace to occasional cobbles, wet																
	1180.62	End of test pit (4.0 m) - test pit sloughing and water ingress at 3.2 m - test pit back filled with excavated material and bucket packed - test pit topped with stripped topsoil																



(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.
 (3) Grainsize results showing only percent SILT represent percent FINES (passing No. 200 sieve)

■ Undrained Shear Strength - Field (kPa)
 ▲ Undrained Shear Strength - Laboratory (kPa)

App'd by:

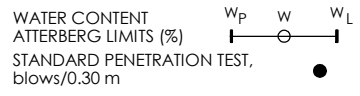


TEST PIT RECORD

TP09

CLIENT Alberta Transportation NORTHING 5657416 PROJECT NO. 110773396
 PROJECT Springbank, Alberta EASTING -28805 EXCAVATOR JD: 210G
 DATE EXCAVATED 2018/10/30 WATER LEVEL 10/30/2018 (3.9 m) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				ADVANCED LAB TESTS	GRAIN SIZE ANALYSIS				UNDRAINED SHEAR STRENGTH (kPa)				
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	40	80	120	160	
														20	40	60	80	
0	1184.16	TOPSOIL																
1	1183.66	Brown sandy low plastic CLAY (CL) - some gravel, moist																
1	1182.66	Brown SAND (SW) - some gravel, frequent cobbles, trace clay, dry to moist			BS	1												
2	1181.76	Brown GRAVEL (GW) - some sand, rounded to sub-rounded, medium to coarse grain sand, wet - grey below 2.9 m - wet below 3.0 m			BS	2												
3	1181.76	Brown GRAVEL (GW) - some sand, rounded to sub-rounded, medium to coarse grain sand, wet - grey below 2.9 m - wet below 3.0 m			BS	3												
4	1179.66	- 300 mm layer of sand with gravel from 3.8 m to 4.1 m - walls sloughing, seepage at 3.8 m			BS	4												
5		End of test pit (4.5 m) - pit sloughing and water in base upon completion - test pit back filled with excavated material and bucket packed																
6																		
7																		
8																		



(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.
 (3) Grainsize results showing only percent SILT represent percent FINES (passing No. 200 sieve)

■ Undrained Shear Strength - Field (kPa)
 ▲ Undrained Shear Strength - Laboratory (kPa)

App'd by:

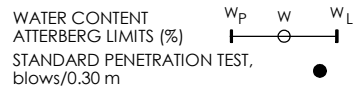


TEST PIT RECORD

TP11

CLIENT Alberta Transportation NORTHING 5657655 PROJECT NO. 110773396
 PROJECT Springbank, Alberta EASTING -28783 EXCAVATOR JD: 210G
 DATE EXCAVATED 2018/10/30 WATER LEVEL 10/30/2018 (5.5 m) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				ADVANCED LAB TESTS	GRAIN SIZE ANALYSIS				UNDRAINED SHEAR STRENGTH (kPa)					
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	WATER CONTENT ATTERBERG LIMITS (%)					
														40	80	120	160		
0	1186.80	TOPSOIL																	
	1186.4	Brown silty SAND (SM) - dry to moist																	
1	1185.8	Brown clayey SAND (SC) - moist																	
	1185.4	Brown to grey GRAVEL (GP) - some sand, dry																	
2	1184.8	Brown low plastic CLAY (CL) - trace gravel, sand, dry																	
	1183.9	Brown low plastic sandy clay (CL) TILL - trace gravel, trace oxidation, moist																	
3																			
4																			
5	1182	Grey GRAVEL (GP) - some sand, wet																	
	1181.2	End of test pit (5.6 m) - pit open, water in base upon completion - test pit back filled with excavated material and bucket packed																	
6																			
7																			
8																			



(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.
 (3) Grainsize results showing only percent SILT represent percent FINES (passing No. 200 sieve)

■ Undrained Shear Strength - Field (kPa)
 ▲ Undrained Shear Strength - Laboratory (kPa)

App'd by:



TEST PIT RECORD

TP12

CLIENT Alberta Transportation

NORTHING 5657761 PROJECT NO. 110773396

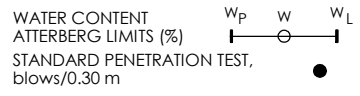
PROJECT Springbank, Alberta

EASTING -28803 EXCAVATOR JD: 210G

DATE EXCAVATED 2018/10/31 WATER LEVEL

10/31/2018 (Dry) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				ADVANCED LAB TESTS	GRAIN SIZE ANALYSIS				UNDRAINED SHEAR STRENGTH (kPa)					
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	WATER CONTENT ATTERBERG LIMITS (%)					
														40	80	120	160		
0	1193.33	TOPSOIL																	
	1193.03	Brown sandy low plastic CLAY (CL) - trace rootlets, oxidation, dry - moist below 0.5 m																	
1					BS 1														
2		- some sand below 1.8 m			BS 2														
	1190.83	Brown low plastic sandy clay (CL) TILL - trace to some gravel, trace oxidation, moist																	
3					BS 3														
4																			
5		- boulder at 5.0 m																	
	1187.53	End of test pit (5.8 m) - pit open and dry upon completion - test pit back filled with excavated material and bucket packed			BS 4														
6																			
7																			
8																			



(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.
 (3) Grainsize results showing only percent SILT represent percent FINES (passing No. 200 sieve)

■ Undrained Shear Strength - Field (kPa)
 ▲ Undrained Shear Strength - Laboratory (kPa)

App'd by:



TEST PIT RECORD

TP13

CLIENT Alberta Transportation

NORTHING 5657311 PROJECT NO. 110773396

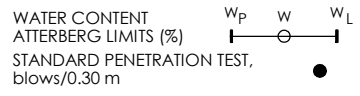
PROJECT Springbank, Alberta

EASTING -28886 EXCAVATOR JD: 135D

DATE EXCAVATED 2018/10/01 WATER LEVEL

10/01/2018 (dry) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				ADVANCED LAB TESTS	GRAIN SIZE ANALYSIS				UNDRAINED SHEAR STRENGTH (kPa)					
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	WATER CONTENT ATTERBERG LIMITS (%)					
														40	80	120	160		
0	1192.75	TOPSOIL																	
	1192.45	Brown ORGANIC SILT (OL) - some sand, frequent organics, dry																	
	1192.25																		
1		Brown high plastic CLAY (CH) - trace gravel, trace sand, fine to coarse grain, subangular to subrounded, trace rootlets, dry - moist below 1.3 m																	
				BS	1														
2		Brown medium plastic clay (CI) TILL - some sand, fine to coarse grain sand, subangular, some gravel, fine to coarse grain, subangular to subrounded, moist																	
				BS	2														
3	1189.95	Brown medium plastic clay (CI) TILL - some sand, fine to coarse grain sand, subangular, some gravel, fine to coarse grain, subangular to subrounded, moist																	
				BS	3														
4		End of test pit (4.5 m) - test pit dry upon completion - test pit back filled with excavated material and bucket packed - test pit topped with stripped topsoil																	
5	1188.25																		
6																			
7																			
8																			



(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.
 (3) Grainsize results showing only percent SILT represent percent FINES (passing No. 200 sieve)

■ Undrained Shear Strength - Field (kPa)
 ▲ Undrained Shear Strength - Laboratory (kPa)

App'd by:



TEST PIT RECORD

TP16

CLIENT Alberta Transportation

NORTHING 5657944 PROJECT NO. 110773396

PROJECT Springbank, Alberta

EASTING -28867 EXCAVATOR JD: 210G

DATE EXCAVATED 2018/10/31 WATER LEVEL

10/31/2018 (Dry) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				ADVANCED LAB TESTS	GRAIN SIZE ANALYSIS				UNDRAINED SHEAR STRENGTH (kPa)					
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	WATER CONTENT ATTERBERG LIMITS (%)					
														Wp	w	WL	Standard Penetration Test, blows/0.30 m		
0	1198.66	TOPSOIL																	
	1198.36	Brown to grey low plastic CLAY (CL) - trace rootlets, dry																	
1		- grey, moist below 1.4 m																	
					BS	1													
2																			
	1195.96	Brown low plastic clay (CL) TILL - some sand, trace gravel, trace coal, oxidation, moist																	
3					BS	2													
4					BS	3													
	1194.66	End of test pit (4.0 m) - pit open and dry upon completion - test pit back filled with excavated material and bucket packed			BS	4													
5																			
6																			
7																			
8																			

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.
 (3) Grainsize results showing only percent SILT represent percent FINES (passing No. 200 sieve)

■ Undrained Shear Strength - Field (kPa)
 ▲ Undrained Shear Strength - Laboratory (kPa)

App'd by:



TEST PIT RECORD

TT02A

CLIENT Alberta Transportation NORTHING 5657503 PROJECT NO. 110773396
 PROJECT Springbank, Alberta EASTING -28894 EXCAVATOR JD: 210G
 DATE EXCAVATED 2018/10/29 WATER LEVEL 10/29/2018 (5.1 m) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				ADVANCED LAB TESTS	GRAIN SIZE ANALYSIS				UNDRAINED SHEAR STRENGTH (kPa)					
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	WATER CONTENT ATTERBERG LIMITS (%)					
														W _p	w	W _L	STANDARD PENETRATION TEST, blows/0.30 m		
0	1186.68	TOPSOIL																	
1	1186.18	Brown SILT (ML) - trace sand, trace organics, dry																	
1	1185.38	Poorly graded GRAVEL (GP) - some sand, dry																	
2	1185.08	Brown low plastic clay (CL) TILL - some sand, some gravel, fine to coarse, subrounded to subangular																	
3																			
4																			
5	1181.78																		
5	1181.68	Brown poorly graded SAND (SP) - some gravel, fine to medium sand, fine to coarse gravel, rounded to subrounded, moist																	
5	1181.48	Brown well graded gravelly SAND (SW) - fine to coarse grain, subangular, trace cobbles, wet																	
6		End of test trench (5.2 m) - test trench completed along sloping ground, depths are referenced from crest of slope - trench open upon completion - water level inferred at 5.1 m upon completion - test trench back filled with excavated material and bucket packed																	
7																			
8																			

(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.
 (3) Grainsize results showing only percent SILT represent percent FINES (passing No. 200 sieve)

■ Undrained Shear Strength - Field (kPa)
 ▲ Undrained Shear Strength - Laboratory (kPa)

App'd by:



TEST PIT RECORD

TT02B

CLIENT Alberta Transportation

NORTHING 5657449

PROJECT NO. 110773396

PROJECT Springbank, Alberta

EASTING -28926

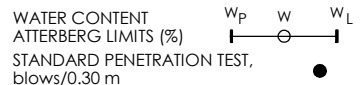
EXCAVATOR JD: 210G

DATE EXCAVATED 2018/10/31

WATER LEVEL 10/31/2018 (Dry)

DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				ADVANCED LAB TESTS	GRAIN SIZE ANALYSIS				UNDRAINED SHEAR STRENGTH (kPa)					
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	40	80	120	160		
														20	40	60	80		
0	1190.92	TOPSOIL																	
0.5	1190.62	Brown low plastic CLAY (CL) - trace gravel, sand, rootlets, oxidation - moist below 1.1 m			BS 1														
2	1188.82	Brown low plastic clay (CL) TILL - trace gravel, sand, trace coal, oxidation, moist			BS 2														
3	1187.72	End of test trench (3.2 m) - trench open and dry upon completion - test trench back filled with excavated material and bucket packed			BS 3														



(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.
 (3) Grainsize results showing only percent SILT represent percent FINES (passing No. 200 sieve)

■ Undrained Shear Strength - Field (kPa)
 ▲ Undrained Shear Strength - Laboratory (kPa)

App'd by:



TEST PIT RECORD

TT02C

CLIENT Alberta Transportation

NORTHING 5657481 PROJECT NO. 110773396

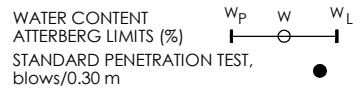
PROJECT Springbank, Alberta

EASTING -28896 EXCAVATOR JD: 210G

DATE EXCAVATED 2018/10/31 WATER LEVEL

10/31/2018 (Dry) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				ADVANCED LAB TESTS	GRAIN SIZE ANALYSIS				UNDRAINED SHEAR STRENGTH (kPa)				
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	40	80	120	160	
														20	40	60	80	
0	1189.08	TOPSOIL																
	1188.68	Brown sandy low plastic CLAY (CL) - dry - moist below 1.1 m - some gravel below 1.2 m																
1																		
2																		
3		- boulders at 3.2 m																
4	1185.28	Brown low plastic sandy clay (CL) TILL - trace to some gravel, trace oxidation, coal, moist																
5																		
6	1183.78	End of test trench (5.3 m) - trench open and dry upon completion - test trench back filled with excavated material and bucket packed																
7																		
8																		



(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.
 (3) Grainsize results showing only percent SILT represent percent FINES (passing No. 200 sieve)

■ Undrained Shear Strength - Field (kPa)
 ▲ Undrained Shear Strength - Laboratory (kPa)

App'd by:



TEST PIT RECORD

TT03A

CLIENT Alberta Transportation

NORTHING 5657586 PROJECT NO. 110773396

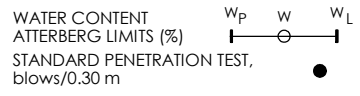
PROJECT Springbank, Alberta

EASTING -28841 EXCAVATOR JD: 210G

DATE EXCAVATED 2018/10/30 WATER LEVEL _____

10/30/2018 (Dry) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				ADVANCED LAB TESTS	GRAIN SIZE ANALYSIS				UNDRAINED SHEAR STRENGTH (kPa)					
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	40	80	120	160		
														WATER CONTENT	ATTERBERG LIMITS (%)				
0	1188	TOPSOIL																	
	1187.6	Brown SAND (SP) - some gravel, trace cobbles, fine to medium grain sand, dry																	
1																			
2		- material transitioning to fill-like below 1.8 m																	
	1185.6	Brown low plastic clay (CL) TILL - some sand, trace gravel, trace coal, oxidation, moist																	
3																			
4																			
5	1182.9	End of test trench (5.1 m) - trench open and dry upon completion - trench could not be further advanced due to the excavators boom length - test trench back filled with excavated material and bucket packed																	
6																			
7																			
8																			



(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.
 (3) Grainsize results showing only percent SILT represent percent FINES (passing No. 200 sieve)

■ Undrained Shear Strength - Field (kPa)
 ▲ Undrained Shear Strength - Laboratory (kPa)

App'd by:

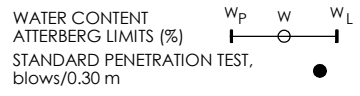


TEST PIT RECORD

TT03B

CLIENT Alberta Transportation NORTHING 5657555 PROJECT NO. 110773396
 PROJECT Springbank, Alberta EASTING -28872 EXCAVATOR JD: 210G
 DATE EXCAVATED 2018/10/30 WATER LEVEL 10/31/2018 (4.0 m) DATUM Geodetic

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLES				ADVANCED LAB TESTS	GRAIN SIZE ANALYSIS				UNDRAINED SHEAR STRENGTH (kPa)					
					TYPE	NUMBER	RECOVERY (mm)	N-VALUE		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	WATER CONTENT ATTERBERG LIMITS (%)					
														40	80	120	160		
0	1185	TOPSOIL																	
	1184.4	Brown to grey low plastic CLAY (CL) - some sand, some silt, trace gravel, dry to moist																	
	1183.9																		
	1182.8	Brown sandy low plastic CLAY (CL) - some gravel, trace cobbles, trace oxidation, moist																	
	1181.3	Brown low plastic clay (CL) TILL - some sand, some gravel, trace coal, oxidation, moist - inferred stiff to hard below 2.7 m - grey below 3.2 m																	
	1180.5	Brown GRAVEL (GP) - some sand, trace cobbles, wet - seepage at 4.0 m																	
		End of test trench (4.5 m) - trench sloughing at 1.8 m and 3.7 m due to cobbles - water in base of trench upon completion - test trench back filled with excavated material and bucket packed																	



(1) Approximate borehole locations surveyed by Stantec Consulting Ltd.
 (2) Water may be influenced by drilling fluids/techniques; piezometer install shown, if applicable.
 (3) Grainsize results showing only percent SILT represent percent FINES (passing No. 200 sieve)

■ Undrained Shear Strength - Field (kPa)
 ▲ Undrained Shear Strength - Laboratory (kPa)

App'd by:

**APPENDIX E:
LAB TESTING**

APPENDIX E.1: LOW LEVEL OUTLET (LLO)



Atterberg Limits
ASTM D4318
Method B- One Point

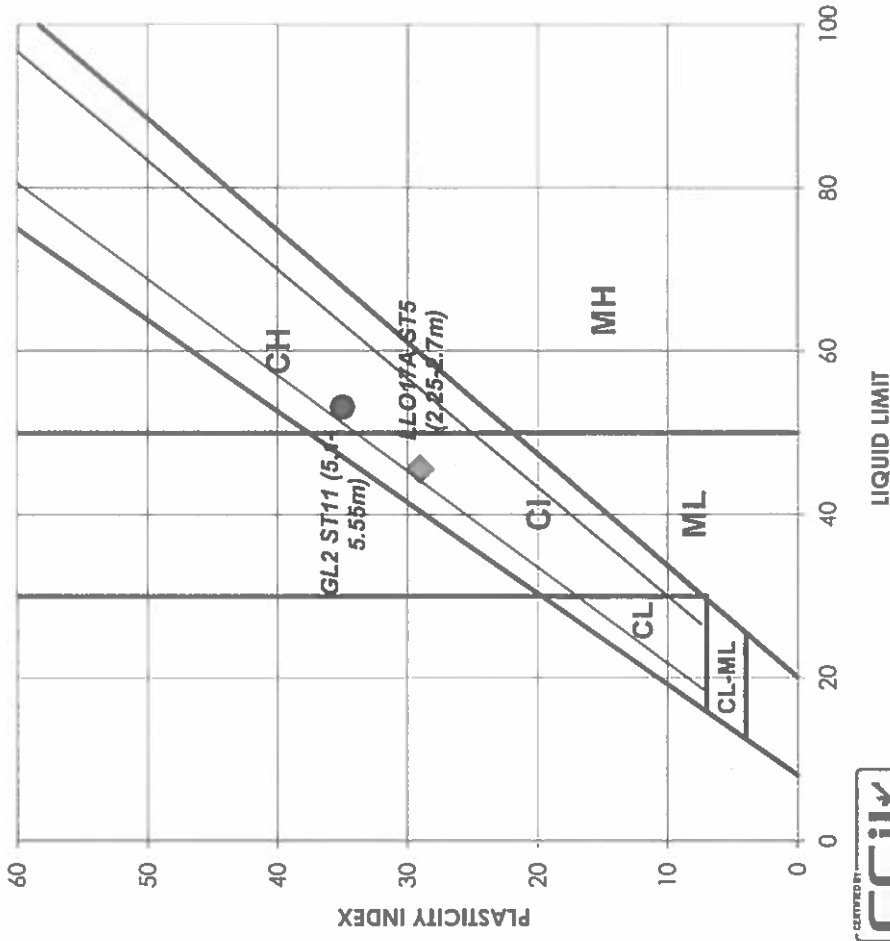
Client: Alberta Transportation
Project Name: SR1 2018 Investigation
Project No: 110773396
Date Received: 09-27-18 & 09-29-18
Date Tested: October 26, 2018
Tested By: E. Wahl & B. Peiskey

LABORATORY
10830 - 46th Street SE
Calgary, Alberta
Canada T2C 1G4
Tel: (403) 253-7876

OFFICE
325 - 25th Street SE
Suite 200
Calgary, Alberta
Canada T2A 7H8
Tel: (403) 716-8000

Sample: GL2 ST11 (5.1-5.55m) LIQUID LLO17A ST5 (2.25-2.7m) LIQUID

GL2 ST11 (5.1-5.55m)		LLO17A ST5 (2.25-2.7m)	
LIQUID		LIQUID	
1	2	1	2
28	26	22	23
Number of Blows		35.61	
31.77	33.59	25.19	
Container Number		1.17	
21.20	22.40	24.0	
Wt. Sample (wet+tare)(g)		11.1	
1.16	1.12	46.3%	
Wt. Tare (g)		45.6%	
20.0	21.3		
Wt. Dry Soil (g)			
10.6	11.2		
Water Content (%)			
52.7%	52.6%		
Corrected Water Content (%)			
53.5%	52.8%		
PLASTIC		PLASTIC	
1	2	1	2
Trial No.		26.72	
Container Number		24.90	
26.39	26.49	14.05	
24.46	24.53	10.9	
Wt. Sample (wet+tare)(g)		1.8	
13.9	13.80	16.6%	
Wt. Tare (g)		16.8%	
10.6	10.7		
Wt. Dry Soil (g)			
1.9	2.0		
Wt. Water (g)			
18.3%	18.3%		
Water Content (%)			
AVERAGE VALUES		AVERAGE VALUES	
1	2	1	2
LL		46	
PL		17	
PI		29	
Natural MC (%)		27.4%	
CLASSIFICATION		CLASSIFICATION	
CH		CI	



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Reviewed By:

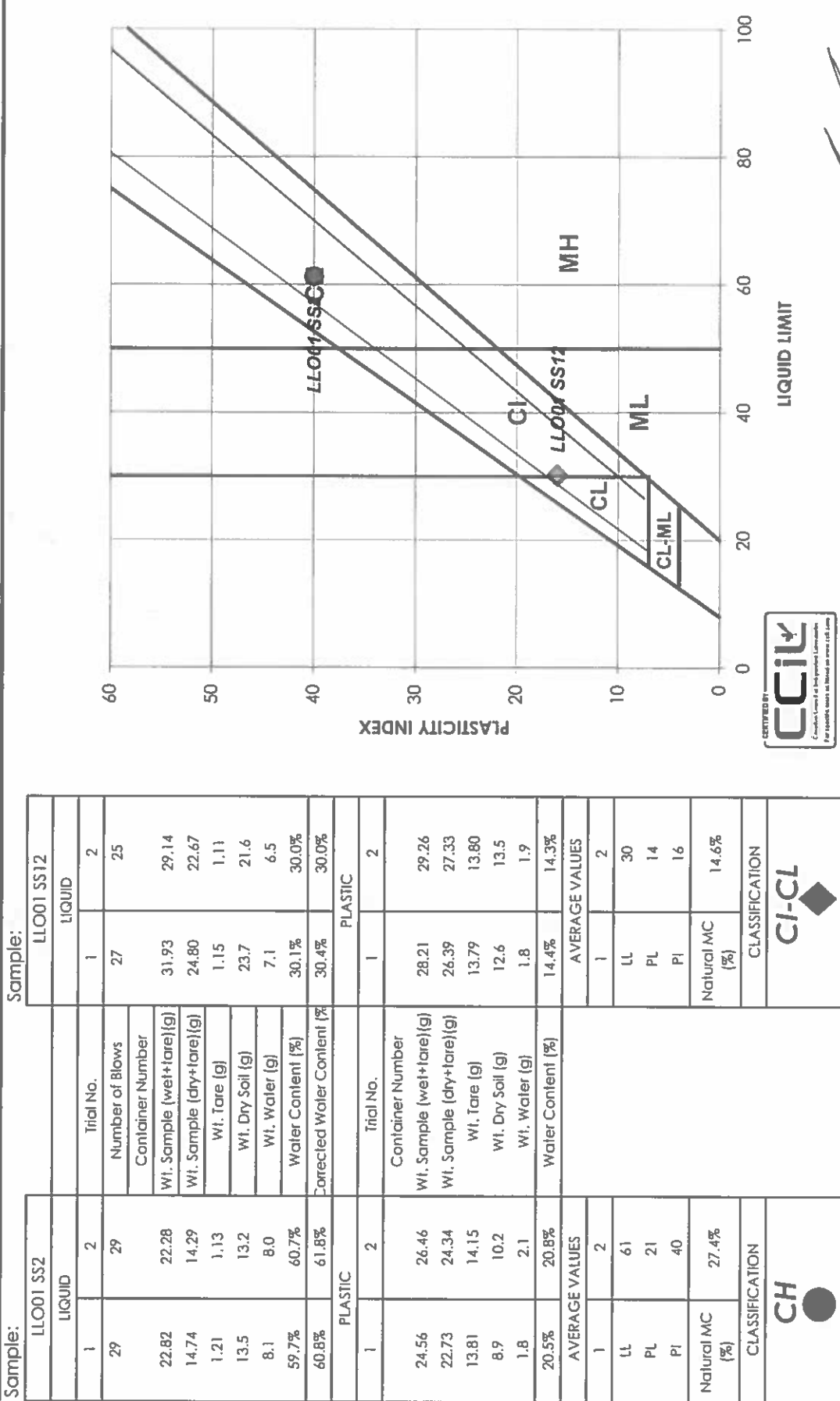


Atterberg Limits
ASTM D4318
Method B- One Point

Client: Alberta Transportation
Project Name: SRI
Project No: 110773396.302.702.310
Date Received: May 6, 2018
Date Tested: May 24, 2018
Tested By: B. Pelkey

OFFICE
325 - 25th Street SE
Suite 200
Calgary, Alberta
Canada T2A 7H8
Tel: (403) 716-8000

LABORATORY
10830 - 46th Street SE
Calgary, Alberta
Canada T2C 1G4
Tel: (403) 253-7876



Sample: LLO01 SS2		Sample: LLO01 SS12	
LIQUID		LIQUID	
1	2	1	2
29	29	27	25
Number of Blows		Number of Blows	
22.82	22.28	31.93	29.14
14.74	14.29	24.80	22.67
Container Number		Container Number	
1.21	1.13	1.15	1.11
13.5	13.2	23.7	21.6
Wt. Sample (wet+tare)(g)		Wt. Sample (wet+tare)(g)	
8.1	8.0	7.1	6.5
Wt. Tare (g)		Wt. Tare (g)	
59.7%	60.7%	30.1%	30.0%
Water Content (%)		Water Content (%)	
60.8%	61.8%	30.4%	30.0%
Corrected Water Content (%)		Corrected Water Content (%)	
PLASTIC			
1	2	1	2
Trial No.		Trial No.	
Container Number		Container Number	
24.56	26.46	28.21	29.26
22.73	24.34	26.39	27.33
13.81	14.15	13.79	13.80
Wt. Sample (wet+tare)(g)		Wt. Sample (wet+tare)(g)	
8.9	10.2	12.6	13.5
Wt. Tare (g)		Wt. Tare (g)	
1.8	2.1	1.8	1.9
Wt. Dry Soil (g)		Wt. Dry Soil (g)	
20.5%	20.8%	14.4%	14.3%
Water Content (%)		Water Content (%)	
AVERAGE VALUES			
1	2	1	2
Trial No.		Trial No.	
LL	61	LL	30
PL	21	PL	14
PI	40	PI	16
Natural MC (%)		Natural MC (%)	
27.4%		14.6%	
CLASSIFICATION			
CH		CI-CL	



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Reviewed By:



Afterberg Limits
ASTM D4318
Method B- One Point

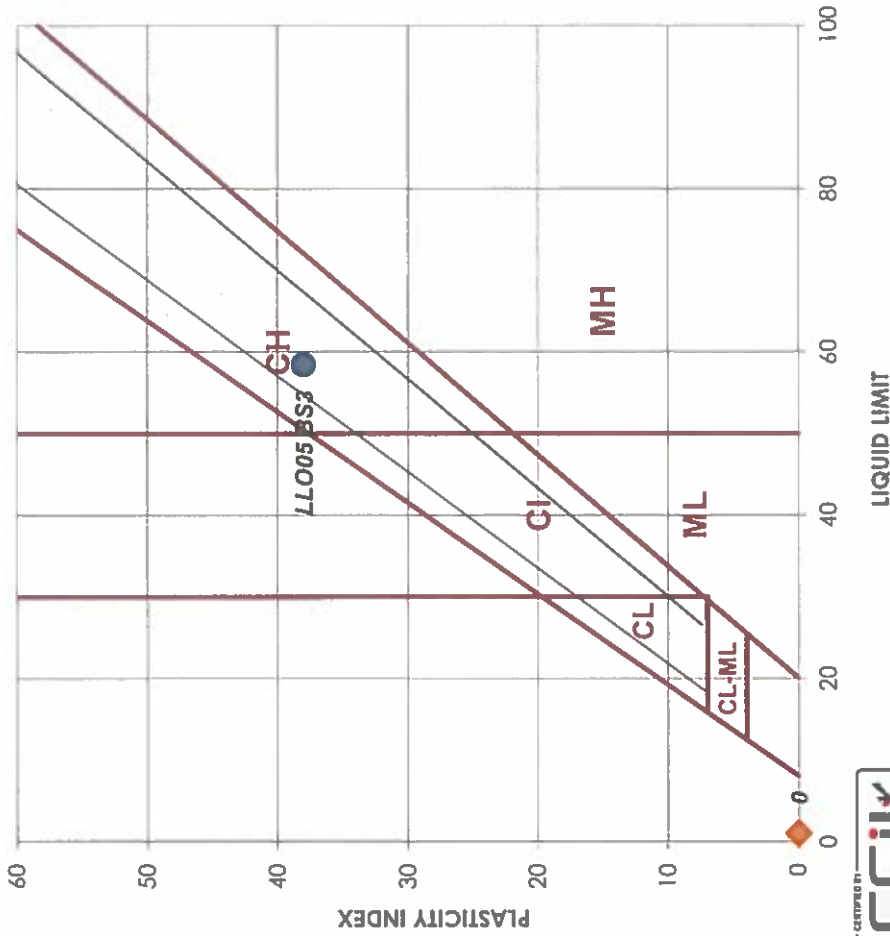
Client: Alberta Transportation
Project Name: SR1
Project No: 110773396.302.702.310
Date Received: May 1, 2018
Date Tested: June 14, 2018
Tested By: B. Peilkey

OFFICE
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LABORATORY
10830 - 46th Street SE
Calgary, Alberta
Canada T2C 1G4
Tel: (403) 253-7876

Sample: LLO05 BS3

LIQUID		LIQUID	
1	2	1	2
29	29		
Number of Blows			
Container Number			
24.29	20.93		
15.87	13.75		
1.23	1.22		
14.6	12.5		
8.4	7.2		
57.5%	57.3%		
58.6%	58.3%		
Corrected Water Content (%)			
PLASTIC		PLASTIC	
1	2	1	2
Container Number			
29.01	32.61		
26.47	29.43		
13.95	13.91		
12.5	15.5		
2.5	3.2		
20.3%	20.5%		
Water Content (%)			
AVERAGE VALUES		AVERAGE VALUES	
1	2	1	2
LL	58	LL	
PL	20	PL	
PI	38	PI	
Natural MC (%)	21.8%	Natural MC (%)	
CLASSIFICATION		CLASSIFICATION	
CH		NON-PLASTIC	



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Afterberg Limits
ASTM D4318
Method B- One Point

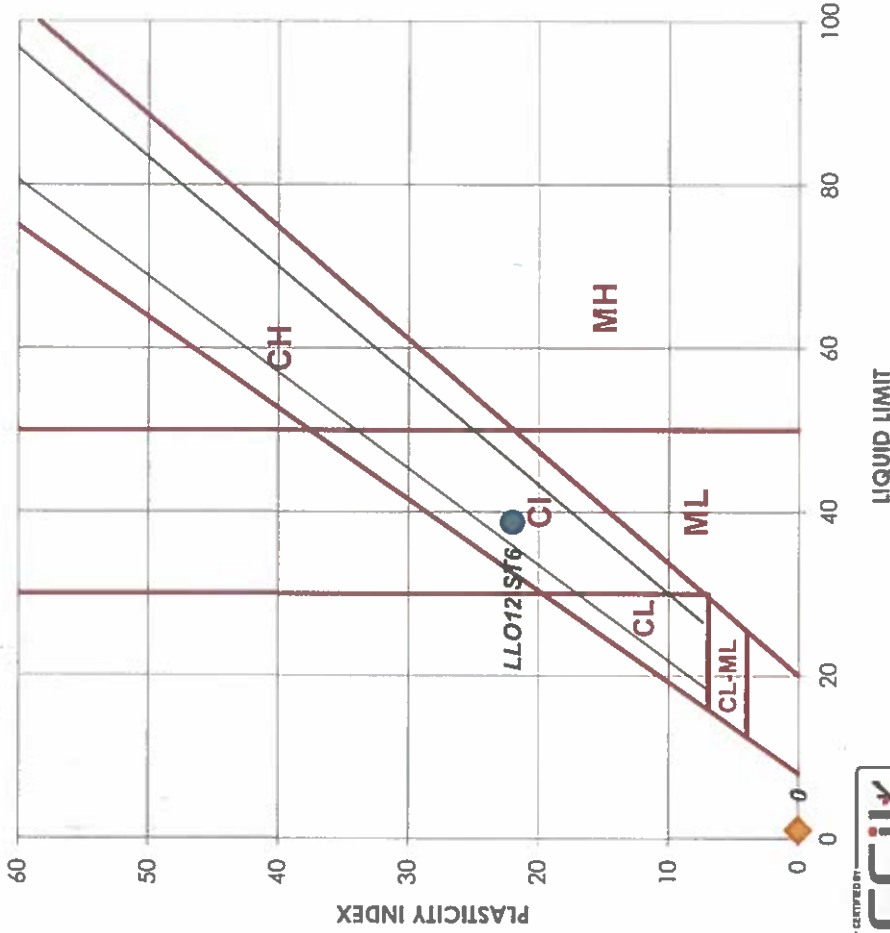
Client: Alberta Transportation
Project Name: SR1
Project No: 110773396.302.702.310
Date Received: May 6, 2018
Date Tested: June 4, 2018
Tested By: B. Pelkey

LABORATORY
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Calgary, Alberta
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Tel: (403) 253-7876

OFFICE
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Suite 200
Calgary, Alberta
Canada T2A 7H8
Tel: (403) 716-8000

Sample:

LLO12 ST6		t LIQUID	
Trial No.	Number of Blows	Trial No.	2
21	21	1	2
25.62	32.01		
18.68	23.36		
1.15	1.51		
17.5	21.9		
6.9	8.7		
39.6%	39.6%		
38.8%	38.8%		
PLASTIC		PLASTIC	
1	2	1	2
27.67	33.90		
25.64	31.03		
13.87	13.95		
11.8	17.1		
2.0	2.9		
17.2%	16.8%		
AVERAGE VALUES		AVERAGE VALUES	
1	2	1	2
LL	39	LL	
PL	17	PL	
PI	22	PI	
Natural MC (%)	17.8%	Natural MC (%)	
CLASSIFICATION		CLASSIFICATION	
CI		NON-PLASTIC	



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Reviewed By: _____



Afterberg Limits

ASTM D4318
Method B- One Point

Client: Alberta Transportation

Project Name: SRI
Project No: 110773396.302.702.310
Date Received: May 6, 2018
Date Tested: June 5, 2018
Tested By: B. Pelkey

OFFICE

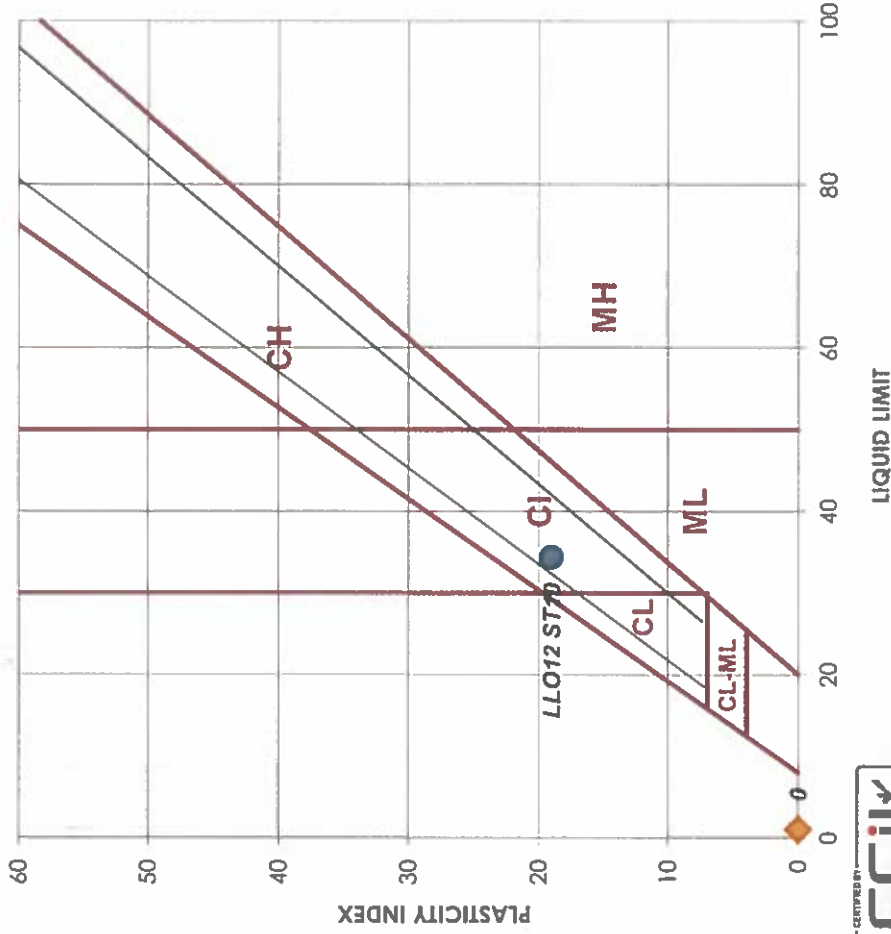
325 - 25th Street SE
Suite 200
Calgary, Alberta
Canada T2A 7H8
Tel: (403) 716-8000

LABORATORY

10830 - 46th Street SE
Calgary, Alberta
Canada T2C 1G4
Tel: (403) 253-7876

Sample:

Sample: LLO12 ST10		LIQUID	
1	2	1	2
25	27	Number of Blows	
25.69	25.29	Container Number	
19.43	19.16	Wt. Sample (wet+tare)[g]	
1.18	1.30	Wt. Sample (dry+tare)[g]	
18.3	17.9	Wt. Tare [g]	
6.3	6.1	Wt. Dry Soil [g]	
34.3%	34.2%	Wt. Water [g]	
34.3%	34.5%	Water Content [%]	
PLASTIC		PLASTIC	
1	2	1	2
Trial No.		Trial No.	
Container Number		Container Number	
32.28	27.25	Wt. Sample (wet+tare)[g]	
29.83	25.53	Wt. Sample (dry+tare)[g]	
13.76	13.86	Wt. Tare [g]	
16.1	11.7	Wt. Dry Soil [g]	
2.5	1.7	Wt. Water [g]	
15.2%	14.7%	Water Content [%]	
AVERAGE VALUES		AVERAGE VALUES	
1	2	1	2
LL	34	LL	
PL	15	PL	
PI	19	PI	
Natural MC [%]	16.8%	Natural MC [%]	
CLASSIFICATION		CLASSIFICATION	
CI		NON-PLASTIC	



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Reviewed By:



Afterberg Limits
ASTM D4318
Method B- One Point

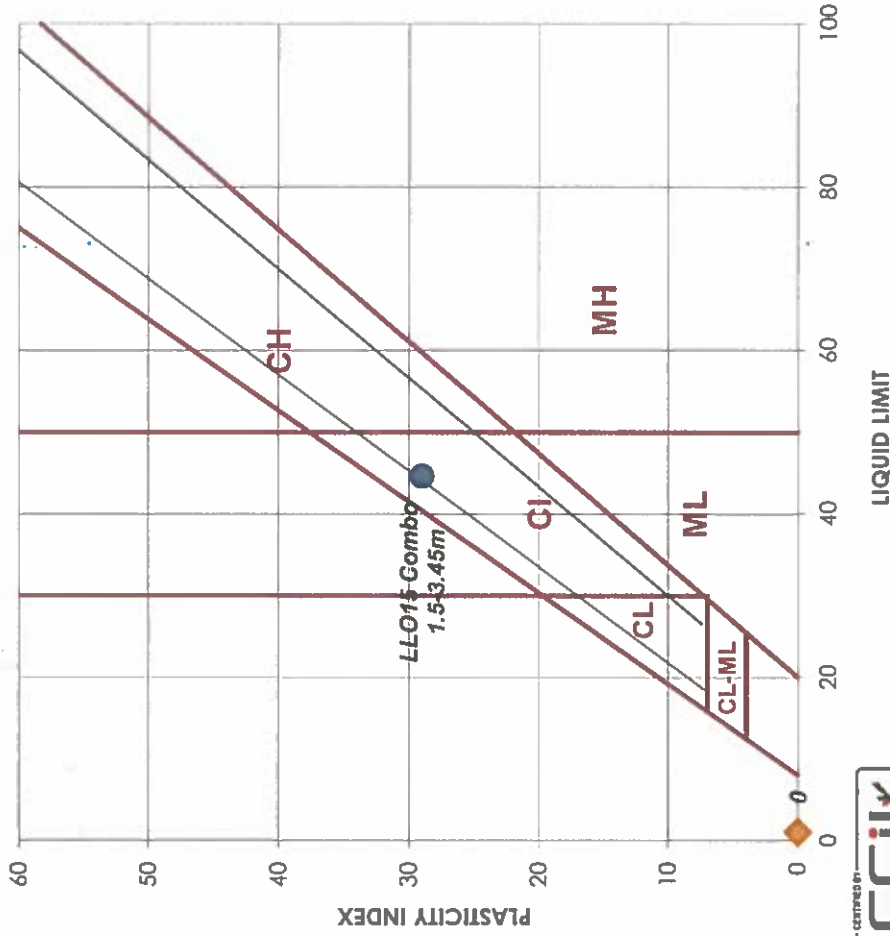
Client: Alberta Transportation
Project Name: SR1
Project No: 110773396.302.702.310
Date Received: May 1, 2018
Date Tested: June 20, 2018
Tested By: B. Pelkey

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LABORATORY
10830 - 46th Street SE
Calgary, Alberta
Canada T2C 1G4
Tel: (403) 253-7876

Sample:

LIQUID		LIQUID	
1	2	1	2
25	27		
26.48	35.48		
18.70	24.91		
1.17	1.17		
17.5	23.7		
7.8	10.6		
44.4%	44.5%		
44.4%	44.9%		
PLASTIC		PLASTIC	
1	2	1	2
26.26	26.22		
24.52	24.53		
13.8	13.95		
10.7	10.6		
1.7	1.7		
16.2%	16.0%		
AVERAGE VALUES		AVERAGE VALUES	
1	2	1	2
LL	45	LL	
PL	16	PL	
PI	29	PI	
Natural MC (%)	22.1%	Natural MC (%)	
CLASSIFICATION		CLASSIFICATION	
CI		NON-PLASTIC	



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Reviewed By:



Aterberg Limits
ASTM D4318
Method B- One Point

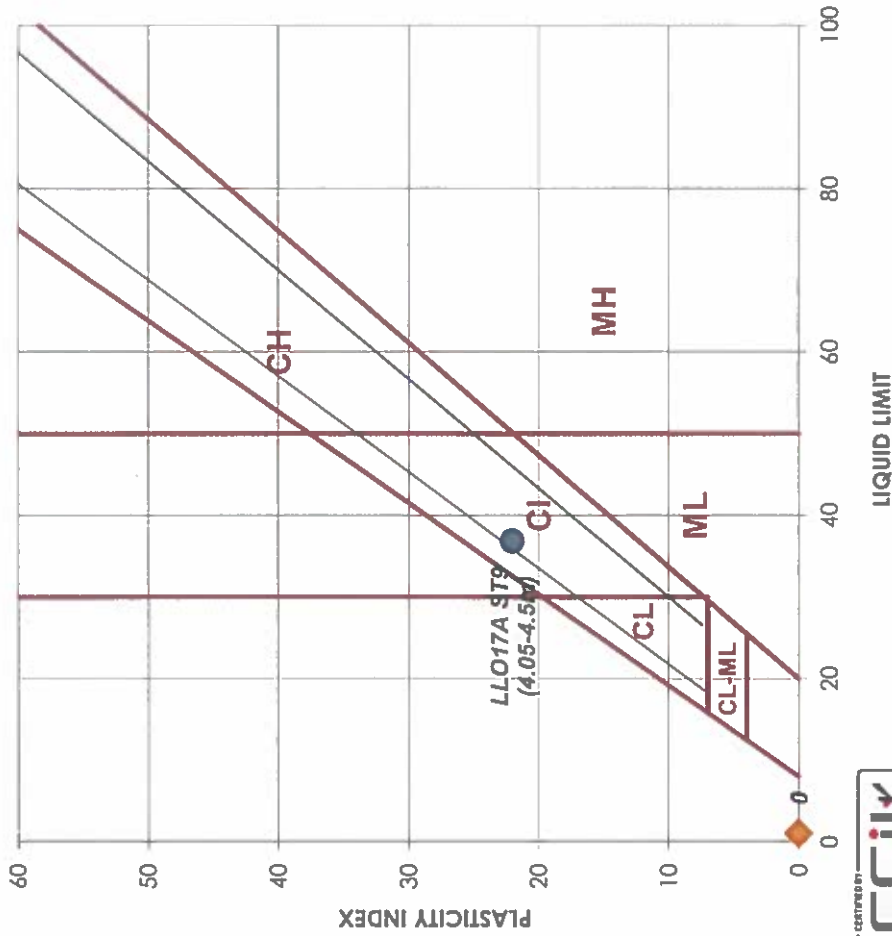
Client: Alberta Transportation
Project Name: SR1 2018 Investigation
Project No: 110773396
Date Received: -
Date Tested: November 19, 2018
Tested By: B. Pelkey

OFFICE: 325 - 25th Street SE
Suite 200
Calgary, Alberta
Canada T2A 7H8
Tel: (403) 716-8000

LABORATORY: 10830 - 46th Street SE
Calgary, Alberta
Canada T2C 1G4
Tel: (403) 253-7876

Sample: LLO17A ST9 (4.05-4.5m)

LIQUID		LIQUID	
1	2	1	2
23	22		
Number of Blows			
27.52	29.83		
Container Number			
20.35	22.04		
Wt. Sample (wet+tare)(g)			
1.19	1.15		
Wt. Sample (dry+tare)(g)			
19.2	20.9		
Wt. Tare (g)			
7.2	7.8		
Wt. Dry Soil (g)			
37.4%	37.3%		
Water Content (%)			
37.0%	36.7%		
Corrected Water Content (%)			
PLASTIC			
PLASTIC		PLASTIC	
1	2	1	2
Container Number			
24.25	23.75		
Wt. Sample (wet+tare)(g)			
22.89	22.42		
Wt. Sample (dry+tare)(g)			
13.97	13.86		
Wt. Tare (g)			
8.9	8.6		
Wt. Dry Soil (g)			
1.4	1.3		
Wt. Water (g)			
15.2%	15.5%		
Water Content (%)			
AVERAGE VALUES			
1	2	AVERAGE VALUES	
LL	37	1	2
PL	15	LL	
PI	22	PL	
		PI	
Natural MC (%)	15.4%	Natural MC (%)	
CLASSIFICATION			
CI		NON-PLASTIC	



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Reviewed By:



Atterberg Limits
ASTM D4318
Method B- One Point

Client: Alberta Transportation
Project Name: SR1 2018 Investigation

Office: 325 - 25th Street SE
Suite 200
Calgary, Alberta
Canada T2A 7H8
Tel: (403) 716-8000

Laboratory: 10830 - 46th Street SE
Calgary, Alberta
Canada T2C 1G4
Tel: (403) 253-7876

Project No: 110773396
Date Received: September 25, 2018
Date Tested: November 8, 2018
Tested By: E. Wahl

Sample: LLO17 SS2-SS4 Comp.

LIQUID		LIQUID	
1	2	1	2
26	24	27	26
Container Number			
27.58	31.17	35.78	36.68
18.62	21.00	27.20	27.91
1.15	1.18	1.18	1.16
17.5	19.8	26.0	26.8
9.0	10.2	8.6	8.8
51.3%	51.3%	33.0%	32.8%
51.5%	51.1%	33.3%	32.9%
Corrected Water Content (%)			

PLASTIC		PLASTIC	
1	2	1	2
25.59	25.76	25.60	25.89
23.78	23.94	24.13	24.41
14.06	14.16	13.82	13.90
9.7	9.8	10.3	10.5
1.8	1.8	1.5	1.5
18.6%	18.6%	14.3%	14.1%
Water Content (%)			

AVERAGE VALUES		AVERAGE VALUES	
1	2	1	2
LL	51	LL	33
PL	19	PL	14
PI	32	PI	19
Natural MC (%)	17.9%	Natural MC (%)	13.4%

CLASSIFICATION		CLASSIFICATION	
CH-CI		CI	

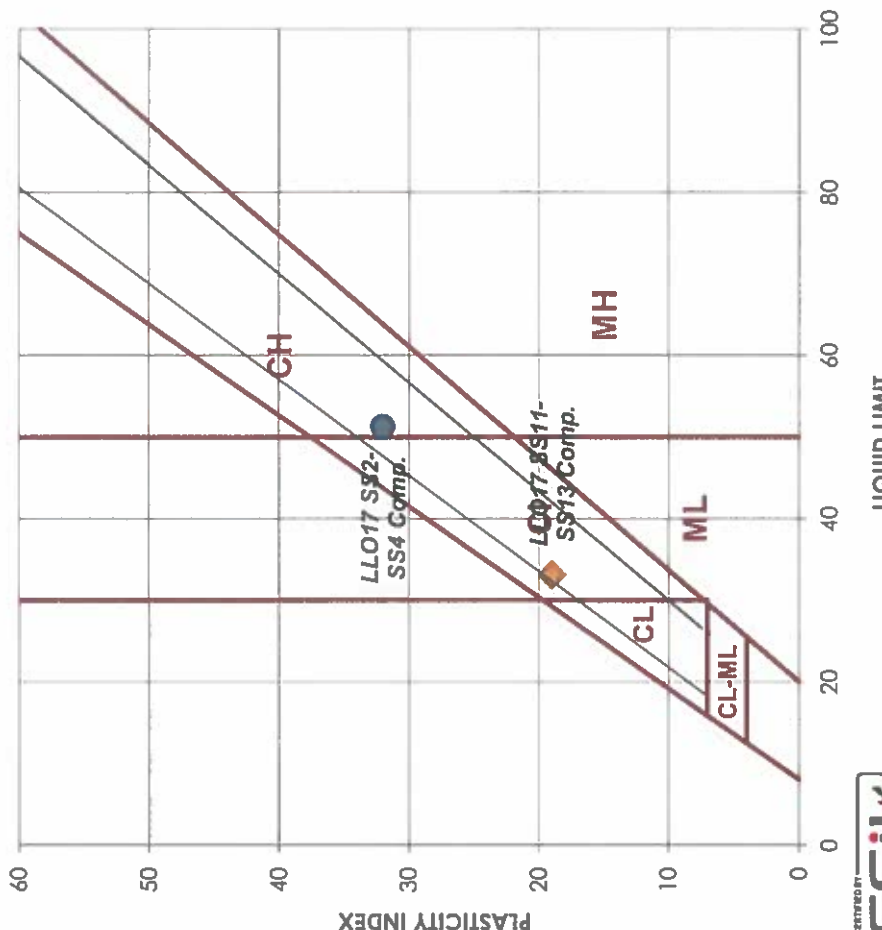
Sample: LLO17 SS1-SS13 Comp.

LIQUID		LIQUID	
1	2	1	2
26	24	27	26
Container Number			
27.58	31.17	35.78	36.68
18.62	21.00	27.20	27.91
1.15	1.18	1.18	1.16
17.5	19.8	26.0	26.8
9.0	10.2	8.6	8.8
51.3%	51.3%	33.0%	32.8%
51.5%	51.1%	33.3%	32.9%
Corrected Water Content (%)			

PLASTIC		PLASTIC	
1	2	1	2
25.59	25.76	25.60	25.89
23.78	23.94	24.13	24.41
14.06	14.16	13.82	13.90
9.7	9.8	10.3	10.5
1.8	1.8	1.5	1.5
18.6%	18.6%	14.3%	14.1%
Water Content (%)			

AVERAGE VALUES		AVERAGE VALUES	
1	2	1	2
LL	51	LL	33
PL	19	PL	14
PI	32	PI	19
Natural MC (%)	17.9%	Natural MC (%)	13.4%

CLASSIFICATION		CLASSIFICATION	
CH-CI		CI	



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Reviewed By: _____



Atterberg Limits
ASTM D4318
Method B- One Point

Client: Alberta Transportation
Project Name: SR1 2018 Investigation
Project No: 110773396
Date Received: September 25, 2018
Date Tested: November 8, 2018
Tested By: E. Wahl

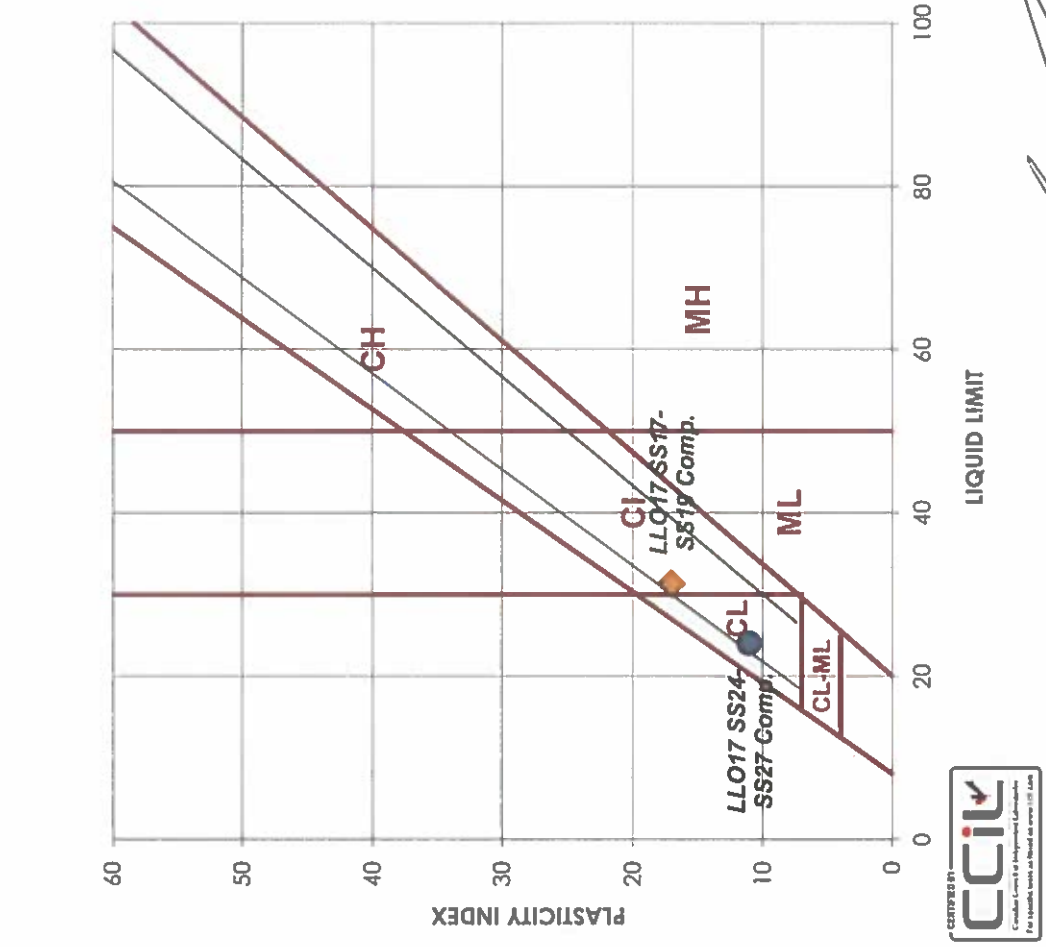
OFFICE
325 - 25th Street SE
Suite 200
Calgary, Alberta
Canada T2A 7H8
Tel: (403) 716-8000

LABORATORY
10830 - 46th Street SE
Calgary, Alberta
Canada T2C 1G4
Tel: (403) 253-7876

Sample:

LLO17 SS24-SS27 Comp.		LLO17 SS17-SS19 Comp.	
LIQUID		LIQUID	
1	2	1	2
21	21	25	25
Container Number		Container Number	
36.73	38.82	35.65	35.66
29.71	31.41	27.43	27.45
Wt. Sample (wet+tare)[g]		Wt. Sample (wet+tare)[g]	
1.18	1.17	1.18	1.17
Wt. Tare (g)		Wt. Tare (g)	
28.5	30.2	26.3	26.3
Wt. Dry Soil (g)		Wt. Dry Soil (g)	
7.0	7.4	8.2	8.2
Wt. Water (g)		Wt. Water (g)	
24.6%	24.5%	31.3%	31.2%
Water Content (%)		Water Content (%)	
24.1%	24.0%	31.3%	31.2%
Corrected Water Content (%)		Corrected Water Content (%)	
PLASTIC		PLASTIC	
1	2	1	2
Container Number		Container Number	
27.44	27.24	25.53	25.88
25.88	25.70	24.07	24.39
Wt. Sample (wet+tare)[g]		Wt. Sample (wet+tare)[g]	
13.96	14.00	13.83	14.01
Wt. Tare (g)		Wt. Tare (g)	
11.9	11.7	10.2	10.4
Wt. Dry Soil (g)		Wt. Dry Soil (g)	
1.6	1.5	1.5	1.5
Wt. Water (g)		Wt. Water (g)	
13.1%	13.2%	14.3%	14.4%
Water Content (%)		Water Content (%)	
AVERAGE VALUES		AVERAGE VALUES	
1	2	1	2
LL	24	LL	31
PL	13	PL	14
PI	11	PI	17
Natural MC (%)		Natural MC (%)	
11.2%		14.7%	
CLASSIFICATION		CLASSIFICATION	
CL		CI-CL	

Sample:



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Afterberg Limits
 ASTM D4318
 Method B- One Point

Client: Alberta Transportation
 Project Name: SR1 2018 Investigation

LABORATORY
 10830 - 46th Street SE
 Calgary, Alberta
 Canada T2C 1G4

Project No: 110773396

Date Received: September 24, 2018

Date Tested: November 2, 2018

Tested By: E. Wahl

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Tel: (403) 253-7876

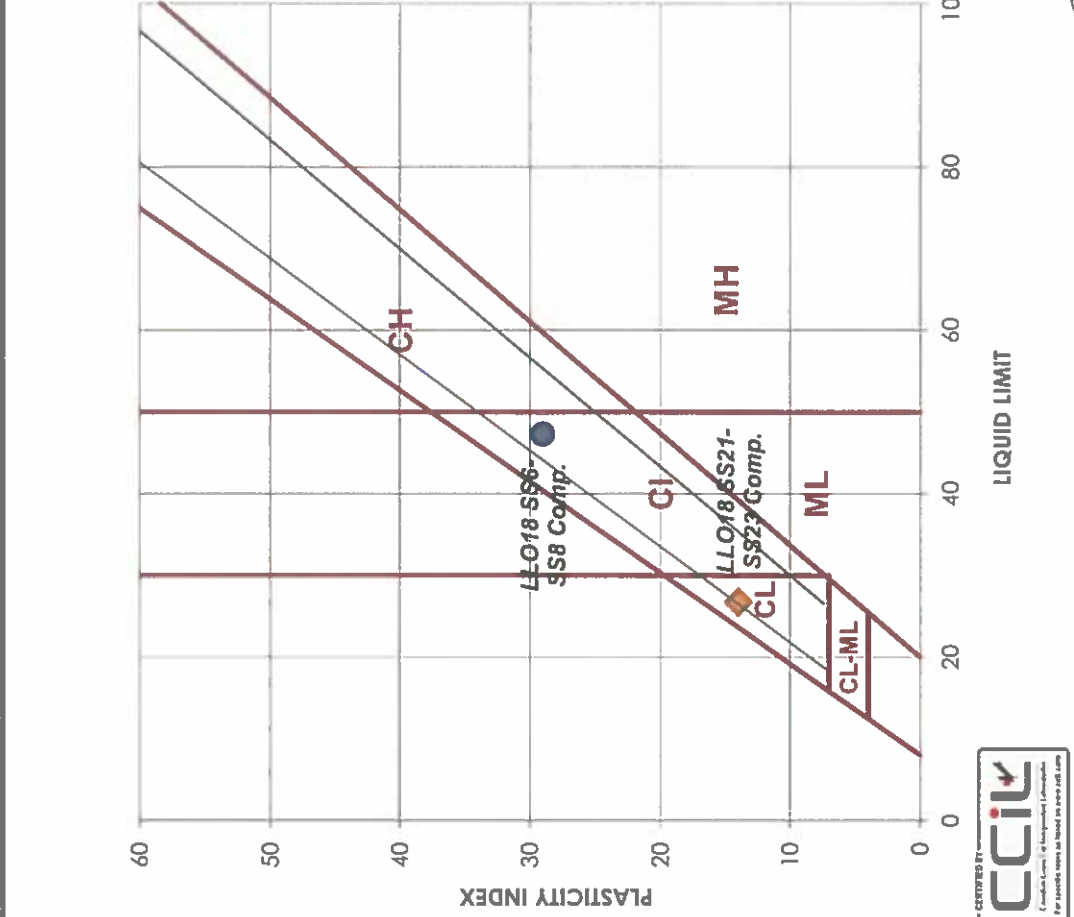
Sample: LLO18 SS6-SS8 Comp.

LIQUID		LIQUID	
1	2	1	2
26	27	22	23
Container Number			
32.55	35.91	35.85	40.08
22.50	24.81	28.45	31.82
1.15	1.14	1.19	1.26
21.4	23.7	27.3	30.6
10.1	11.1	7.4	8.3
47.1%	46.9%	27.1%	27.0%
47.3%	47.3%	26.7%	26.8%
Corrected Water Content (%)			
PLASTIC			

LIQUID		LIQUID	
1	2	1	2
26.86	26.66	25.25	25.51
24.95	24.76	23.89	24.12
14.18	13.80	13.77	13.86
10.8	11.0	10.1	10.3
1.9	1.9	1.4	1.4
17.7%	17.3%	13.4%	13.5%
Water Content (%)			
PLASTIC			

AVERAGE VALUES		AVERAGE VALUES	
1	2	1	2
LL	47	LL	27
PL	18	PL	13
PI	29	PI	14
Natural MC (%)	23.0%	Natural MC (%)	13.1%
CLASSIFICATION			
CI		CI	

AVERAGE VALUES		AVERAGE VALUES	
1	2	1	2
LL	47	LL	27
PL	18	PL	13
PI	29	PI	14
Natural MC (%)	23.0%	Natural MC (%)	13.1%
CLASSIFICATION			
CI		CI	



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Atterberg Limits
ASTM D4318
Method B- One Point

Client: Alberta Transportation
Project Name: SRI 2018 Investigation

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Project No: 110773396
Date Received: September 25, 2018
Date Tested: November 9, 2018
Tested By: E. Wahl

Sample: LLO18 SS13-SS15 Comp.

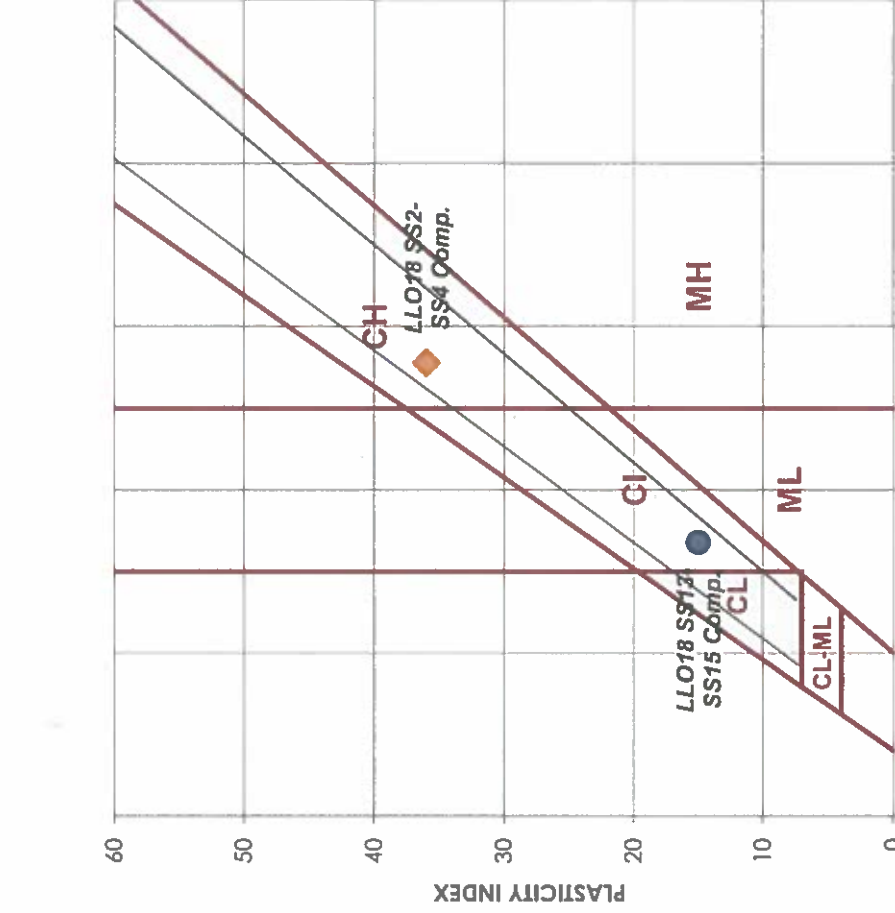
LIQUID		LIQUID	
Trial No.	28	Trial No.	2
Number of Blows	28	Number of Blows	2
Container Number	34.60	Container Number	25
Wt. Sample (wet+tare)(g)	34.09	Wt. Sample (wet+tare)(g)	29.64
Wt. Sample (dry+tare)(g)	25.87	Wt. Sample (dry+tare)(g)	19.47
Wt. Tare (g)	1.13	Wt. Tare (g)	1.20
Wt. Dry Soil (g)	24.7	Wt. Dry Soil (g)	18.3
Wt. Water (g)	8.2	Wt. Water (g)	10.2
Water Content (%)	33.2%	Water Content (%)	55.7%
Corrected Water Content (%)	33.6%	Corrected Water Content (%)	55.5%

PLASTIC		PLASTIC	
Trial No.	2	Trial No.	2
Container Number	25.59	Container Number	25.74
Wt. Sample (wet+tare)(g)	23.78	Wt. Sample (wet+tare)(g)	23.81
Wt. Sample (dry+tare)(g)	14.06	Wt. Sample (dry+tare)(g)	14.06
Wt. Tare (g)	9.7	Wt. Tare (g)	9.8
Wt. Dry Soil (g)	1.8	Wt. Dry Soil (g)	1.9
Wt. Water (g)	18.6%	Wt. Water (g)	19.8%
Water Content (%)	18.6%	Water Content (%)	19.8%

AVERAGE VALUES		AVERAGE VALUES	
1	2	1	2
LL	34	LL	56
PL	19	PL	20
PI	15	PI	36
Natural MC (%)	16.5%	Natural MC (%)	20.9%

CLASSIFICATION		CLASSIFICATION	
CI		CH	

Sample: LLO18 SS2-SS4 Comp.



AVERAGE VALUES		AVERAGE VALUES	
1	2	1	2
LL	34	LL	56
PL	19	PL	20
PI	15	PI	36
Natural MC (%)	16.5%	Natural MC (%)	20.9%



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 ASTM D4318
 Method B- One Point

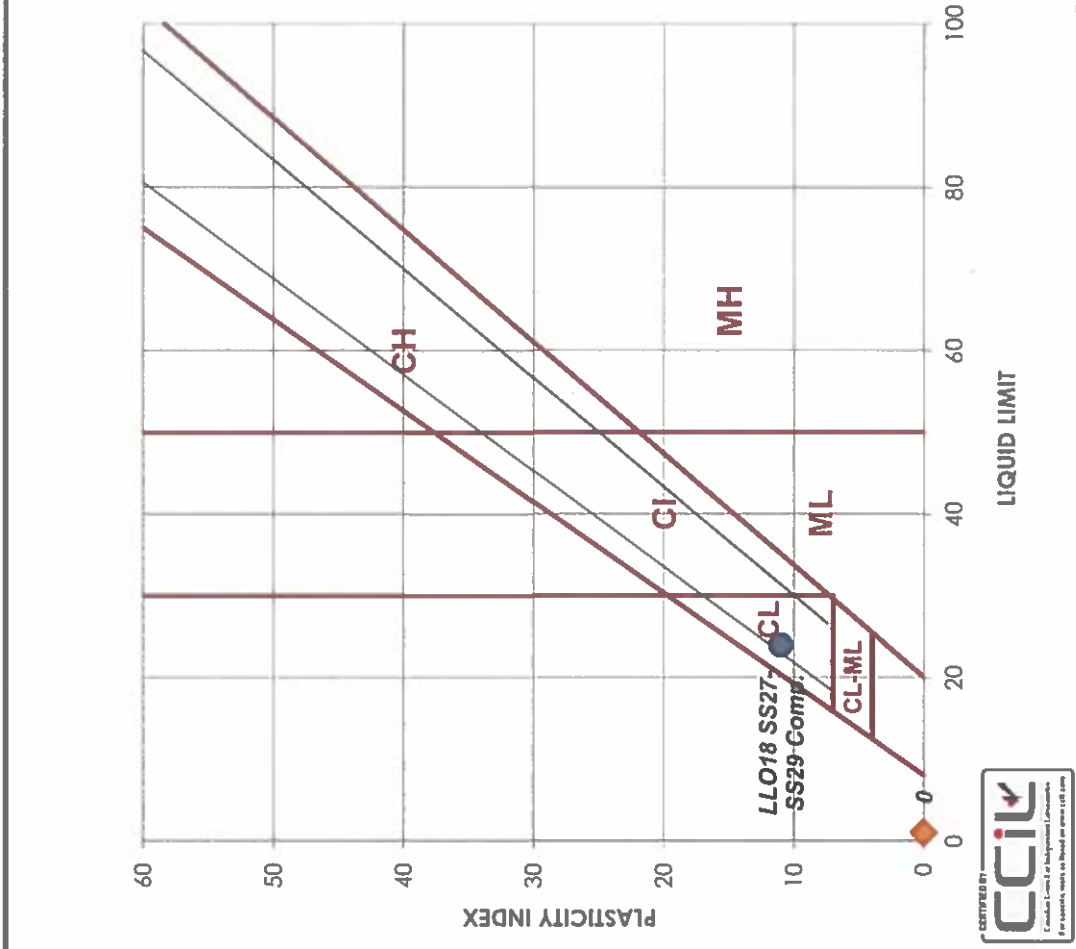
Client: Alberta Transportation
Project Name: SR1 2018 Investigation
Project No.: 110773396
Date Received: September 24, 2018
Date Tested: November 2, 2018
Tested By: E. Wahl

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Sample: LLO18 SS27-SS29 Comp.

LIQUID		LIQUID	
Trial No.	2	Trial No.	2
23	23		
Container Number			
37.57	35.83		
30.47	29.09		
1.20	1.16		
29.3	27.9		
7.1	6.7		
24.3%	24.1%		
24.0%	23.9%		
Corrected Water Content (%)			
PLASTIC			
1	2	1	2
Container Number			
24.74	26.19		
23.49	24.88		
13.83	14.84		
9.7	10.0		
1.3	1.3		
12.9%	13.0%		
Water Content (%)			
AVERAGE VALUES			
1	2	1	2
LL	24	LL	
PL	13	PL	
PI	11	PI	
Natural MC (%)	11.9%	Natural MC (%)	
CLASSIFICATION			
CL		NON-PLASTIC	



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Atterberg Limits
 ASTM D4318
 Method B- One Point

Client: Alberta Transportation

Project Name: SRI
 Project No: 110773396.302.702.310
 Date Received: May 5, 2018
 Date Tested: July 8, 2018
 Tested By: B. Pelkey

LABORATORY

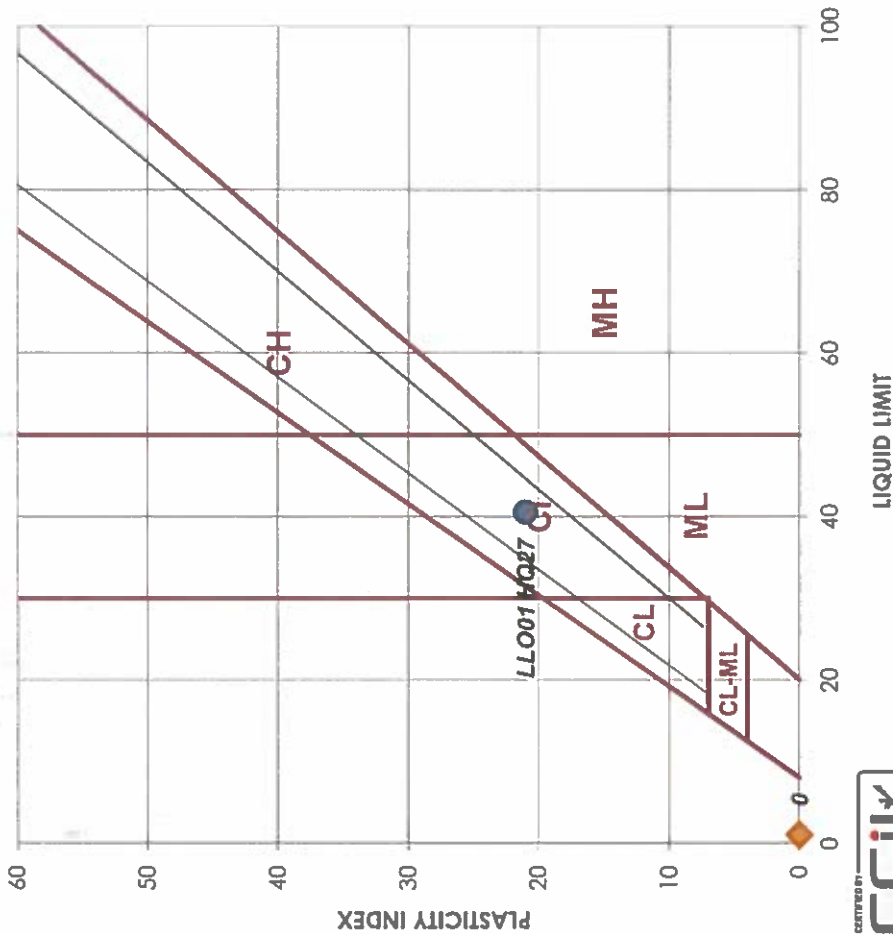
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Sample: LLO01 HQ27

LIQUID		LIQUID	
1	2	1	2
29	29		
27.35	27.32		
19.88	19.88		
1.16	1.16		
18.7	18.7		
7.5	7.4		
39.9%	39.7%		
40.6%	40.5%		
PLASTIC		PLASTIC	
1	2	1	2
31.84	30.86		
29.25	28.39		
15.94	15.79		
13.3	12.6		
2.6	2.5		
19.5%	19.6%		
AVERAGE VALUES		AVERAGE VALUES	
1	2	1	2
LL	41	LL	
PL	20	PL	
PI	21	PI	
Natural MC (%)	11.8%	Natural MC (%)	
CLASSIFICATION		CLASSIFICATION	
CI		NON-PLASTIC	



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Afterberg Limits
ASTM D4318
Method B- One Point

Client: Alberta Transportation
Project Name: SR1
Project No: 110773396.302.702.310

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Date Received: July 8, 2018
Date Tested: July 8, 2018
Tested By: B. Pelkey

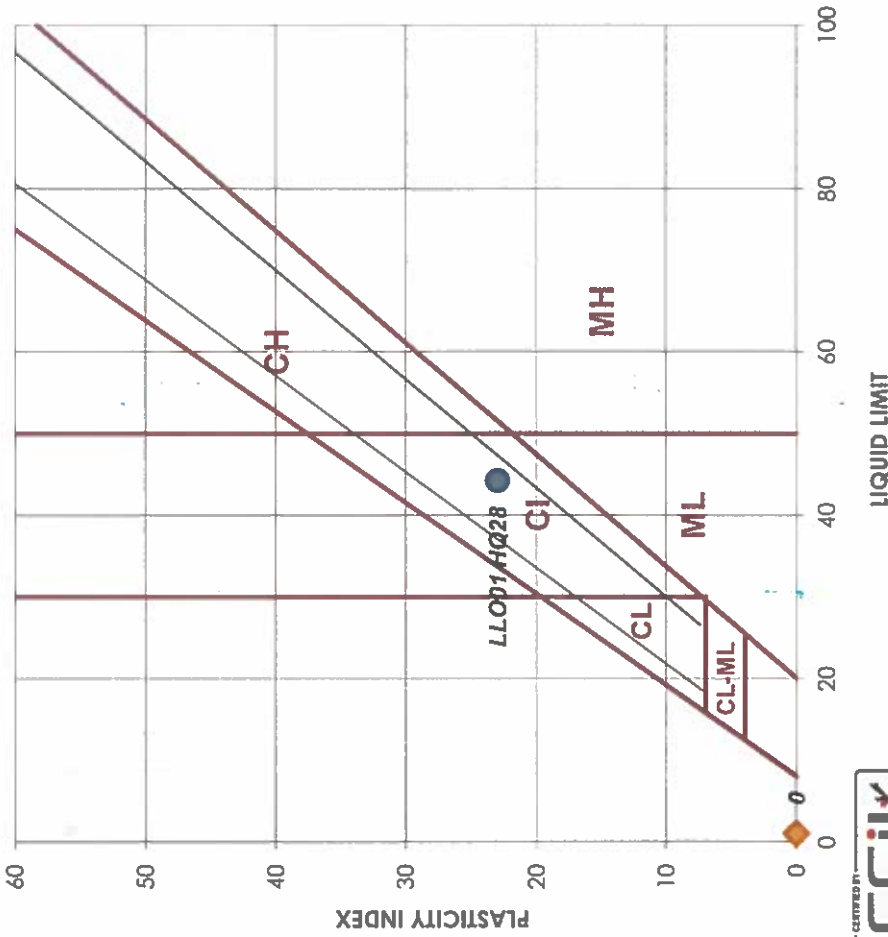
Sample: LLO01 HQ28

LIQUID		LIQUID	
1	2	1	2
29	28	29	28
27.69	28.12	27.69	28.12
19.62	19.96	19.62	19.96
1.16	1.16	1.16	1.16
18.5	18.8	18.5	18.8
8.1	8.2	8.1	8.2
43.7%	43.4%	43.7%	43.4%
44.5%	44.0%	44.5%	44.0%

PLASTIC		PLASTIC	
1	2	1	2
29.3	29.49	29.3	29.49
26.95	27.15	26.95	27.15
15.66	15.80	15.66	15.80
11.3	11.4	11.3	11.4
2.4	2.3	2.4	2.3
20.8%	20.6%	20.8%	20.6%

AVERAGE VALUES		AVERAGE VALUES	
1	2	1	2
LL	44	LL	44
PL	21	PL	21
PI	23	PI	23
Natural MC (%)	16.9%	Natural MC (%)	16.9%

CLASSIFICATION		CLASSIFICATION	
CI		CI	



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Atterberg Limits
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Method B - One Point

Client: Alberta Transportation

Project Name: SRI

Project No: 110773396.302.702.310

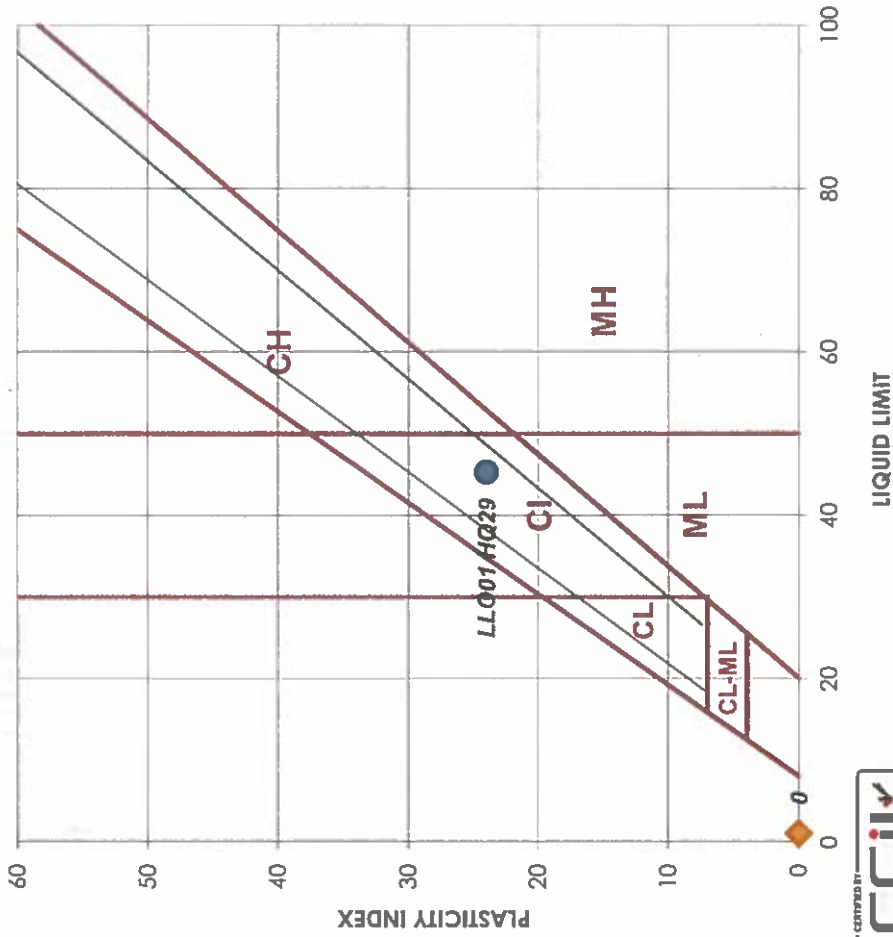
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Date Received: May 5, 2018
Date Tested: July 8, 2018
Tested By: B. Pelkey

Sample:

LLO01 HQ29		LIQUID	
Trial No.	2	1	2
Number of Blows	25		
Container Number			
Wt. Sample (wet+tare) [g]	20.79		
Wt. Sample (dry+tare) [g]	14.68		
Wt. Tare [g]	1.10		
Wt. Dry Soil [g]	13.6		
Wt. Water [g]	6.1		
Water Content (%)	45.0%		
Corrected Water Content (%)	45.0%		
PLASTIC			
Trial No.	2	1	2
Container Number			
Wt. Sample (wet+tare) [g]	28.30		
Wt. Sample (dry+tare) [g]	25.73		
Wt. Tare [g]	13.88		
Wt. Dry Soil [g]	11.9		
Wt. Water [g]	2.6		
Water Content (%)	21.7%		
AVERAGE VALUES			
	2	1	2
LL	45		
PL	21		
PI	24		
Natural MC (%)	9.5%		
CLASSIFICATION			
CI		NON-PLASTIC	



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ASTM D4318
Method B- One Point

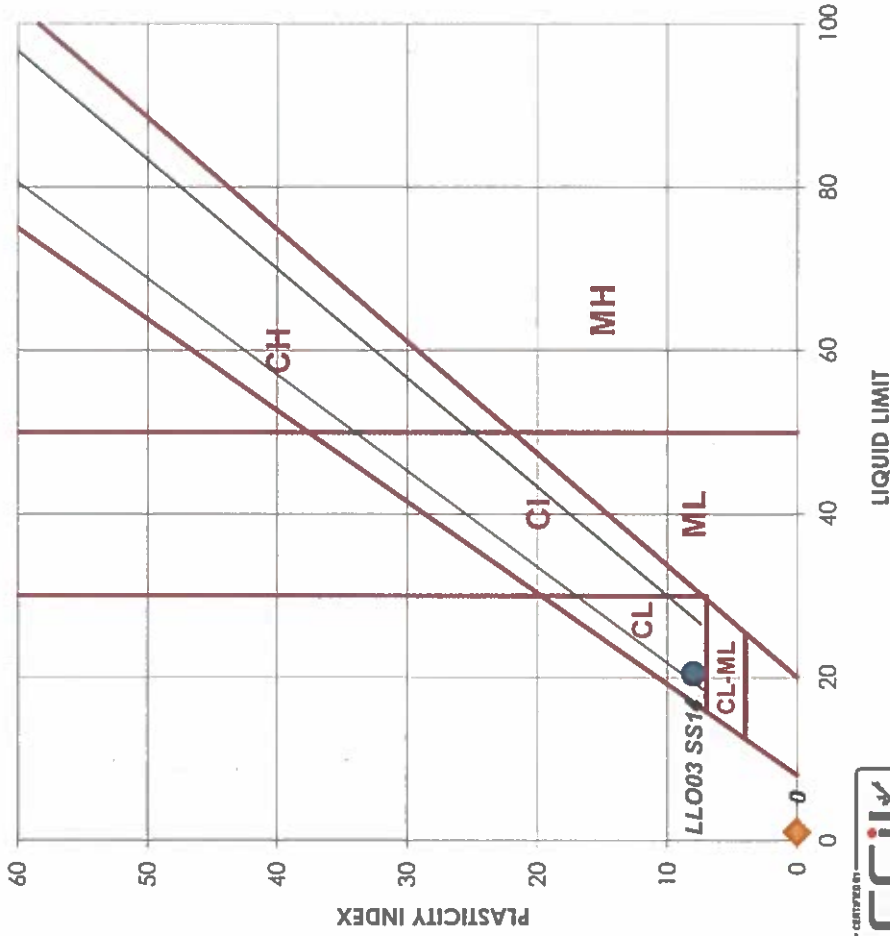
Client: Alberta Transportation
Project Name: SR1
Project No: 110773396.302.702.310
Date Received: May 6, 2018
Date Tested: June 1, 2018
Tested By: B. Pelkey

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Sample: LLO03 SS14

LIQUID		LIQUID	
1	2	1	2
20	21	20	21
33.16	37.15	33.16	37.15
27.62	30.91	27.62	30.91
1.19	1.28	1.19	1.28
26.4	29.6	26.4	29.6
5.5	6.2	5.5	6.2
21.0%	21.1%	21.0%	21.1%
20.4%	20.6%	20.4%	20.6%
PLASTIC		PLASTIC	
1	2	1	2
28.72	30.02	28.72	30.02
26.97	28.12	26.97	28.12
13.87	13.81	13.87	13.81
13.1	14.3	13.1	14.3
1.8	1.9	1.8	1.9
13.4%	13.3%	13.4%	13.3%
AVERAGE VALUES		AVERAGE VALUES	
1	2	1	2
LL	21	LL	21
PL	13	PL	13
PI	8	PI	8
Natural MC (%)	11.4%	Natural MC (%)	11.4%
CLASSIFICATION		CLASSIFICATION	
CL		NON-PLASTIC	



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ASTM D4318
Method B- One Point

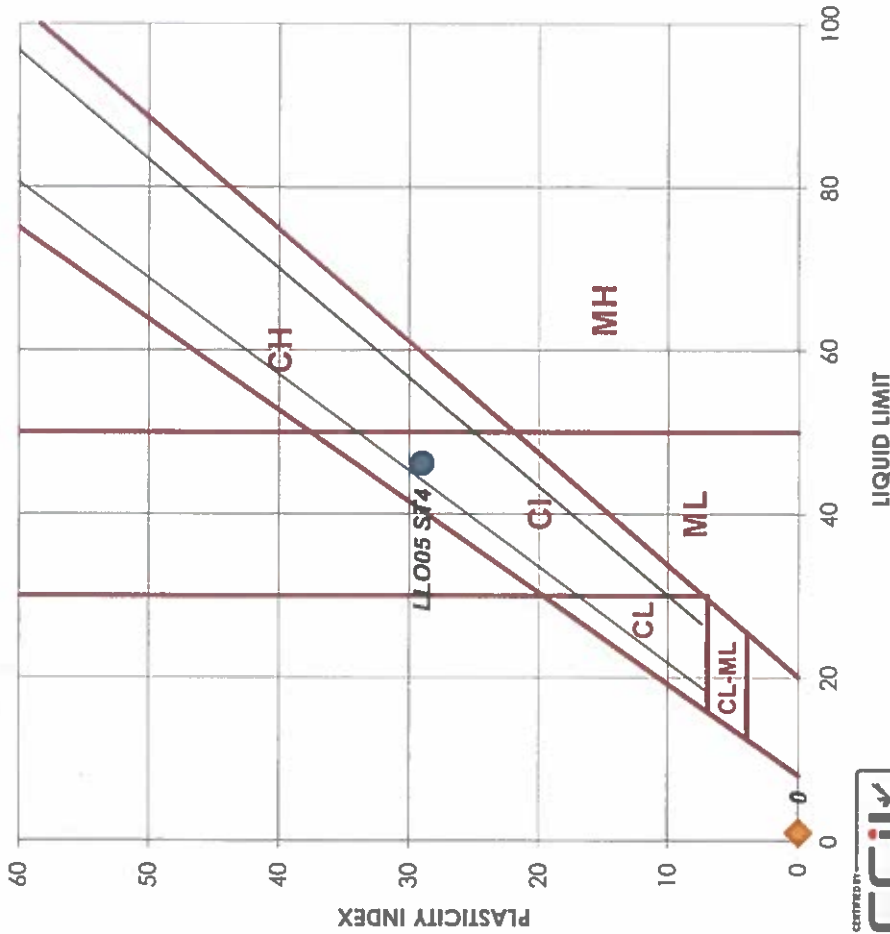
Client: Alberta Transportation
Project Name: SR1
Project No: 110773396.302.702.310
Date Received: May 6, 2018
Date Tested: June 5, 2018
Tested By: B. Pelkey

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Sample:

LLO05 ST4		LIQUID	
Trial No.	Number of Blows	Trial No.	Number of Blows
1	26	1	2
Container Number			
25.54	27.26		
17.87	19.08		
1.17	1.18		
16.7	17.9		
7.7	8.2		
45.9%	45.7%		
46.6%	45.9%		
Corrected Water Content (%)			
PLASTIC			
1	2	1	2
Container Number			
29.77	29.92		
27.41	27.54		
13.94	13.76		
13.5	13.8		
2.4	2.4		
17.5%	17.3%		
Water Content (%)			
AVERAGE VALUES			
1	2	1	2
LL	46	LL	
PL	17	PL	
PI	29	PI	
Natural MC (%)	22.8%	Natural MC (%)	
CLASSIFICATION			
CI		NON-PLASTIC	



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Atterberg Limits
ASTM D4318
Method B - One Point

Client: Alberta Transportation

Project Name: SRI

Project No: 110773396.302.702.310

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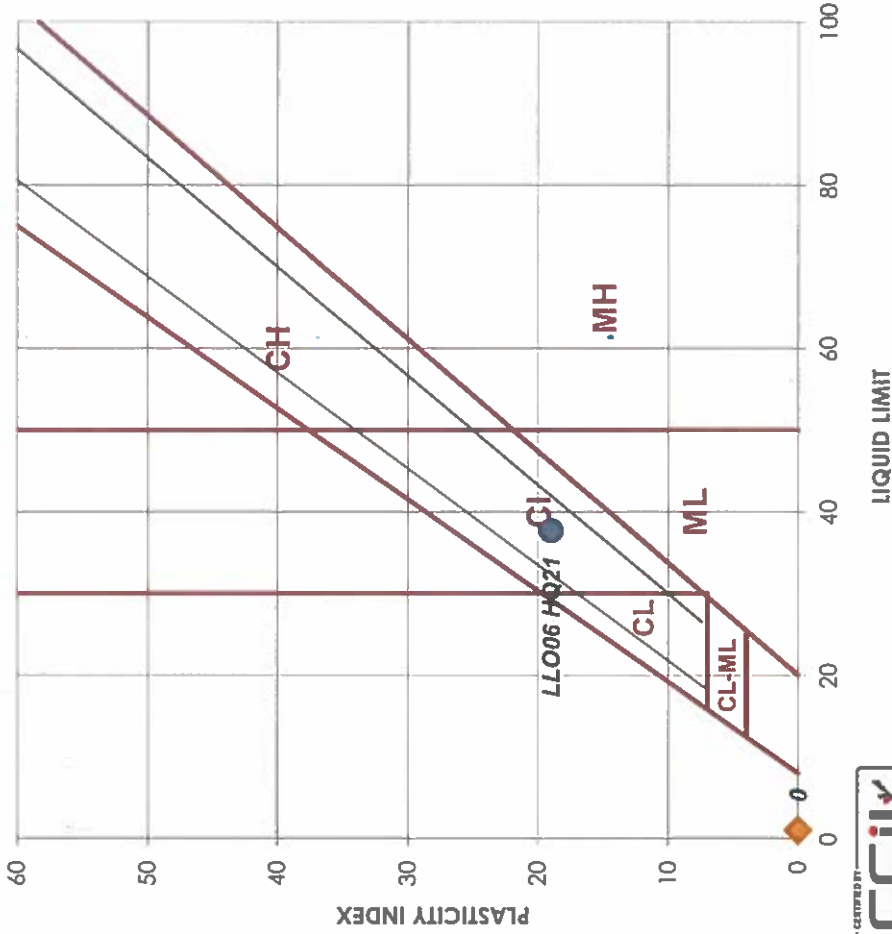
Date Received: May 3, 2018
Date Tested: July 8, 2018
Tested By: B. Pelkey

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Sample: LLO06 HQ21

LIQUID		LIQUID	
1	2	1	2
28	28		
24.11	30.46		
17.89	22.50		
1.17	1.10		
16.7	21.4		
6.2	8.0		
37.2%	37.2%		
37.7%	37.7%		
PLASTIC		PLASTIC	
1	2	1	2
24.06	28.13		
22.43	25.83		
13.8	13.78		
8.6	12.1		
1.6	2.3		
18.9%	19.1%		
AVERAGE VALUES		AVERAGE VALUES	
1	2	1	2
LL	38	LL	
PL	19	PL	
PI	19	PI	
Natural MC (%)	12.9%	Natural MC (%)	
CLASSIFICATION		CLASSIFICATION	
CI		NON-PLASTIC	



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Method B - One Point

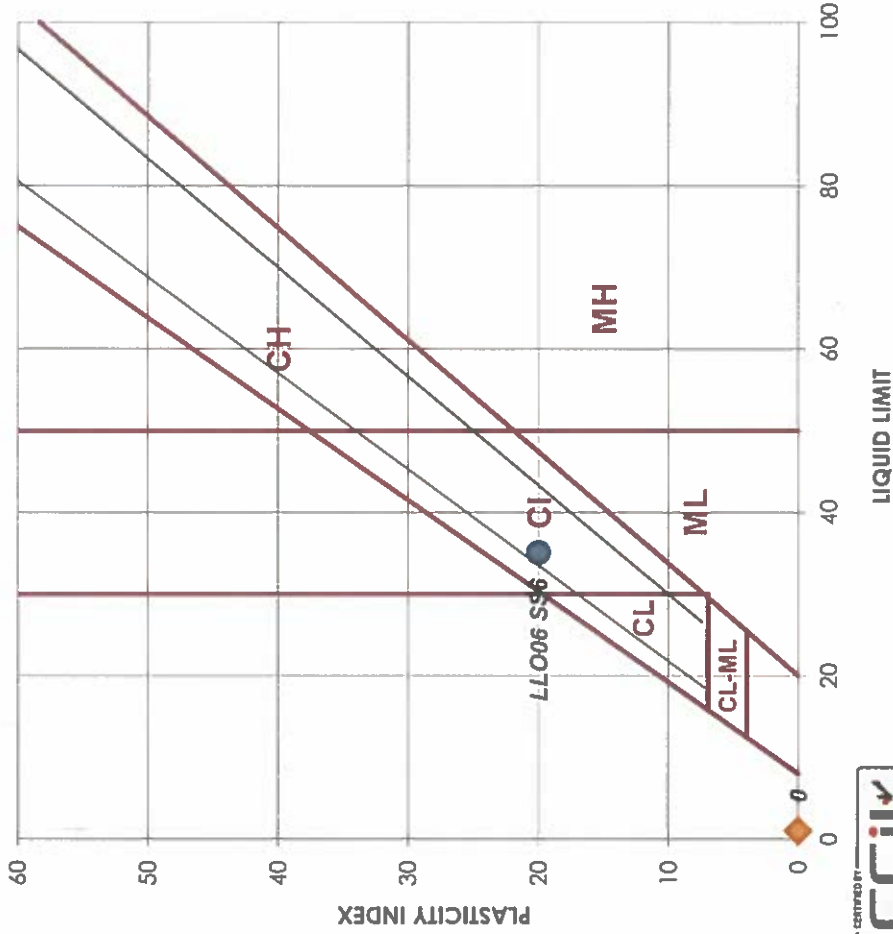
Client: Alberta Transportation
Project Name: SRI
Project No: 110773396.302.702.310
Date Received: May 6, 2018
Date Tested: June 1, 2018
Tested By: B. Pelkey

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Sample:

LLO06 SS6		LIQUID	
Trial No.	24	Trial No.	2
Container Number	24.18	Container Number	2
Wt. Sample (wet+tare)(g)	23.69	Wt. Sample (wet+tare)(g)	24.18
Wt. Sample (dry+tare)(g)	1.17	Wt. Sample (dry+tare)(g)	18.17
Wt. Tare (g)	22.5	Wt. Tare (g)	1.21
Wt. Dry Soil (g)	8.0	Wt. Dry Soil (g)	17.0
Wt. Water (g)	35.5%	Wt. Water (g)	6.0
Water Content (%)	35.3%	Water Content (%)	35.4%
Corrected Water Content (%)		Corrected Water Content (%)	34.9%
PLASTIC		PLASTIC	
Trial No.	1	Trial No.	2
Container Number	28.76	Container Number	32.33
Wt. Sample (wet+tare)(g)	26.84	Wt. Sample (wet+tare)(g)	29.89
Wt. Sample (dry+tare)(g)	14.15	Wt. Sample (dry+tare)(g)	13.77
Wt. Tare (g)	12.7	Wt. Tare (g)	16.1
Wt. Dry Soil (g)	1.9	Wt. Dry Soil (g)	2.4
Wt. Water (g)	15.1%	Wt. Water (g)	15.1%
Water Content (%)		Water Content (%)	15.1%
AVERAGE VALUES		AVERAGE VALUES	
1	LL	1	LL
2	PL	2	PL
35	PI	20	PI
Natural MC (%)	11.4%	Natural MC (%)	11.4%
CLASSIFICATION		CLASSIFICATION	
CI		NON-PLASTIC	



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Atterberg Limits
ASTM D4318
Method B - One Point

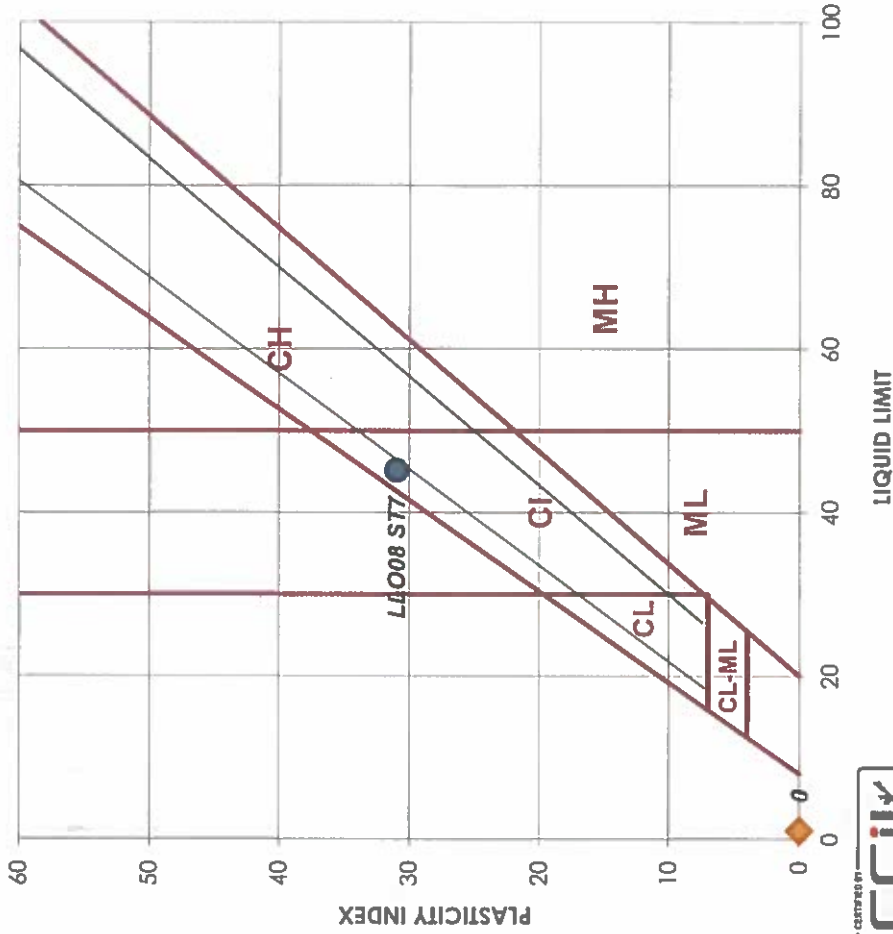
Client: Alberta Transportation
Project Name: SR1
Project No: 110773396.302.702.310
Date Received: May 3, 2018
Date Tested: June 14, 2018
Tested By: B. Pelkey

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Sample:

LLO08 ST7		LIQUID	
1	2	1	2
22	21	Number of Blows	
30.86	25.43	Container Number	
21.53	17.81	Wt. Sample (wet+tare)(g)	
1.26	1.22	Wt. Sample (dry+tare)(g)	
20.3	16.6	Wt. Tare (g)	
9.3	7.6	Wt. Dry Soil (g)	
46.0%	45.9%	Wt. Water (g)	
45.3%	45.0%	Corrected Water Content (%)	
PLASTIC		PLASTIC	
1	2	1	2
29.57	26.18	Container Number	
27.65	24.69	Wt. Sample (wet+tare)(g)	
13.81	13.77	Wt. Sample (dry+tare)(g)	
13.8	10.9	Wt. Tare (g)	
1.9	1.5	Wt. Dry Soil (g)	
13.9%	13.6%	Wt. Water (g)	
AVERAGE VALUES		AVERAGE VALUES	
1	2	1	2
LL	45	LL	
PL	14	PL	
PI	31	PI	
Natural MC (%)	21.0%	Natural MC (%)	
CLASSIFICATION		CLASSIFICATION	
CI		NON-PLASTIC	



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Reviewed By:



Atterberg Limits
ASTM D4318
Method B- One Point

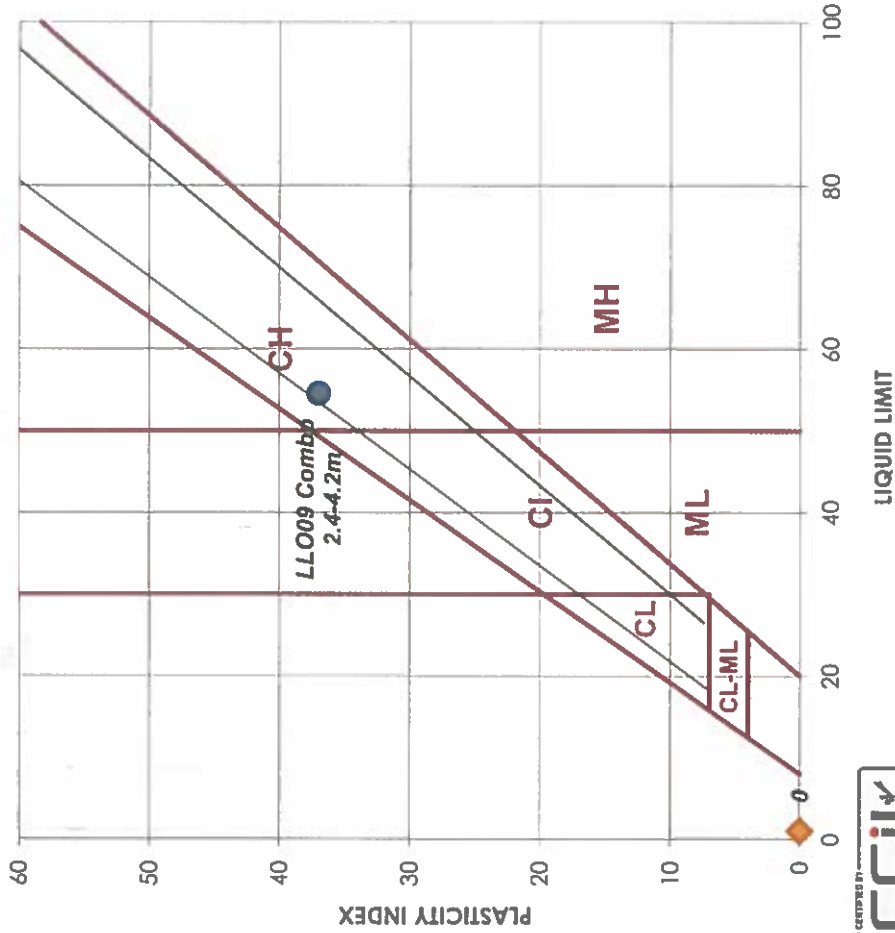
Client: Alberta Transportation
Project Name: SR1
Project No: 110773396.302.702.310
Date Received: May 7, 2018
Date Tested: June 20, 2018
Tested By: B. Pelkey

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Sample:

LLO09 Combo 2.4-4.2m		LIQUID	
1	2	1	2
26	25	Number of Blows	
28.00	23.78	Container Number	
18.55	15.83	Wt. Sample (wet+tare)(g)	
1.22	1.22	Wt. Sample (dry+tare)(g)	
17.3	14.6	Wt. Tare (g)	
9.5	8.0	Wt. Dry Soil (g)	
54.5%	54.4%	Wt. Water (g)	
54.8%	54.4%	Water Content (%)	
PLASTIC		PLASTIC	
1	2	1	2
Trial No.		Trial No.	
Container Number		Container Number	
26.29	23.16	Wt. Sample (wet+tare)(g)	
24.36	21.74	Wt. Sample (dry+tare)(g)	
13.88	13.92	Wt. Tare (g)	
10.5	7.8	Wt. Dry Soil (g)	
1.9	1.4	Wt. Water (g)	
18.4%	18.2%	Water Content (%)	
AVERAGE VALUES		AVERAGE VALUES	
1	2	1	2
LL	55	LL	
PL	18	PL	
PI	37	PI	
Natural MC (%)	22.2%	Natural MC (%)	
CLASSIFICATION		CLASSIFICATION	
CH ●		NON-PLASTIC ◆	



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Reviewed By: _____



Afterberg Limits
ASTM D4318
Method B- One Point

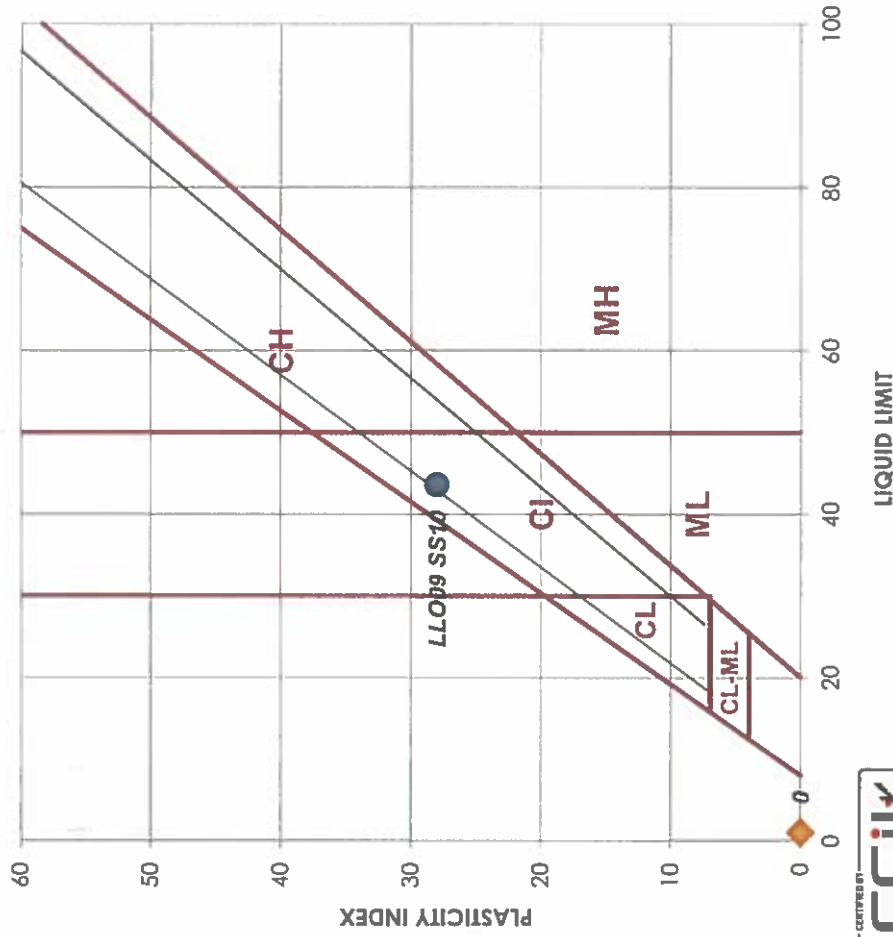
Client: Alberta Transportation
Project Name: SR1
Project No: 110773396.302.702.310
Date Received: May 6, 2018
Date Tested: June 1, 2018
Tested By: B. Pelkey

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Sample:

LLO09 SS10		LIQUID	
1	2	1	2
29	29		
21.23	23.48		
15.20	16.90		
1.16	1.50		
14.0	15.4		
6.0	6.6		
42.9%	42.7%		
43.7%	43.5%		
PLASTIC		PLASTIC	
1	2	1	2
26.83	24.69		
25.07	23.24		
13.8	13.87		
11.3	9.4		
1.8	1.5		
15.6%	15.5%		
AVERAGE VALUES		AVERAGE VALUES	
1	2	1	2
LL	44	LL	
PL	16	PL	
PI	28	PI	
Natural MC (%)	18.8%	Natural MC (%)	
CLASSIFICATION		CLASSIFICATION	
CI		NON-PLASTIC	



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Reviewed By:



Atterberg Limits
ASTM D4318
Method B- One Point

Client: Alberta Transportation

Project Name: SRI

Project No: 110773396.302.702.310

Date Received: May 4, 2018

Date Tested: June 20, 2018

Tested By: B. Pelkey

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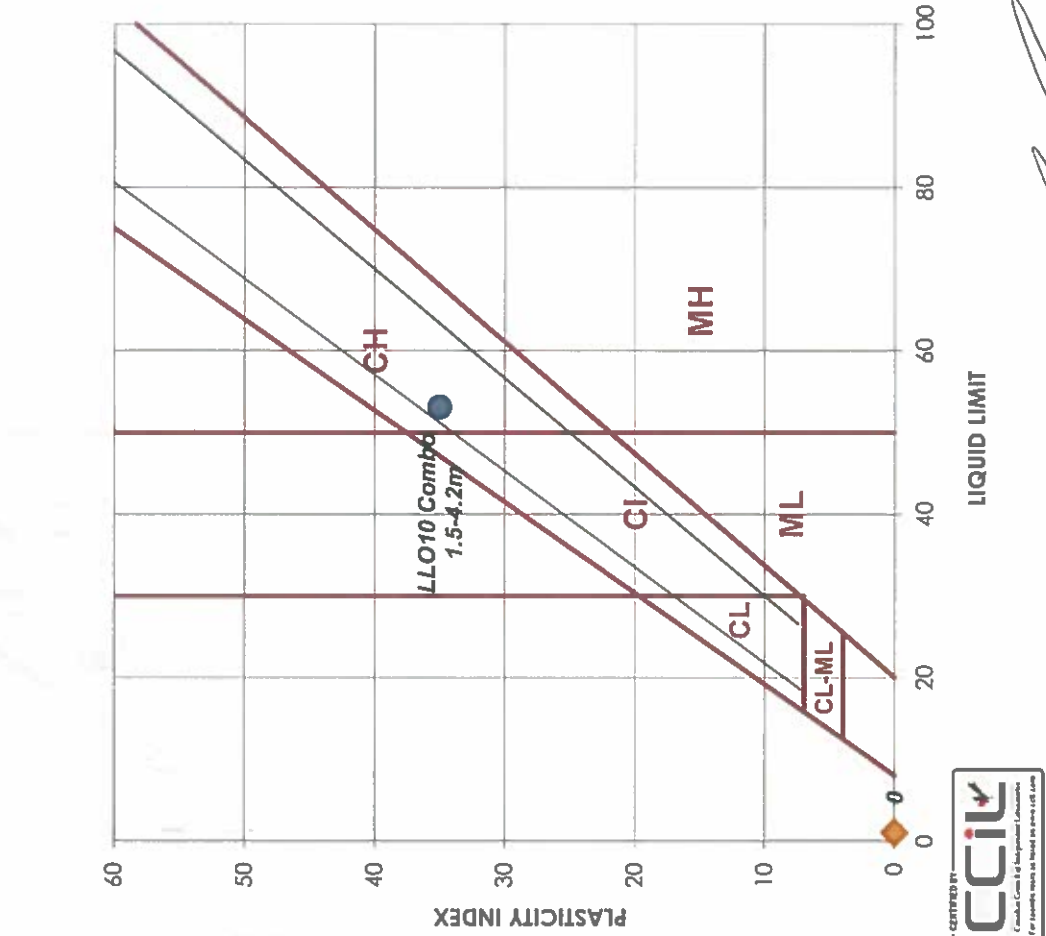
Canada T2C 1G4

Tel: (403) 253-7876

Sample: LLO10 Combo 1.5-4.2m

LIQUID		LIQUID	
Trial No.	Number of Blows	Trial No.	Number of Blows
1	24	1	2
22	24		
27.38	26.64		
18.20	17.75		
1.14	1.14		
17.1	16.6		
9.2	8.9		
53.8%	53.5%		
53.0%	53.3%		
PLASTIC		PLASTIC	
Trial No.	Container Number	Trial No.	Container Number
1	2	1	2
26.67	24.04		
24.68	22.45		
13.83	13.77		
10.9	8.7		
2.0	1.6		
18.3%	18.3%		
AVERAGE VALUES		AVERAGE VALUES	
1	2	1	2
LL	53	LL	
PL	18	PL	
PI	35	PI	
Natural MC (%)	21.1%	Natural MC (%)	
CLASSIFICATION		CLASSIFICATION	
CH		NON-PLASTIC	

Sample:



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Reviewed By:



Afterberg Limits
ASTM D4318
Method B- One Point

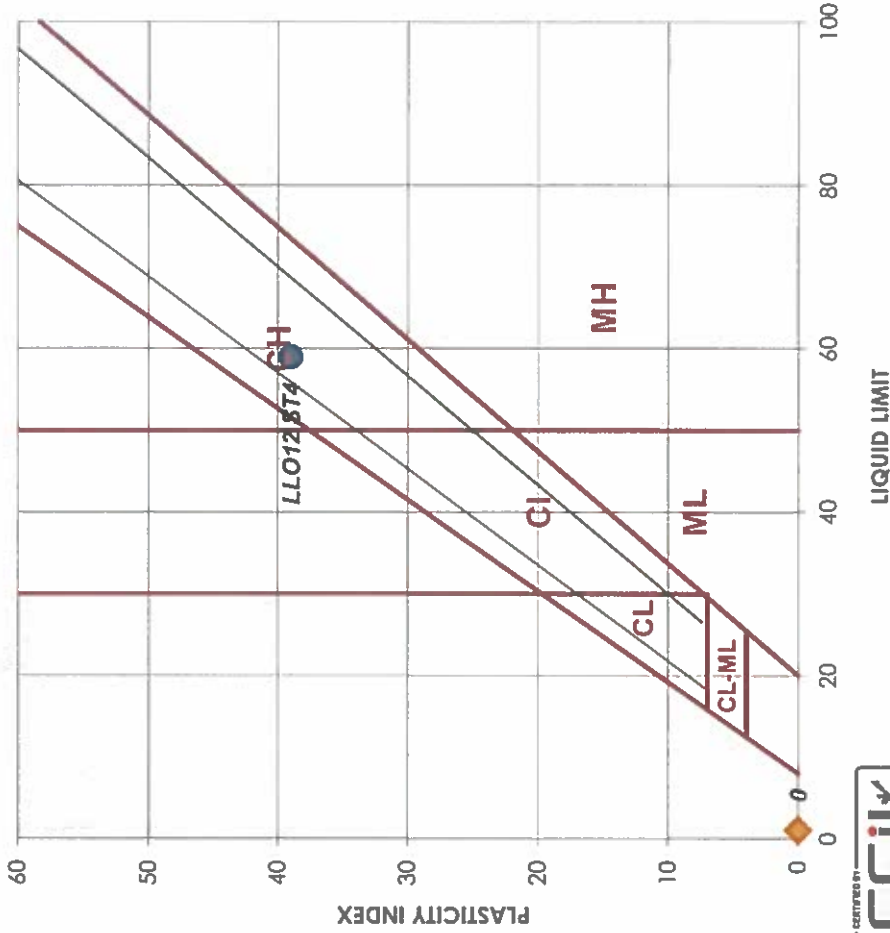
Client: Alberta Transportation
Project Name: SR1
Project No.: 110773396.302.702.310
Date Received: May 6, 2018
Date Tested: June 5, 2018
Tested By: B. Pelkey

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Sample:

LLO12 ST4		LIQUID	
Trial No.	27	Trial No.	2
29	23.66	29	23.66
22.91	15.41	22.91	15.41
14.90	1.22	14.90	1.22
1.16	14.2	1.16	14.2
13.7	8.3	13.7	8.3
8.0	58.1%	8.0	58.1%
58.3%	58.7%	58.3%	58.7%
59.4%		59.4%	
Corrected Water Content (%)		Corrected Water Content (%)	
PLASTIC		PLASTIC	
Trial No.	2	Trial No.	2
26.71	24.69	26.71	24.69
24.53	22.85	24.53	22.85
13.91	13.81	13.91	13.81
10.6	9.0	10.6	9.0
2.2	1.8	2.2	1.8
20.5%	20.4%	20.5%	20.4%
Water Content (%)		Water Content (%)	
AVERAGE VALUES		AVERAGE VALUES	
1	2	1	2
LL	59	LL	59
PL	20	PL	20
PI	39	PI	39
Natural MC (%)	27.0%	Natural MC (%)	27.0%
CLASSIFICATION		CLASSIFICATION	
CH		NON-PLASTIC	



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Grain Size Analysis
Hydrometer Report
ASTM D7928 / D6913
CANFEM

Client: Alberta Transportation

Project Name: SR1

Project No: 110773396.302.702.310

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SAMPLE No.: SS2

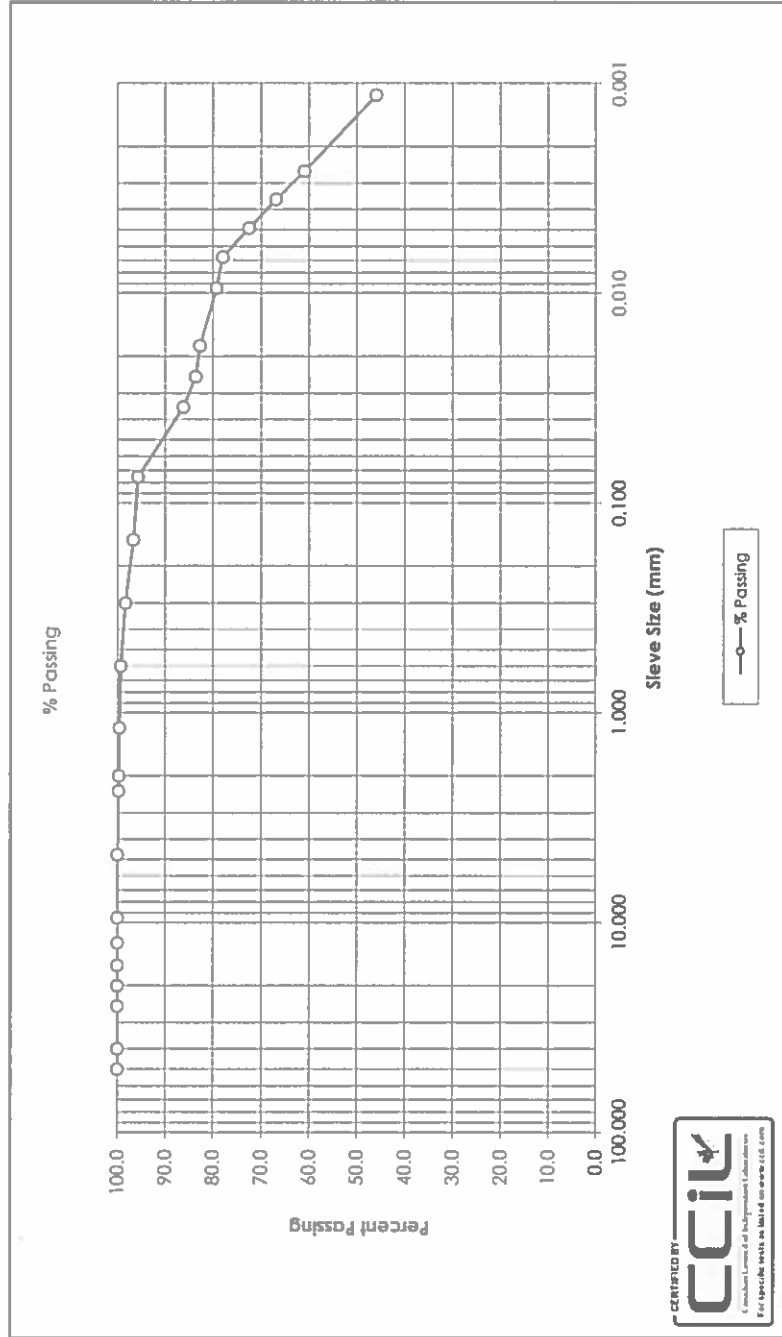
SOURCE: LLO01

TESTED BY: B. Pelkey

DATE RECEIVED: April 5, 2018

DATE TESTED: May 28, 2018

SAMPLE DESCRIPTION: Clay(CH), Trace Sand



Comments: Sample description (MUSCS) derived from both the Grain Size and Atterberg Limit test results. The 0.075mm sieve was used in place of the 0.080mm.

Reviewed by:

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Grain Size Analysis
Hydrometer Report
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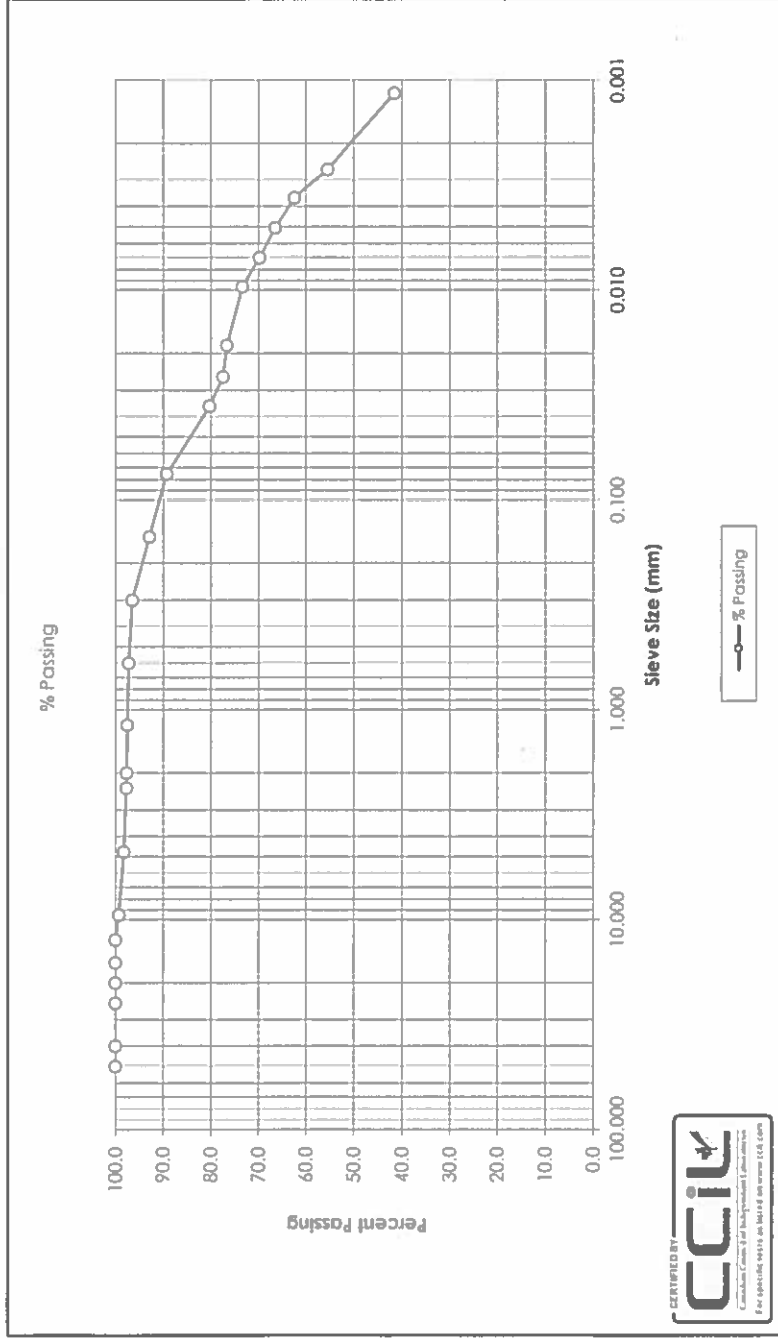
Client: Alberta Transportation
Project Name: SR1
Project No: 110773396.302.702.310

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SAMPLE No.: Combo (2.4-4.2m)
SOURCE: LLO09
TESTED BY: B. Pelkey

DATE RECEIVED: May 7, 2018
DATE TESTED: June 12, 2018
SAMPLE DESCRIPTION: Clay (CH)



Comments: Sample description (USCS) derived from the Grain Size analysis and Atterberg limit test results. From borehole LLO09, sample is comprised of BS3 (2.4-2.6m), SS4 (3.0-3.45m), and BS5 (4.0-4.2m).

Reviewed by:

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[Signature]



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Grain Size Analysis
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Client: Alberta Transportation

Project Name: SRI

Project No: 110773396.302.702.310

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SAMPLE No.: SS10

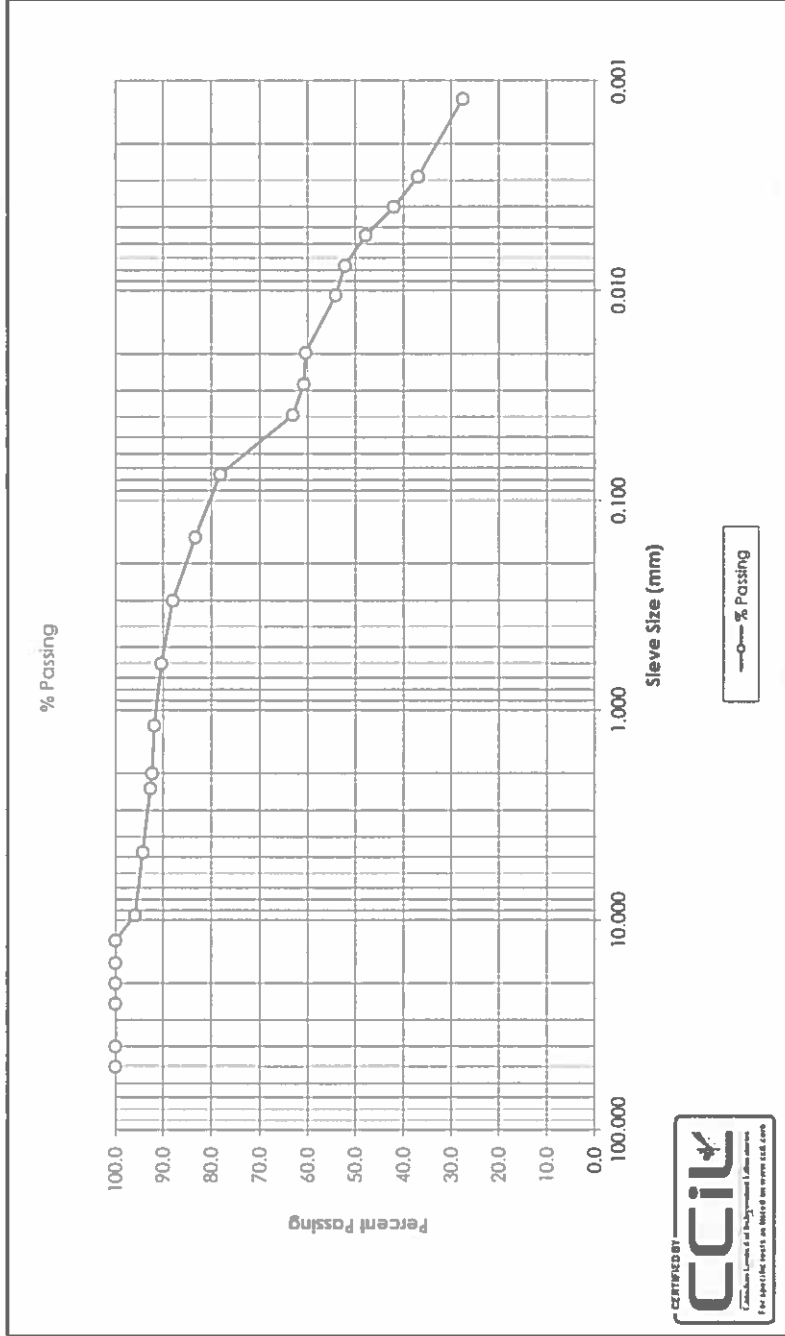
SOURCE: LLO09

TESTED BY: B. Pelkey

DATE RECEIVED: May 6, 2018

DATE TESTED: June 5, 2018

SAMPLE DESCRIPTION: Clay (CL) with Sand



Comments: Sample description (USCS) derived from the Grain Size analysis and Atterberg limit test results.

Reviewed by:

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Grain Size Analysis
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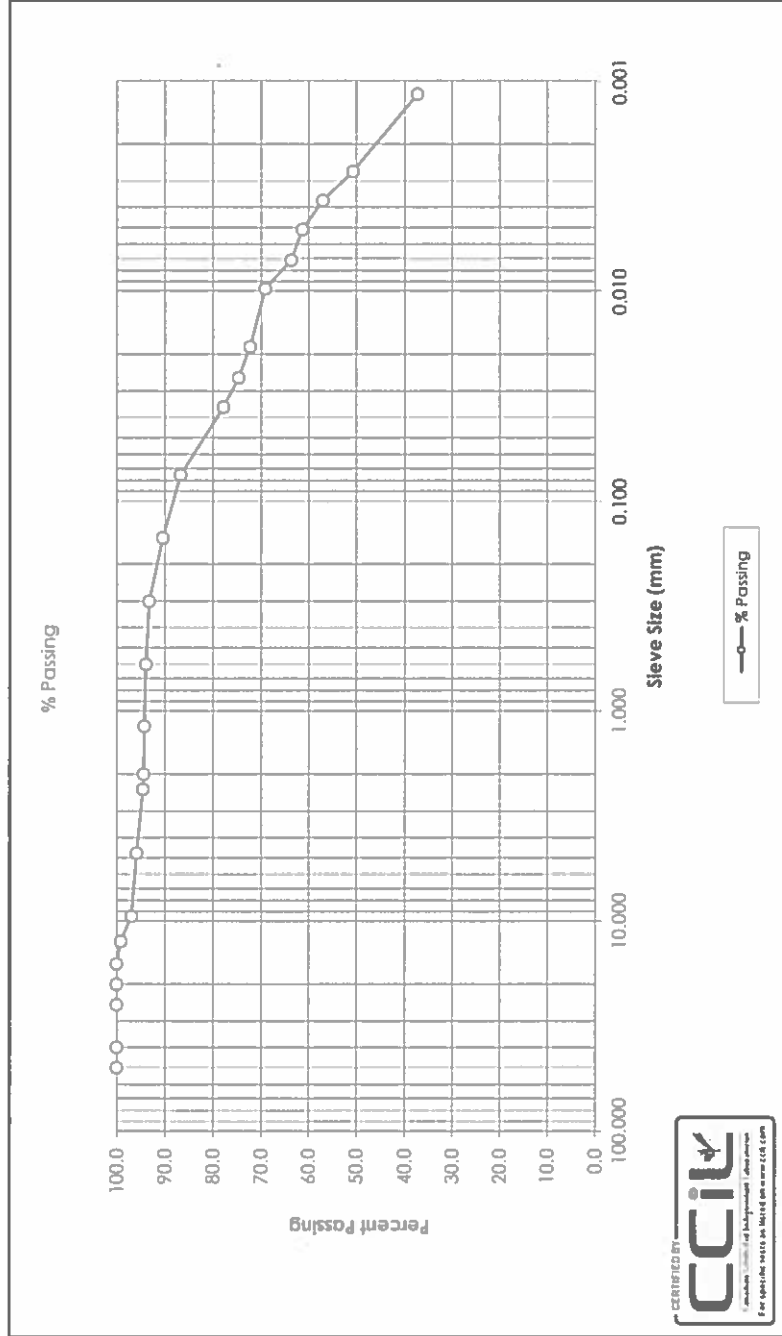
Client: Alberta Transportation
Project Name: SR1
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SAMPLE No.: Combo (1.5-4.2m)
SOURCE: LLO10
TESTED BY: B. Pekey

DATE RECEIVED: May 7, 2018
DATE TESTED: June 12, 2018
SAMPLE DESCRIPTION: Clay (CH)



Comments: Sample description (USCS) derived from the Grain Size analysis and Atterberg limit test results. From borehole LLO10, sample is comprised of SS2 (1.5-1.95m), BS3 (2.4-2.6m), SS5 (3.23-3.68m), and BS6 (4.0-4.2m).

Reviewed by:

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Grain Size Analysis
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ASTM D7928 / D6913
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Client: Alberta Transportation

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SAMPLE No.: SS17

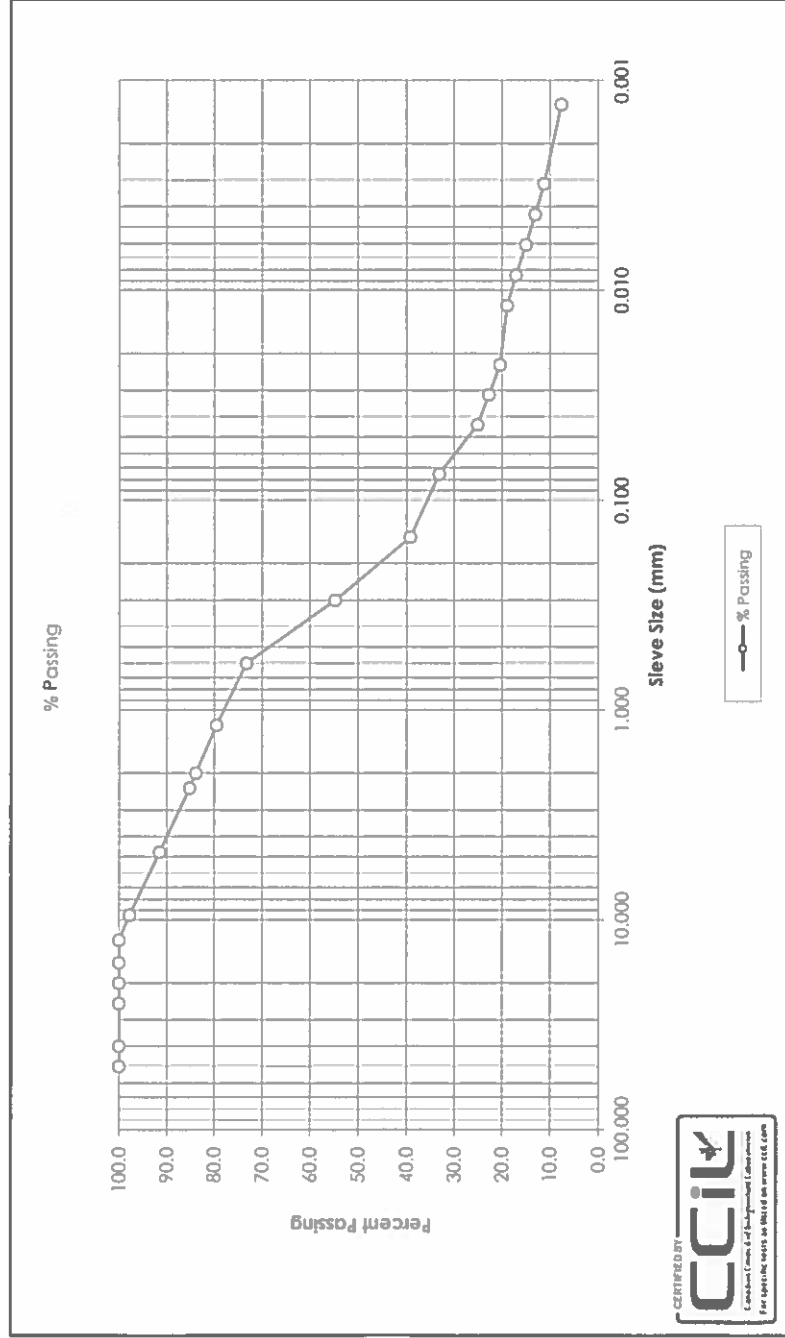
SOURCE: LLO10

TESTED BY: B. Pelkey

DATE RECEIVED: May 6, 2018

DATE TESTED: June 5, 2018

SAMPLE DESCRIPTION: Sand with Fines



Comments: Sample description (USCS) derived from the Grain Size analysis results.

Reviewed by:

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Grain Size Analysis
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SAMPLE No.: BS16

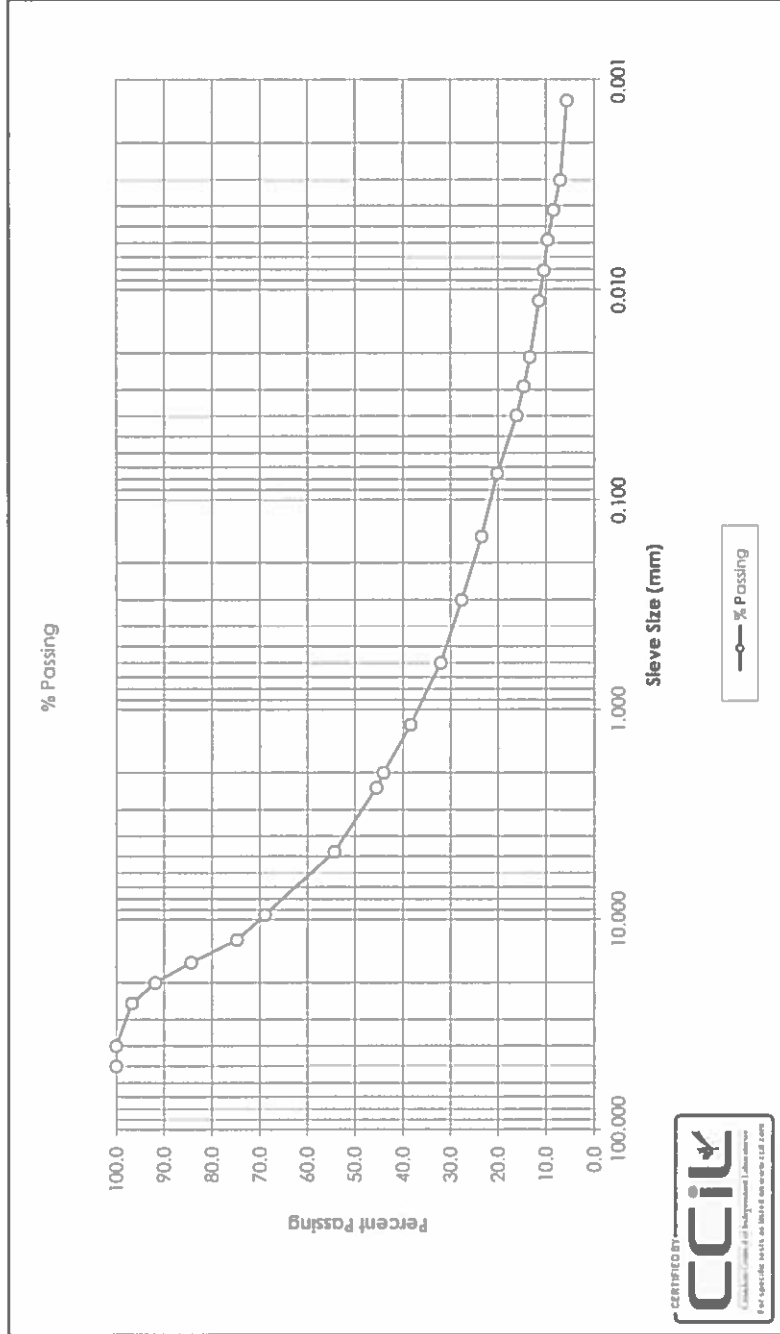
SOURCE: LLO12

TESTED BY: B. Pelkey

DATE RECEIVED: May 6, 2018

DATE TESTED: June 5, 2018

SAMPLE DESCRIPTION: Sandy Gravel, Some Fines



Comments: Sample description (MUSCS) derived from the Grain Size analysis only. The 0.075mm sieve was used in place of the 0.080mm sieve.

Reviewed by:

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Grain Size Analysis
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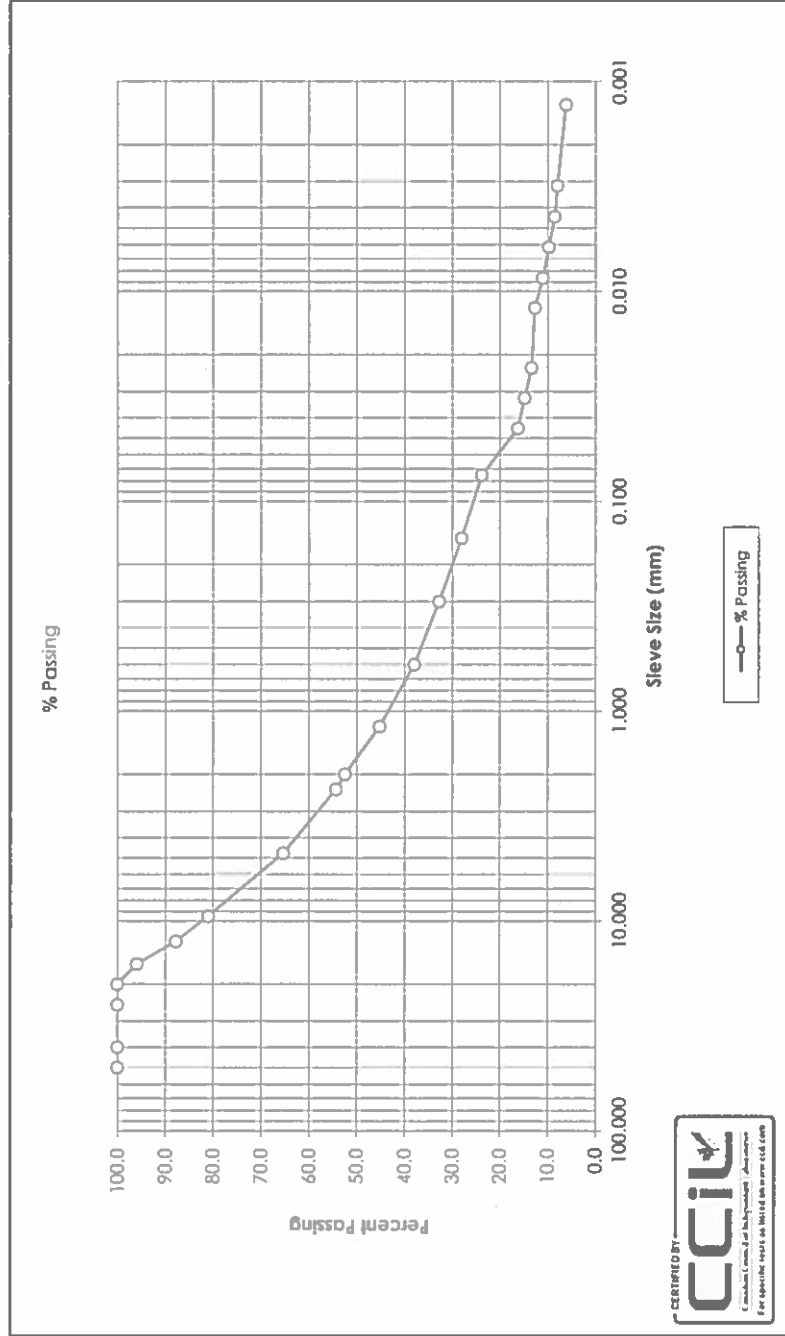
Client: Alberta Transportation
Project Name: SR1
Project No: 110773396.302.702.310

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SAMPLE NO.: SS15
SOURCE: LLO12
TESTED BY: B. Peikay

DATE RECEIVED: May 6, 2018
DATE TESTED: June 5, 2018
SAMPLE DESCRIPTION: Sandy Gravel with Fines



Sieve (mm)	Sample % Passing	Sieve (mm)	Sample % Passing
50.0	100.0	0.0086	11.0
40.0	100.0	0.0062	9.8
25.0	100.0	0.0044	8.5
20.0	100.0	0.0031	8.0
16.0	95.9	0.0013	6.2
12.5	87.8		
9.5	81.0		
4.75	65.4		
2.36	54.3		
2.00	52.5		
1.18	45.2		
0.600	37.9		
0.300	32.8		
0.150	28.0		
0.075	23.8		
0.0449	16.3		
0.0321	14.8		
0.0231	13.4		
0.0120	12.7		

Comments: Sample description (MUSCS) derived from the Grain Size analysis only. The 0.075mm sieve was used in place of the 0.080mm sieve.

Reviewed by:

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Grain Size Analysis
Hydrometer Report
ASTM D7928 / D6913
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Client: Alberta Transportation

Project Name: SR1

Project No: 110773396.302.702.310

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SAMPLE No.: ST4 (3.0-3.45m)

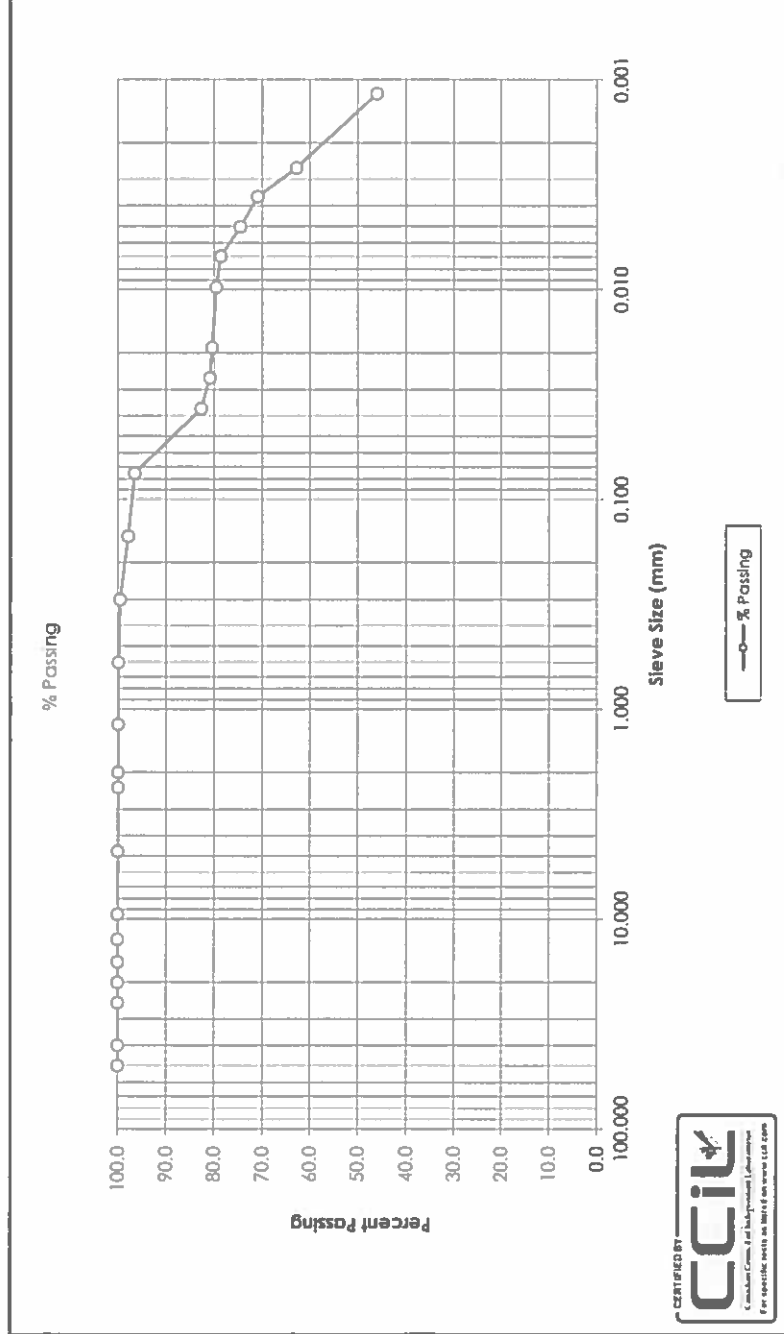
SOURCE: LLO12

TESTED BY: B. Peikay

DATE RECEIVED: May 6, 2018

DATE TESTED: June 5, 2018

SAMPLE DESCRIPTION: Clay (CH)



Comments: Sample description (USCS) derived from the Grain Size analysis and Atterberg limit test results.

Reviewed by:

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Grain Size Analysis
Hydrometer Report
ASTM D7928 / D6913
CANFEM

Client: Alberta Transportation

Project Name: SRI

Project No: 110773396.302.702.310

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SAMPLE No.: ST6 (4.6-5.05m)

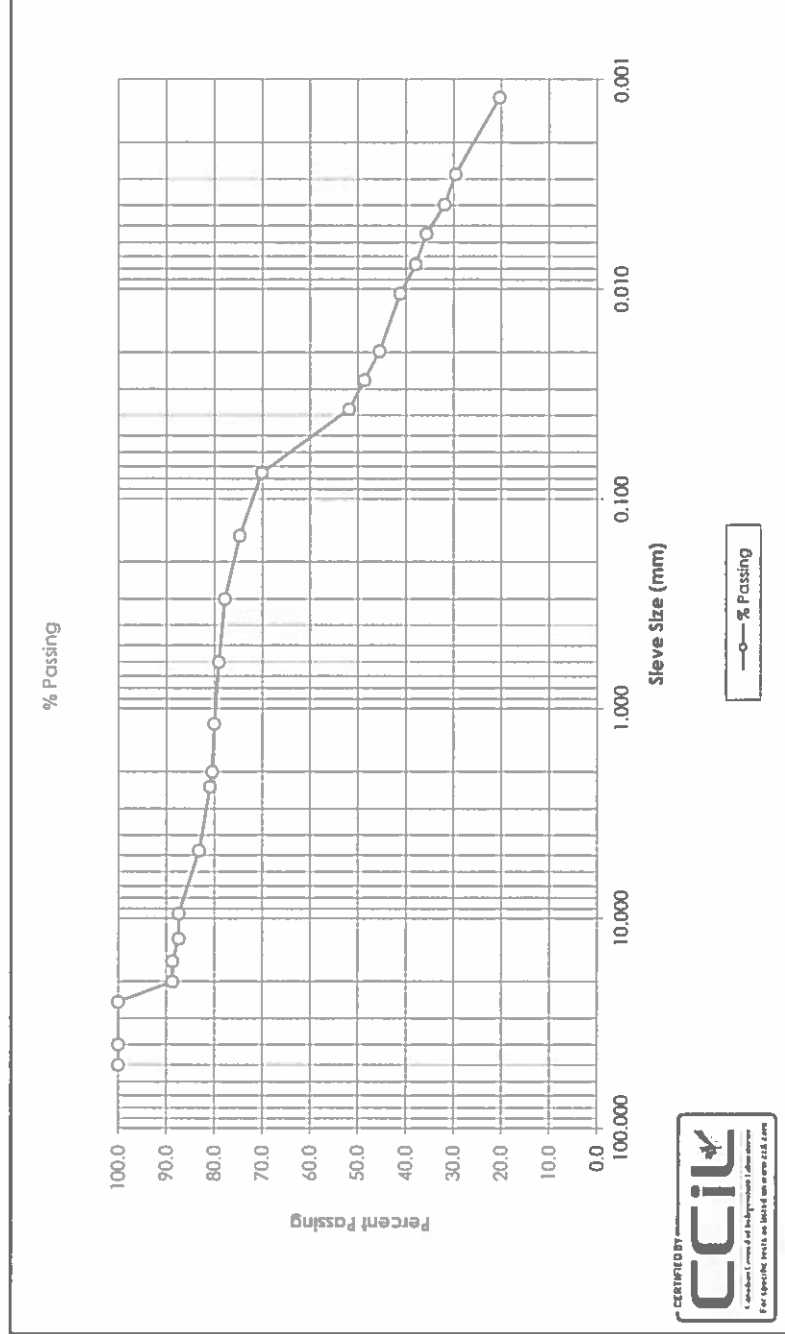
SOURCE: LLO12

TESTED BY: B. Peikay

DATE RECEIVED: May 6, 2018

DATE TESTED: June 5, 2018

SAMPLE DESCRIPTION: Clay (Cl), Some Gravel, Some Sand



Comments: Sample description (MUSCS) derived from both the Grain Size and Atterberg Limit test results. The 0.075mm sieve was used in place of the 0.080mm sieve.

Reviewed by:

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Grain Size Analysis
Hydrometer Report
ASTM D7928 / D6913
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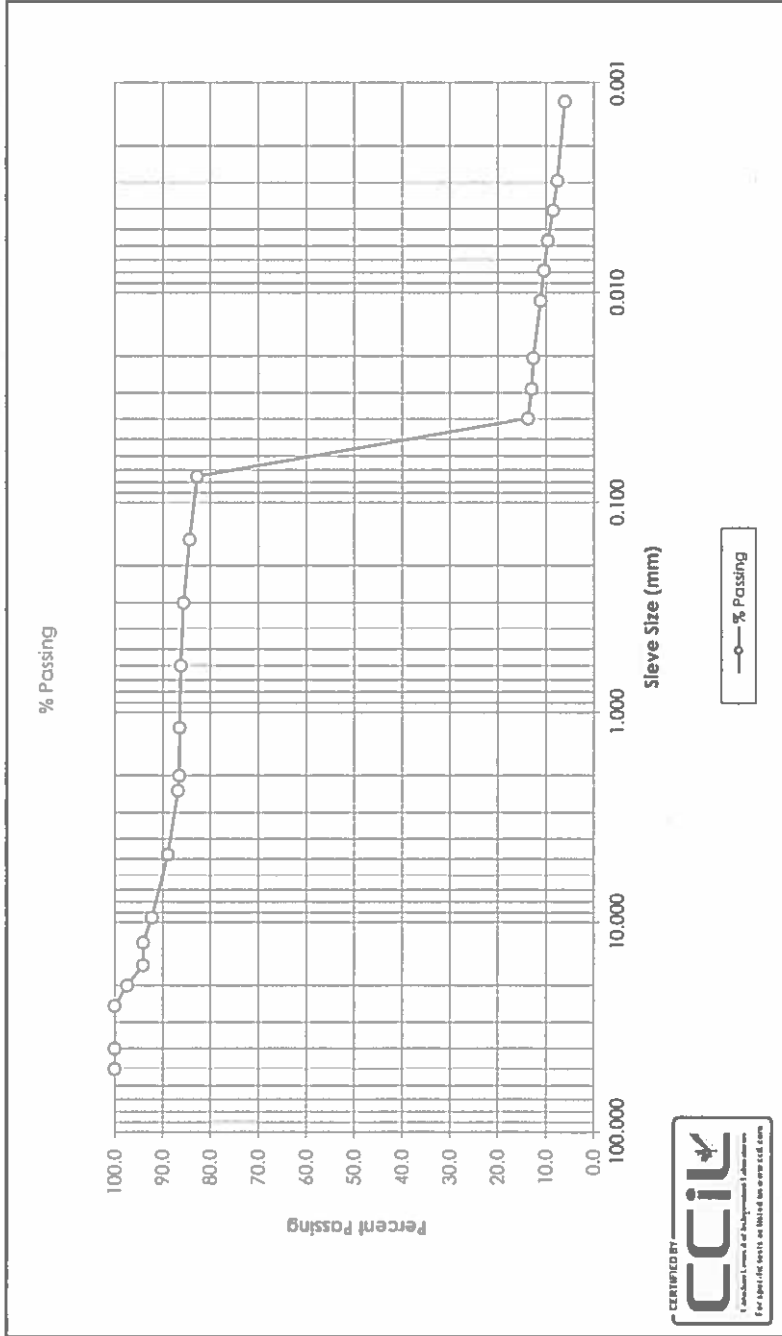
Client: Alberta Transportation
Project Name: SR1
Project No: 110773396.302.702.310

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SAMPLE No.: ST10 (7.6-8.05m)
SOURCE: LLO12
TESTED BY: B. Pelkey

DATE RECEIVED: May 6, 2018
DATE TESTED: June 5, 2018
SAMPLE DESCRIPTION: Clay (Cl), Some Gravel, Trace Sand



Comments: Sample description (MUSCS) derived from the Grain Size and Atterberg Limit test results. The 0.075mm sieve was used in place of the 0.080mm sieve.

Reviewed by:

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Grain Size Analysis
Hydrometer Report
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Client: Alberta Transportation

Project Name: SRI

Project No: 110773396.302.702.310

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SAMPLE No.: Combo (1.5-3.45m)

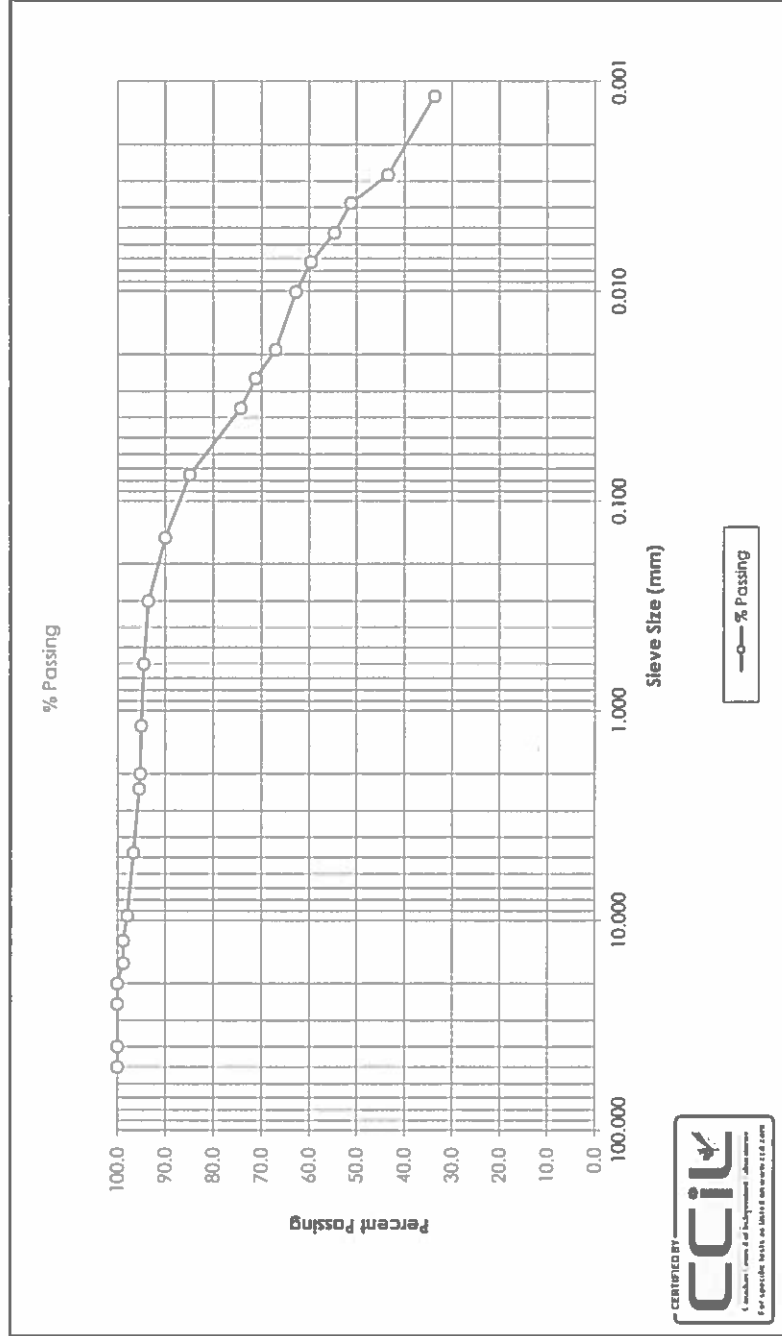
SOURCE: LLO15

TESTED BY: B. Pelkey

DATE RECEIVED: May 1, 2018

DATE TESTED: June 12, 2018

SAMPLE DESCRIPTION: Clay (Cl), Some Sand, Trace Gravel



Comments: Sample comprised of SS2 (1.5-1.95m), BS3 (2.4-2.6m), and SS4 (3.0-3.45m). Sample description (MUSCS) derived from both the Grain Size and Atterberg Limit test results. The 0.075mm sieve was used in place of the 0.080mm sieve.

Reviewed by:

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Grain Size Analysis
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Client: Alberta Transportation

Project Name: SR1

Project No: 110773396.302.702.310

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SAMPLE No.: SS12

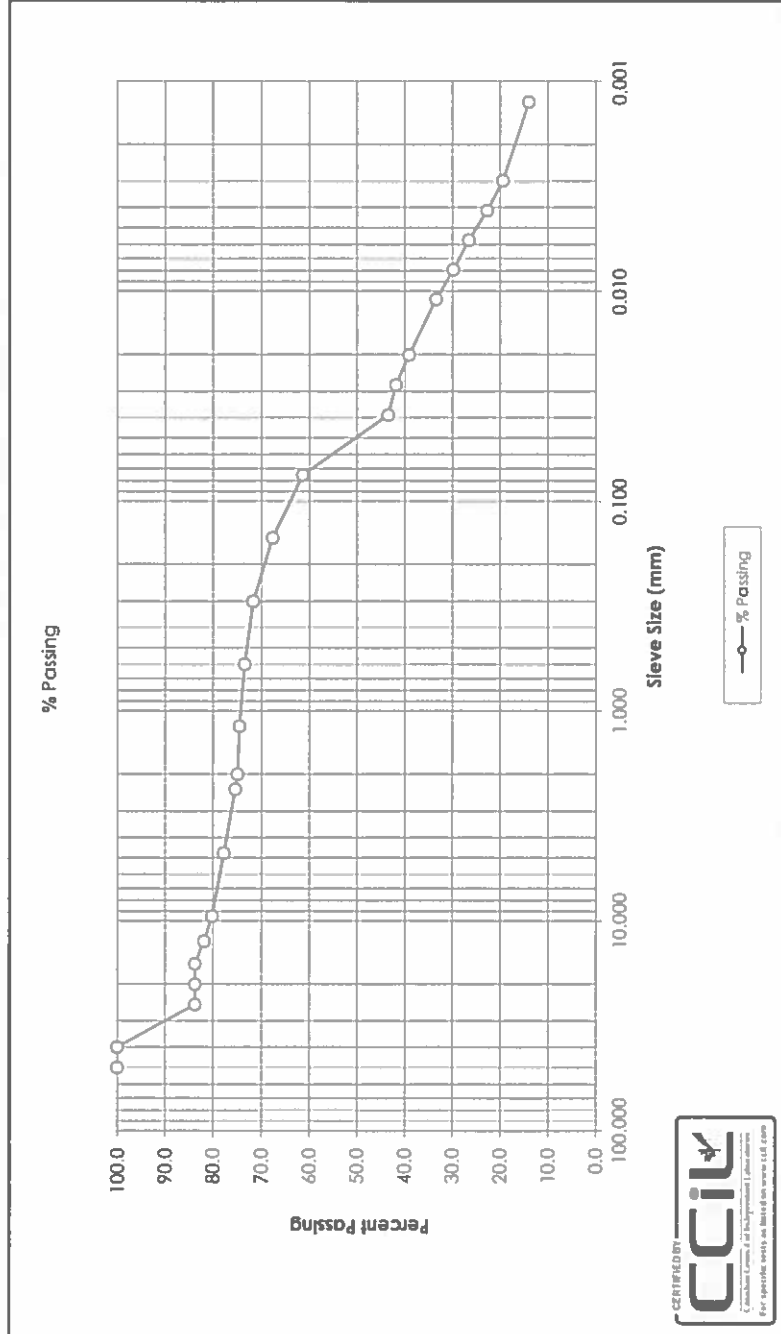
SOURCE: LLO01

TESTED BY: B. Pekey

DATE RECEIVED: April 5, 2018

DATE TESTED: May 26, 2018

SAMPLE DESCRIPTION: Gravelly Clay (CL) Some Sand



Sieve (mm)	Sample % Passing	Sieve (mm)	Sample % Passing
50.0	100.0	0.0075	29.8
40.0	100.0	0.0057	26.5
25.0	83.8	0.0041	22.7
20.0	83.8	0.0030	19.5
16.0	83.8	0.0013	14.0
12.5	81.8		
9.5	80.2		
4.75	77.7		
2.36	75.3		
2.00	74.9		
1.18	74.5		
0.600	73.4		
0.300	71.7		
0.150	67.6		
0.075	61.4		
0.0389	43.4		
0.0280	41.8		
0.0201	39.1		
0.0109	33.4		
Gravel:	22.3%	D ₁₀ :	-
Sand:	16.4%	D ₃₀ :	0.0081
Silt:	44.4%	D ₆₀ :	0.0727
Clay:	16.9%	C _u :	-
		C _c :	-

Comments: Sample description (MUSCS) derived from the Grain Size analysis and Atterberg limits test results. The 0.075mm sieve was used in place of the 0.080mm.

Reviewed by:

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Grain Size Analysis
Hydrometer Report
ASTM D7928 / D6913
CANFEM

Client: Alberta Transportation

Project Name: SR1

Project No: 110773396.302.702.310

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SAMPLE No.: SS18

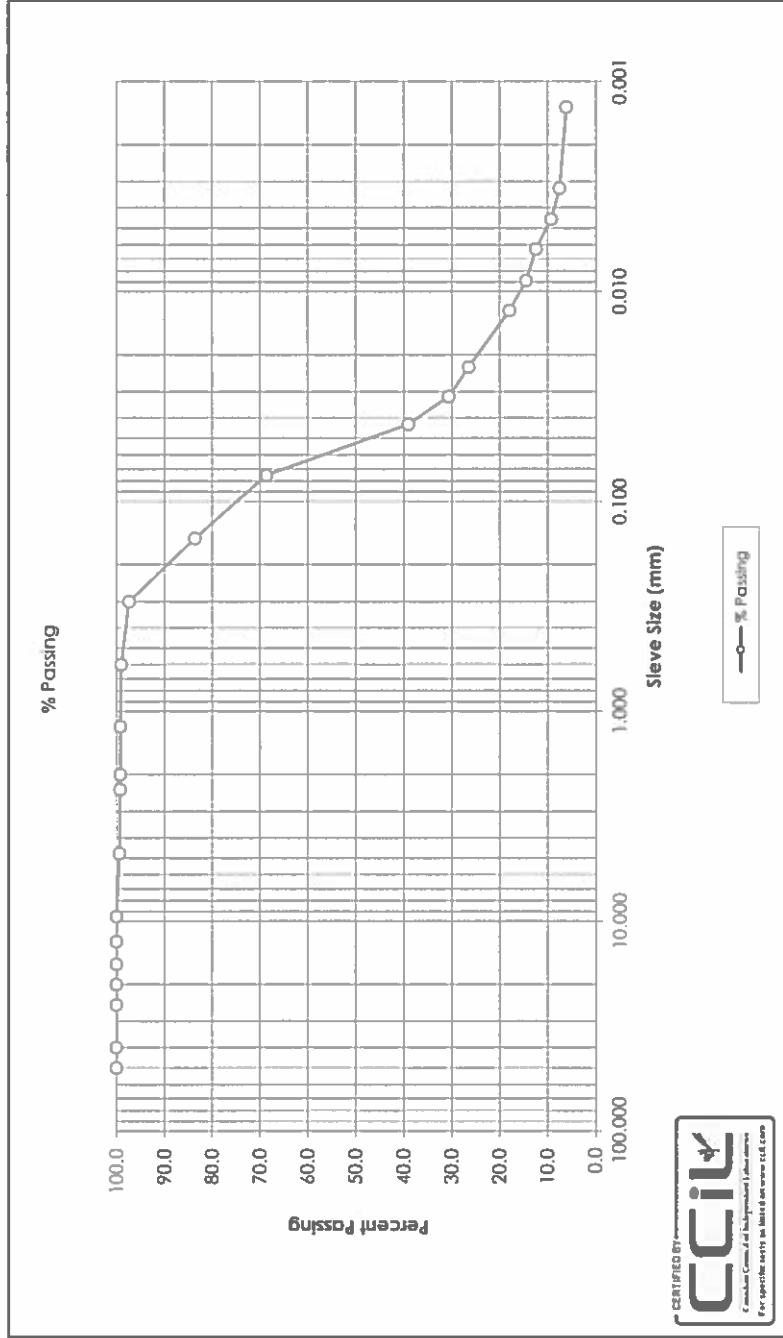
SOURCE: LLO01

TESTED BY: M. Vega

DATE RECEIVED: April 5, 2018

DATE TESTED: May 28, 2018

SAMPLE DESCRIPTION: Sandy Fines



Sieve (mm)	Sample % Passing	Sieve (mm)	Sample % Passing
50.0	100.0	0.0089	14.5
40.0	100.0	0.0063	12.4
25.0	100.0	0.0045	9.2
20.0	100.0	0.0032	7.5
16.0	100.0	0.0013	6.1
12.5	100.0		
9.5	100.0		
4.75	99.4		
2.36	99.2		
2.00	99.2		
1.18	99.2		
0.600	99.0		
0.300	97.4		
0.150	83.6		
0.075	68.6		
0.0429	39.0		
0.0317	30.6		
0.0229	26.4		
0.0123	18.0		
Gravel:	0.6%	D ₁₀ :	0.0050
Sand:	30.8%	D ₃₀ :	0.0305
Silt:	61.9%	D ₆₀ :	0.0674
Clay:	6.7%	C _u :	13.48
		C _c :	2.77

Comments: Sample description (MUSCS) derived from the Grain Size analysis only. The 0.075mm sieve was used in place of the 0.080mm sieve.

Reviewed by:

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Grain Size Analysis
Hydrometer Report
ASTM D7928 / D6913
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Client: Alberta Transportation

Project Name: SRI

Project No: 110773396.302.702.310

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SAMPLE No.: SS14

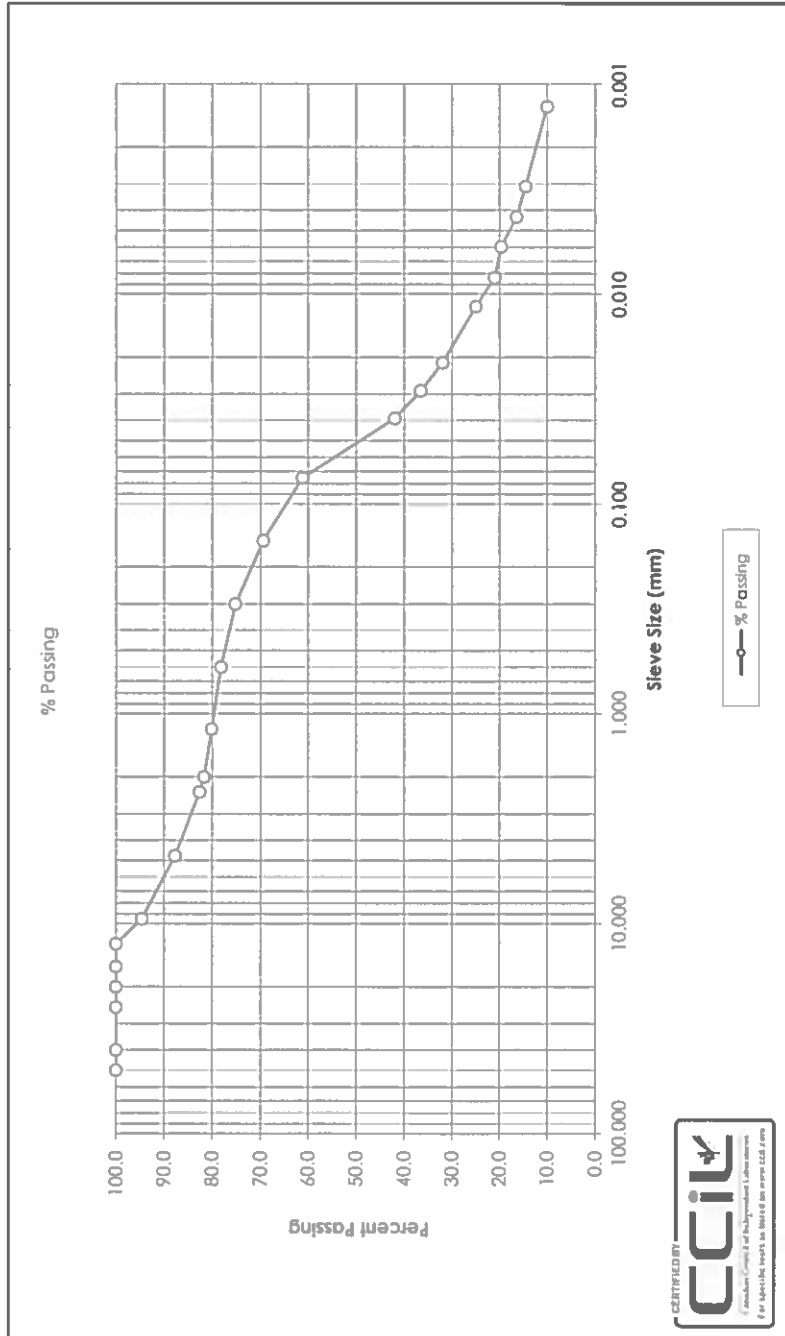
SOURCE: LLO03

TESTED BY: B. Pelkey

DATE RECEIVED: April 5, 2018

DATE TESTED: May 26, 2018

SAMPLE DESCRIPTION: Sandy Clay (CL), Some Gravel



Comments: Sample description (MUSCS) derived from the Grain Size analysis and Atterberg limits test results. The 0.075mm sieve was used in place of the 0.080mm sieve.

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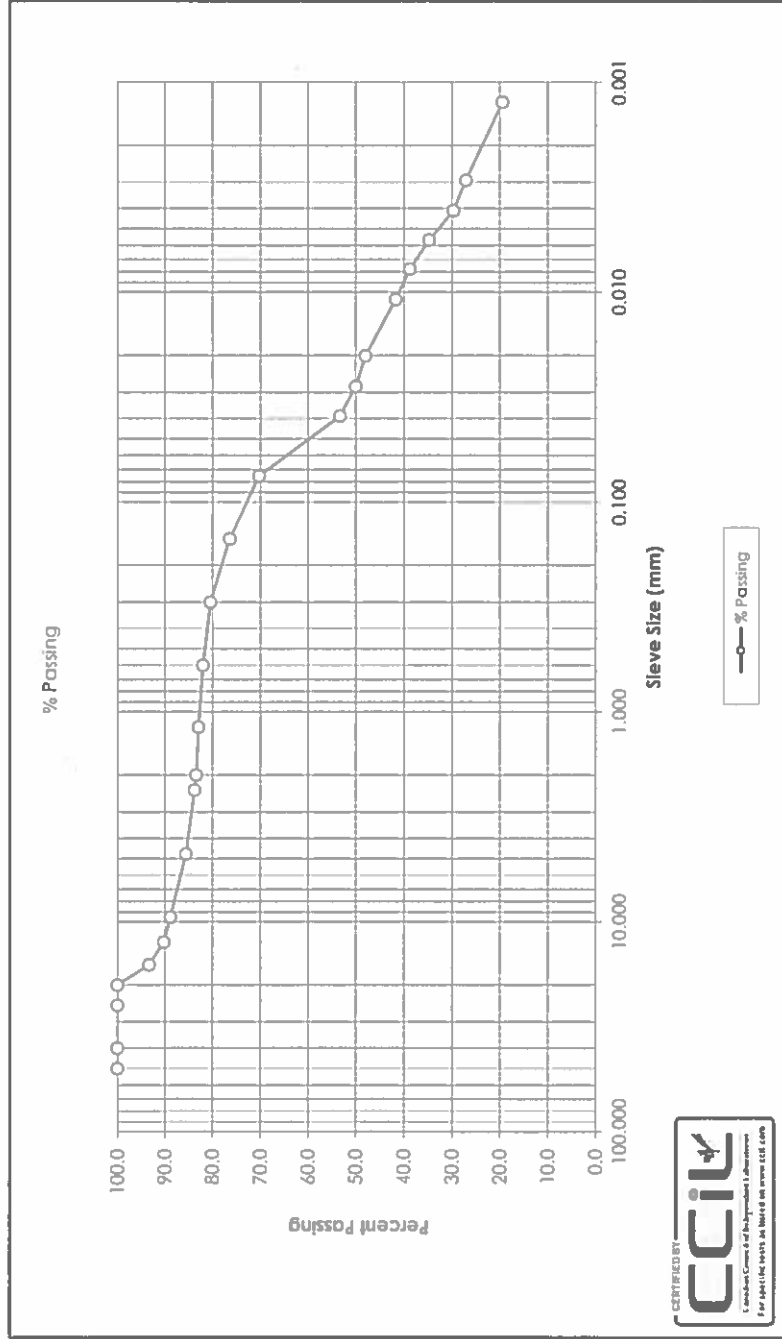
Client: Alberta Transportation
Project Name: SRI
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SAMPLE No.: SS9
SOURCE: LLO05
TESTED BY: M. Vega

DATE RECEIVED: April 5, 2018
DATE TESTED: May 26, 2018
SAMPLE DESCRIPTION: Fines, Some Sand, Some Gravel



Comments: Sample description (MUSCS) derived from the Grain Size analysis only. The 0.075mm sieve was used in place of a 0.080mm sieve.

Reviewed by:

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Grain Size Analysis
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Client: Alberta Transportation
Project Name: SR1
Project No: 110773396.302.702.310

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SAMPLE No.: ST4 (3.0-3.45m)

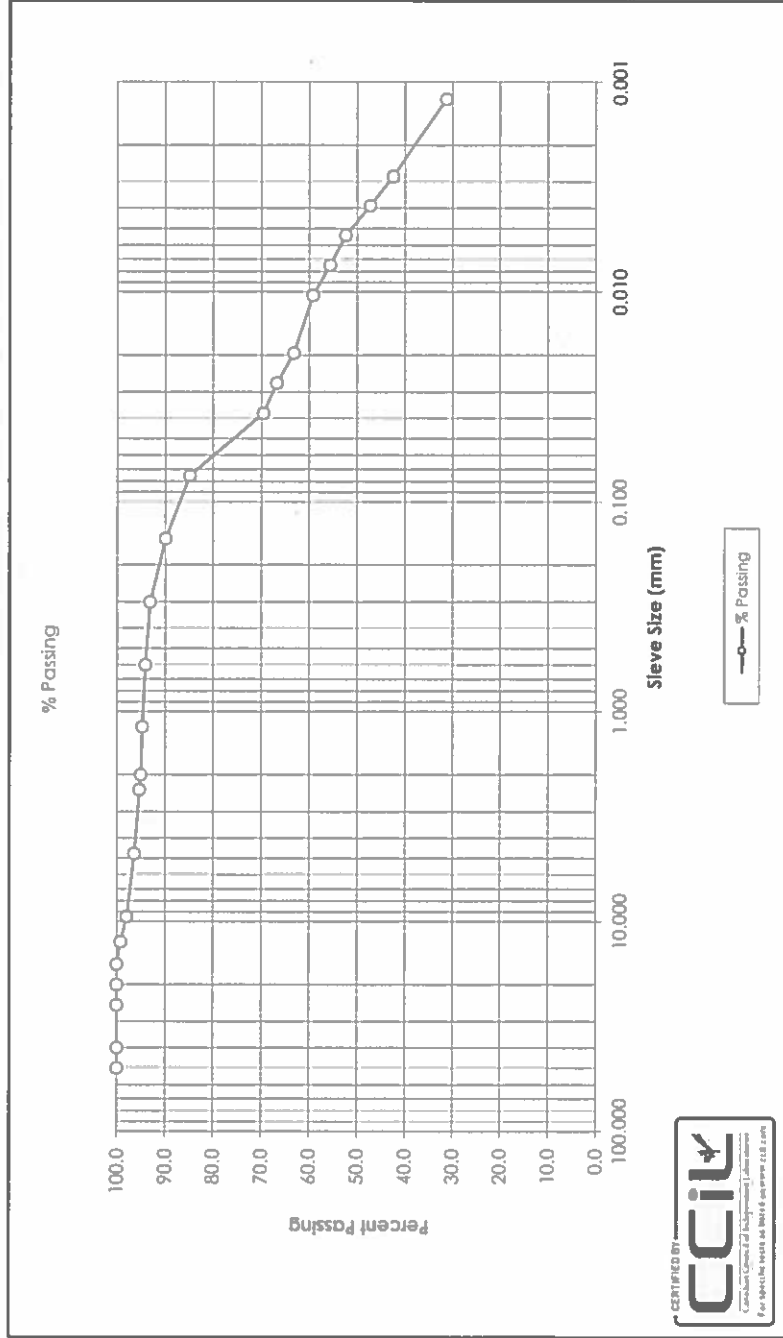
SOURCE: LLO05

TESTED BY: B. Peikey

DATE RECEIVED: May 1, 2018

DATE TESTED: June 5, 2018

SAMPLE DESCRIPTION: Clay (CL), Some Sand, Trace Gravel



Comments: Sample description (MUSCS) derived from the Grain Size analysis and Atterberg limit test results. The 0.075mm sieve was used in place of the 0.080mm sieve.

Reviewed by:

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SAMPLE No.: BS15

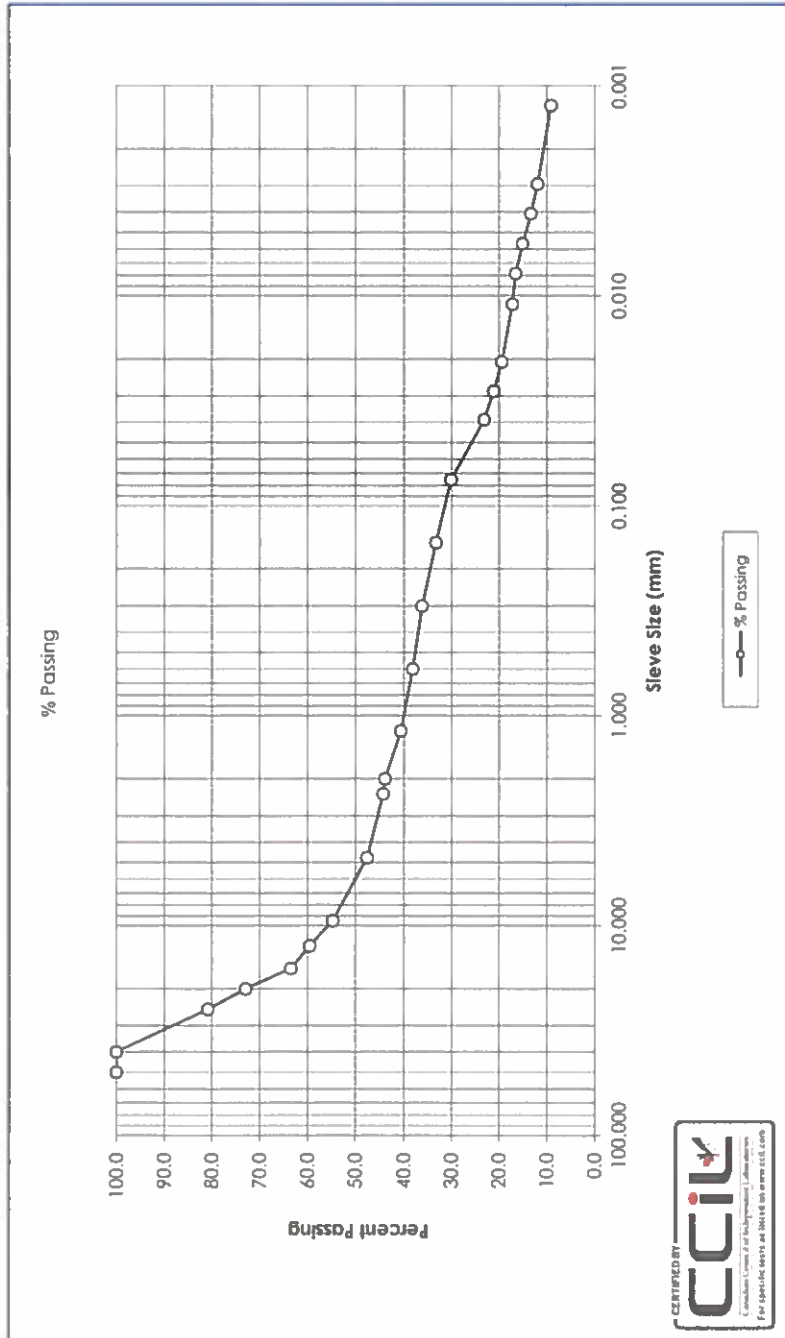
SOURCE: LLO06

TESTED BY: M. Vega

DATE RECEIVED: April 5, 2018

DATE TESTED: May 26, 2018

SAMPLE DESCRIPTION: Gravel with Fines, Some Gravel



Comments: Sample description (MUSCS) derived from the Grain size analysis only. The 0.075mm sieve was used in place of the 0.080mm sieve.

Reviewed by:

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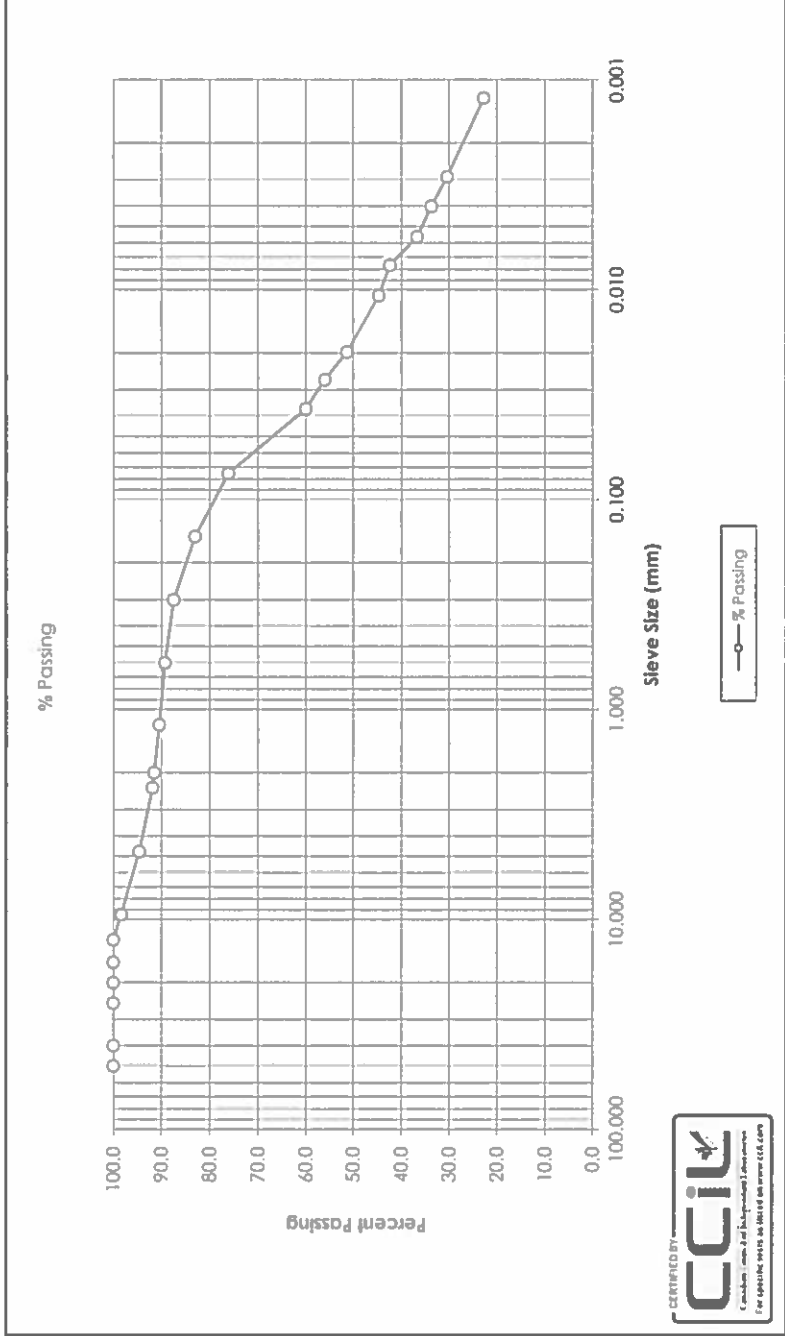
Client: Alberta Transportation
Project Name: SR1
Project No: 110773396.302.702.310

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SAMPLE No.: SS6
SOURCE: LLO06
TESTED BY: B. Peikay

DATE RECEIVED: April 5, 2018
DATE TESTED: May 26, 2018
SAMPLE DESCRIPTION: Clay (CL), Some Sand, Trace Gravel



Comments: Sample description (MUSCS) derived from the Grain Size analysis and Atterberg limits test results. The 0.075mm sieve was used in place of the 0.080mm sieve.

Reviewed by:

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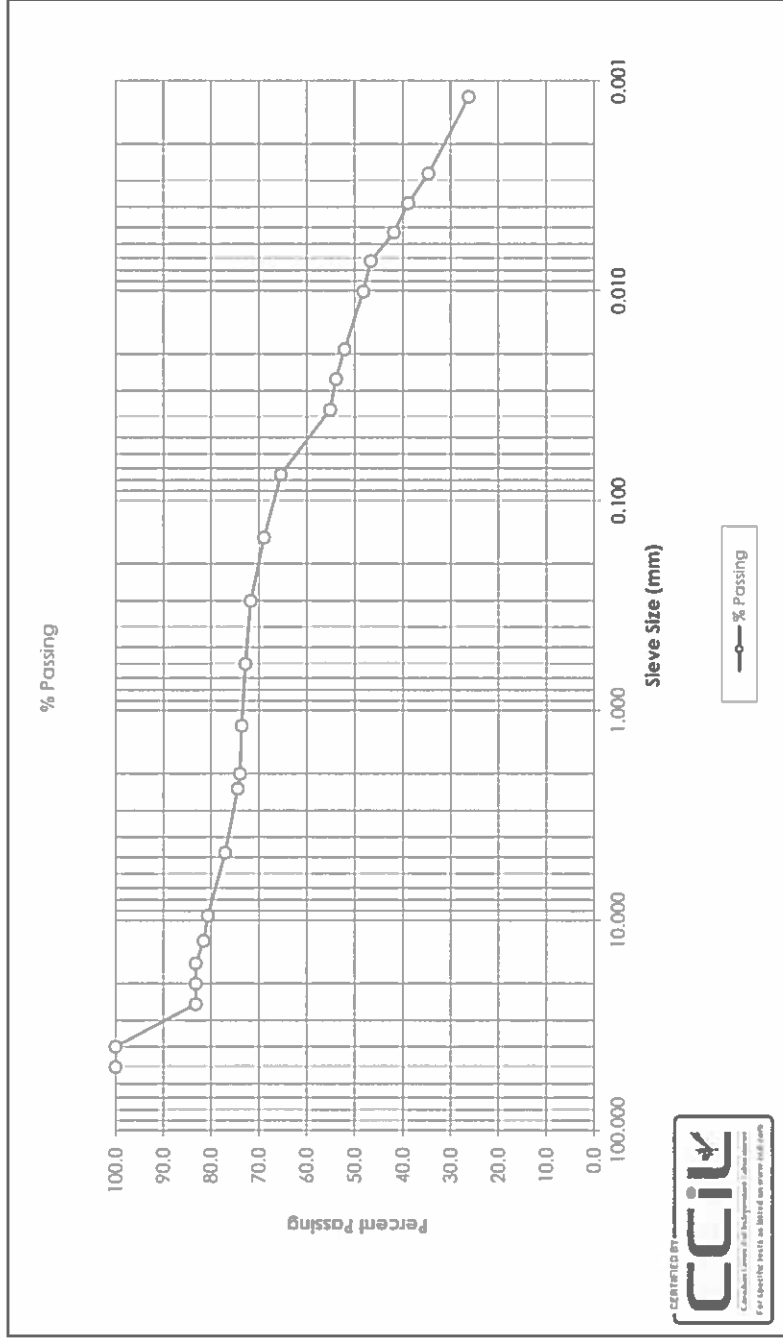
Client: Alberta Transportation
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Project No: 110773396.302.702.310

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SAMPLE No.: BS19
SOURCE: LLO09
TESTED BY: B. Pelkey

DATE RECEIVED: May 6, 2018
DATE TESTED: June 5, 2018
SAMPLE DESCRIPTION: Gravelly Fines, Some Sand



Sieve (mm)	Sample % Passing	Sieve (mm)	Sample % Passing
50.0	100.0	0.0072	46.7
40.0	100.0	0.0053	41.8
25.0	83.1	0.0038	38.8
20.0	83.1	0.0028	34.6
16.0	83.1	0.0012	26.1
12.5	81.6		
9.5	80.7		
7.5	77.0		
6.0	74.4		
4.75	73.9		
3.75	73.6		
3.0	72.8		
2.5	71.7		
2.0	68.9		
1.5	65.4		
1.18	55.1		
0.85	53.9		
0.75	52.1		
0.60	48.2		

Comments: Sample description (MUSCS) derived from the Grain Size analysis results. The 0.075mm sieve was used in place of the 0.080mm sieve.

Reviewed by:

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Grain Size Analysis
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SAMPLE No.: Combo (2.4-4.2m)

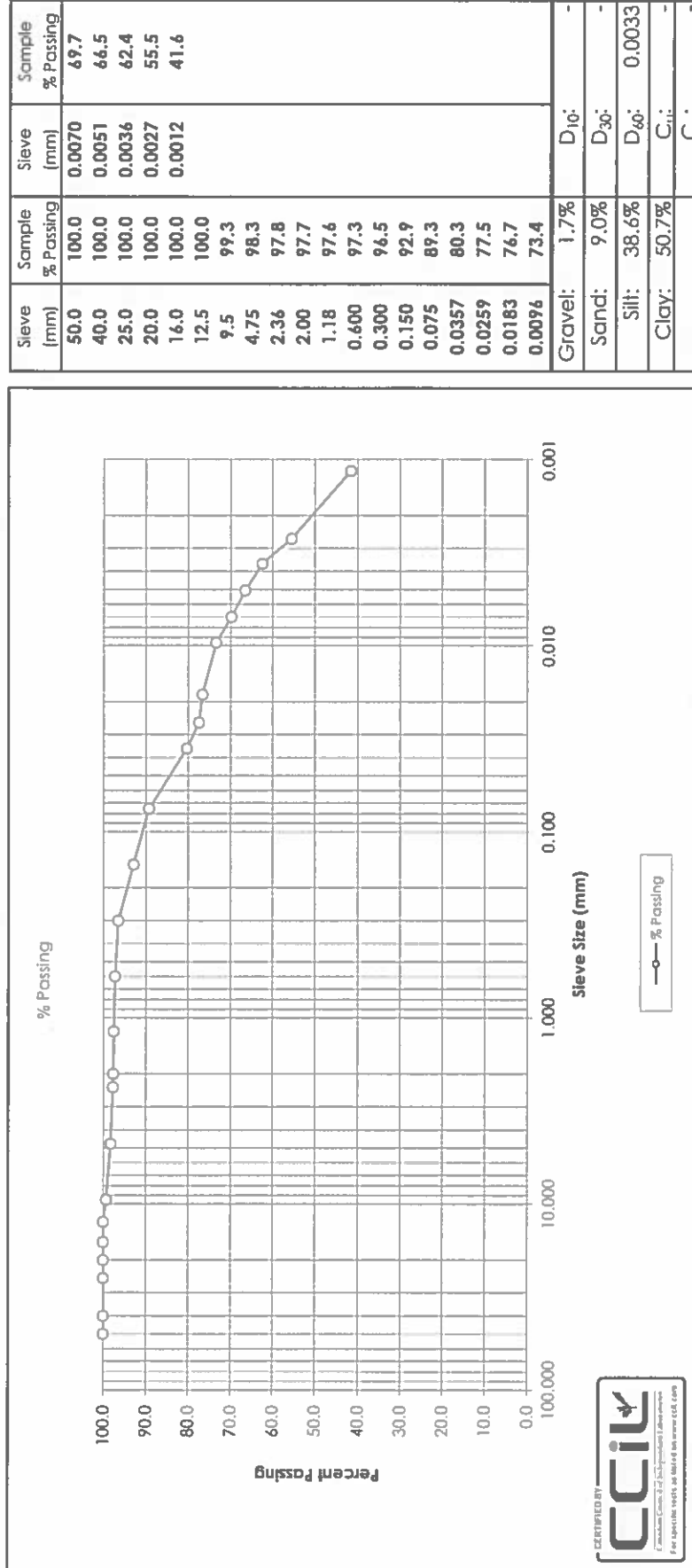
SOURCE: LLO09

TESTED BY: B. Pekey

DATE RECEIVED: May 7, 2018

DATE TESTED: June 12, 2018

SAMPLE DESCRIPTION: Clay (CH) and Silt, Trace Sand, Trace Gravel



Comments: From borehole LLO09, sample is comprised of BS3 (2.4-2.6m), SS4 (3.0-3.45m), and BS5 (4.0-4.2m). Sample description (MUSCS) derived from the Grain Size analysis and Atterberg limit test results. The 0.075mm sieve used in place of the 0.080mm sieve.

Reviewed by:

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Grain Size Analysis
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Client: Alberta Transportation
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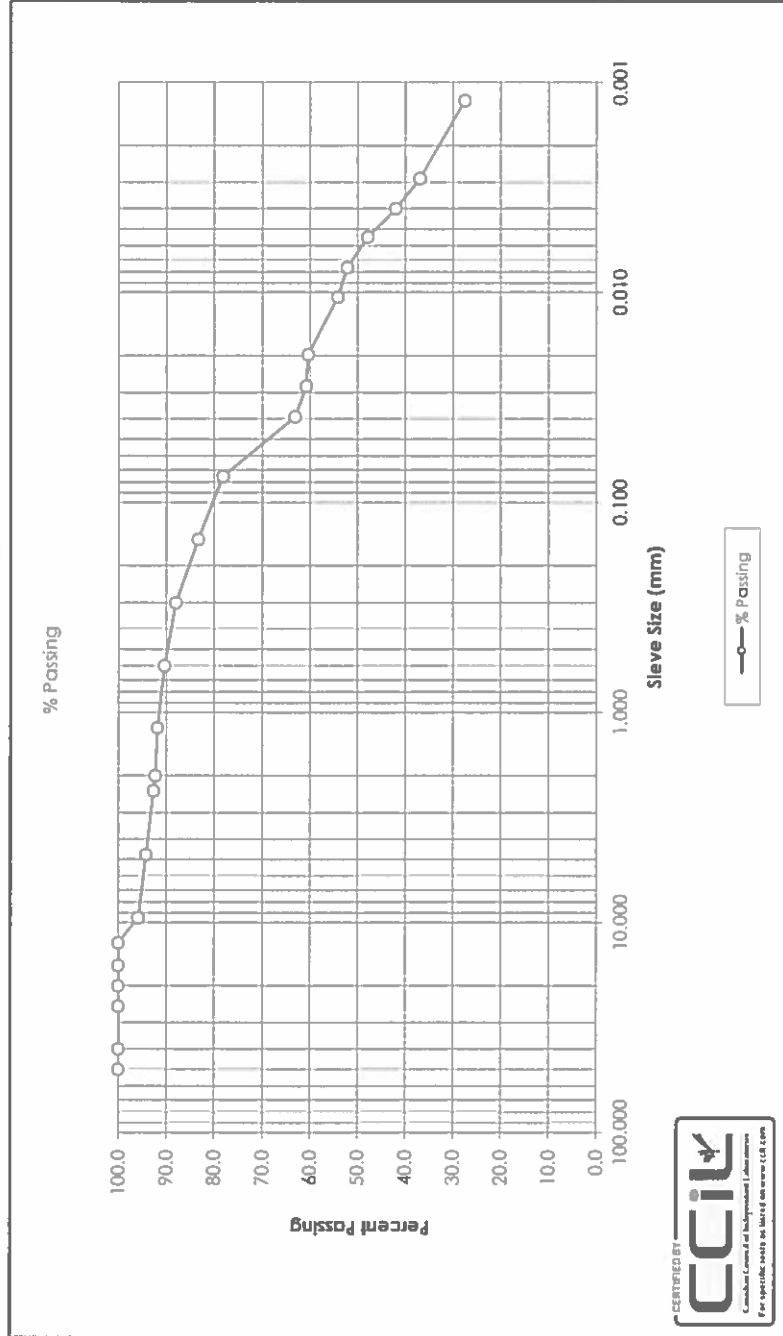
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SAMPLE No.: SS10
SOURCE: LLO09
TESTED BY: B. Peikay

DATE RECEIVED: May 6, 2018
DATE TESTED: June 5, 2018

SAMPLE DESCRIPTION: Clay (CL), Some Sand, Trace Gravel



Comments: Sample description (MUSCS) derived from the Grain Size analysis and Aterberg limit test results. The 0.075mm sieve used in place of the 0.080mm sieve.

Reviewed by:

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Grain Size Analysis
Hydrometer Report
ASTM D7928 / D6913
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Client: Alberta Transportation
Project Name: SRI
Project No: 110773396.302.702.310

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SAMPLE No.: Combo (1.5-4.2m)

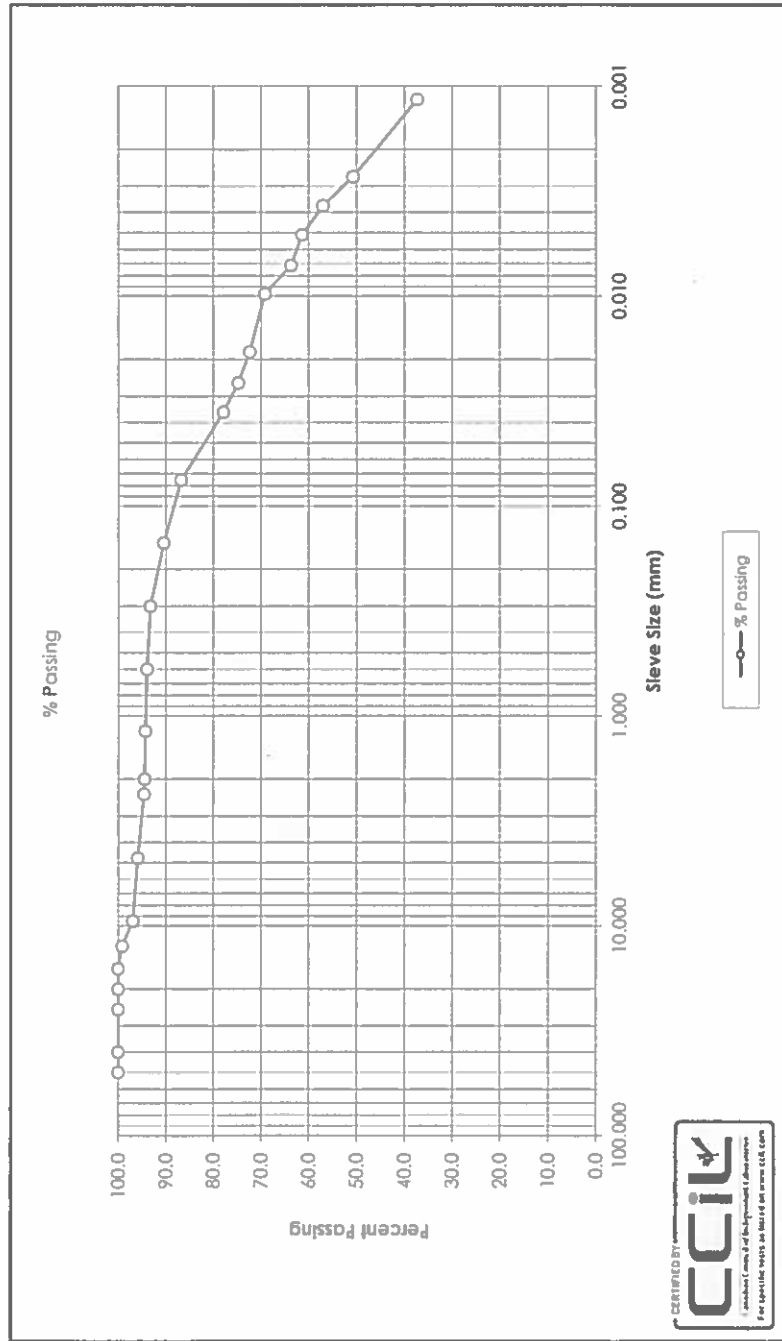
SOURCE: LLO10

TESTED BY: B. Peikay

DATE RECEIVED: May 7, 2018

DATE TESTED: June 12, 2018

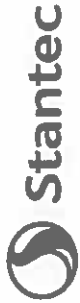
SAMPLE DESCRIPTION: Clay (CH), Trace Sand, Trace Gravel



Comments: From borehole LLO10, sample is comprised of SS2 (1.5-1.95m), BS3 (2.4-2.6m), SS5 (3.23-3.68m), and BS6 (4.0-4.2m). Sample description (MUSCS) derived from the Grain Size analysis and Atterberg limit test results. The 0.075mm used in place of the 0.080mm sieve.

Reviewed by:

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Grain Size Analysis
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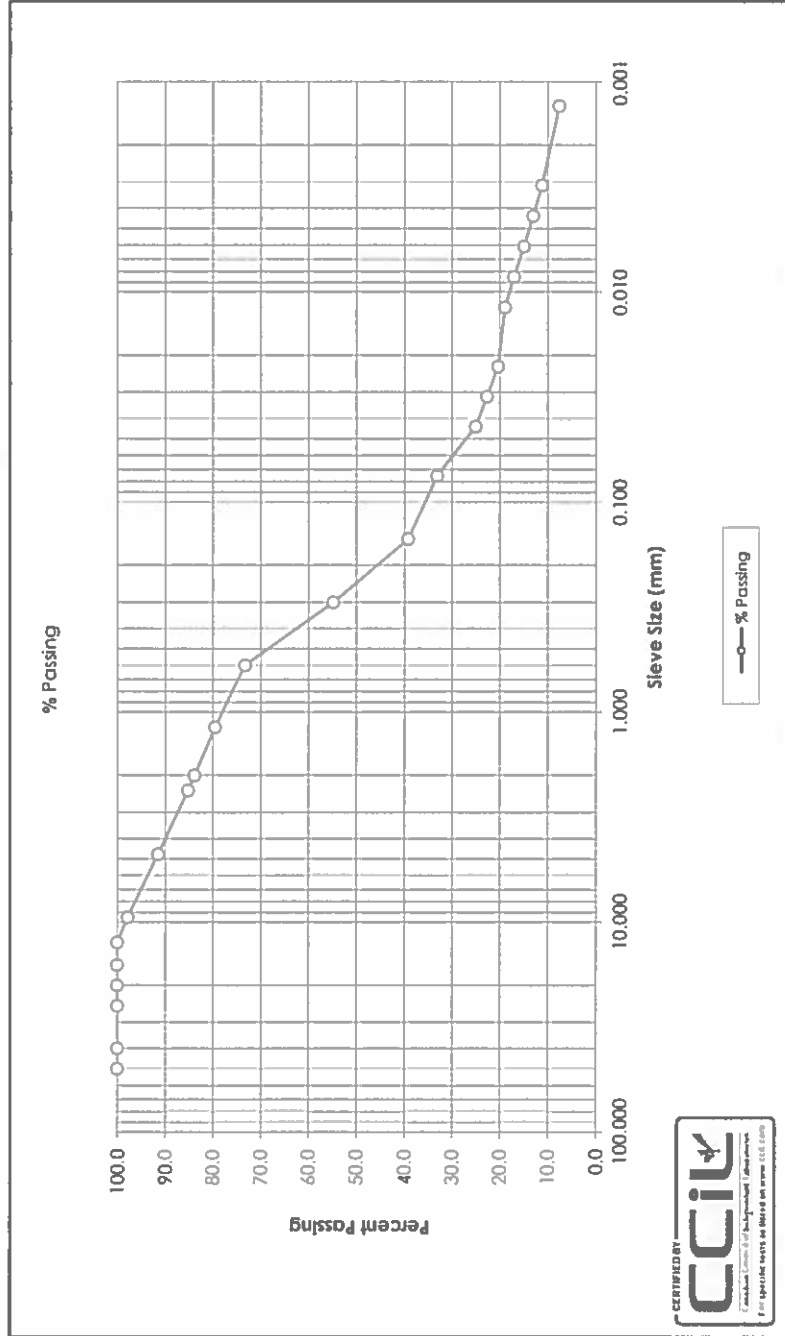
Client: Alberta Transportation
Project Name: SRI
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SAMPLE No.: SS17
SOURCE: LLO10
TESTED BY: B. Pelkey

DATE RECEIVED: May 6, 2018
DATE TESTED: June 5, 2018
SAMPLE DESCRIPTION: Sand with Fines, Trace Gravel



Comments: Sample description (MUSCS) derived from the Grain Size analysis test results only. The 0.075mm sieve was used in place of the 0.080mm sieve.

Reviewed by:

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Grain Size Analysis
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SAMPLE No.: BS16

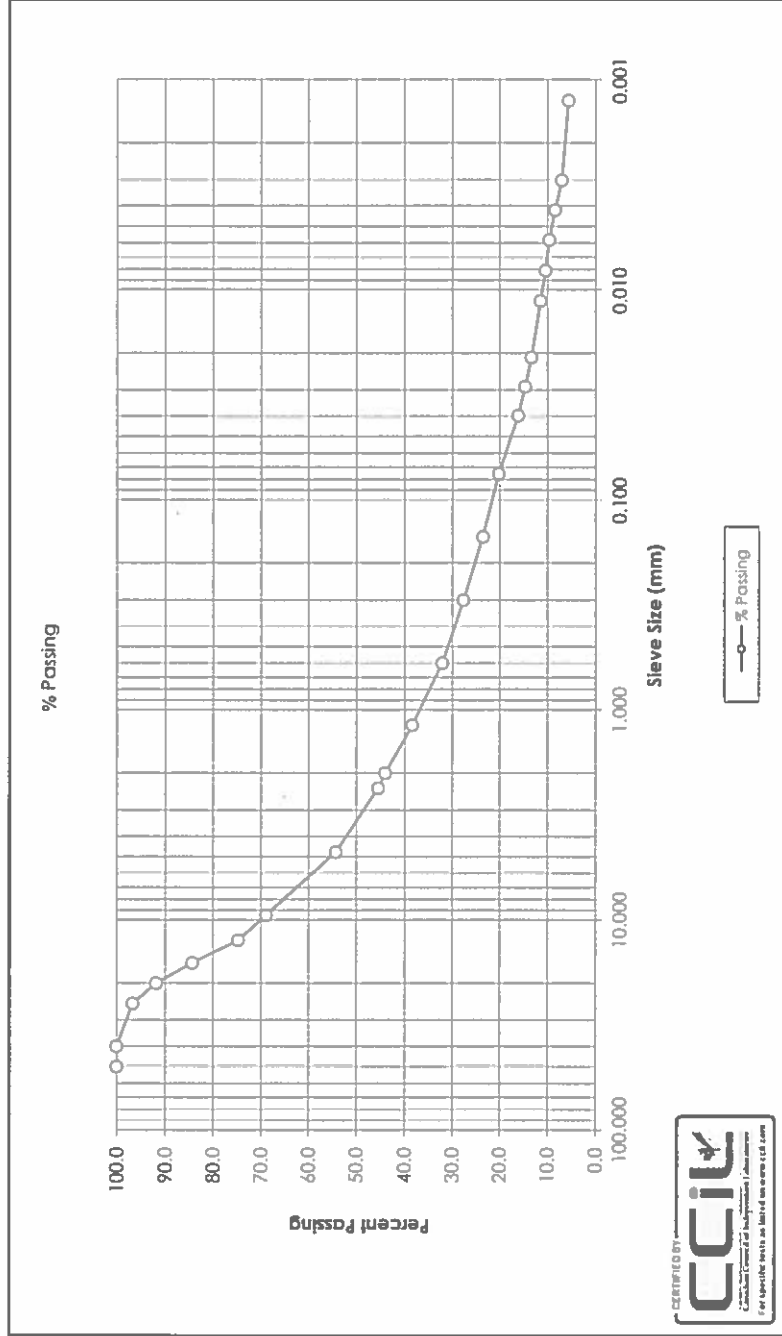
SOURCE: LLO12

TESTED BY: B. Pekey

DATE RECEIVED: May 6, 2018

DATE TESTED: June 5, 2018

SAMPLE DESCRIPTION: Sandy Gravel, Some Fines



Sieve (mm)	Sample % Passing	Sieve (mm)	Sample % Passing
50.0	100.0	0.0081	10.4
40.0	100.0	0.0058	9.6
25.0	96.7	0.0042	8.4
20.0	91.9	0.0030	7.0
16.0	84.3	0.0013	5.7
12.5	74.8		
9.5	68.9		
4.75	54.3		
2.36	45.5		
2.00	44.0		
1.18	38.4		
0.600	32.1		
0.300	27.7		
0.150	23.5		
0.075	20.2		
0.0398	16.1		
0.0289	14.7		
0.0210	13.4		
0.0113	11.5		
Gravel:	45.7%	D ₁₀ :	0.0070
Sand:	34.1%	D ₃₀ :	0.4646
Silt:	13.8%	D ₆₀ :	6.7427
Clay:	6.4%	C _u :	967.52
		C _c :	4.59

Comments: Sample description (MUSCS) derived from the Grain Size analysis results. The 0.075mm sieve was used in place of the 0.080mm sieve.

Reviewed by:

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Grain Size Analysis
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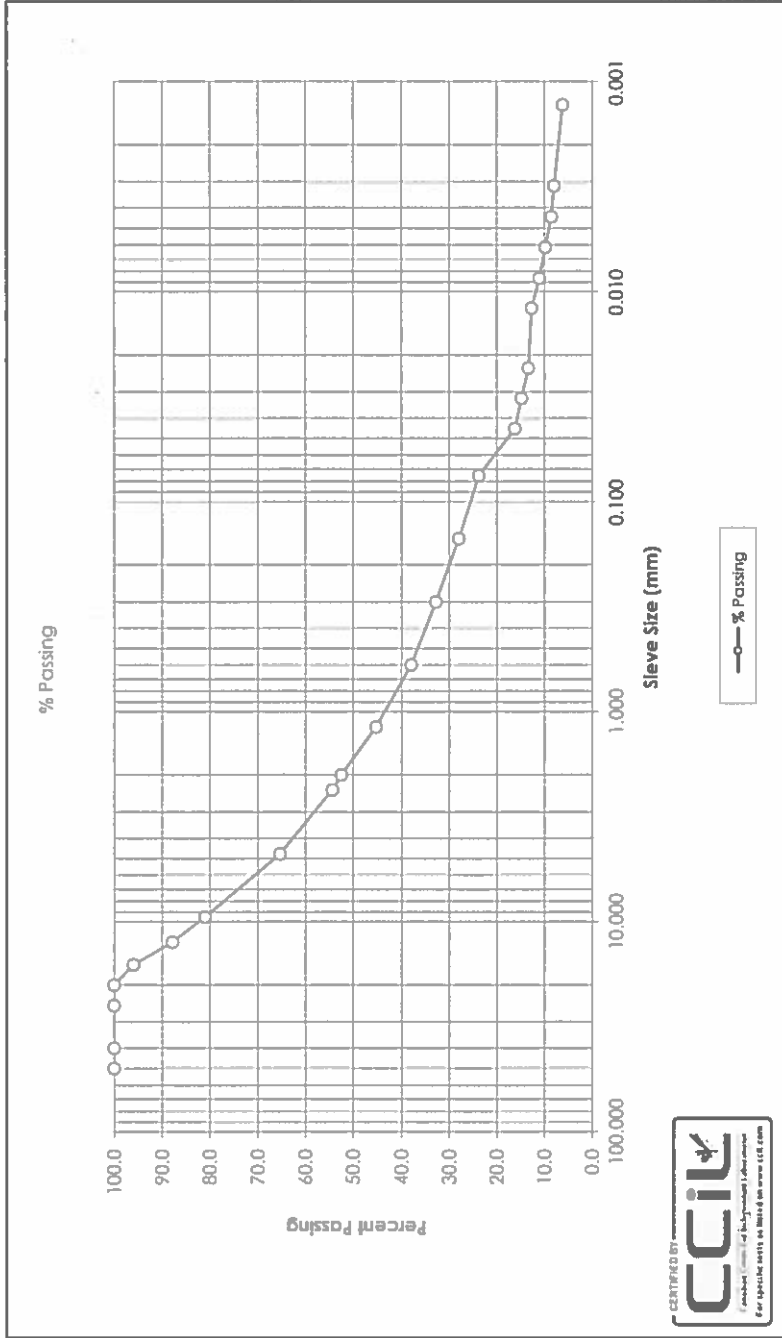
Client: Alberta Transportation
Project Name: SR1
Project No: 110773396.302.702.310

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SAMPLE No.: SS15
SOURCE: LLO12
TESTED BY: B. Pelkey

DATE RECEIVED: May 6, 2018
DATE TESTED: June 5, 2018
SAMPLE DESCRIPTION: Sandy Gravel with Fines



Sieve (mm)	Sample % Passing	Sieve (mm)	Sample % Passing
50.0	100.0	0.0086	11.0
40.0	100.0	0.0062	9.8
25.0	100.0	0.0044	8.5
20.0	100.0	0.0031	8.0
16.0	95.9	0.0013	6.2
12.5	87.8		
9.5	81.0		
4.75	65.4		
2.36	54.3		
2.00	52.5		
1.18	45.2		
0.600	37.9		
0.300	32.8		
0.150	28.0		
0.075	23.8		
0.0449	16.3		
0.0321	14.8		
0.0231	13.4		
0.0120	12.7		

Gravel:	34.6%	D ₁₀ :	0.0066
Sand:	41.5%	D ₃₀ :	0.2147
Silt:	16.8%	D ₆₀ :	3.6415
Clay:	7.1%	C _u :	551.37
		C _c :	1.92

Comments: Sample description (MUSCS) derived from the Grain Size analysis results. The 0.075mm sieve was used in place of the 0.080mm sieve.

Reviewed by:

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Grain Size Analysis
Hydrometer Report
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Client: Alberta Transportation

Project Name: SRI

Project No: 110773396.302.702.310

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SAMPLE No.: ST4 (3.0-3.45m)

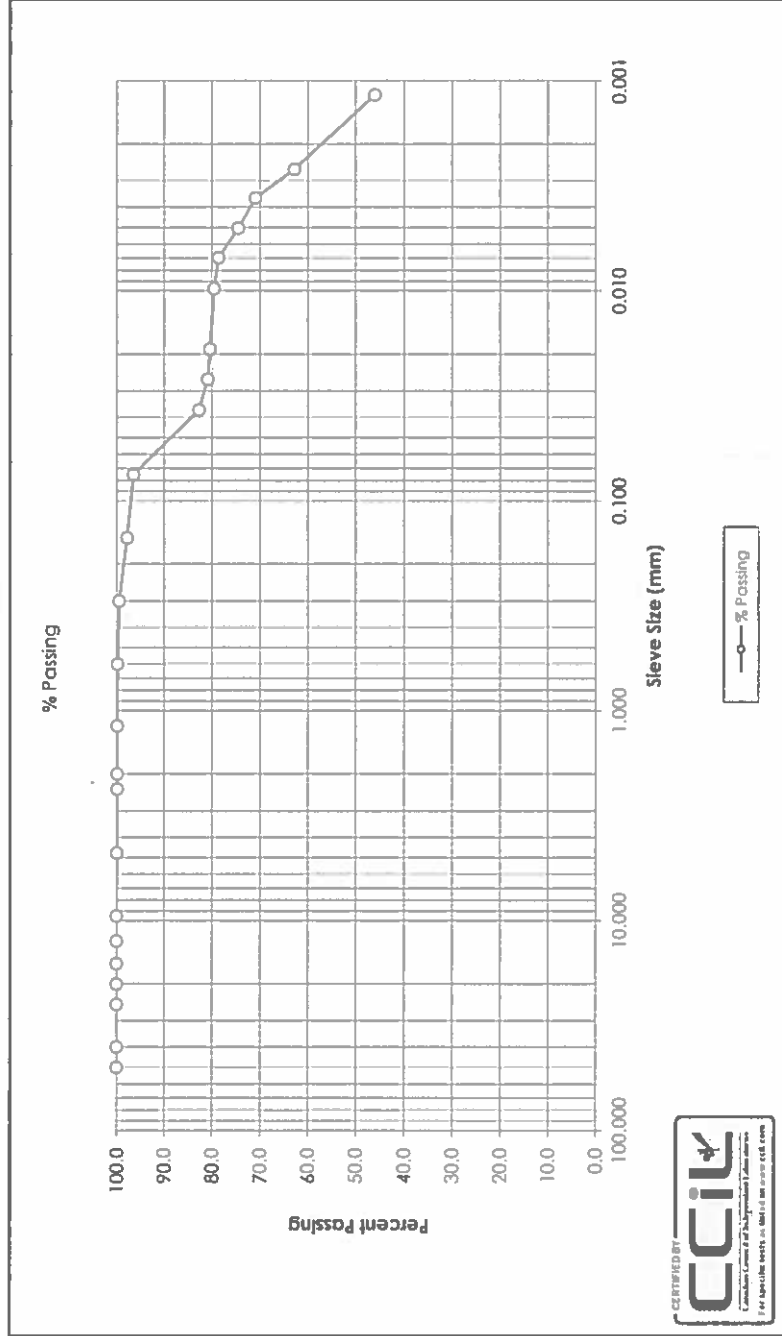
SOURCE: LLO12

TESTED BY: B. Pelkey

DATE RECEIVED: May 6, 2018

DATE TESTED: June 5, 2018

SAMPLE DESCRIPTION: Clay (CH), Trace Sand



Comments: Sample description (MUSCS) derived from the Grain Size analysis and Aterberg limit test results. The 0.075mm sieve was used in place of the 0.080mm sieve.

Reviewed by:

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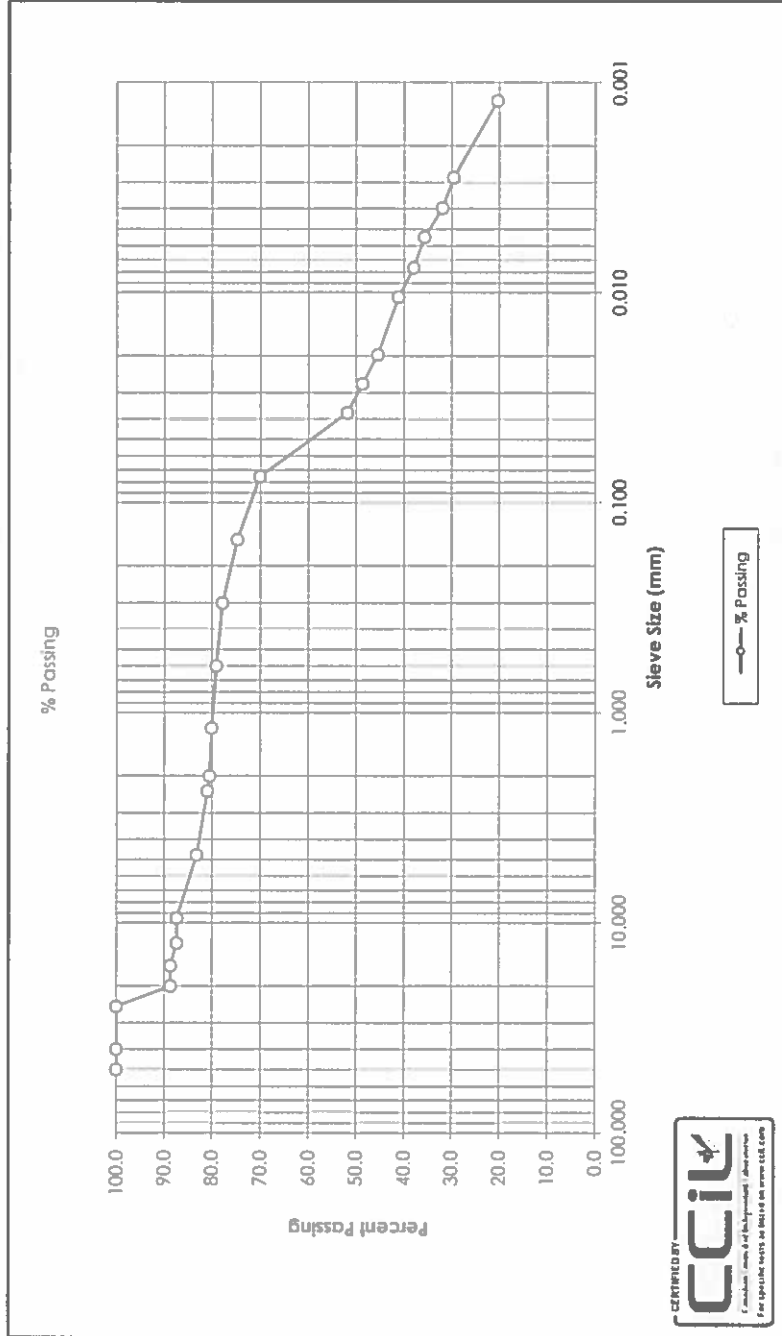
Client: Alberta Transportation
Project Name: SRI
Project No: 110773396.302.702.310

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SAMPLE No.: ST6 (4.6-5.05m)
SOURCE: LLO12
TESTED BY: B. Pelkey

DATE RECEIVED: May 6, 2018
DATE TESTED: June 5, 2018
SAMPLE DESCRIPTION: Clay (CL), Some Gravel, Some Sand



Comments: Sample description (MUSCS) derived from the Grain Size analysis and Aterberg limit test results. The 0.075mm sieve was used in place of the 0.080mm sieve.

Reviewed by:

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Grain Size Analysis
Hydrometer Report
ASTM D7928 / D6913
CANFEM

Client: Alberta Transportation

Project Name: SR1

Project No: 110773396.302.702.310

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SAMPLE No.: ST10 (7.6-8.05m)

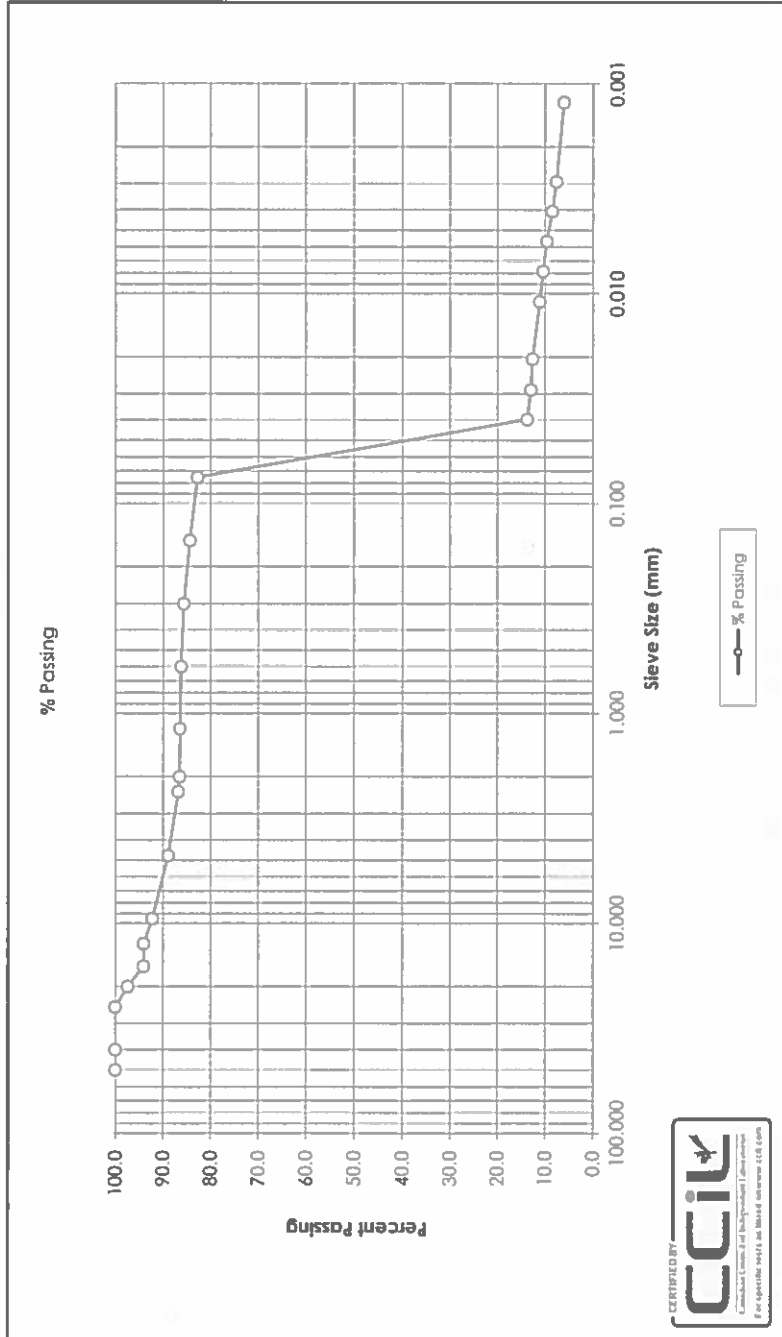
SOURCE: LLO12

TESTED BY: B. Pelkey

DATE RECEIVED: May 6, 2018

DATE TESTED: June 5, 2018

SAMPLE DESCRIPTION: Clay (CL), Some Gravel, Trace Sand



Comments: Sample description (MUSCS) derived from the Grain Size analysis and Atterberg limit test results. The 0.075mm sieve was used in place of the 0.080mm sieve.

Reviewed by:

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Grain Size Analysis
Hydrometer Report
ASTM D7928 / D6913
CANFEM

Client: Alberta Transportation

Project Name: SR1

Project No: 110773396.302.702.310

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SAMPLE No.: BS11

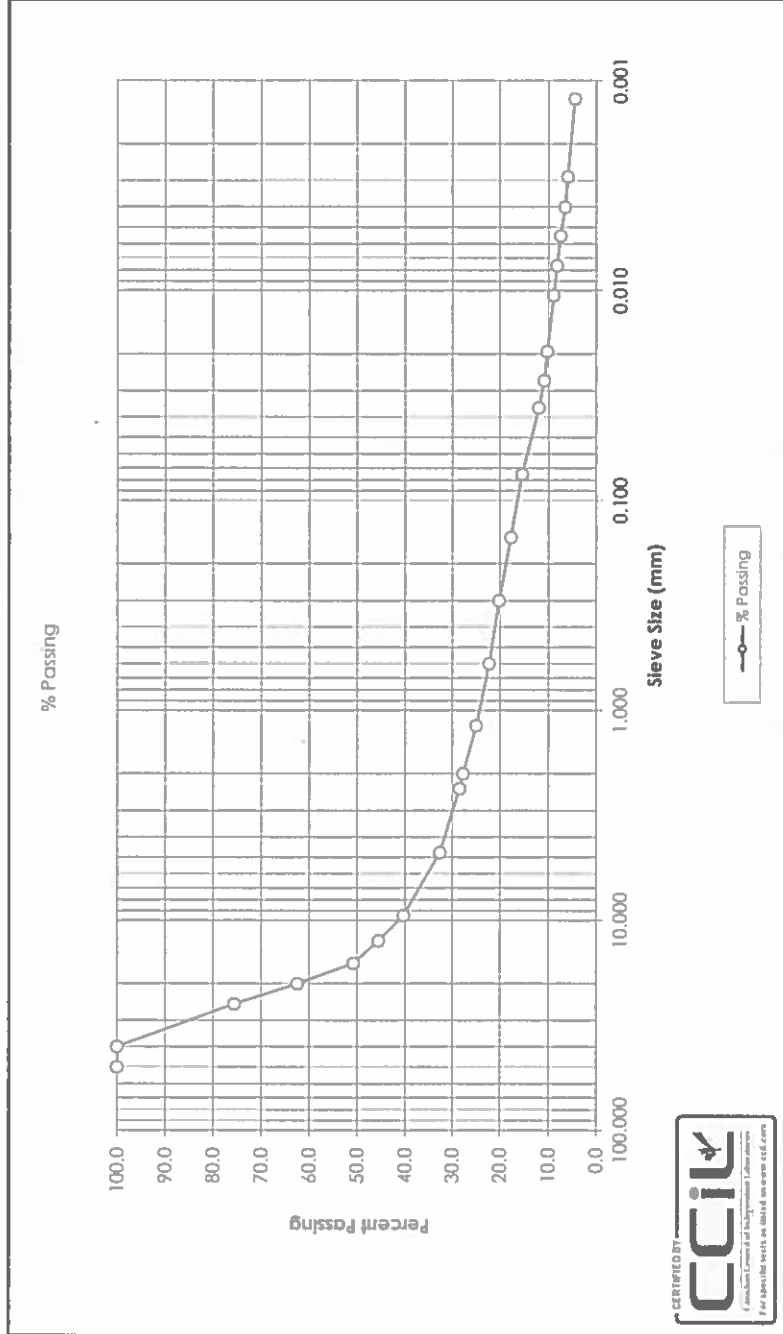
SOURCE: LLO15

TESTED BY: B. Pelkey

DATE RECEIVED: May 6, 2018

DATE TESTED: June 5, 2018

SAMPLE DESCRIPTION: Gravel, Some Sand, Some Fines



Comments: Sample description (MUSCS) derived from the Grain Size analysis results. The 0.075mm sieve was used in place of the 0.080mm sieve.

Reviewed by:

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Stantec Grain Size Analysis

ASTM C136, ASTM C117

Client: Alberta Transportation
Project Name: SR1

Project No: 110773396.302.702.310

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SAMPLE No.: SS20

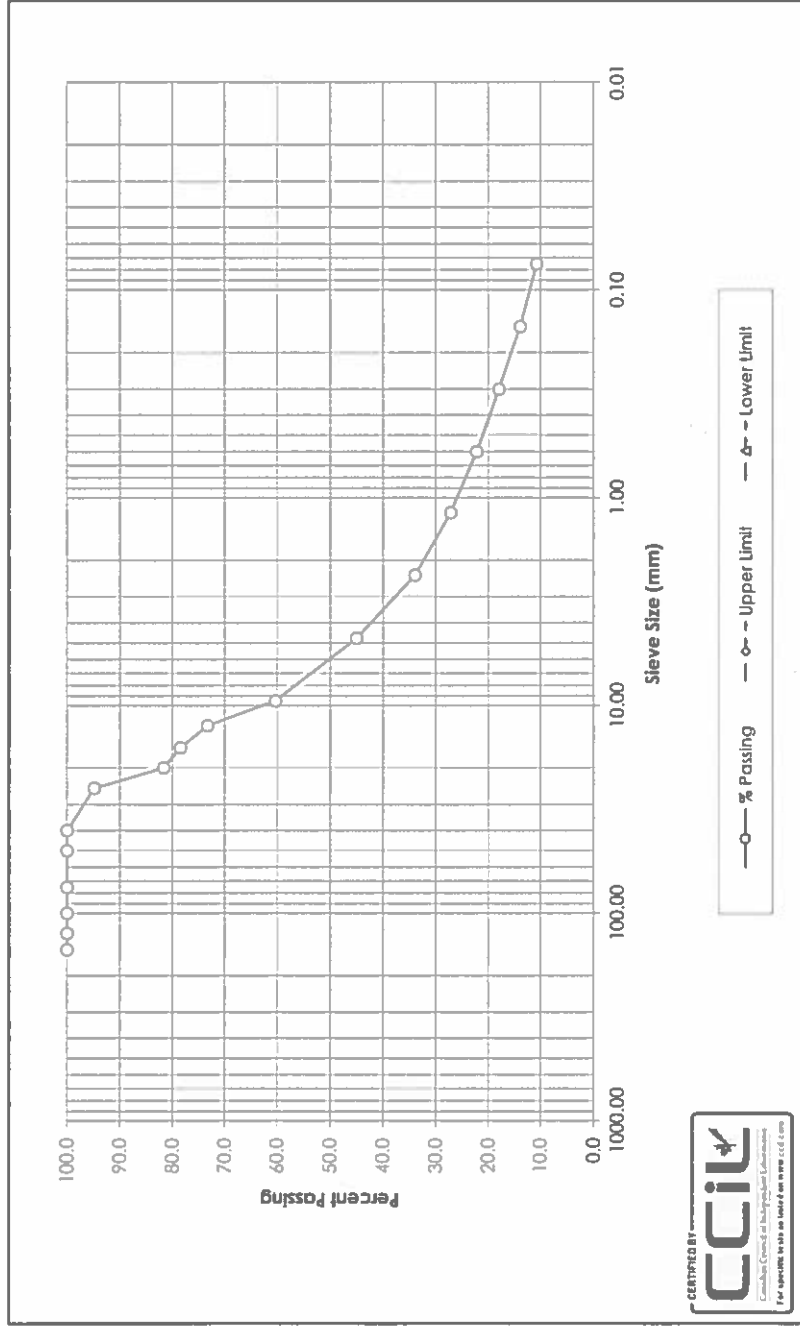
SOURCE: LLO09

TESTED BY: B. Peikay

DATE RECEIVED: May 6, 2018

DATE TESTED: June 4, 2018

SAMPLE DESCRIPTION: Sandy Gravel, Some Fines



Sieve (mm)	Sample % Passing	Specifications	
		Lower	Upper
150.0	100.0	-	-
125.0	100.0	-	-
100.0	100.0	-	-
75.0	100.0	-	-
50.0	100.0	-	-
40.0	100.0	-	-
25.0	94.8	-	-
20.0	81.6	-	-
14.0	78.5	-	-
12.5	73.3	-	-
9.5	60.4	-	-
4.75	45.0	-	-
2.36	33.9	-	-
1.18	27.0	-	-
0.600	22.2	-	-
0.300	17.9	-	-
0.150	13.9	-	-
0.075	10.7	-	-
Cobble:	0.0%	D ₁₀ :	-
Gravel:	55.0%	D ₃₀ :	1.7223
Sand:	34.3%	D ₆₀ :	9.4045
Fines:	10.7%	C _u :	-
		C _c :	-

Comments: Sample description(MUSCS) derived from the Grain Size Analysis only. The 0.075mm sieve was used in place of the 0.080mm sieve.

Reviewed by:

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Stantec Grain Size Analysis

ASTM C136, ASTM C117

Client: Alberta Transportation
Project Name: SR1 2018 Investigation

Project No: 110773396

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SAMPLE No.: SS2-SS4 Comp.

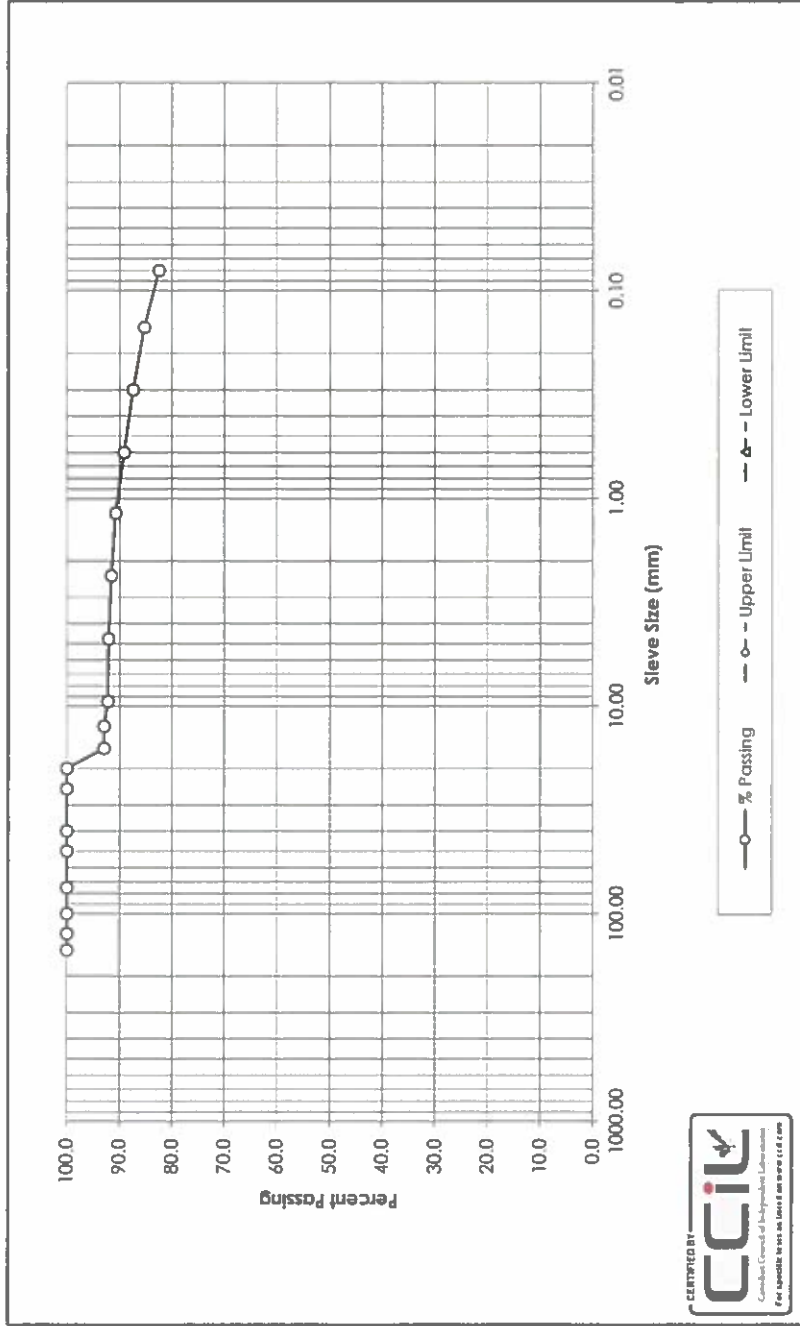
SOURCE: LLO17

TESTED BY: B. Pelkey

DATE RECEIVED: September 25, 2018

DATE TESTED: October 31, 2018

SAMPLE DESCRIPTION: Clay (CH-Ct), Trace Sand, Trace Gravel



Sieve (mm)	Sample % Passing	Specifications	
		Lower	Upper
150.0	100.0	-	-
125.0	100.0	-	-
100.0	100.0	-	-
75.0	100.0	-	-
50.0	100.0	-	-
40.0	100.0	-	-
25.0	100.0	-	-
20.0	100.0	-	-
16.0	93.0	-	-
12.5	93.0	-	-
9.5	92.3	-	-
4.75	92.2	-	-
2.36	91.7	-	-
1.18	90.8	-	-
0.600	89.2	-	-
0.300	87.5	-	-
0.150	85.4	-	-
0.080	82.5	-	-

Cobble:	0.0%	D ₁₀ :	-
Gravel:	7.8%	D ₃₀ :	-
Sand:	9.6%	D ₆₀ :	-
Fines:	82.6%	C _u :	-
		C _c :	-

Comments: Sample description (MUSCS) derived from both the Grain Size and Atterberg Limits analyses.

Reviewed by:

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Stantec Grain Size Analysis

ASTM C136, ASTM C117

Client: Alberta Transportation
Project Name: SR1 2018 Investigation

Project No: 110773396

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SAMPLE No.: SS11-SS13 Comp.

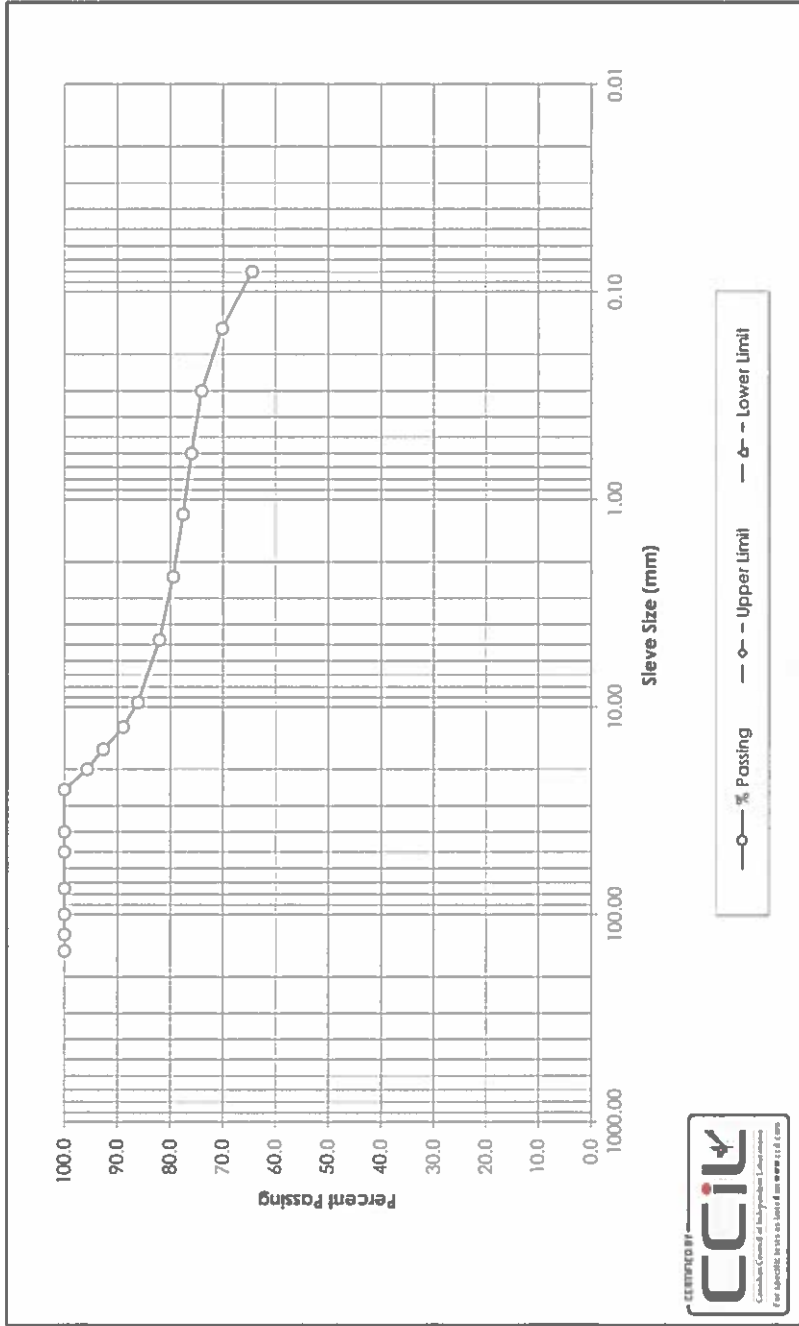
SOURCE: LLO17

TESTED BY: B. Pelkey

DATE RECEIVED: September 25, 2018

DATE TESTED: October 31, 2018

SAMPLE DESCRIPTION: Clay (Cl), Some Gravel, Some Sand



Sieve (mm)	Sample % Passing	Specifications	
		Lower	Upper
150.0	100.0	-	-
125.0	100.0	-	-
100.0	100.0	-	-
75.0	100.0	-	-
50.0	100.0	-	-
40.0	100.0	-	-
25.0	100.0	-	-
20.0	95.7	-	-
16.0	92.7	-	-
12.5	88.9	-	-
9.5	86.2	-	-
4.75	82.1	-	-
2.36	79.5	-	-
1.18	77.6	-	-
0.600	76.0	-	-
0.300	74.1	-	-
0.150	70.2	-	-
0.080	64.5	-	-

Cobble:	0.0%	D ₁₀ :	-
Gravel:	17.9%	D ₃₀ :	-
Sand:	17.6%	D ₆₀ :	-
Fines:	64.5%	C _u :	-
		C _c :	-

Comments: Sample description (MUSCS) derived from both the Grain Size and Atterberg limits analyses.

Reviewed by:

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Stantec Grain Size Analysis

ASTM C136, ASTM C117

Client: Alberta Transportation
Project Name: SR1 2018 Investigation

Project No: 110773396

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SAMPLE No.: SS17-SS19 Comp.

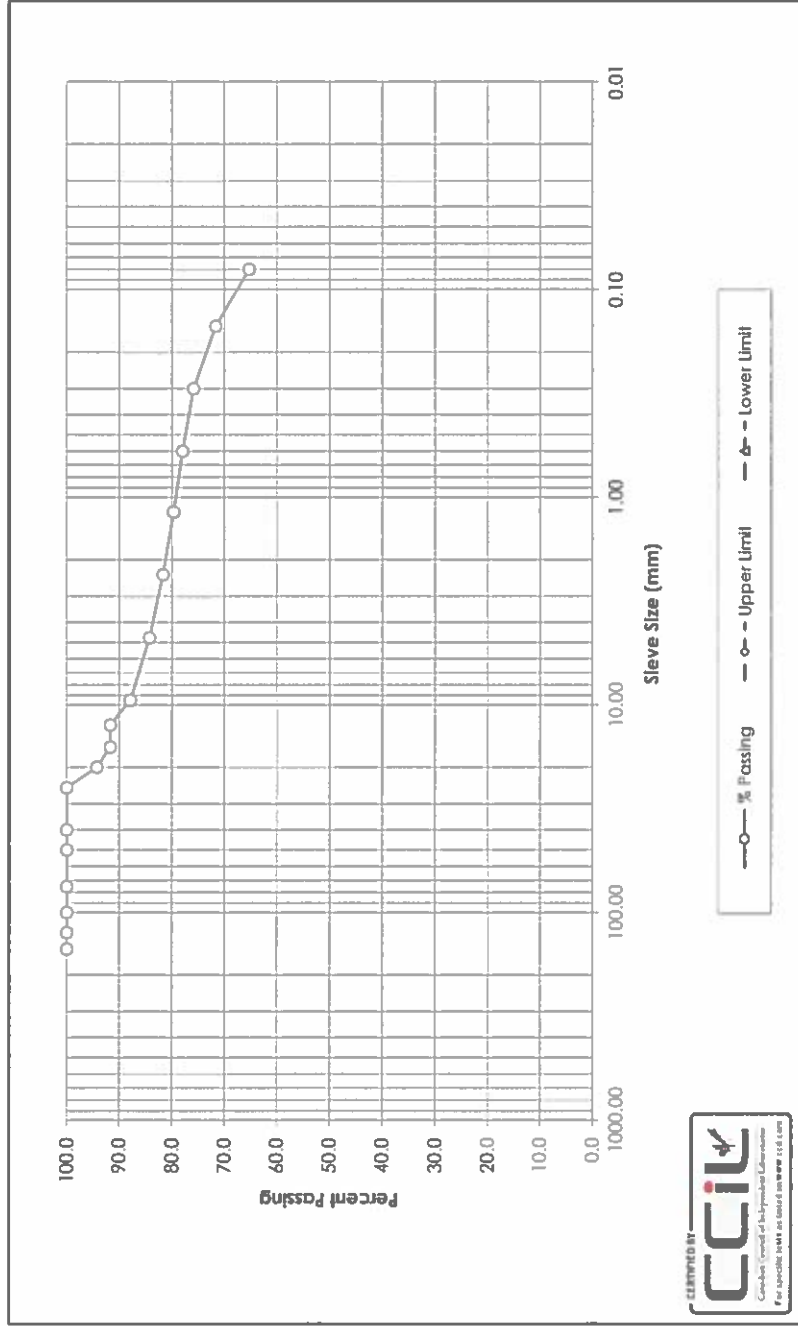
SOURCE: LLO17

TESTED BY: B. Pelkey

DATE RECEIVED: September 25, 2018

DATE TESTED: October 31, 2018

SAMPLE DESCRIPTION: Clay (CI-CU), Some Sand, Some Gravel



Comments: Sample description (MUSCS) derived from both the Grain Size and Atterberg Limits analyses.

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Stantec Grain Size Analysis

ASTM C136, ASTM C117

Client: Alberta Transportation
Project Name: SRI 2018 Investigation

Project No: 110773396

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SAMPLE No.: SS24-SS27 Comp.

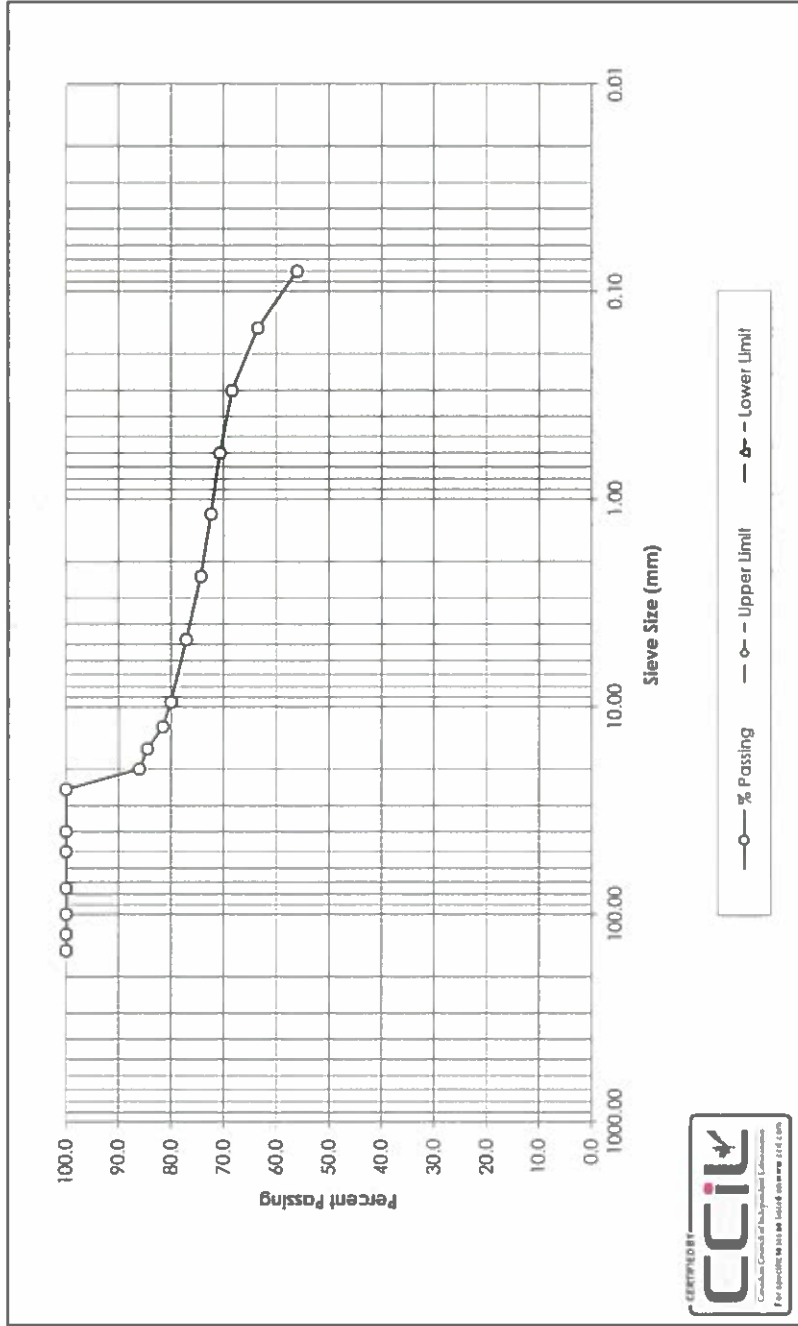
SOURCE: LLO17

TESTED BY: B. Pelkey

DATE RECEIVED: September 25, 2018

DATE TESTED: October 31, 2018

SAMPLE DESCRIPTION: Gravelly Sandy Clay (CL)



Sieve (mm)	Sample % Passing	Specifications	
		Lower	Upper
150.0	100.0	-	-
125.0	100.0	-	-
100.0	100.0	-	-
75.0	100.0	-	-
50.0	100.0	-	-
40.0	100.0	-	-
25.0	100.0	-	-
20.0	86.1	-	-
16.0	84.6	-	-
12.5	81.6	-	-
9.5	80.0	-	-
4.75	77.2	-	-
2.36	74.4	-	-
1.18	72.4	-	-
0.600	70.7	-	-
0.300	68.5	-	-
0.150	63.6	-	-
0.080	56.1	-	-
Cobble:	0.0%	D ₁₀ :	-
Gravel:	22.8%	D ₃₀ :	-
Sand:	21.1%	D ₆₀ :	0.1175
Fines:	56.1%	C _u :	-
		C _c :	-

Comments: Sample description (MUSCS) derived from both the Grain Size and Atterberg Limits analyses.

Reviewed by:

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ASTM C136, ASTM C117

Client: Alberta Transportation
Project Name: SR1 2018 Investigation

Project No: 110773396

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SAMPLE No.: ST5 (2.25-2.7m)

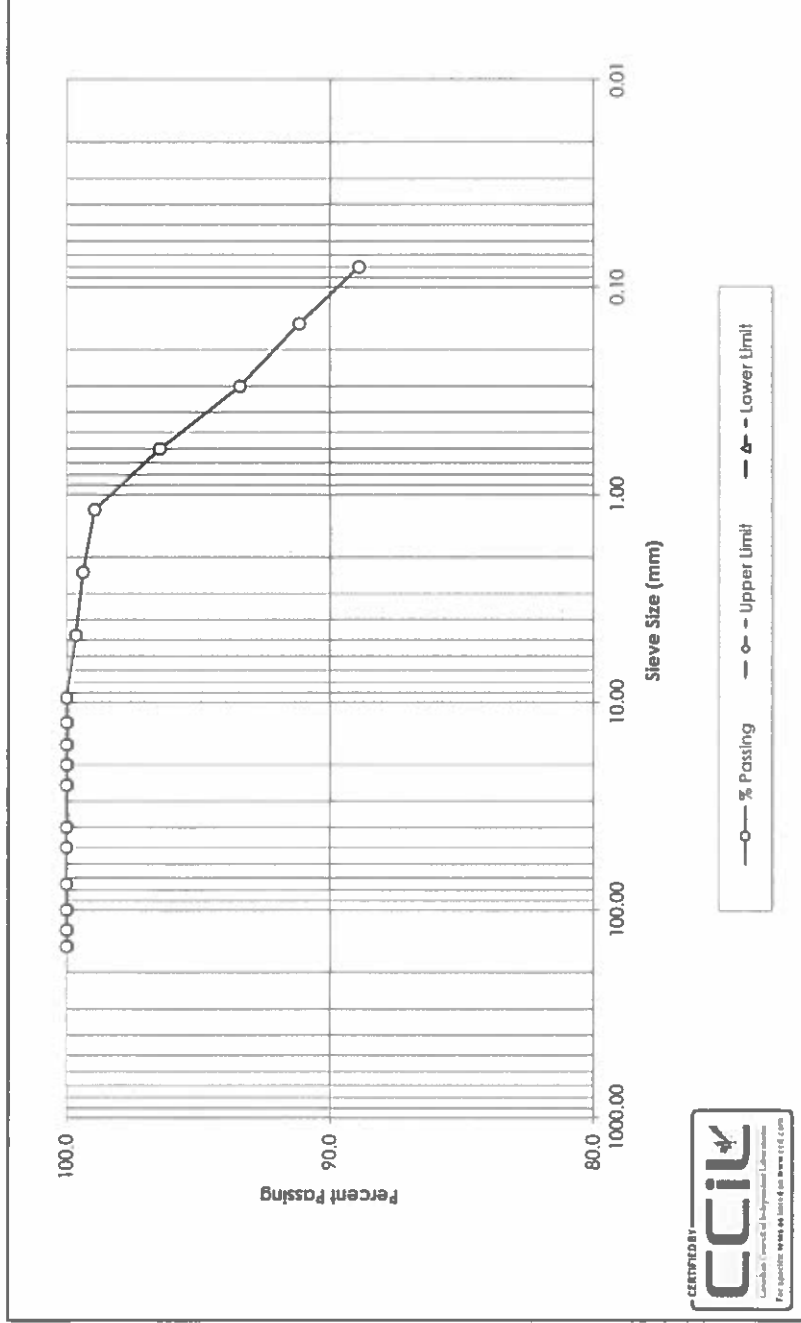
SOURCE: LLO17A

TESTED BY: B. Pelkey

DATE RECEIVED: September 25, 2018

DATE TESTED: October 17, 2018

SAMPLE DESCRIPTION: Clay (Cl) Same Sand



Comments: Sample description (MUSCS) derived from both the Grain Size and Atterberg Limits test results.

Reviewed by:

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Stantec Grain Size Analysis

ASTM C136, ASTM C117

Client: Alberta Transportation
Project Name: SR1_2018 Investigation

Project No: 110773396

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SAMPLE No.: SS2-SS4 Comp.

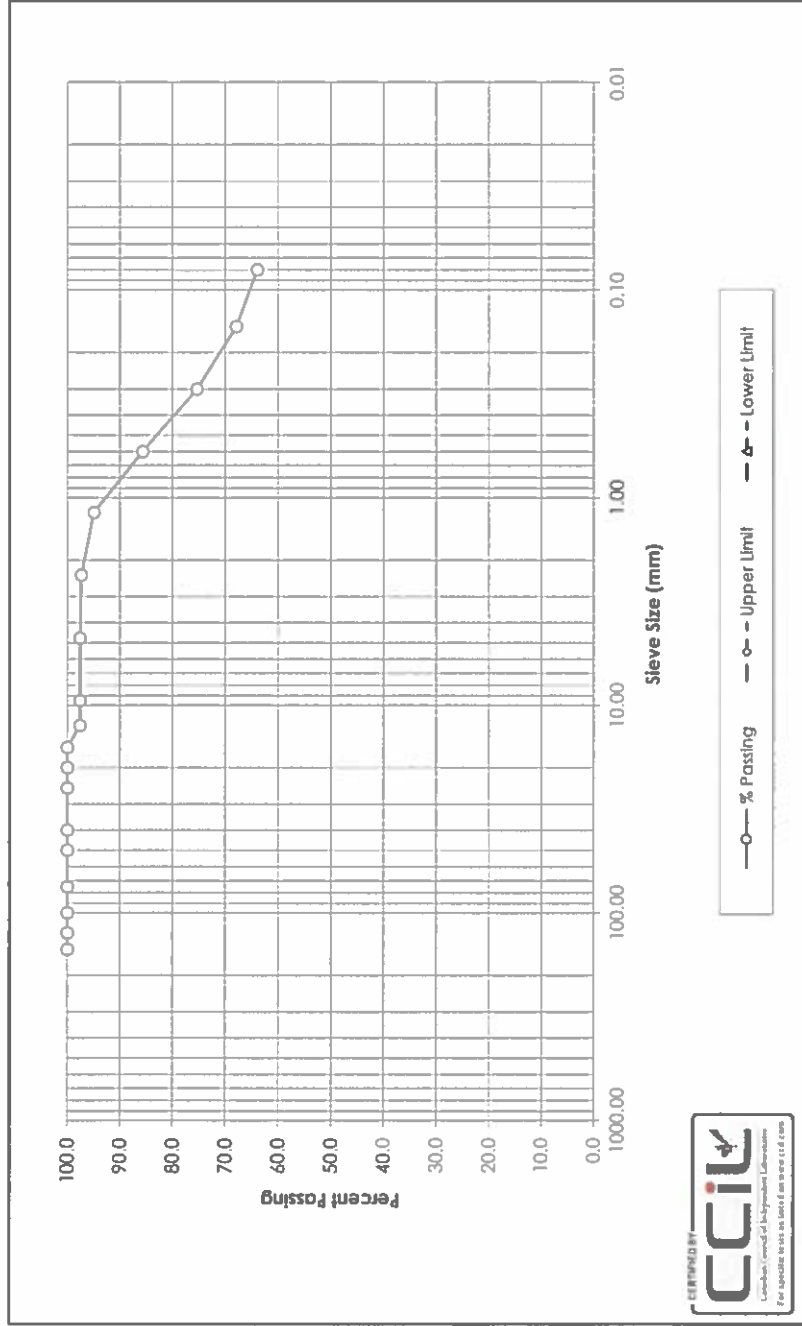
SOURCE: LLO18

TESTED BY: S. McKay

DATE RECEIVED: September 24, 2018

DATE TESTED: October 31, 2018

SAMPLE DESCRIPTION: Sandy Clay (CH), Trace Gravel



Comments: Sample description (MUSCS) derived from both the Grain Size and Atterberg Limits analyses.

Reviewed by:

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Stantec Grain Size Analysis

ASTM C136, ASTM C117

Client: Alberta Transportation
Project Name: SR1 2018 Investigation

Project No: 110773396

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SAMPLE No.: SS6-SS8 Comp.

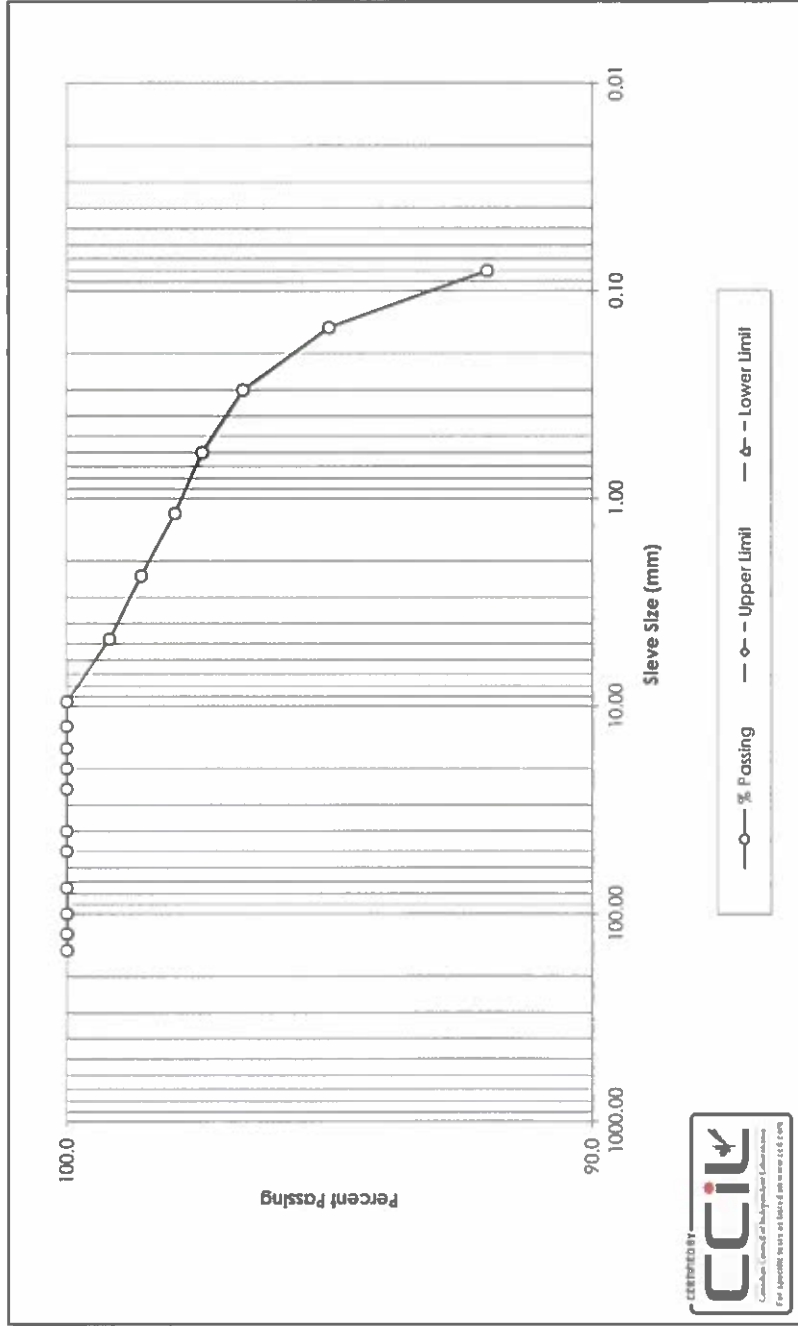
SOURCE: LLO18

TESTED BY: S. McKay

DATE RECEIVED: September 24, 2018

DATE TESTED: October 31, 2018

SAMPLE DESCRIPTION: Clay (Cl), Trace Sand



Comments: Sample description (MUSCS) derived from both the Grain Size and Atterberg Limits analyses.

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Reviewed by:

Sieve (mm)	Sample % Passing	Specifications	
		Lower	Upper
150.0	100.0	-	-
125.0	100.0	-	-
100.0	100.0	-	-
75.0	100.0	-	-
50.0	100.0	-	-
40.0	100.0	-	-
25.0	100.0	-	-
20.0	100.0	-	-
16.0	100.0	-	-
12.5	100.0	-	-
9.5	100.0	-	-
4.75	99.2	-	-
2.36	98.6	-	-
1.18	97.9	-	-
0.600	97.4	-	-
0.300	96.6	-	-
0.150	95.0	-	-
0.080	92.0	-	-
Cobble:	0.0%	D ₁₀ :	-
Gravel:	0.8%	D ₃₀ :	-
Sand:	7.2%	D ₆₀ :	-
Fines:	92.0%	C _u :	-
		C _c :	-



Stantec Grain Size Analysis

ASTM C136, ASTM C117

Client: Alberta Transportation
Project Name: SRI 2018 Investigation

Project No: 110773396

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SAMPLE No.: SS13-SS15 Comp.

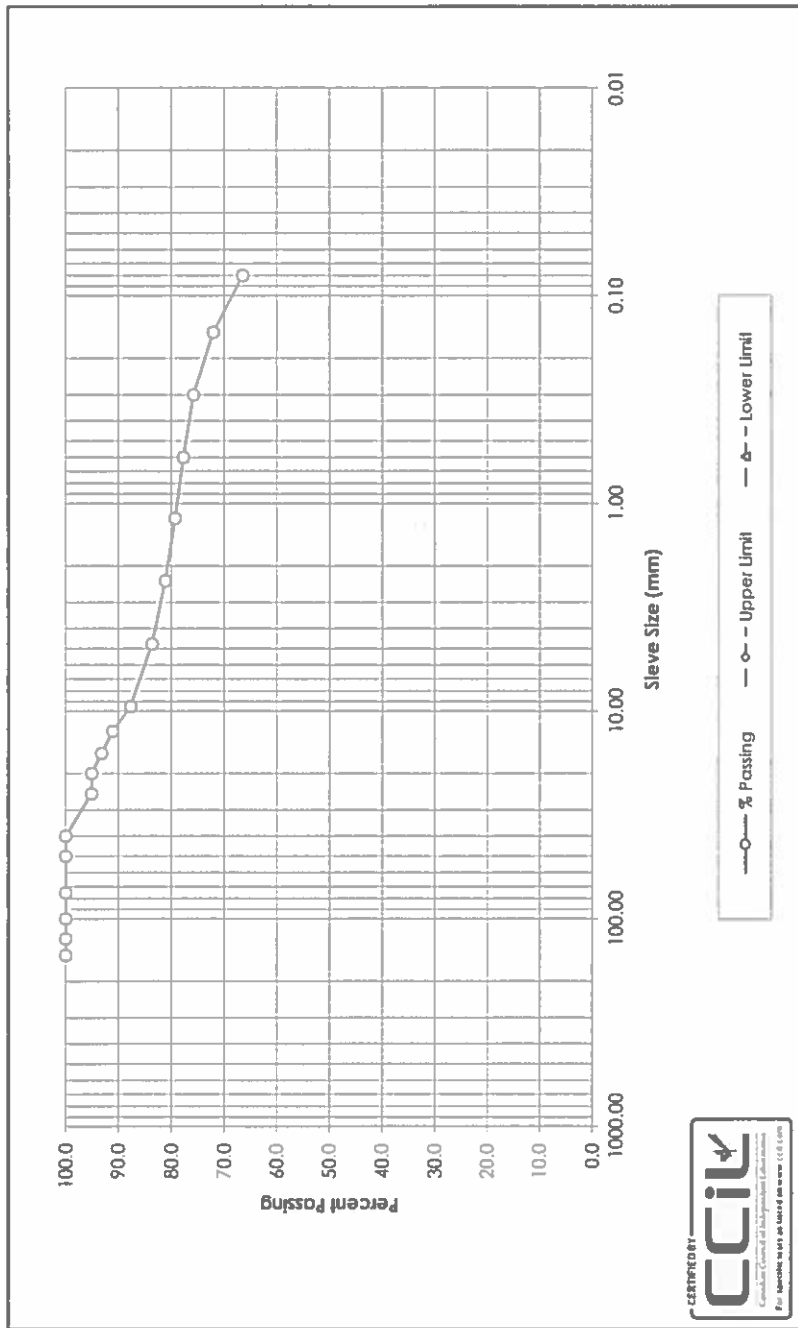
SOURCE: LLO18

TESTED BY: S. McKay

DATE RECEIVED: September 24, 2018

DATE TESTED: October 31, 2018

SAMPLE DESCRIPTION: Clay (Cl), Some Sand, Some Gravel



Sieve (mm)	Sample % Passing	Specifications	
		Lower	Upper
150.0	100.0	-	-
125.0	100.0	-	-
100.0	100.0	-	-
75.0	100.0	-	-
50.0	100.0	-	-
40.0	100.0	-	-
25.0	95.1	-	-
20.0	95.1	-	-
16.0	93.2	-	-
12.5	91.1	-	-
9.5	87.6	-	-
4.75	83.6	-	-
2.36	81.1	-	-
1.18	79.3	-	-
0.600	77.7	-	-
0.300	75.8	-	-
0.150	72.0	-	-
0.080	66.5	-	-

Comments: Sample description (MUSCS) derived from both the Grain Size and Atterberg Limits test results.

Reviewed by:

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ASTM C136, ASTM C117

Client: Alberta Transportation
Project Name: SRI 2018 Investigation

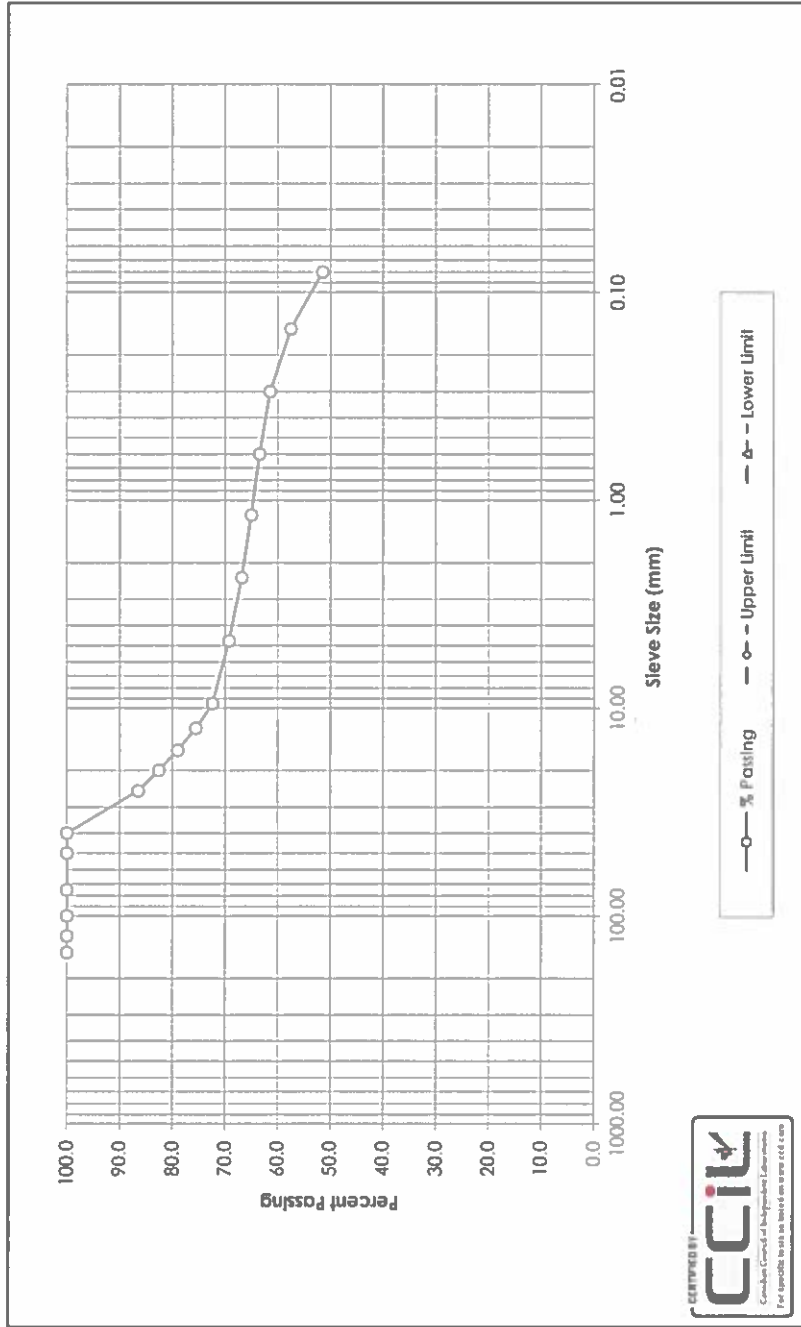
Project No: I10773396

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SAMPLE No.: SS21-SS23 Comp.
SOURCE: LLO18
TESTED BY: B. Pelkey & S. McKay

DATE RECEIVED: September 24, 2018
DATE TESTED: October 31, 2018
SAMPLE DESCRIPTION: Gravelly Clay (CL), Some Sand



Comments: Sample description (MUSCS) derived from both the Grain Size and Atterberg Limits analyses.

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Stantec Grain Size Analysis

ASTM C136, ASTM C117

Client: Alberta Transportation
Project Name: SRI 2018 Investigation

Project No: 110773396

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SAMPLE No.: SS27-SS29 Comp.

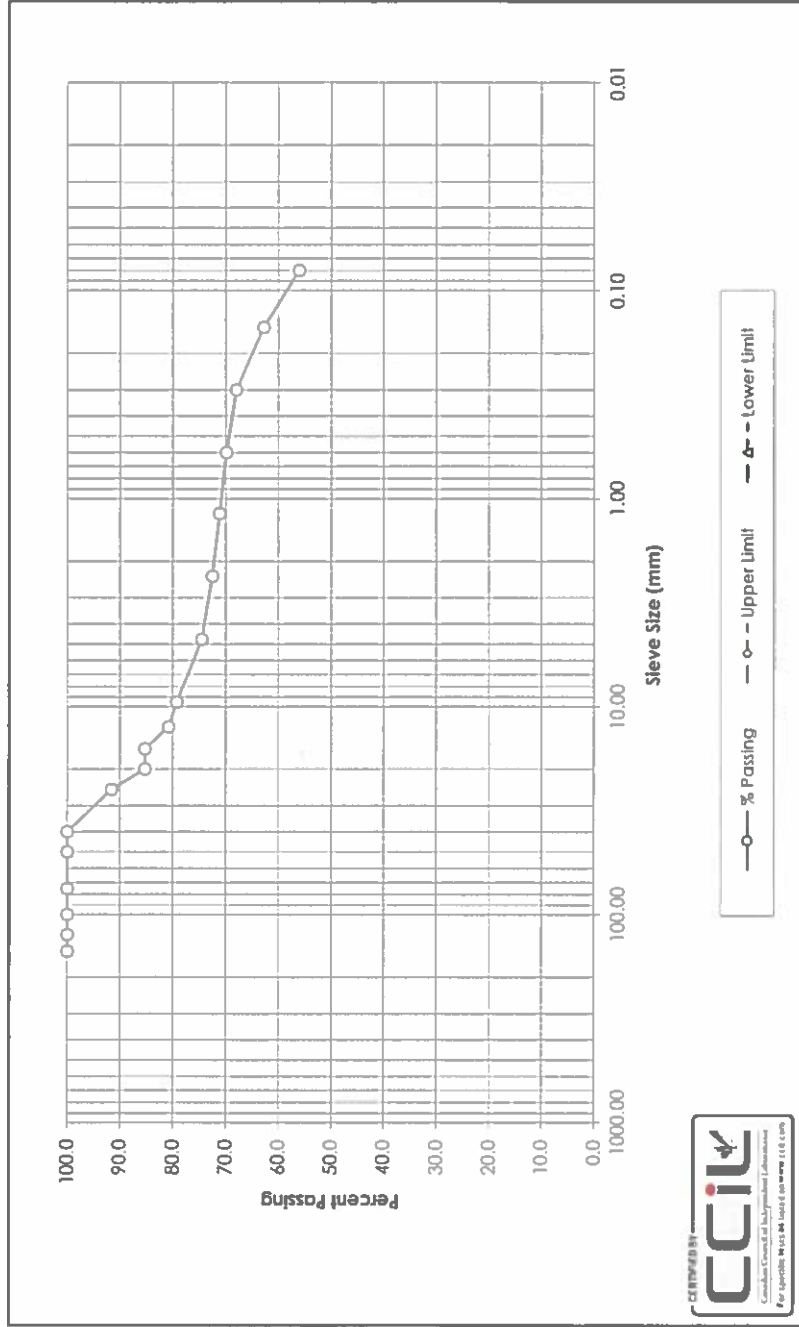
SOURCE: LLO18

TESTED BY: B. Peikay & S. McKay

DATE RECEIVED: September 24, 2018

DATE TESTED: October 31, 2018

SAMPLE DESCRIPTION: Gravelly Clay (CL), Some Sand



Comments: Sample description (MUSCS) derived from both the Grain Size and Atterberg Limits analyses.

Sieve (mm)	Sample % Passing	Specifications	
		Lower	Upper
150.0	100.0	-	-
125.0	100.0	-	-
100.0	100.0	-	-
75.0	100.0	-	-
50.0	100.0	-	-
40.0	100.0	-	-
25.0	91.6	-	-
20.0	85.3	-	-
16.0	85.3	-	-
12.5	80.8	-	-
9.5	79.3	-	-
4.75	74.5	-	-
2.36	72.5	-	-
1.18	71.1	-	-
0.600	69.9	-	-
0.300	68.0	-	-
0.150	62.8	-	-
0.080	56.1	-	-

Cobble:	0.0%	D ₁₀ :	-
Gravel:	25.5%	D ₃₀ :	-
Sand:	18.5%	D ₆₀ :	0.1220
Fines:	56.0%	C _u :	-
		C _c :	-

Reviewed by:

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Stantec Grain Size Analysis

ASTM C136, ASTM C117

Client: Alberta Transportation
Project Name: SR1
Project No: 110773396.302.702.310

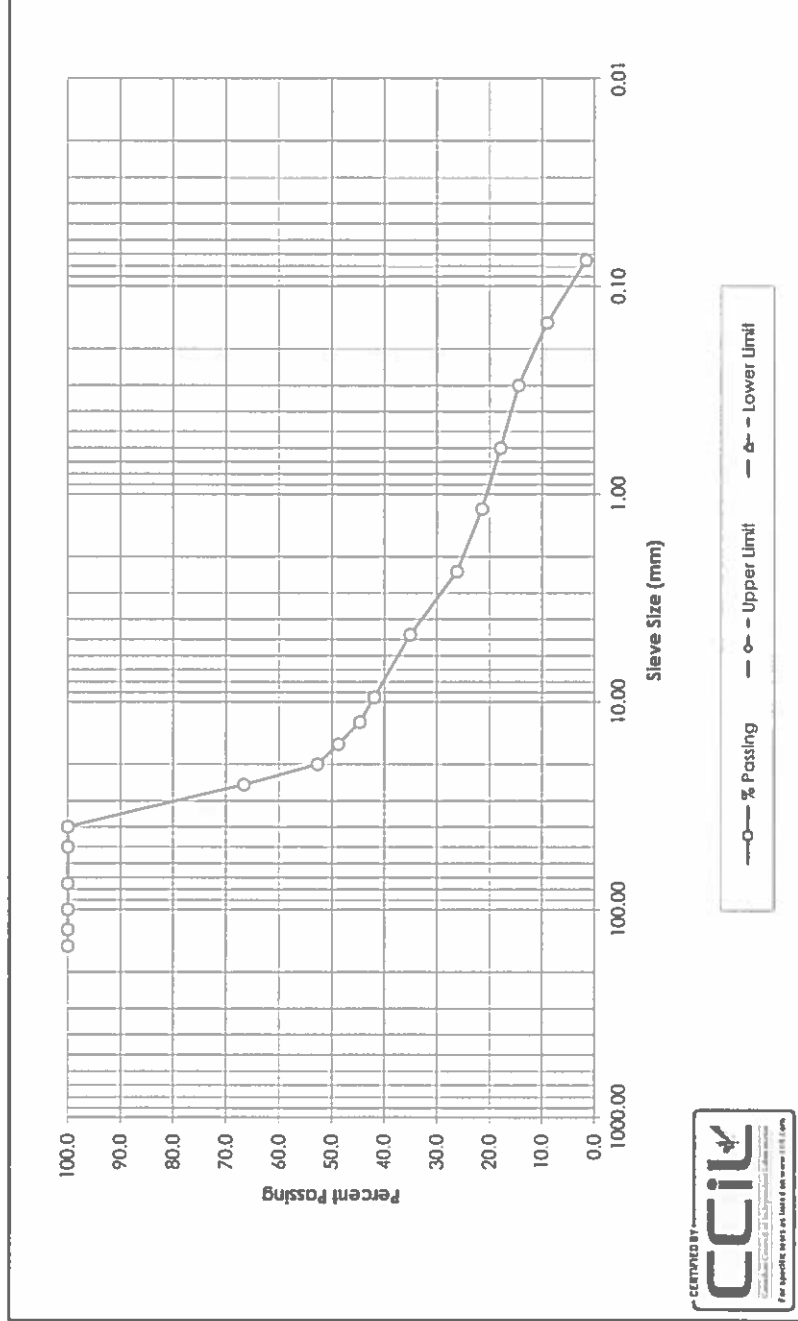
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SAMPLE No.: BS15
SOURCE: LLO03
TESTED BY: M. Vega

DATE RECEIVED: May 6, 2018
DATE TESTED: May 30, 2018

SAMPLE DESCRIPTION: Sandy Gravel, Trace Fines



Comments: Sample description (MUCSC) derived from the Grain Size analysis only. The 0.075mm sieve was used in place of the 0.080mm sieve.

Reviewed by:

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Stantec Grain Size Analysis

ASTM C136, ASTM C117

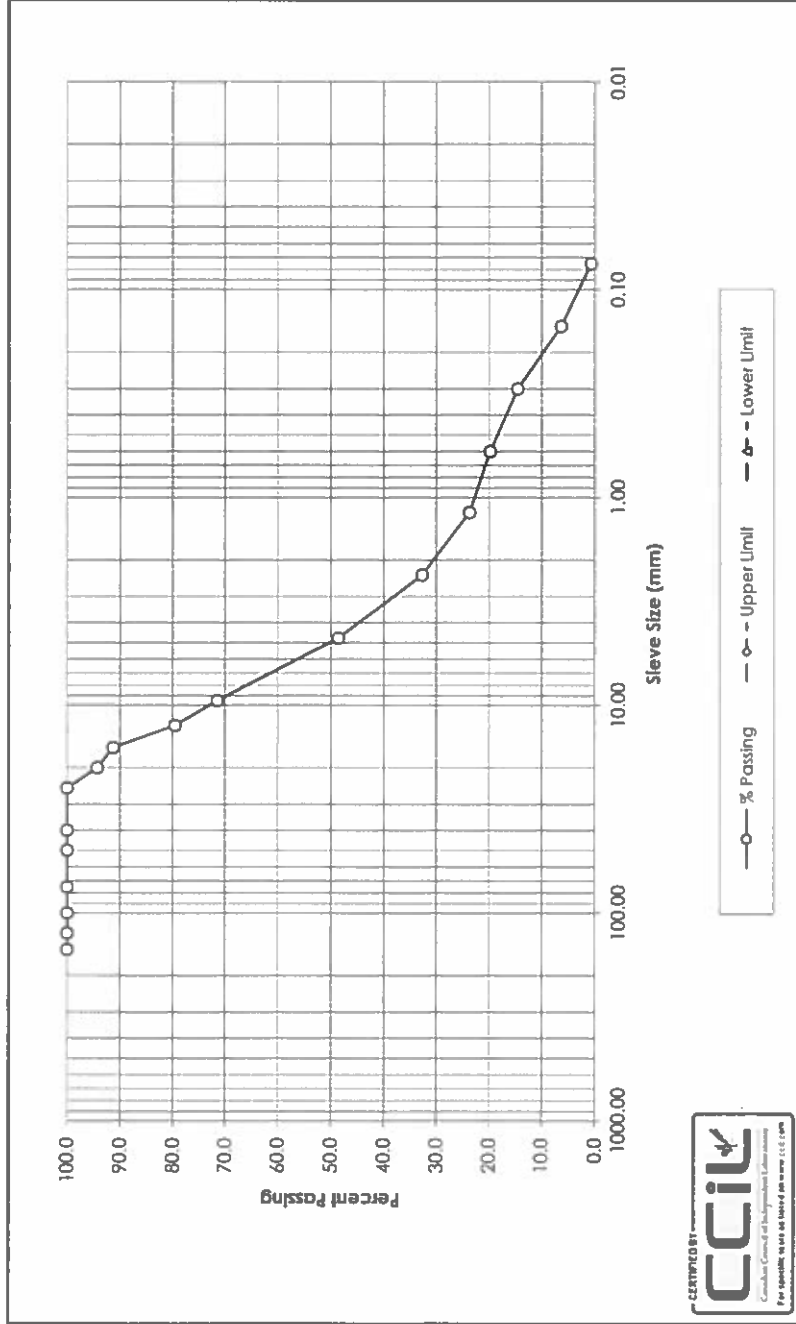
Client: Alberta Transportation
Project Name: SRI
Project No: 110773396.302.702.310

OFFICE
325 - 25th Street SE
Suite 200
Calgary, Alberta
Canada T2A 7H8
Tel: (403) 716-8000

LABORATORY
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Calgary, Alberta
Canada T2C 1G4
Tel: (403) 253-7876

SAMPLE No.: SS19
SOURCE: LLO05
TESTED BY: M. Vega

DATE RECEIVED: May 6, 2018
DATE TESTED: May 30, 2018
SAMPLE DESCRIPTION: Gravel and Sand



Sieve (mm)	Sample % Passing	Specifications	
		Lower	Upper
150.0	100.0	-	-
125.0	100.0	-	-
100.0	100.0	-	-
75.0	100.0	-	-
50.0	100.0	-	-
40.0	100.0	-	-
25.0	100.0	-	-
20.0	94.3	-	-
16.0	91.3	-	-
12.5	79.6	-	-
9.5	71.5	-	-
4.75	48.6	-	-
2.36	32.7	-	-
1.18	23.7	-	-
0.600	19.8	-	-
0.300	14.6	-	-
0.150	6.3	-	-
0.075	0.6	-	-

Cobble:	0.0%	D ₁₀ :	0.2332
Gravel:	51.4%	D ₃₀ :	2.0442
Sand:	47.9%	D ₆₀ :	7.3482
Fines:	0.7%	C _u :	31.51
		C _c :	2.44

Comments: Sample description (MUCSC) derived from the Grain Size analysis only. The 0.075mm sieve was used in place of the 0.080mm sieve.

Reviewed by:

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[Signature]



Stantec Grain Size Analysis

ASTM C136, ASTM C117

Client: Alberla Transportation
Project Name: SR1
Project No: 110773396.302.702.310

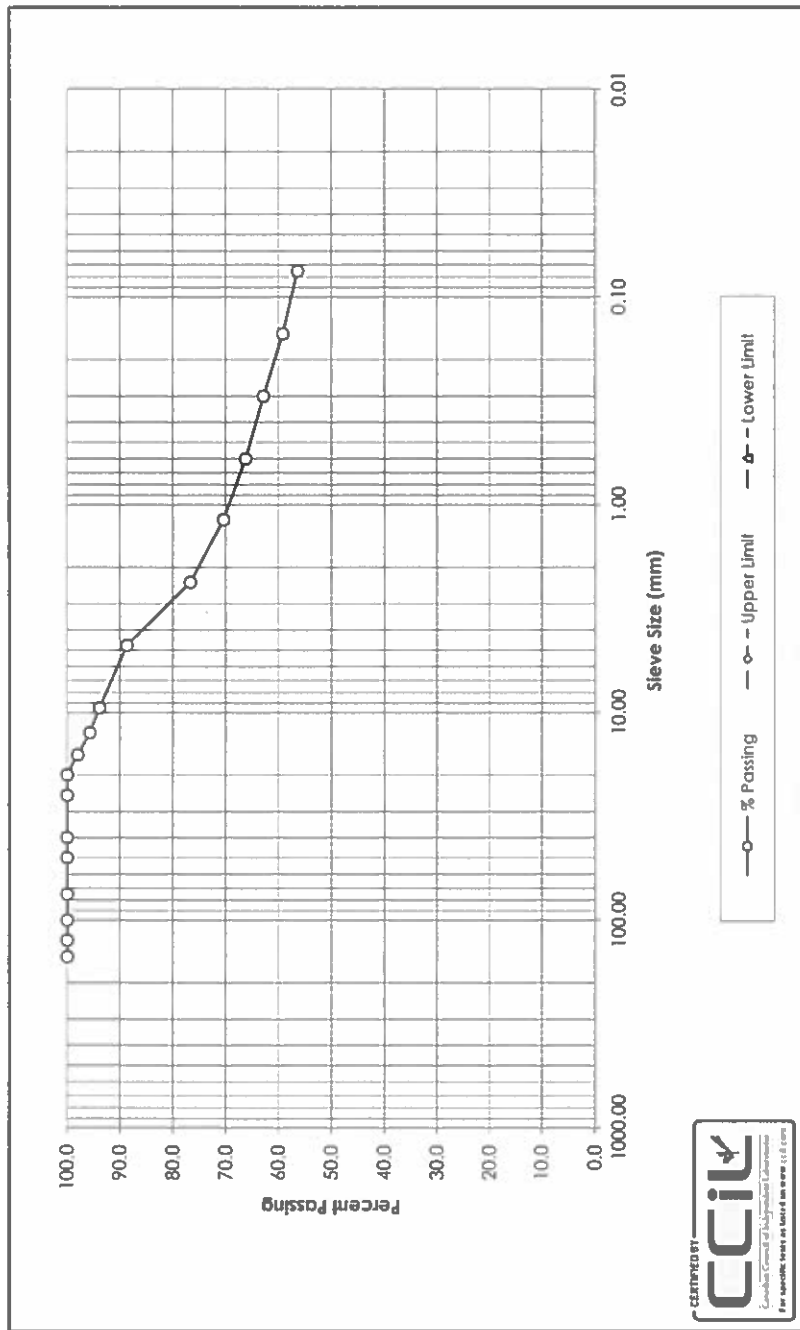
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Calgary, Alberta
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LABORATORY
10830 - 46th Street SE
Calgary, Alberta
Canada T2C 1G4

Tel: (403) 716-8000
Tel: (403) 253-7876

SAMPLE No.: SS14
SOURCE: LLO06
TESTED BY: M. Vega

DATE RECEIVED: May 6, 2018
DATE TESTED: May 30, 2018
SAMPLE DESCRIPTION: Sandy Fines, Some Gravel



Comments: Sample description (MUCSC) derived from the Grain Size analysis only. The 0.075mm sieve was used in place of the 0.080mm sieve.

Reviewed by:

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Stantec Grain Size Analysis

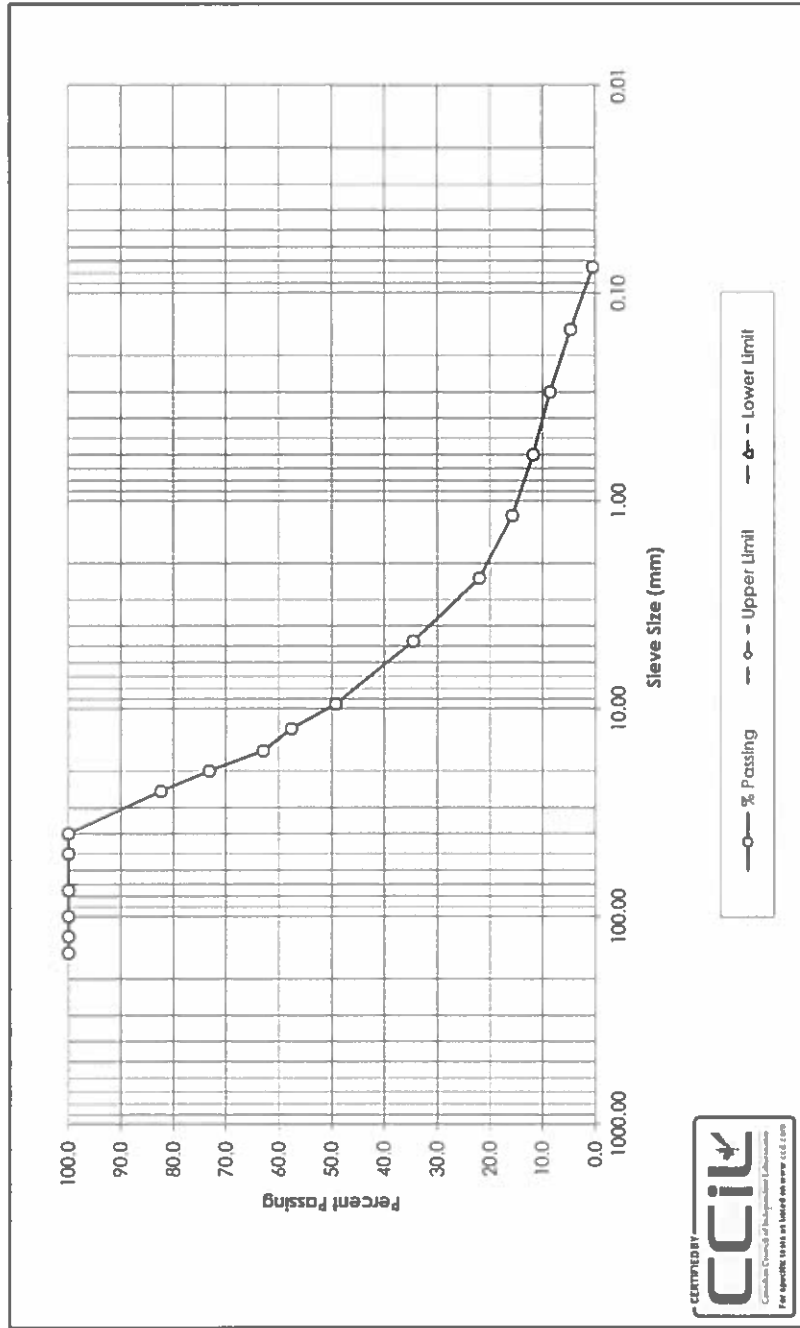
ASTM C136, ASTM C117

Client: Alberta Transportation
Project Name: SR1
Project No: 110773396.302.702.310

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325 - 25th Street SE
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SAMPLE No.: BS7
SOURCE: LLO07
TESTED BY: M. Vega
DATE RECEIVED: May 6, 2018
DATE TESTED: May 30, 2018
SAMPLE DESCRIPTION: Sandy Gravel



Comments: Sample description (MUSCS) derived from the Grain Size analysis only. Thew 0.075mm sieve was used in place for the 0.080mm sieve.

Reviewed by:

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Stantec Grain Size Analysis

ASTM C136, ASTM C117

Client: Alberta Transportation
Project Name: SR1 2018 Investigation

Project No: 110773396

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Canada T2A 7H8

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Calgary, Alberta
Canada T2C 1G4

Tel: (403) 716-8000

SAMPLE No.: ST9 (4.05-4.5m)

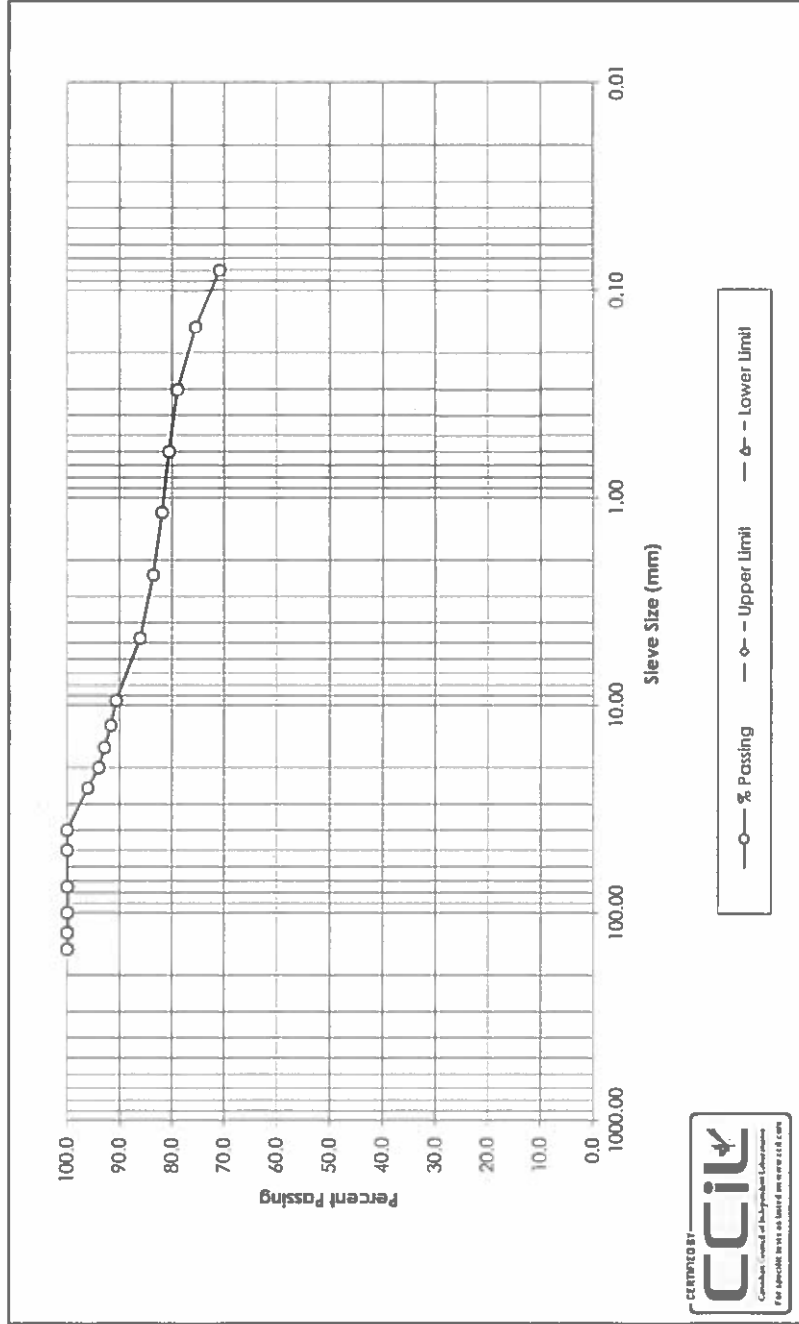
SOURCE: LLO17A

TESTED BY: B. Pelkey

DATE RECEIVED: -

DATE TESTED: November 19, 2018

SAMPLE DESCRIPTION: Clay (Cl), Some Sand, Some Gravel



Sieve (mm)	Sample % Passing	Specifications	
		Lower	Upper
150.0	100.0	-	-
125.0	100.0	-	-
100.0	100.0	-	-
75.0	100.0	-	-
50.0	100.0	-	-
40.0	100.0	-	-
25.0	96.1	-	-
20.0	94.0	-	-
16.0	92.9	-	-
12.5	91.7	-	-
9.5	90.7	-	-
4.75	86.1	-	-
2.36	83.6	-	-
1.18	81.9	-	-
0.600	80.6	-	-
0.300	79.0	-	-
0.150	75.6	-	-
0.080	70.9	-	-
Cobble:	0.0%	D ₁₀ :	-
Gravel:	13.9%	D ₃₀ :	-
Sand:	15.2%	D ₆₀ :	-
Fines:	70.9%	C _u :	-
		C _c :	-

Comments: Sample description (MUSCS) derived from both the Grain Size and Atterberg Limits test results.

Reviewed by:

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Stantec Grain Size Analysis

ASTM C136, ASTM C117

Client: Alberta Transportation
Project Name: SR1
Project No: 110773396.302.702.310

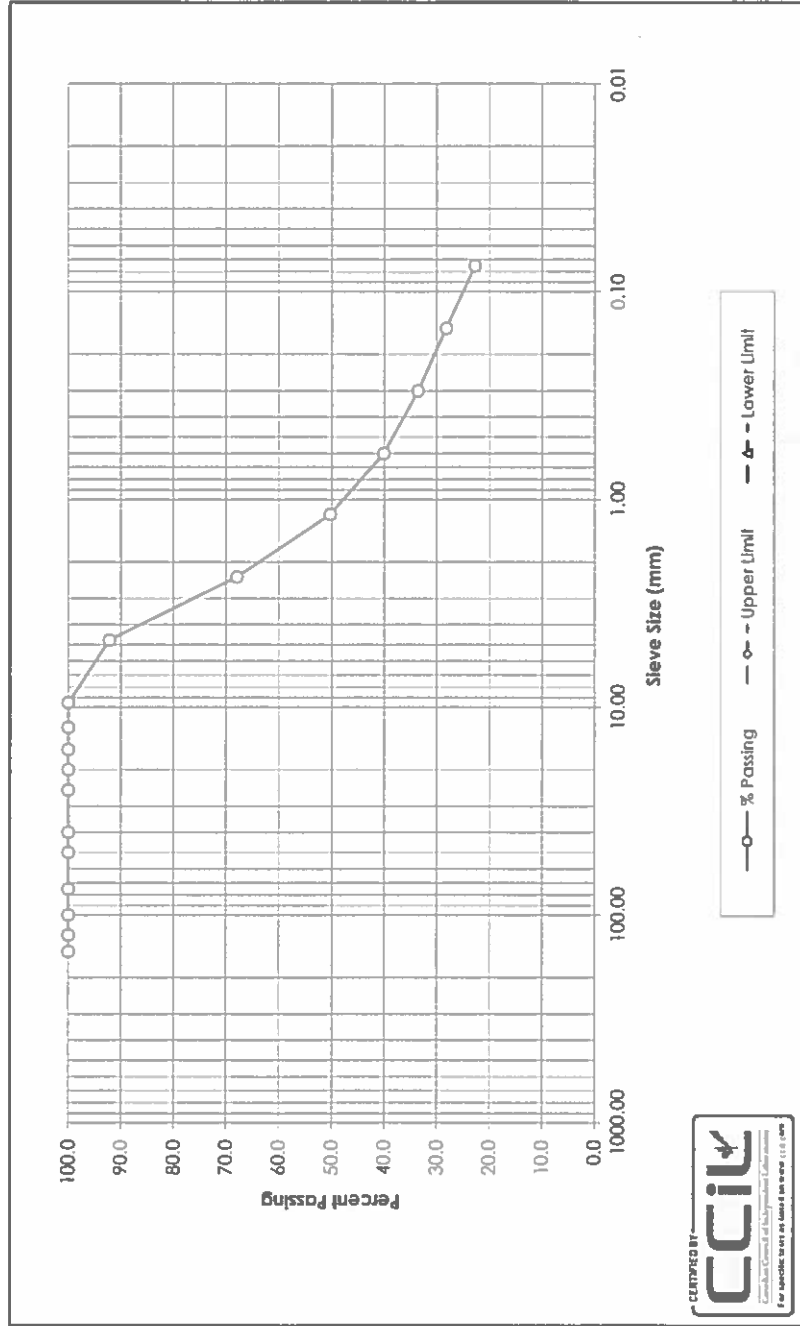
OFFICE
325 - 25th Street SE
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LABORATORY
10830 - 46th Street SE
Calgary, Alberta
Canada T2C 1G4

Tel: (403) 716-8000
Tel: (403) 253-7876

SAMPLE No.: SS13
SOURCE: LLO15
TESTED BY: B. Peikay

DATE RECEIVED: May 6, 2018
DATE TESTED: June 4, 2018
SAMPLE DESCRIPTION: Sand with Fines, Trace Gravel



Comments: Sample description(MUSCS) derived from the Grain Size Analysis only. The 0.075mm sieve was used in place of the 0.080mm sieve.

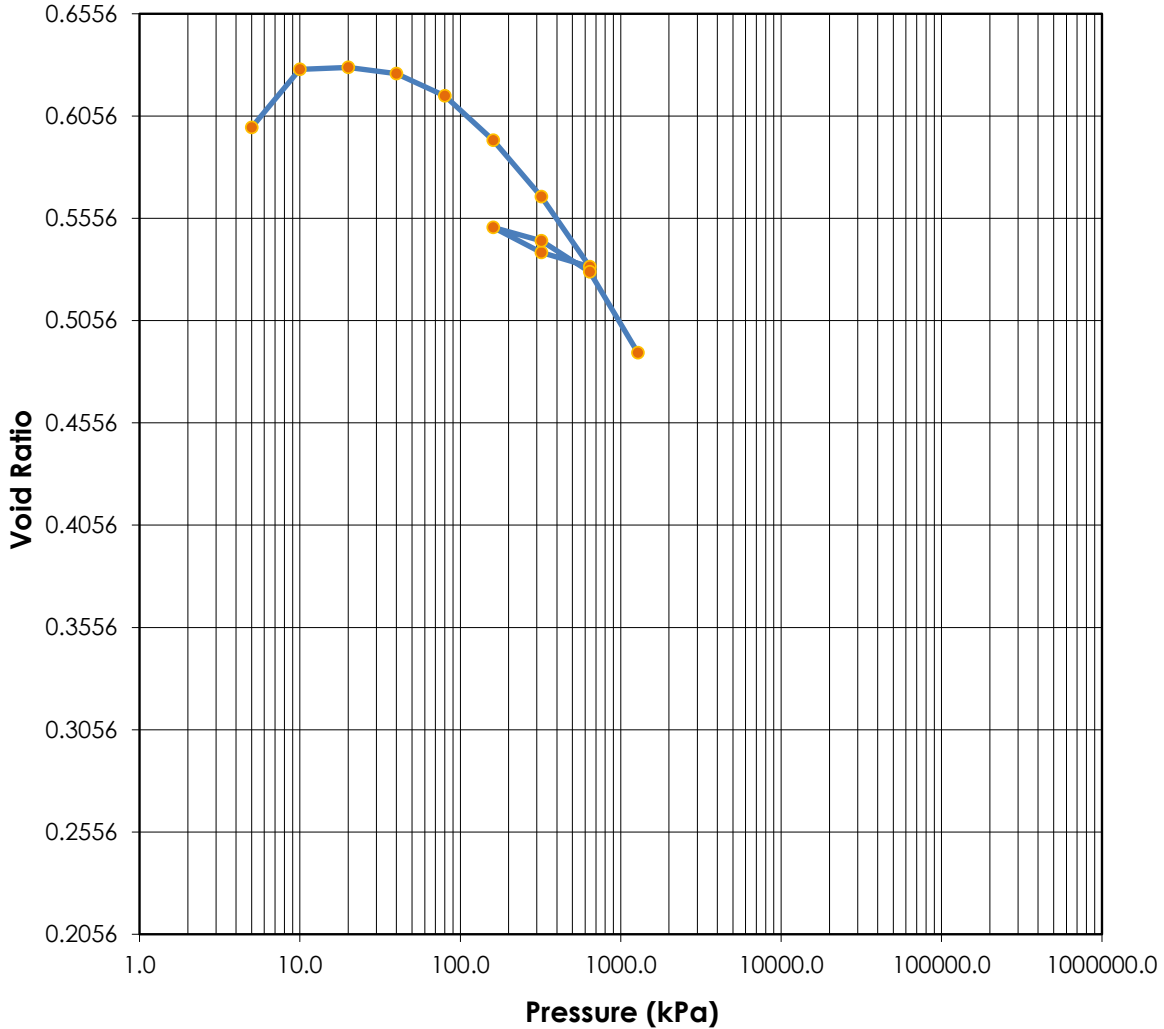
Reviewed by:

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Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
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 Tel: (403) 253-7876



	Before	After	Liquid Limits:	58	Test Date:	9-Jun-18
Moisture (%):	21.8	19.5	Plastic Limits:	20		
Dry Density (g/cm³):	1.684	1.811	Plasticity Index (%):	38		
Saturation (%):	98	100				
Void Ratio:	0.5998	0.4896	Specific Gravity:	2.70	Assumed	
Soil Description:	Clay (CH)					
Project Number:	110773396		Depth:	2.4-2.6m		
Sample Number:	LLO5 BS3		Boring Number:			
Project:	SR1					
Client:	Alberta Transportation					
Location:						
						Remarks:

Tested By: E. Wahl

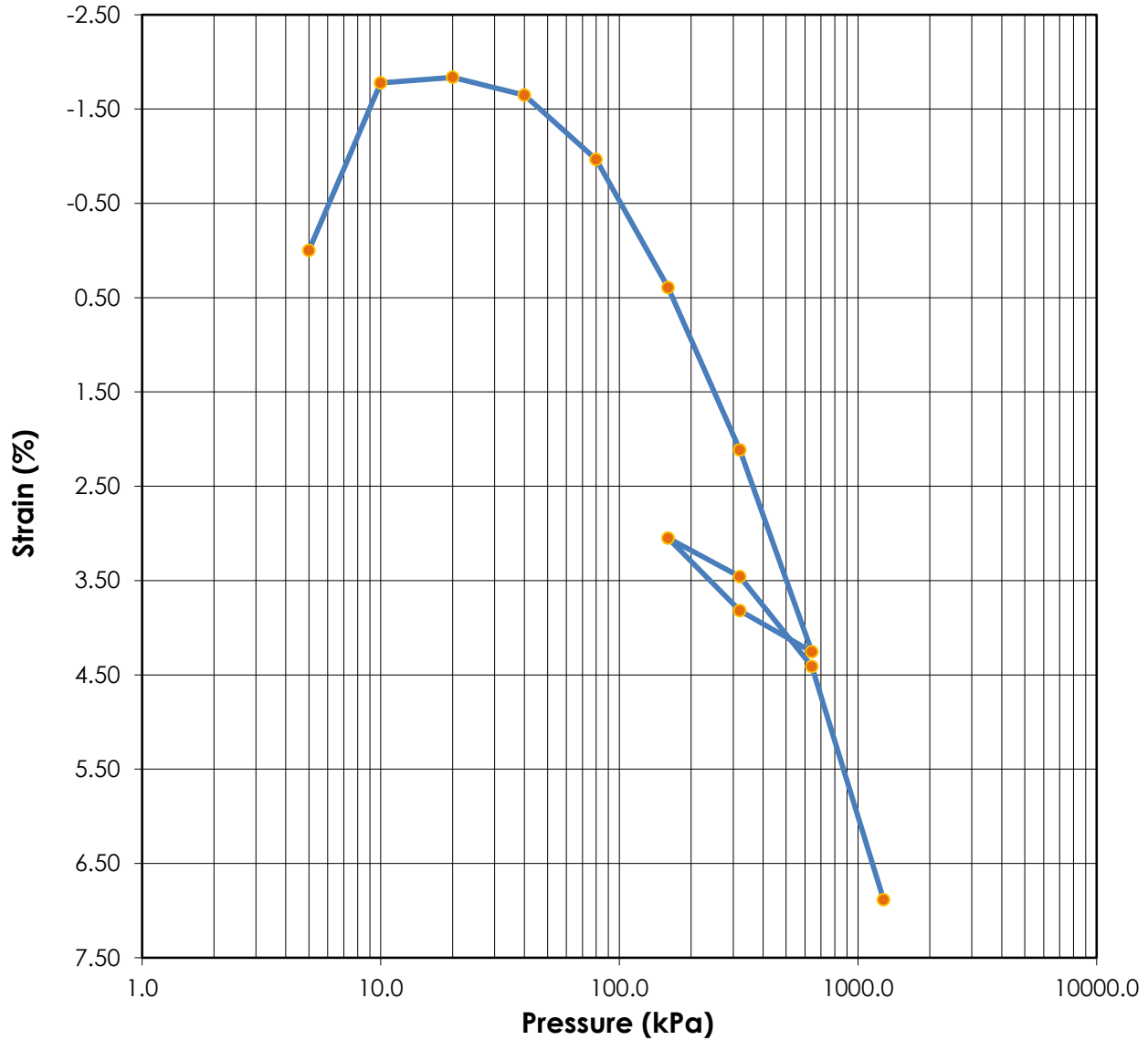
Reviewed By: C. Lamoureux

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One-Dimensional Consolidation Test
ASTM D2435
Test Results

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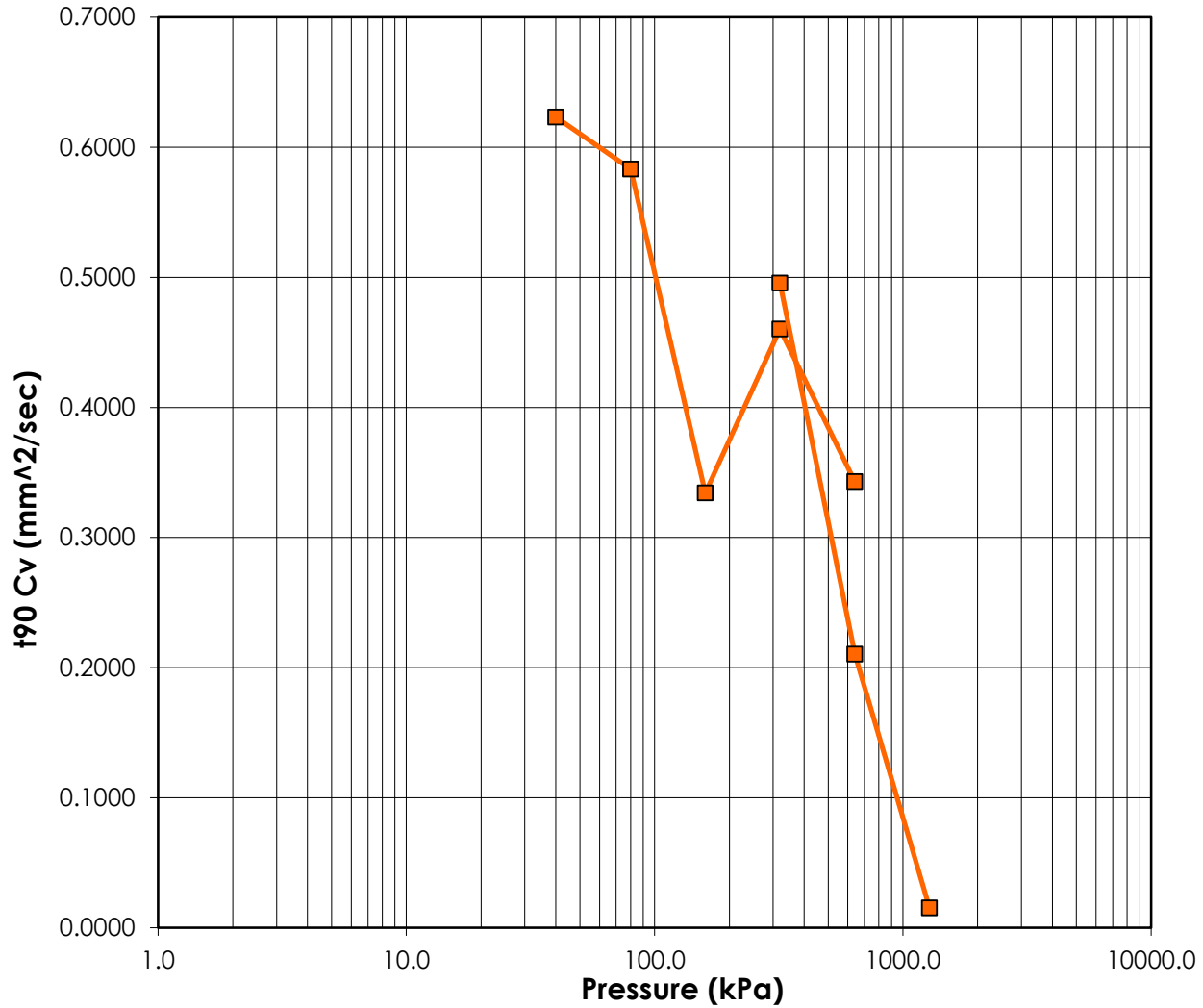


	Before	After	Liquid Limits:	58	Test Date:	9-Jun-18
Moisture (%):	21.8	19.5	Plastic Limits:	20		
Dry Density (g/cm3):	1.684	1.811	Plasticity Index (%):	38		
Saturation (%):	98	100				
Void Ratio:	0.5998	0.4896	Specific Gravity:	2.70	Assumed	
Sample Description:	Clay (CH)					
Project Number:	110773396	Depth:	2.4-2.6m			
Sample Number:	LLO05 BS3	Boring Number:				
Project:	SR1					Remarks:
Client:	Alberta Transportation					
Location:						



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ASTM D2435
Test Results

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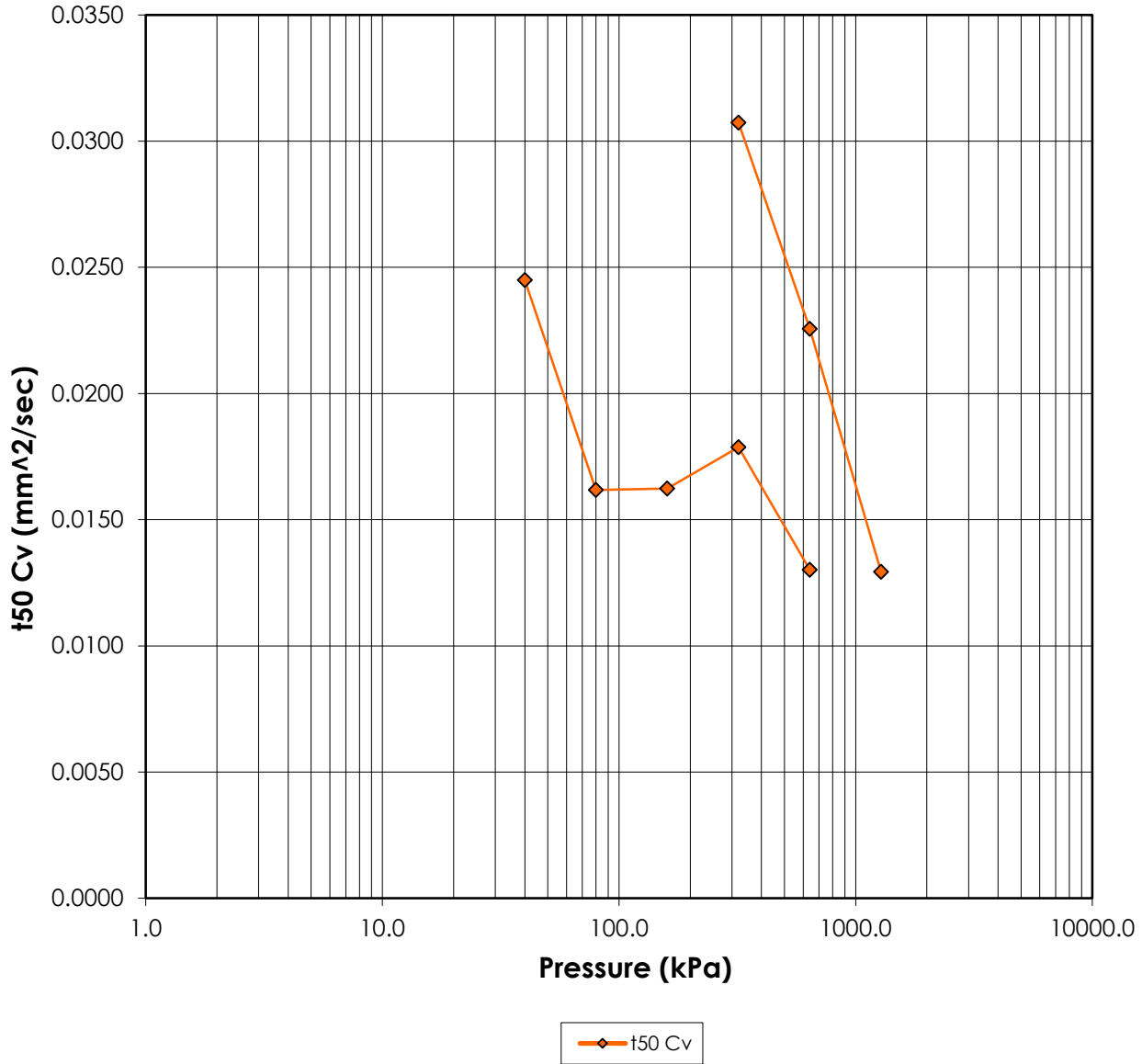
—■— $t_{90} C_v$

	Before	After	Liquid Limits:	58	Test Date:	9-Jun-18
Moisture (%):	21.8	19.5	Plastic Limits:	20		
Dry Density (g/cm³):	1.684	1.811	Plasticity Index (%):	38		
Saturation (%):	98	100				
Void Ratio:	0.5998	0.4896	Specific Gravity:	2.70	Assumed	
Soil Description:	Clay (CH)					
Project Number:	110773396		Depth:	2.4-2.6m		
Sample Number:	LLO05 BS3		Boring Number:			
Project:	SR1					
Client:	Alberta Transportation					
Location:						
						Remarks:



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One-Dimensional Consolidation Test
ASTM D2435
Test Results

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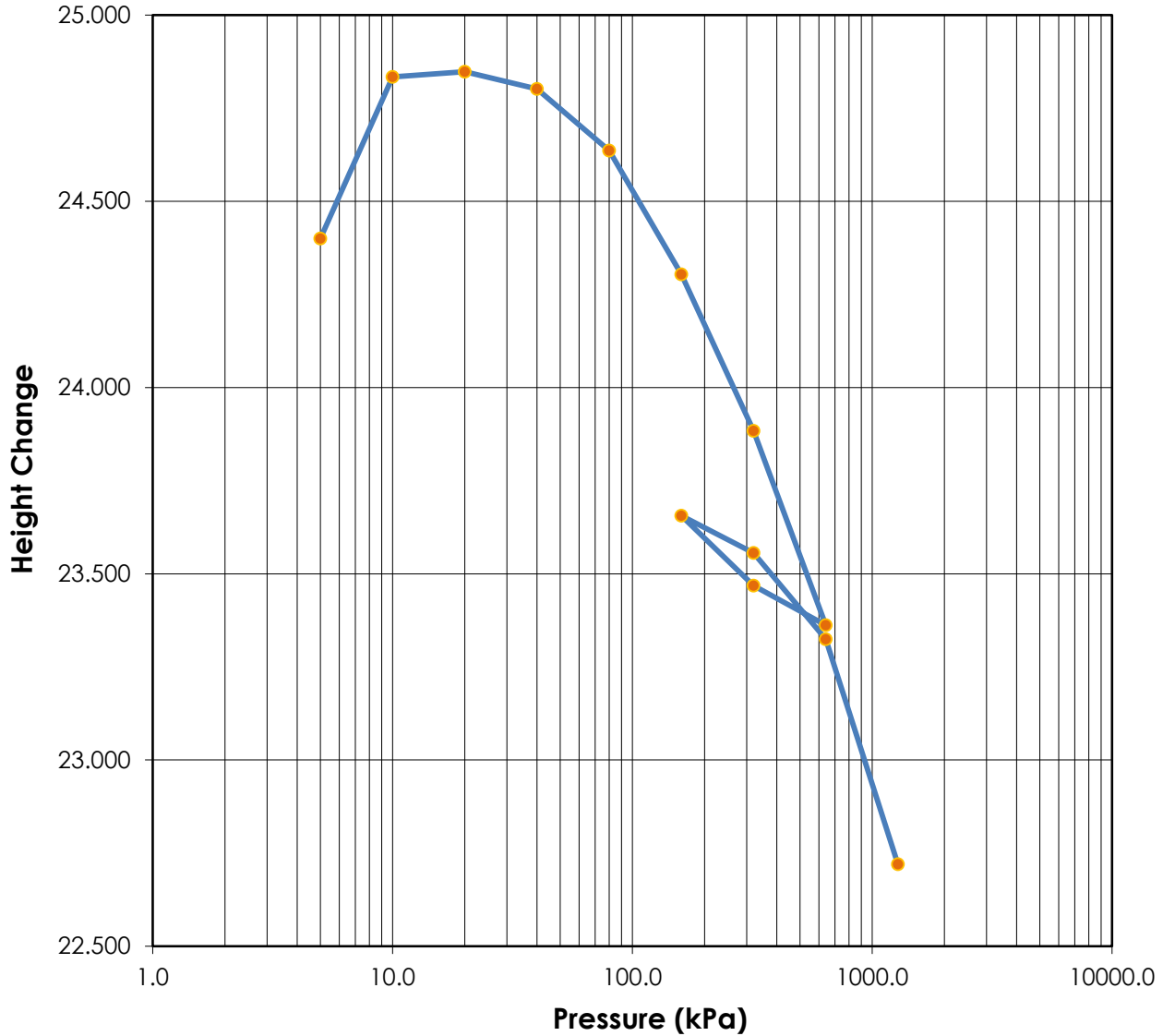


	Before	After	Liquid Limits: 58	Test Date: 9-Jun-18
Moisture (%):	21.8	19.5	Plastic Limits: 20	
Dry Density (g/cm³):	1.684	1.811	Plasticity Index (%): 38	
Saturation (%):	98	100	Specific Gravity: 2.70	Assumed
Void Ratio:	0.5998	0.4896		
Soil Description:	Clay (CH)			
Project Number:	110773396	Depth: 2.4-2.6m	Remarks:	
Sample Number:	LLO05 BS3	Boring Number:		
Project:	SR1			
Client:	Alberta Transportation			
Location:				



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

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	Before	After	Liquid Limits:	58	Test Date:	9-Jun-18
Moisture (%):	21.8	19.5	Plastic Limits:	20		
Dry Density (g/cm3):	1.684	1.811	Plasticity Index (%):	38		
Saturation (%):	98	100	Specific Gravity:	2.70	Assumed	
Void Ratio:	0.5998	0.4896				
Soil Description:	Clay (CH)					
Project Number:	110773396	Depth:	2.4-2.6m			
Sample Number:	LLO05 BS3	Boring Number:				
Project:	SR1					Remarks:
Client:	Alberta Transportation					
Location:						

Consolidation Test Results Summary

Project: SR1

Project Number: 110773396

Location:

Job Number:

Sample Number: LLO05 BS3

Sample Description:

Boring Number:

Clay (CH)

Depth: 2.4-2.6m

Remarks:

Test Number:

Sample Type: Remolded

Test Date: 9-Jun-18

Index	Load Sequence (kPa)	Cummulative Change in Height (mm)	Specimen Height (mm)	Height of Void (mm)	Vertical Strain (%)	Void Ratio	t90 Fitting Time (min)	t50 Fitting Time (min)	t90 Cv (mm ² /sec)	t50 Cv (mm ² /sec)
0	0.000	0.0000	24.4000	9.1502	0.00	0.6000	0.000	0.000	0.000	0.000
1	5.000	0.0000	24.4000	9.1502	0.00	0.6000	0.000	0.000	0.000	0.000
2	10.000	-0.4340	24.8340	9.5842	-1.78	0.6285	0.000	0.000	0.000	0.000
3	20.000	-0.4480	24.8480	9.5982	-1.84	0.6294	0.000	0.000	0.000	0.000
4	40.000	-0.4020	24.8020	9.5522	-1.65	0.6264	3.488	20.618	0.623	0.024
5	80.000	-0.2360	24.6360	9.3862	-0.97	0.6155	3.677	30.788	0.583	0.016
6	160.000	0.0960	24.3040	9.0542	0.39	0.5937	6.245	29.864	0.334	0.016
7	320.000	0.5160	23.8840	8.6342	2.11	0.5662	4.379	26.195	0.460	0.018
8	640.000	1.0380	23.3620	8.1122	4.25	0.5320	5.622	34.420	0.343	0.013
9	320.000	0.9320	23.4680	8.2182	3.82	0.5389	0.000	0.000	0.000	0.000
10	160.000	0.7440	23.6560	8.4062	3.05	0.5512	0.000	0.000	0.000	0.000
11	320.000	0.8440	23.5560	8.3062	3.46	0.5447	3.956	14.818	0.496	0.031
12	640.000	1.0760	23.3240	8.0742	4.41	0.5295	9.143	19.794	0.210	0.023
13	1280.000	1.6800	22.7200	7.4702	6.89	0.4899	120.441	32.749	0.015	0.013

Predicted value indicated with *

Consolidation Test

Consolidation Specimen Information

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 9-Jun-18

Sample Number: LLO05 BS3

Sample Description:

Boring Number:

Clay (CH)

Depth: 2.4-2.6m

Remarks:

Sample Type: Remolded

Test Number:

Liquid Limit: 58

Initial Void Ratio: 0.5998

Initial Height (mm): 24.40

Plastic Limit: 20

Plasticity Index (%): 38

Initial Diameter (mm): 63.46

Specific Gravity: 2.70

Weight of Ring (g): 111.53

Assumed

Parameters	Initial Specimen	Final Specimen
Moist Weight + Container (g)	74.93	158.77
Dry Soil + Container (g)	62.18	133.44
Weight of Container (g)	3.71	3.70
Moisture Content (%)	21.8	19.5
Void Ratio	0.5998	0.4896
Saturation (%)	98	100
Dry Density (g/cm ³)	1.684	1.811

Consolidation Test Results
(Sequence 1) Load 5.000 kPa

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 9-Jun-18

Test Number:

Sample Number: LLO05 BS3

Soil Description:

Boring Number:

Clay (CH)

Depth: 2.4-2.6m

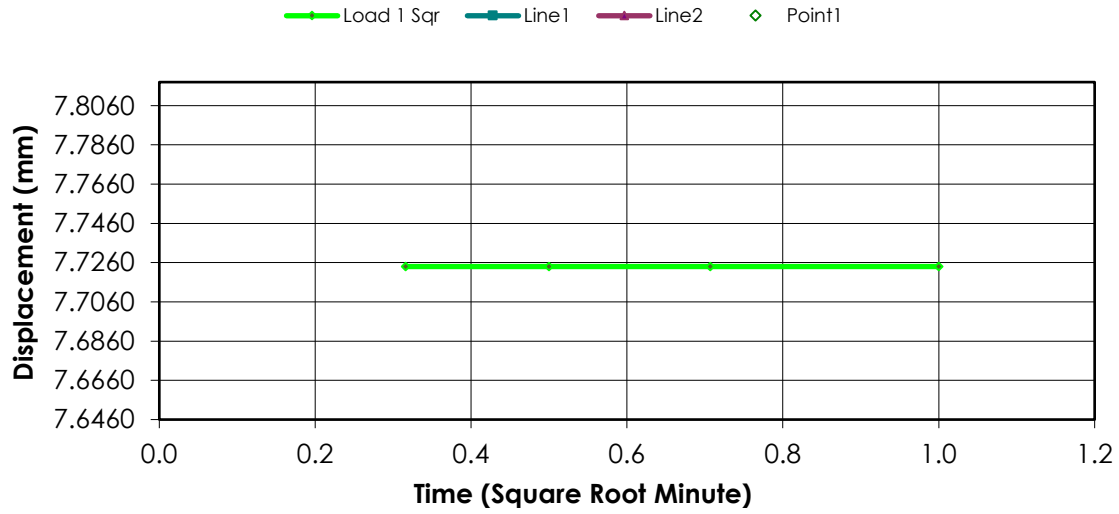
Remarks:

Sample Type: Remolded

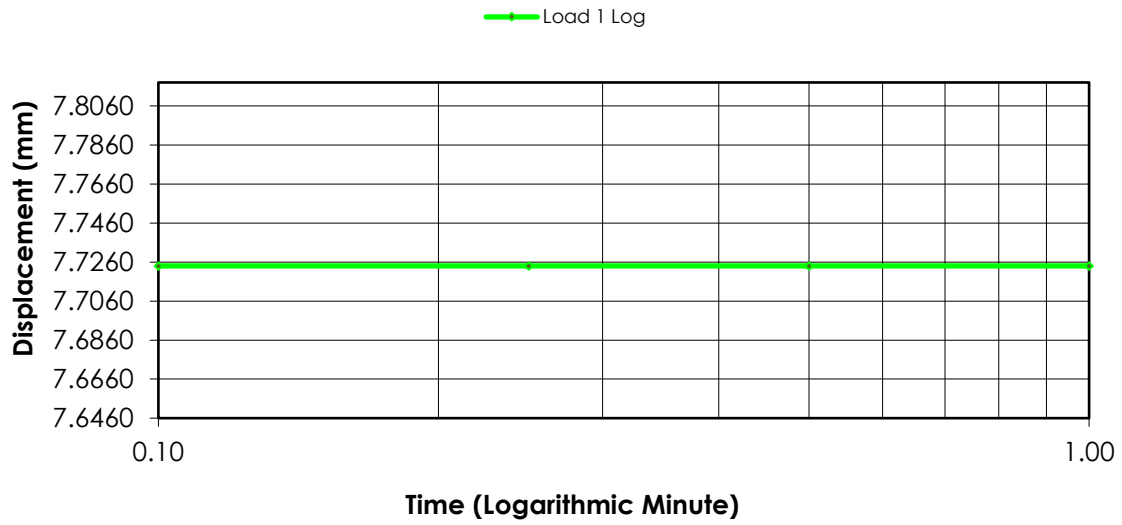
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	7.7240	0.0000	0.0000	0.5998
1	00:00:06	7.7240	0.0000	0.0000	0.5998
2	00:00:15	7.7240	0.0000	0.0000	0.5998
3	00:00:30	7.7240	0.0000	0.0000	0.5998
4	00:01:00	7.7240	0.0000	0.0000	0.5998

Consolidation Test Results (Sequence 1) Load 5.000 kPa

Consolidation Graph (Square-root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 2) Load 10.000 kPa

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 9-Jun-18

Test Number:

Sample Number: LLO05 BS3

Soil Description:

Boring Number:

Clay (CH)

Depth: 2.4-2.6m

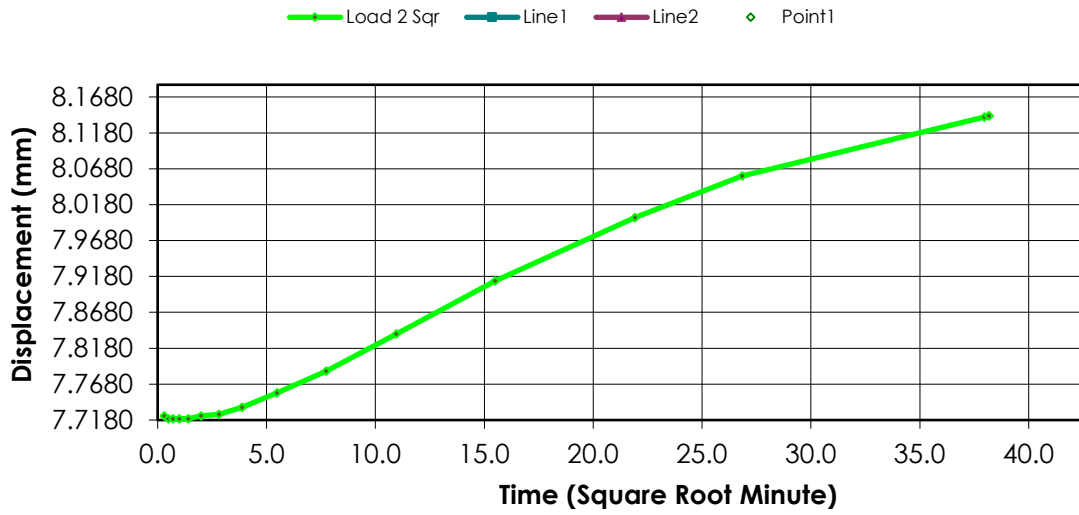
Remarks:

Sample Type: Remolded

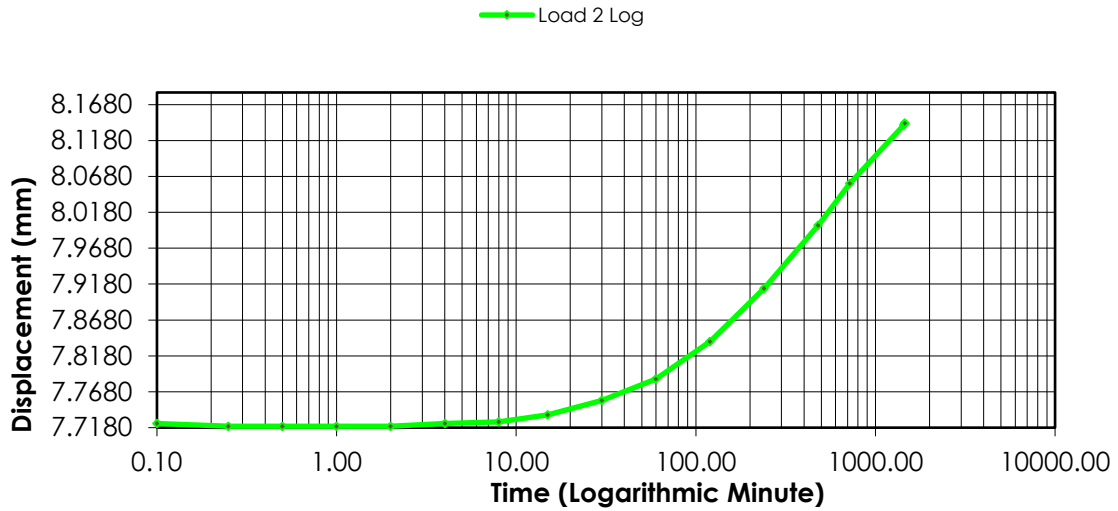
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	7.7240	0.0000	0.0000	0.5998
1	00:00:06	7.7240	-0.0160	-0.0656	0.6008
2	00:00:15	7.7200	-0.0120	-0.0492	0.6006
3	00:00:30	7.7200	-0.0120	-0.0492	0.6006
4	00:01:00	7.7200	-0.0120	-0.0492	0.6006
5	00:02:00	7.7200	-0.0120	-0.0492	0.6006
6	00:04:01	7.7240	-0.0160	-0.0656	0.6008
7	00:08:01	7.7260	-0.0180	-0.0738	0.6010
8	00:15:01	7.7360	-0.0280	-0.1148	0.6016
9	00:30:03	7.7560	-0.0480	-0.1967	0.6029
10	01:00:05	7.7860	-0.0780	-0.3197	0.6049
11	02:00:09	7.8380	-0.1300	-0.5328	0.6083
12	04:00:18	7.9120	-0.2040	-0.8361	0.6132
13	08:00:35	8.0000	-0.2920	-1.1967	0.6189
14	12:00:52	8.0580	-0.3500	-1.4344	0.6227
15	24:01:43	8.1400	-0.4320	-1.7705	0.6281
16	24:17:17	8.1420	-0.4340	-1.7787	0.6283
17	24:17:19	8.1420	-0.4340	-1.7787	0.6283

Consolidation Test Results (Sequence 2) Load 10.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 3) Load 20.000 kPa

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 9-Jun-18

Test Number:

Sample Number: LLO05 BS3

Soil Description:

Boring Number:

Clay (CH)

Depth: 2.4-2.6m

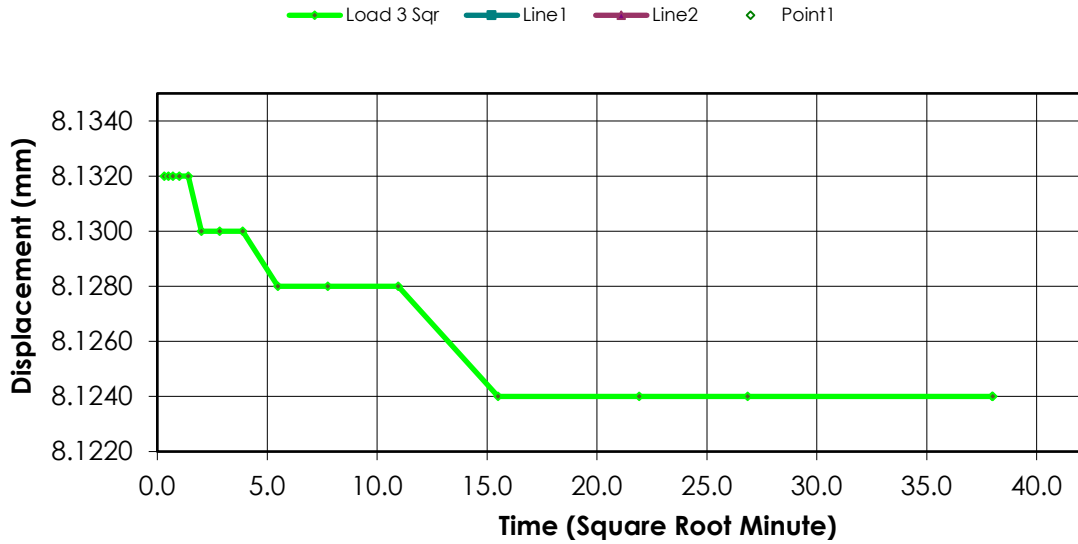
Remarks:

Sample Type: Remolded

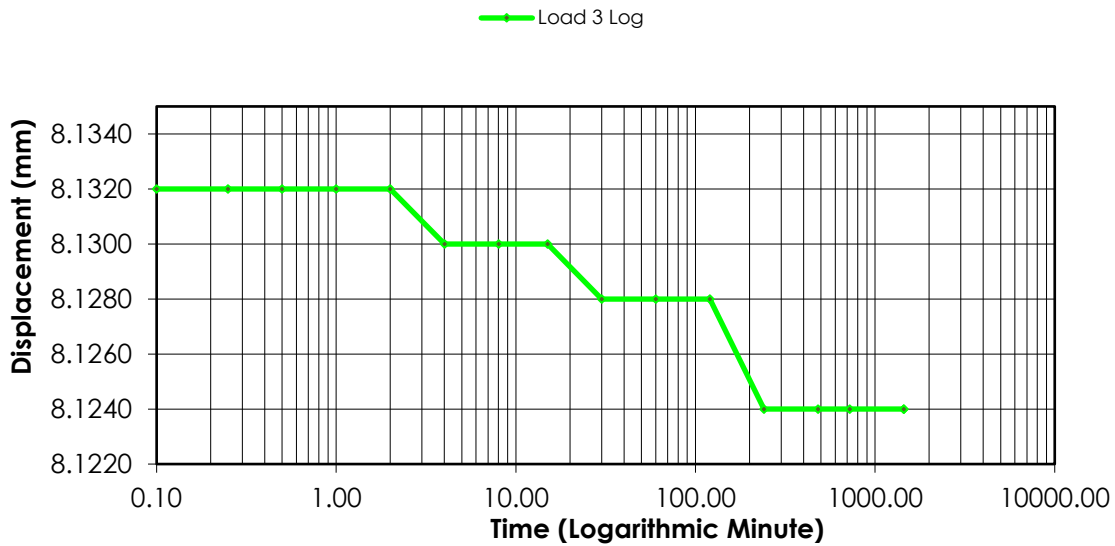
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.1420	-0.4340	-1.7787	0.6283
1	00:00:06	8.1320	-0.4560	-1.8689	0.6297
2	00:00:15	8.1320	-0.4560	-1.8689	0.6297
3	00:00:30	8.1320	-0.4560	-1.8689	0.6297
4	00:01:00	8.1320	-0.4560	-1.8689	0.6297
5	00:02:00	8.1320	-0.4560	-1.8689	0.6297
6	00:04:01	8.1300	-0.4540	-1.8607	0.6296
7	00:08:01	8.1300	-0.4540	-1.8607	0.6296
8	00:15:01	8.1300	-0.4540	-1.8607	0.6296
9	00:30:02	8.1280	-0.4520	-1.8525	0.6294
10	01:00:05	8.1280	-0.4520	-1.8525	0.6294
11	02:00:09	8.1280	-0.4520	-1.8525	0.6294
12	04:00:17	8.1240	-0.4480	-1.8361	0.6292
13	08:00:35	8.1240	-0.4480	-1.8361	0.6292
14	12:00:52	8.1240	-0.4480	-1.8361	0.6292
15	24:01:43	8.1240	-0.4480	-1.8361	0.6292
16	24:04:52	8.1240	-0.4480	-1.8361	0.6292

Consolidation Test Results (Sequence 3) Load 20.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 4) Load 40.000 kPa

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 9-Jun-18

Test Number:

Sample Number: LLO05 BS3

Soil Description:

Boring Number:

Clay (CH)

Depth: 2.4-2.6m

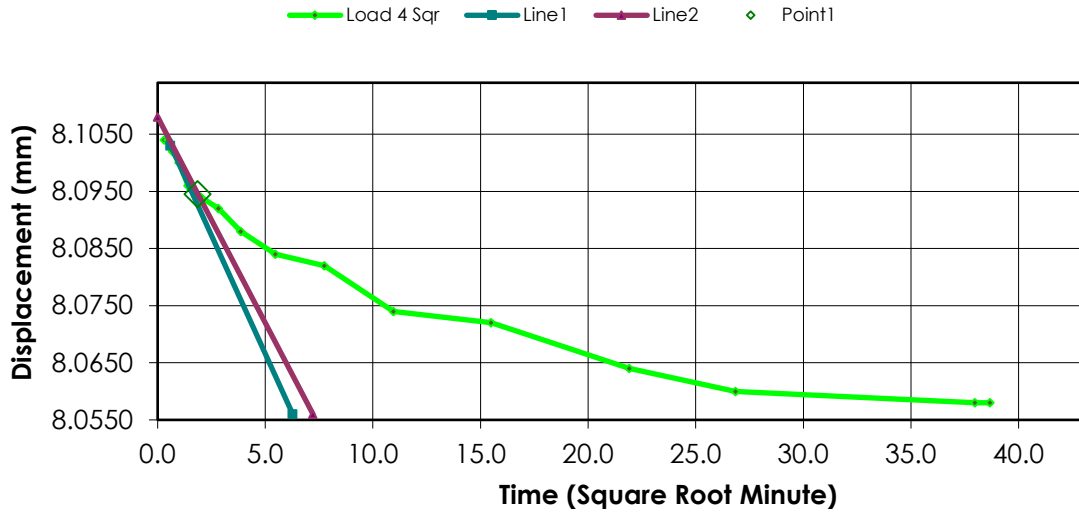
Remarks:

Sample Type: Remolded

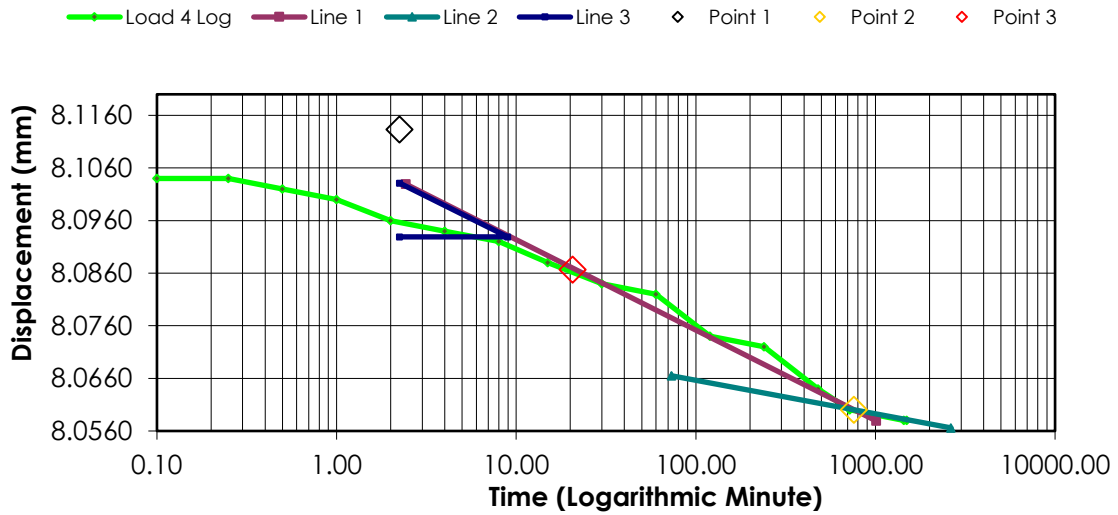
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.1240	-0.4480	-1.8361	0.6292
1	00:00:06	8.1040	-0.4480	-1.8361	0.6292
2	00:00:15	8.1040	-0.4480	-1.8361	0.6292
3	00:00:30	8.1020	-0.4460	-1.8279	0.6290
4	00:01:00	8.1000	-0.4440	-1.8197	0.6289
5	00:02:00	8.0960	-0.4400	-1.8033	0.6286
6	00:04:00	8.0940	-0.4380	-1.7951	0.6285
7	00:08:00	8.0920	-0.4360	-1.7869	0.6284
8	00:15:01	8.0880	-0.4320	-1.7705	0.6281
9	00:30:02	8.0840	-0.4280	-1.7541	0.6279
10	01:00:04	8.0820	-0.4260	-1.7459	0.6277
11	02:00:08	8.0740	-0.4180	-1.7131	0.6272
12	04:00:17	8.0720	-0.4160	-1.7049	0.6271
13	08:00:34	8.0640	-0.4080	-1.6721	0.6265
14	12:00:51	8.0600	-0.4040	-1.6557	0.6263
15	24:01:43	8.0580	-0.4020	-1.6475	0.6262
16	24:55:15	8.0580	-0.4020	-1.6475	0.6262

Consolidation Test Results (Sequence 4) Load 40.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 5) Load 80.000 kPa

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 9-Jun-18

Test Number:

Sample Number: LLO05 BS3

Soil Description:

Boring Number:

Clay (CH)

Depth: 2.4-2.6m

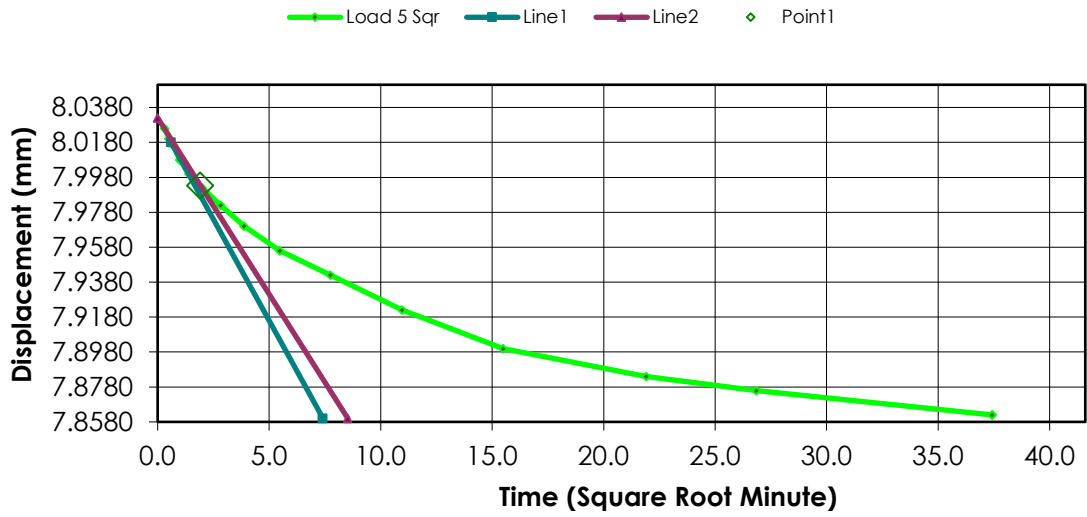
Remarks:

Sample Type: Remolded

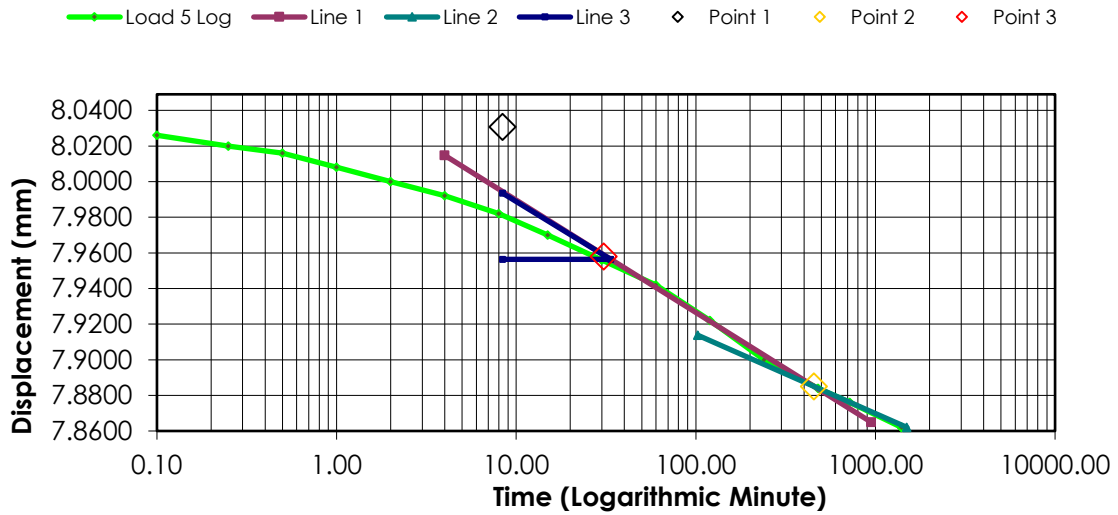
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.0580	-0.4020	-1.6475	0.6262
1	00:00:06	8.0260	-0.4000	-1.6393	0.6260
2	00:00:15	8.0200	-0.3940	-1.6148	0.6256
3	00:00:30	8.0160	-0.3900	-1.5984	0.6254
4	00:01:00	8.0080	-0.3820	-1.5656	0.6248
5	00:02:00	8.0000	-0.3740	-1.5328	0.6243
6	00:04:00	7.9920	-0.3660	-1.5000	0.6238
7	00:08:00	7.9820	-0.3560	-1.4590	0.6231
8	00:15:01	7.9700	-0.3440	-1.4098	0.6224
9	00:30:02	7.9560	-0.3300	-1.3525	0.6214
10	01:00:04	7.9420	-0.3160	-1.2951	0.6205
11	02:00:08	7.9220	-0.2960	-1.2131	0.6192
12	04:00:17	7.9000	-0.2740	-1.1230	0.6178
13	08:00:34	7.8840	-0.2580	-1.0574	0.6167
14	12:00:52	7.8760	-0.2500	-1.0246	0.6162
15	23:20:23	7.8620	-0.2360	-0.9672	0.6153
16	23:20:25	7.8620	-0.2360	-0.9672	0.6153

Consolidation Test Results (Sequence 5) Load 80.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 6) Load 160.000 kPa

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 9-Jun-18

Test Number:

Sample Number: LLO05 BS3

Soil Description:

Boring Number:

Clay (CH)

Depth: 2.4-2.6m

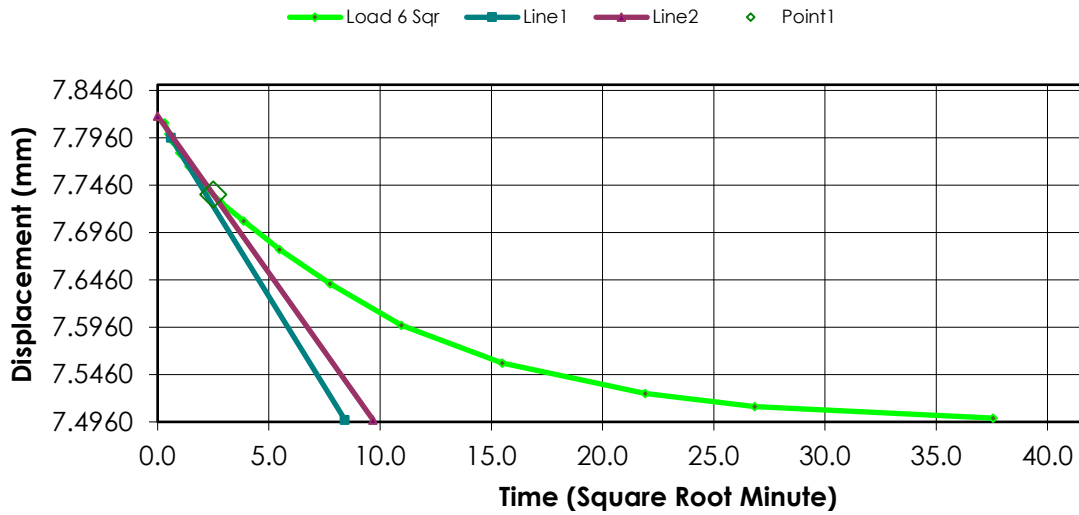
Remarks:

Sample Type: Remolded

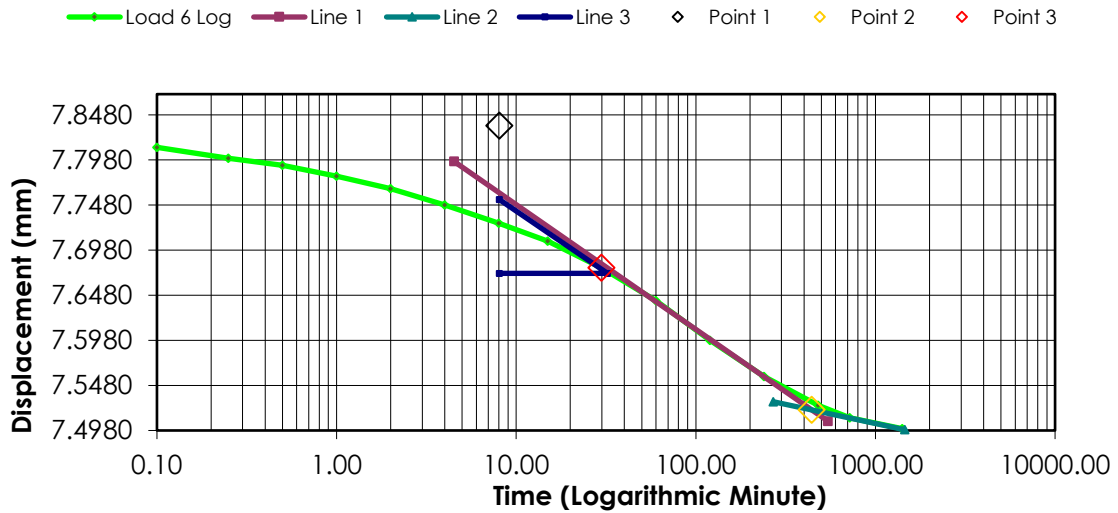
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	7.8620	-0.2360	-0.9672	0.6153
1	00:00:06	7.8120	-0.2160	-0.8852	0.6140
2	00:00:15	7.8000	-0.2040	-0.8361	0.6132
3	00:00:30	7.7920	-0.1960	-0.8033	0.6126
4	00:01:00	7.7800	-0.1840	-0.7541	0.6119
5	00:02:00	7.7660	-0.1700	-0.6967	0.6109
6	00:04:00	7.7480	-0.1520	-0.6230	0.6098
7	00:08:00	7.7280	-0.1320	-0.5410	0.6085
8	00:15:01	7.7080	-0.1120	-0.4590	0.6071
9	00:30:02	7.6780	-0.0820	-0.3361	0.6052
10	01:00:04	7.6420	-0.0460	-0.1885	0.6028
11	02:00:09	7.5980	-0.0020	-0.0082	0.5999
12	04:00:17	7.5580	0.0380	0.1557	0.5973
13	08:00:34	7.5260	0.0700	0.2869	0.5952
14	12:00:52	7.5120	0.0840	0.3443	0.5943
15	23:31:06	7.5000	0.0960	0.3934	0.5935

Consolidation Test Results (Sequence 6) Load 160.000 kPa

Consolidation Graph (Square-root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 7) Load 320.000 kPa

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 9-Jun-18

Test Number:

Sample Number: LLO05 BS3

Soil Description:

Boring Number:

Clay (CH)

Depth: 2.4-2.6m

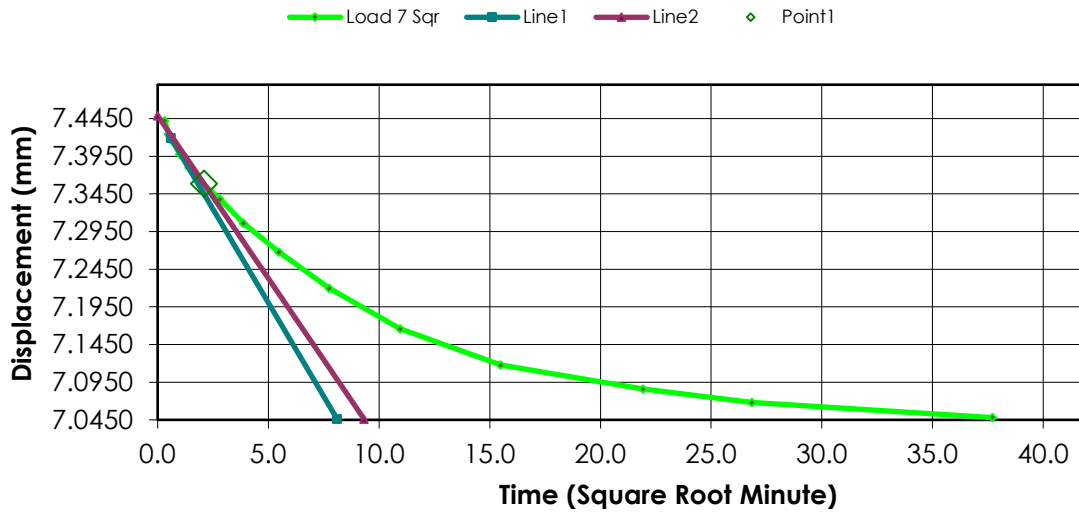
Remarks:

Sample Type: Remolded

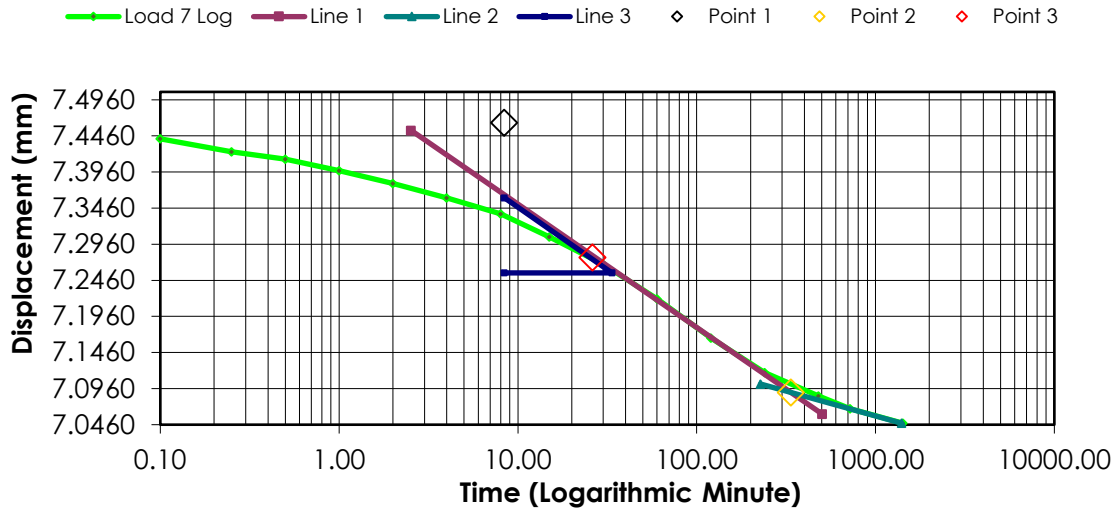
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	7.5000	0.0960	0.3934	0.5935
1	00:00:06	7.4420	0.1220	0.5000	0.5918
2	00:00:15	7.4240	0.1400	0.5738	0.5906
3	00:00:30	7.4140	0.1500	0.6148	0.5900
4	00:01:00	7.3980	0.1660	0.6803	0.5889
5	00:02:00	7.3800	0.1840	0.7541	0.5877
6	00:04:00	7.3600	0.2040	0.8361	0.5864
7	00:08:00	7.3380	0.2260	0.9262	0.5850
8	00:15:01	7.3060	0.2580	1.0574	0.5829
9	00:30:02	7.2680	0.2960	1.2131	0.5804
10	01:00:04	7.2200	0.3440	1.4098	0.5772
11	02:00:09	7.1660	0.3980	1.6311	0.5737
12	04:00:17	7.1180	0.4460	1.8279	0.5706
13	08:00:35	7.0860	0.4780	1.9590	0.5685
14	12:00:52	7.0680	0.4960	2.0328	0.5673
15	23:41:43	7.0480	0.5160	2.1148	0.5660

Consolidation Test Results (Sequence 7) Load 320.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 8) Load 640.000 kPa

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 9-Jun-18

Test Number:

Sample Number: LLO05 BS3

Soil Description:

Boring Number:

Clay (CH)

Depth: 2.4-2.6m

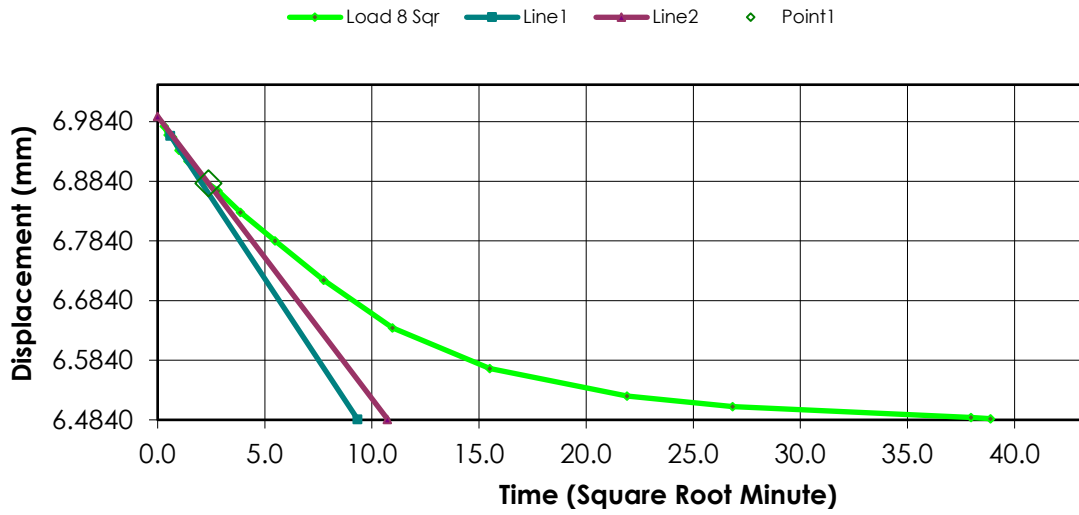
Remarks:

Sample Type: Remolded

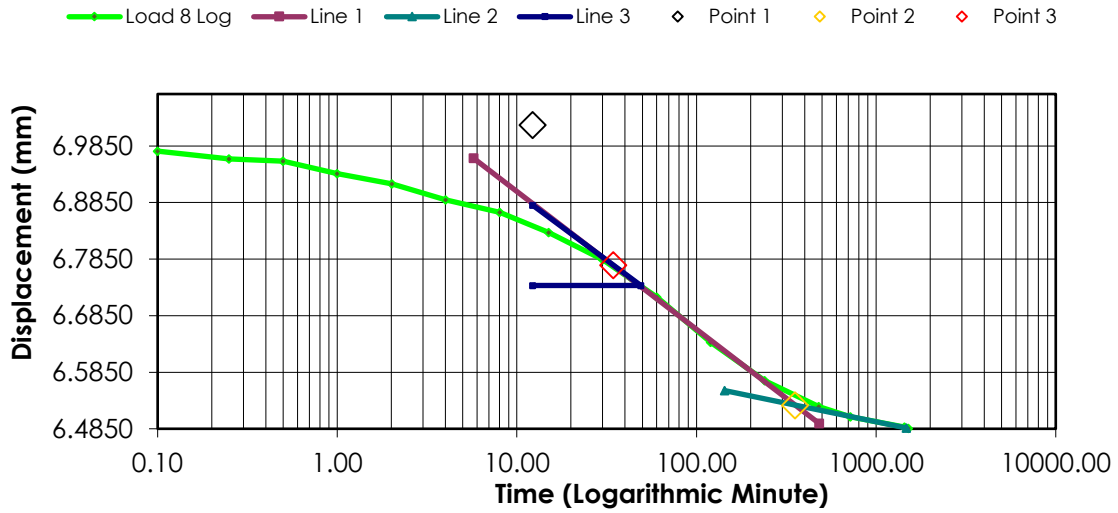
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	7.0480	0.5160	2.1148	0.5660
1	00:00:06	6.9760	0.5480	2.2459	0.5639
2	00:00:15	6.9620	0.5620	2.3033	0.5629
3	00:00:30	6.9580	0.5660	2.3197	0.5627
4	00:01:00	6.9360	0.5880	2.4098	0.5612
5	00:02:01	6.9180	0.6060	2.4836	0.5601
6	00:04:01	6.8900	0.6340	2.5984	0.5582
7	00:08:01	6.8680	0.6560	2.6885	0.5568
8	00:15:02	6.8320	0.6920	2.8361	0.5544
9	00:30:03	6.7840	0.7400	3.0328	0.5513
10	01:00:05	6.7180	0.8060	3.3033	0.5470
11	02:00:09	6.6380	0.8860	3.6311	0.5417
12	04:00:18	6.5700	0.9540	3.9098	0.5372
13	08:00:35	6.5240	1.0000	4.0984	0.5342
14	12:00:52	6.5060	1.0180	4.1721	0.5331
15	24:01:44	6.4880	1.0360	4.2459	0.5319
16	25:11:29	6.4860	1.0380	4.2541	0.5317

Consolidation Test Results (Sequence 8) Load 640.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 9) Rebound 320.000 kPa

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 9-Jun-18

Test Number:

Sample Number: LLO05 BS3

Soil Description:

Boring Number:

Clay (CH)

Depth: 2.4-2.6m

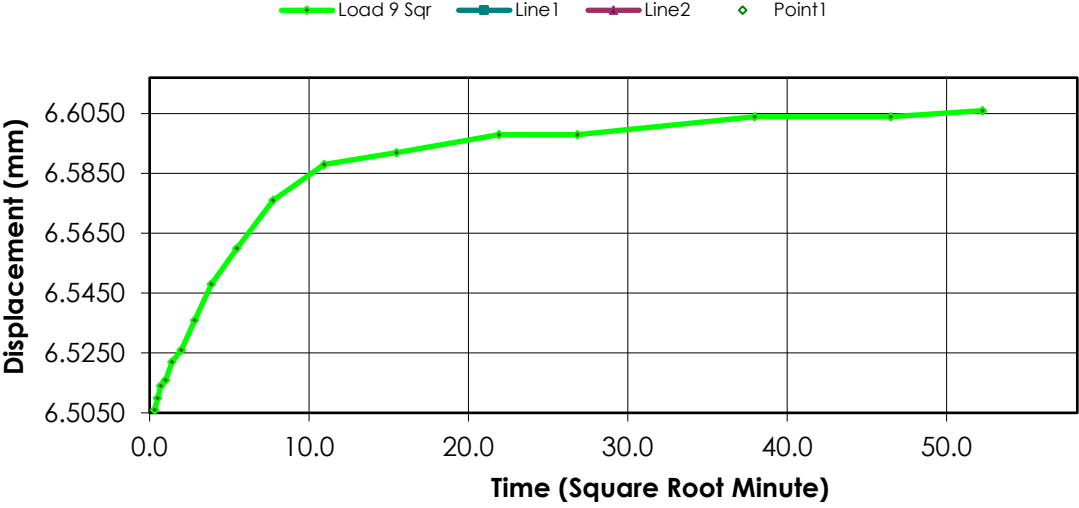
Remarks:

Sample Type: Remolded

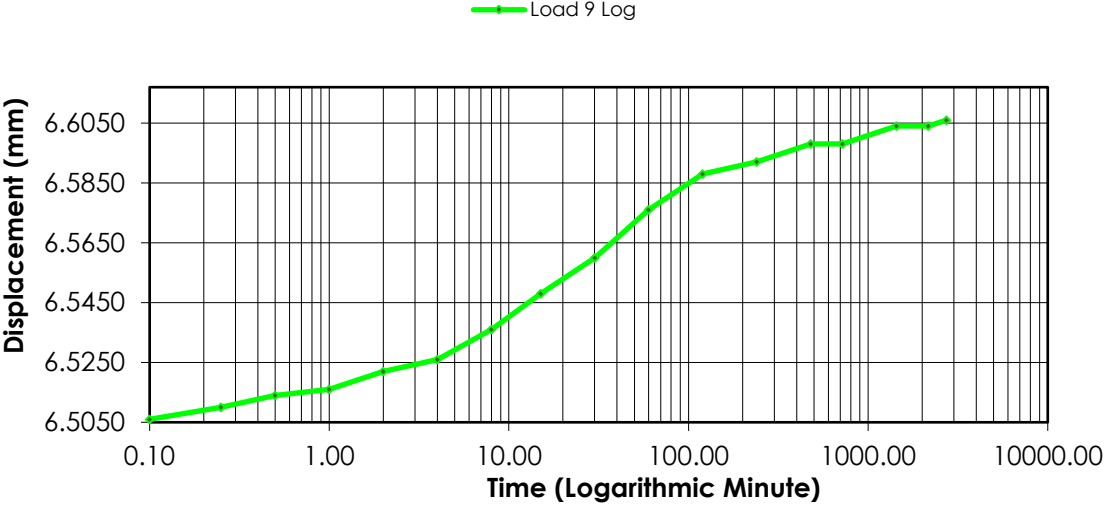
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	6.4860	1.0380	4.2541	0.5317
1	00:00:06	6.5060	1.0320	4.2295	0.5321
2	00:00:15	6.5100	1.0280	4.2131	0.5324
3	00:00:30	6.5140	1.0240	4.1967	0.5327
4	00:01:00	6.5160	1.0220	4.1885	0.5328
5	00:02:00	6.5220	1.0160	4.1639	0.5332
6	00:04:00	6.5260	1.0120	4.1475	0.5334
7	00:08:00	6.5360	1.0020	4.1066	0.5341
8	00:15:01	6.5480	0.9900	4.0574	0.5349
9	00:30:02	6.5600	0.9780	4.0082	0.5357
10	01:00:04	6.5760	0.9620	3.9426	0.5367
11	02:00:08	6.5880	0.9500	3.8934	0.5375
12	04:00:17	6.5920	0.9460	3.8770	0.5378
13	08:00:34	6.5980	0.9400	3.8525	0.5382
14	12:00:52	6.5980	0.9400	3.8525	0.5382
15	24:01:44	6.6040	0.9340	3.8279	0.5386
16	36:02:35	6.6040	0.9340	3.8279	0.5386
17	45:30:32	6.6060	0.9320	3.8197	0.5387

**Consolidation Test Results
(Sequence 9) Rebound 320.000 kPa**

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 10) Rebound 160.000 kPa

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 9-Jun-18

Test Number:

Sample Number: LLO05 BS3

Soil Description:

Boring Number:

Clay (CH)

Depth: 2.4-2.6m

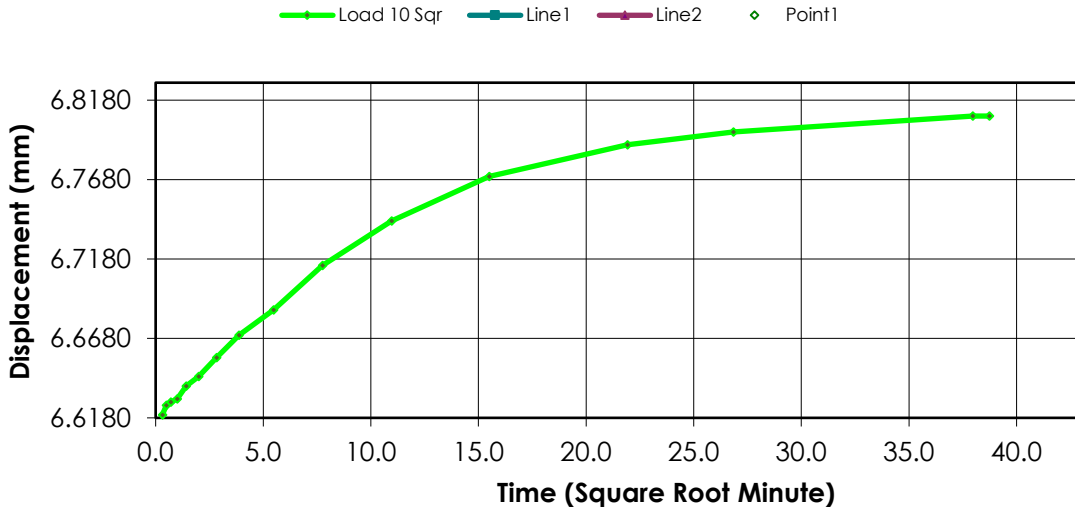
Remarks:

Sample Type: Remolded

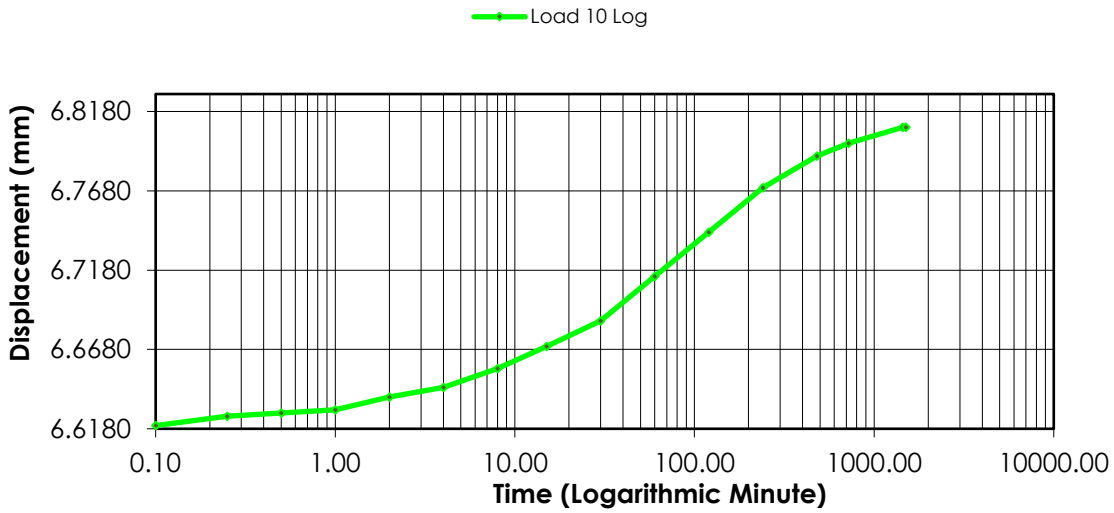
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	6.6060	0.9320	3.8197	0.5387
1	00:00:06	6.6200	0.9320	3.8197	0.5387
2	00:00:15	6.6260	0.9260	3.7951	0.5391
3	00:00:30	6.6280	0.9240	3.7869	0.5392
4	00:01:00	6.6300	0.9220	3.7787	0.5393
5	00:02:00	6.6380	0.9140	3.7459	0.5399
6	00:04:00	6.6440	0.9080	3.7213	0.5403
7	00:08:00	6.6560	0.8960	3.6721	0.5410
8	00:15:01	6.6700	0.8820	3.6148	0.5420
9	00:30:02	6.6860	0.8660	3.5492	0.5430
10	01:00:04	6.7140	0.8380	3.4344	0.5449
11	02:00:08	6.7420	0.8100	3.3197	0.5467
12	04:00:17	6.7700	0.7820	3.2049	0.5485
13	08:00:35	6.7900	0.7620	3.1230	0.5498
14	12:00:52	6.7980	0.7540	3.0902	0.5504
15	24:01:44	6.8080	0.7440	3.0492	0.5510
16	25:00:01	6.8080	0.7440	3.0492	0.5510

Consolidation Test Results
(Sequence 10) Rebound 160.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 11) Load 320.000 kPa

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 9-Jun-18

Test Number:

Sample Number: LLO05 BS3

Soil Description:

Boring Number:

Clay (CH)

Depth: 2.4-2.6m

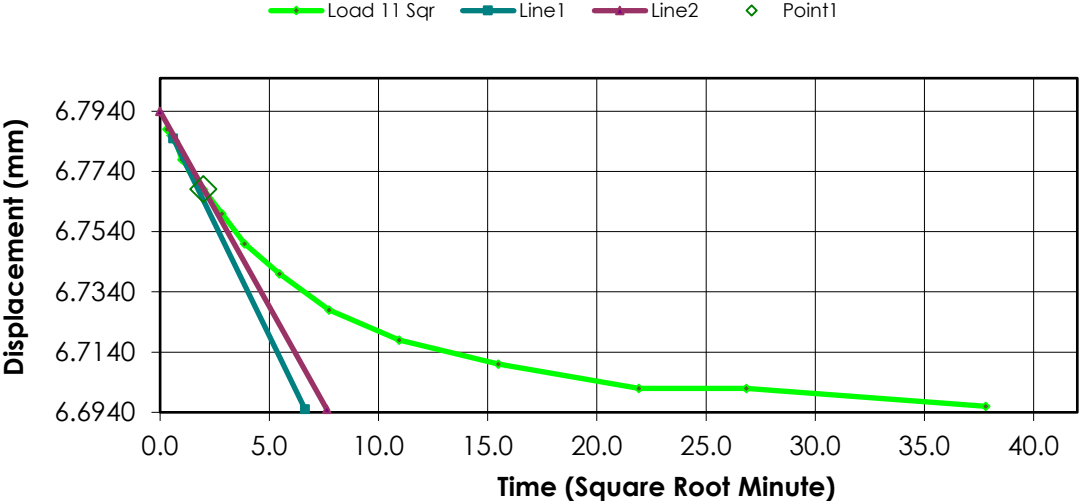
Remarks:

Sample Type: Remolded

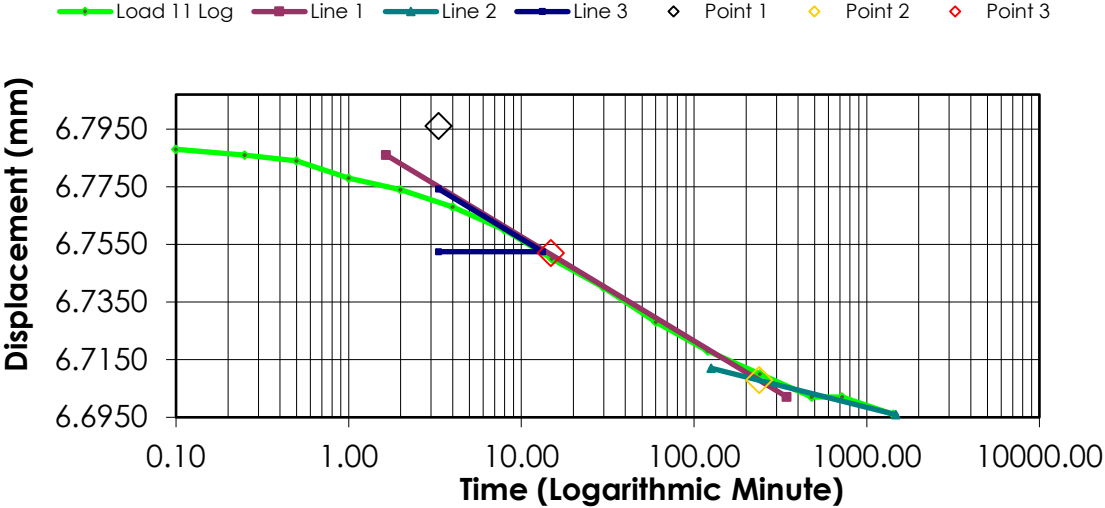
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	6.8080	0.7440	3.0492	0.5510
1	00:00:06	6.7880	0.7520	3.0820	0.5505
2	00:00:15	6.7860	0.7540	3.0902	0.5504
3	00:00:30	6.7840	0.7560	3.0984	0.5502
4	00:01:00	6.7780	0.7620	3.1229	0.5498
5	00:02:00	6.7740	0.7660	3.1393	0.5496
6	00:04:00	6.7680	0.7720	3.1639	0.5492
7	00:08:00	6.7600	0.7800	3.1967	0.5487
8	00:15:01	6.7500	0.7900	3.2377	0.5480
9	00:30:02	6.7400	0.8000	3.2787	0.5473
10	01:00:04	6.7280	0.8120	3.3279	0.5466
11	02:00:08	6.7180	0.8220	3.3689	0.5459
12	04:00:17	6.7100	0.8300	3.4016	0.5454
13	08:00:34	6.7020	0.8380	3.4344	0.5449
14	12:00:52	6.7020	0.8380	3.4344	0.5449
15	23:49:23	6.6960	0.8440	3.4590	0.5445

Consolidation Test Results (Sequence 11) Load 320.000 kPa

Consolidation Graph (Square root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 12) Load 640.000 kPa

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 9-Jun-18

Test Number:

Sample Number: LLO05 BS3

Soil Description:

Boring Number:

Clay (CH)

Depth: 2.4-2.6m

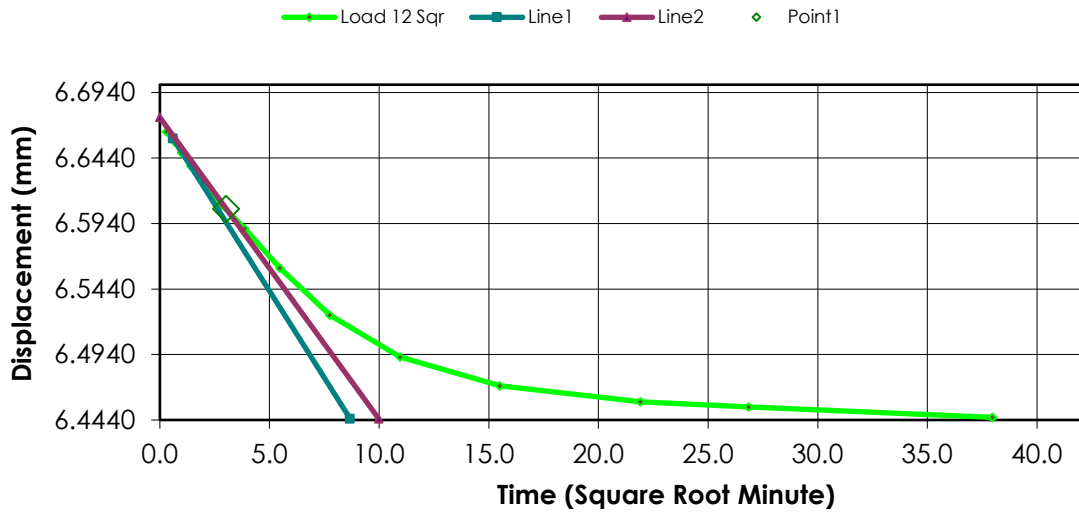
Remarks:

Sample Type: Remolded

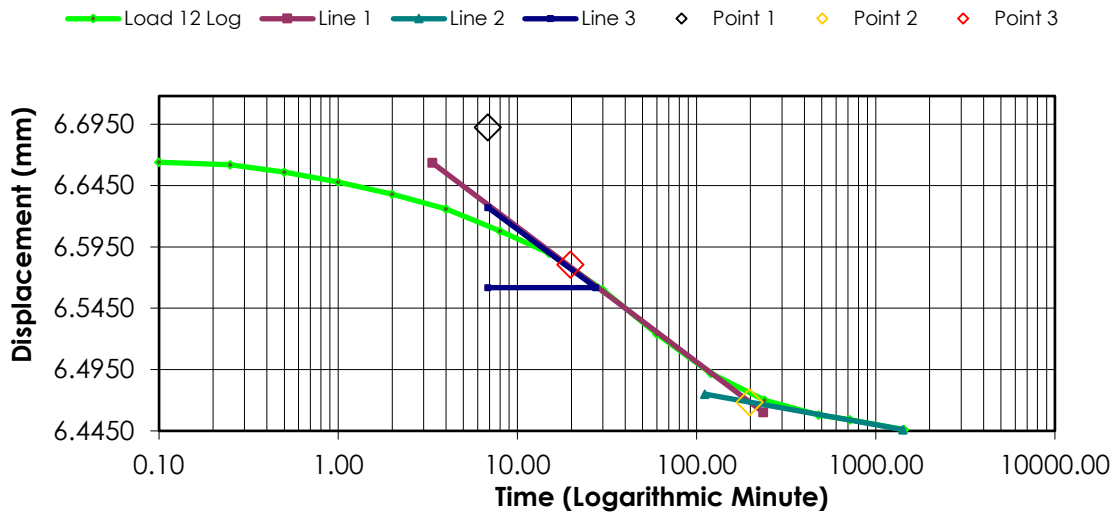
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	6.6960	0.8440	3.4590	0.5445
1	00:00:06	6.6640	0.8580	3.5164	0.5435
2	00:00:15	6.6620	0.8600	3.5246	0.5434
3	00:00:30	6.6560	0.8660	3.5492	0.5430
4	00:01:00	6.6480	0.8740	3.5820	0.5425
5	00:02:00	6.6380	0.8840	3.6230	0.5418
6	00:04:00	6.6260	0.8960	3.6721	0.5410
7	00:08:00	6.6080	0.9140	3.7459	0.5399
8	00:15:01	6.5900	0.9320	3.8197	0.5387
9	00:30:02	6.5600	0.9620	3.9426	0.5367
10	01:00:04	6.5240	0.9980	4.0902	0.5344
11	02:00:08	6.4920	1.0300	4.2213	0.5323
12	04:00:17	6.4700	1.0520	4.3115	0.5308
13	08:00:34	6.4580	1.0640	4.3607	0.5300
14	12:00:51	6.4540	1.0680	4.3771	0.5298
15	24:01:41	6.4460	1.0760	4.4098	0.5292
16	24:01:48	6.4460	1.0760	4.4098	0.5292

Consolidation Test Results (Sequence 12) Load 640.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 13) Load 1280.000 kPa

Project: SR1
Location:
Job Number:

Project Number: 110773396

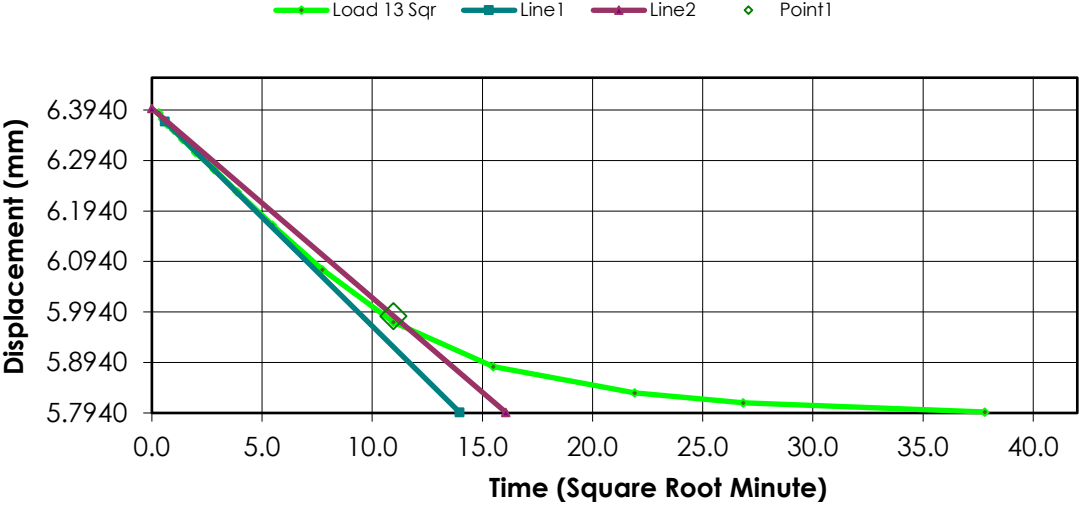
Test Date: 9-Jun-18
Test Number:

Sample Number: LLO05 BS3 **Soil Description:**
Boring Number: Clay (CH)
Depth: 2.4-2.6m **Remarks:**
Sample Type: Remolded

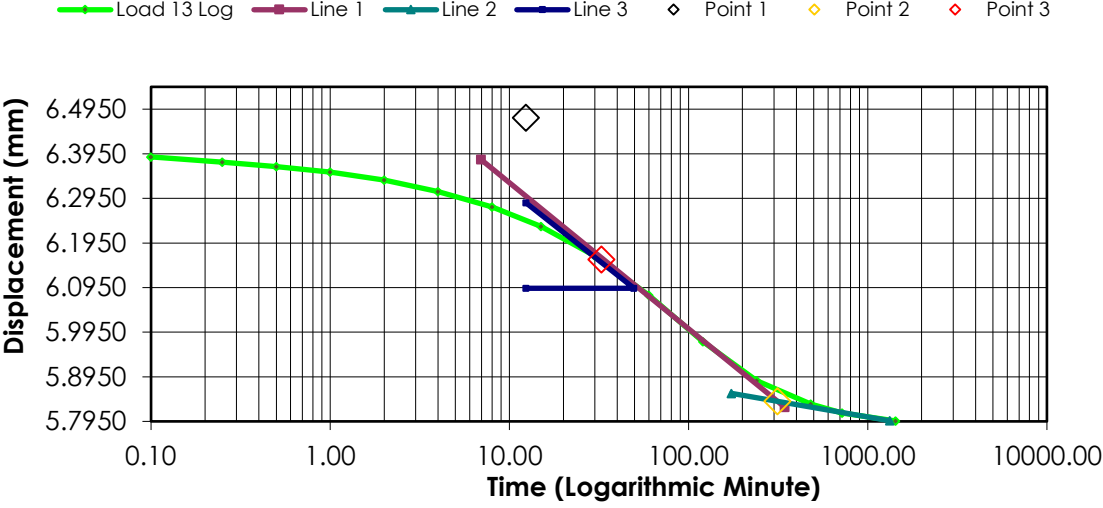
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	6.4460	1.0760	4.4098	0.5292
1	00:00:06	6.3880	1.0880	4.4590	0.5285
2	00:00:15	6.3760	1.1000	4.5082	0.5277
3	00:00:30	6.3660	1.1100	4.5492	0.5270
4	00:01:00	6.3540	1.1220	4.5984	0.5262
5	00:02:00	6.3360	1.1400	4.6721	0.5251
6	00:04:00	6.3100	1.1660	4.7787	0.5233
7	00:08:01	6.2760	1.2000	4.9180	0.5211
8	00:15:01	6.2320	1.2440	5.0984	0.5182
9	00:30:02	6.1660	1.3100	5.3689	0.5139
10	01:00:04	6.0780	1.3980	5.7295	0.5081
11	02:00:09	5.9740	1.5020	6.1557	0.5013
12	04:00:17	5.8860	1.5900	6.5164	0.4955
13	08:00:34	5.8340	1.6420	6.7295	0.4921
14	12:00:52	5.8140	1.6620	6.8115	0.4908
15	23:48:56	5.7960	1.6800	6.8852	0.4896

Consolidation Test Results (Sequence 13) Load 1280.000 kPa

Consolidation Graph (Square Root Time)



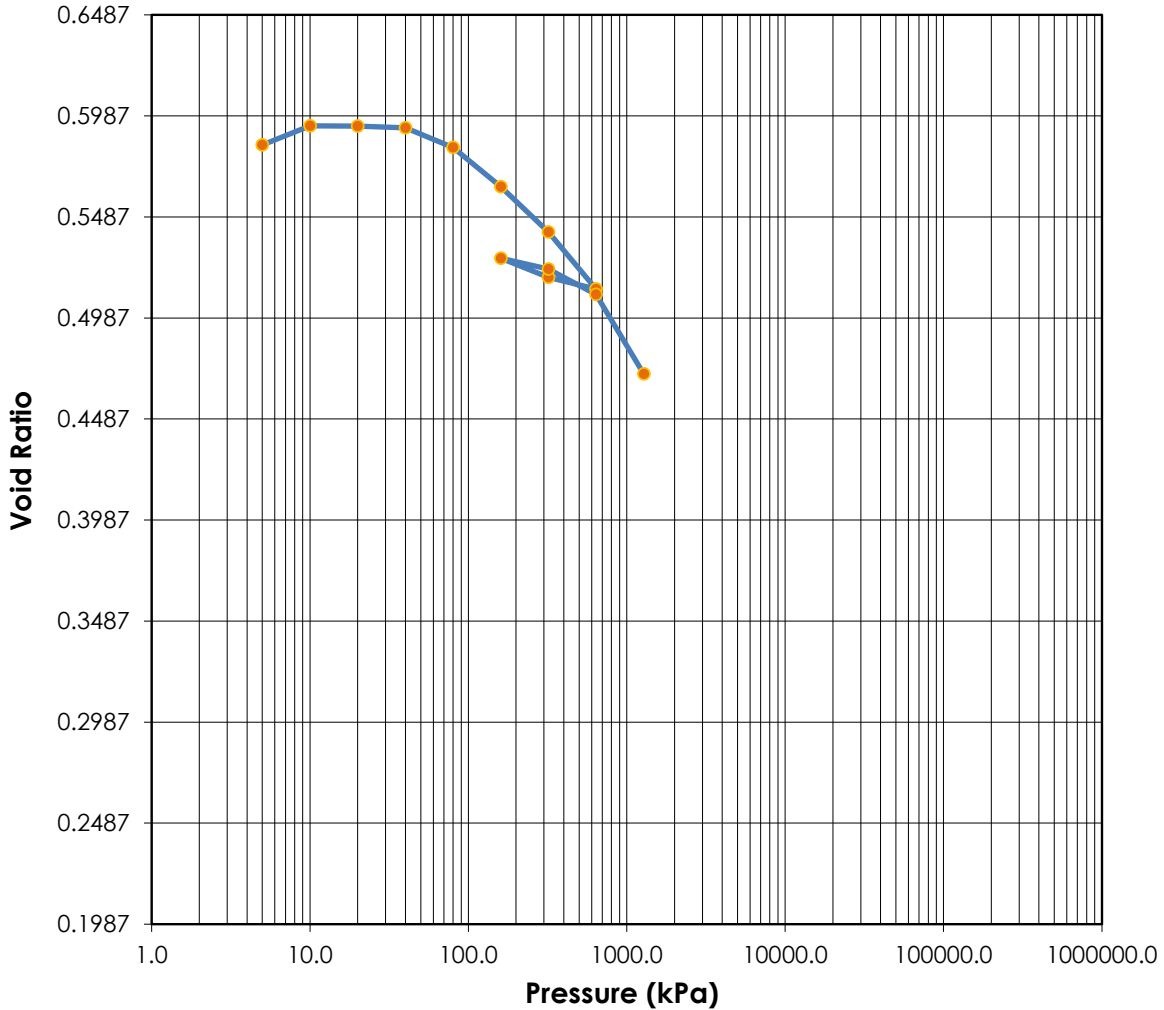
Consolidation Graph (Logarithmic Time)





Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876



	Before	After	Liquid Limits:	46	Test Date:	7-Jun-18	
Moisture (%):	22.8	18.9	Plastic Limits:	17			
Dry Density (g/cm³):	1.701	1.868	Plasticity Index (%):	29			
Saturation (%):	100	100					
Void Ratio:	0.5867	0.4731	Specific Gravity:	2.70	Assumed		
Soil Description:	Clay (CL)						
Project Number:	110773396	Depth:	3.0-3.45m		Remarks:		
Sample Number:	LLO5 ST4	Boring Number:					
Project:	SR1						
Client:	Alberta Transportation						
Location:							

Tested By: E. Wahl

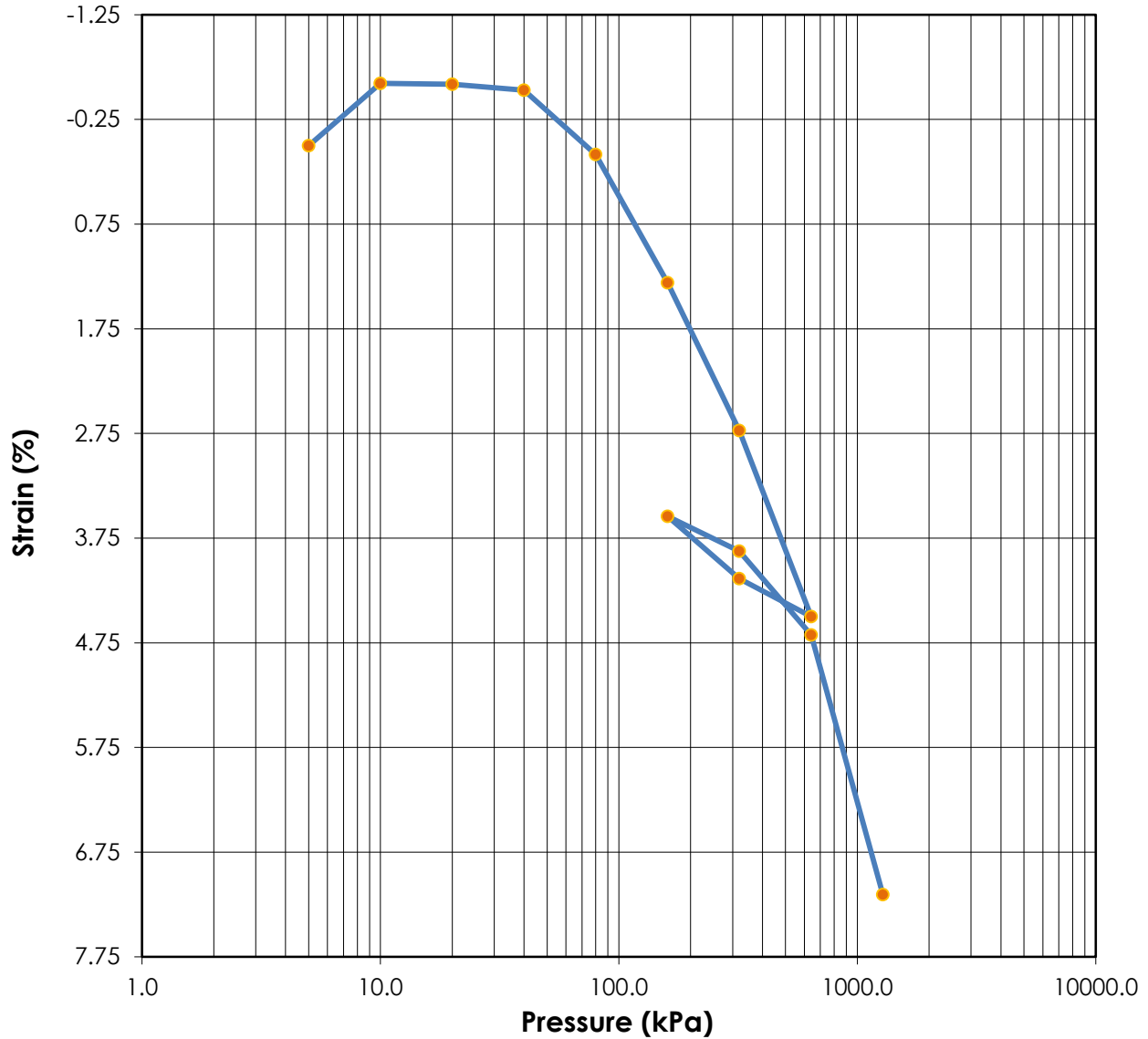
Reviewed By: C. Lamoureux

Reporting of these test results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request. The data presented above is for the sole use of the client stipulated above. Stantec is not responsible, nor can be held liable, for the use of this report by any other party, with or without the knowledge of Stantec.



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876

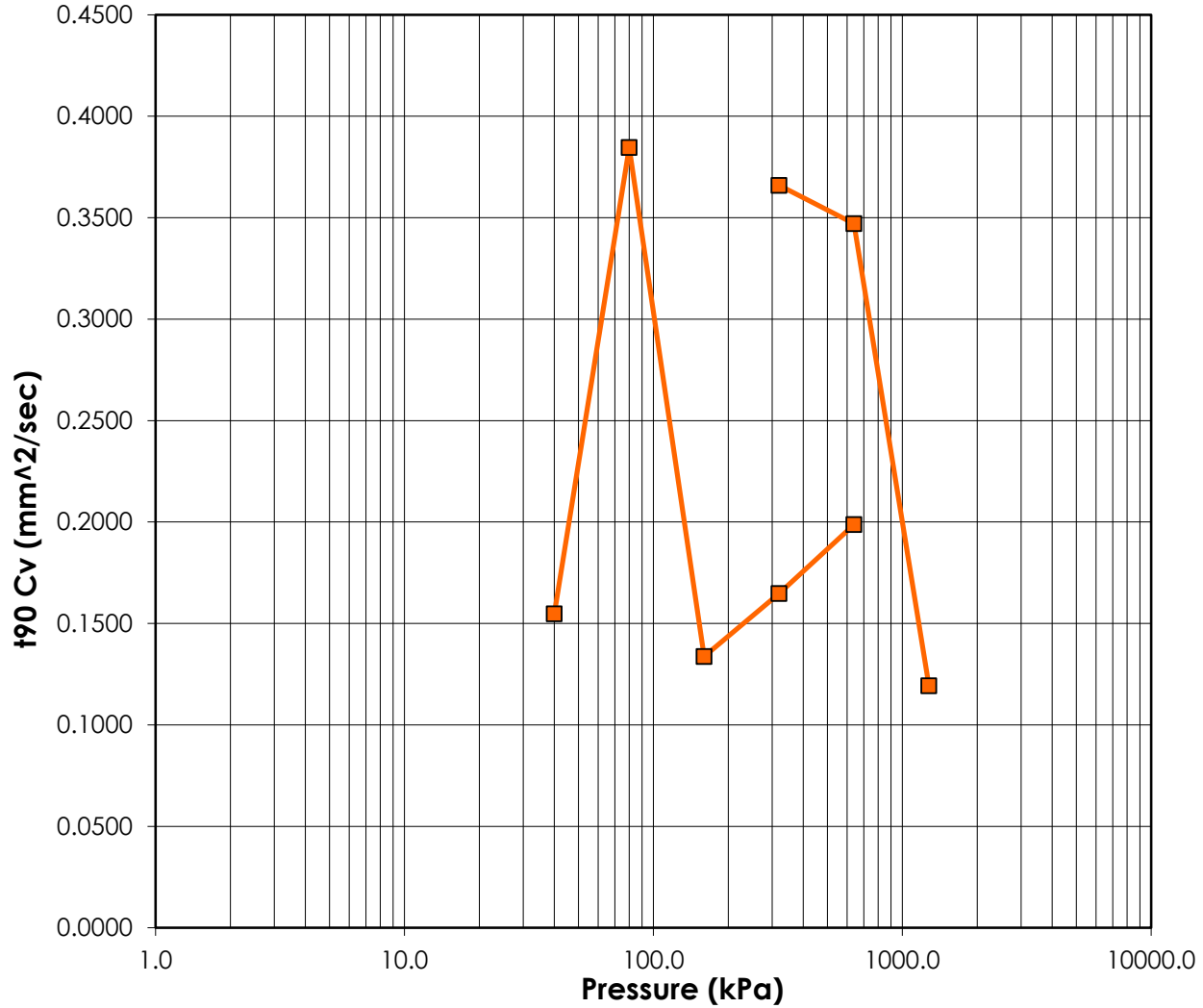


	Before	After	Liquid Limits:	46	Test Date:	7-Jun-18
Moisture (%):	22.8	18.9	Plastic Limits:	17		
Dry Density (g/cm3):	1.701	1.868	Plasticity Index (%):	29		
Saturation (%):	100	100	Specific Gravity:	2.70	Assumed	
Void Ratio:	0.5867	0.4731				
Sample Description:	Clay (CL)					
Project Number:	110773396	Depth:	3.0-3.45m			
Sample Number:	LLO05 ST4	Boring Number:				
Project:	SR1					Remarks:
Client:	Alberta Transportation					
Location:						



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

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 Tel: (403) 253-7876



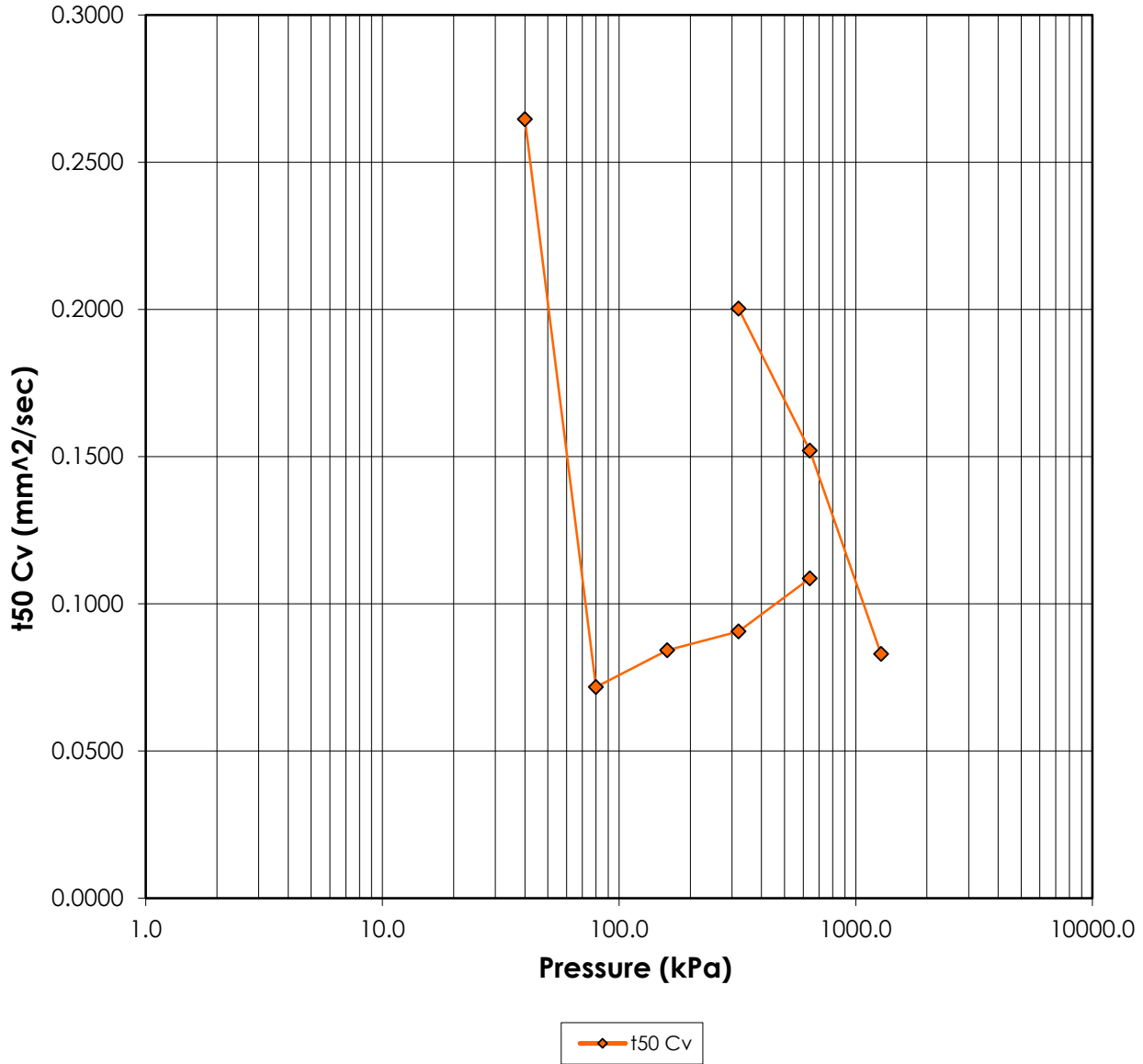
—■— $t_{90} C_v$

	Before	After	Liquid Limits:	46	Test Date:	7-Jun-18
Moisture (%):	22.8	18.9	Plastic Limits:	17		
Dry Density (g/cm³):	1.701	1.868	Plasticity Index (%):	29		
Saturation (%):	100	100				
Void Ratio:	0.5867	0.4731	Specific Gravity:	2.70	Assumed	
Soil Description:	Clay (CL)					
Project Number:	110773396		Depth:	3.0-3.45m		
Sample Number:	LLO05 ST4		Boring Number:			
Project:	SR1					
Client:	Alberta Transportation					
Location:						
	Remarks:					



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One-Dimensional Consolidation Test
ASTM D2435
Test Results

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 Tel: (403) 253-7876

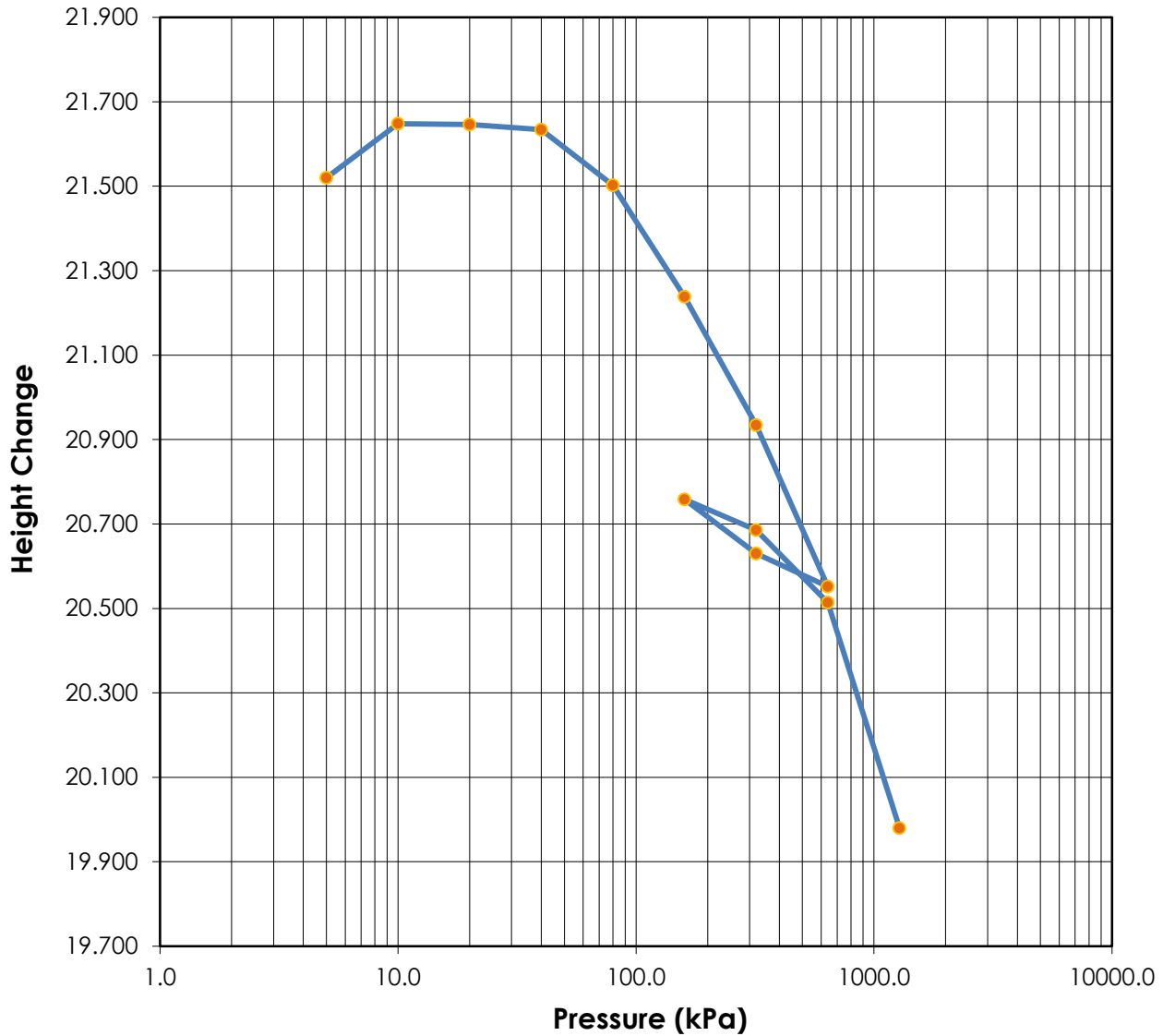


	Before	After	Liquid Limits:	46	Test Date:	7-Jun-18
Moisture (%):	22.8	18.9	Plastic Limits:	17		
Dry Density (g/cm3):	1.701	1.868	Plasticity Index (%):	29		
Saturation (%):	100	100	Specific Gravity:	2.70	Assumed	
Void Ratio:	0.5867	0.4731				
Soil Description:	Clay (CL)					
Project Number:	110773396	Depth:	3.0-3.45m			
Sample Number:	LLO05 ST4	Boring Number:				
Project:	SR1					Remarks:
Client:	Alberta Transportation					
Location:						



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

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	Before	After	Liquid Limits:	46	Test Date:	7-Jun-18
Moisture (%):	22.8	18.9	Plastic Limits:	17		
Dry Density (g/cm3):	1.701	1.868	Plasticity Index (%):	29		
Saturation (%):	100	100	Specific Gravity:	2.70	Assumed	
Void Ratio:	0.5867	0.4731				
Soil Description:	Clay (CL)					
Project Number:	110773396		Depth:	3.0-3.45m		
Sample Number:	LLO05 ST4		Boring Number:			
Project:	SR1					
Client:	Alberta Transportation					
Location:						
	Remarks:					

Consolidation Test Results Summary

Project: SR1

Project Number: 110773396

Location:

Job Number:

Sample Number: LLO05 ST4

Sample Description:

Boring Number:

Clay (CL)

Depth: 3.0-3.45m

Remarks:

Test Number:

Sample Type: Undisturbed

Test Date: 7-Jun-18

Index	Load Sequence (kPa)	Cummulative Change in Height (mm)	Specimen Height (mm)	Height of Void (mm)	Vertical Strain (%)	Void Ratio	t90 Fitting Time (min)	t50 Fitting Time (min)	t90 Cv (mm ² /sec)	t50 Cv (mm ² /sec)
0	0.000	0.0000	21.5200	7.9372	0.00	0.5844	0.000	0.000	0.000	0.000
1	5.000	0.0000	21.5200	7.9372	0.00	0.5844	0.000	0.000	0.000	0.000
2	10.000	-0.1280	21.6480	8.0652	-0.59	0.5938	0.000	0.000	0.000	0.000
3	20.000	-0.1260	21.6460	8.0632	-0.59	0.5936	0.000	0.000	0.000	0.000
4	40.000	-0.1140	21.6340	8.0512	-0.53	0.5927	10.691	1.452	0.155	0.265
5	80.000	0.0180	21.5020	7.9192	0.08	0.5830	4.247	5.291	0.385	0.072
6	160.000	0.2820	21.2380	7.6552	1.31	0.5636	11.919	4.394	0.134	0.084
7	320.000	0.5860	20.9340	7.3512	2.72	0.5412	9.402	3.969	0.165	0.091
8	640.000	0.9680	20.5520	6.9692	4.50	0.5131	7.511	3.191	0.199	0.109
9	320.000	0.8900	20.6300	7.0472	4.14	0.5188	0.000	0.000	0.000	0.000
10	160.000	0.7620	20.7580	7.1752	3.54	0.5283	0.000	0.000	0.000	0.000
11	320.000	0.8340	20.6860	7.1032	3.88	0.5230	4.131	1.754	0.366	0.200
12	640.000	1.0060	20.5140	6.9312	4.67	0.5103	4.284	2.272	0.347	0.152
13	1280.000	1.5400	19.9800	6.3972	7.16	0.4710	11.830	3.952	0.119	0.083

Predicted value indicated with *

Consolidation Test
Consolidation Specimen Information

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 7-Jun-18

Sample Number: LLO05 ST4

Sample Description:

Boring Number:

Clay (CL)

Depth: 3.0-3.45m

Remarks:

Sample Type: Undisturbed

Test Number:

Liquid Limit: 46

Initial Void Ratio: 0.5867

Initial Height (mm): 21.52

Plastic Limit: 17

Plasticity Index (%): 29

Initial Diameter (mm): 50.76

Specific Gravity: 2.70

Weight of Ring (g): 89.71

Assumed

Parameters	Initial Specimen	Final Specimen
Moist Weight + Container (g)	142.73	93.32
Dry Soil + Container (g)	116.95	79.09
Weight of Container (g)	3.89	3.71
Moisture Content (%)	22.8	18.9
Void Ratio	0.5867	0.4731
Saturation (%)	100	100
Dry Density (g/cm ³)	1.701	1.868

**Consolidation Test Results
(Sequence 1) Load 5.000 kPa**

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 7-Jun-18

Test Number:

Sample Number: LLO05 ST4

Soil Description:

Boring Number:

Clay (CL)

Depth: 3.0-3.45m

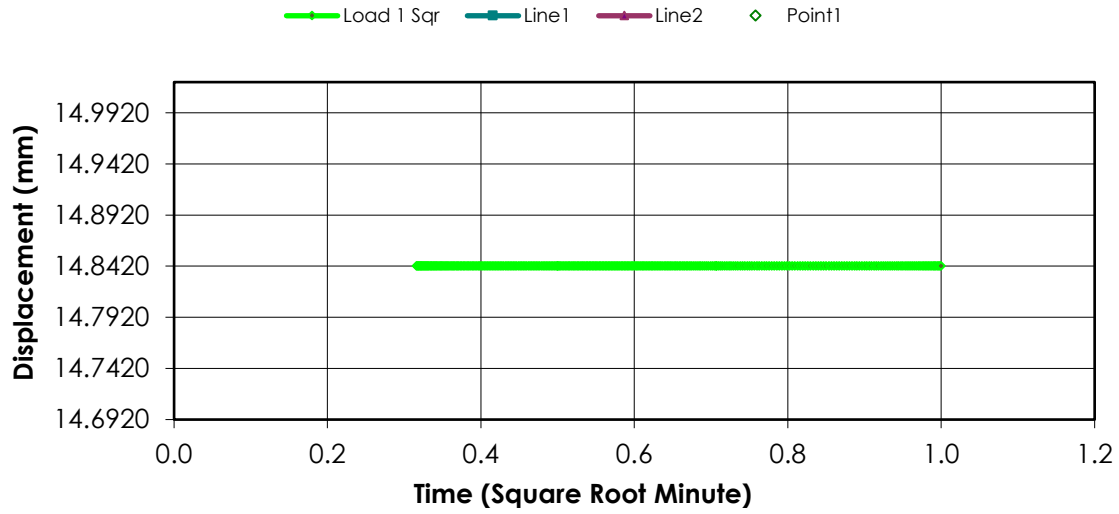
Remarks:

Sample Type: Undisturbed

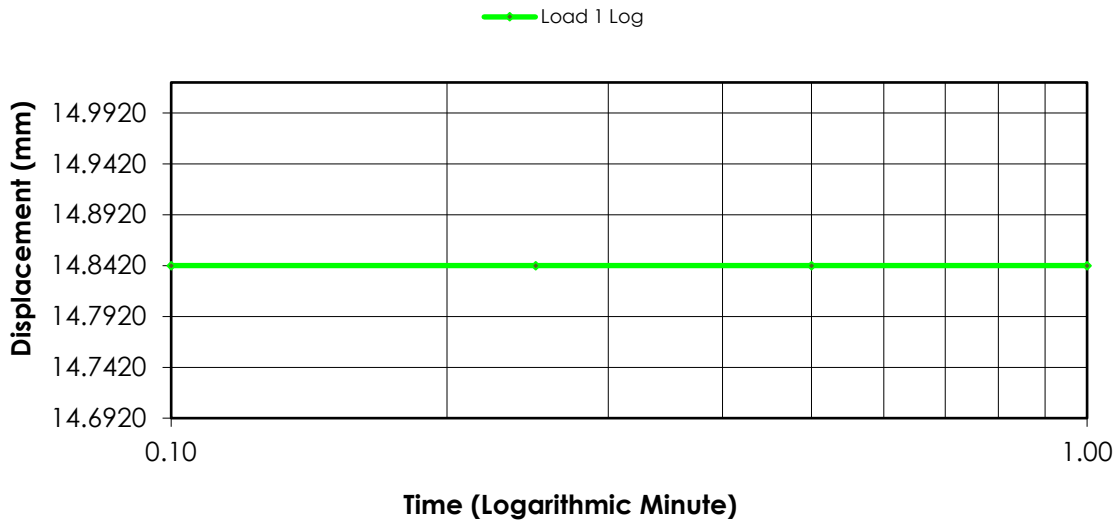
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	14.8420	0.0000	0.0000	0.5867
1	00:00:06	14.8420	0.0000	0.0000	0.5867
2	00:00:15	14.8420	0.0000	0.0000	0.5867
3	00:00:30	14.8420	0.0000	0.0000	0.5867
4	00:01:00	14.8420	0.0000	0.0000	0.5867

Consolidation Test Results (Sequence 1) Load 5.000 kPa

Consolidation Graph (Square root Time)



Consolidation Graph (Logarithmic Time)



**Consolidation Test Results
(Sequence 2) Load 10.000 kPa**

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 7-Jun-18

Test Number:

Sample Number: LLO05 ST4

Soil Description:

Boring Number:

Clay (CL)

Depth: 3.0-3.45m

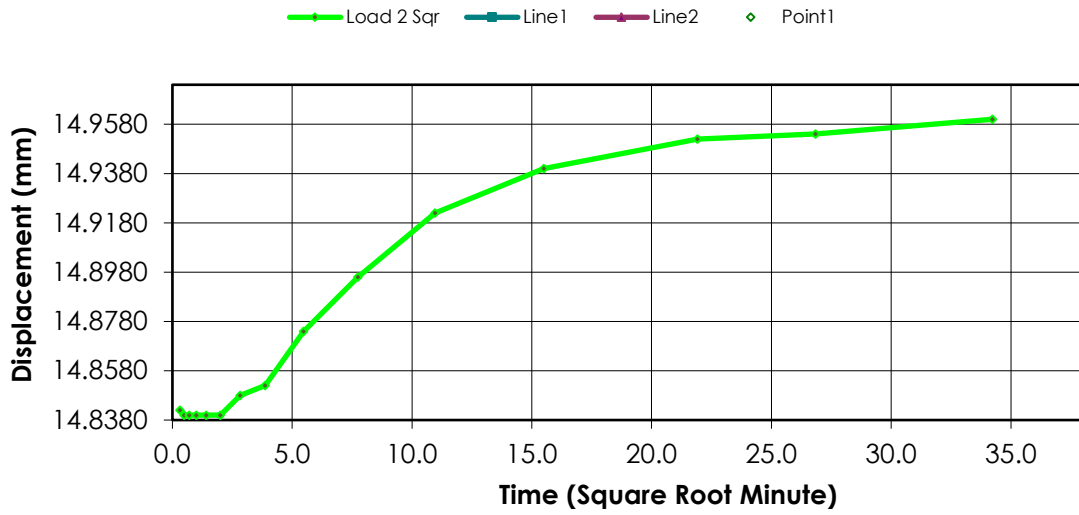
Remarks:

Sample Type: Undisturbed

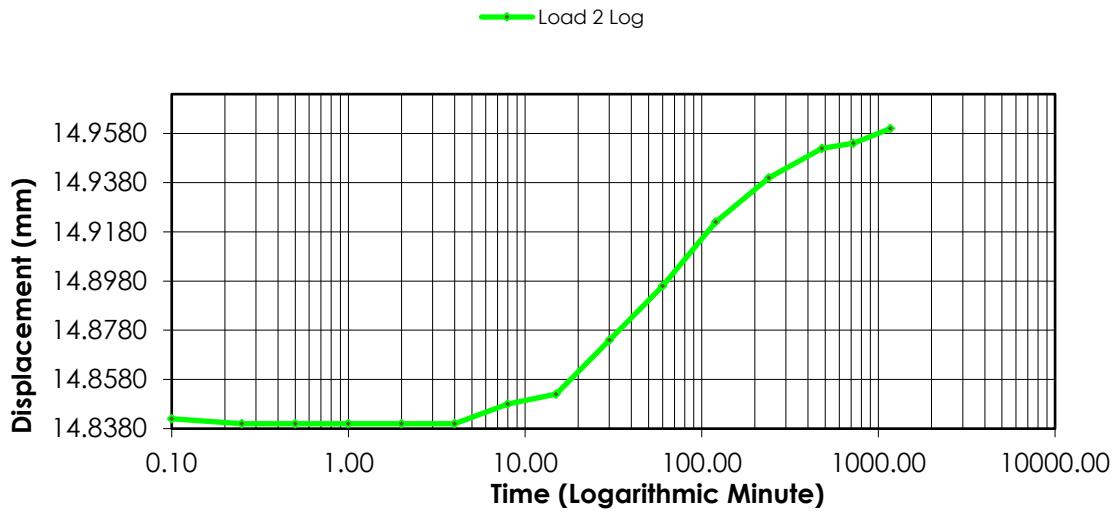
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	14.8420	0.0000	0.0000	0.5867
1	00:00:06	14.8420	-0.0100	-0.0465	0.5874
2	00:00:15	14.8400	-0.0080	-0.0372	0.5873
3	00:00:30	14.8400	-0.0080	-0.0372	0.5873
4	00:01:00	14.8400	-0.0080	-0.0372	0.5873
5	00:02:00	14.8400	-0.0080	-0.0372	0.5873
6	00:04:00	14.8400	-0.0080	-0.0372	0.5873
7	00:08:00	14.8480	-0.0160	-0.0743	0.5879
8	00:15:01	14.8520	-0.0200	-0.0929	0.5882
9	00:30:02	14.8740	-0.0420	-0.1952	0.5898
10	01:00:05	14.8960	-0.0640	-0.2974	0.5914
11	02:00:10	14.9220	-0.0900	-0.4182	0.5933
12	04:00:20	14.9400	-0.1080	-0.5019	0.5947
13	08:00:38	14.9520	-0.1200	-0.5576	0.5955
14	12:00:55	14.9540	-0.1220	-0.5669	0.5957
15	19:31:18	14.9600	-0.1280	-0.5948	0.5961

Consolidation Test Results (Sequence 2) Load 10.000 kPa

Consolidation Graph (Square Root Time)



Consolidation Graph (Logarithmic Time)



**Consolidation Test Results
(Sequence 3) Load 20.000 kPa**

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 7-Jun-18

Test Number:

Sample Number: LLO05 ST4

Soil Description:

Boring Number:

Clay (CL)

Depth: 3.0-3.45m

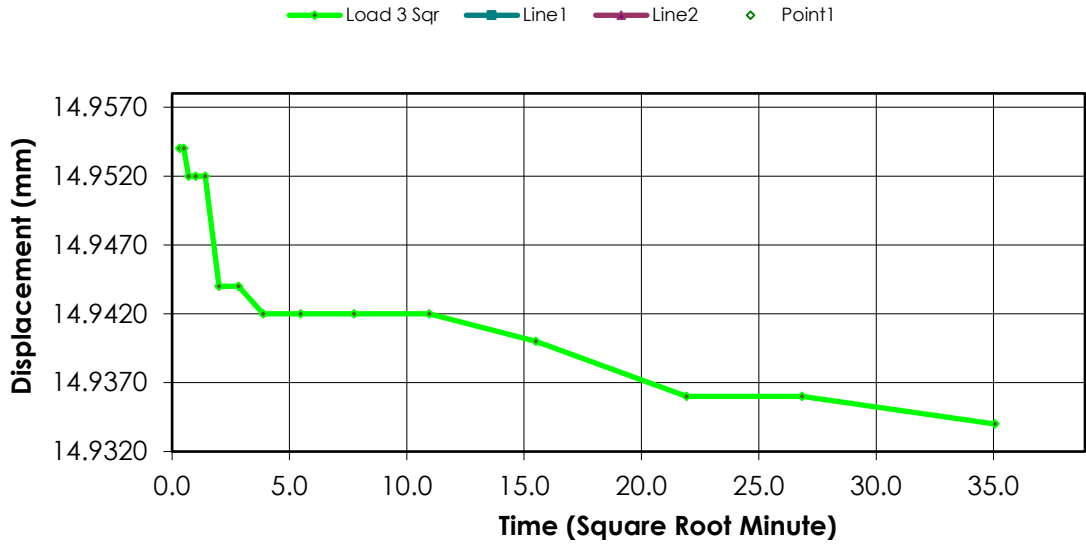
Remarks:

Sample Type: Undisturbed

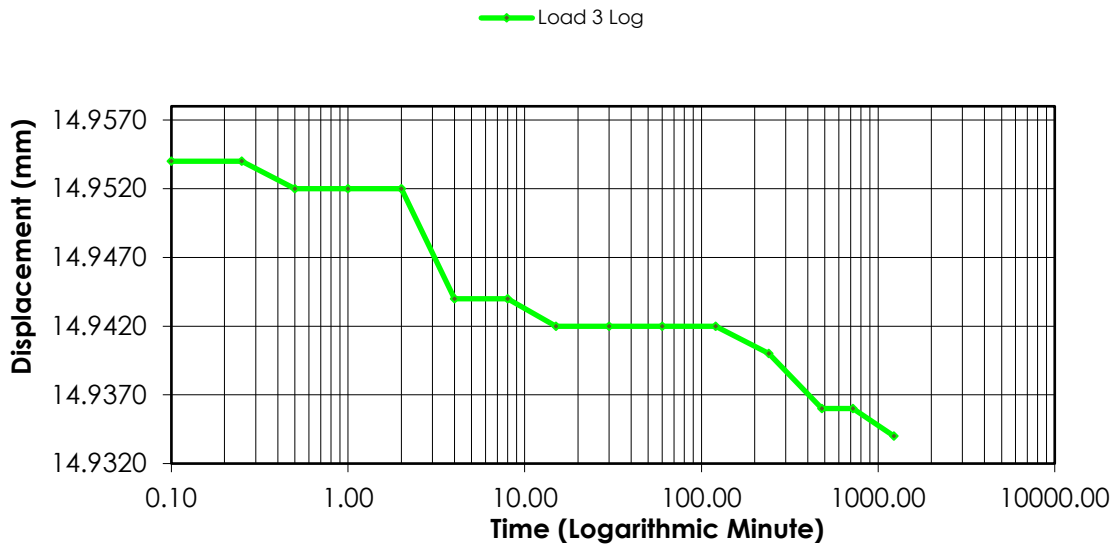
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	14.9600	-0.1280	-0.5948	0.5961
1	00:00:06	14.9540	-0.1460	-0.6784	0.5975
2	00:00:15	14.9540	-0.1460	-0.6784	0.5975
3	00:00:30	14.9520	-0.1440	-0.6691	0.5973
4	00:01:00	14.9520	-0.1440	-0.6691	0.5973
5	00:02:00	14.9520	-0.1440	-0.6691	0.5973
6	00:04:00	14.9440	-0.1360	-0.6320	0.5967
7	00:08:01	14.9440	-0.1360	-0.6320	0.5967
8	00:15:01	14.9420	-0.1340	-0.6227	0.5966
9	00:30:02	14.9420	-0.1340	-0.6227	0.5966
10	01:00:04	14.9420	-0.1340	-0.6227	0.5966
11	02:00:09	14.9420	-0.1340	-0.6227	0.5966
12	04:00:17	14.9400	-0.1320	-0.6134	0.5964
13	08:00:35	14.9360	-0.1280	-0.5948	0.5961
14	12:00:52	14.9360	-0.1280	-0.5948	0.5961
15	20:29:12	14.9340	-0.1260	-0.5855	0.5960

**Consolidation Test Results
(Sequence 3) Load 20.000 kPa**

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 4) Load 40.000 kPa

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 7-Jun-18

Test Number:

Sample Number: LLO05 ST4

Soil Description:

Boring Number:

Clay (CL)

Depth: 3.0-3.45m

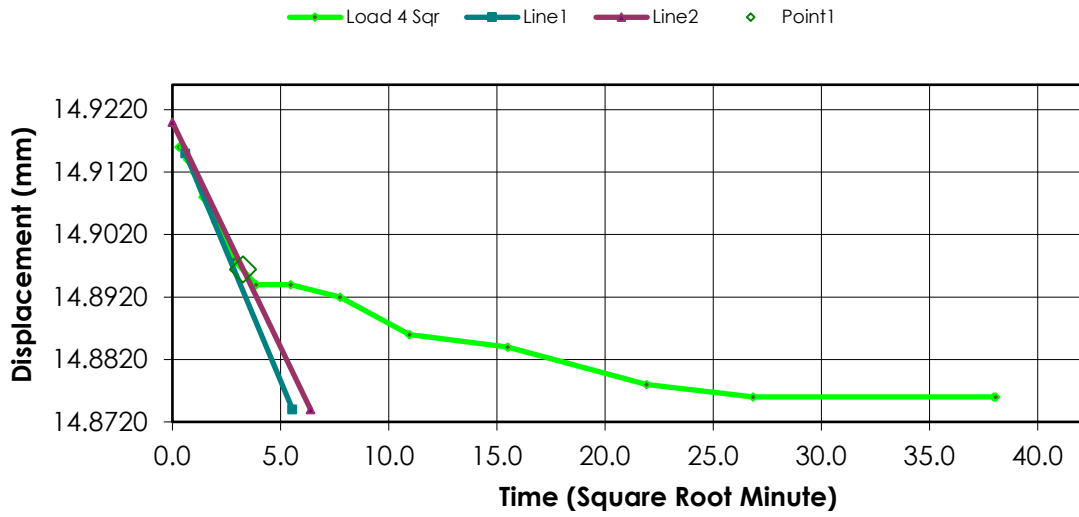
Remarks:

Sample Type: Undisturbed

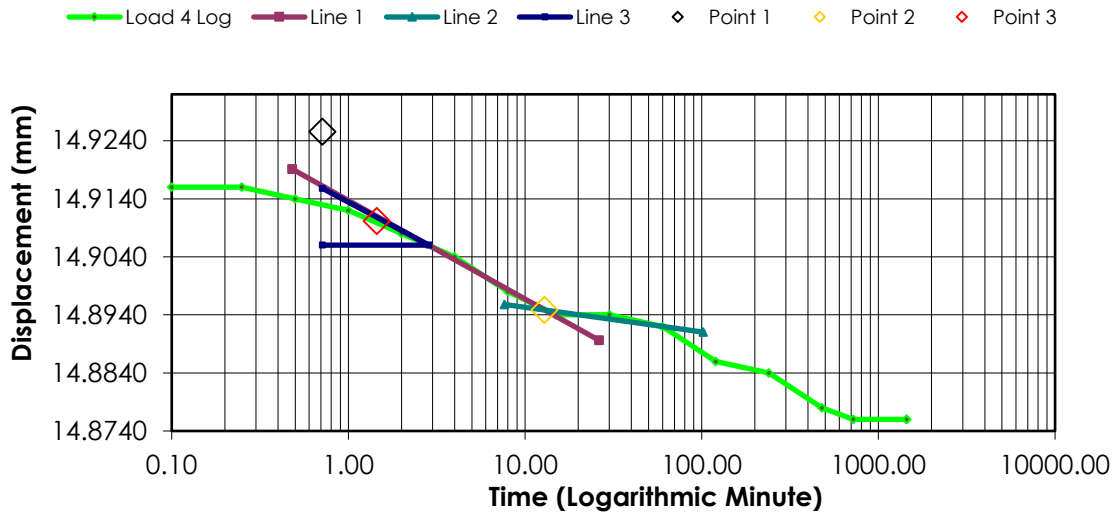
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	14.9340	-0.1260	-0.5855	0.5960
1	00:00:06	14.9160	-0.1540	-0.7156	0.5980
2	00:00:15	14.9160	-0.1540	-0.7156	0.5980
3	00:00:30	14.9140	-0.1520	-0.7063	0.5979
4	00:01:00	14.9120	-0.1500	-0.6970	0.5978
5	00:02:00	14.9080	-0.1460	-0.6784	0.5975
6	00:04:00	14.9040	-0.1420	-0.6598	0.5972
7	00:08:01	14.8980	-0.1360	-0.6320	0.5967
8	00:15:01	14.8940	-0.1320	-0.6134	0.5964
9	00:30:02	14.8940	-0.1320	-0.6134	0.5964
10	01:00:04	14.8920	-0.1300	-0.6041	0.5963
11	02:00:09	14.8860	-0.1240	-0.5762	0.5958
12	04:00:17	14.8840	-0.1220	-0.5669	0.5957
13	08:00:34	14.8780	-0.1160	-0.5390	0.5952
14	12:00:51	14.8760	-0.1140	-0.5297	0.5951
15	24:01:43	14.8760	-0.1140	-0.5297	0.5951
16	24:08:13	14.8760	-0.1140	-0.5297	0.5951

Consolidation Test Results (Sequence 4) Load 40.000 kPa

Consolidation Graph (Square-root Time)



Consolidation Graph (Logarithmic Time)



**Consolidation Test Results
(Sequence 5) Load 80.000 kPa**

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 7-Jun-18

Test Number:

Sample Number: LLO05 ST4

Soil Description:

Boring Number:

Clay (CL)

Depth: 3.0-3.45m

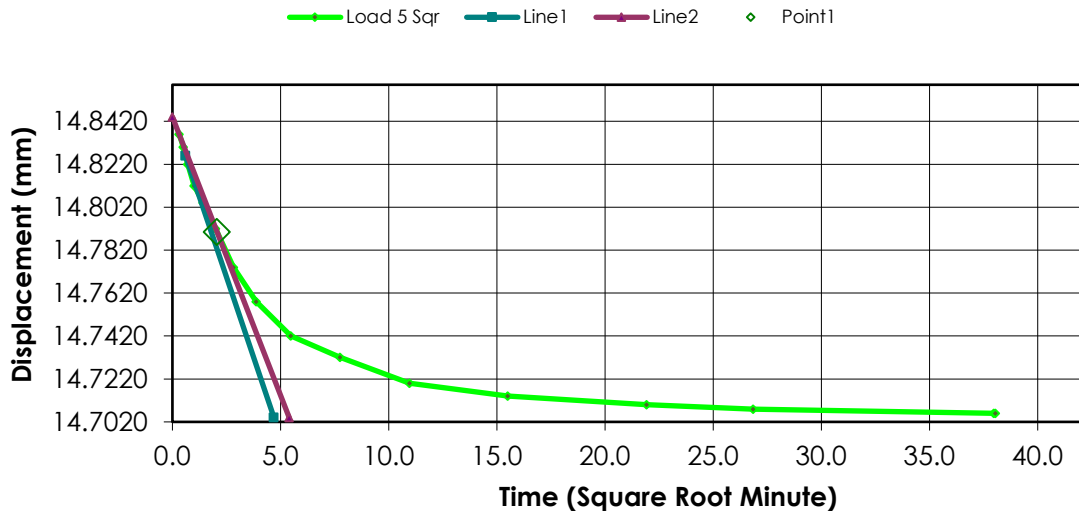
Remarks:

Sample Type: Undisturbed

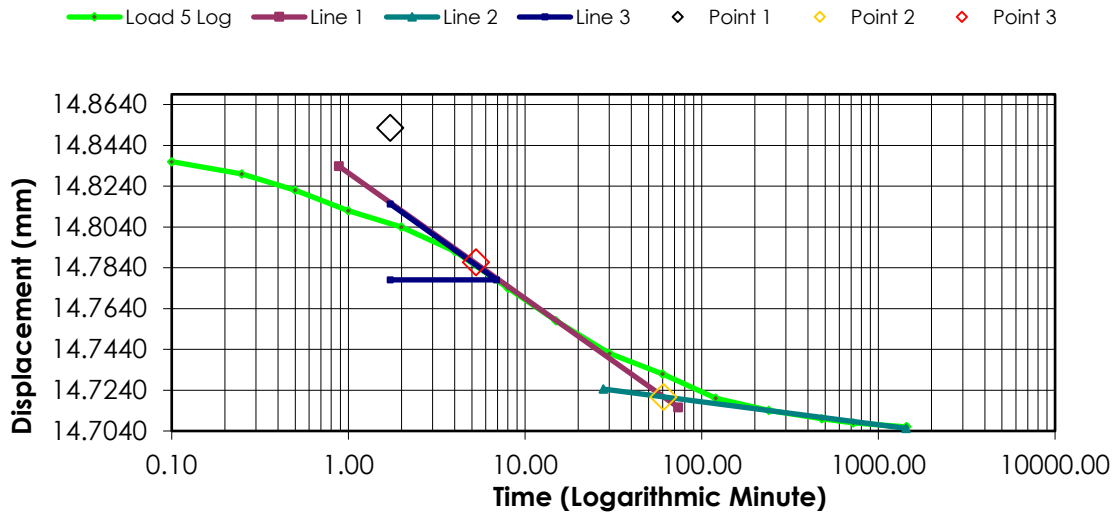
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	14.8760	-0.1140	-0.5297	0.5951
1	00:00:06	14.8360	-0.1120	-0.5204	0.5950
2	00:00:15	14.8300	-0.1060	-0.4926	0.5945
3	00:00:30	14.8220	-0.0980	-0.4554	0.5939
4	00:01:00	14.8120	-0.0880	-0.4089	0.5932
5	00:02:00	14.8040	-0.0800	-0.3717	0.5926
6	00:04:01	14.7920	-0.0680	-0.3160	0.5917
7	00:08:01	14.7740	-0.0500	-0.2323	0.5904
8	00:15:01	14.7580	-0.0340	-0.1580	0.5892
9	00:30:02	14.7420	-0.0180	-0.0836	0.5880
10	01:00:05	14.7320	-0.0080	-0.0372	0.5873
11	02:00:09	14.7200	0.0040	0.0186	0.5864
12	04:00:17	14.7140	0.0100	0.0465	0.5860
13	08:00:34	14.7100	0.0140	0.0651	0.5857
14	12:00:52	14.7080	0.0160	0.0744	0.5855
15	24:01:43	14.7060	0.0180	0.0836	0.5854
16	24:07:11	14.7060	0.0180	0.0836	0.5854

Consolidation Test Results (Sequence 5) Load 80.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 6) Load 160.000 kPa

Project: SR1
Location:
Job Number:

Project Number: 110773396

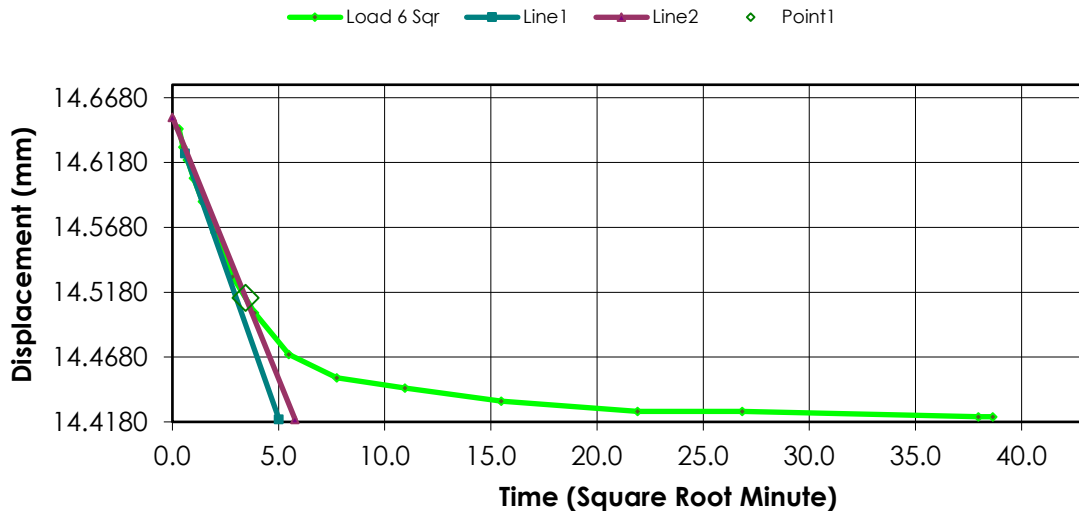
Test Date: 7-Jun-18
Test Number:

Sample Number: LLO05 ST4 **Soil Description:**
Boring Number: Clay (CL)
Depth: 3.0-3.45m **Remarks:**
Sample Type: Undisturbed

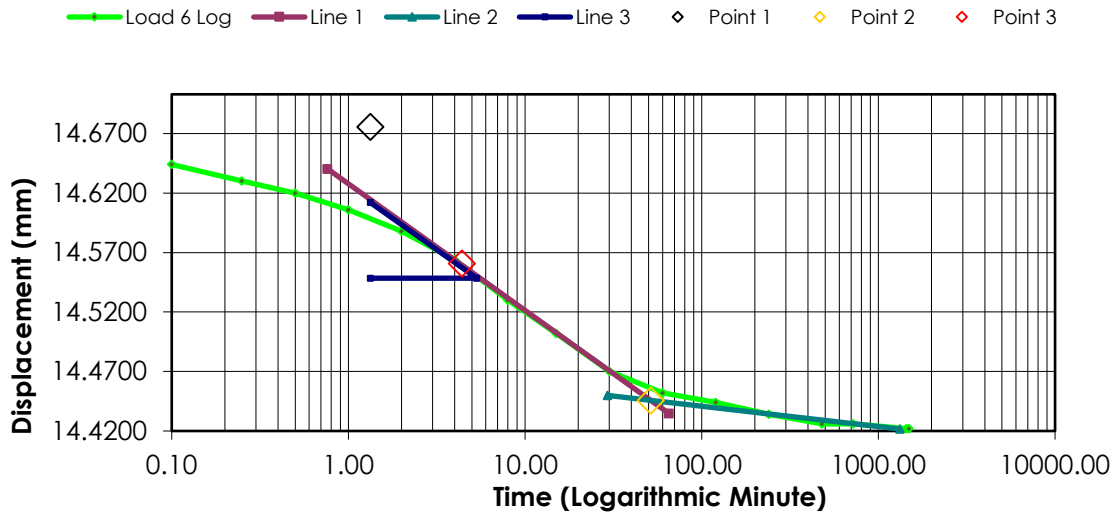
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	14.7060	0.0180	0.0836	0.5854
1	00:00:06	14.6440	0.0600	0.2788	0.5823
2	00:00:15	14.6300	0.0740	0.3439	0.5812
3	00:00:30	14.6200	0.0840	0.3903	0.5805
4	00:01:00	14.6060	0.0980	0.4554	0.5795
5	00:02:00	14.5880	0.1160	0.5390	0.5781
6	00:04:00	14.5640	0.1400	0.6506	0.5764
7	00:08:00	14.5300	0.1740	0.8086	0.5739
8	00:15:01	14.5020	0.2020	0.9387	0.5718
9	00:30:02	14.4700	0.2340	1.0874	0.5694
10	01:00:04	14.4520	0.2520	1.1710	0.5681
11	02:00:08	14.4440	0.2600	1.2082	0.5675
12	04:00:17	14.4340	0.2700	1.2547	0.5668
13	08:00:34	14.4260	0.2780	1.2918	0.5662
14	12:00:51	14.4260	0.2780	1.2918	0.5662
15	24:01:43	14.4220	0.2820	1.3104	0.5659
16	24:53:57	14.4220	0.2820	1.3104	0.5659

Consolidation Test Results (Sequence 6) Load 160.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 7) Load 320.000 kPa

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 7-Jun-18

Test Number:

Sample Number: LLO05 ST4

Soil Description:

Boring Number:

Clay (CL)

Depth: 3.0-3.45m

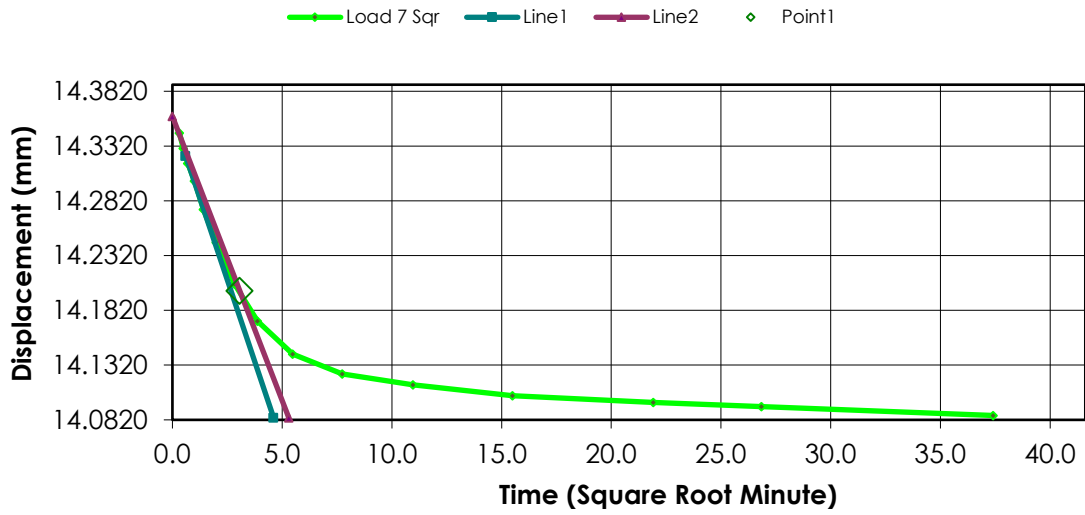
Remarks:

Sample Type: Undisturbed

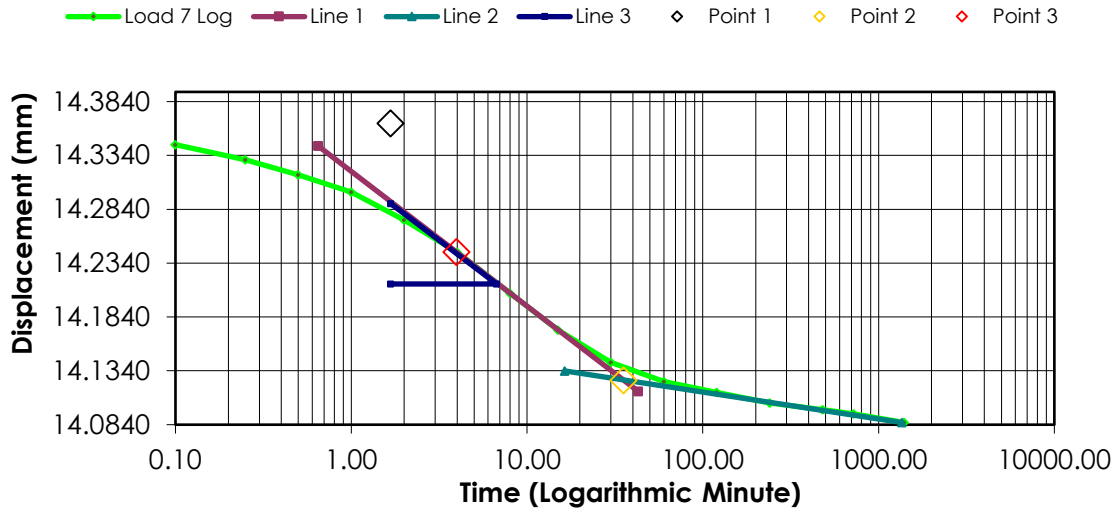
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	14.4220	0.2820	1.3104	0.5659
1	00:00:06	14.3440	0.3280	1.5242	0.5625
2	00:00:15	14.3300	0.3420	1.5892	0.5615
3	00:00:30	14.3160	0.3560	1.6543	0.5604
4	00:01:00	14.3000	0.3720	1.7286	0.5593
5	00:02:00	14.2740	0.3980	1.8494	0.5573
6	00:04:00	14.2440	0.4280	1.9888	0.5551
7	00:08:00	14.2060	0.4660	2.1654	0.5523
8	00:15:01	14.1720	0.5000	2.3234	0.5498
9	00:30:02	14.1420	0.5300	2.4628	0.5476
10	01:00:04	14.1240	0.5480	2.5465	0.5463
11	02:00:09	14.1140	0.5580	2.5929	0.5456
12	04:00:17	14.1040	0.5680	2.6394	0.5448
13	08:00:34	14.0980	0.5740	2.6673	0.5444
14	12:00:52	14.0940	0.5780	2.6859	0.5441
15	23:19:18	14.0860	0.5860	2.7231	0.5435

Consolidation Test Results (Sequence 7) Load 320.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 8) Load 640.000 kPa

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 7-Jun-18

Test Number:

Sample Number: LLO05 ST4

Soil Description:

Boring Number:

Clay (CL)

Depth: 3.0-3.45m

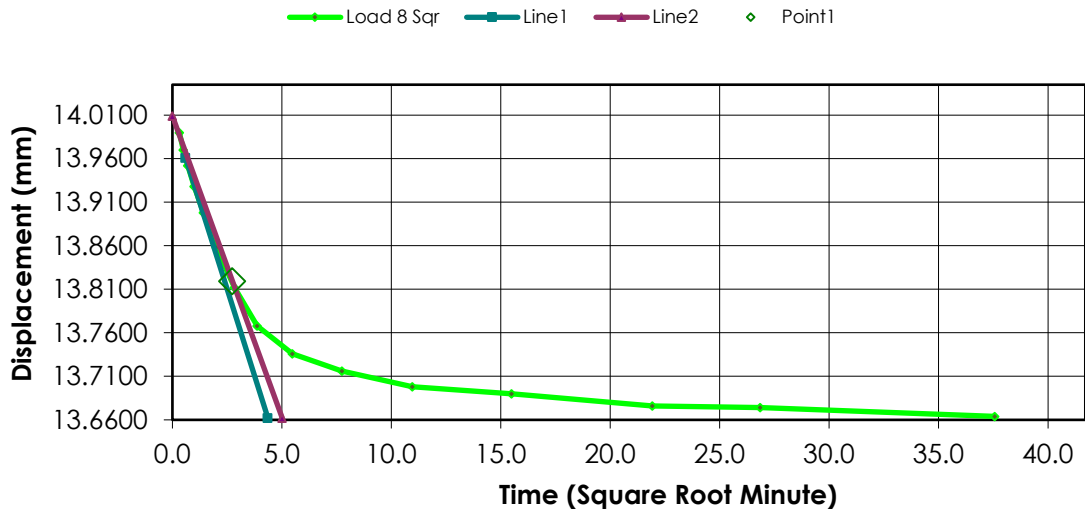
Remarks:

Sample Type: Undisturbed

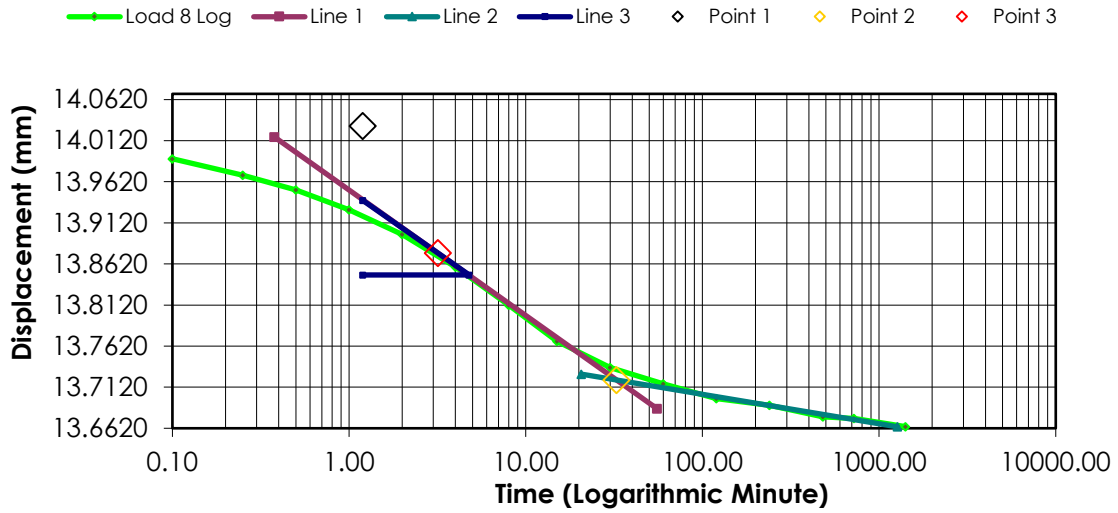
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	14.0860	0.5860	2.7231	0.5435
1	00:00:06	13.9900	0.6420	2.9833	0.5394
2	00:00:15	13.9700	0.6620	3.0762	0.5379
3	00:00:30	13.9520	0.6800	3.1599	0.5366
4	00:01:00	13.9280	0.7040	3.2714	0.5348
5	00:02:00	13.8980	0.7340	3.4108	0.5326
6	00:04:01	13.8580	0.7740	3.5967	0.5296
7	00:08:01	13.8120	0.8200	3.8104	0.5262
8	00:15:01	13.7680	0.8640	4.0149	0.5230
9	00:30:02	13.7360	0.8960	4.1636	0.5206
10	01:00:05	13.7160	0.9160	4.2565	0.5192
11	02:00:09	13.6980	0.9340	4.3402	0.5178
12	04:00:18	13.6900	0.9420	4.3773	0.5172
13	08:00:35	13.6760	0.9560	4.4424	0.5162
14	12:00:52	13.6740	0.9580	4.4517	0.5161
15	23:30:52	13.6640	0.9680	4.4981	0.5153

Consolidation Test Results (Sequence 8) Load 640.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 9) Rebound 320.000 kPa

Project: SR1
Location:
Job Number:

Project Number: 110773396

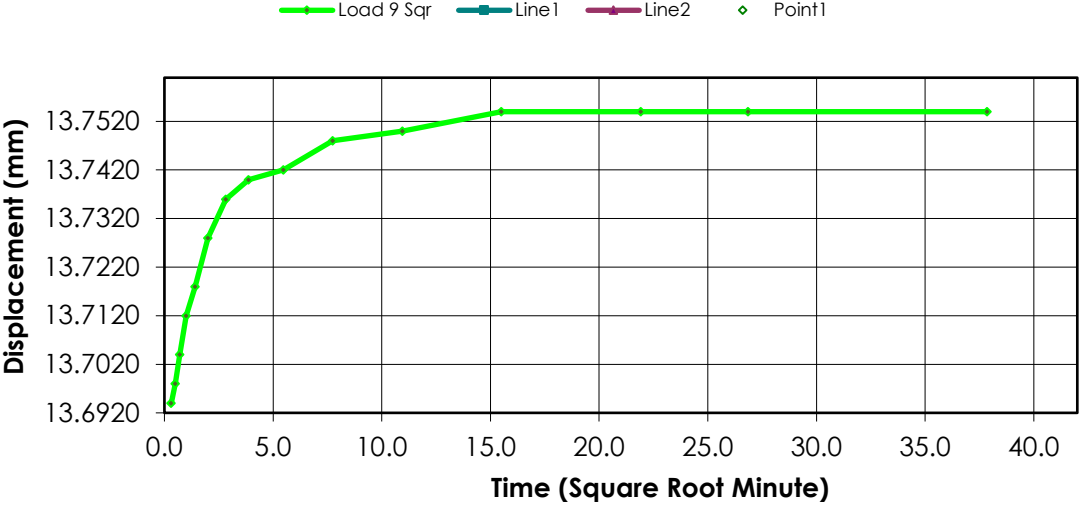
Test Date: 7-Jun-18
Test Number:

Sample Number: LLO05 ST4 **Soil Description:**
Boring Number: Clay (CL)
Depth: 3.0-3.45m **Remarks:**
Sample Type: Undisturbed

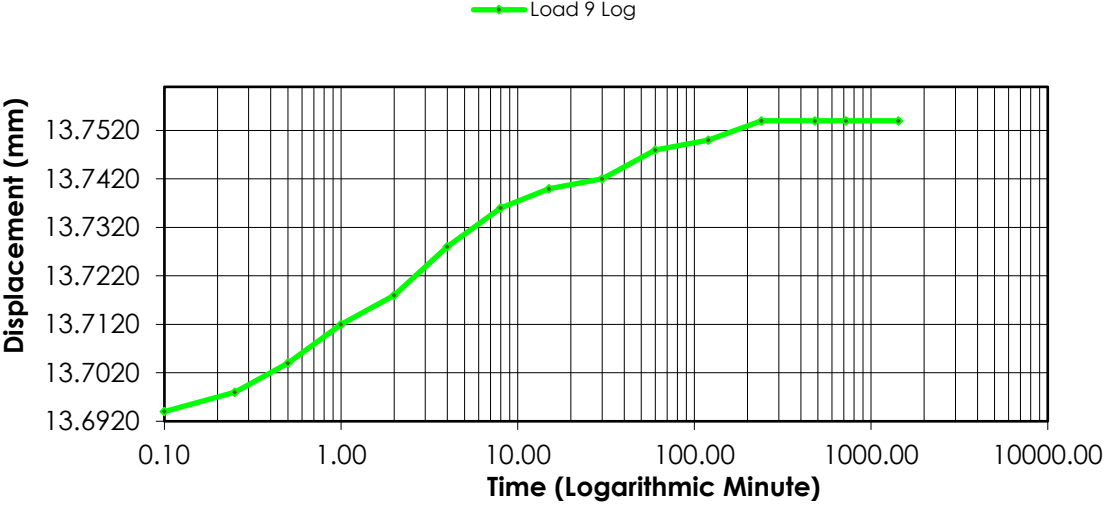
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	13.6640	0.9680	4.4981	0.5153
1	00:00:06	13.6940	0.9500	4.4145	0.5166
2	00:00:15	13.6980	0.9460	4.3959	0.5169
3	00:00:30	13.7040	0.9400	4.3680	0.5174
4	00:01:00	13.7120	0.9320	4.3309	0.5180
5	00:02:00	13.7180	0.9260	4.3030	0.5184
6	00:04:00	13.7280	0.9160	4.2565	0.5192
7	00:08:00	13.7360	0.9080	4.2193	0.5197
8	00:15:01	13.7400	0.9040	4.2007	0.5200
9	00:30:02	13.7420	0.9020	4.1915	0.5202
10	01:00:04	13.7480	0.8960	4.1636	0.5206
11	02:00:08	13.7500	0.8940	4.1543	0.5208
12	04:00:17	13.7540	0.8900	4.1357	0.5211
13	08:00:34	13.7540	0.8900	4.1357	0.5211
14	12:00:52	13.7540	0.8900	4.1357	0.5211
15	23:52:18	13.7540	0.8900	4.1357	0.5211

Consolidation Test Results (Sequence 9) Rebound 320.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 10) Rebound 160.000 kPa

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 7-Jun-18

Test Number:

Sample Number: LLO05 ST4

Soil Description:

Boring Number:

Clay (CL)

Depth: 3.0-3.45m

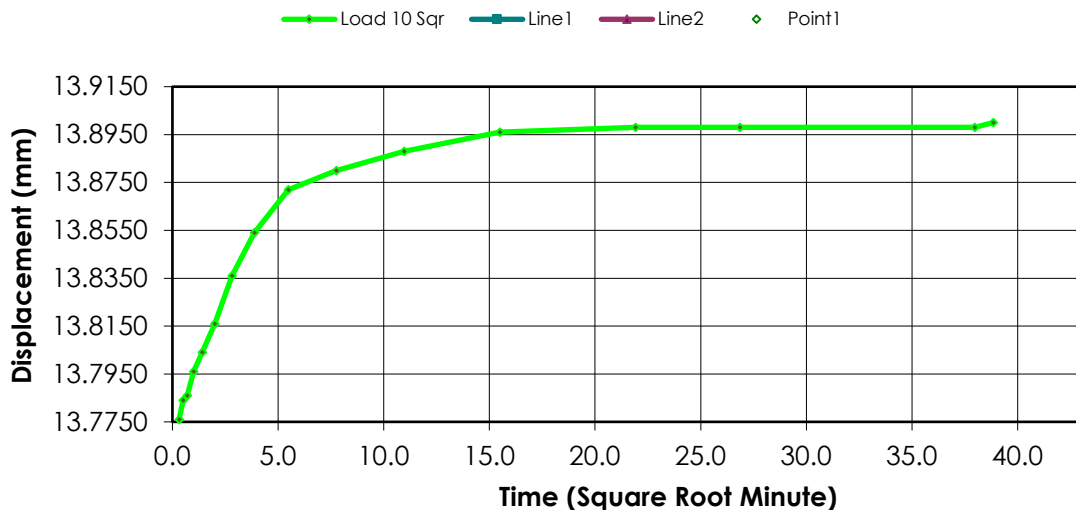
Remarks:

Sample Type: Undisturbed

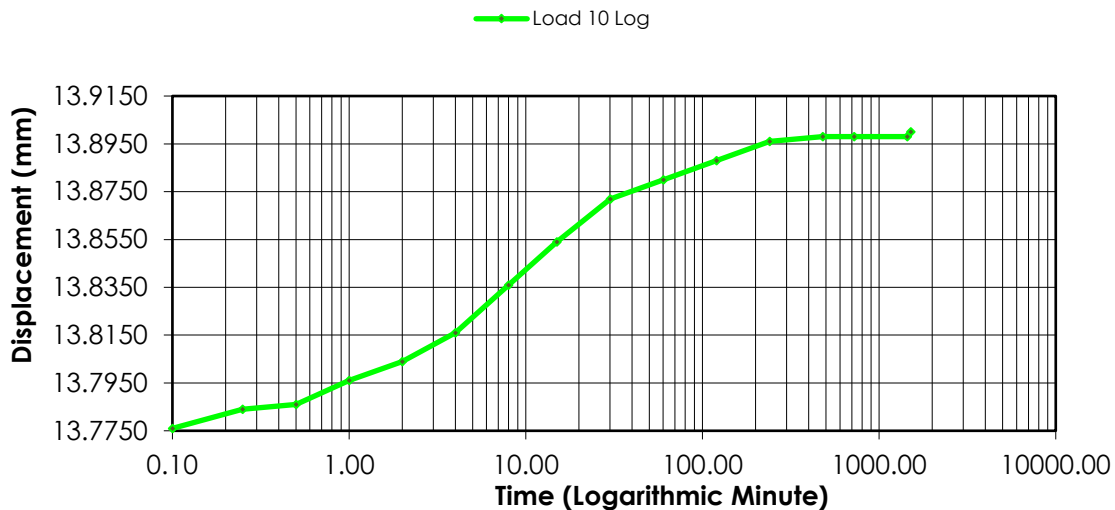
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	13.7540	0.8900	4.1357	0.5211
1	00:00:06	13.7760	0.8860	4.1171	0.5214
2	00:00:15	13.7840	0.8780	4.0799	0.5220
3	00:00:30	13.7860	0.8760	4.0706	0.5221
4	00:01:00	13.7960	0.8660	4.0242	0.5228
5	00:02:00	13.8040	0.8580	3.9870	0.5234
6	00:04:00	13.8160	0.8460	3.9312	0.5243
7	00:08:00	13.8360	0.8260	3.8383	0.5258
8	00:15:01	13.8540	0.8080	3.7546	0.5271
9	00:30:02	13.8720	0.7900	3.6710	0.5284
10	01:00:04	13.8800	0.7820	3.6338	0.5290
11	02:00:09	13.8880	0.7740	3.5967	0.5296
12	04:00:17	13.8960	0.7660	3.5595	0.5302
13	08:00:34	13.8980	0.7640	3.5502	0.5304
14	12:00:52	13.8980	0.7640	3.5502	0.5304
15	24:01:44	13.8980	0.7640	3.5502	0.5304
16	25:09:06	13.9000	0.7620	3.5409	0.5305

Consolidation Test Results (Sequence 10) Rebound 160.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 11) Load 320.000 kPa

Project: SR1
Location:
Job Number:

Project Number: 110773396

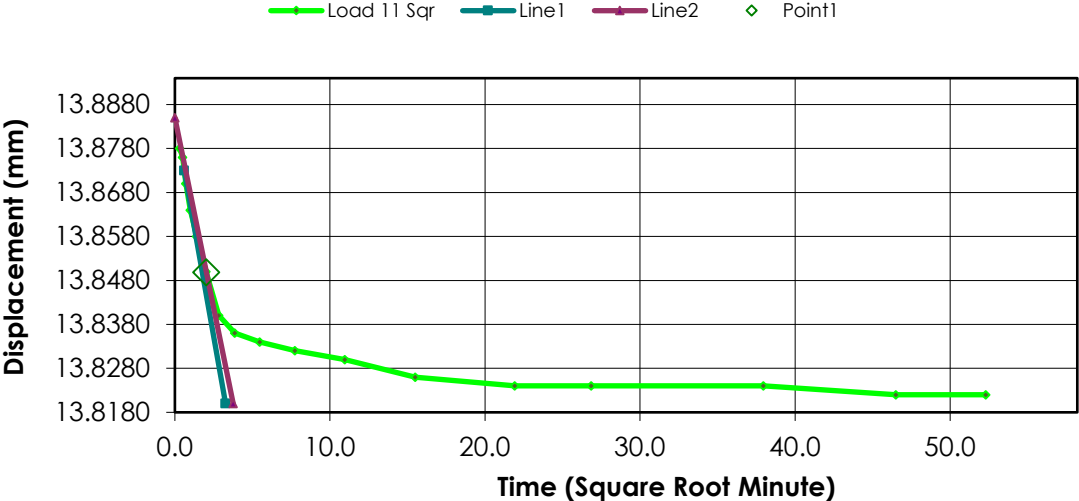
Test Date: 7-Jun-18
Test Number:

Sample Number: LLO05 ST4 **Soil Description:**
Boring Number: Clay (CL)
Depth: 3.0-3.45m **Remarks:**
Sample Type: Undisturbed

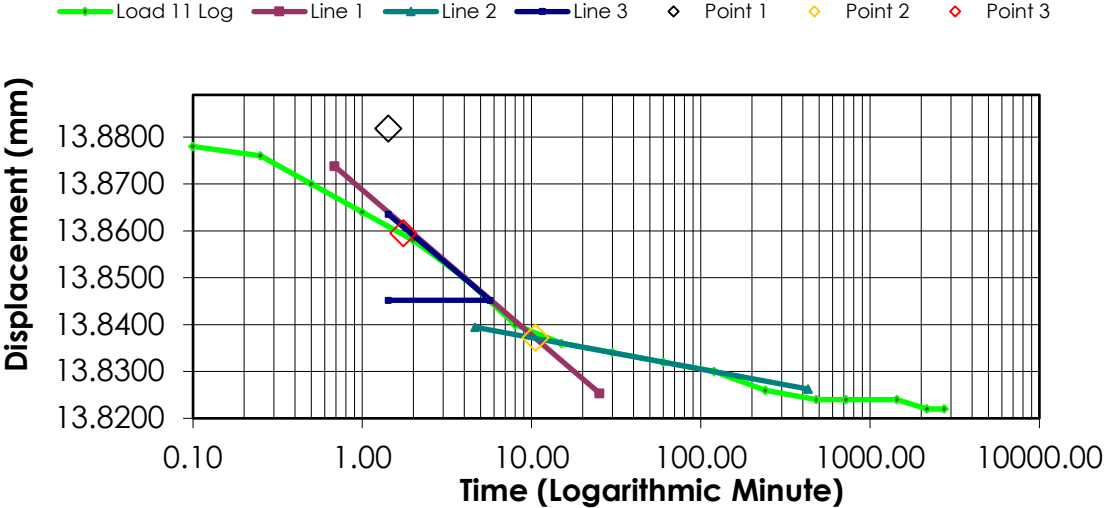
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	13.9000	0.7620	3.5409	0.5305
1	00:00:06	13.8780	0.7780	3.6152	0.5293
2	00:00:15	13.8760	0.7800	3.6245	0.5292
3	00:00:30	13.8700	0.7860	3.6524	0.5287
4	00:01:00	13.8640	0.7920	3.6803	0.5283
5	00:02:00	13.8580	0.7980	3.7082	0.5279
6	00:04:00	13.8500	0.8060	3.7454	0.5273
7	00:08:00	13.8400	0.8160	3.7918	0.5265
8	00:15:01	13.8360	0.8200	3.8104	0.5262
9	00:30:02	13.8340	0.8220	3.8197	0.5261
10	01:00:04	13.8320	0.8240	3.8290	0.5259
11	02:00:08	13.8300	0.8260	3.8383	0.5258
12	04:00:17	13.8260	0.8300	3.8569	0.5255
13	08:00:34	13.8240	0.8320	3.8662	0.5253
14	12:00:52	13.8240	0.8320	3.8662	0.5253
15	24:01:44	13.8240	0.8320	3.8662	0.5253
16	36:02:36	13.8220	0.8340	3.8755	0.5252
17	45:36:14	13.8220	0.8340	3.8755	0.5252

Consolidation Test Results (Sequence 11) Load 320.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 12) Load 640.000 kPa

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 7-Jun-18

Test Number:

Sample Number: LLO05 ST4

Soil Description:

Boring Number:

Clay (CL)

Depth: 3.0-3.45m

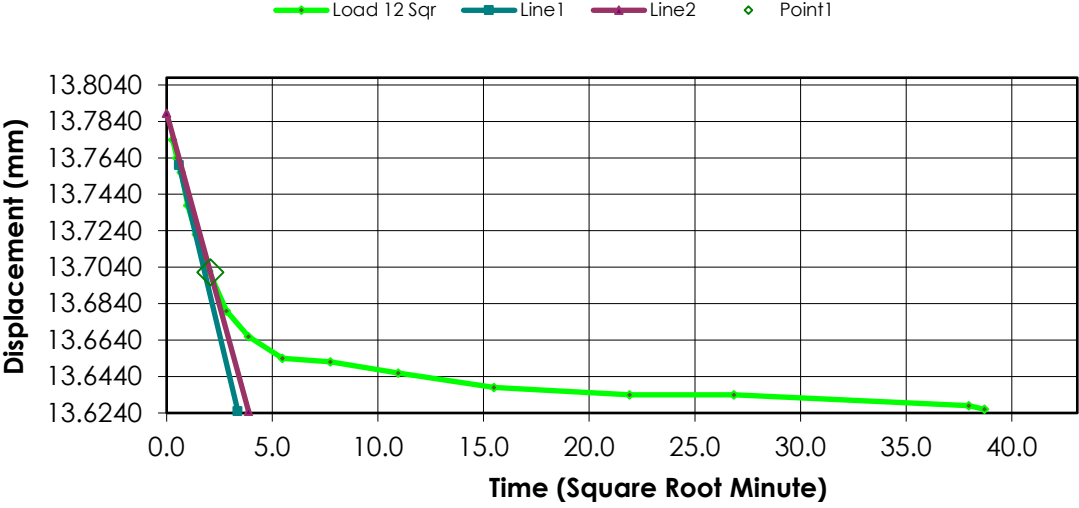
Remarks:

Sample Type: Undisturbed

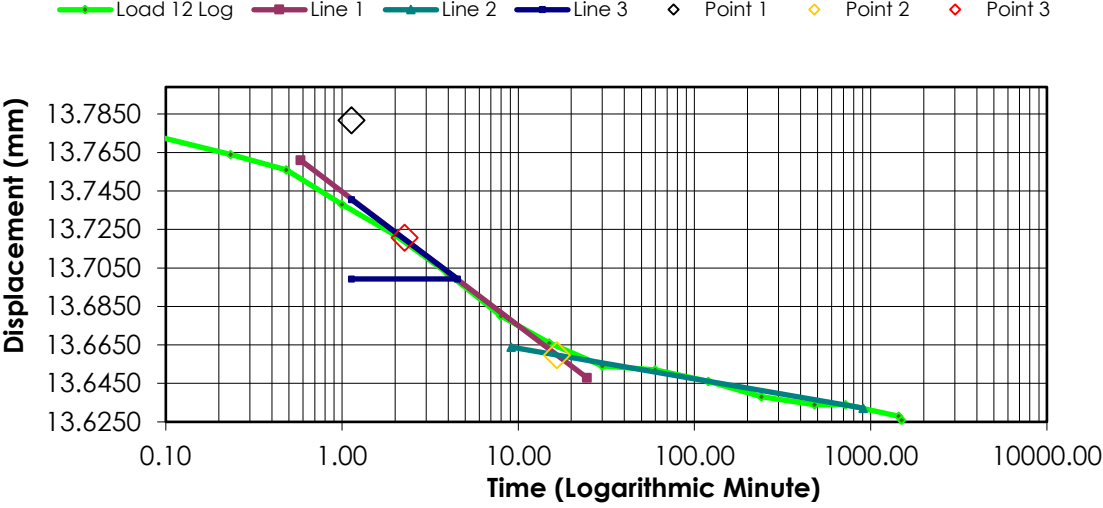
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	13.8220	0.8340	3.8755	0.5252
1	00:00:05	13.7740	0.8580	3.9870	0.5234
2	00:00:14	13.7640	0.8680	4.0335	0.5227
3	00:00:29	13.7560	0.8760	4.0706	0.5221
4	00:01:00	13.7380	0.8940	4.1543	0.5208
5	00:02:00	13.7220	0.9100	4.2286	0.5196
6	00:04:00	13.7020	0.9300	4.3216	0.5181
7	00:08:00	13.6800	0.9520	4.4238	0.5165
8	00:15:01	13.6660	0.9660	4.4888	0.5155
9	00:30:02	13.6540	0.9780	4.5446	0.5146
10	01:00:04	13.6520	0.9800	4.5539	0.5144
11	02:00:08	13.6460	0.9860	4.5818	0.5140
12	04:00:17	13.6380	0.9940	4.6190	0.5134
13	08:00:34	13.6340	0.9980	4.6375	0.5131
14	12:00:51	13.6340	0.9980	4.6375	0.5131
15	24:01:43	13.6280	1.0040	4.6654	0.5127
16	24:58:27	13.6260	1.0060	4.6747	0.5125

Consolidation Test Results (Sequence 12) Load 640.000 kPa

Consolidation Graph (Square Root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 13) Load 1280.000 kPa

Project: SR1
Location:
Job Number:

Project Number: 110773396

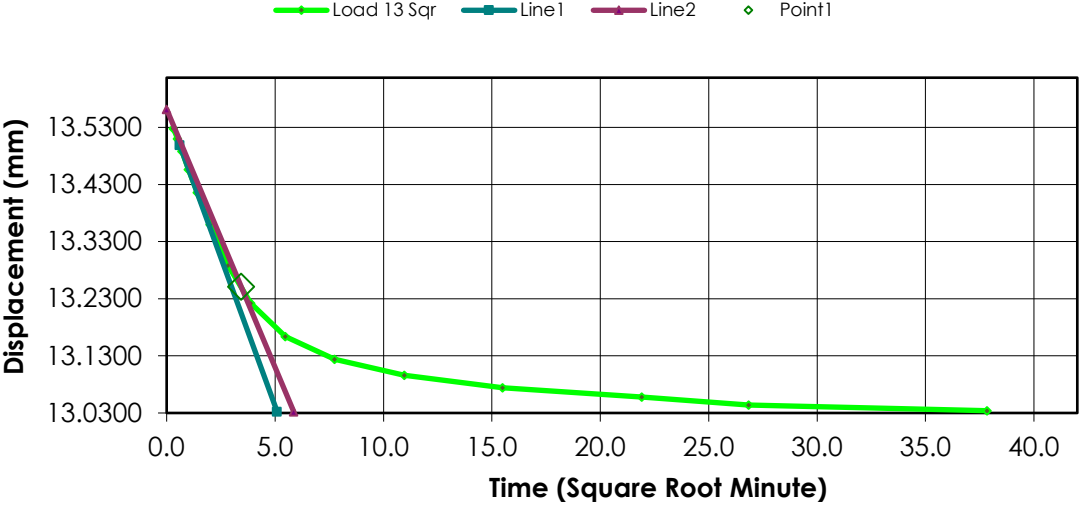
Test Date: 7-Jun-18
Test Number:

Sample Number: LLO05 ST4 **Soil Description:**
Boring Number: Clay (CL)
Depth: 3.0-3.45m **Remarks:**
Sample Type: Undisturbed

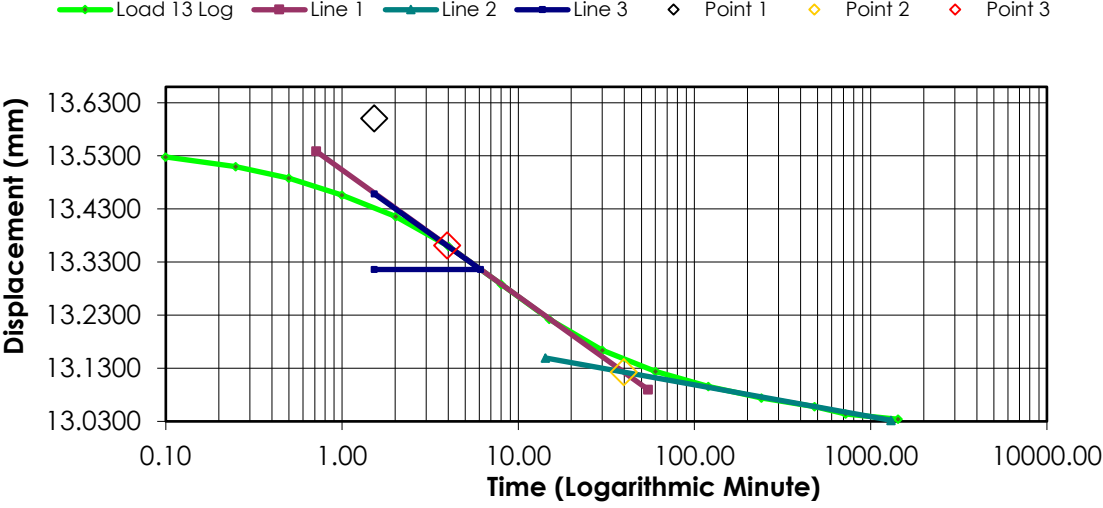
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	13.6260	1.0060	4.6747	0.5125
1	00:00:06	13.5280	1.0460	4.8606	0.5096
2	00:00:15	13.5100	1.0640	4.9442	0.5082
3	00:00:30	13.4880	1.0860	5.0465	0.5066
4	00:01:00	13.4560	1.1180	5.1952	0.5043
5	00:02:01	13.4160	1.1580	5.3810	0.5013
6	00:04:01	13.3600	1.2140	5.6413	0.4972
7	00:08:01	13.2880	1.2860	5.9758	0.4919
8	00:15:02	13.2220	1.3520	6.2825	0.4870
9	00:30:03	13.1640	1.4100	6.5520	0.4827
10	01:00:05	13.1240	1.4500	6.7379	0.4798
11	02:00:09	13.0960	1.4780	6.8680	0.4777
12	04:00:18	13.0740	1.5000	6.9703	0.4761
13	08:00:35	13.0580	1.5160	7.0446	0.4749
14	12:00:52	13.0440	1.5300	7.1097	0.4739
15	23:52:10	13.0340	1.5400	7.1561	0.4731

Consolidation Test Results (Sequence 13) Load 1280.000 kPa

Consolidation Graph (Square-root Time)



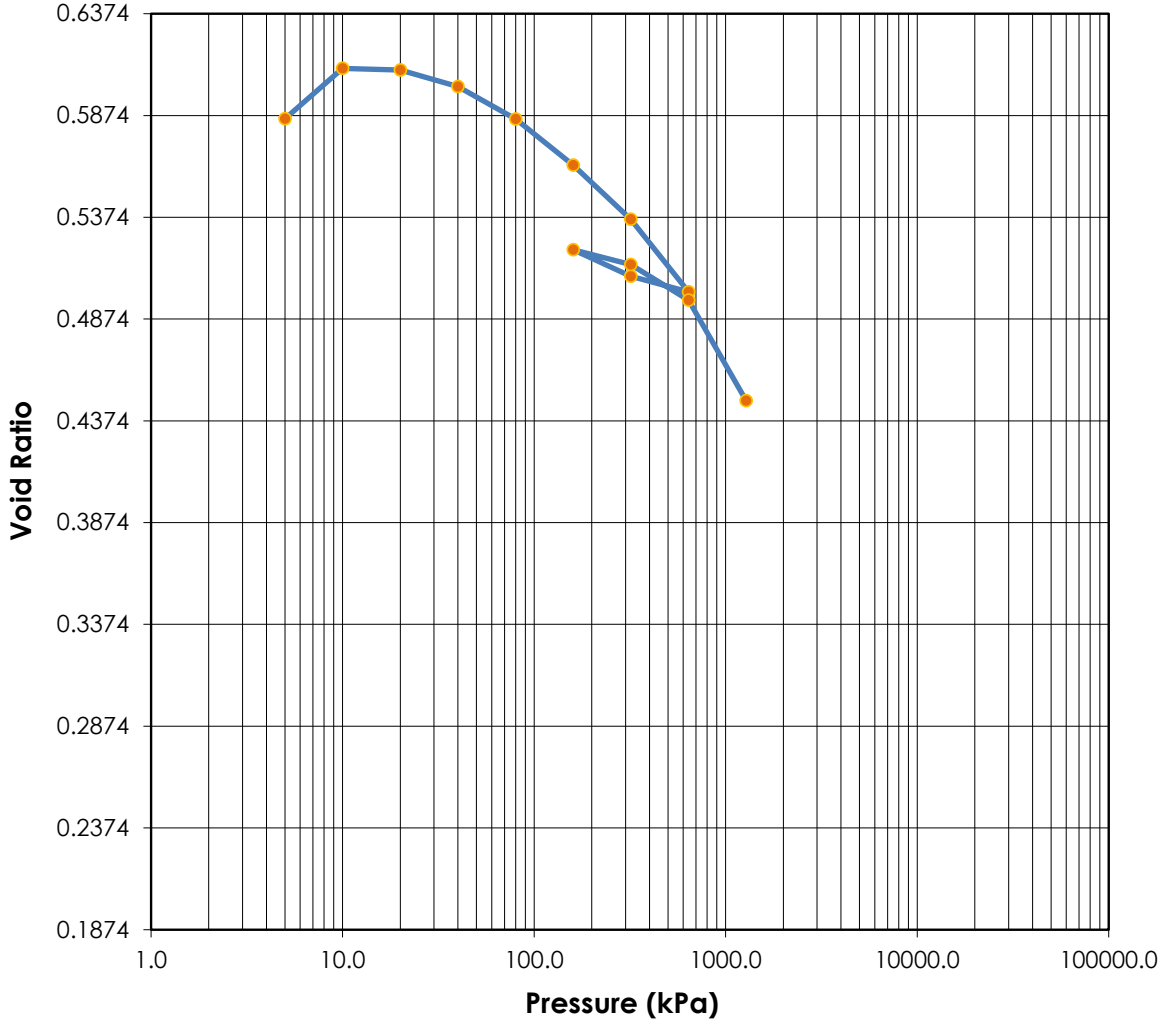
Consolidation Graph (Logarithmic Time)





Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876



	Before	After	Liquid Limits:	45	Test Date:	11-Jun-18
Moisture (%):	21.0	20.6	Plastic Limits:	14		
Dry Density (g/cm³):	1.700	1.826	Plasticity Index (%):	31		
Saturation (%):	97	100				
Void Ratio:	0.5845	0.4461	Specific Gravity:	2.70	Assumed	
Soil Description:	Clay (CL), Some Gravel					
Project Number:	110773396	Depth:	4.6-5.05m		Remarks:	
Sample Number:	LLO08 ST7	Boring Number:				
Project:	SR1					
Client:	Alberta Transportation					
Location:						

Tested By: E. Wahl

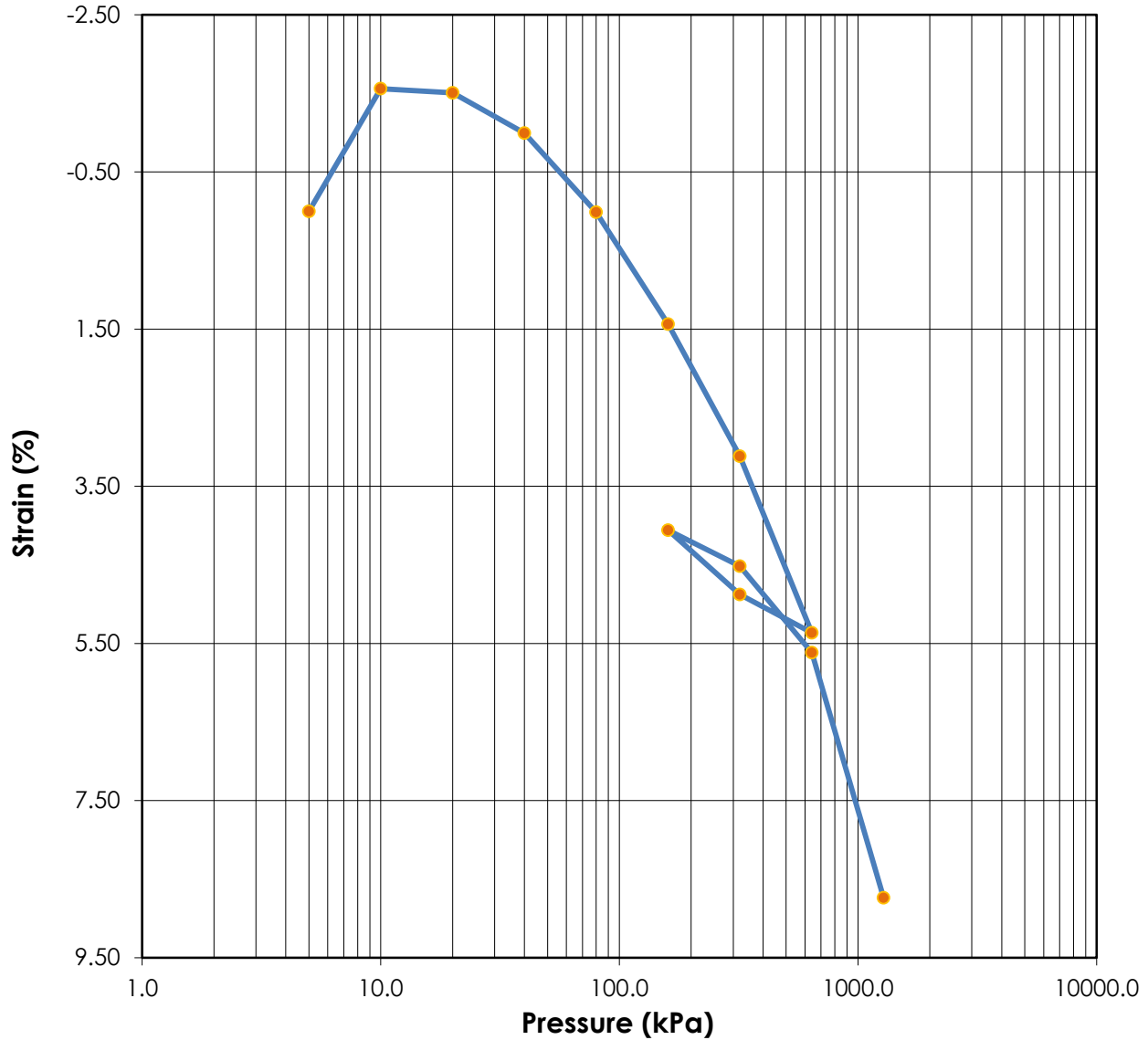
Reviewed By: C. Lamoureux

Reporting of these test results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request. The data presented above is for the sole use of the client stipulated above. Stantec is not responsible, nor can be held liable, for the use of this report by any other party, with or without the knowledge of Stantec.



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876

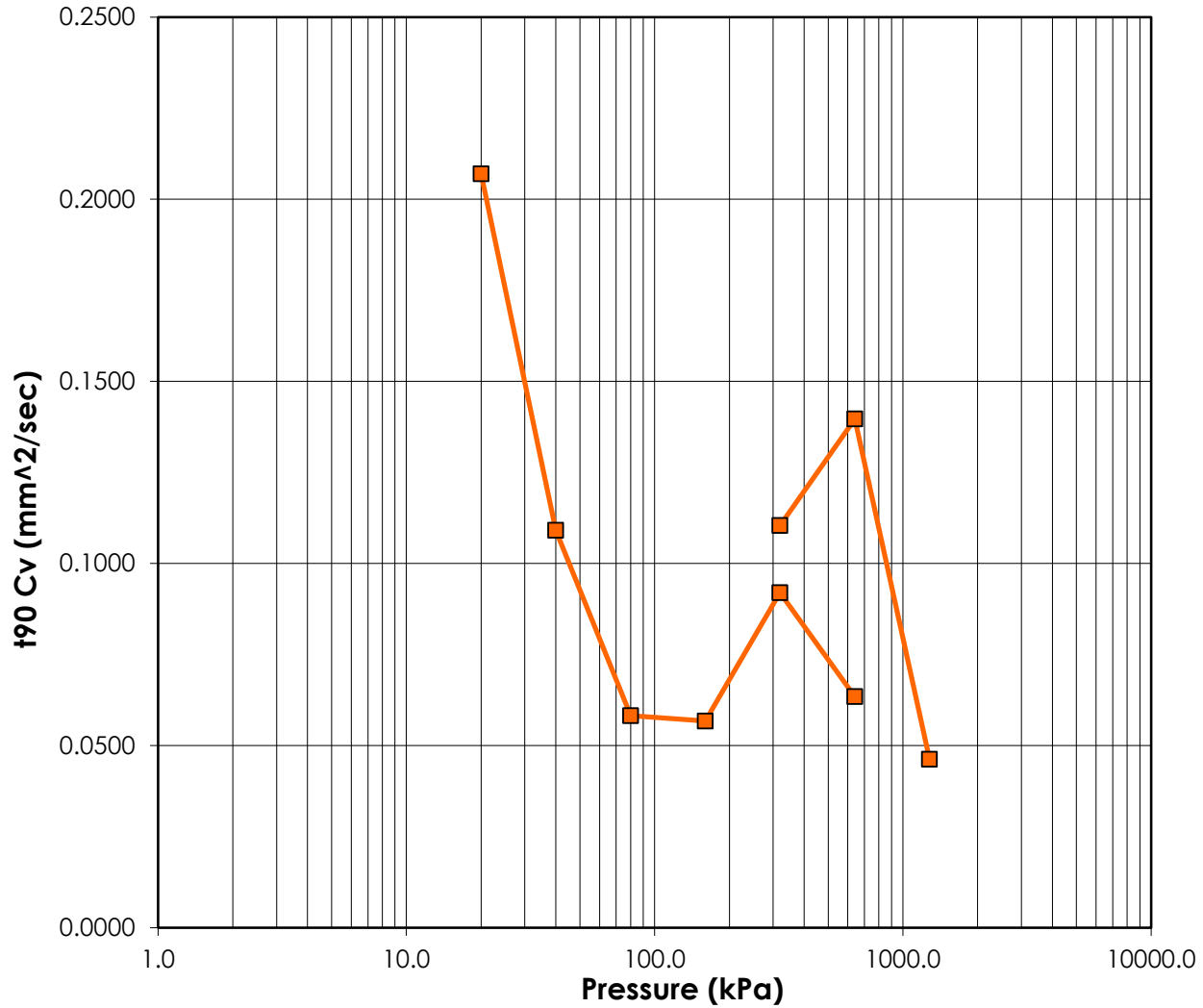


	Before	After	Liquid Limits:	45	Test Date:	11-Jun-18
Moisture (%):	21.0	20.6	Plastic Limits:	14		
Dry Density (g/cm3):	1.700	1.826	Plasticity Index (%):	31		
Saturation (%):	97	100	Specific Gravity:	2.70	Assumed	
Void Ratio:	0.5845	0.4461				
Sample Description:	Clay (CL), Some Gravel					
Project Number:	110773396	Depth:	4.6-5.05m			
Sample Number:	LLO08 ST7	Boring Number:				
Project:	SR1					Remarks:
Client:	Alberta Transportation					
Location:						



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One-Dimensional Consolidation Test
ASTM D2435
Test Results

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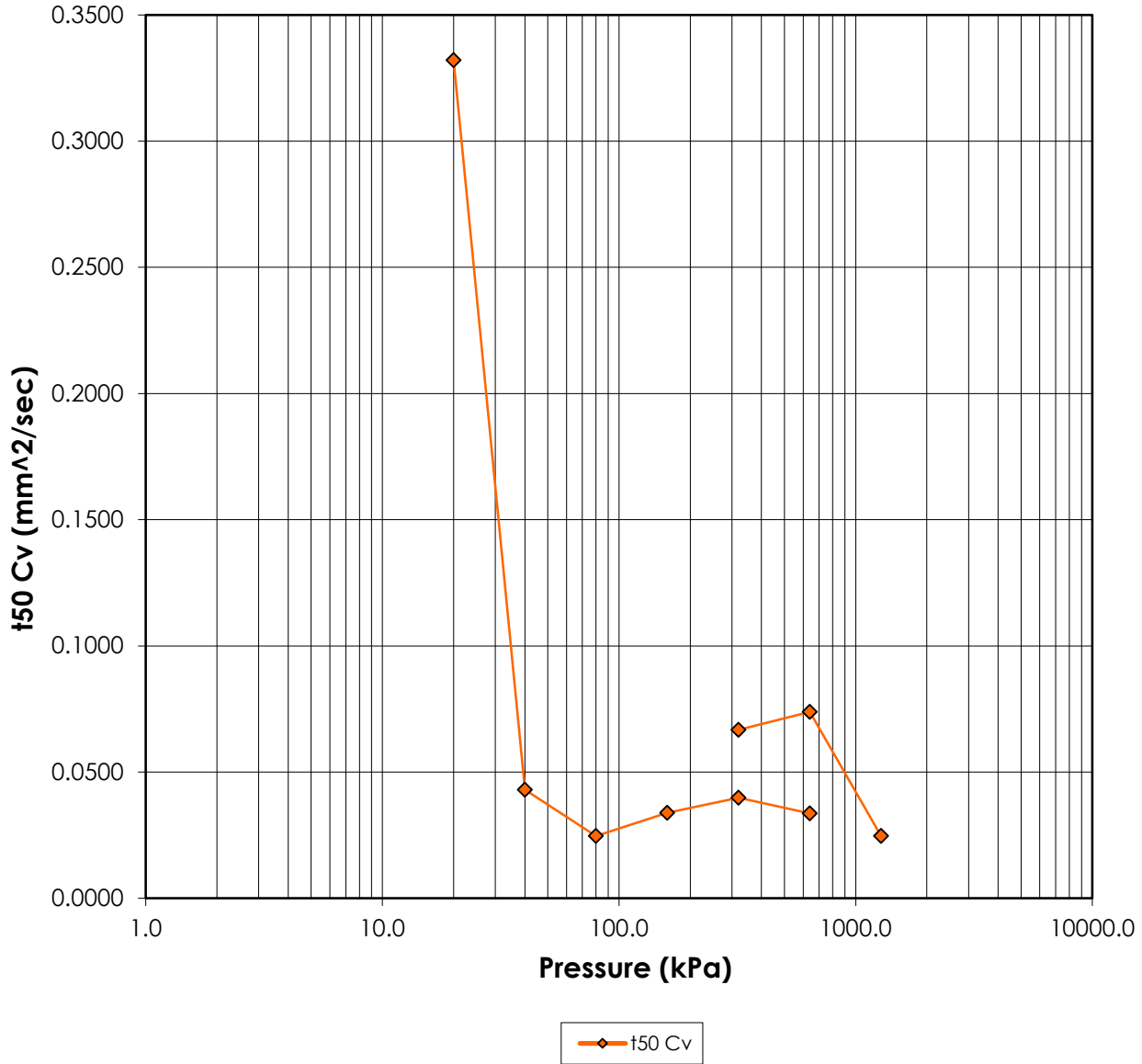
—■— t90 Cv

	Before	After	Liquid Limits:	45	Test Date:	11-Jun-18
Moisture (%):	21.0	20.6	Plastic Limits:	14		
Dry Density (g/cm3):	1.700	1.826	Plasticity Index (%):	31		
Saturation (%):	97	100	Specific Gravity:	2.70	Assumed	
Void Ratio:	0.5845	0.4461				
Soil Description:	Clay (CL), Some Gravel					
Project Number:	110773396		Depth:	4.6-5.05m		
Sample Number:	LLO08 ST7		Boring Number:			
Project:	SR1					
Client:	Alberta Transportation					
Location:						
	Remarks:					



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One-Dimensional Consolidation Test
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Test Results

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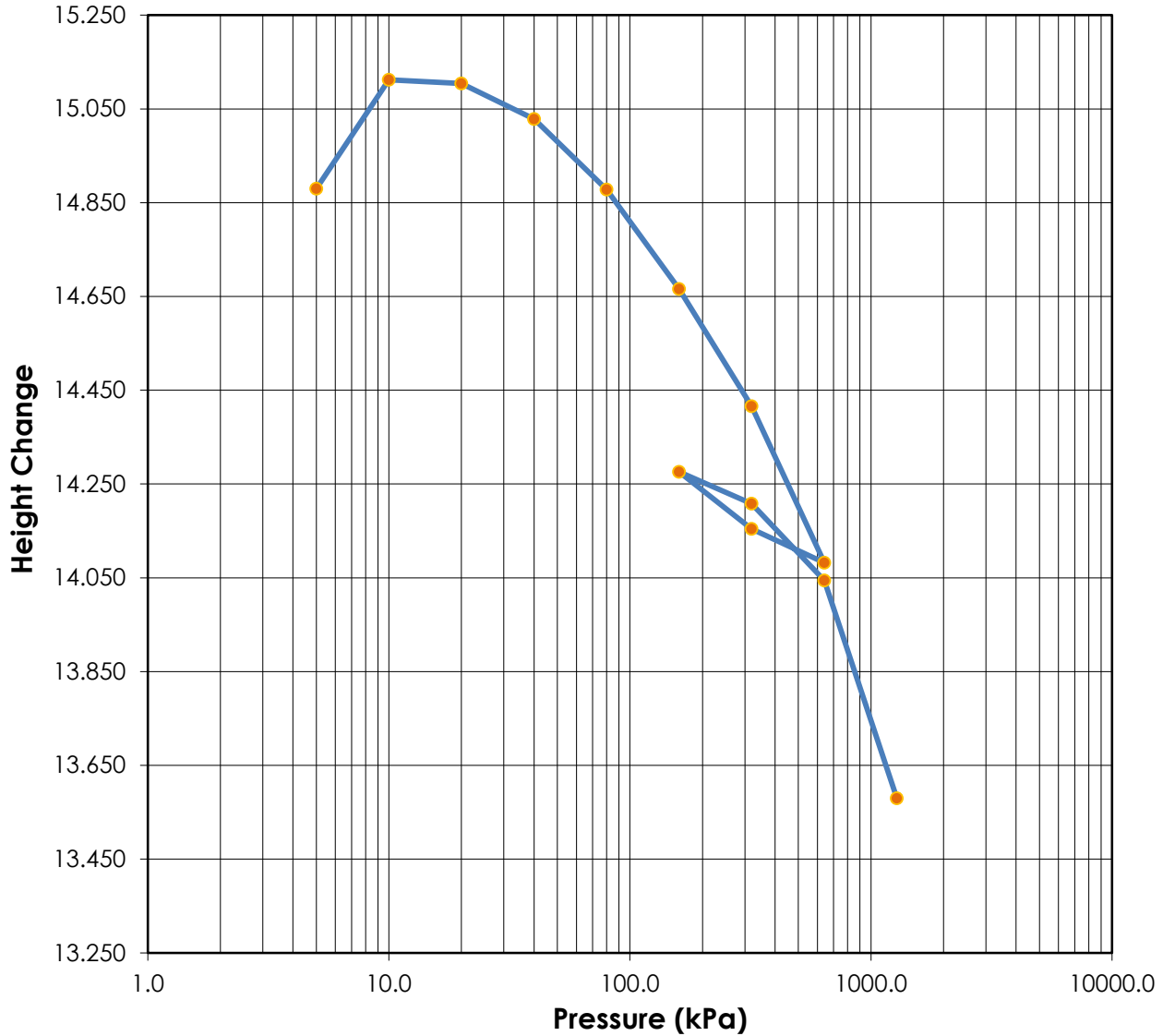


	Before	After	Liquid Limits:	45	Test Date:	11-Jun-18
Moisture (%):	21.0	20.6	Plastic Limits:	14		
Dry Density (g/cm³):	1.700	1.826	Plasticity Index (%):	31		
Saturation (%):	97	100	Specific Gravity:	2.70	Assumed	
Void Ratio:	0.5845	0.4461				
Soil Description:	Clay (CL), Some Gravel					
Project Number:	110773396	Depth:	4.6-5.05m			
Sample Number:	LLO08 ST7	Boring Number:				
Project:	SR1					Remarks:
Client:	Alberta Transportation					
Location:						



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876



	Before	After	Liquid Limits:	45	Test Date:	11-Jun-18
Moisture (%):	21.0	20.6	Plastic Limits:	14		
Dry Density (g/cm3):	1.700	1.826	Plasticity Index (%):	31		
Saturation (%):	97	100	Specific Gravity:	2.70	Assumed	
Void Ratio:	0.5845	0.4461				
Soil Description:	Clay (CL), Some Gravel					
Project Number:	110773396	Depth:	4.6-5.05m			
Sample Number:	LLO08 ST7	Boring Number:				
Project:	SR1					Remarks:
Client:	Alberta Transportation					
Location:						

Consolidation Test Results Summary

Project: SR1

Project Number: 110773396

Location:

Job Number:

Sample Number: LLO08 ST7

Sample Description:

Boring Number:

Clay (CL), Some Gravel

Depth: 4.6-5.05m

Remarks:

Test Number:

Sample Type: Undisturbed

Test Date: 11-Jun-18

Index	Load Sequence (kPa)	Cummulative Change in Height (mm)	Specimen Height (mm)	Height of Void (mm)	Vertical Strain (%)	Void Ratio	t90 Fitting Time (min)	t50 Fitting Time (min)	t90 Cv (mm ² /sec)	t50 Cv (mm ² /sec)
0	0.000	0.0000	14.8800	5.4965	0.00	0.5858	0.000	0.000	0.000	0.000
1	5.000	0.0000	14.8800	5.4965	0.00	0.5858	0.000	0.000	0.000	0.000
2	10.000	-0.2320	15.1120	5.7285	-1.56	0.6105	0.000	0.000	0.000	0.000
3	20.000	-0.2240	15.1040	5.7205	-1.51	0.6096	3.894	0.564	0.207	0.332
4	40.000	-0.1480	15.0280	5.6445	-0.99	0.6015	7.310	4.317	0.109	0.043
5	80.000	0.0020	14.8780	5.4945	0.01	0.5855	13.425	7.373	0.058	0.025
6	160.000	0.2140	14.6660	5.2825	1.44	0.5630	13.388	5.214	0.057	0.034
7	320.000	0.4640	14.4160	5.0325	3.12	0.5363	7.980	4.281	0.092	0.040
8	640.000	0.7980	14.0820	4.6985	5.36	0.5007	11.041	4.841	0.063	0.034
9	320.000	0.7260	14.1540	4.7705	4.88	0.5084	0.000	0.000	0.000	0.000
10	160.000	0.6040	14.2760	4.8925	4.06	0.5214	0.000	0.000	0.000	0.000
11	320.000	0.6720	14.2080	4.8245	4.52	0.5141	6.459	2.484	0.110	0.067
12	640.000	0.8360	14.0440	4.6605	5.62	0.4967	4.989	2.193	0.140	0.074
13	1280.000	1.3000	13.5800	4.1965	8.74	0.4472	14.083	6.138	0.046	0.025

Predicted value indicated with *

Consolidation Test

Consolidation Specimen Information

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 11-Jun-18

Sample Number: LLO08 ST7

Sample Description:

Boring Number:

Clay (CL), Some Gravel

Depth: 4.6-5.05m

Remarks:

Sample Type: Undisturbed

Test Number:

Liquid Limit: 45

Initial Void Ratio: 0.5845

Initial Height (mm): 14.88

Plastic Limit: 14

Plasticity Index (%): 31

Initial Diameter (mm): 50.00

Specific Gravity: 2.70

Weight of Ring (g): 60.81

Assumed

Parameters	Initial Specimen	Final Specimen
Moist Weight + Container (g)	138.63	62.51
Dry Soil + Container (g)	115.17	52.49
Weight of Container (g)	3.71	3.89
Moisture Content (%)	21.0	20.6
Void Ratio	0.5845	0.4461
Saturation (%)	97	100
Dry Density (g/cm ³)	1.700	1.826

Consolidation Test Results
(Sequence 1) Load 5.000 kPa

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 11-Jun-18

Test Number:

Sample Number: LLO08 ST7

Soil Description:

Boring Number:

Clay (CL), Some Gravel

Depth: 4.6-5.05m

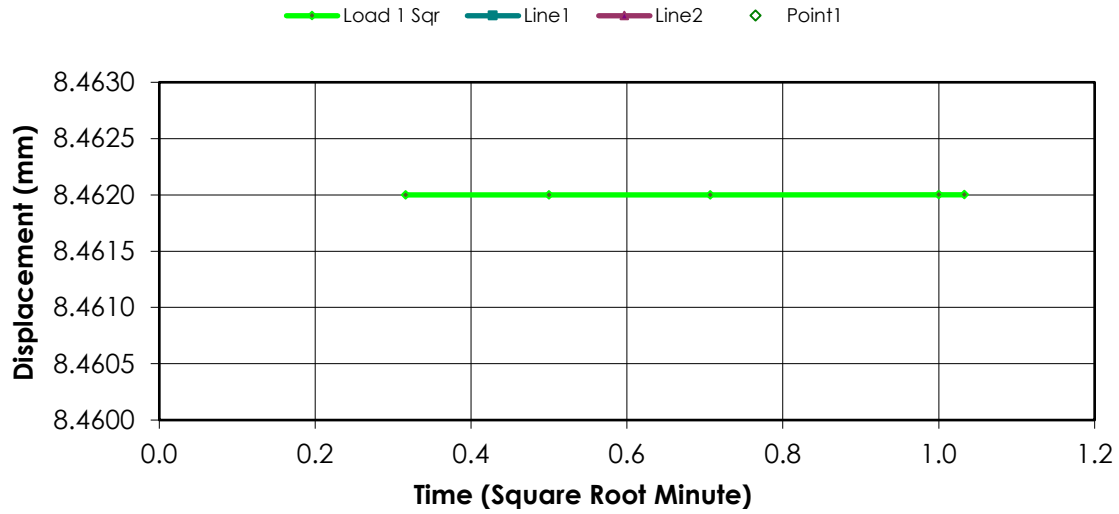
Remarks:

Sample Type: Undisturbed

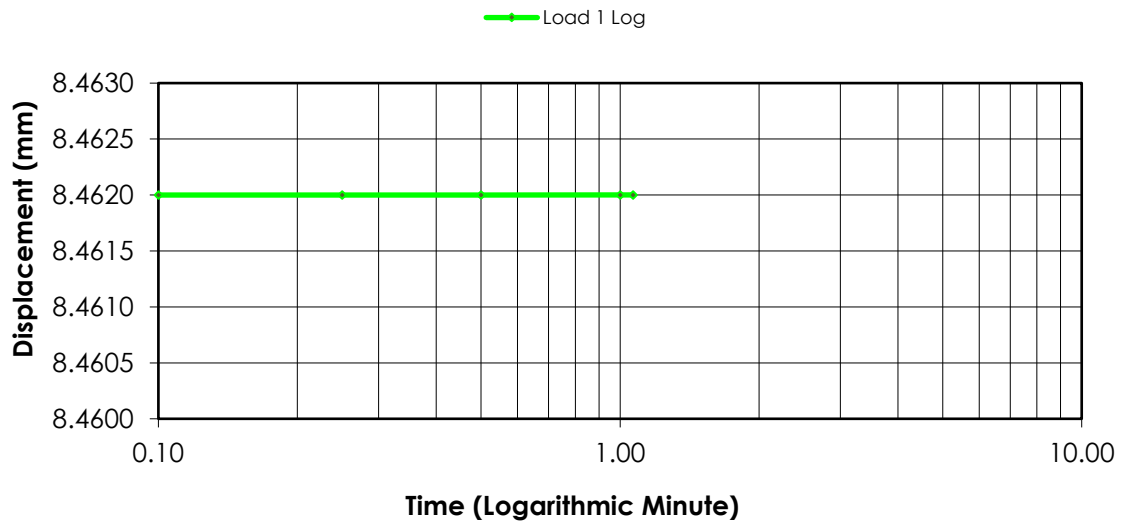
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.4620	0.0000	0.0000	0.5845
1	00:00:06	8.4620	0.0000	0.0000	0.5845
2	00:00:15	8.4620	0.0000	0.0000	0.5845
3	00:00:30	8.4620	0.0000	0.0000	0.5845
4	00:01:00	8.4620	0.0000	0.0000	0.5845
5	00:01:04	8.4620	0.0000	0.0000	0.5845

Consolidation Test Results (Sequence 1) Load 5.000 kPa

Consolidation Graph (Square root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 2) Load 10.000 kPa

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 11-Jun-18

Test Number:

Sample Number: LLO08 ST7

Soil Description:

Boring Number:

Clay (CL), Some Gravel

Depth: 4.6-5.05m

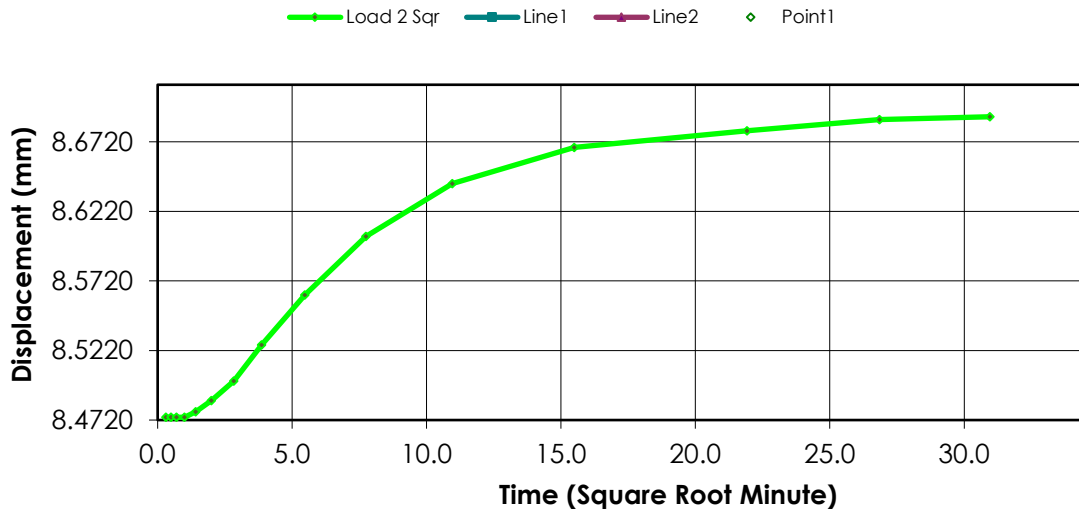
Remarks:

Sample Type: Undisturbed

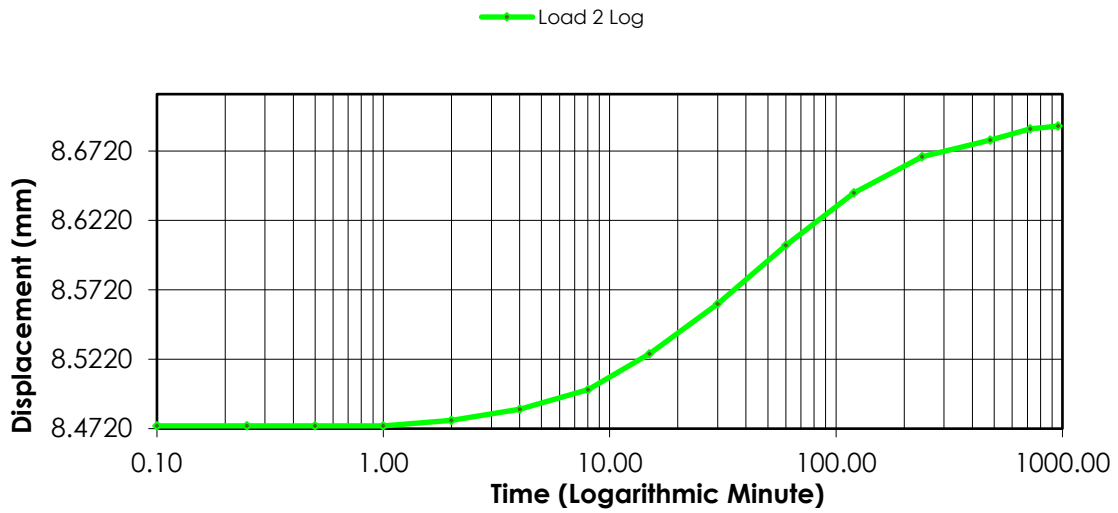
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.4620	0.0000	0.0000	0.5845
1	00:00:06	8.4740	-0.0160	-0.1075	0.5862
2	00:00:15	8.4740	-0.0160	-0.1075	0.5862
3	00:00:30	8.4740	-0.0160	-0.1075	0.5862
4	00:01:00	8.4740	-0.0160	-0.1075	0.5862
5	00:02:00	8.4780	-0.0200	-0.1344	0.5866
6	00:04:01	8.4860	-0.0280	-0.1882	0.5875
7	00:08:01	8.5000	-0.0420	-0.2823	0.5890
8	00:15:01	8.5260	-0.0680	-0.4570	0.5917
9	00:30:03	8.5620	-0.1040	-0.6989	0.5956
10	01:00:05	8.6040	-0.1460	-0.9812	0.6000
11	02:00:09	8.6420	-0.1840	-1.2366	0.6041
12	04:00:18	8.6680	-0.2100	-1.4113	0.6069
13	08:00:35	8.6800	-0.2220	-1.4919	0.6081
14	12:00:52	8.6880	-0.2300	-1.5457	0.6090
15	15:58:21	8.6900	-0.2320	-1.5591	0.6092

**Consolidation Test Results
(Sequence 2) Load 10.000 kPa**

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 3) Load 20.000 kPa

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 11-Jun-18

Test Number:

Sample Number: LLO08 ST7

Soil Description:

Boring Number:

Clay (CL), Some Gravel

Depth: 4.6-5.05m

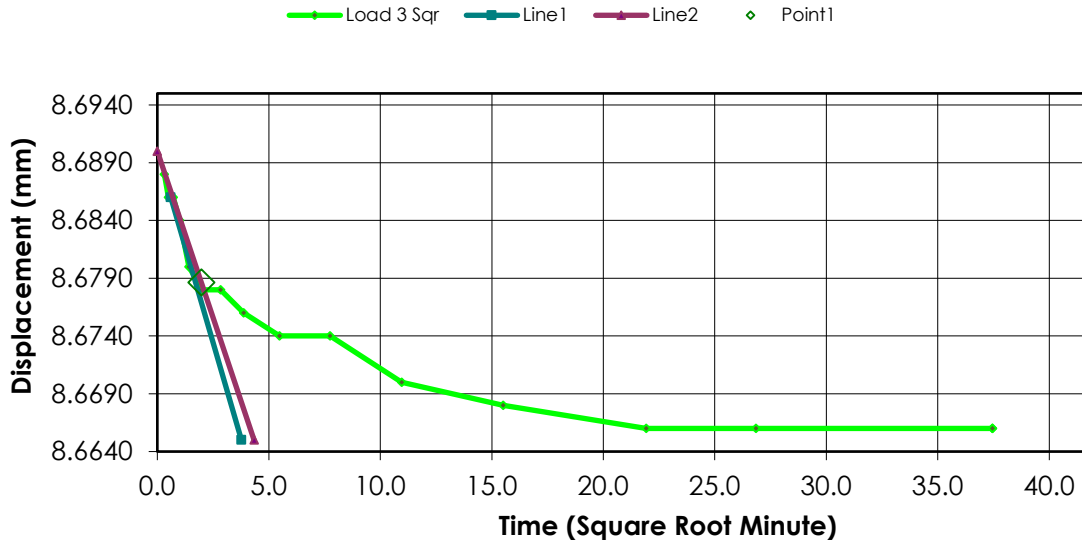
Remarks:

Sample Type: Undisturbed

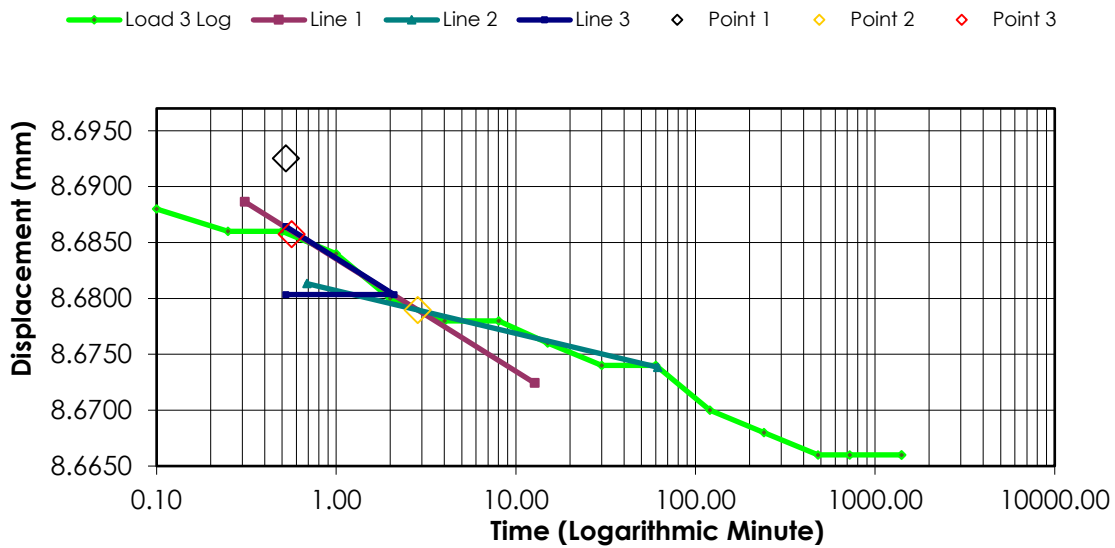
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.6900	-0.2320	-1.5591	0.6092
1	00:00:06	8.6880	-0.2460	-1.6532	0.6107
2	00:00:15	8.6860	-0.2440	-1.6398	0.6105
3	00:00:30	8.6860	-0.2440	-1.6398	0.6105
4	00:01:00	8.6840	-0.2420	-1.6263	0.6103
5	00:02:00	8.6800	-0.2380	-1.5995	0.6098
6	00:04:01	8.6780	-0.2360	-1.5860	0.6096
7	00:08:01	8.6780	-0.2360	-1.5860	0.6096
8	00:15:01	8.6760	-0.2340	-1.5726	0.6094
9	00:30:02	8.6740	-0.2320	-1.5591	0.6092
10	01:00:05	8.6740	-0.2320	-1.5591	0.6092
11	02:00:09	8.6700	-0.2280	-1.5323	0.6088
12	04:00:18	8.6680	-0.2260	-1.5188	0.6086
13	08:00:35	8.6660	-0.2240	-1.5054	0.6084
14	12:00:52	8.6660	-0.2240	-1.5054	0.6084
15	23:22:09	8.6660	-0.2240	-1.5054	0.6084
16	23:22:11	8.6660	-0.2240	-1.5054	0.6084

Consolidation Test Results (Sequence 3) Load 20.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 4) Load 40.000 kPa

Project: SR1

Project Number: 110773396

Location:

Test Date: 11-Jun-18

Job Number:

Test Number:

Sample Number: LLO08 ST7

Soil Description:

Boring Number:

Clay (CL), Some Gravel

Depth: 4.6-5.05m

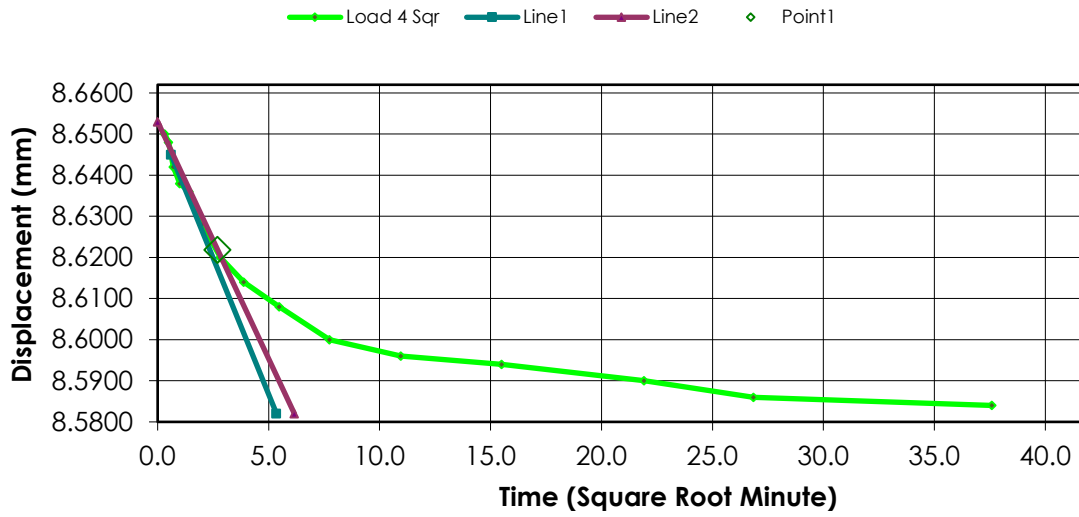
Remarks:

Sample Type: Undisturbed

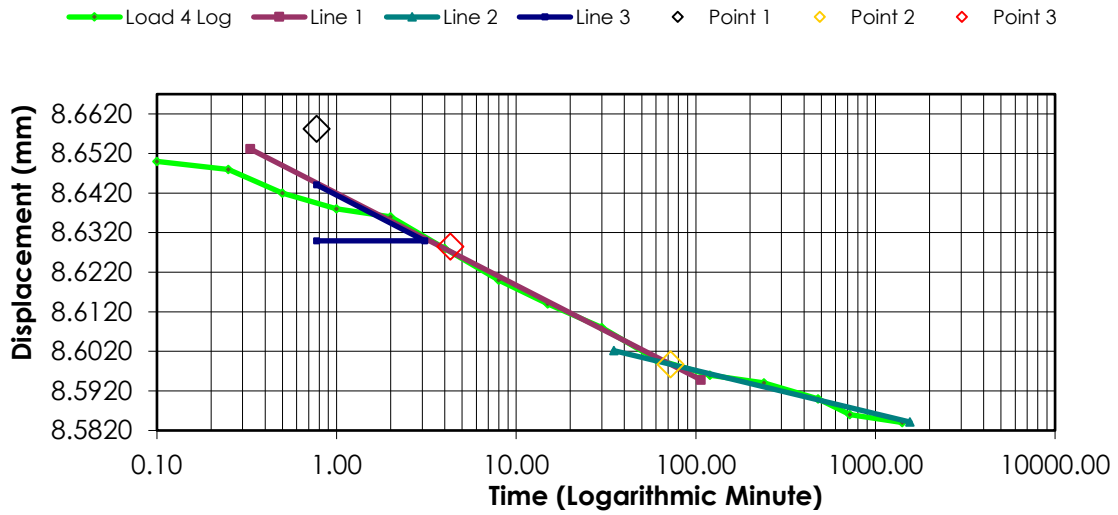
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.6660	-0.2240	-1.5054	0.6084
1	00:00:06	8.6500	-0.2140	-1.4382	0.6073
2	00:00:15	8.6480	-0.2120	-1.4247	0.6071
3	00:00:30	8.6420	-0.2060	-1.3844	0.6064
4	00:01:00	8.6380	-0.2020	-1.3575	0.6060
5	00:02:00	8.6360	-0.2000	-1.3441	0.6058
6	00:04:00	8.6280	-0.1920	-1.2903	0.6049
7	00:08:00	8.6200	-0.1840	-1.2366	0.6041
8	00:15:01	8.6140	-0.1780	-1.1962	0.6035
9	00:30:02	8.6080	-0.1720	-1.1559	0.6028
10	01:00:04	8.6000	-0.1640	-1.1022	0.6020
11	02:00:08	8.5960	-0.1600	-1.0753	0.6015
12	04:00:17	8.5940	-0.1580	-1.0618	0.6013
13	08:00:34	8.5900	-0.1540	-1.0349	0.6009
14	12:00:51	8.5860	-0.1500	-1.0081	0.6005
15	23:33:14	8.5840	-0.1480	-0.9946	0.6003

Consolidation Test Results (Sequence 4) Load 40.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



**Consolidation Test Results
(Sequence 5) Load 80.000 kPa**

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 11-Jun-18

Test Number:

Sample Number: LLO08 ST7

Soil Description:

Boring Number:

Clay (CL), Some Gravel

Depth: 4.6-5.05m

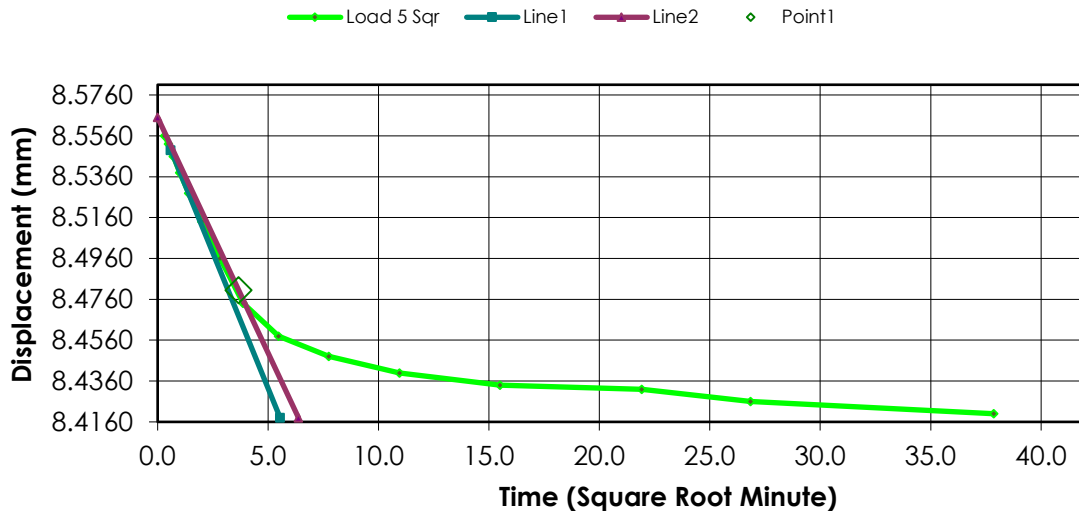
Remarks:

Sample Type: Undisturbed

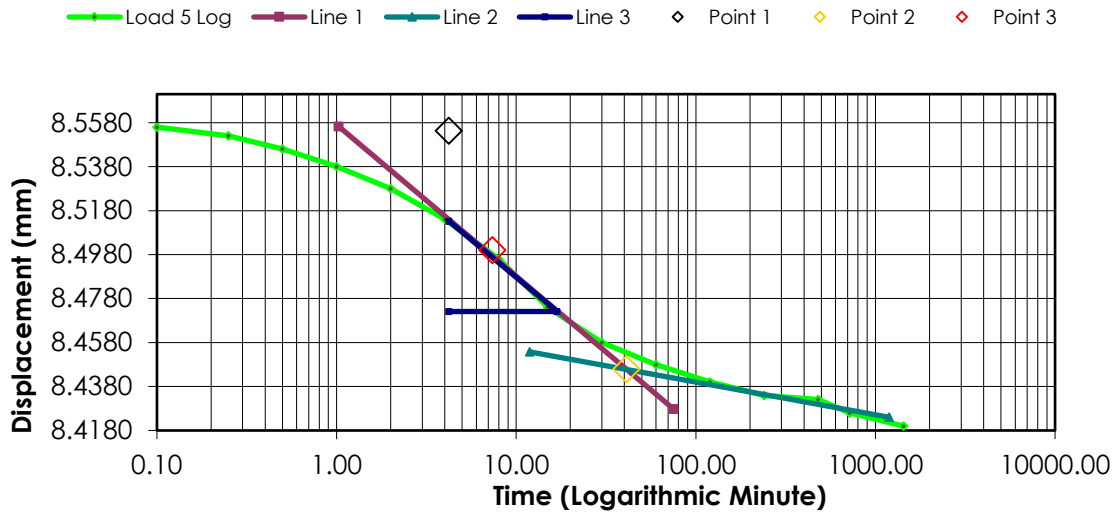
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.5840	-0.1480	-0.9946	0.6003
1	00:00:06	8.5560	-0.1340	-0.9005	0.5988
2	00:00:15	8.5520	-0.1300	-0.8737	0.5983
3	00:00:30	8.5460	-0.1240	-0.8333	0.5977
4	00:01:00	8.5380	-0.1160	-0.7796	0.5969
5	00:02:00	8.5280	-0.1060	-0.7124	0.5958
6	00:04:01	8.5140	-0.0920	-0.6183	0.5943
7	00:08:01	8.4960	-0.0740	-0.4973	0.5924
8	00:15:01	8.4740	-0.0520	-0.3495	0.5900
9	00:30:02	8.4580	-0.0360	-0.2419	0.5883
10	01:00:05	8.4480	-0.0260	-0.1747	0.5873
11	02:00:09	8.4400	-0.0180	-0.1210	0.5864
12	04:00:18	8.4340	-0.0120	-0.0806	0.5858
13	08:00:35	8.4320	-0.0100	-0.0672	0.5856
14	12:00:52	8.4260	-0.0040	-0.0269	0.5849
15	23:53:03	8.4200	0.0020	0.0134	0.5843

Consolidation Test Results (Sequence 5) Load 80.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 6) Load 160.000 kPa

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 11-Jun-18

Test Number:

Sample Number: LLO08 ST7

Soil Description:

Boring Number:

Clay (CL), Some Gravel

Depth: 4.6-5.05m

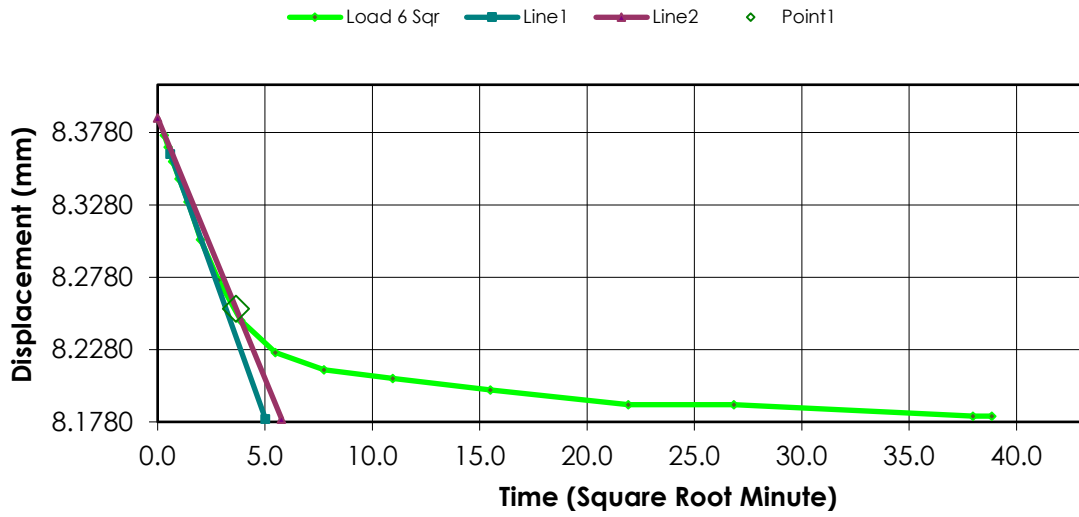
Remarks:

Sample Type: Undisturbed

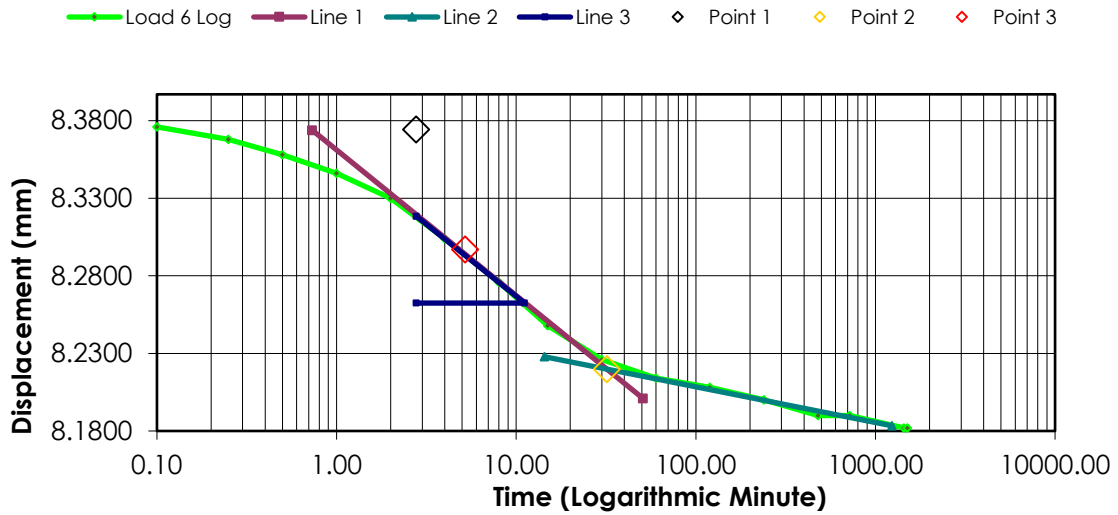
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.4200	0.0020	0.0134	0.5843
1	00:00:06	8.3760	0.0200	0.1344	0.5824
2	00:00:15	8.3680	0.0280	0.1882	0.5815
3	00:00:30	8.3580	0.0380	0.2554	0.5805
4	00:01:00	8.3460	0.0500	0.3360	0.5792
5	00:02:00	8.3300	0.0660	0.4435	0.5775
6	00:04:00	8.3040	0.0920	0.6183	0.5747
7	00:08:00	8.2760	0.1200	0.8065	0.5717
8	00:15:01	8.2480	0.1480	0.9946	0.5687
9	00:30:02	8.2260	0.1700	1.1425	0.5664
10	01:00:04	8.2140	0.1820	1.2231	0.5651
11	02:00:08	8.2080	0.1880	1.2634	0.5645
12	04:00:17	8.2000	0.1960	1.3172	0.5636
13	08:00:34	8.1900	0.2060	1.3844	0.5626
14	12:00:52	8.1900	0.2060	1.3844	0.5626
15	24:01:44	8.1820	0.2140	1.4382	0.5617
16	25:09:01	8.1820	0.2140	1.4382	0.5617

Consolidation Test Results (Sequence 6) Load 160.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 7) Load 320.000 kPa

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 11-Jun-18

Test Number:

Sample Number: LLO08 ST7

Soil Description:

Boring Number:

Clay (CL), Some Gravel

Depth: 4.6-5.05m

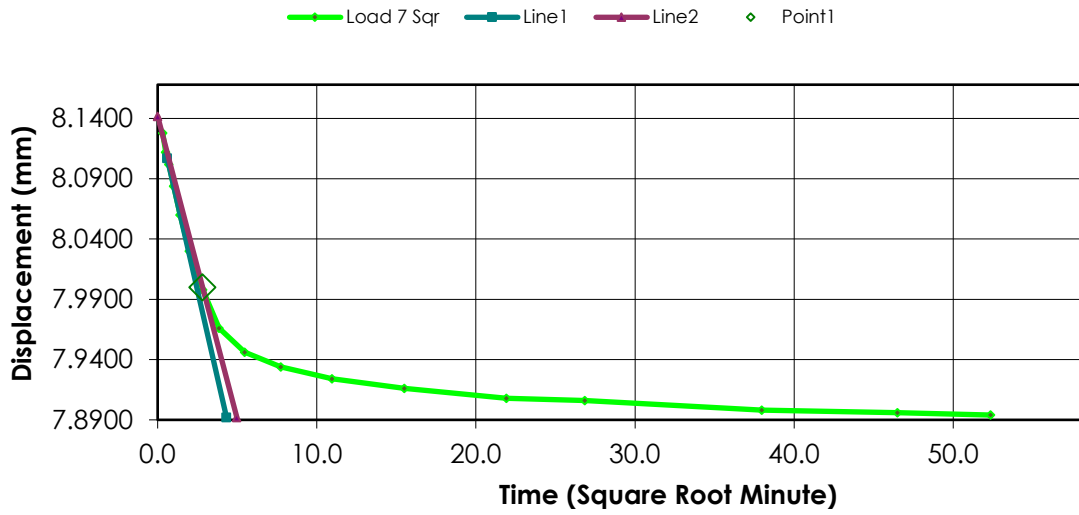
Remarks:

Sample Type: Undisturbed

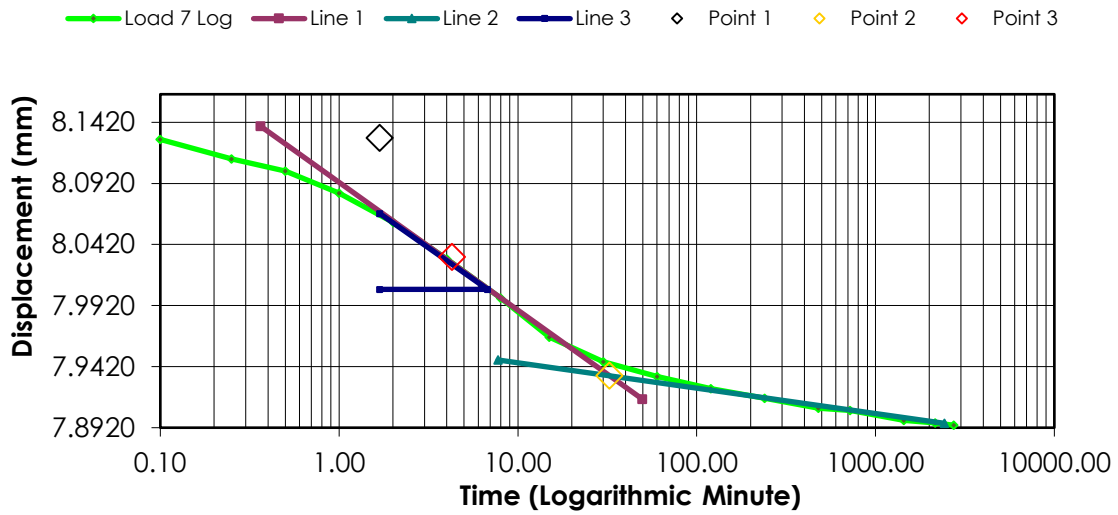
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.1820	0.2140	1.4382	0.5617
1	00:00:06	8.1280	0.2300	1.5457	0.5600
2	00:00:15	8.1120	0.2460	1.6532	0.5583
3	00:00:30	8.1020	0.2560	1.7204	0.5572
4	00:01:00	8.0840	0.2740	1.8414	0.5553
5	00:02:01	8.0600	0.2980	2.0027	0.5528
6	00:04:01	8.0300	0.3280	2.2043	0.5496
7	00:08:01	7.9980	0.3600	2.4194	0.5462
8	00:15:01	7.9660	0.3920	2.6344	0.5428
9	00:30:03	7.9460	0.4120	2.7688	0.5406
10	01:00:05	7.9340	0.4240	2.8495	0.5393
11	02:00:09	7.9240	0.4340	2.9167	0.5383
12	04:00:18	7.9160	0.4420	2.9704	0.5374
13	08:00:35	7.9080	0.4500	3.0242	0.5366
14	12:00:52	7.9060	0.4520	3.0376	0.5364
15	24:01:44	7.8980	0.4600	3.0914	0.5355
16	36:02:36	7.8960	0.4620	3.1048	0.5353
17	45:41:07	7.8940	0.4640	3.1183	0.5351

Consolidation Test Results (Sequence 7) Load 320.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 8) Load 640.000 kPa

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 11-Jun-18

Test Number:

Sample Number: LLO08 ST7

Soil Description:

Boring Number:

Clay (CL), Some Gravel

Depth: 4.6-5.05m

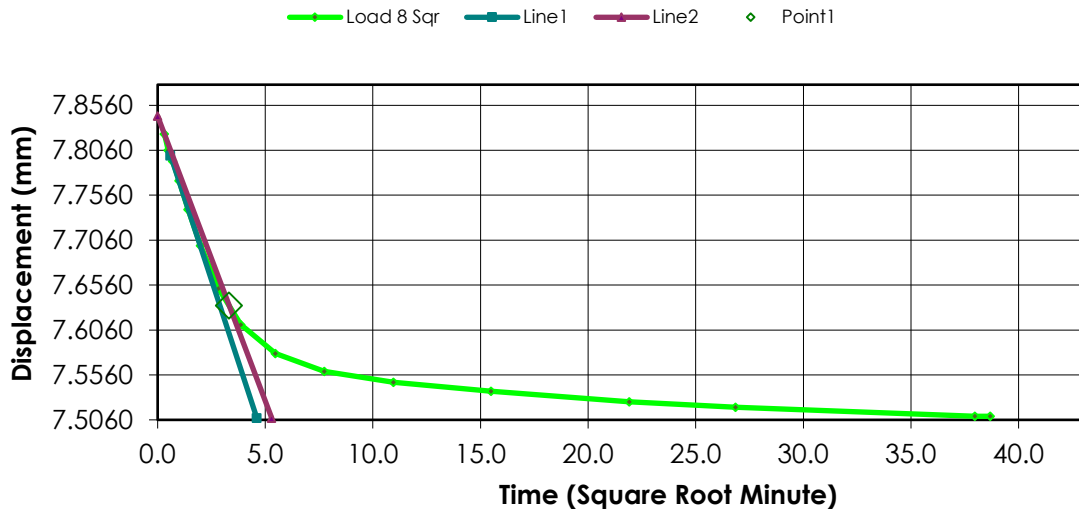
Remarks:

Sample Type: Undisturbed

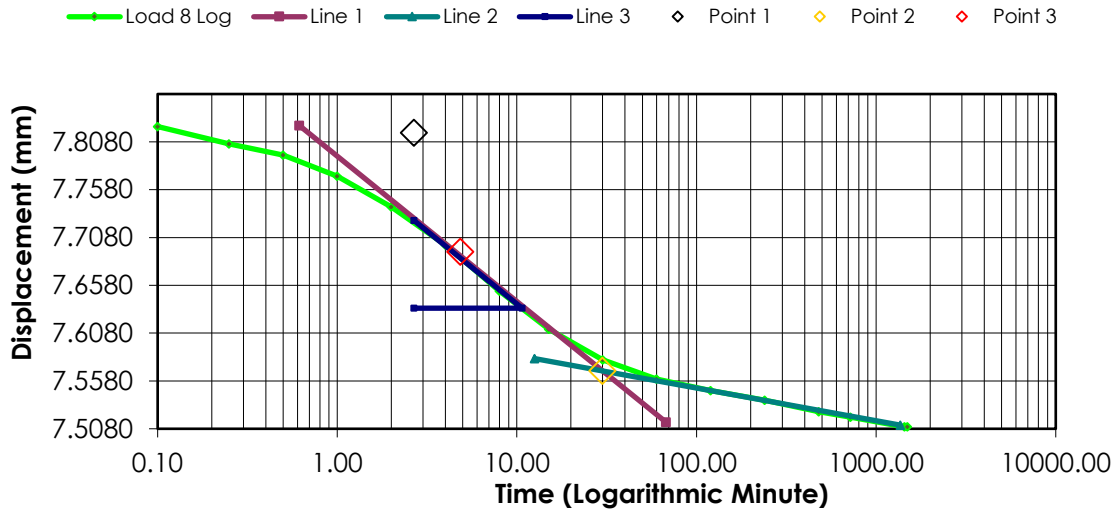
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	7.8940	0.4640	3.1183	0.5351
1	00:00:06	7.8240	0.4840	3.2527	0.5330
2	00:00:15	7.8060	0.5020	3.3737	0.5310
3	00:00:30	7.7940	0.5140	3.4543	0.5298
4	00:01:00	7.7720	0.5360	3.6021	0.5274
5	00:02:00	7.7400	0.5680	3.8172	0.5240
6	00:04:00	7.7000	0.6080	4.0860	0.5198
7	00:08:00	7.6520	0.6560	4.4086	0.5146
8	00:15:01	7.6120	0.6960	4.6774	0.5104
9	00:30:02	7.5800	0.7280	4.8925	0.5070
10	01:00:04	7.5600	0.7480	5.0269	0.5048
11	02:00:08	7.5480	0.7600	5.1075	0.5036
12	04:00:17	7.5380	0.7700	5.1747	0.5025
13	08:00:34	7.5260	0.7820	5.2554	0.5012
14	12:00:52	7.5200	0.7880	5.2957	0.5006
15	24:01:44	7.5100	0.7980	5.3629	0.4995
16	24:57:20	7.5100	0.7980	5.3629	0.4995

Consolidation Test Results (Sequence 8) Load 640.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 9) Rebound 320.000 kPa

Project: SR1
Location:
Job Number:

Project Number: 110773396

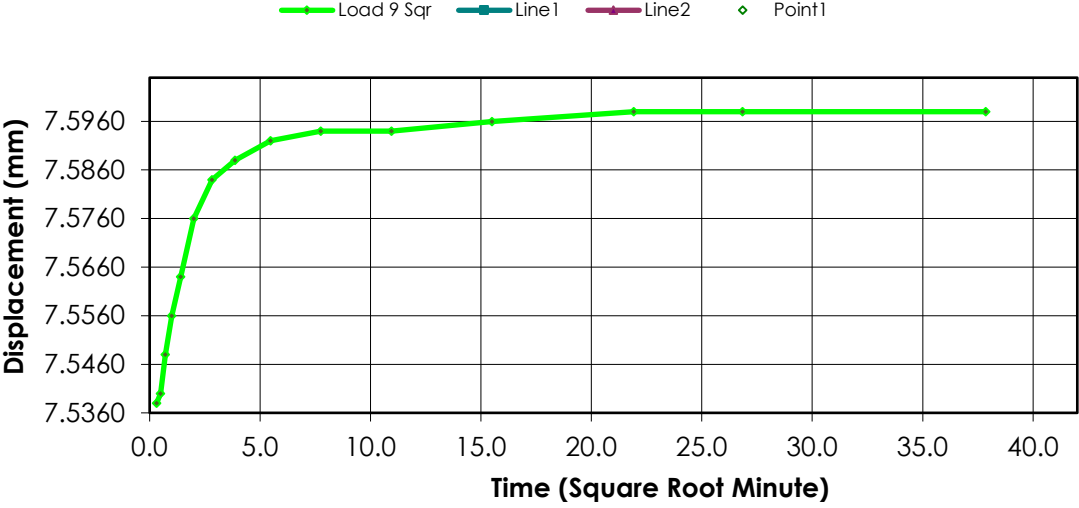
Test Date: 11-Jun-18
Test Number:

Sample Number: LLO08 ST7 **Soil Description:**
Boring Number: Clay (CL), Some Gravel
Depth: 4.6-5.05m **Remarks:**
Sample Type: Undisturbed

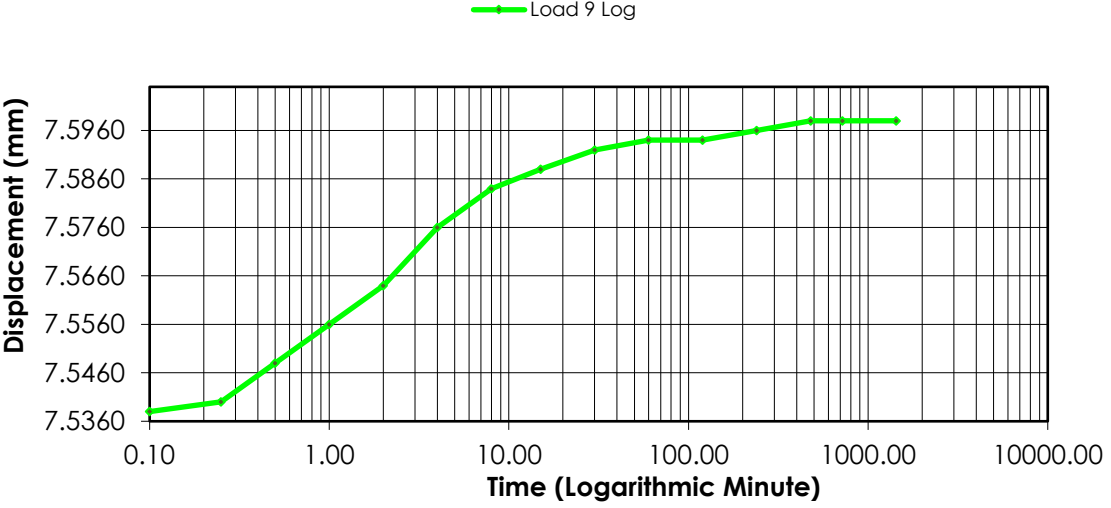
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	7.5100	0.7980	5.3629	0.4995
1	00:00:06	7.5380	0.7860	5.2823	0.5008
2	00:00:15	7.5400	0.7840	5.2688	0.5010
3	00:00:30	7.5480	0.7760	5.2151	0.5019
4	00:01:00	7.5560	0.7680	5.1613	0.5027
5	00:02:00	7.5640	0.7600	5.1075	0.5036
6	00:04:00	7.5760	0.7480	5.0269	0.5048
7	00:08:00	7.5840	0.7400	4.9731	0.5057
8	00:15:01	7.5880	0.7360	4.9462	0.5061
9	00:30:02	7.5920	0.7320	4.9194	0.5066
10	01:00:04	7.5940	0.7300	4.9059	0.5068
11	02:00:09	7.5940	0.7300	4.9059	0.5068
12	04:00:17	7.5960	0.7280	4.8925	0.5070
13	08:00:34	7.5980	0.7260	4.8790	0.5072
14	12:00:52	7.5980	0.7260	4.8790	0.5072
15	23:53:13	7.5980	0.7260	4.8790	0.5072

Consolidation Test Results (Sequence 9) Rebound 320.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 10) Rebound 160.000 kPa

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 11-Jun-18

Test Number:

Sample Number: LLO08 ST7

Soil Description:

Boring Number:

Clay (CL), Some Gravel

Depth: 4.6-5.05m

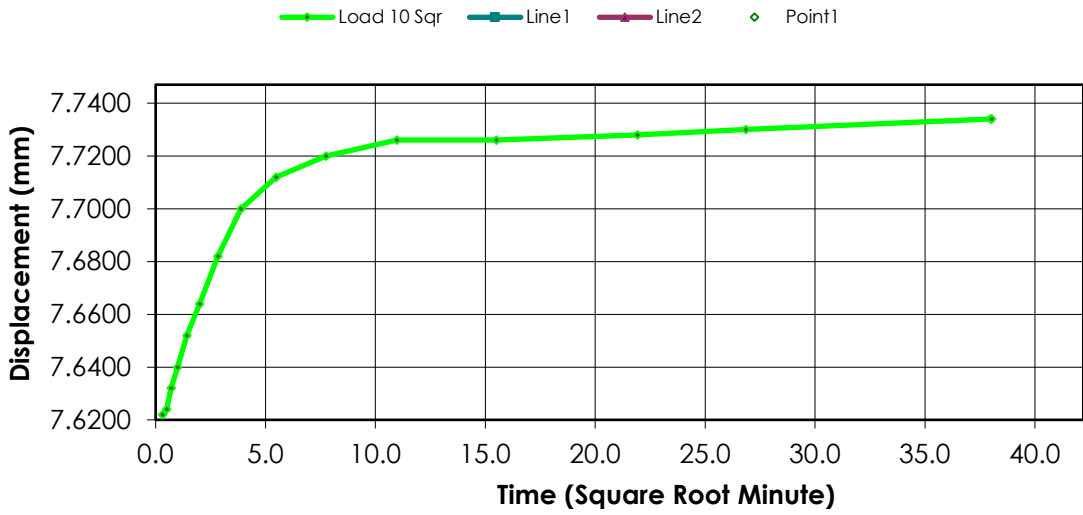
Remarks:

Sample Type: Undisturbed

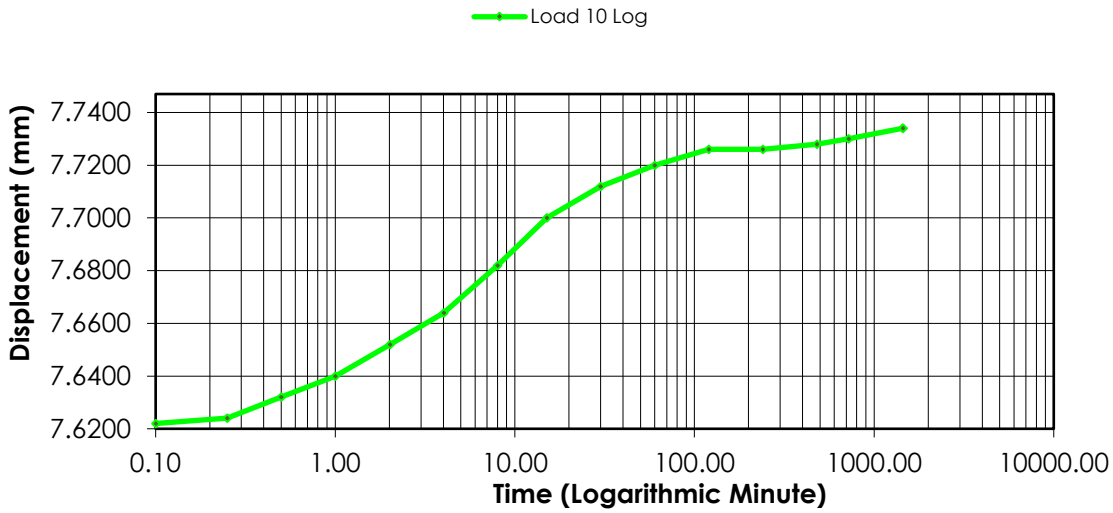
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	7.5980	0.7260	4.8790	0.5072
1	00:00:06	7.6220	0.7160	4.8118	0.5083
2	00:00:15	7.6240	0.7140	4.7984	0.5085
3	00:00:30	7.6320	0.7060	4.7446	0.5093
4	00:01:00	7.6400	0.6980	4.6909	0.5102
5	00:02:01	7.6520	0.6860	4.6102	0.5115
6	00:04:01	7.6640	0.6740	4.5296	0.5127
7	00:08:01	7.6820	0.6560	4.4086	0.5146
8	00:15:02	7.7000	0.6380	4.2876	0.5166
9	00:30:03	7.7120	0.6260	4.2070	0.5178
10	01:00:05	7.7200	0.6180	4.1532	0.5187
11	02:00:09	7.7260	0.6120	4.1129	0.5193
12	04:00:17	7.7260	0.6120	4.1129	0.5193
13	08:00:35	7.7280	0.6100	4.0995	0.5195
14	12:00:52	7.7300	0.6080	4.0860	0.5198
15	24:01:42	7.7340	0.6040	4.0591	0.5202
16	24:05:51	7.7340	0.6040	4.0591	0.5202

Consolidation Test Results
(Sequence 10) Rebound 160.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 11) Load 320.000 kPa

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 11-Jun-18

Test Number:

Sample Number: LLO08 ST7

Soil Description:

Boring Number:

Clay (CL), Some Gravel

Depth: 4.6-5.05m

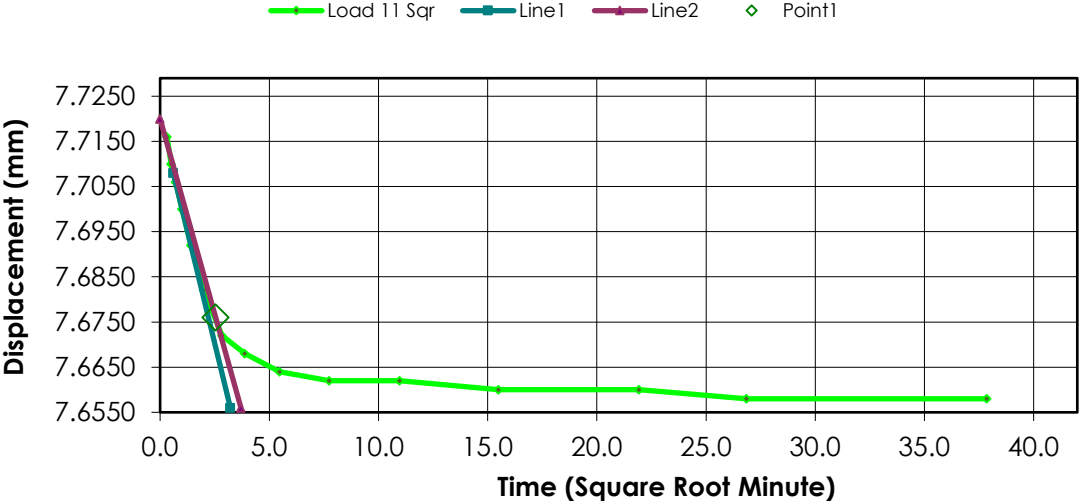
Remarks:

Sample Type: Undisturbed

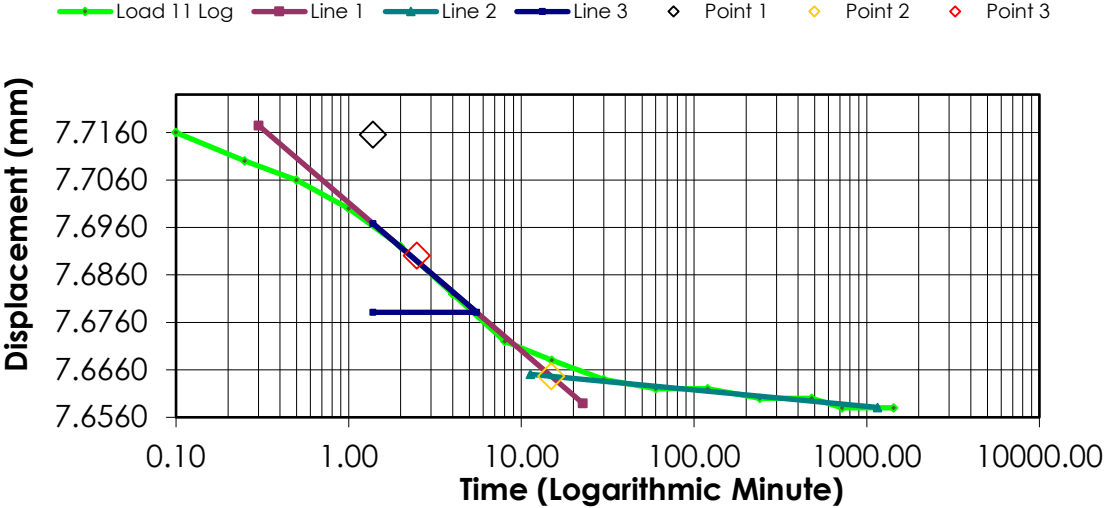
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	7.7340	0.6040	4.0591	0.5202
1	00:00:06	7.7160	0.6140	4.1263	0.5191
2	00:00:15	7.7100	0.6200	4.1667	0.5185
3	00:00:30	7.7060	0.6240	4.1935	0.5181
4	00:01:00	7.7000	0.6300	4.2339	0.5174
5	00:02:00	7.6920	0.6380	4.2876	0.5166
6	00:04:00	7.6820	0.6480	4.3548	0.5155
7	00:08:01	7.6720	0.6580	4.4220	0.5144
8	00:15:01	7.6680	0.6620	4.4489	0.5140
9	00:30:02	7.6640	0.6660	4.4758	0.5136
10	01:00:04	7.6620	0.6680	4.4892	0.5134
11	02:00:09	7.6620	0.6680	4.4892	0.5134
12	04:00:17	7.6600	0.6700	4.5027	0.5132
13	08:00:34	7.6600	0.6700	4.5027	0.5132
14	12:00:52	7.6580	0.6720	4.5161	0.5129
15	23:53:14	7.6580	0.6720	4.5161	0.5129

Consolidation Test Results (Sequence 11) Load 320.000 kPa

Consolidation Graph (Square Root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 12) Load 640.000 kPa

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 11-Jun-18

Test Number:

Sample Number: LLO08 ST7

Soil Description:

Boring Number:

Clay (CL), Some Gravel

Depth: 4.6-5.05m

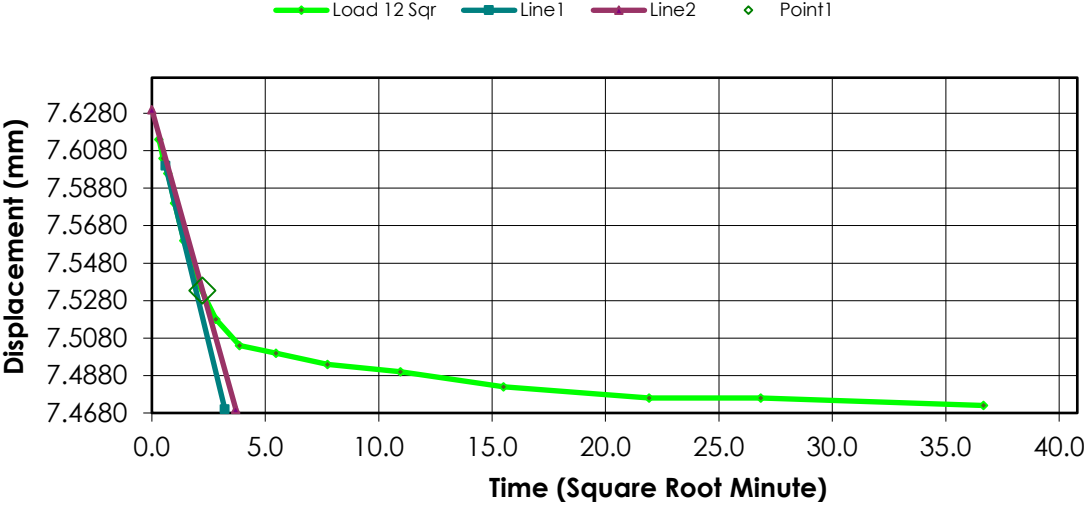
Remarks:

Sample Type: Undisturbed

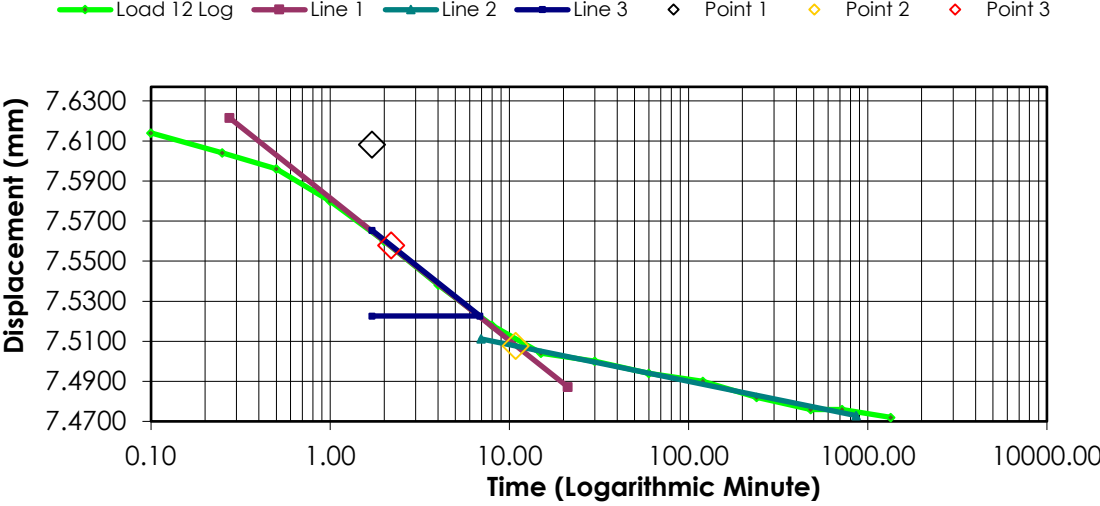
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	7.6580	0.6720	4.5161	0.5129
1	00:00:06	7.6140	0.6940	4.6640	0.5106
2	00:00:15	7.6040	0.7040	4.7312	0.5095
3	00:00:30	7.5960	0.7120	4.7849	0.5087
4	00:01:00	7.5800	0.7280	4.8925	0.5070
5	00:02:00	7.5600	0.7480	5.0269	0.5048
6	00:04:01	7.5380	0.7700	5.1747	0.5025
7	00:08:01	7.5180	0.7900	5.3091	0.5004
8	00:15:01	7.5040	0.8040	5.4032	0.4989
9	00:30:02	7.5000	0.8080	5.4301	0.4985
10	01:00:05	7.4940	0.8140	5.4704	0.4978
11	02:00:09	7.4900	0.8180	5.4973	0.4974
12	04:00:18	7.4820	0.8260	5.5511	0.4965
13	08:00:35	7.4760	0.8320	5.5914	0.4959
14	12:00:53	7.4760	0.8320	5.5914	0.4959
15	22:24:26	7.4720	0.8360	5.6183	0.4955

Consolidation Test Results (Sequence 12) Load 640.000 kPa

Consolidation Graph (Square root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 13) Load 1280.000 kPa

Project: SR1
Location:
Job Number:

Project Number: 110773396

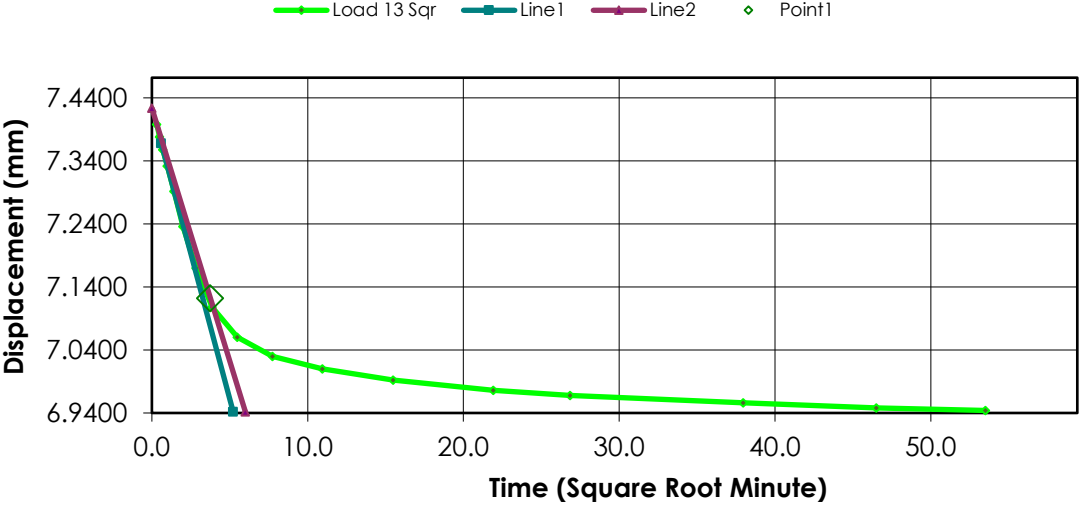
Test Date: 11-Jun-18
Test Number:

Sample Number: LLO08 ST7 **Soil Description:**
Boring Number: Clay (CL), Some Gravel
Depth: 4.6-5.05m **Remarks:**
Sample Type: Undisturbed

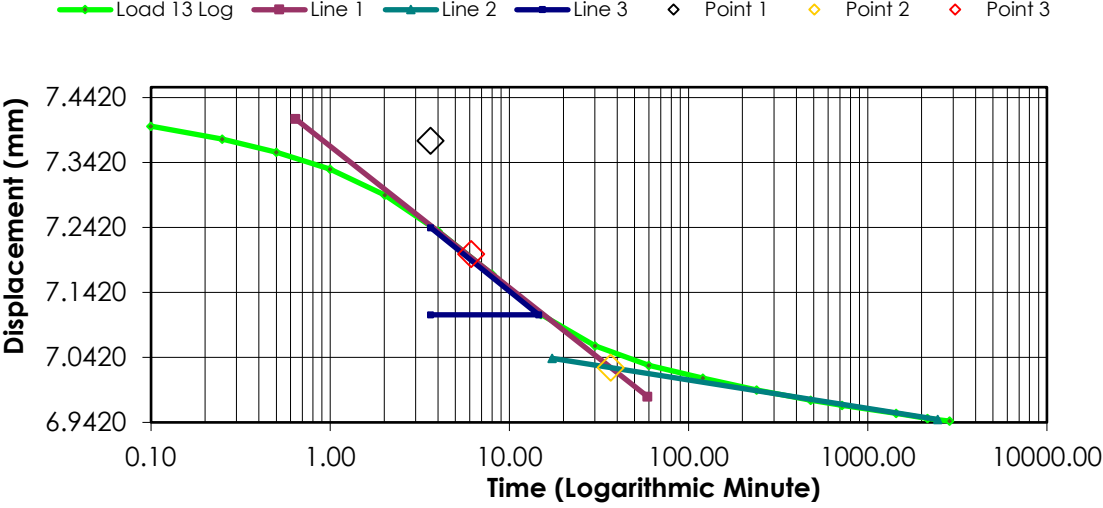
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	7.4720	0.8360	5.6183	0.4955
1	00:00:06	7.3980	0.8460	5.6855	0.4944
2	00:00:15	7.3780	0.8660	5.8199	0.4923
3	00:00:30	7.3580	0.8860	5.9543	0.4902
4	00:01:00	7.3320	0.9120	6.1290	0.4874
5	00:02:01	7.2920	0.9520	6.3979	0.4831
6	00:04:01	7.2360	1.0080	6.7742	0.4772
7	00:08:01	7.1700	1.0740	7.2177	0.4701
8	00:15:01	7.1080	1.1360	7.6344	0.4635
9	00:30:03	7.0600	1.1840	7.9570	0.4584
10	01:00:05	7.0300	1.2140	8.1586	0.4552
11	02:00:09	7.0100	1.2340	8.2930	0.4531
12	04:00:18	6.9920	1.2520	8.4140	0.4512
13	08:00:35	6.9760	1.2680	8.5215	0.4495
14	12:00:53	6.9680	1.2760	8.5753	0.4486
15	24:01:45	6.9560	1.2880	8.6559	0.4473
16	36:02:37	6.9480	1.2960	8.7097	0.4465
17	47:42:46	6.9440	1.3000	8.7366	0.4461

Consolidation Test Results (Sequence 13) Load 1280.000 kPa

Consolidation Graph (Squareroot Time)



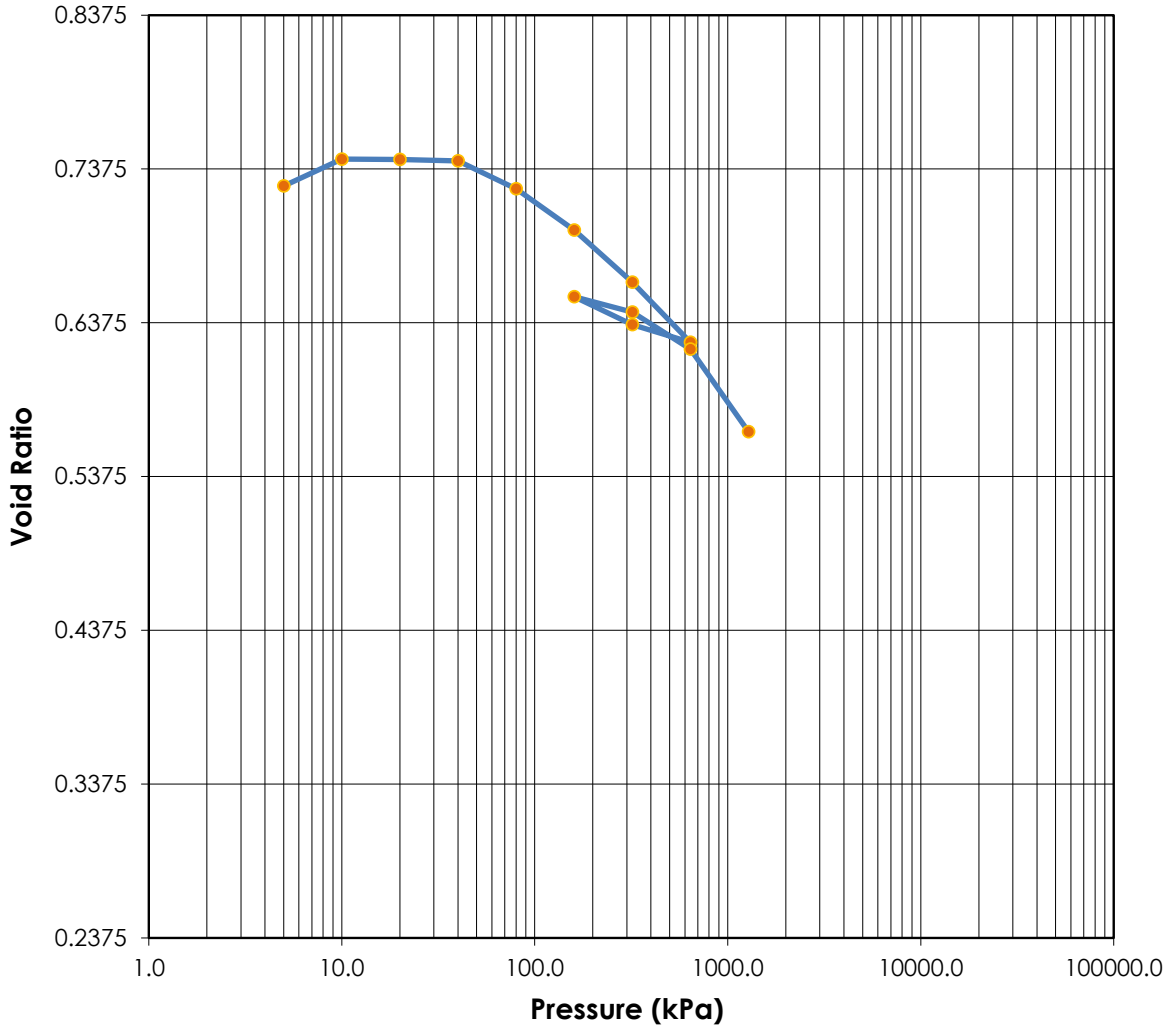
Consolidation Graph (Logarithmic Time)





Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876



	Before	After	Liquid Limits:	59	Test Date:	25-May-18
Moisture (%):	25.6	27.8	Plastic Limits:	20		
Dry Density (g/cm³):	1.562	1.664	Plasticity Index (%):	39		
Saturation (%):	95	100				
Void Ratio:	0.7244	0.5654	Specific Gravity:	2.70	Assumed	
Soil Description:	Clay (CH)					
Project Number:	110773396	Depth:	3.0-3.45m			
Sample Number:	LLO12 ST4	Boring Number:				
Project:	SR1					Remarks:
Client:	Alberta Transportation					
Location:						

Tested By: E. Wahl

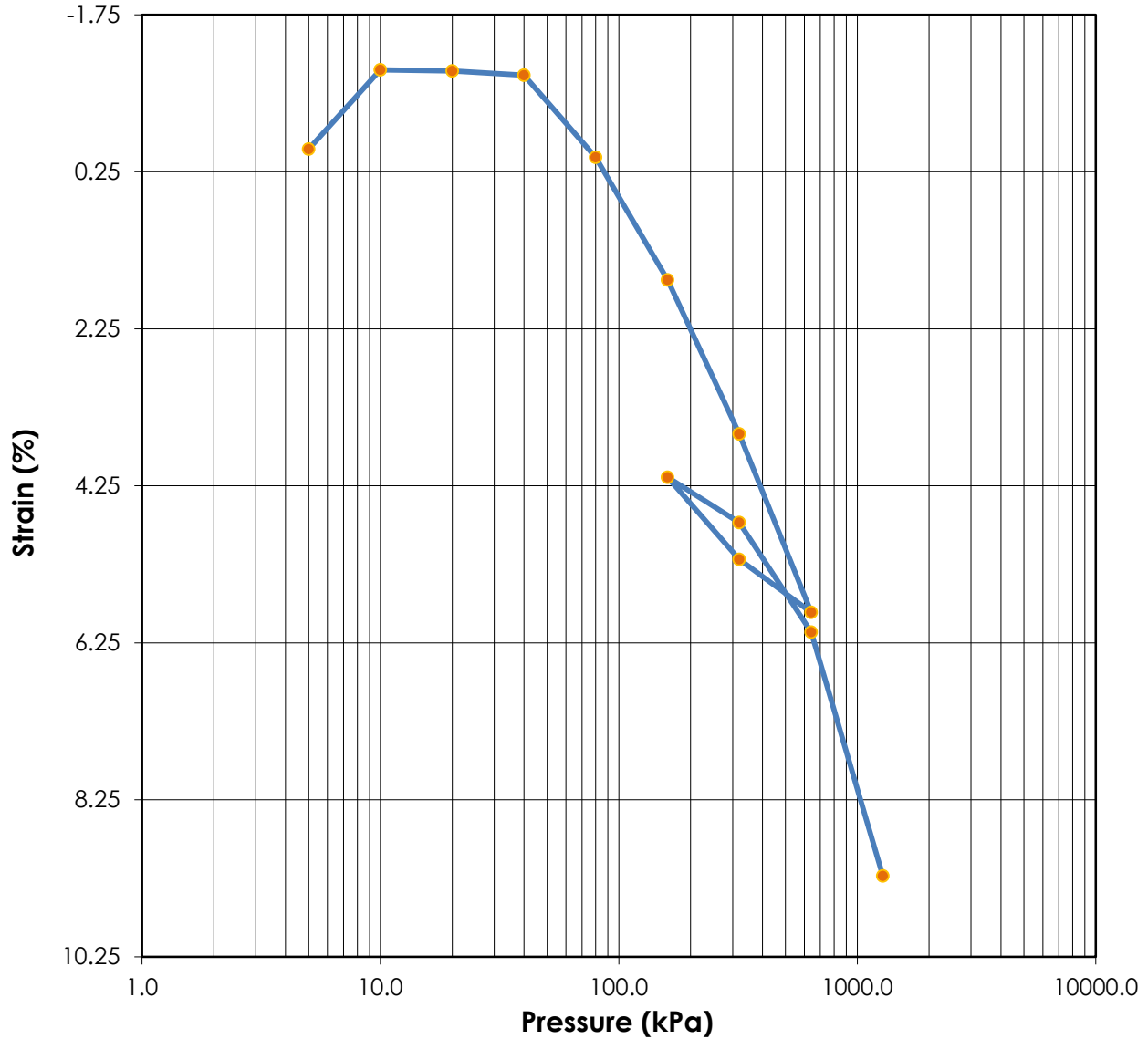
Reviewed By: C. Lamoureux

Reporting of these test results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request. The data presented above is for the sole use of the client stipulated above. Stantec is not responsible, nor can be held liable, for the use of this report by any other party, with or without the knowledge of Stantec.



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876

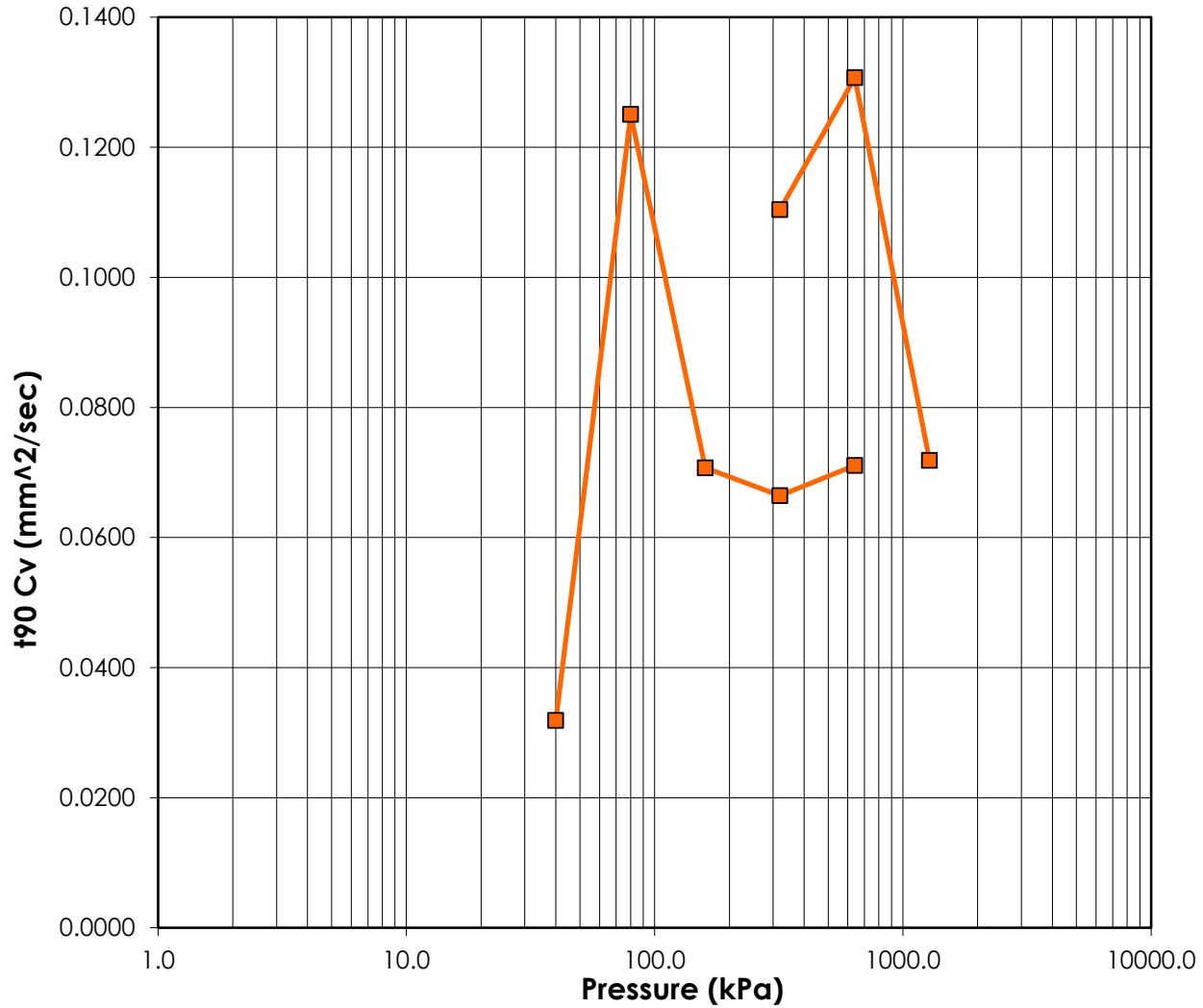


	Before	After	Liquid Limits:	59	Test Date:	25-May-18
Moisture (%):	25.6	27.8	Plastic Limits:	20		
Dry Density (g/cm3):	1.562	1.664	Plasticity Index (%):	39		
Saturation (%):	95	100	Specific Gravity:	2.70	Assumed	
Void Ratio:	0.7244	0.5654				
Sample Description:	Clay (CH)					
Project Number:	110773396	Depth:	3.0-3.45m			
Sample Number:	LLO12 ST4	Boring Number:				
Project:	SR1					Remarks:
Client:	Alberta Transportation					
Location:						



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876



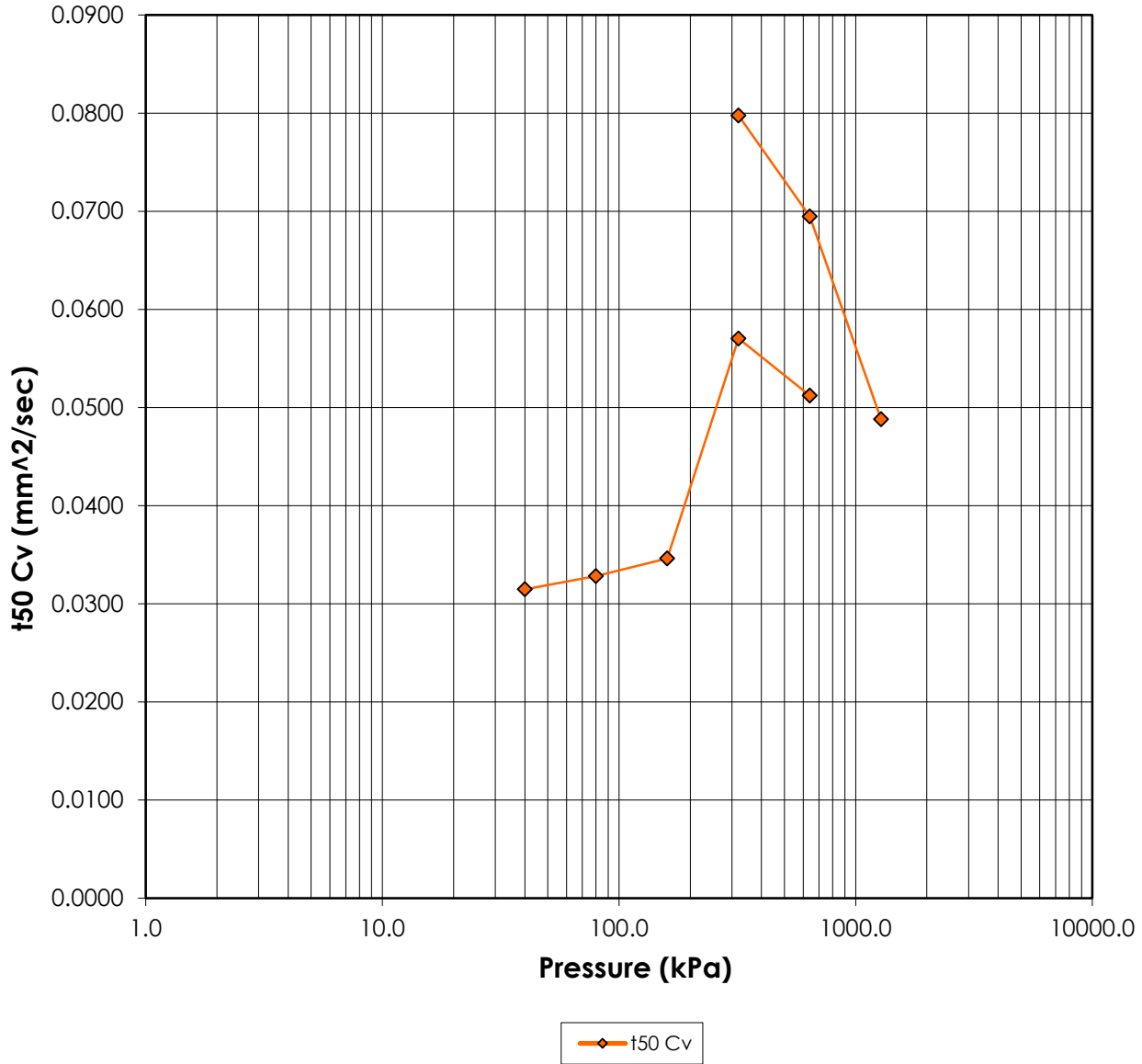
—■— $t_{90} C_v$

	Before	After	Liquid Limits:	59	Test Date:	25-May-18
Moisture (%):	25.6	27.8	Plastic Limits:	20		
Dry Density (g/cm³):	1.562	1.664	Plasticity Index (%):	39		
Saturation (%):	95	100				
Void Ratio:	0.7244	0.5654	Specific Gravity:	2.70	Assumed	
Soil Description:	Clay (CH)					
Project Number:	110773396	Depth:	3.0-3.45m			
Sample Number:	LLO12 ST4	Boring Number:				
Project:	SR1					Remarks:
Client:	Alberta Transportation					
Location:						



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One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
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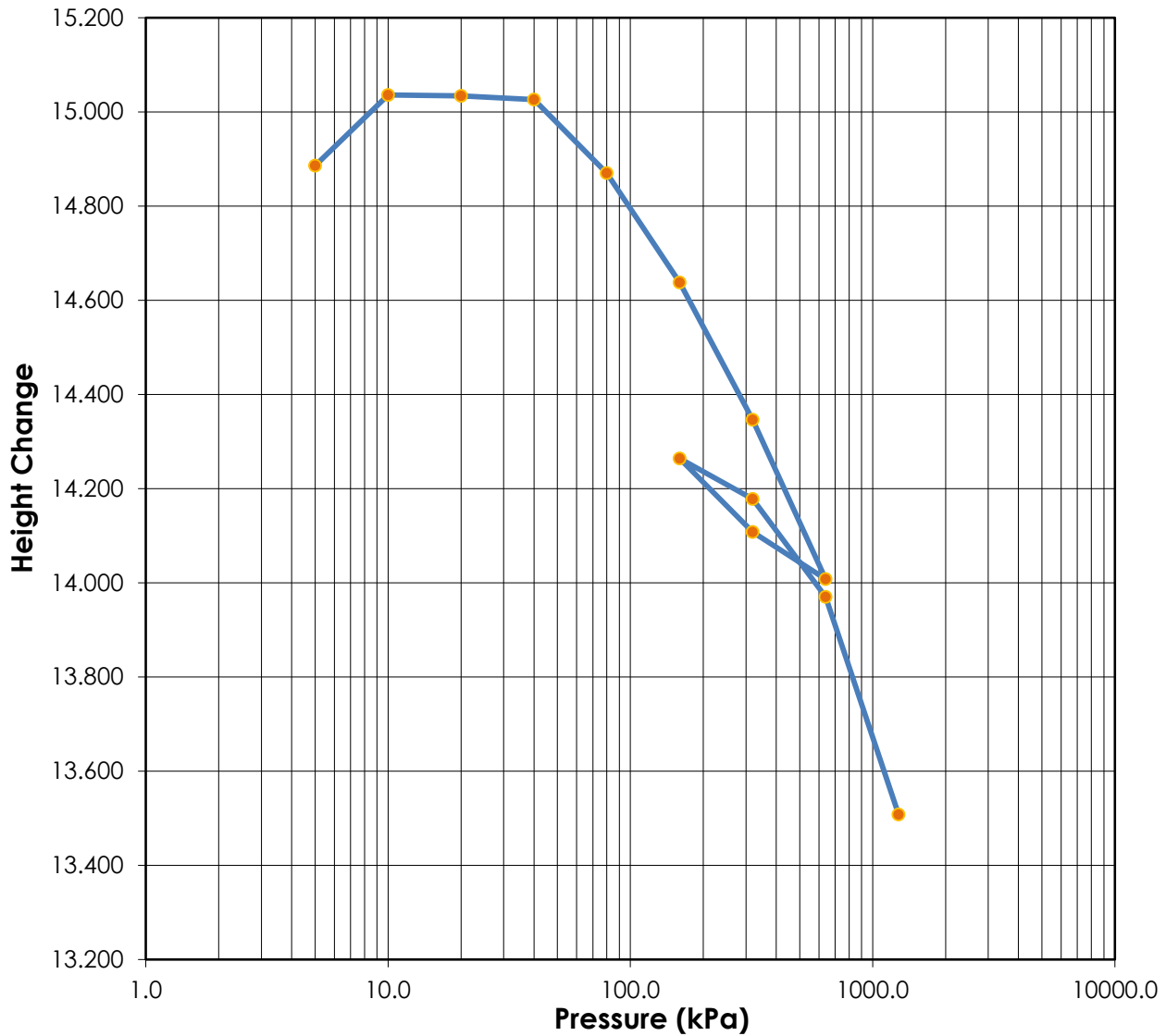


	Before	After	Liquid Limits:	59	Test Date:	25-May-18
Moisture (%):	25.6	27.8	Plastic Limits:	20		
Dry Density (g/cm³):	1.562	1.664	Plasticity Index (%):	39		
Saturation (%):	95	100				
Void Ratio:	0.7244	0.5654	Specific Gravity:	2.70	Assumed	
Soil Description:	Clay (CH)					
Project Number:	110773396	Depth:	3.0-3.45m			
Sample Number:	LLO12 ST4	Boring Number:				
Project:	SR1					Remarks:
Client:	Alberta Transportation					
Location:						



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876



	Before	After	Liquid Limits:	59	Test Date:	25-May-18
Moisture (%):	25.6	27.8	Plastic Limits:	20		
Dry Density (g/cm3):	1.562	1.664	Plasticity Index (%):	39		
Saturation (%):	95	100	Specific Gravity:	2.70	Assumed	
Void Ratio:	0.7244	0.5654				
Soil Description:	Clay (CH)					
Project Number:	110773396	Depth:	3.0-3.45m			
Sample Number:	LLO12 ST4	Boring Number:				
Project:	SR1					Remarks:
Client:	Alberta Transportation					
Location:						

Consolidation Test Results Summary

Project: SR1

Project Number: 110773396

Location:

Job Number:

Sample Number: LLO12 ST4

Sample Description:

Boring Number:

Clay (CH)

Depth: 3.0-3.45m

Remarks:

Test Number:

Sample Type: Undisturbed

Test Date: 25-May-18

Index	Load Sequence (kPa)	Cummulative Change in Height (mm)	Specimen Height (mm)	Height of Void (mm)	Vertical Strain (%)	Void Ratio	t90 Fitting Time (min)	t50 Fitting Time (min)	t90 Cv (mm ² /sec)	t50 Cv (mm ² /sec)
0	0.000	0.0000	14.8800	6.2581	0.00	0.7258	0.000	0.000	0.000	0.000
1	5.000	-0.0060	14.8860	6.2641	-0.04	0.7265	0.000	0.000	0.000	0.000
2	10.000	-0.1560	15.0360	6.4141	-1.05	0.7439	0.000	0.000	0.000	0.000
3	20.000	-0.1540	15.0340	6.4121	-1.03	0.7437	0.000	0.000	0.000	0.000
4	40.000	-0.1460	15.0260	6.4041	-0.98	0.7428	25.041	5.888	0.032	0.031
5	80.000	0.0100	14.8700	6.2481	0.07	0.7247	6.247	5.531	0.125	0.033
6	160.000	0.2420	14.6380	6.0161	1.63	0.6978	10.709	5.081	0.071	0.035
7	320.000	0.5340	14.3460	5.7241	3.59	0.6639	10.948	2.962	0.066	0.057
8	640.000	0.8720	14.0080	5.3861	5.86	0.6247	9.754	3.144	0.071	0.051
9	320.000	0.7720	14.1080	5.4861	5.19	0.6363	0.000	0.000	0.000	0.000
10	160.000	0.6160	14.2640	5.6421	4.14	0.6544	0.000	0.000	0.000	0.000
11	320.000	0.7020	14.1780	5.5561	4.72	0.6444	6.434	2.069	0.110	0.080
12	640.000	0.9100	13.9700	5.3481	6.12	0.6203	5.276	2.306	0.131	0.069
13	1280.000	1.3720	13.5080	4.8861	9.22	0.5667	8.973	3.069	0.072	0.049

Predicted value indicated with *

Consolidation Test Consolidation Specimen Information

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 25-May-18

Sample Number: LLO12 ST4

Sample Description:

Boring Number:

Clay (CH)

Depth: 3.0-3.45m

Remarks:

Sample Type: Undisturbed

Test Number:

Liquid Limit: 59

Initial Void Ratio: 0.7244

Initial Height (mm): 14.88

Plastic Limit: 20

Plasticity Index (%): 39

Initial Diameter (mm): 50.00

Specific Gravity: 2.70

Weight of Ring (g): 61.13

Assumed

Parameters	Initial Specimen	Final Specimen
Moist Weight + Container (g)	125.57	60.18
Dry Soil + Container (g)	100.69	47.94
Weight of Container (g)	3.70	3.93
Moisture Content (%)	25.6	27.8
Void Ratio	0.7244	0.5654
Saturation (%)	95	100
Dry Density (g/cm ³)	1.562	1.664

**Consolidation Test Results
(Sequence 1) Load 5.000 kPa**

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 25-May-18

Test Number:

Sample Number: LLO12 ST4

Soil Description:

Boring Number:

Clay (CH)

Depth: 3.0-3.45m

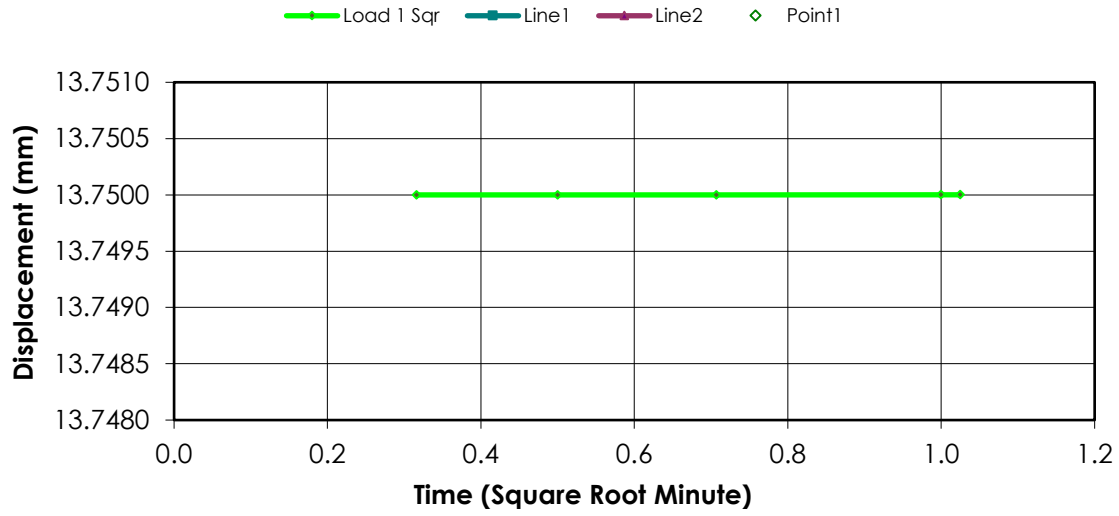
Remarks:

Sample Type: Undisturbed

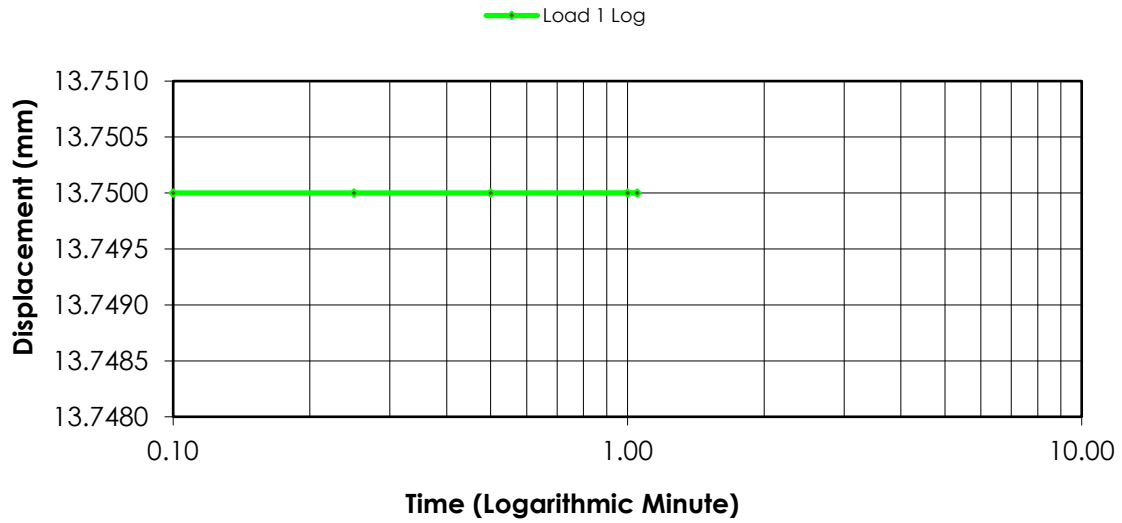
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	13.7500	0.0000	0.0000	0.7244
1	00:00:06	13.7500	-0.0060	-0.0403	0.7251
2	00:00:15	13.7500	-0.0060	-0.0403	0.7251
3	00:00:30	13.7500	-0.0060	-0.0403	0.7251
4	00:01:00	13.7500	-0.0060	-0.0403	0.7251
5	00:01:03	13.7500	-0.0060	-0.0403	0.7251

Consolidation Test Results (Sequence 1) Load 5.000 kPa

Consolidation Graph (Square root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 2) Load 10.000 kPa

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 25-May-18

Test Number:

Sample Number: LLO12 ST4

Soil Description:

Boring Number:

Clay (CH)

Depth: 3.0-3.45m

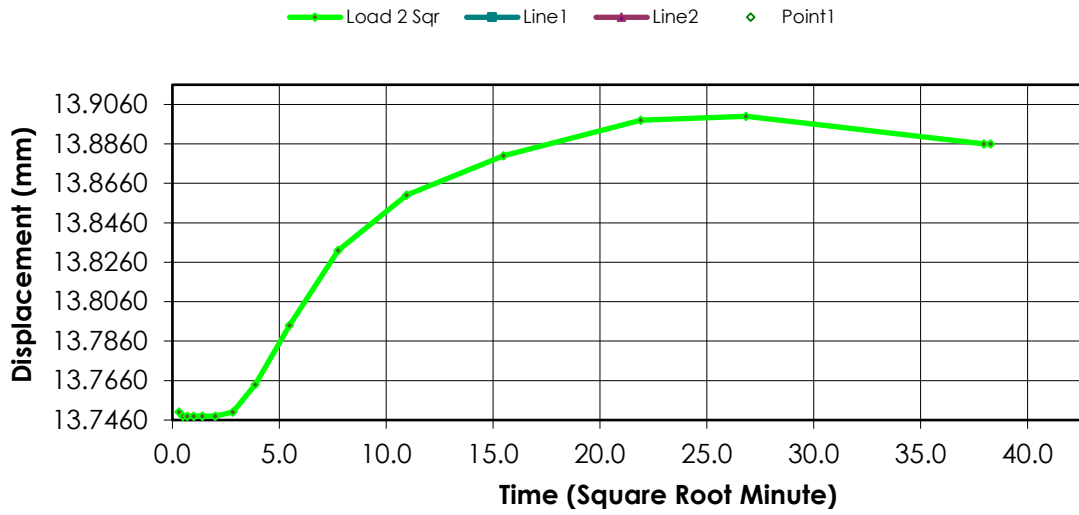
Remarks:

Sample Type: Undisturbed

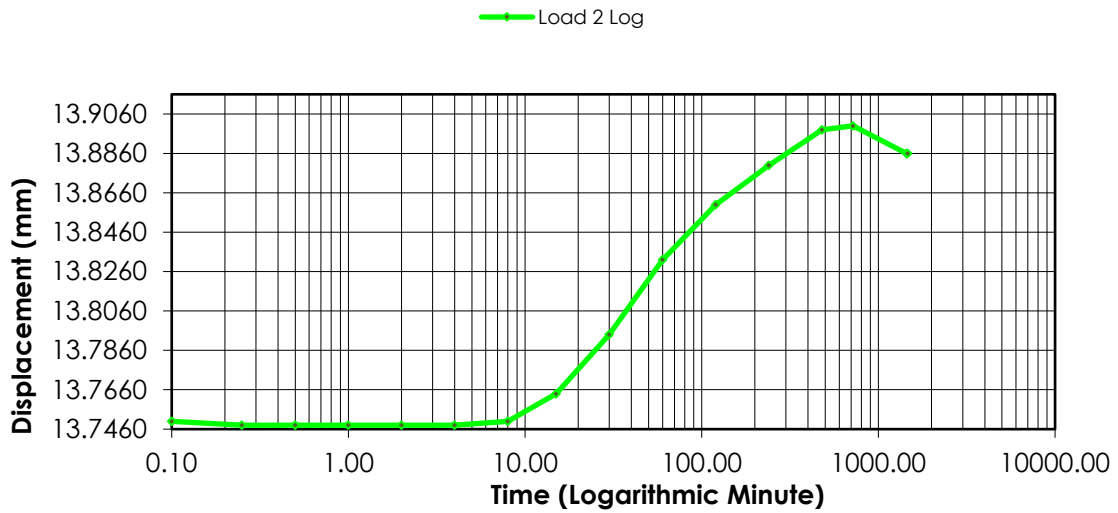
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	13.7500	-0.0060	-0.0403	0.7251
1	00:00:06	13.7500	-0.0200	-0.1344	0.7268
2	00:00:15	13.7480	-0.0180	-0.1210	0.7265
3	00:00:30	13.7480	-0.0180	-0.1210	0.7265
4	00:01:00	13.7480	-0.0180	-0.1210	0.7265
5	00:02:00	13.7480	-0.0180	-0.1210	0.7265
6	00:04:00	13.7480	-0.0180	-0.1210	0.7265
7	00:08:00	13.7500	-0.0200	-0.1344	0.7268
8	00:15:01	13.7640	-0.0340	-0.2285	0.7284
9	00:30:01	13.7940	-0.0640	-0.4301	0.7319
10	01:00:02	13.8320	-0.1020	-0.6855	0.7363
11	02:00:04	13.8600	-0.1300	-0.8737	0.7395
12	04:00:07	13.8800	-0.1500	-1.0081	0.7418
13	08:00:13	13.8980	-0.1680	-1.1290	0.7439
14	12:00:20	13.9000	-0.1700	-1.1425	0.7441
15	24:00:50	13.8860	-0.1560	-1.0484	0.7425
16	24:24:57	13.8860	-0.1560	-1.0484	0.7425

Consolidation Test Results (Sequence 2) Load 10.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 3) Load 20.000 kPa

Project: SR1

Project Number: 110773396

Location:

Test Date: 25-May-18

Job Number:

Test Number:

Sample Number: LLO12 ST4

Soil Description:

Boring Number:

Clay (CH)

Depth: 3.0-3.45m

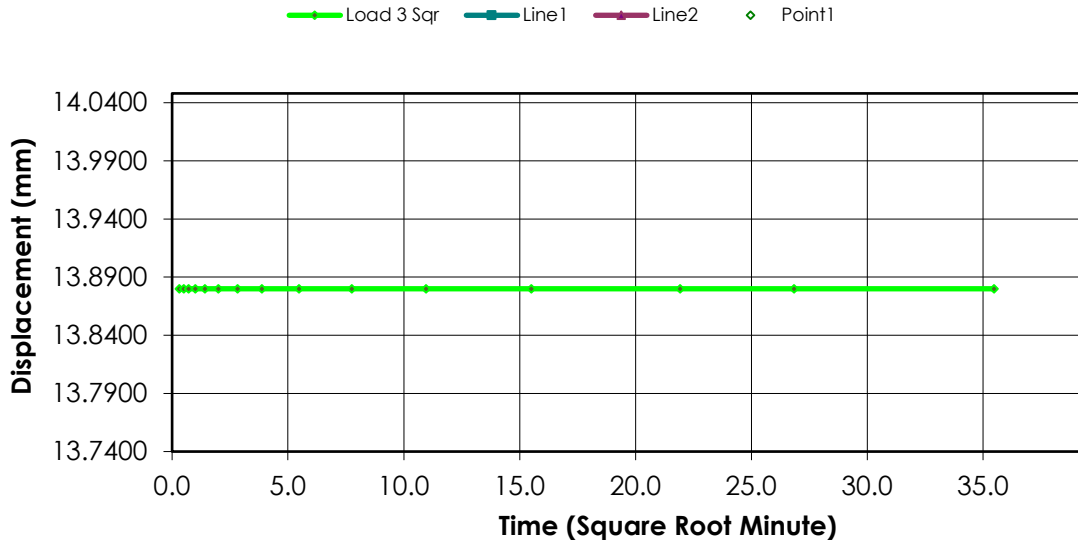
Remarks:

Sample Type: Undisturbed

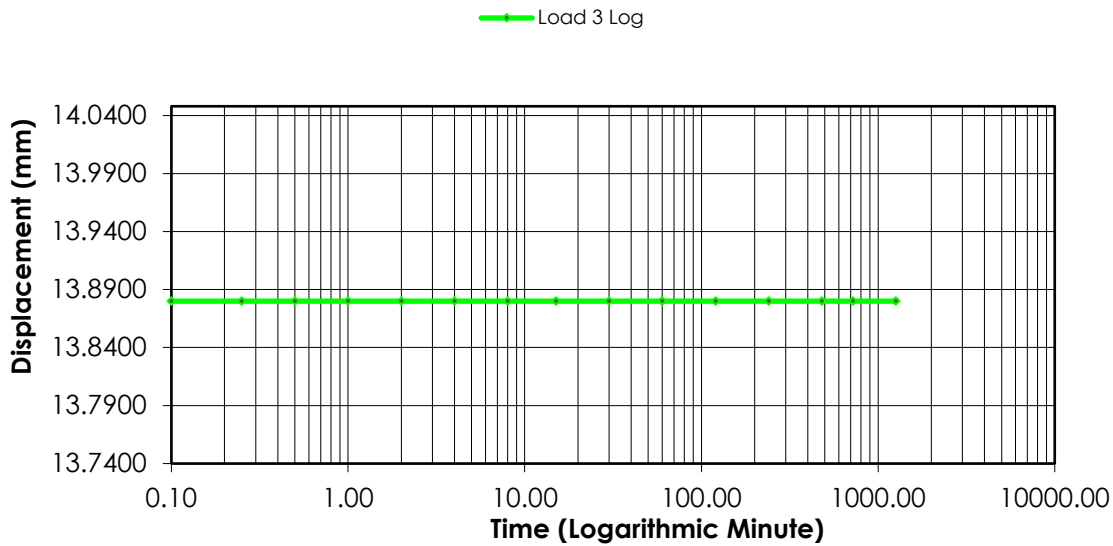
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	13.8860	-0.1560	-1.0484	0.7425
1	00:00:06	13.8800	-0.1540	-1.0349	0.7423
2	00:00:15	13.8800	-0.1540	-1.0349	0.7423
3	00:00:30	13.8800	-0.1540	-1.0349	0.7423
4	00:01:00	13.8800	-0.1540	-1.0349	0.7423
5	00:02:00	13.8800	-0.1540	-1.0349	0.7423
6	00:04:00	13.8800	-0.1540	-1.0349	0.7423
7	00:08:01	13.8800	-0.1540	-1.0349	0.7423
8	00:15:01	13.8800	-0.1540	-1.0349	0.7423
9	00:30:02	13.8800	-0.1540	-1.0349	0.7423
10	01:00:05	13.8800	-0.1540	-1.0349	0.7423
11	02:00:09	13.8800	-0.1540	-1.0349	0.7423
12	04:00:18	13.8800	-0.1540	-1.0349	0.7423
13	08:00:35	13.8800	-0.1540	-1.0349	0.7423
14	12:00:53	13.8800	-0.1540	-1.0349	0.7423
15	20:58:35	13.8800	-0.1540	-1.0349	0.7423

Consolidation Test Results (Sequence 3) Load 20.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 4) Load 40.000 kPa

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 25-May-18

Test Number:

Sample Number: LLO12 ST4

Soil Description:

Boring Number:

Clay (CH)

Depth: 3.0-3.45m

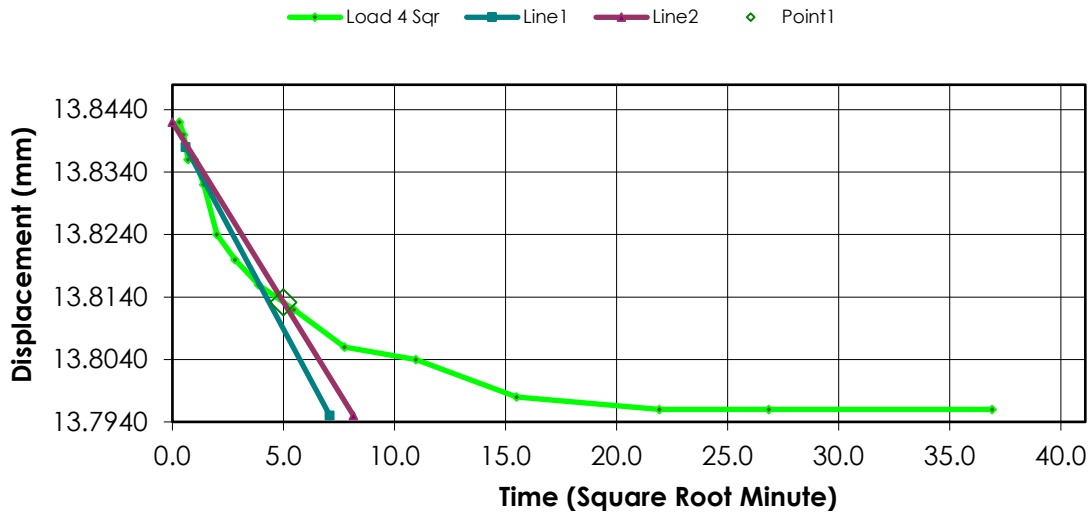
Remarks:

Sample Type: Undisturbed

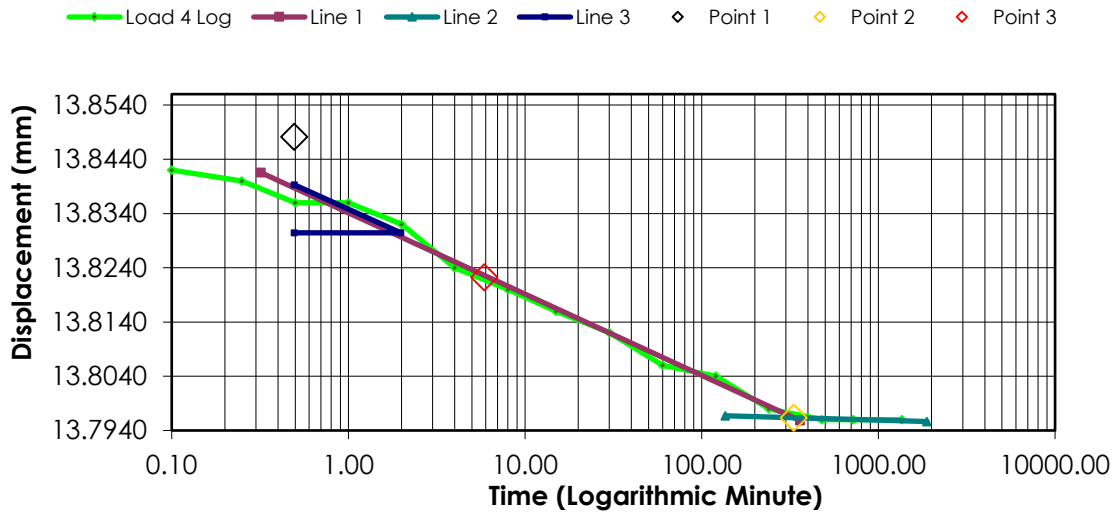
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	13.8800	-0.1540	-1.0349	0.7423
1	00:00:06	13.8420	-0.1920	-1.2903	0.7467
2	00:00:15	13.8400	-0.1900	-1.2769	0.7465
3	00:00:30	13.8360	-0.1860	-1.2500	0.7460
4	00:01:00	13.8360	-0.1860	-1.2500	0.7460
5	00:02:00	13.8320	-0.1820	-1.2231	0.7455
6	00:04:00	13.8240	-0.1740	-1.1694	0.7446
7	00:08:01	13.8200	-0.1700	-1.1425	0.7441
8	00:15:01	13.8160	-0.1660	-1.1156	0.7437
9	00:30:02	13.8120	-0.1620	-1.0887	0.7432
10	01:00:04	13.8060	-0.1560	-1.0484	0.7425
11	02:00:09	13.8040	-0.1540	-1.0350	0.7423
12	04:00:20	13.7980	-0.1480	-0.9946	0.7416
13	08:00:41	13.7960	-0.1460	-0.9812	0.7414
14	12:01:02	13.7960	-0.1460	-0.9812	0.7414
15	22:42:33	13.7960	-0.1460	-0.9812	0.7414

Consolidation Test Results (Sequence 4) Load 40.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 5) Load 80.000 kPa

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 25-May-18

Test Number:

Sample Number: LLO12 ST4

Soil Description:

Boring Number:

Clay (CH)

Depth: 3.0-3.45m

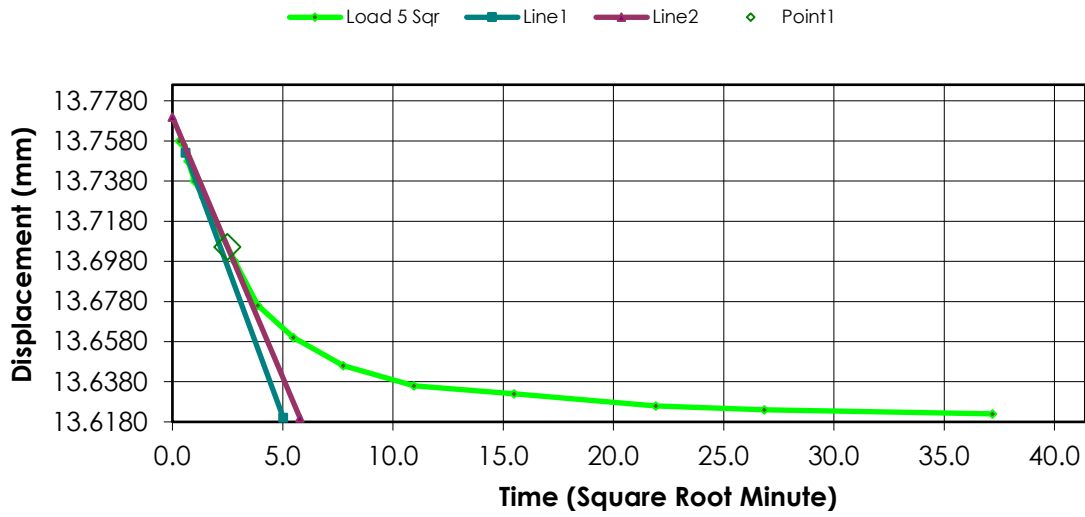
Remarks:

Sample Type: Undisturbed

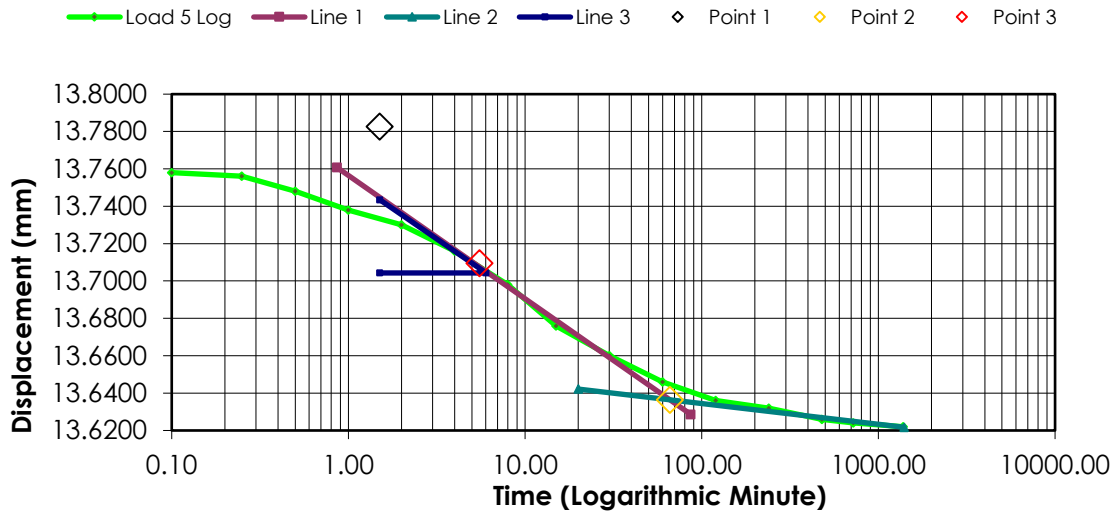
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	13.7960	-0.1460	-0.9812	0.7414
1	00:00:06	13.7580	-0.1260	-0.8468	0.7390
2	00:00:15	13.7560	-0.1240	-0.8333	0.7388
3	00:00:30	13.7480	-0.1160	-0.7796	0.7379
4	00:01:00	13.7380	-0.1060	-0.7124	0.7367
5	00:02:00	13.7300	-0.0980	-0.6586	0.7358
6	00:04:00	13.7160	-0.0840	-0.5645	0.7342
7	00:08:00	13.6980	-0.0660	-0.4435	0.7321
8	00:15:01	13.6760	-0.0440	-0.2957	0.7295
9	00:30:02	13.6600	-0.0280	-0.1882	0.7277
10	01:00:05	13.6460	-0.0140	-0.0941	0.7261
11	02:00:10	13.6360	-0.0040	-0.0269	0.7249
12	04:00:16	13.6320	0.0000	0.0000	0.7244
13	08:00:37	13.6260	0.0060	0.0403	0.7237
14	12:00:58	13.6240	0.0080	0.0538	0.7235
15	23:03:51	13.6220	0.0100	0.0672	0.7233

Consolidation Test Results (Sequence 5) Load 80.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 6) Load 160.000 kPa

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 25-May-18

Test Number:

Sample Number: LLO12 ST4

Soil Description:

Boring Number:

Clay (CH)

Depth: 3.0-3.45m

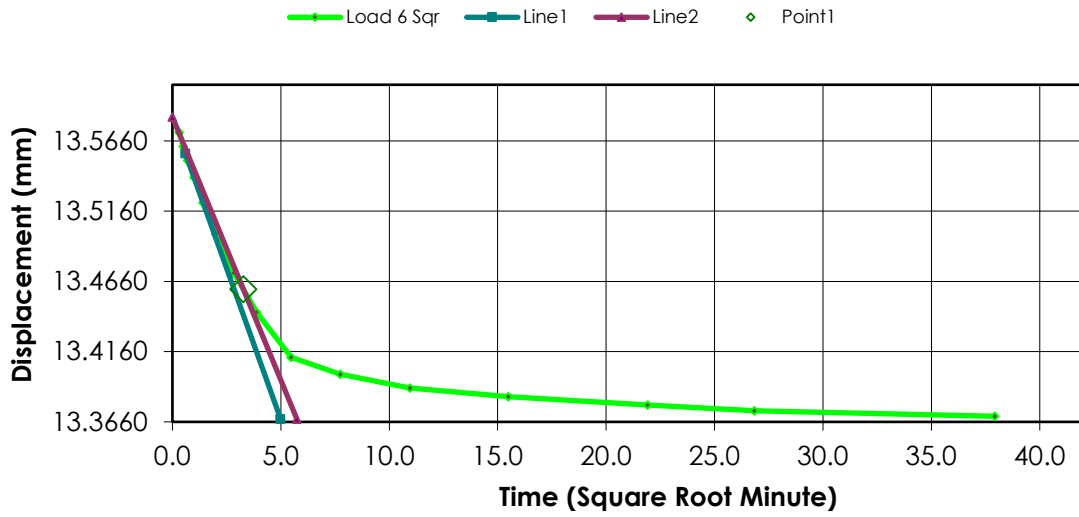
Remarks:

Sample Type: Undisturbed

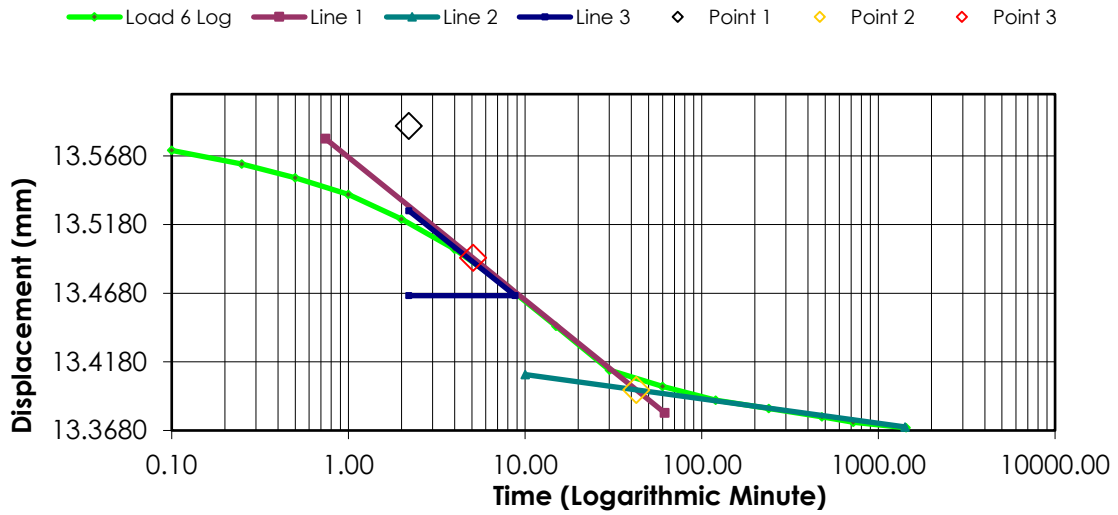
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	13.6220	0.0100	0.0672	0.7233
1	00:00:06	13.5720	0.0400	0.2688	0.7198
2	00:00:15	13.5620	0.0500	0.3360	0.7186
3	00:00:30	13.5520	0.0600	0.4032	0.7175
4	00:01:00	13.5400	0.0720	0.4839	0.7161
5	00:02:00	13.5220	0.0900	0.6048	0.7140
6	00:04:00	13.5000	0.1120	0.7527	0.7115
7	00:08:01	13.4720	0.1400	0.9409	0.7082
8	00:15:01	13.4440	0.1680	1.1290	0.7050
9	00:30:02	13.4120	0.2000	1.3441	0.7013
10	01:00:04	13.4000	0.2120	1.4247	0.6999
11	02:00:09	13.3900	0.2220	1.4919	0.6987
12	04:00:18	13.3840	0.2280	1.5323	0.6980
13	08:00:35	13.3780	0.2340	1.5726	0.6973
14	12:00:53	13.3740	0.2380	1.5995	0.6969
15	23:58:04	13.3700	0.2420	1.6263	0.6964

Consolidation Test Results (Sequence 6) Load 160.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 7) Load 320.000 kPa

Project: SR1
Location:
Job Number:

Project Number: 110773396

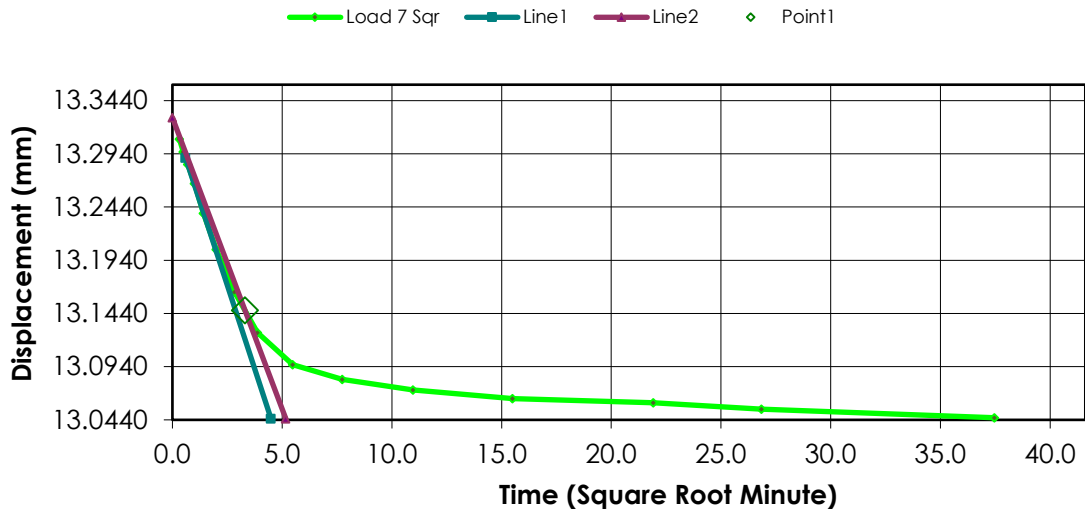
Test Date: 25-May-18
Test Number:

Sample Number: LLO12 ST4 **Soil Description:**
Boring Number: Clay (CH)
Depth: 3.0-3.45m **Remarks:**
Sample Type: Undisturbed

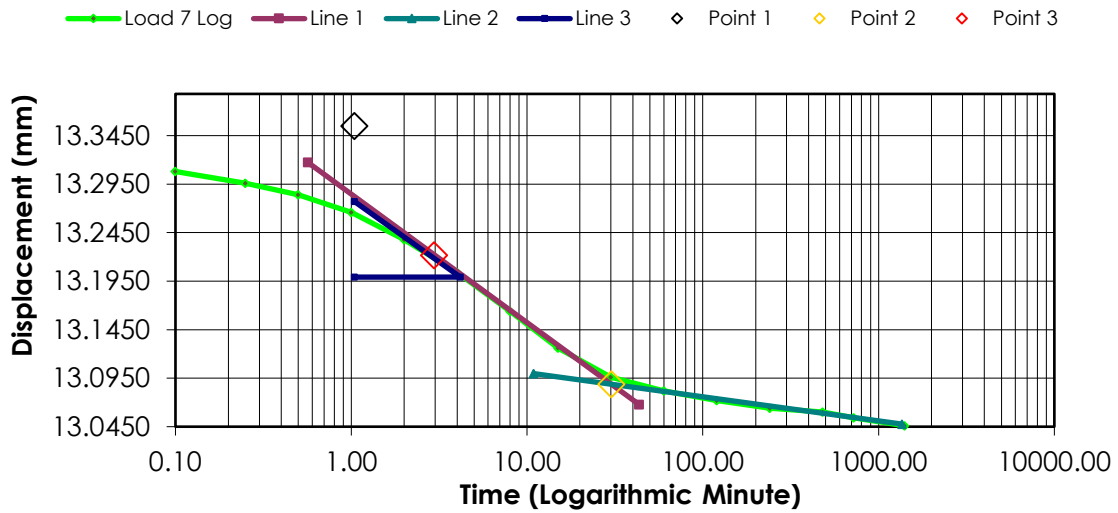
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	13.3700	0.2420	1.6263	0.6964
1	00:00:06	13.3080	0.2720	1.8280	0.6929
2	00:00:15	13.2960	0.2840	1.9086	0.6915
3	00:00:30	13.2840	0.2960	1.9892	0.6901
4	00:01:00	13.2660	0.3140	2.1102	0.6881
5	00:02:00	13.2380	0.3420	2.2984	0.6848
6	00:04:00	13.2040	0.3760	2.5269	0.6809
7	00:08:01	13.1640	0.4160	2.7957	0.6762
8	00:15:01	13.1260	0.4540	3.0511	0.6718
9	00:30:02	13.0960	0.4840	3.2527	0.6683
10	01:00:04	13.0820	0.4980	3.3468	0.6667
11	02:00:09	13.0720	0.5080	3.4140	0.6656
12	04:00:18	13.0640	0.5160	3.4677	0.6646
13	08:00:35	13.0600	0.5200	3.4946	0.6642
14	12:00:53	13.0540	0.5260	3.5349	0.6635
15	23:23:49	13.0460	0.5340	3.5887	0.6626

Consolidation Test Results (Sequence 7) Load 320.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 8) Load 640.000 kPa

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 25-May-18

Test Number:

Sample Number: LLO12 ST4

Soil Description:

Boring Number:

Clay (CH)

Depth: 3.0-3.45m

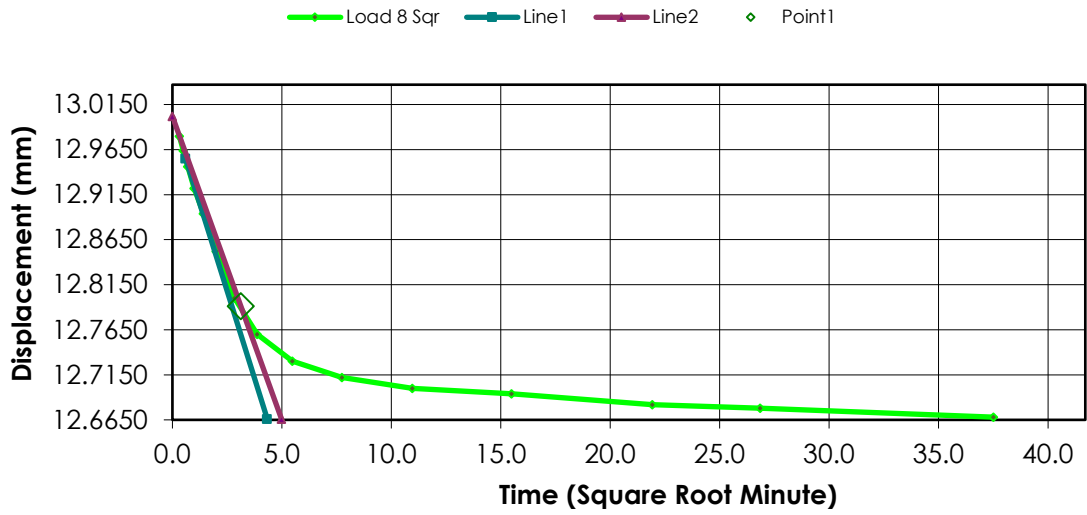
Remarks:

Sample Type: Undisturbed

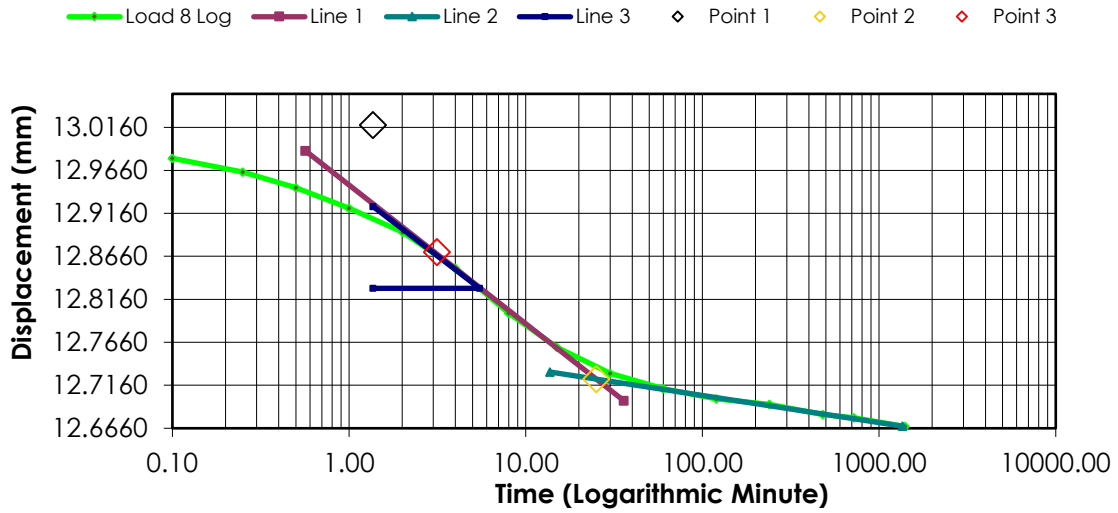
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	13.0460	0.5340	3.5887	0.6626
1	00:00:06	12.9800	0.5600	3.7634	0.6595
2	00:00:15	12.9640	0.5760	3.8710	0.6577
3	00:00:30	12.9460	0.5940	3.9919	0.6556
4	00:01:00	12.9220	0.6180	4.1532	0.6528
5	00:02:01	12.8940	0.6460	4.3414	0.6496
6	00:04:01	12.8520	0.6880	4.6237	0.6447
7	00:08:01	12.8000	0.7400	4.9731	0.6387
8	00:15:01	12.7600	0.7800	5.2419	0.6340
9	00:30:03	12.7300	0.8100	5.4435	0.6306
10	01:00:05	12.7120	0.8280	5.5645	0.6285
11	02:00:09	12.7000	0.8400	5.6452	0.6271
12	04:00:18	12.6940	0.8460	5.6855	0.6264
13	08:00:36	12.6820	0.8580	5.7661	0.6250
14	12:00:53	12.6780	0.8620	5.7930	0.6245
15	23:27:21	12.6680	0.8720	5.8602	0.6234

Consolidation Test Results (Sequence 8) Load 640.000 kPa

Consolidation Graph (Square Root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 9) Rebound 320.000 kPa

Project: SR1
Location:
Job Number:

Project Number: 110773396

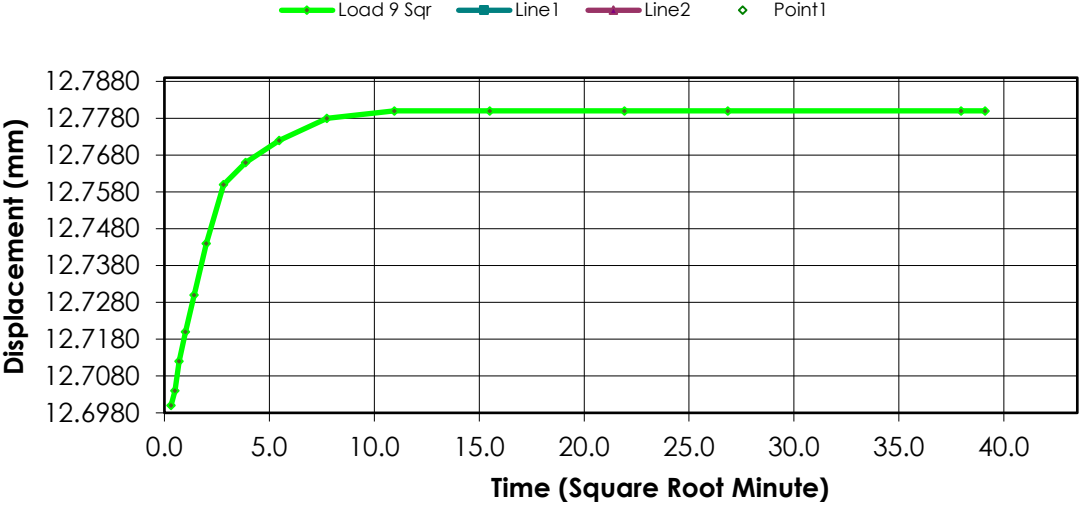
Test Date: 25-May-18
Test Number:

Sample Number: LLO12 ST4 **Soil Description:**
Boring Number: Clay (CH)
Depth: 3.0-3.45m **Remarks:**
Sample Type: Undisturbed

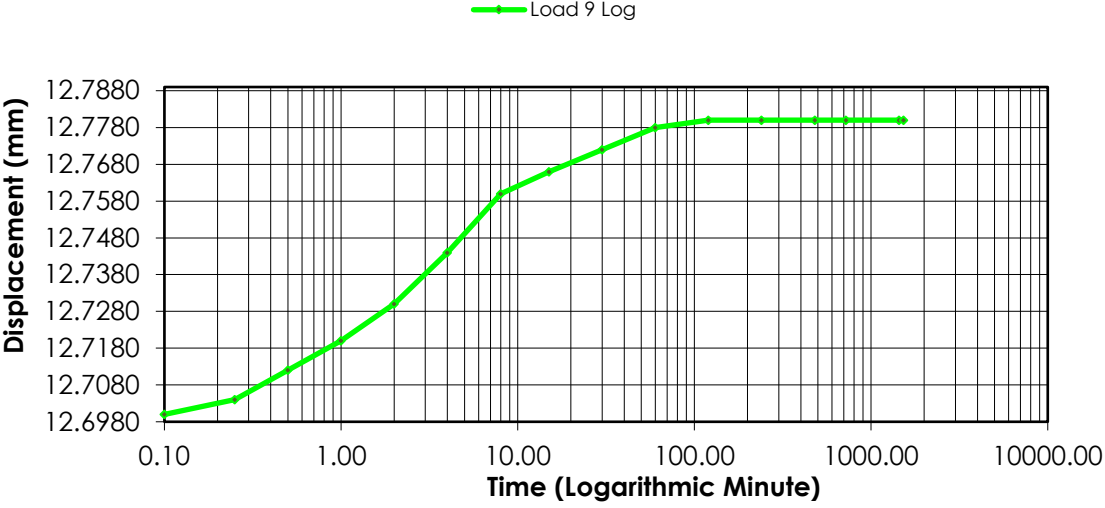
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	12.6680	0.8720	5.8602	0.6234
1	00:00:06	12.7000	0.8520	5.7258	0.6257
2	00:00:15	12.7040	0.8480	5.6989	0.6262
3	00:00:30	12.7120	0.8400	5.6452	0.6271
4	00:01:00	12.7200	0.8320	5.5914	0.6280
5	00:02:00	12.7300	0.8220	5.5242	0.6292
6	00:04:00	12.7440	0.8080	5.4301	0.6308
7	00:08:00	12.7600	0.7920	5.3226	0.6327
8	00:15:01	12.7660	0.7860	5.2823	0.6334
9	00:30:02	12.7720	0.7800	5.2419	0.6340
10	01:00:04	12.7780	0.7740	5.2016	0.6347
11	02:00:08	12.7800	0.7720	5.1882	0.6350
12	04:00:17	12.7800	0.7720	5.1882	0.6350
13	08:00:35	12.7800	0.7720	5.1882	0.6350
14	12:00:52	12.7800	0.7720	5.1882	0.6350
15	24:01:45	12.7800	0.7720	5.1882	0.6350
16	25:30:18	12.7800	0.7720	5.1882	0.6350

Consolidation Test Results (Sequence 9) Rebound 320.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 10) Rebound 160.000 kPa

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 25-May-18

Test Number:

Sample Number: LLO12 ST4

Soil Description:

Boring Number:

Clay (CH)

Depth: 3.0-3.45m

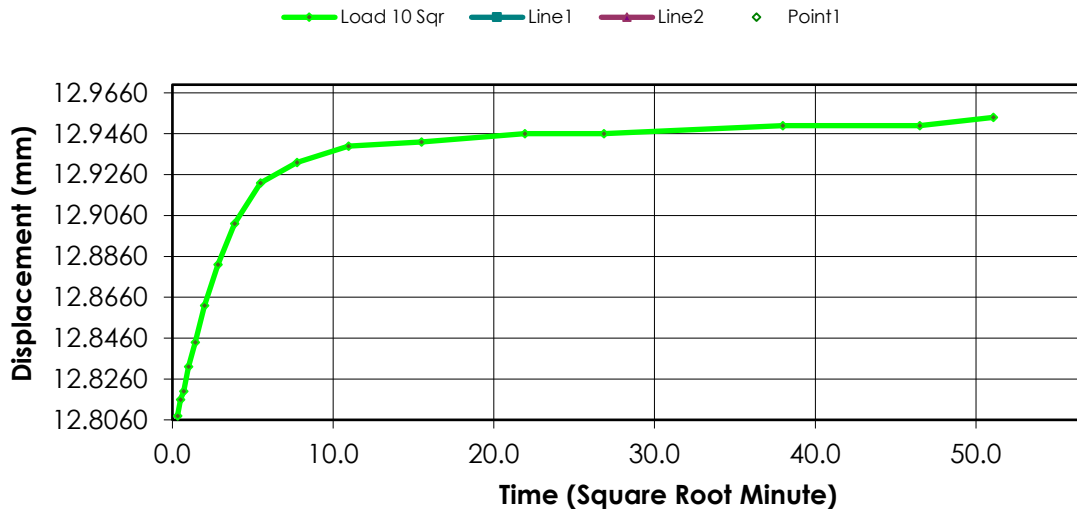
Remarks:

Sample Type: Undisturbed

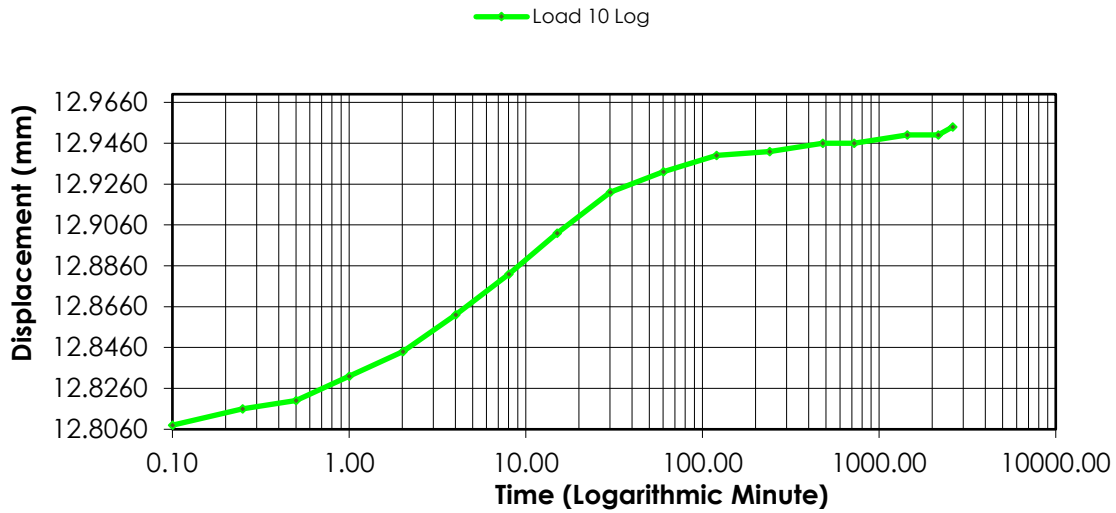
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	12.7800	0.7720	5.1882	0.6350
1	00:00:06	12.8080	0.7620	5.1210	0.6361
2	00:00:15	12.8160	0.7540	5.0672	0.6371
3	00:00:30	12.8200	0.7500	5.0403	0.6375
4	00:01:00	12.8320	0.7380	4.9597	0.6389
5	00:02:01	12.8440	0.7260	4.8790	0.6403
6	00:04:01	12.8620	0.7080	4.7581	0.6424
7	00:08:01	12.8820	0.6880	4.6236	0.6447
8	00:15:02	12.9020	0.6680	4.4892	0.6470
9	00:30:03	12.9220	0.6480	4.3548	0.6493
10	01:00:05	12.9320	0.6380	4.2876	0.6505
11	02:00:09	12.9400	0.6300	4.2339	0.6514
12	04:00:18	12.9420	0.6280	4.2204	0.6517
13	08:00:35	12.9460	0.6240	4.1935	0.6521
14	12:00:53	12.9460	0.6240	4.1935	0.6521
15	24:01:46	12.9500	0.6200	4.1667	0.6526
16	36:02:39	12.9500	0.6200	4.1667	0.6526
17	43:28:28	12.9540	0.6160	4.1398	0.6531

Consolidation Test Results (Sequence 10) Rebound 160.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 11) Load 320.000 kPa

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 25-May-18

Test Number:

Sample Number: LLO12 ST4

Soil Description:

Boring Number:

Clay (CH)

Depth: 3.0-3.45m

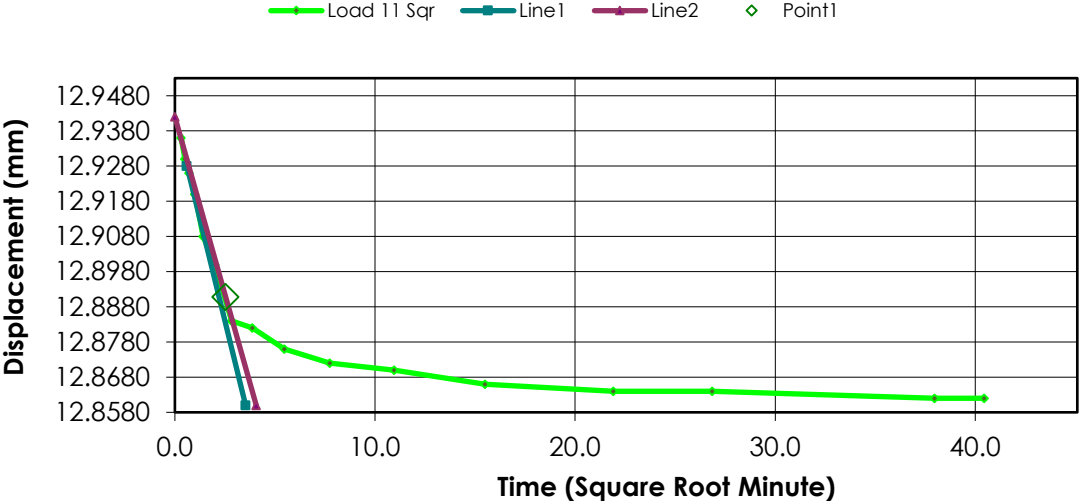
Remarks:

Sample Type: Undisturbed

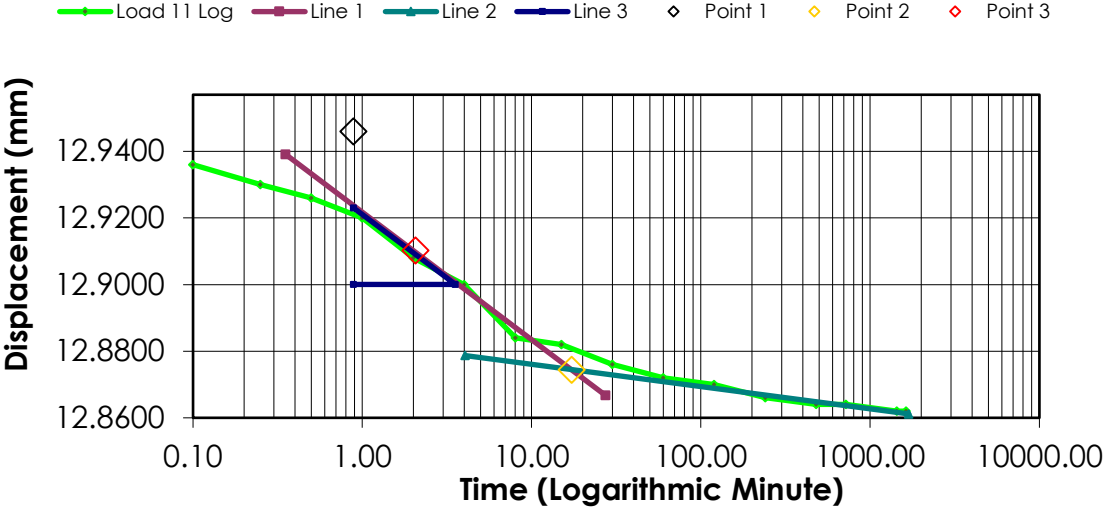
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	12.9540	0.6160	4.1398	0.6531
1	00:00:06	12.9360	0.6280	4.2204	0.6517
2	00:00:15	12.9300	0.6340	4.2607	0.6510
3	00:00:30	12.9260	0.6380	4.2876	0.6505
4	00:01:00	12.9200	0.6440	4.3279	0.6498
5	00:02:00	12.9080	0.6560	4.4086	0.6484
6	00:04:00	12.9000	0.6640	4.4624	0.6475
7	00:08:01	12.8840	0.6800	4.5699	0.6456
8	00:15:01	12.8820	0.6820	4.5833	0.6454
9	00:30:02	12.8760	0.6880	4.6236	0.6447
10	01:00:04	12.8720	0.6920	4.6505	0.6442
11	02:00:09	12.8700	0.6940	4.6640	0.6440
12	04:00:18	12.8660	0.6980	4.6909	0.6435
13	08:00:35	12.8640	0.7000	4.7043	0.6433
14	12:00:53	12.8640	0.7000	4.7043	0.6433
15	24:01:45	12.8620	0.7020	4.7177	0.6431
16	27:16:37	12.8620	0.7020	4.7177	0.6431

Consolidation Test Results (Sequence 11) Load 320.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 12) Load 640.000 kPa

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 25-May-18

Test Number:

Sample Number: LLO12 ST4

Soil Description:

Boring Number:

Clay (CH)

Depth: 3.0-3.45m

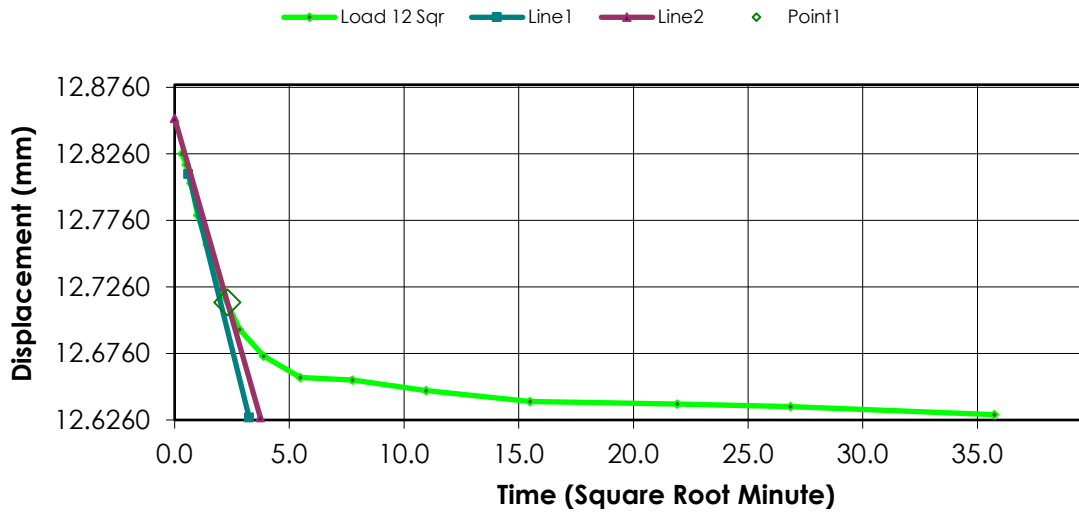
Remarks:

Sample Type: Undisturbed

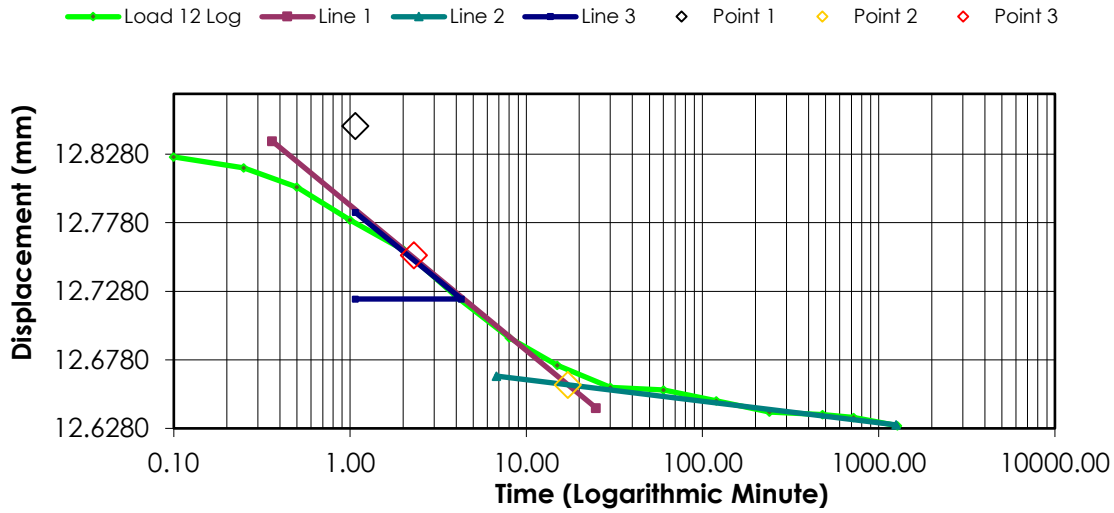
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	12.8620	0.7020	4.7177	0.6431
1	00:00:06	12.8260	0.7140	4.7984	0.6417
2	00:00:15	12.8180	0.7220	4.8521	0.6408
3	00:00:30	12.8040	0.7360	4.9462	0.6391
4	00:01:00	12.7800	0.7600	5.1075	0.6364
5	00:02:01	12.7580	0.7820	5.2554	0.6338
6	00:04:01	12.7240	0.8160	5.4839	0.6299
7	00:08:01	12.6940	0.8460	5.6855	0.6264
8	00:15:01	12.6740	0.8660	5.8199	0.6241
9	00:30:03	12.6580	0.8820	5.9274	0.6222
10	01:00:05	12.6560	0.8840	5.9409	0.6220
11	02:00:09	12.6480	0.8920	5.9946	0.6211
12	04:00:18	12.6400	0.9000	6.0484	0.6201
13	08:00:35	12.6380	0.9020	6.0618	0.6199
14	12:00:53	12.6360	0.9040	6.0753	0.6197
15	21:17:52	12.6300	0.9100	6.1156	0.6190

Consolidation Test Results (Sequence 12) Load 640.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 13) Load 1280.000 kPa

Project: SR1
Location:
Job Number:

Project Number: 110773396

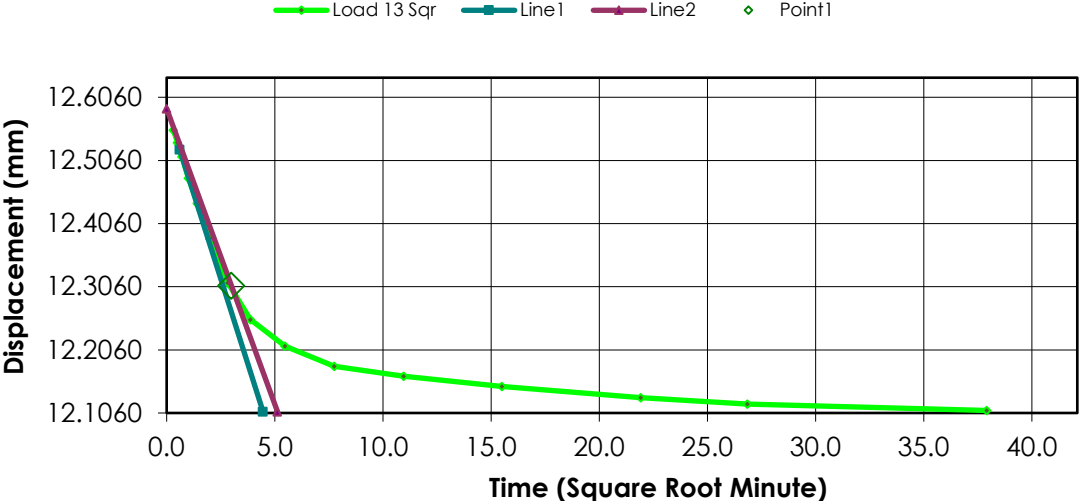
Test Date: 25-May-18
Test Number:

Sample Number: LLO12 ST4 **Soil Description:**
Boring Number: Clay (CH)
Depth: 3.0-3.45m **Remarks:**
Sample Type: Undisturbed

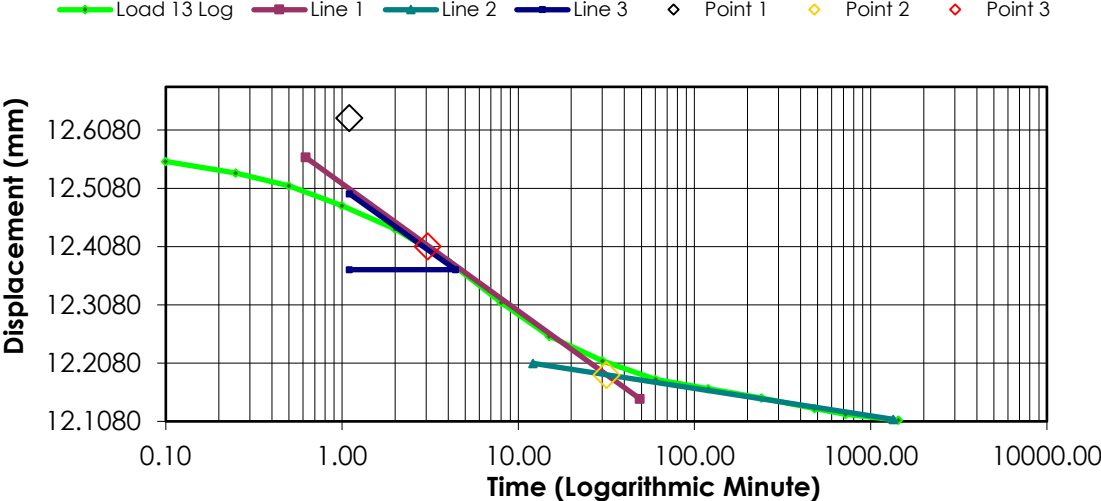
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	12.6300	0.9100	6.1156	0.6190
1	00:00:06	12.5540	0.9280	6.2366	0.6169
2	00:00:15	12.5340	0.9480	6.3710	0.6146
3	00:00:30	12.5120	0.9700	6.5188	0.6120
4	00:01:00	12.4780	1.0040	6.7473	0.6081
5	00:02:00	12.4380	1.0440	7.0161	0.6035
6	00:04:01	12.3820	1.1000	7.3925	0.5970
7	00:08:01	12.3120	1.1700	7.8629	0.5888
8	00:15:01	12.2540	1.2280	8.2527	0.5821
9	00:30:02	12.2120	1.2700	8.5349	0.5773
10	01:00:05	12.1800	1.3020	8.7500	0.5736
11	02:00:09	12.1640	1.3180	8.8575	0.5717
12	04:00:18	12.1480	1.3340	8.9650	0.5698
13	08:00:35	12.1300	1.3520	9.0860	0.5678
14	12:00:53	12.1200	1.3620	9.1532	0.5666
15	23:57:17	12.1100	1.3720	9.2204	0.5654

Consolidation Test Results (Sequence 13) Load 1280.000 kPa

Consolidation Graph (Square-root Time)



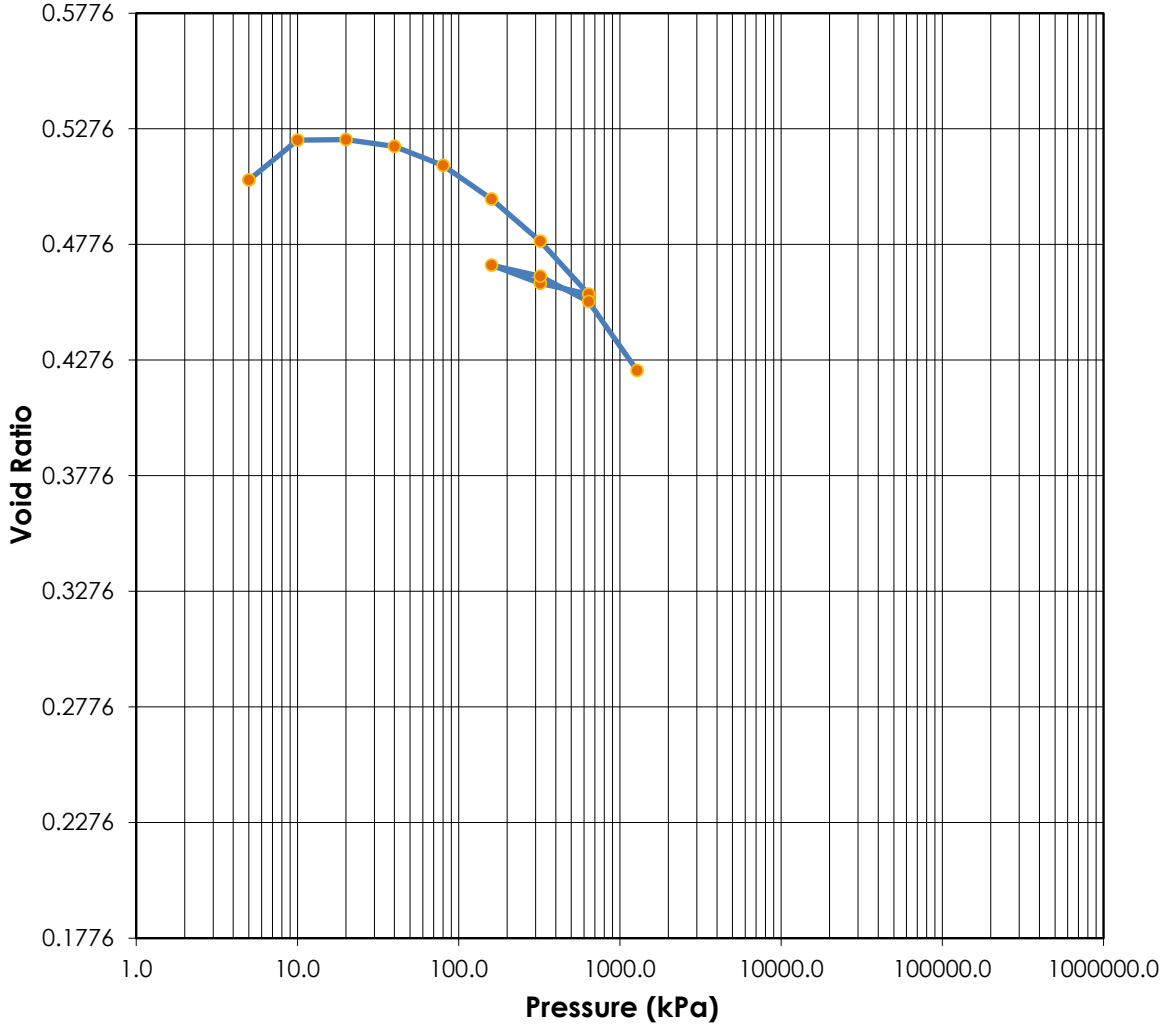
Consolidation Graph (Logarithmic Time)





Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876



	Before	After	Liquid Limits:	39	Test Date:	26-May-18
Moisture (%):	17.8	17.9	Plastic Limits:	17		
Dry Density (g/cm³):	1.790	1.875	Plasticity Index (%):	22		
Saturation (%):	95	100				
Void Ratio:	0.5053	0.4229	Specific Gravity:	2.70	Assumed	
Soil Description:	Clay (Cl), Some Gravel, Some Sand					
Project Number:	110773396	Depth:	4.6-5.05m			
Sample Number:	LLO12 ST6	Boring Number:				
Project:	SR1					Remarks:
Client:	Alberta Transportation					
Location:						

Tested By: E. Wahl

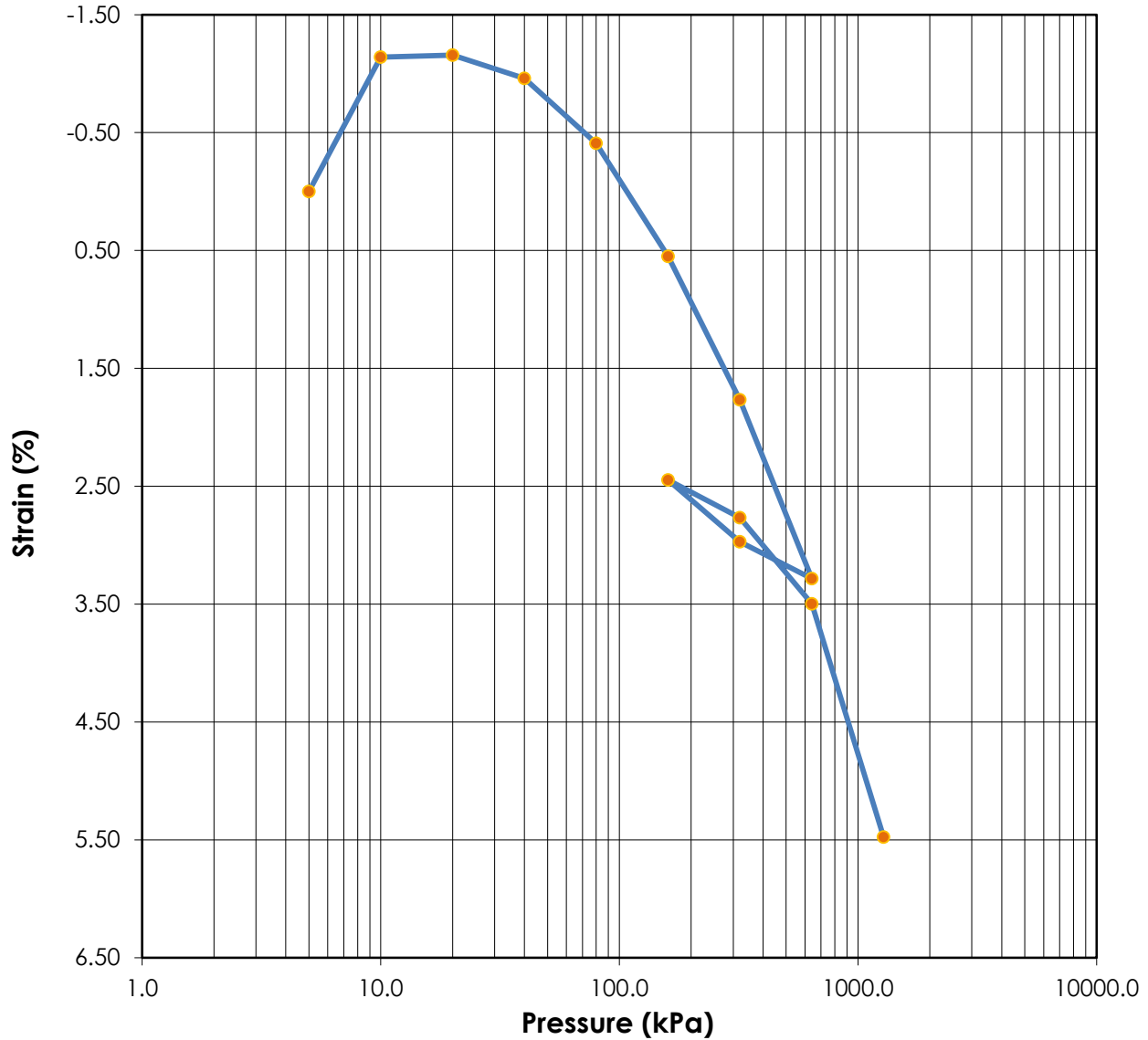
Reviewed By: C. Lamoureux

Reporting of these test results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request. The data presented above is for the sole use of the client stipulated above. Stantec is not responsible, nor can be held liable, for the use of this report by any other party, with or without the knowledge of Stantec.



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876

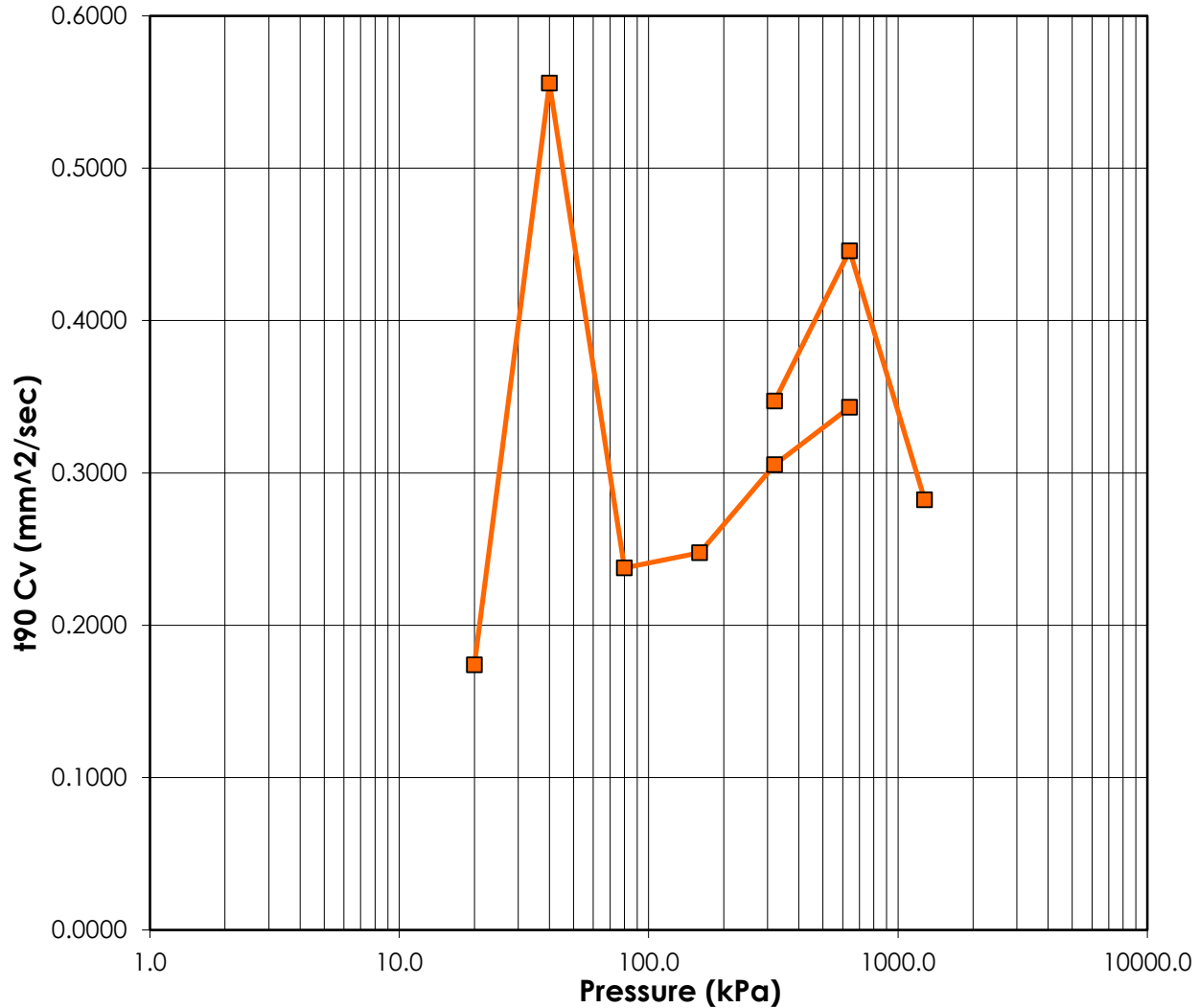


	Before	After	Liquid Limits:	39	Test Date:	26-May-18
Moisture (%):	17.8	17.9	Plastic Limits:	17		
Dry Density (g/cm3):	1.790	1.875	Plasticity Index (%):	22		
Saturation (%):	95	100	Specific Gravity:	2.70	Assumed	
Void Ratio:	0.5053	0.4229				
Sample Description:	Clay (Cl), Some Gravel, Some Sand					
Project Number:	110773396	Depth:	4.6-5.05m			
Sample Number:	LLO12 ST6	Boring Number:				
Project:	SR1					Remarks:
Client:	Alberta Transportation					
Location:						



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876



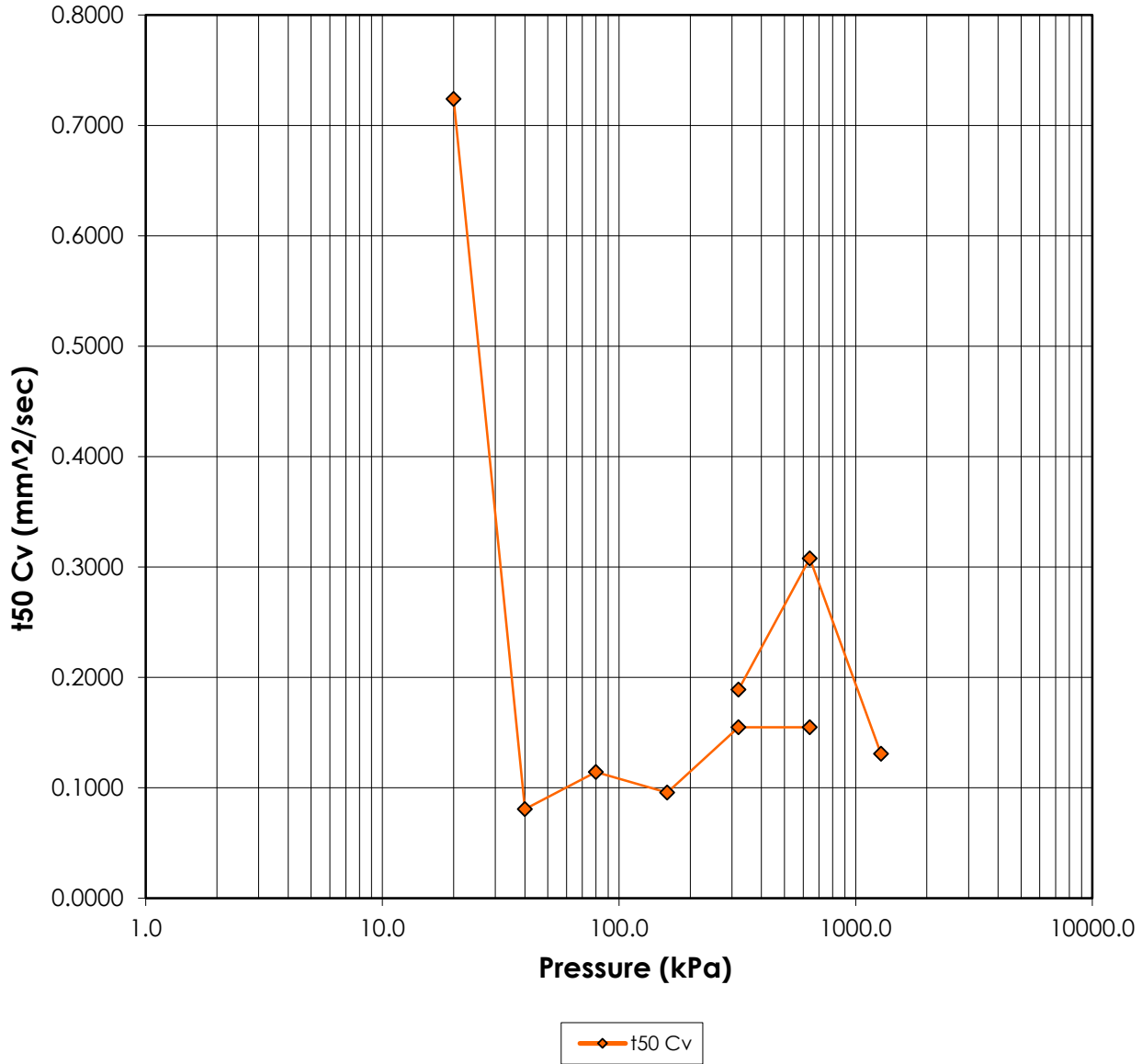
—■— t90 Cv

	Before	After	Liquid Limits:	39	Test Date:	26-May-18
Moisture (%):	17.8	17.9	Plastic Limits:	17		
Dry Density (g/cm³):	1.790	1.875	Plasticity Index (%):	22		
Saturation (%):	95	100				
Void Ratio:	0.5053	0.4229	Specific Gravity:	2.70	Assumed	
Soil Description:	Clay (Cl), Some Gravel, Some Sand					
Project Number:	110773396	Depth:	4.6-5.05m			
Sample Number:	LLO12 ST6	Boring Number:				
Project:	SR1					Remarks:
Client:	Alberta Transportation					
Location:						



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876

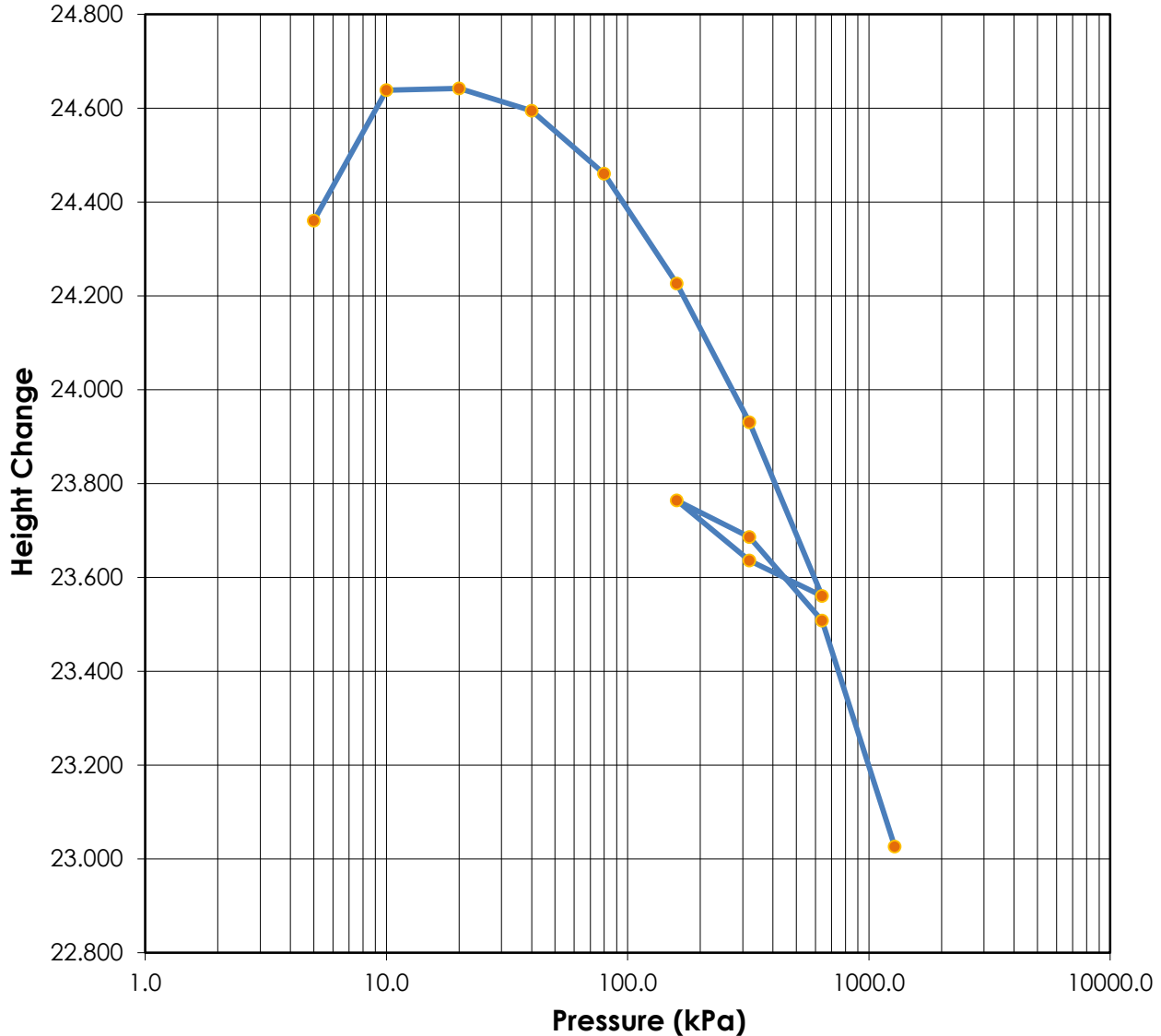


	Before	After	Liquid Limits:	39	Test Date:	26-May-18
Moisture (%):	17.8	17.9	Plastic Limits:	17		
Dry Density (g/cm³):	1.790	1.875	Plasticity Index (%):	22		
Saturation (%):	95	100				
Void Ratio:	0.5053	0.4229	Specific Gravity:	2.70	Assumed	
Soil Description:	Clay (Cl), Some Gravel, Some Sand					
Project Number:	110773396	Depth:	4.6-5.05m			
Sample Number:	LLO12 ST6	Boring Number:				
Project:	SR1					Remarks:
Client:	Alberta Transportation					
Location:						



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

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 Tel: (403) 253-7876



	Before	After	Liquid Limits:	39	Test Date:	26-May-18
Moisture (%):	17.8	17.9	Plastic Limits:	17		
Dry Density (g/cm3):	1.790	1.875	Plasticity Index (%):	22		
Saturation (%):	95	100	Specific Gravity:	2.70	Assumed	
Void Ratio:	0.5053	0.4229				
Soil Description:	Clay (Cl), Some Gravel, Some Sand					
Project Number:	110773396	Depth:	4.6-5.05m			
Sample Number:	LLO12 ST6	Boring Number:				
Project:	SR1					Remarks:
Client:	Alberta Transportation					
Location:						

Consolidation Test Results Summary

Project: SR1

Project Number: 110773396

Location:

Job Number:

Sample Number: LLO12 ST6

Sample Description:

Boring Number:

Clay (Cl), Some Gravel, Some Sand

Depth: 4.6-5.05m

Remarks:

Test Number:

Sample Type: Undisturbed

Test Date: 26-May-18

Index	Load Sequence (kPa)	Cummulative Change in Height (mm)	Specimen Height (mm)	Height of Void (mm)	Vertical Strain (%)	Void Ratio	t90 Fitting Time (min)	t50 Fitting Time (min)	t90 Cv (mm ² /sec)	t50 Cv (mm ² /sec)
0	0.000	0.0000	24.3600	8.1798	0.00	0.5055	0.000	0.000	0.000	0.000
1	5.000	0.0000	24.3600	8.1798	0.00	0.5055	0.000	0.000	0.000	0.000
2	10.000	-0.2780	24.6380	8.4578	-1.14	0.5227	0.000	0.000	0.000	0.000
3	20.000	-0.2820	24.6420	8.4618	-1.16	0.5230	12.335	0.689	0.174	0.724
4	40.000	-0.2340	24.5940	8.4138	-0.96	0.5200	3.845	6.153	0.556	0.081
5	80.000	-0.1000	24.4600	8.2798	-0.41	0.5117	8.894	4.297	0.238	0.114
6	160.000	0.1340	24.2260	8.0458	0.55	0.4973	8.375	5.030	0.248	0.096
7	320.000	0.4300	23.9300	7.7498	1.77	0.4790	6.624	3.035	0.305	0.155
8	640.000	0.8000	23.5600	7.3798	3.28	0.4561	5.717	2.943	0.343	0.155
9	320.000	0.7240	23.6360	7.4558	2.97	0.4608	0.000	0.000	0.000	0.000
10	160.000	0.5960	23.7640	7.5838	2.45	0.4687	0.000	0.000	0.000	0.000
11	320.000	0.6740	23.6860	7.5058	2.77	0.4639	5.709	2.438	0.347	0.189
12	640.000	0.8520	23.5080	7.3278	3.50	0.4529	4.379	1.474	0.446	0.308
13	1280.000	1.3340	23.0260	6.8458	5.48	0.4231	6.637	3.330	0.282	0.131

Predicted value indicated with *

Consolidation Test

Consolidation Specimen Information

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 26-May-18

Sample Number: LLO12 ST6

Sample Description:

Boring Number:

Clay (Cl), Some Gravel, Some Sand

Depth: 4.6-5.05m

Remarks:

Sample Type: Undisturbed

Test Number:

Liquid Limit: 39

Initial Void Ratio: 0.5053

Initial Height (mm): 24.36

Plastic Limit: 17

Plasticity Index (%): 22

Initial Diameter (mm): 63.46

Specific Gravity: 2.70

Weight of Ring (g): 111.53

Assumed

Parameters	Initial Specimen	Final Specimen
Moist Weight + Container (g)	218.41	164.81
Dry Soil + Container (g)	185.97	140.38
Weight of Container (g)	3.71	3.91
Moisture Content (%)	17.8	17.9
Void Ratio	0.5053	0.4229
Saturation (%)	95	100
Dry Density (g/cm ³)	1.790	1.875

**Consolidation Test Results
(Sequence 1) Load 5.000 kPa**

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 26-May-18

Test Number:

Sample Number: LLO12 ST6

Soil Description:

Boring Number:

Clay (Cl), Some Gravel, Some Sand

Depth: 4.6-5.05m

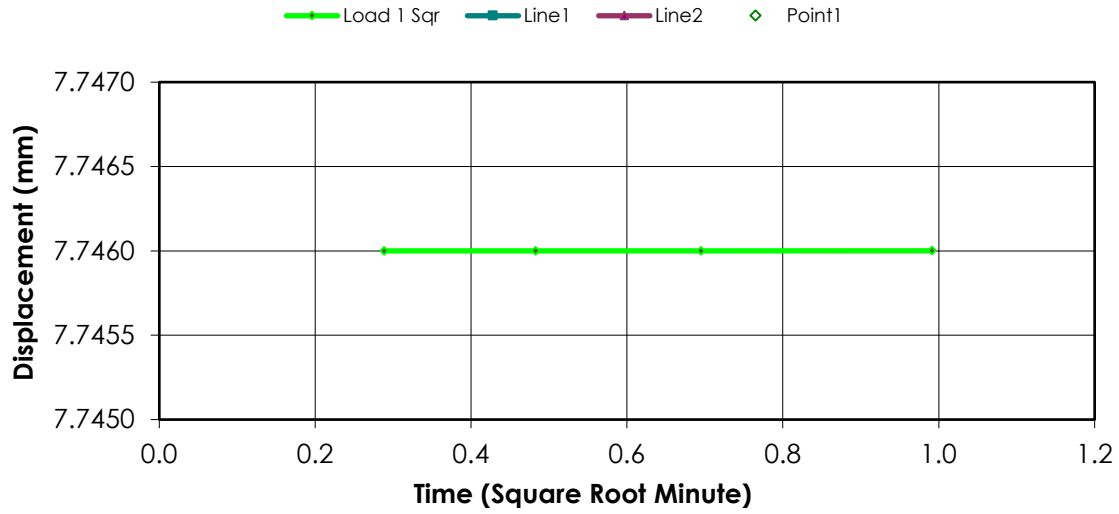
Remarks:

Sample Type: Undisturbed

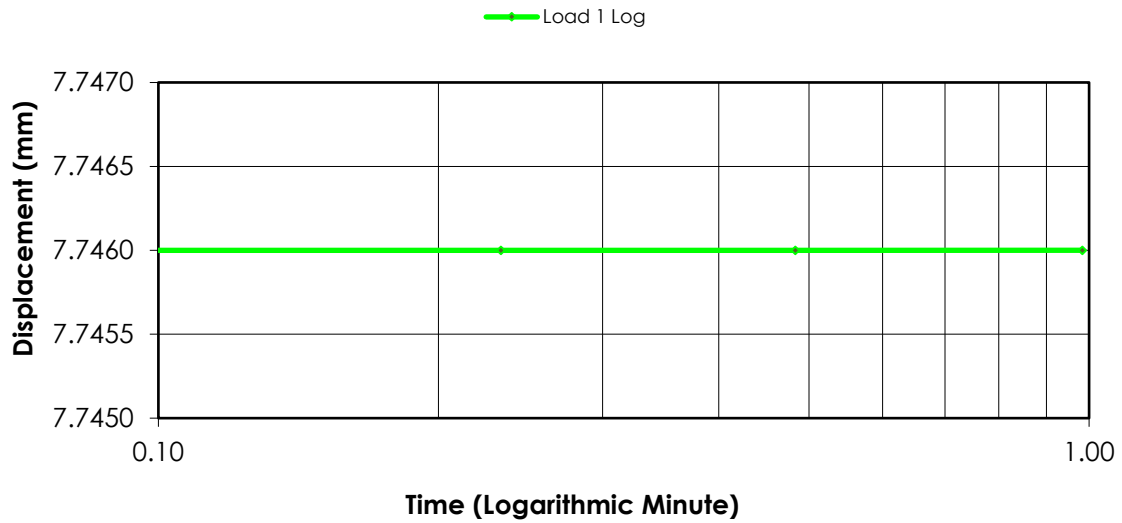
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	7.7460	0.0000	0.0000	0.5053
1	00:00:05	7.7460	0.0000	0.0000	0.5053
2	00:00:14	7.7460	0.0000	0.0000	0.5053
3	00:00:29	7.7460	0.0000	0.0000	0.5053
4	00:00:59	7.7460	0.0000	0.0000	0.5053

Consolidation Test Results (Sequence 1) Load 5.000 kPa

Consolidation Graph (Square root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 2) Load 10.000 kPa

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 26-May-18

Test Number:

Sample Number: LLO12 ST6

Soil Description:

Boring Number:

Clay (Cl), Some Gravel, Some Sand

Depth: 4.6-5.05m

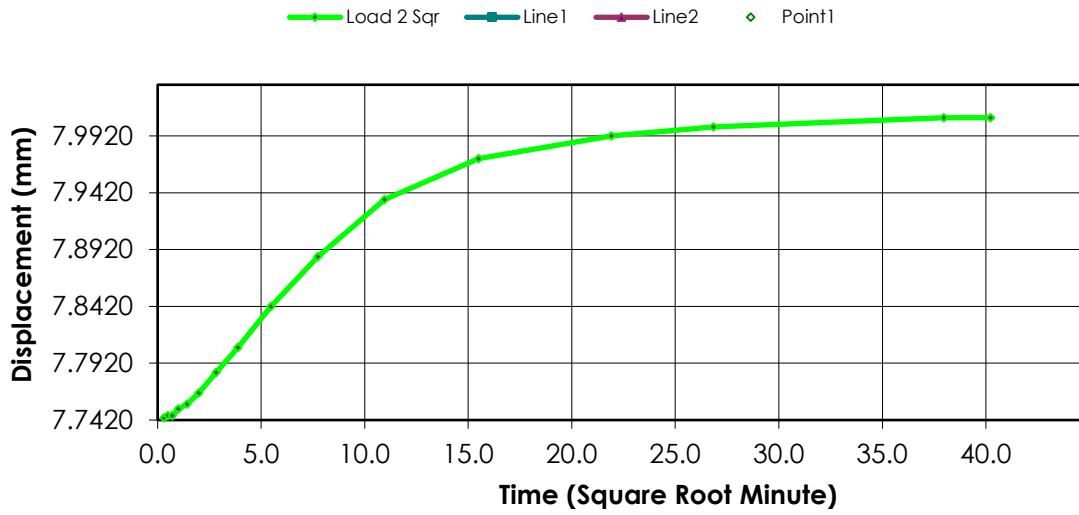
Remarks:

Sample Type: Undisturbed

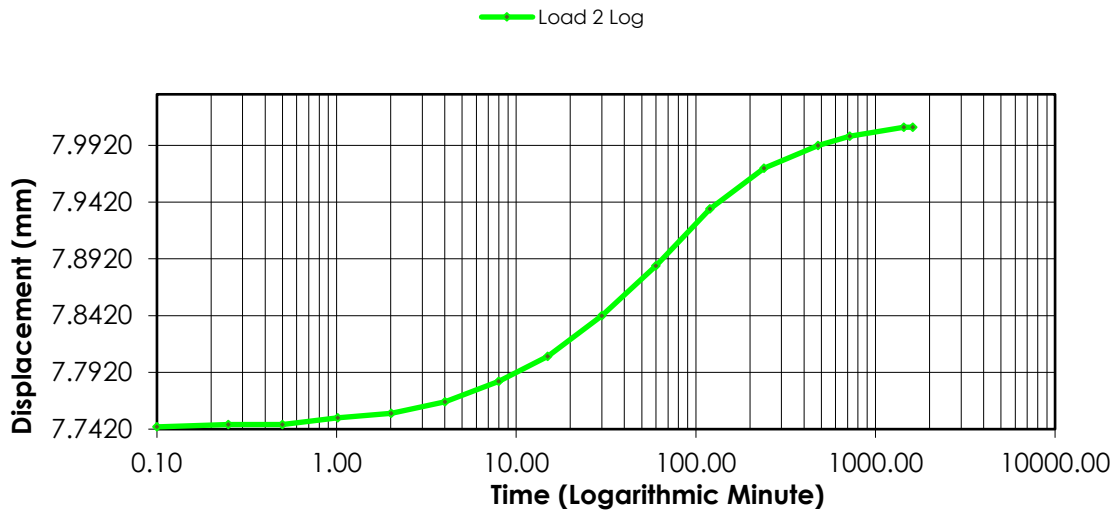
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	7.7460	0.0000	0.0000	0.5053
1	00:00:06	7.7440	-0.0140	-0.0575	0.5062
2	00:00:15	7.7460	-0.0160	-0.0657	0.5063
3	00:00:30	7.7460	-0.0160	-0.0657	0.5063
4	00:01:01	7.7520	-0.0220	-0.0903	0.5067
5	00:02:01	7.7560	-0.0260	-0.1067	0.5070
6	00:04:01	7.7660	-0.0360	-0.1478	0.5076
7	00:08:01	7.7840	-0.0540	-0.2217	0.5087
8	00:15:01	7.8060	-0.0760	-0.3120	0.5100
9	00:30:01	7.8420	-0.1120	-0.4598	0.5123
10	01:00:02	7.8860	-0.1560	-0.6404	0.5150
11	02:00:05	7.9360	-0.2060	-0.8457	0.5181
12	04:00:14	7.9720	-0.2420	-0.9934	0.5203
13	08:00:32	7.9920	-0.2620	-1.0755	0.5215
14	12:00:49	8.0000	-0.2700	-1.1084	0.5220
15	24:01:42	8.0080	-0.2780	-1.1412	0.5225
16	26:58:38	8.0080	-0.2780	-1.1412	0.5225

Consolidation Test Results (Sequence 2) Load 10.000 kPa

Consolidation Graph (Square-root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 3) Load 20.000 kPa

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 26-May-18

Test Number:

Sample Number: LLO12 ST6

Soil Description:

Boring Number:

Clay (Cl), Some Gravel, Some Sand

Depth: 4.6-5.05m

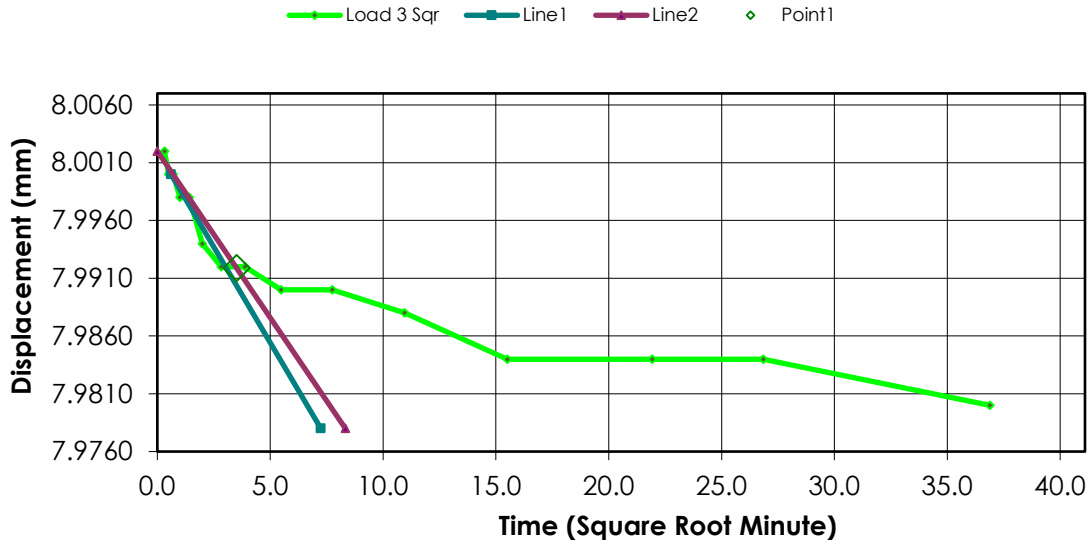
Remarks:

Sample Type: Undisturbed

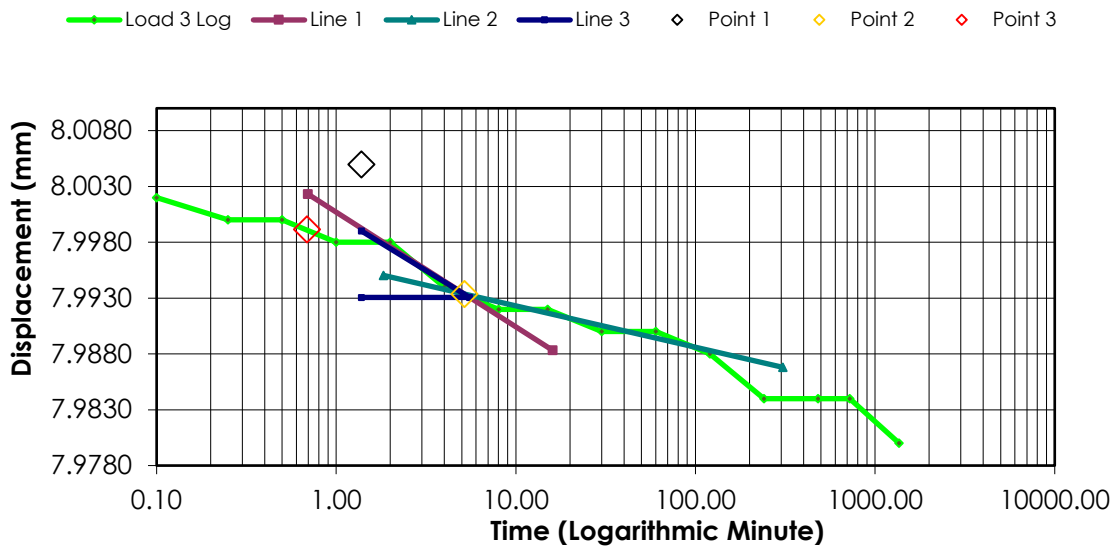
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.0080	-0.2780	-1.1412	0.5225
1	00:00:06	8.0020	-0.3040	-1.2479	0.5241
2	00:00:15	8.0000	-0.3020	-1.2397	0.5240
3	00:00:30	8.0000	-0.3020	-1.2397	0.5240
4	00:01:00	7.9980	-0.3000	-1.2315	0.5239
5	00:02:00	7.9980	-0.3000	-1.2315	0.5239
6	00:04:00	7.9940	-0.2960	-1.2151	0.5236
7	00:08:01	7.9920	-0.2940	-1.2069	0.5235
8	00:15:01	7.9920	-0.2940	-1.2069	0.5235
9	00:30:02	7.9900	-0.2920	-1.1987	0.5234
10	01:00:04	7.9900	-0.2920	-1.1987	0.5234
11	02:00:09	7.9880	-0.2900	-1.1905	0.5233
12	04:00:20	7.9840	-0.2860	-1.1741	0.5230
13	08:00:41	7.9840	-0.2860	-1.1741	0.5230
14	12:01:02	7.9840	-0.2860	-1.1741	0.5230
15	22:40:47	7.9800	-0.2820	-1.1576	0.5228

Consolidation Test Results (Sequence 3) Load 20.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



**Consolidation Test Results
(Sequence 4) Load 40.000 kPa**

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 26-May-18

Test Number:

Sample Number: LLO12 ST6

Soil Description:

Boring Number:

Clay (Cl), Some Gravel, Some Sand

Depth: 4.6-5.05m

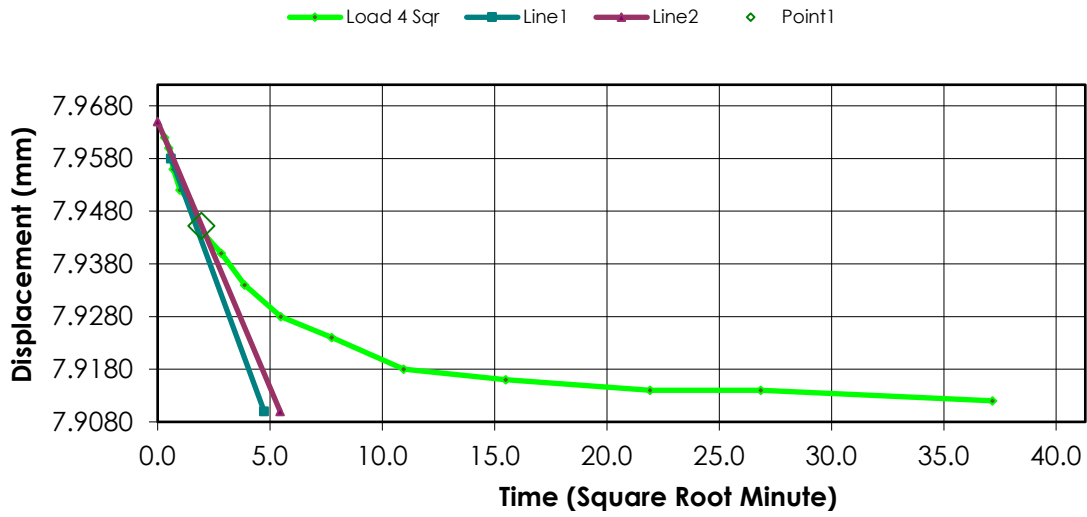
Remarks:

Sample Type: Undisturbed

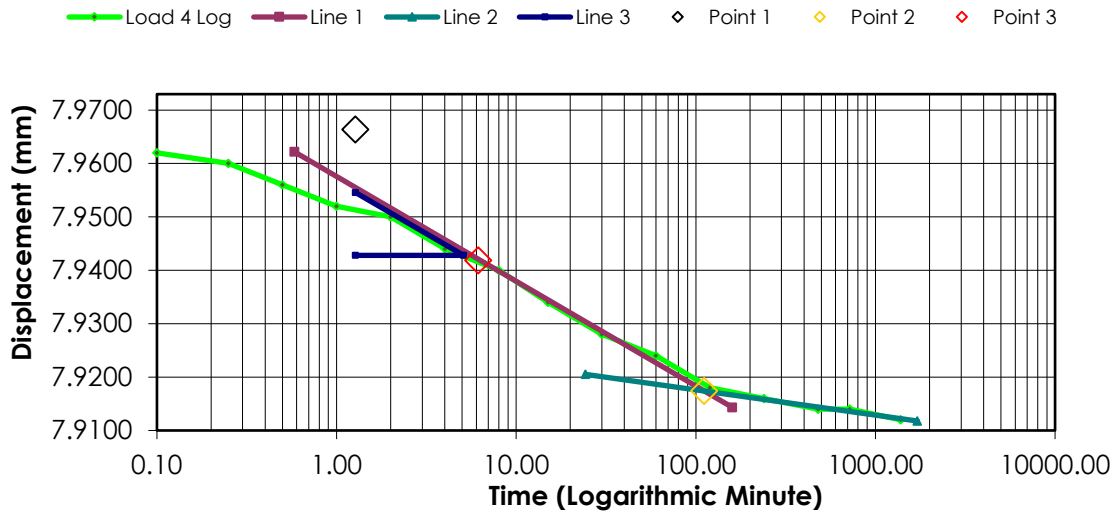
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	7.9800	-0.2820	-1.1576	0.5228
1	00:00:06	7.9620	-0.2840	-1.1658	0.5229
2	00:00:15	7.9600	-0.2820	-1.1576	0.5228
3	00:00:30	7.9560	-0.2780	-1.1412	0.5225
4	00:01:00	7.9520	-0.2740	-1.1248	0.5223
5	00:02:00	7.9500	-0.2720	-1.1166	0.5222
6	00:04:01	7.9440	-0.2660	-1.0920	0.5218
7	00:08:01	7.9400	-0.2620	-1.0755	0.5215
8	00:15:02	7.9340	-0.2560	-1.0509	0.5212
9	00:30:03	7.9280	-0.2500	-1.0263	0.5208
10	01:00:05	7.9240	-0.2460	-1.0099	0.5205
11	02:00:11	7.9180	-0.2400	-0.9852	0.5202
12	04:00:17	7.9160	-0.2380	-0.9770	0.5201
13	08:00:38	7.9140	-0.2360	-0.9688	0.5199
14	12:00:59	7.9140	-0.2360	-0.9688	0.5199
15	23:01:40	7.9120	-0.2340	-0.9606	0.5198

Consolidation Test Results (Sequence 4) Load 40.000 kPa

Consolidation Graph (Square Root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 5) Load 80.000 kPa

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 26-May-18

Test Number:

Sample Number: LLO12 ST6

Soil Description:

Boring Number:

Clay (Cl), Some Gravel, Some Sand

Depth: 4.6-5.05m

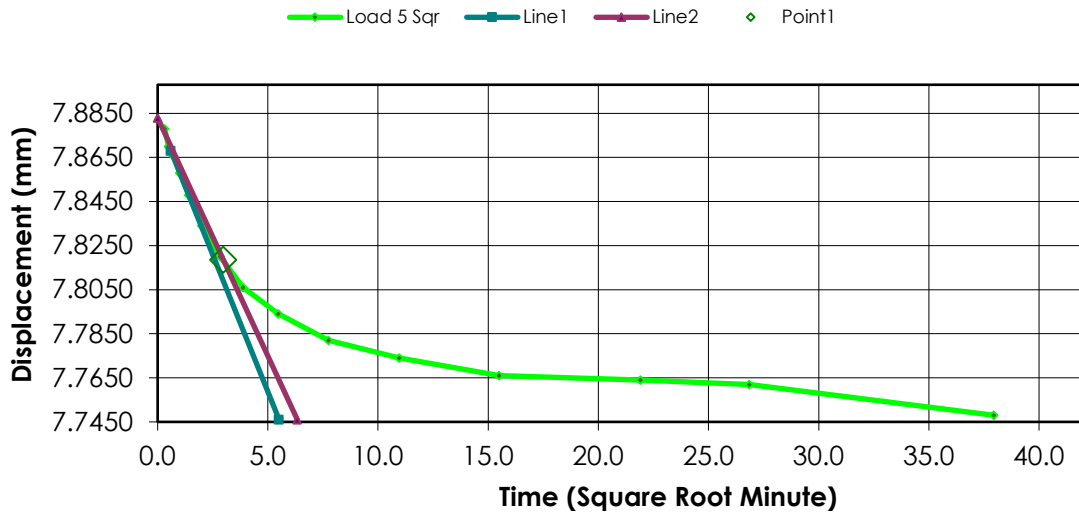
Remarks:

Sample Type: Undisturbed

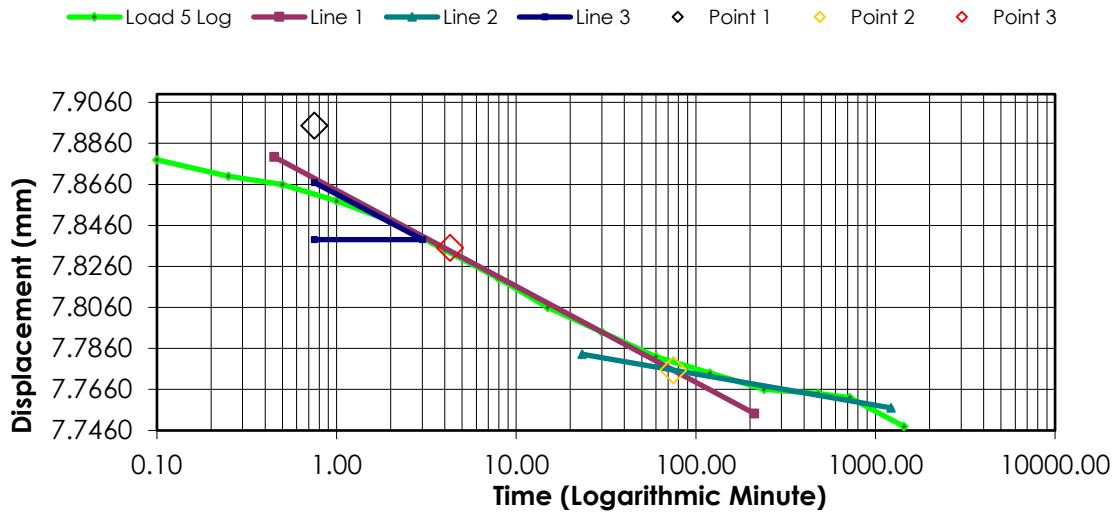
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	7.9120	-0.2340	-0.9606	0.5198
1	00:00:06	7.8780	-0.2300	-0.9442	0.5196
2	00:00:15	7.8700	-0.2220	-0.9113	0.5191
3	00:00:30	7.8660	-0.2180	-0.8949	0.5188
4	00:01:00	7.8580	-0.2100	-0.8621	0.5183
5	00:02:00	7.8480	-0.2000	-0.8210	0.5177
6	00:04:01	7.8340	-0.1860	-0.7635	0.5168
7	00:08:01	7.8200	-0.1720	-0.7061	0.5160
8	00:15:01	7.8060	-0.1580	-0.6486	0.5151
9	00:30:02	7.7940	-0.1460	-0.5993	0.5144
10	01:00:05	7.7820	-0.1340	-0.5501	0.5136
11	02:00:09	7.7740	-0.1260	-0.5172	0.5131
12	04:00:18	7.7660	-0.1180	-0.4844	0.5126
13	08:00:35	7.7640	-0.1160	-0.4762	0.5125
14	12:00:53	7.7620	-0.1140	-0.4680	0.5124
15	24:00:39	7.7480	-0.1000	-0.4105	0.5115

Consolidation Test Results (Sequence 5) Load 80.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 6) Load 160.000 kPa

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 26-May-18

Test Number:

Sample Number: LLO12 ST6

Soil Description:

Boring Number:

Clay (Cl), Some Gravel, Some Sand

Depth: 4.6-5.05m

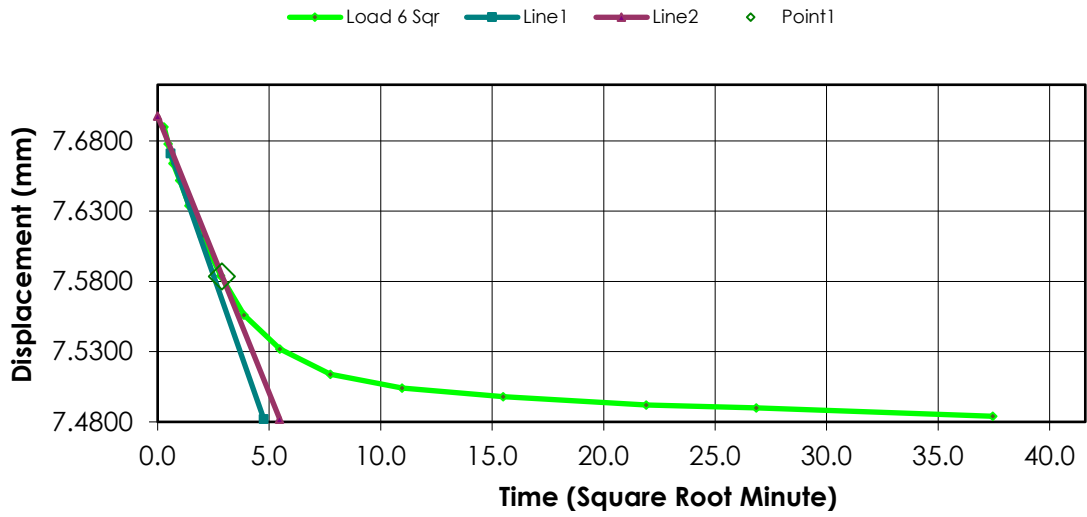
Remarks:

Sample Type: Undisturbed

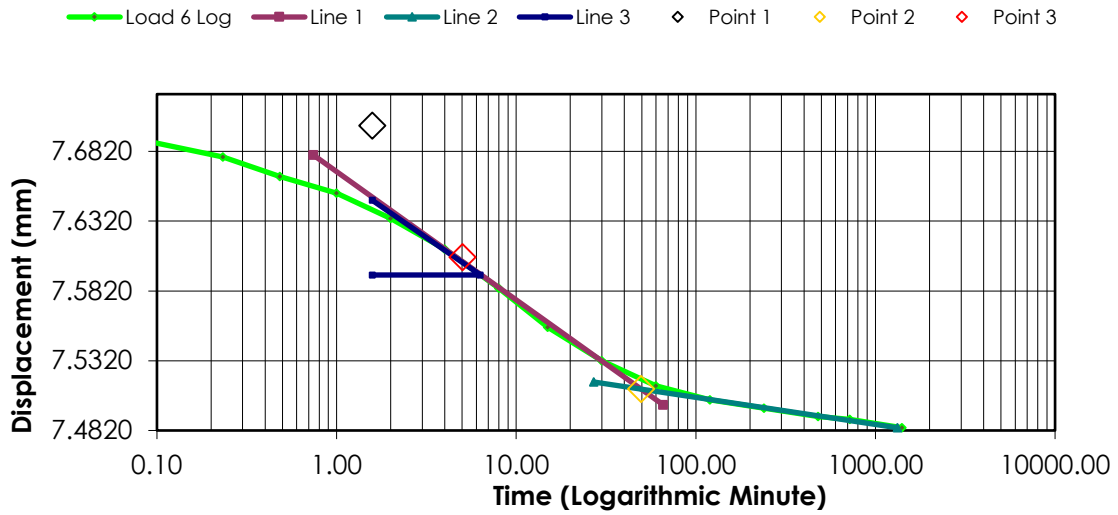
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	7.7480	-0.1000	-0.4105	0.5115
1	00:00:05	7.6900	-0.0720	-0.2956	0.5098
2	00:00:14	7.6780	-0.0600	-0.2463	0.5091
3	00:00:29	7.6640	-0.0460	-0.1888	0.5082
4	00:01:00	7.6520	-0.0340	-0.1396	0.5074
5	00:02:00	7.6340	-0.0160	-0.0657	0.5063
6	00:04:00	7.6120	0.0060	0.0246	0.5050
7	00:08:00	7.5840	0.0340	0.1396	0.5032
8	00:15:01	7.5560	0.0620	0.2545	0.5015
9	00:30:02	7.5320	0.0860	0.3530	0.5000
10	01:00:04	7.5140	0.1040	0.4269	0.4989
11	02:00:08	7.5040	0.1140	0.4680	0.4983
12	04:00:17	7.4980	0.1200	0.4926	0.4979
13	08:00:35	7.4920	0.1260	0.5172	0.4976
14	12:00:52	7.4900	0.1280	0.5255	0.4974
15	23:23:30	7.4840	0.1340	0.5501	0.4971

Consolidation Test Results (Sequence 6) Load 160.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 7) Load 320.000 kPa

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 26-May-18

Test Number:

Sample Number: LLO12 ST6

Soil Description:

Boring Number:

Clay (Cl), Some Gravel, Some Sand

Depth: 4.6-5.05m

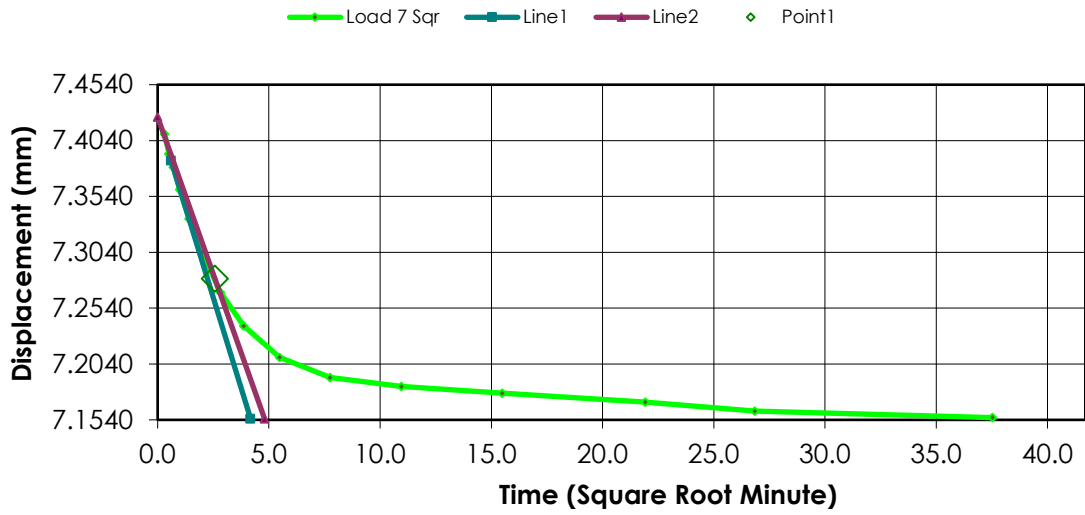
Remarks:

Sample Type: Undisturbed

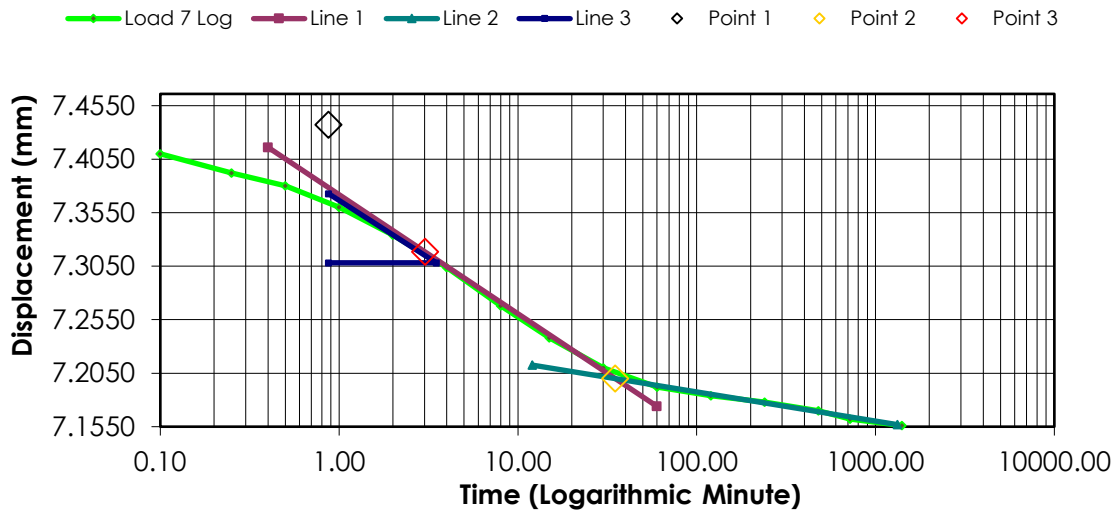
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	7.4840	0.1340	0.5501	0.4971
1	00:00:06	7.4100	0.1760	0.7225	0.4945
2	00:00:15	7.3920	0.1940	0.7964	0.4934
3	00:00:30	7.3800	0.2060	0.8456	0.4926
4	00:01:00	7.3600	0.2260	0.9277	0.4914
5	00:02:00	7.3340	0.2520	1.0345	0.4898
6	00:04:00	7.3040	0.2820	1.1576	0.4879
7	00:08:00	7.2680	0.3180	1.3054	0.4857
8	00:15:01	7.2380	0.3480	1.4286	0.4838
9	00:30:02	7.2100	0.3760	1.5435	0.4821
10	01:00:04	7.1920	0.3940	1.6174	0.4810
11	02:00:08	7.1840	0.4020	1.6502	0.4805
12	04:00:17	7.1780	0.4080	1.6749	0.4801
13	08:00:35	7.1700	0.4160	1.7077	0.4796
14	12:00:52	7.1620	0.4240	1.7406	0.4791
15	23:29:10	7.1560	0.4300	1.7652	0.4788

Consolidation Test Results (Sequence 7) Load 320.000 kPa

Consolidation Graph (Square Root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 8) Load 640.000 kPa

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 26-May-18

Test Number:

Sample Number: LLO12 ST6

Soil Description:

Boring Number:

Clay (Cl), Some Gravel, Some Sand

Depth: 4.6-5.05m

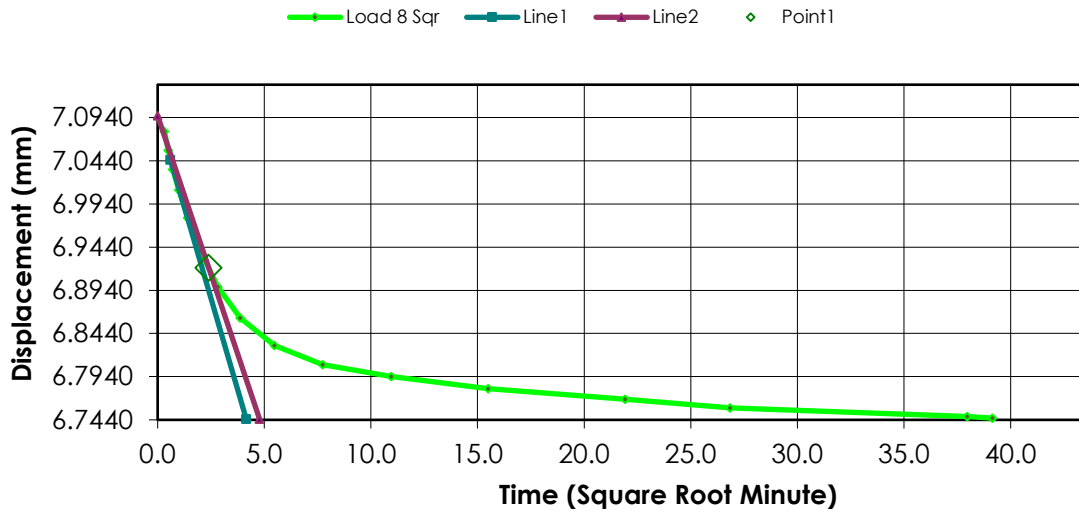
Remarks:

Sample Type: Undisturbed

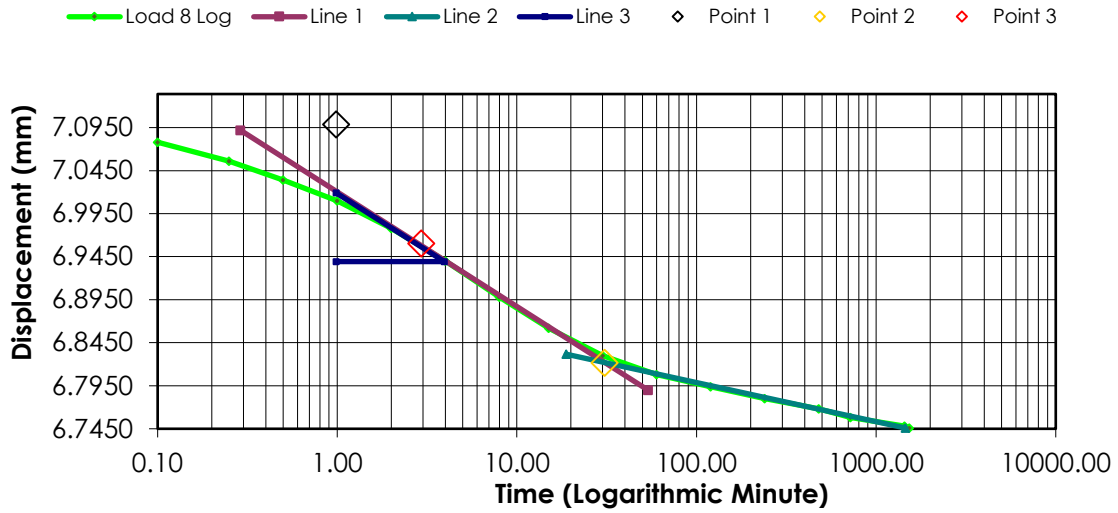
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	7.1560	0.4300	1.7652	0.4788
1	00:00:06	7.0780	0.4680	1.9212	0.4764
2	00:00:15	7.0560	0.4900	2.0115	0.4751
3	00:00:30	7.0340	0.5120	2.1018	0.4737
4	00:01:00	7.0100	0.5360	2.2003	0.4722
5	00:02:00	6.9780	0.5680	2.3317	0.4702
6	00:04:00	6.9400	0.6060	2.4877	0.4679
7	00:08:00	6.8980	0.6480	2.6601	0.4653
8	00:15:01	6.8620	0.6840	2.8079	0.4631
9	00:30:02	6.8300	0.7160	2.9392	0.4611
10	01:00:04	6.8080	0.7380	3.0296	0.4597
11	02:00:08	6.7940	0.7520	3.0870	0.4589
12	04:00:17	6.7800	0.7660	3.1445	0.4580
13	08:00:35	6.7680	0.7780	3.1938	0.4573
14	12:00:52	6.7580	0.7880	3.2348	0.4567
15	24:01:45	6.7480	0.7980	3.2759	0.4560
16	25:32:51	6.7460	0.8000	3.2841	0.4559

Consolidation Test Results (Sequence 8) Load 640.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 9) Rebound 320.000 kPa

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 26-May-18

Test Number:

Sample Number: LLO12 ST6

Soil Description:

Boring Number:

Clay (Cl), Some Gravel, Some Sand

Depth: 4.6-5.05m

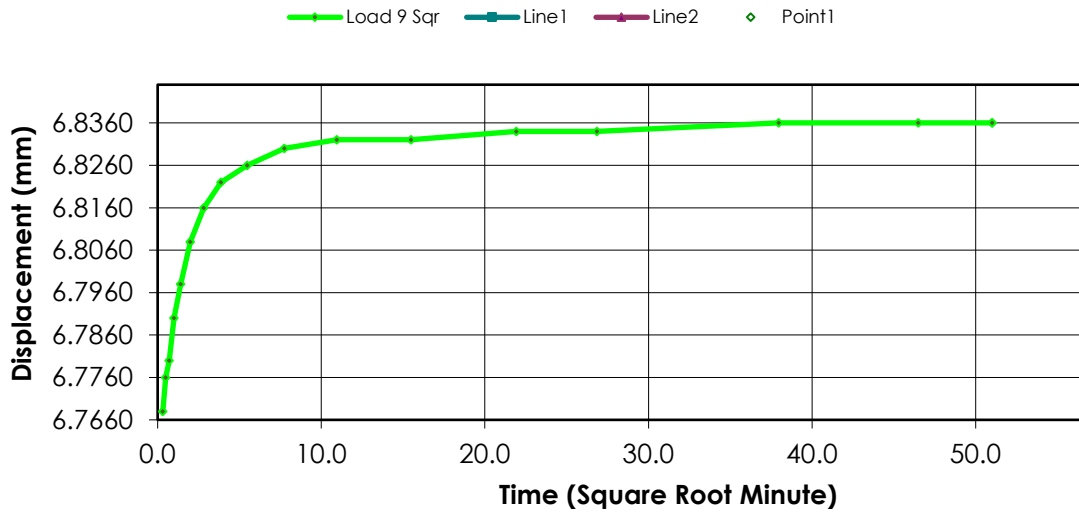
Remarks:

Sample Type: Undisturbed

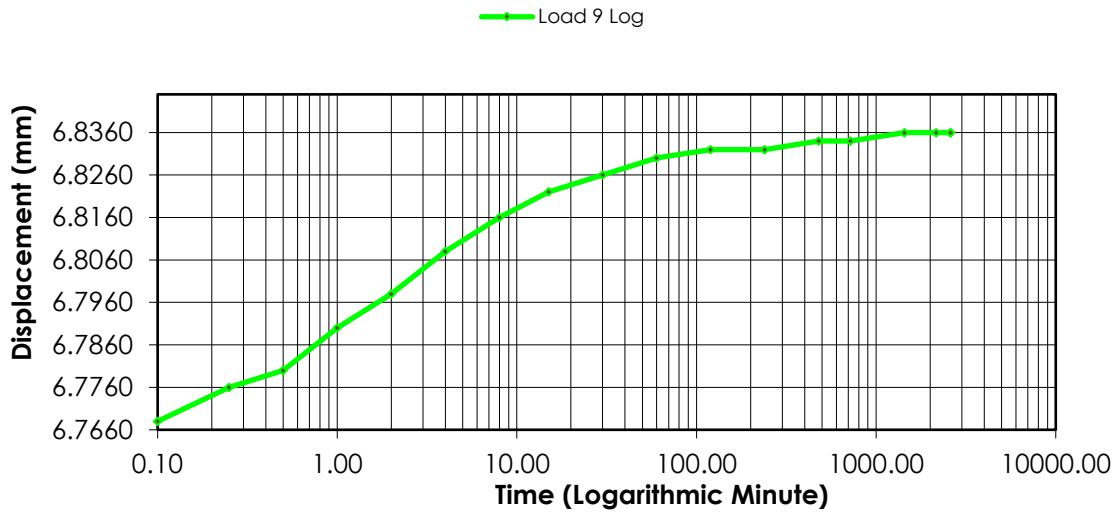
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	6.7460	0.8000	3.2841	0.4559
1	00:00:06	6.7680	0.7920	3.2512	0.4564
2	00:00:15	6.7760	0.7840	3.2184	0.4569
3	00:00:30	6.7800	0.7800	3.2020	0.4571
4	00:01:00	6.7900	0.7700	3.1609	0.4578
5	00:02:00	6.7980	0.7620	3.1281	0.4583
6	00:04:00	6.8080	0.7520	3.0870	0.4589
7	00:08:00	6.8160	0.7440	3.0542	0.4594
8	00:15:01	6.8220	0.7380	3.0296	0.4597
9	00:30:02	6.8260	0.7340	3.0131	0.4600
10	01:00:04	6.8300	0.7300	2.9967	0.4602
11	02:00:08	6.8320	0.7280	2.9885	0.4604
12	04:00:17	6.8320	0.7280	2.9885	0.4604
13	08:00:35	6.8340	0.7260	2.9803	0.4605
14	12:00:52	6.8340	0.7260	2.9803	0.4605
15	24:01:45	6.8360	0.7240	2.9721	0.4606
16	36:02:38	6.8360	0.7240	2.9721	0.4606
17	43:23:06	6.8360	0.7240	2.9721	0.4606
18	43:23:16	6.8360	0.7240	2.9721	0.4606

Consolidation Test Results (Sequence 9) Rebound 320.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 10) Rebound 160.000 kPa

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 26-May-18

Test Number:

Sample Number: LLO12 ST6

Soil Description:

Boring Number:

Clay (Cl), Some Gravel, Some Sand

Depth: 4.6-5.05m

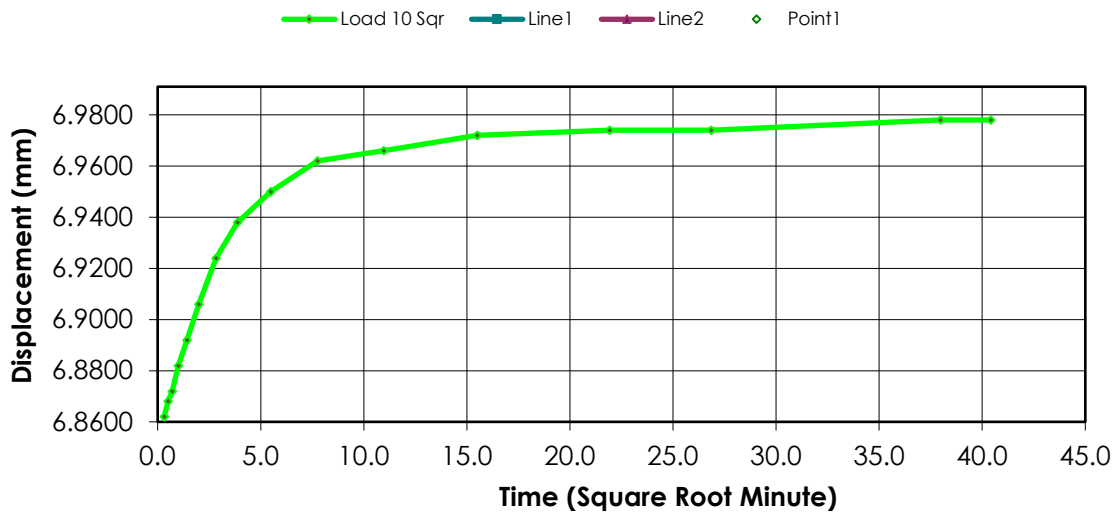
Remarks:

Sample Type: Undisturbed

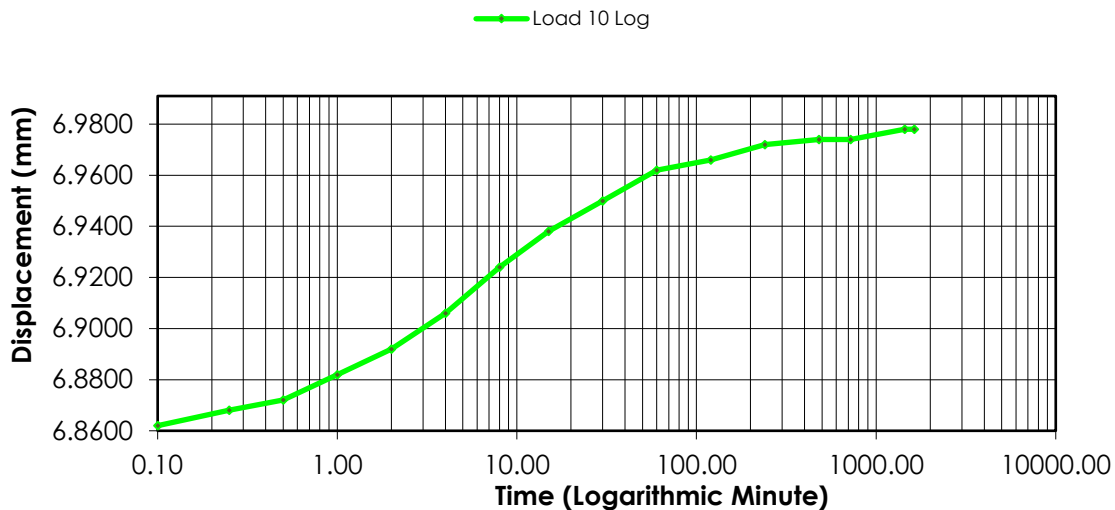
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	6.8360	0.7240	2.9721	0.4606
1	00:00:06	6.8620	0.7120	2.9228	0.4613
2	00:00:15	6.8680	0.7060	2.8982	0.4617
3	00:00:30	6.8720	0.7020	2.8818	0.4620
4	00:01:00	6.8820	0.6920	2.8407	0.4626
5	00:02:00	6.8920	0.6820	2.7997	0.4632
6	00:04:00	6.9060	0.6680	2.7422	0.4641
7	00:08:01	6.9240	0.6500	2.6683	0.4652
8	00:15:01	6.9380	0.6360	2.6108	0.4660
9	00:30:02	6.9500	0.6240	2.5616	0.4668
10	01:00:05	6.9620	0.6120	2.5123	0.4675
11	02:00:09	6.9660	0.6080	2.4959	0.4678
12	04:00:18	6.9720	0.6020	2.4713	0.4681
13	08:00:35	6.9740	0.6000	2.4631	0.4683
14	12:00:53	6.9740	0.6000	2.4631	0.4683
15	24:01:46	6.9780	0.5960	2.4466	0.4685
16	27:13:05	6.9780	0.5960	2.4466	0.4685

Consolidation Test Results (Sequence 10) Rebound 160.000 kPa

Consolidation Graph (Square-root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 11) Load 320.000 kPa

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 26-May-18

Test Number:

Sample Number: LLO12 ST6

Soil Description:

Boring Number:

Clay (Cl), Some Gravel, Some Sand

Depth: 4.6-5.05m

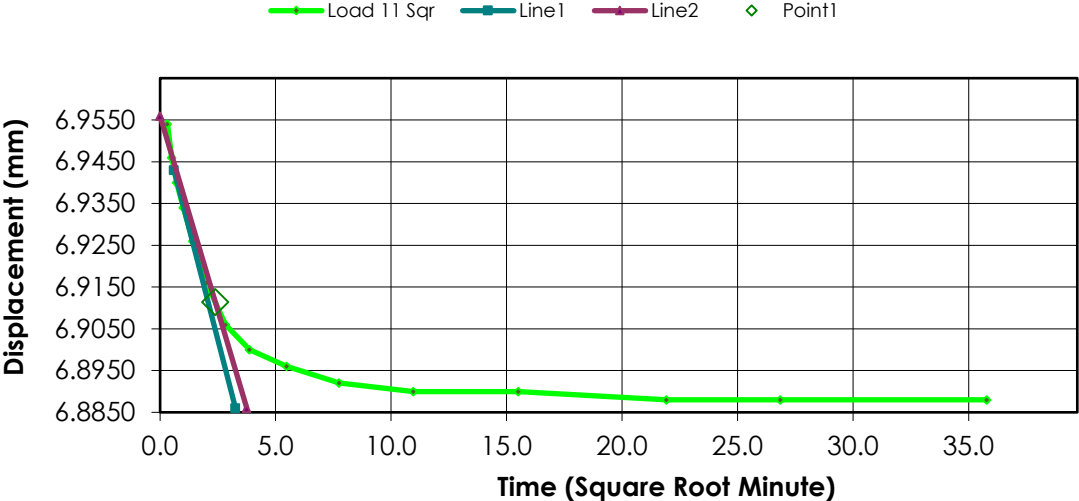
Remarks:

Sample Type: Undisturbed

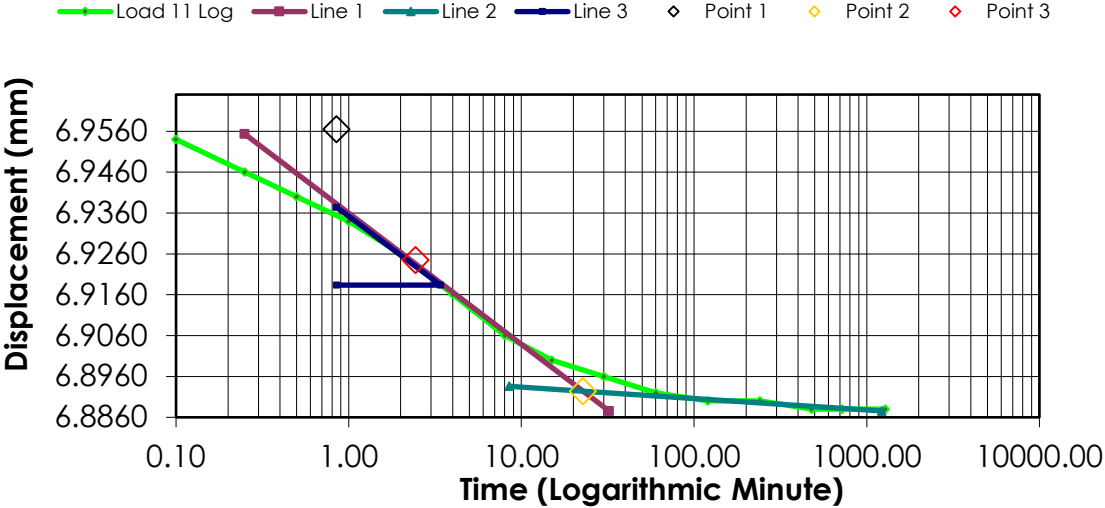
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	6.9780	0.5960	2.4466	0.4685
1	00:00:06	6.9540	0.6080	2.4959	0.4678
2	00:00:15	6.9460	0.6160	2.5287	0.4673
3	00:00:30	6.9400	0.6220	2.5534	0.4669
4	00:01:00	6.9340	0.6280	2.5780	0.4665
5	00:02:01	6.9260	0.6360	2.6108	0.4660
6	00:04:01	6.9160	0.6460	2.6519	0.4654
7	00:08:01	6.9060	0.6560	2.6929	0.4648
8	00:15:01	6.9000	0.6620	2.7176	0.4644
9	00:30:03	6.8960	0.6660	2.7340	0.4642
10	01:00:05	6.8920	0.6700	2.7504	0.4639
11	02:00:09	6.8900	0.6720	2.7586	0.4638
12	04:00:18	6.8900	0.6720	2.7586	0.4638
13	08:00:35	6.8880	0.6740	2.7668	0.4637
14	12:00:53	6.8880	0.6740	2.7668	0.4637
15	21:20:39	6.8880	0.6740	2.7668	0.4637

Consolidation Test Results (Sequence 11) Load 320.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 12) Load 640.000 kPa

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 26-May-18

Test Number:

Sample Number: LLO12 ST6

Soil Description:

Boring Number:

Clay (Cl), Some Gravel, Some Sand

Depth: 4.6-5.05m

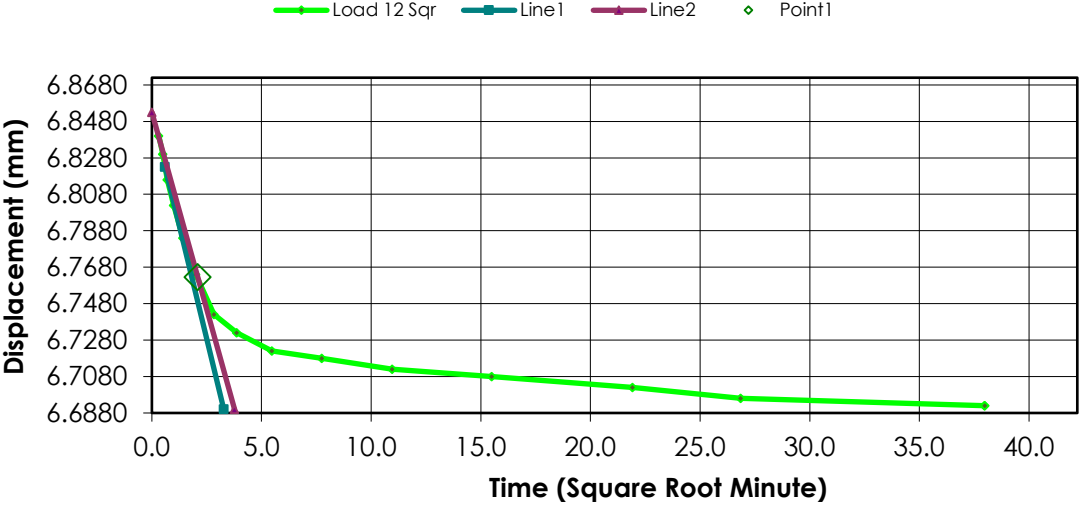
Remarks:

Sample Type: Undisturbed

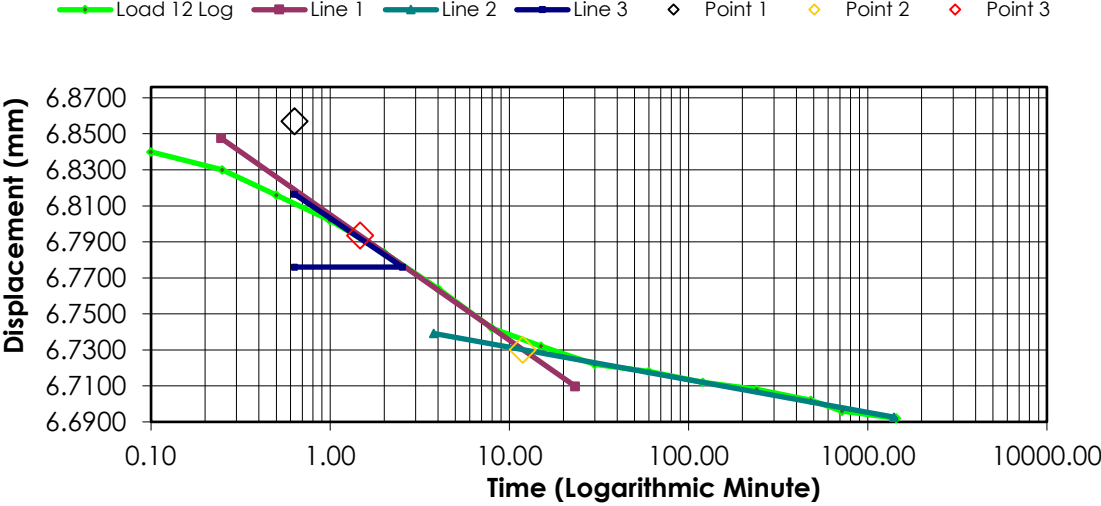
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	6.8880	0.6740	2.7668	0.4637
1	00:00:06	6.8400	0.7040	2.8900	0.4618
2	00:00:15	6.8300	0.7140	2.9310	0.4612
3	00:00:30	6.8160	0.7280	2.9885	0.4604
4	00:01:00	6.8020	0.7420	3.0460	0.4595
5	00:02:00	6.7840	0.7600	3.1199	0.4584
6	00:04:00	6.7640	0.7800	3.2020	0.4571
7	00:08:00	6.7420	0.8020	3.2923	0.4558
8	00:15:01	6.7320	0.8120	3.3333	0.4552
9	00:30:02	6.7220	0.8220	3.3744	0.4546
10	01:00:04	6.7180	0.8260	3.3908	0.4543
11	02:00:09	6.7120	0.8320	3.4154	0.4539
12	04:00:17	6.7080	0.8360	3.4319	0.4537
13	08:00:35	6.7020	0.8420	3.4565	0.4533
14	12:00:53	6.6960	0.8480	3.4811	0.4529
15	24:01:45	6.6920	0.8520	3.4975	0.4527
16	24:03:30	6.6920	0.8520	3.4975	0.4527

Consolidation Test Results (Sequence 12) Load 640.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 13) Load 1280.000 kPa

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 26-May-18

Test Number:

Sample Number: LLO12 ST6

Soil Description:

Boring Number:

Clay (Cl), Some Gravel, Some Sand

Depth: 4.6-5.05m

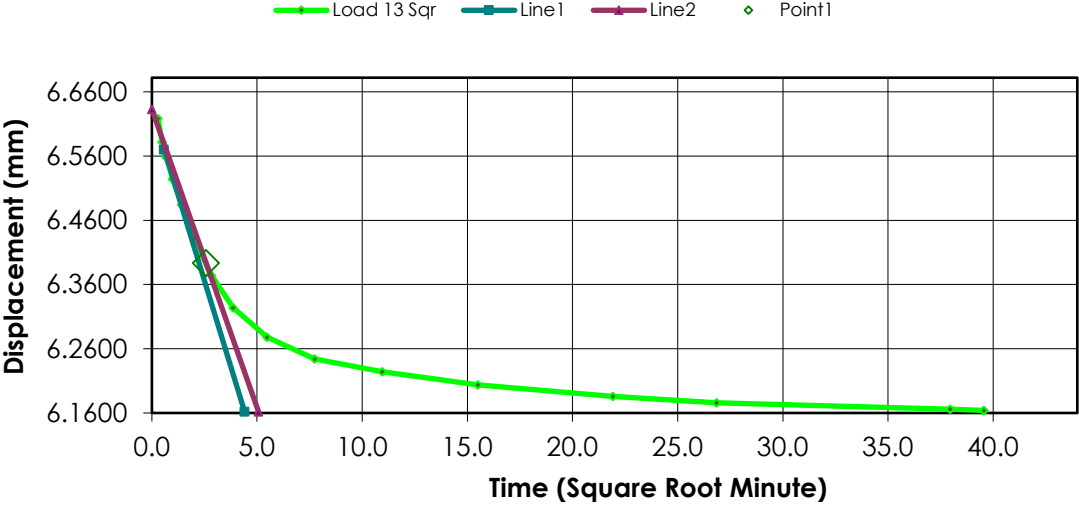
Remarks:

Sample Type: Undisturbed

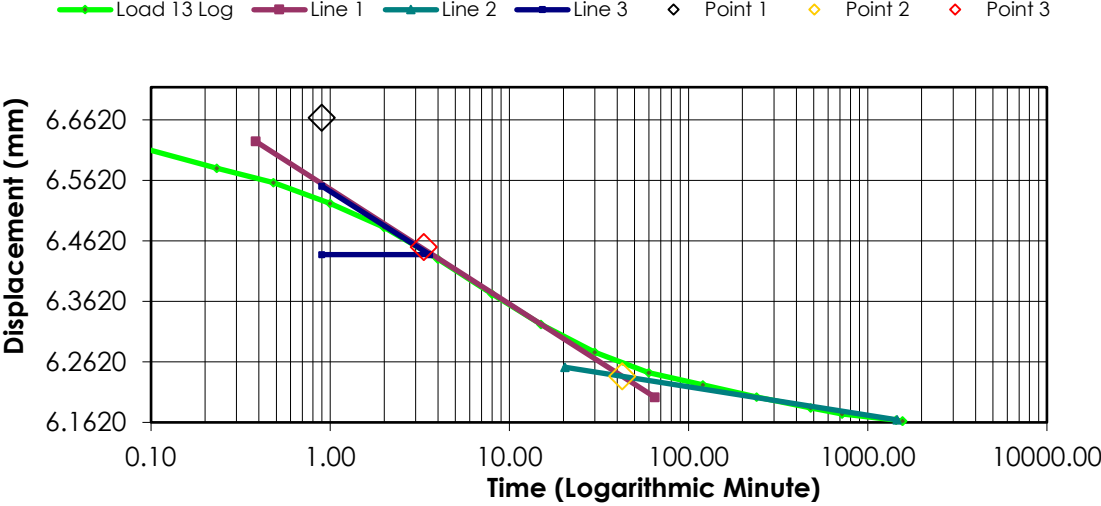
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	6.6920	0.8520	3.4975	0.4527
1	00:00:05	6.6180	0.8800	3.6125	0.4510
2	00:00:14	6.5820	0.9160	3.7603	0.4487
3	00:00:29	6.5580	0.9400	3.8588	0.4473
4	00:01:00	6.5240	0.9740	3.9984	0.4452
5	00:02:00	6.4840	1.0140	4.1626	0.4427
6	00:04:00	6.4320	1.0660	4.3760	0.4395
7	00:08:00	6.3740	1.1240	4.6141	0.4359
8	00:15:01	6.3240	1.1740	4.8194	0.4328
9	00:30:02	6.2780	1.2200	5.0082	0.4300
10	01:00:04	6.2440	1.2540	5.1478	0.4279
11	02:00:08	6.2240	1.2740	5.2299	0.4266
12	04:00:17	6.2040	1.2940	5.3120	0.4254
13	08:00:38	6.1860	1.3120	5.3859	0.4243
14	12:00:57	6.1760	1.3220	5.4269	0.4237
15	24:01:50	6.1660	1.3320	5.4680	0.4230
16	26:04:44	6.1640	1.3340	5.4762	0.4229
17	26:04:47	6.1640	1.3340	5.4762	0.4229

Consolidation Test Results (Sequence 13) Load 1280.000 kPa

Consolidation Graph (Squareroot Time)



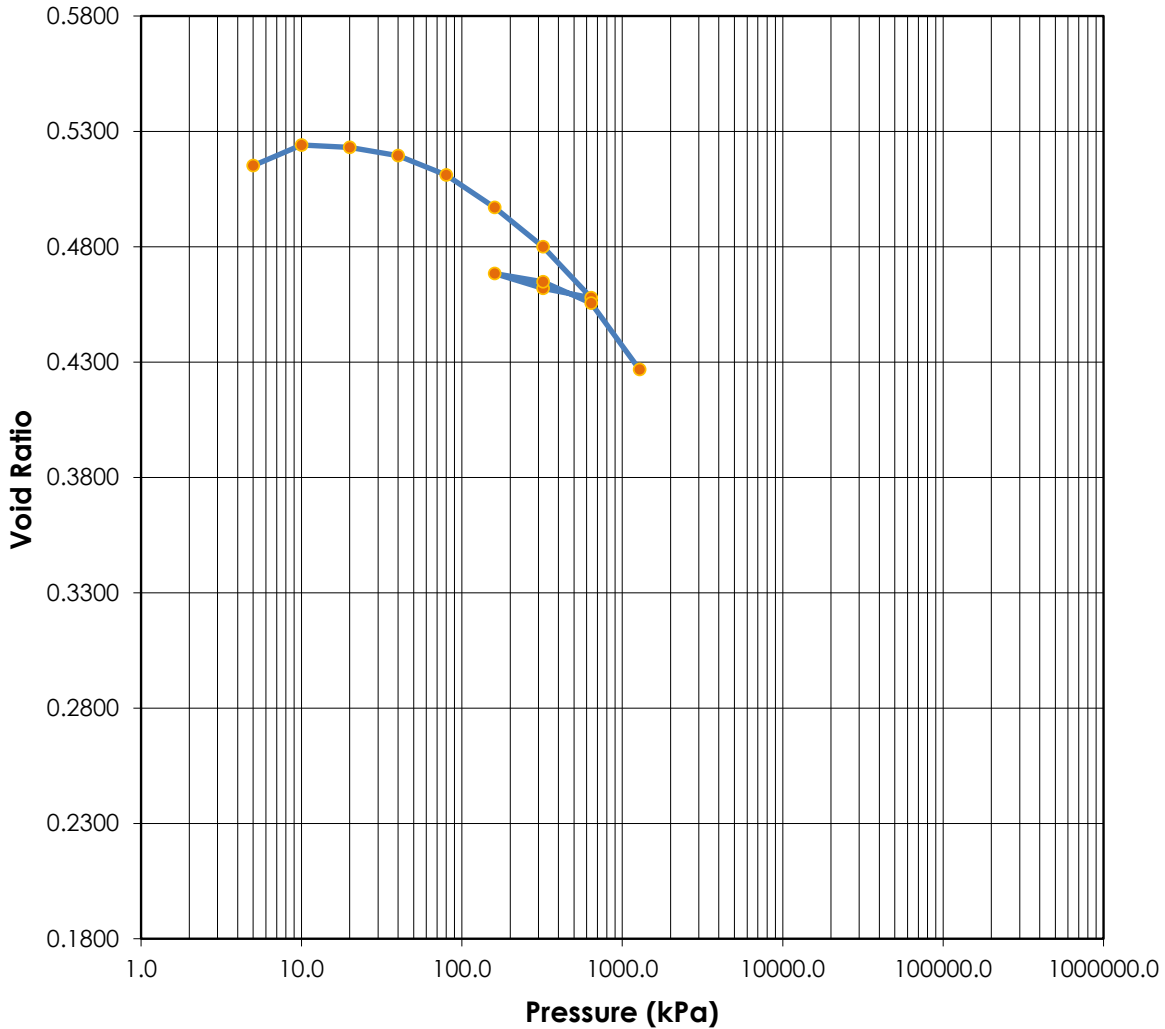
Consolidation Graph (Logarithmic Time)





Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876



	Before	After	Liquid Limits:	34	Test Date:	26-May-18
Moisture (%):	18.6	17.4	Plastic Limits:	15		
Dry Density (g/cm³):	1.779	1.887	Plasticity Index (%):	19		
Saturation (%):	97	100	Specific Gravity:	2.70	Assumed	
Void Ratio:	0.5170	0.4285				
Soil Description:	Clay (Cl), Some Gravel, Trace Sand					
Project Number:	110773396	Depth:	7.6-8.05m			
Sample Number:	LLO12 ST10	Boring Number:				
Project:	SR1					Remarks:
Client:	Alberta Transportation					
Location:						

Tested By: E. Wahl

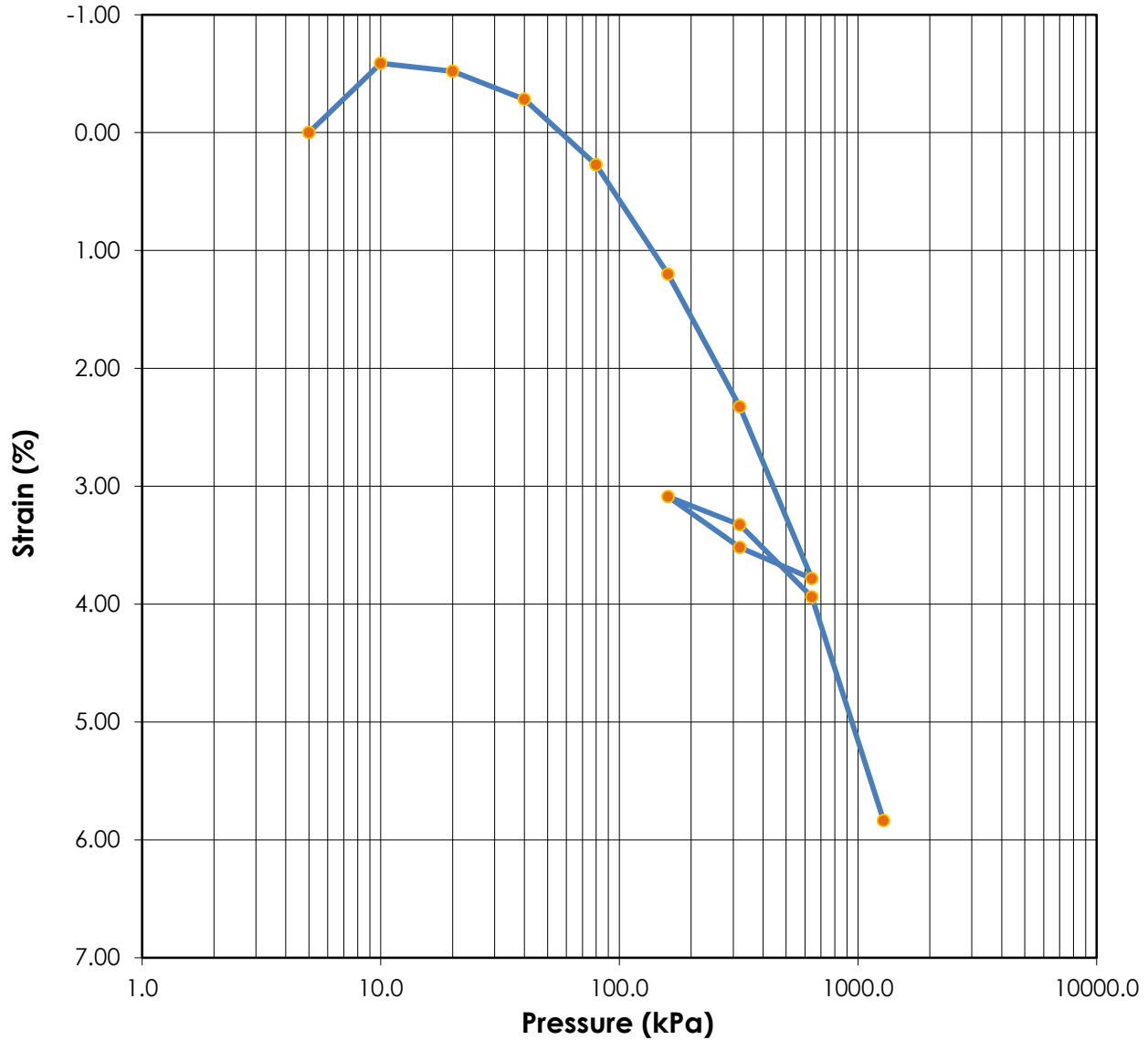
Reviewed By: C. Lamoureux

Reporting of these test results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request. The data presented above is for the sole use of the client stipulated above. Stantec is not responsible, nor can be held liable, for the use of this report by any other party, with or without the knowledge of Stantec.

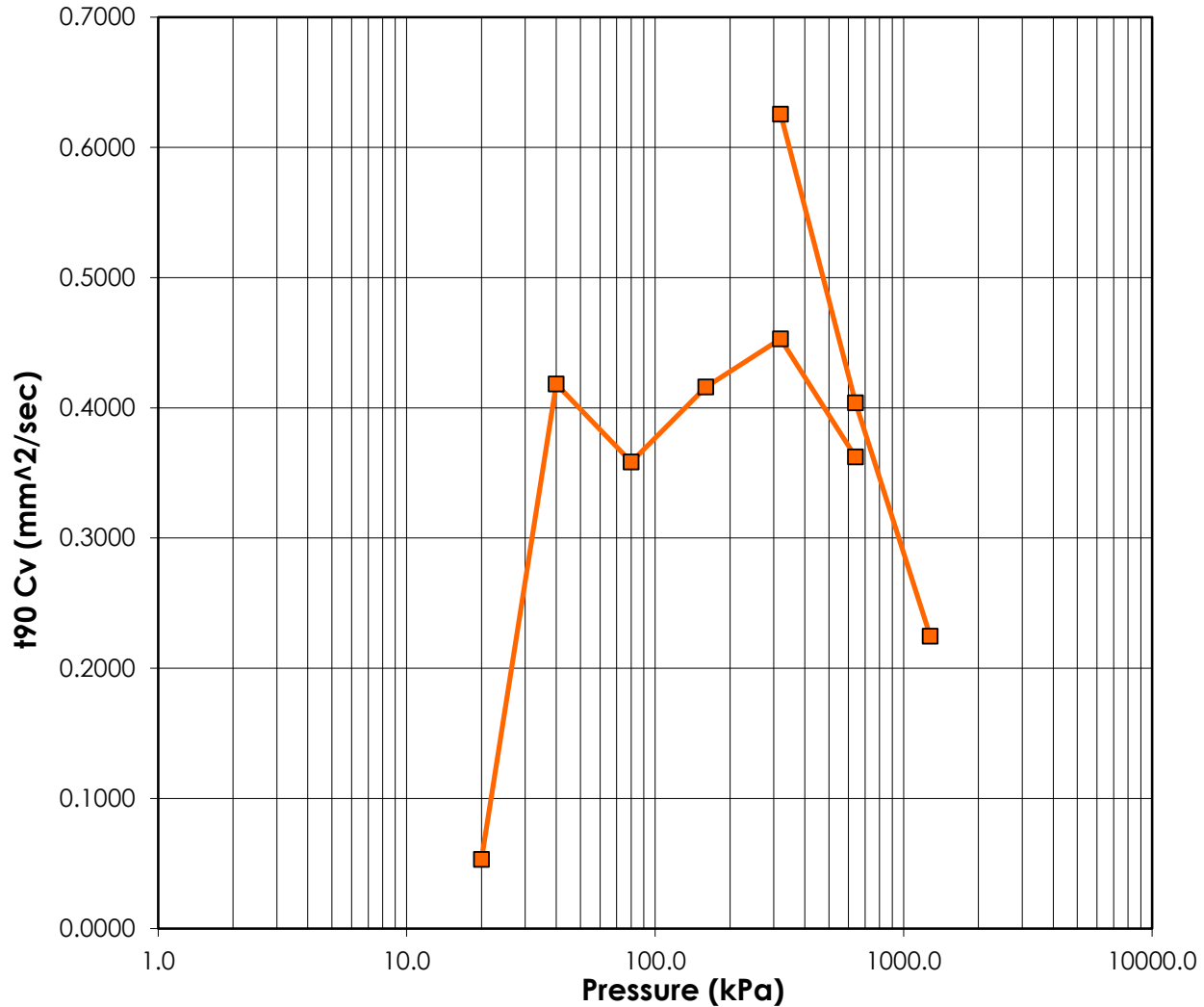


Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876



	Before	After	Liquid Limits:	34	Test Date:	26-May-18
Moisture (%):	18.6	17.4	Plastic Limits:	15		
Dry Density (g/cm3):	1.779	1.887	Plasticity Index (%):	19		
Saturation (%):	97	100				
Void Ratio:	0.5170	0.4285	Specific Gravity:	2.70	Assumed	
Sample Description:	Clay (Cl), Some Gravel, Trace Sand					
Project Number:	110773396	Depth:	7.6-8.05m			
Sample Number:	LLO12 ST10	Boring Number:				
Project:	SR1					Remarks:
Client:	Alberta Transportation					
Location:						



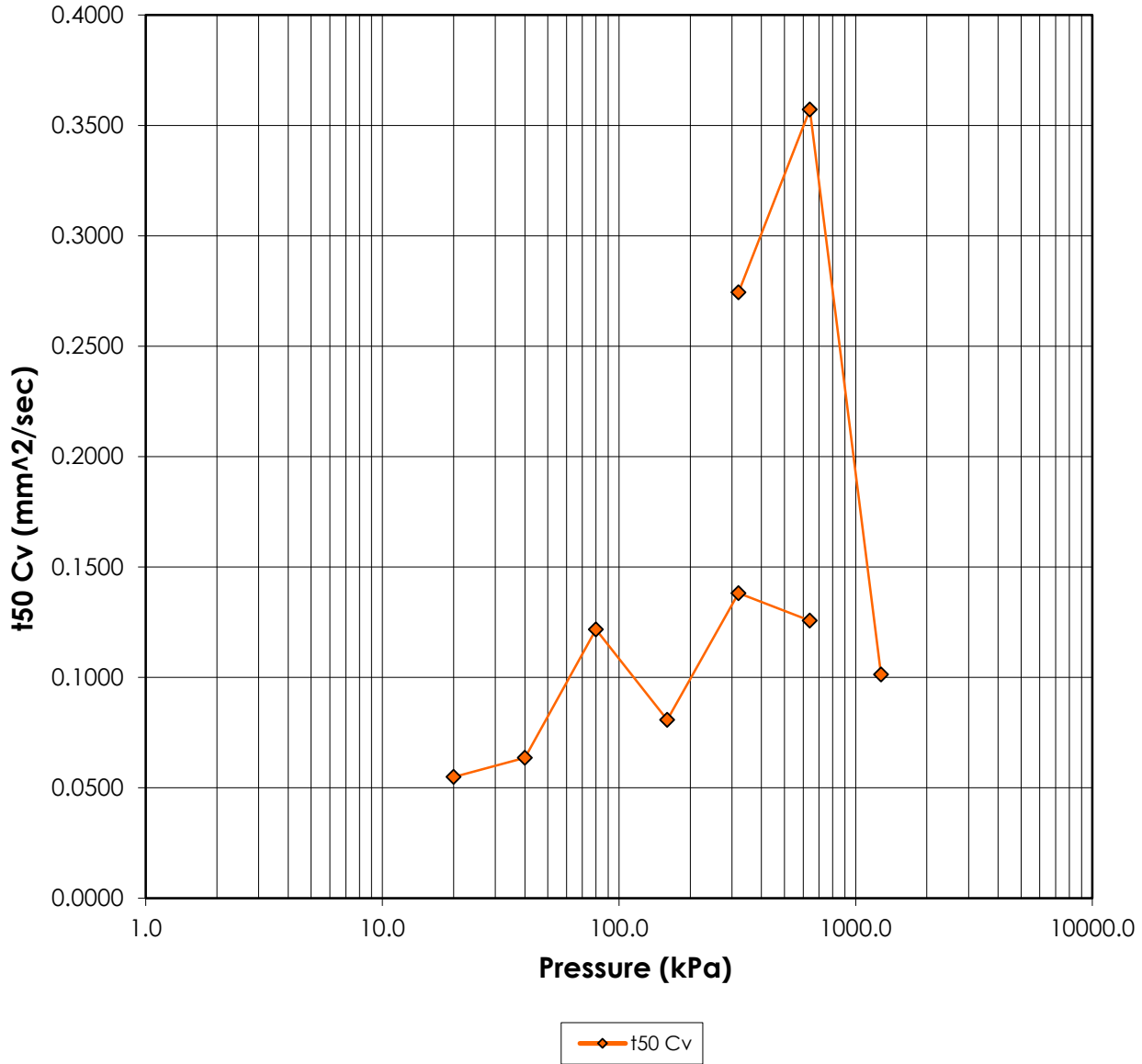

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	Before	After	Liquid Limits:	34	Test Date:	26-May-18
Moisture (%):	18.6	17.4	Plastic Limits:	15		
Dry Density (g/cm³):	1.779	1.887	Plasticity Index (%):	19		
Saturation (%):	97	100				
Void Ratio:	0.5170	0.4285	Specific Gravity:	2.70	Assumed	
Soil Description:	Clay (Cl), Some Gravel, Trace Sand					
Project Number:	110773396	Depth:	7.6-8.05m			
Sample Number:	LLO12 ST10	Boring Number:				
Project:	SR1					Remarks:
Client:	Alberta Transportation					
Location:						



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

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 Calgary, Alberta T2C 1G4
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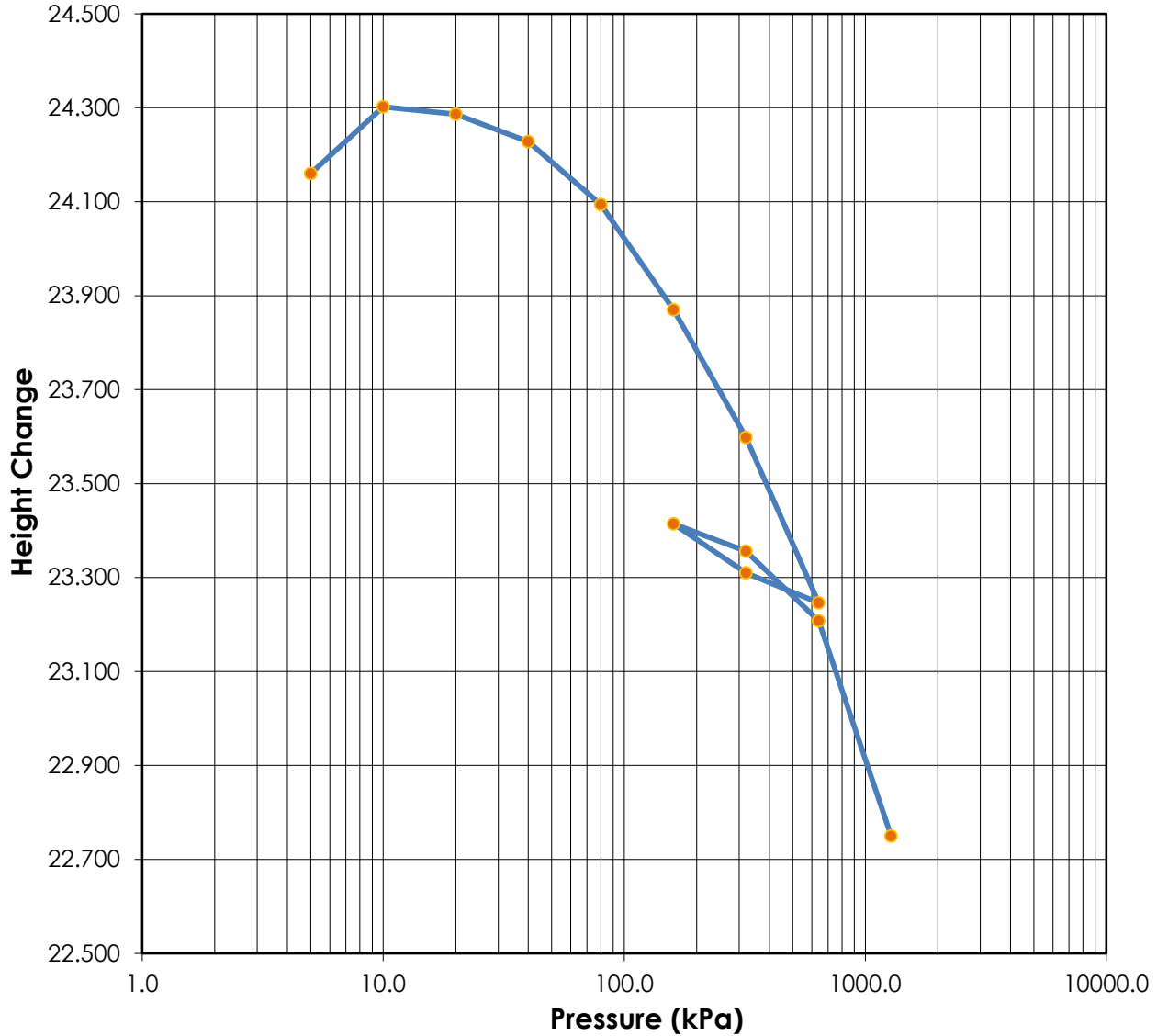


	Before	After	Liquid Limits:	34	Test Date:	26-May-18
Moisture (%):	18.6	17.4	Plastic Limits:	15		
Dry Density (g/cm³):	1.779	1.887	Plasticity Index (%):	19		
Saturation (%):	97	100				
Void Ratio:	0.5170	0.4285	Specific Gravity:	2.70	Assumed	
Soil Description:	Clay (Cl), Some Gravel, Trace Sand					
Project Number:	110773396	Depth:	7.6-8.05m			
Sample Number:	LLO12 ST10	Boring Number:				
Project:	SR1					
Client:	Alberta Transportation					
Location:						
	Remarks:					



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876



	Before	After	Liquid Limits:	34	Test Date:	26-May-18
Moisture (%):	18.6	17.4	Plastic Limits:	15		
Dry Density (g/cm3):	1.779	1.887	Plasticity Index (%):	19		
Saturation (%):	97	100				
Void Ratio:	0.5170	0.4285	Specific Gravity:	2.70	Assumed	
Soil Description:	Clay (Cl), Some Gravel, Trace Sand					
Project Number:	110773396	Depth:	7.6-8.05m			
Sample Number:	LLO12 ST10	Boring Number:				
Project:	SR1					Remarks:
Client:	Alberta Transportation					
Location:						

Consolidation Test Results Summary

Project: SR1
Location:
Job Number:

Project Number: 110773396

Sample Number: LLO12 ST10
Boring Number:
Depth: 7.6-8.05m
Sample Type: Undisturbed

Sample Description:
Clay (Cl), Some Gravel, Trace Sand
Remarks:

Test Number:
Test Date: 26-May-18

Index	Load Sequence (kPa)	Cummulative Change in Height (mm)	Specimen Height (mm)	Height of Void (mm)	Vertical Strain (%)	Void Ratio	t90 Fitting Time (min)	t50 Fitting Time (min)	t90 Cv (mm ² /sec)	t50 Cv (mm ² /sec)
0	0.000	0.0000	24.1600	8.2143	0.00	0.5151	0.000	0.000	0.000	0.000
1	5.000	0.0000	24.1600	8.2143	0.00	0.5151	0.000	0.000	0.000	0.000
2	10.000	-0.1420	24.3020	8.3563	-0.59	0.5240	0.000	0.000	0.000	0.000
3	20.000	-0.1260	24.2860	8.3403	-0.52	0.5230	39.207	8.822	0.053	0.055
4	40.000	-0.0680	24.2280	8.2823	-0.28	0.5194	4.959	7.575	0.418	0.064
5	80.000	0.0660	24.0940	8.1483	0.27	0.5110	5.725	3.915	0.358	0.122
6	160.000	0.2900	23.8700	7.9243	1.20	0.4970	4.839	5.790	0.416	0.081
7	320.000	0.5620	23.5980	7.6523	2.33	0.4799	4.345	3.308	0.453	0.138
8	640.000	0.9140	23.2460	7.3003	3.78	0.4578	5.270	3.529	0.362	0.126
9	320.000	0.8500	23.3100	7.3643	3.52	0.4618	0.000	0.000	0.000	0.000
10	160.000	0.7460	23.4140	7.4683	3.09	0.4684	0.000	0.000	0.000	0.000
11	320.000	0.8040	23.3560	7.4103	3.33	0.4647	3.081	1.632	0.626	0.274
12	640.000	0.9520	23.2080	7.2623	3.94	0.4554	4.713	1.238	0.404	0.357
13	1280.000	1.4100	22.7500	6.8043	5.84	0.4267	8.146	4.193	0.225	0.101

Predicted value indicated with *

Consolidation Test

Consolidation Specimen Information

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 26-May-18

Sample Number: LLO12 ST10

Sample Description:

Boring Number:

Clay (Cl), Some Gravel, Trace Sand

Depth: 7.6-8.05m

Remarks:

Sample Type: Undisturbed

Test Number:

Liquid Limit: 34

Initial Void Ratio: 0.5170

Initial Height (mm): 24.16

Plastic Limit: 15

Plasticity Index (%): 19

Initial Diameter (mm): 63.48

Specific Gravity: 2.70

Weight of Ring (g): 207.72

Assumed

Parameters	Initial Specimen	Final Specimen
Moist Weight + Container (g)	250.81	162.87
Dry Soil + Container (g)	212.12	139.25
Weight of Container (g)	3.71	3.71
Moisture Content (%)	18.6	17.4
Void Ratio	0.5170	0.4285
Saturation (%)	97	100
Dry Density (g/cm ³)	1.779	1.887

**Consolidation Test Results
(Sequence 1) Load 5.000 kPa**

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 26-May-18

Test Number:

Sample Number: LLO12 ST10

Soil Description:

Boring Number:

Clay (Cl), Some Gravel, Trace Sand

Depth: 7.6-8.05m

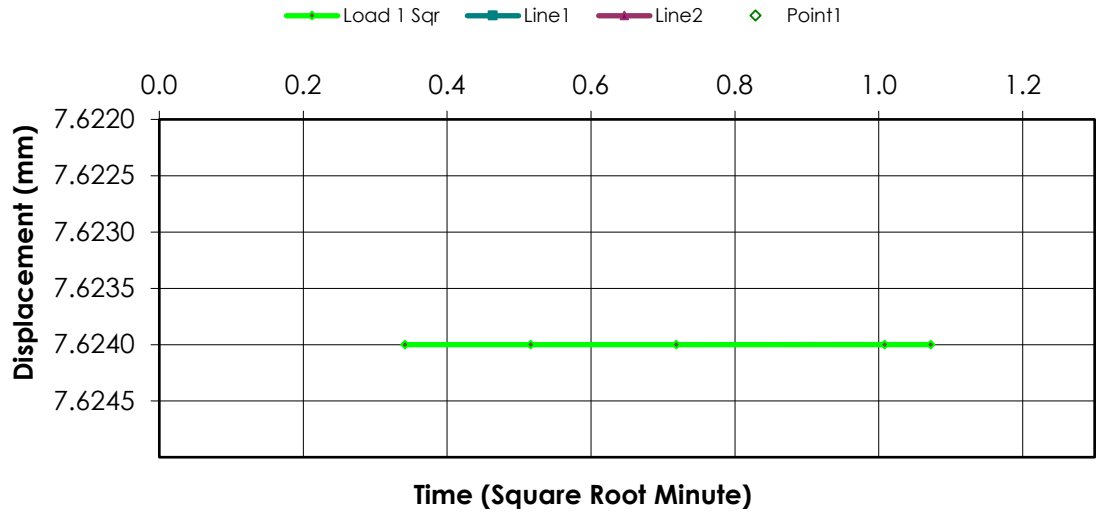
Remarks:

Sample Type: Undisturbed

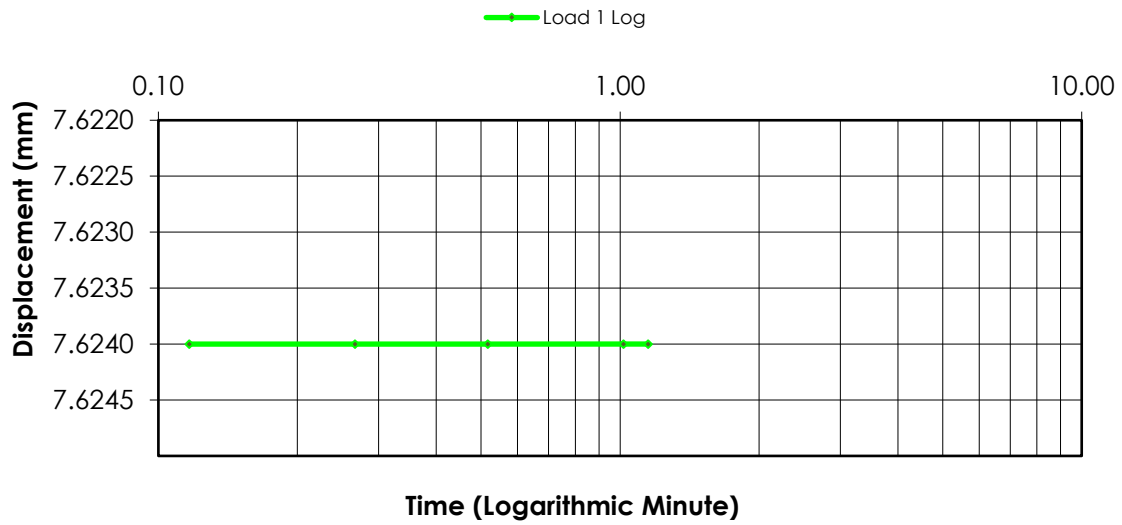
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	7.6240	0.0000	0.0000	0.5170
1	00:00:07	7.6240	0.0000	0.0000	0.5170
2	00:00:16	7.6240	0.0000	0.0000	0.5170
3	00:00:31	7.6240	0.0000	0.0000	0.5170
4	00:01:01	7.6240	0.0000	0.0000	0.5170
5	00:01:09	7.6240	0.0000	0.0000	0.5170

**Consolidation Test Results
(Sequence 1) Load 5.000 kPa**

Consolidation Graph (Square-root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 2) Load 10.000 kPa

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 26-May-18

Test Number:

Sample Number: LLO12 ST10

Soil Description:

Boring Number:

Clay (Cl), Some Gravel, Trace Sand

Depth: 7.6-8.05m

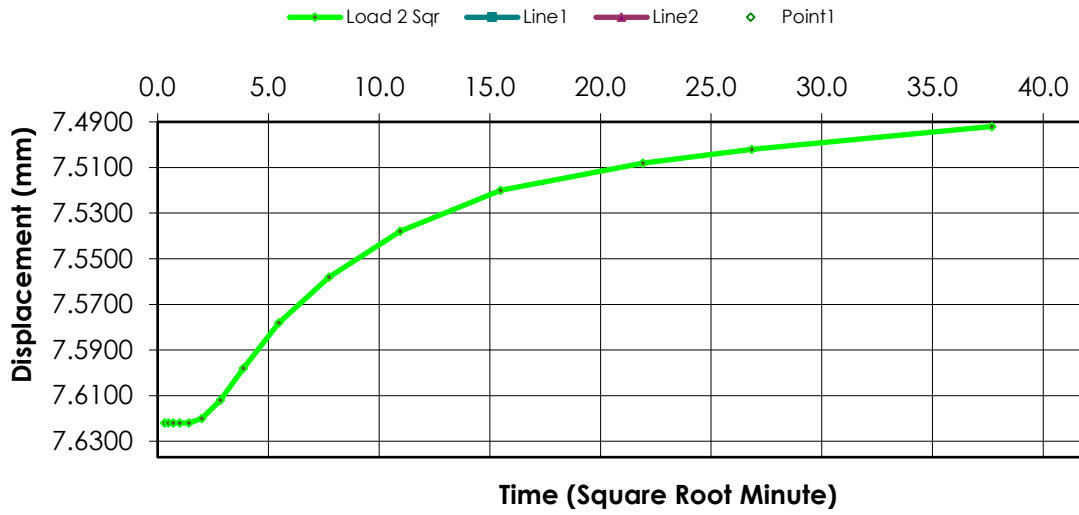
Remarks:

Sample Type: Undisturbed

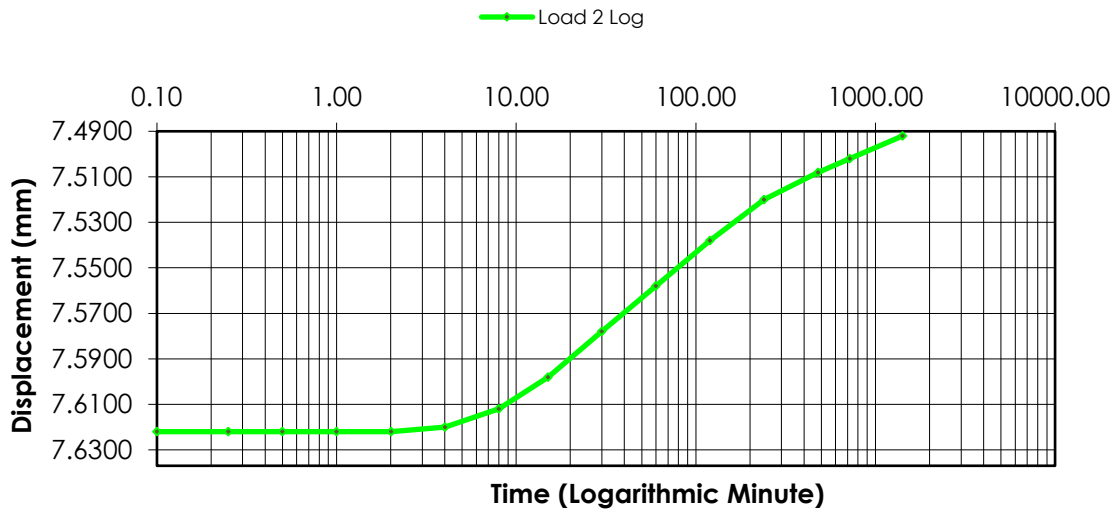
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	7.6240	0.0000	0.0000	0.5170
1	00:00:06	7.6220	-0.0120	-0.0497	0.5178
2	00:00:15	7.6220	-0.0120	-0.0497	0.5178
3	00:00:30	7.6220	-0.0120	-0.0497	0.5178
4	00:01:00	7.6220	-0.0120	-0.0497	0.5178
5	00:02:01	7.6220	-0.0120	-0.0497	0.5178
6	00:04:01	7.6200	-0.0140	-0.0579	0.5179
7	00:08:01	7.6120	-0.0220	-0.0911	0.5184
8	00:15:02	7.5980	-0.0360	-0.1490	0.5193
9	00:30:03	7.5780	-0.0560	-0.2318	0.5206
10	01:00:05	7.5580	-0.0760	-0.3146	0.5218
11	02:00:09	7.5380	-0.0960	-0.3974	0.5231
12	04:00:18	7.5200	-0.1140	-0.4719	0.5242
13	08:00:35	7.5080	-0.1260	-0.5215	0.5250
14	12:00:53	7.5020	-0.1320	-0.5464	0.5253
15	23:39:46	7.4920	-0.1420	-0.5877	0.5260

**Consolidation Test Results
(Sequence 2) Load 10.000 kPa**

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 3) Load 20.000 kPa

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 26-May-18

Test Number:

Sample Number: LLO12 ST10

Soil Description:

Boring Number:

Clay (Cl), Some Gravel, Trace Sand

Depth: 7.6-8.05m

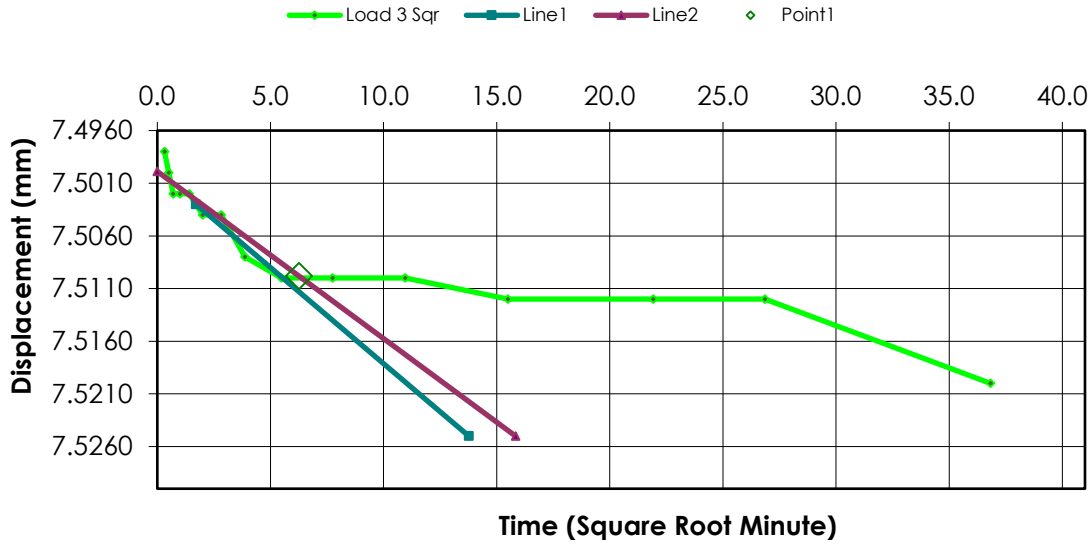
Remarks:

Sample Type: Undisturbed

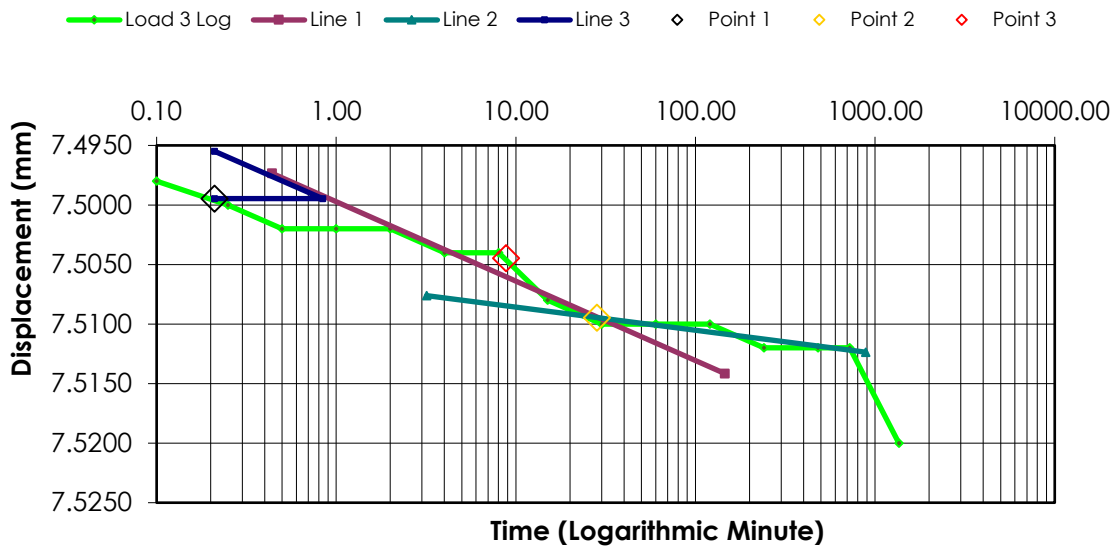
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	7.4920	-0.1420	-0.5877	0.5260
1	00:00:06	7.4980	-0.1480	-0.6126	0.5263
2	00:00:15	7.5000	-0.1460	-0.6043	0.5262
3	00:00:30	7.5020	-0.1440	-0.5960	0.5261
4	00:01:00	7.5020	-0.1440	-0.5960	0.5261
5	00:02:00	7.5020	-0.1440	-0.5960	0.5261
6	00:04:01	7.5040	-0.1420	-0.5877	0.5260
7	00:08:01	7.5040	-0.1420	-0.5877	0.5260
8	00:15:01	7.5080	-0.1380	-0.5712	0.5257
9	00:30:02	7.5100	-0.1360	-0.5629	0.5256
10	01:00:05	7.5100	-0.1360	-0.5629	0.5256
11	02:00:10	7.5100	-0.1360	-0.5629	0.5256
12	04:00:20	7.5120	-0.1340	-0.5546	0.5255
13	08:00:41	7.5120	-0.1340	-0.5546	0.5255
14	12:01:02	7.5120	-0.1340	-0.5546	0.5255
15	22:36:06	7.5200	-0.1260	-0.5215	0.5250

Consolidation Test Results (Sequence 3) Load 20.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 4) Load 40.000 kPa

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 26-May-18

Test Number:

Sample Number: LLO12 ST10

Soil Description:

Boring Number:

Clay (Cl), Some Gravel, Trace Sand

Depth: 7.6-8.05m

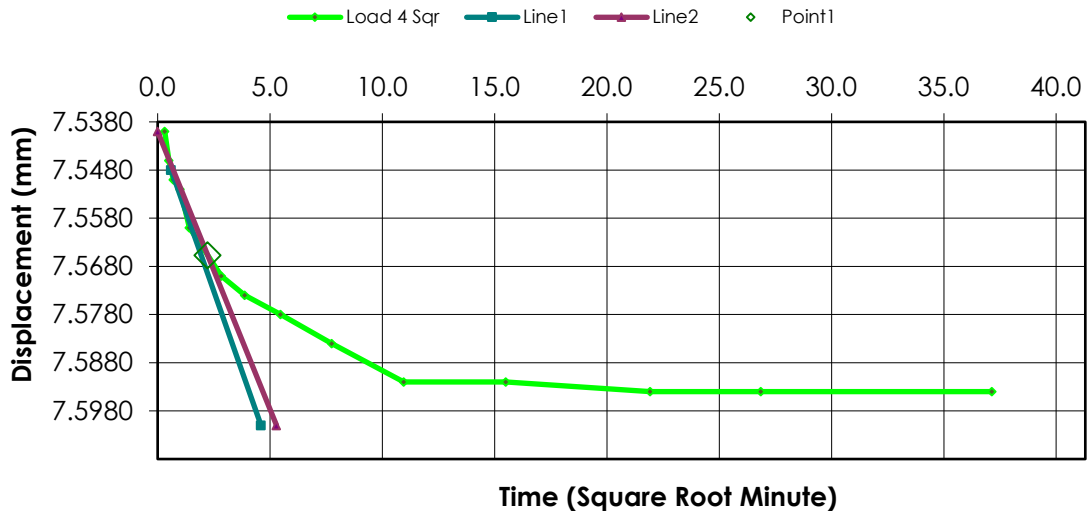
Remarks:

Sample Type: Undisturbed

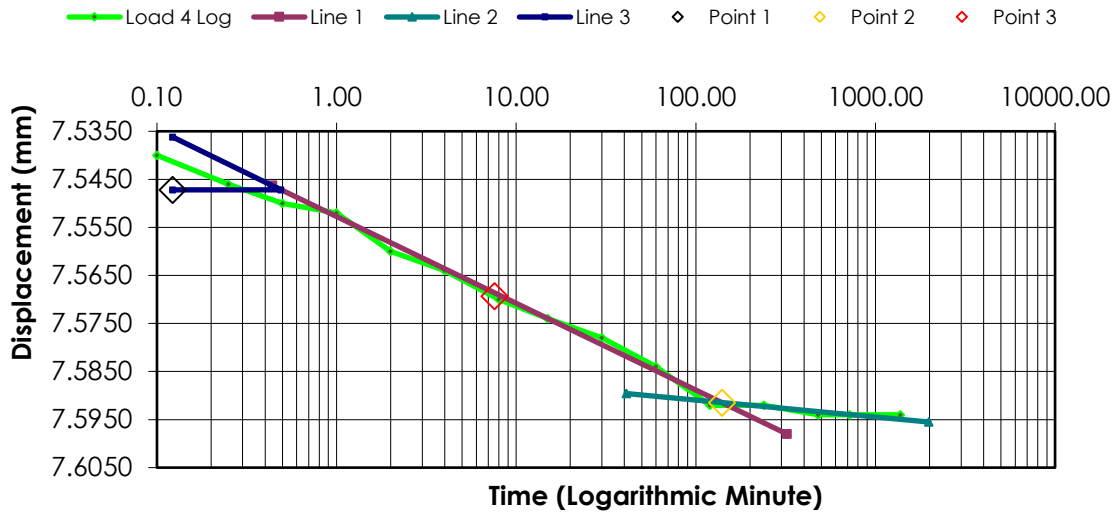
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	7.5200	-0.1260	-0.5215	0.5250
1	00:00:06	7.5400	-0.1220	-0.5050	0.5247
2	00:00:15	7.5460	-0.1160	-0.4801	0.5243
3	00:00:30	7.5500	-0.1120	-0.4636	0.5241
4	00:01:00	7.5520	-0.1100	-0.4553	0.5239
5	00:02:00	7.5600	-0.1020	-0.4222	0.5234
6	00:04:00	7.5640	-0.0980	-0.4056	0.5232
7	00:08:01	7.5700	-0.0920	-0.3808	0.5228
8	00:15:01	7.5740	-0.0880	-0.3642	0.5226
9	00:30:02	7.5780	-0.0840	-0.3477	0.5223
10	01:00:05	7.5840	-0.0780	-0.3228	0.5219
11	02:00:10	7.5920	-0.0700	-0.2897	0.5214
12	04:00:16	7.5920	-0.0700	-0.2897	0.5214
13	08:00:37	7.5940	-0.0680	-0.2815	0.5213
14	12:00:58	7.5940	-0.0680	-0.2815	0.5213
15	23:00:00	7.5940	-0.0680	-0.2815	0.5213

Consolidation Test Results (Sequence 4) Load 40.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 5) Load 80.000 kPa

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 26-May-18

Test Number:

Sample Number: LLO12 ST10

Soil Description:

Boring Number:

Clay (Cl), Some Gravel, Trace Sand

Depth: 7.6-8.05m

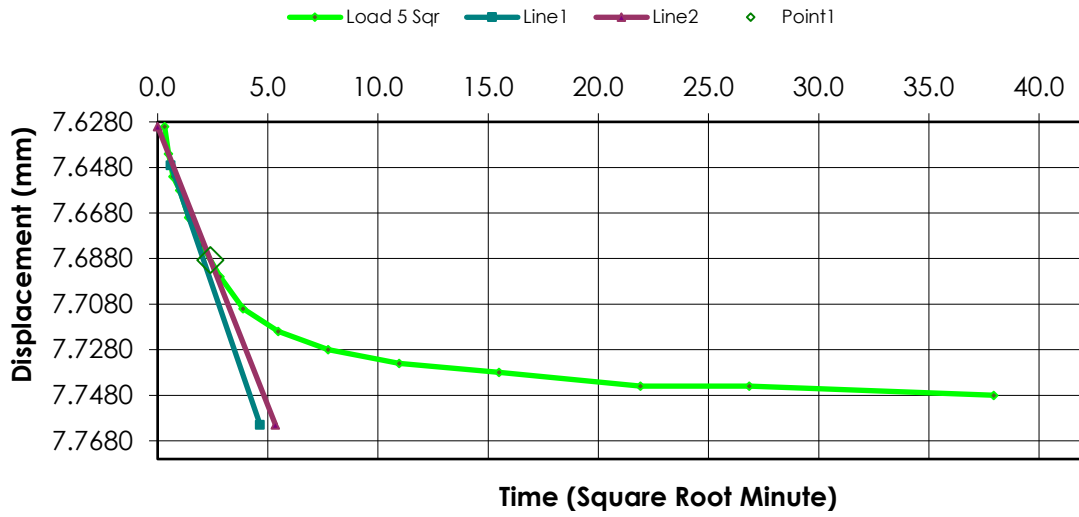
Remarks:

Sample Type: Undisturbed

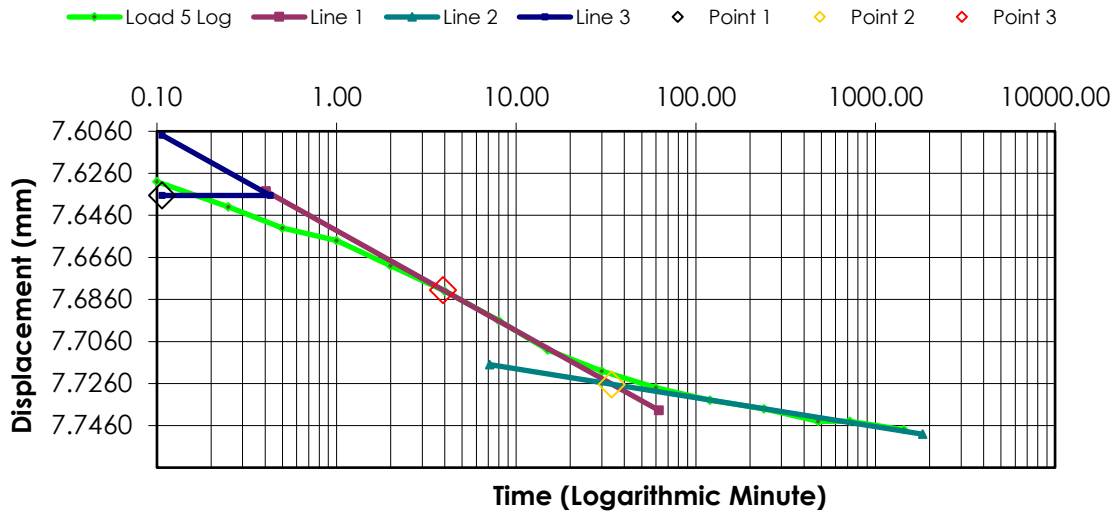
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	7.5940	-0.0680	-0.2815	0.5213
1	00:00:06	7.6300	-0.0520	-0.2152	0.5203
2	00:00:15	7.6420	-0.0400	-0.1656	0.5196
3	00:00:30	7.6520	-0.0300	-0.1242	0.5189
4	00:01:00	7.6580	-0.0240	-0.0993	0.5185
5	00:02:00	7.6700	-0.0120	-0.0497	0.5178
6	00:04:00	7.6820	0.0000	0.0000	0.5170
7	00:08:00	7.6960	0.0140	0.0579	0.5162
8	00:15:01	7.7100	0.0280	0.1159	0.5153
9	00:30:02	7.7200	0.0380	0.1573	0.5147
10	01:00:04	7.7280	0.0460	0.1904	0.5142
11	02:00:08	7.7340	0.0520	0.2152	0.5138
12	04:00:17	7.7380	0.0560	0.2318	0.5135
13	08:00:35	7.7440	0.0620	0.2566	0.5131
14	12:00:52	7.7440	0.0620	0.2566	0.5131
15	24:00:24	7.7480	0.0660	0.2732	0.5129

Consolidation Test Results (Sequence 5) Load 80.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 6) Load 160.000 kPa

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 26-May-18

Test Number:

Sample Number: LLO12 ST10

Soil Description:

Boring Number:

Clay (Cl), Some Gravel, Trace Sand

Depth: 7.6-8.05m

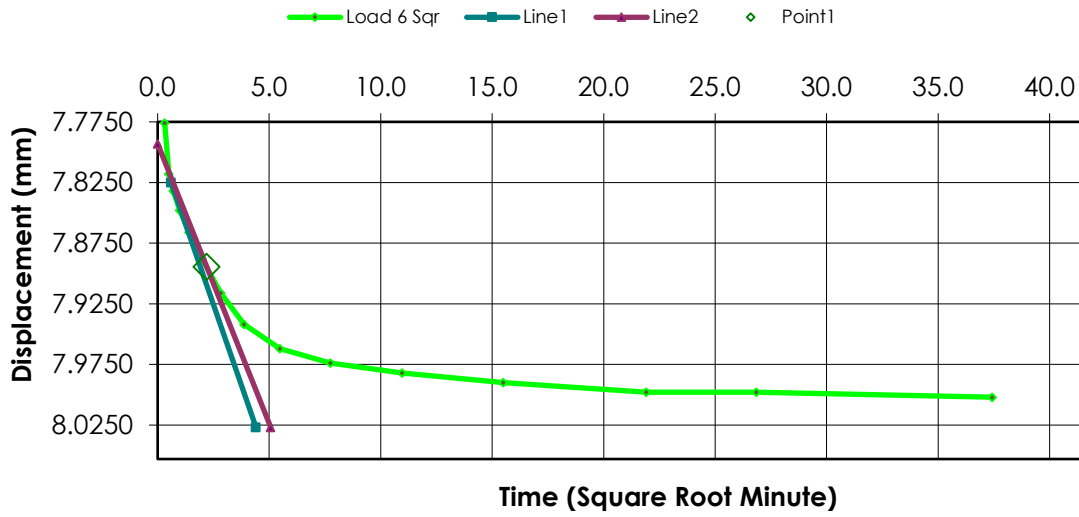
Remarks:

Sample Type: Undisturbed

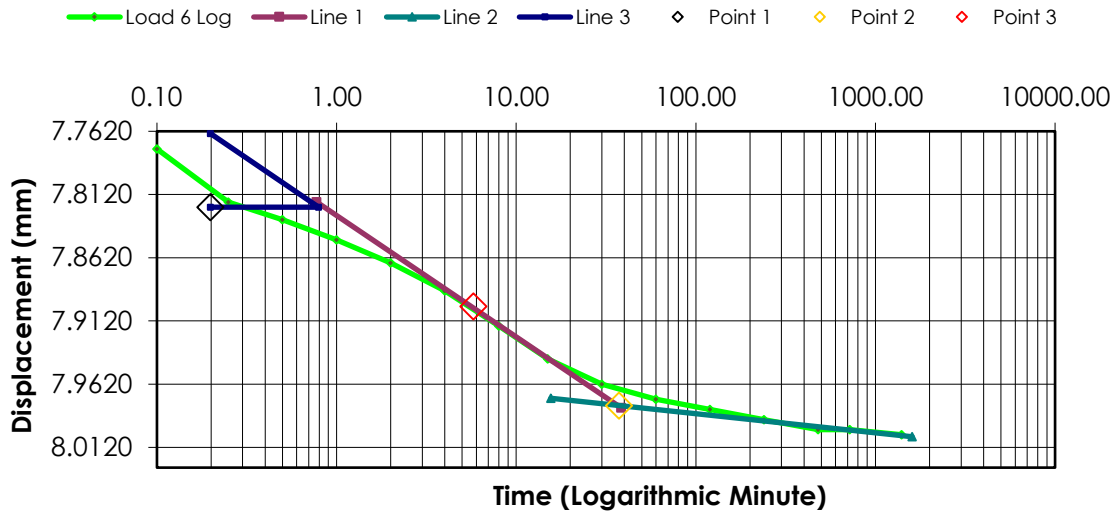
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	7.7480	0.0660	0.2732	0.5129
1	00:00:06	7.7760	0.0640	0.2649	0.5130
2	00:00:15	7.8180	0.1060	0.4387	0.5104
3	00:00:30	7.8320	0.1200	0.4967	0.5095
4	00:01:00	7.8480	0.1360	0.5629	0.5085
5	00:02:00	7.8660	0.1540	0.6374	0.5074
6	00:04:00	7.8880	0.1760	0.7285	0.5060
7	00:08:00	7.9160	0.2040	0.8444	0.5042
8	00:15:01	7.9420	0.2300	0.9520	0.5026
9	00:30:02	7.9620	0.2500	1.0348	0.5013
10	01:00:04	7.9740	0.2620	1.0844	0.5006
11	02:00:09	7.9820	0.2700	1.1175	0.5001
12	04:00:17	7.9900	0.2780	1.1507	0.4996
13	08:00:35	7.9980	0.2860	1.1838	0.4991
14	12:00:52	7.9980	0.2860	1.1838	0.4991
15	23:21:12	8.0020	0.2900	1.2003	0.4988

Consolidation Test Results (Sequence 6) Load 160.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 7) Load 320.000 kPa

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 26-May-18

Test Number:

Sample Number: LLO12 ST10

Soil Description:

Boring Number:

Clay (Cl), Some Gravel, Trace Sand

Depth: 7.6-8.05m

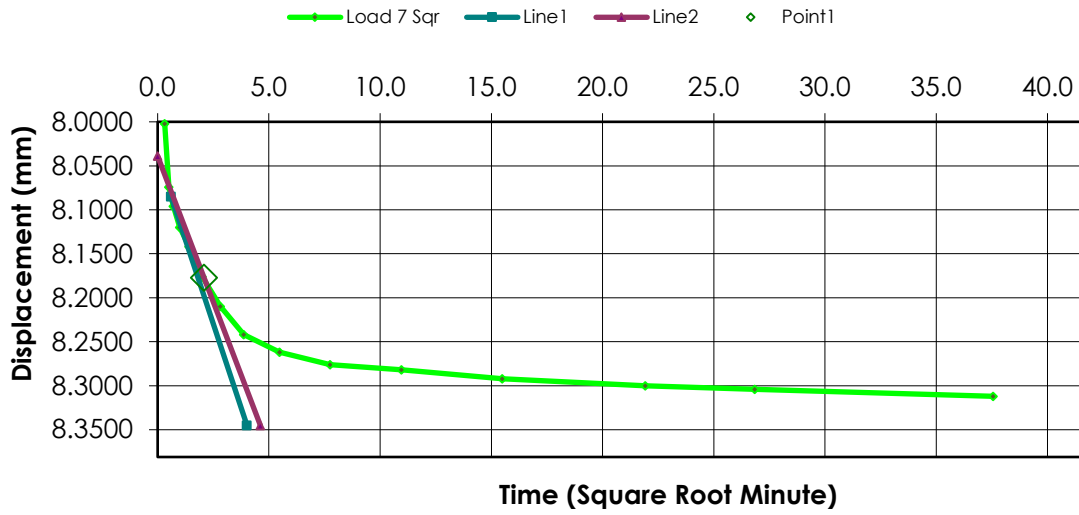
Remarks:

Sample Type: Undisturbed

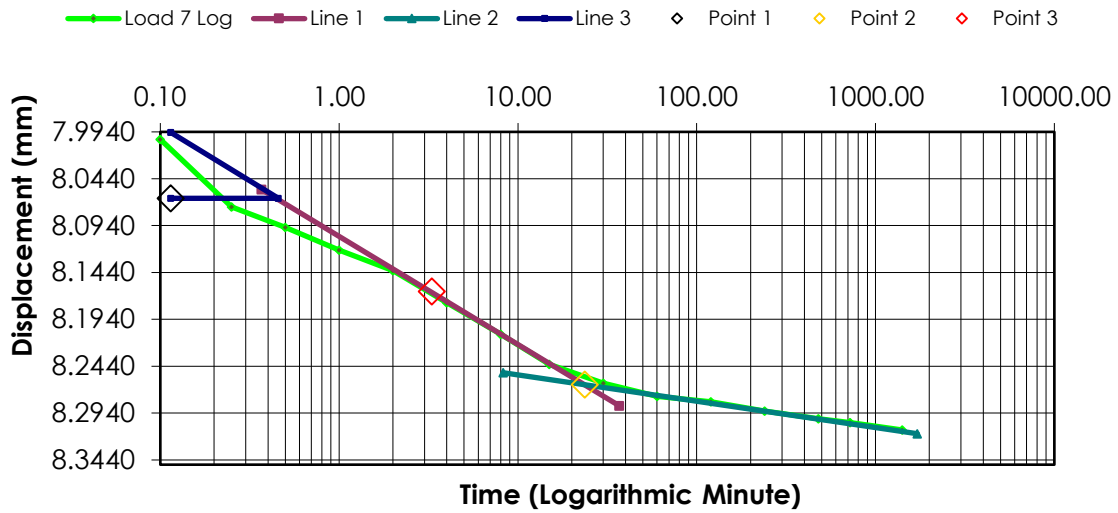
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.0020	0.2900	1.2003	0.4988
1	00:00:06	8.0020	0.2520	1.0430	0.5012
2	00:00:15	8.0740	0.3240	1.3411	0.4967
3	00:00:30	8.0960	0.3460	1.4321	0.4953
4	00:01:00	8.1200	0.3700	1.5315	0.4938
5	00:02:00	8.1420	0.3920	1.6225	0.4924
6	00:04:00	8.1760	0.4260	1.7632	0.4903
7	00:08:00	8.2100	0.4600	1.9040	0.4882
8	00:15:01	8.2420	0.4920	2.0364	0.4861
9	00:30:02	8.2620	0.5120	2.1192	0.4849
10	01:00:04	8.2760	0.5260	2.1772	0.4840
11	02:00:08	8.2820	0.5320	2.2020	0.4836
12	04:00:17	8.2920	0.5420	2.2434	0.4830
13	08:00:35	8.3000	0.5500	2.2765	0.4825
14	12:00:52	8.3040	0.5540	2.2930	0.4823
15	23:30:49	8.3120	0.5620	2.3262	0.4818

Consolidation Test Results (Sequence 7) Load 320.000 kPa

Consolidation Graph (Square-root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 8) Load 640.000 kPa

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 26-May-18

Test Number:

Sample Number: LLO12 ST10

Soil Description:

Boring Number:

Clay (Cl), Some Gravel, Trace Sand

Depth: 7.6-8.05m

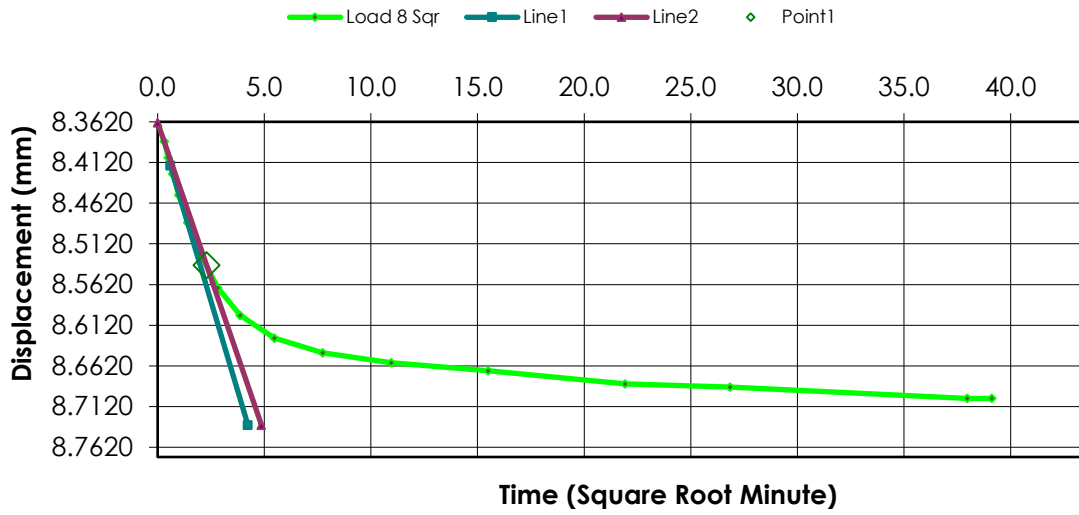
Remarks:

Sample Type: Undisturbed

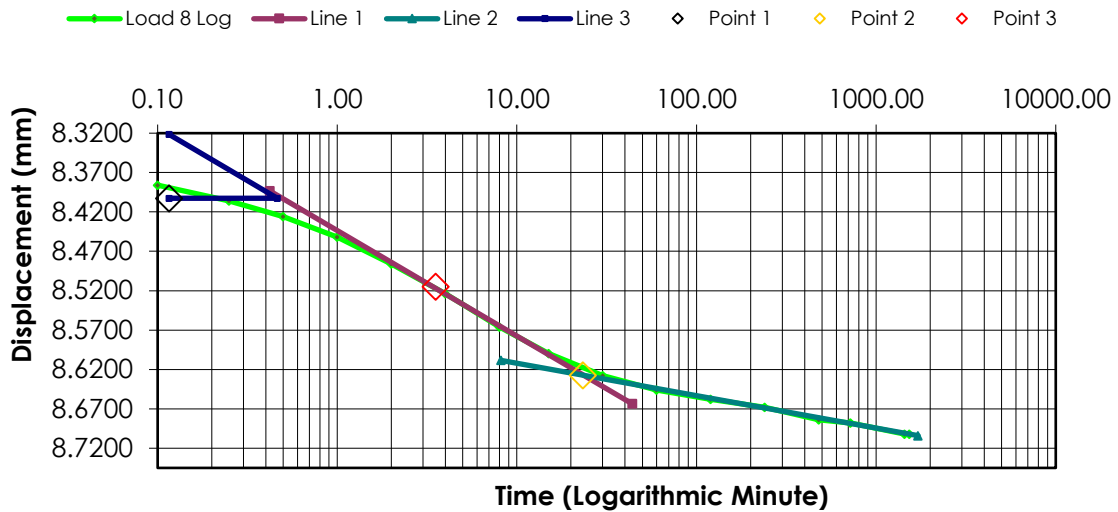
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.3120	0.5620	2.3262	0.4818
1	00:00:06	8.3860	0.5980	2.4752	0.4795
2	00:00:15	8.4060	0.6180	2.5579	0.4782
3	00:00:30	8.4260	0.6380	2.6407	0.4770
4	00:01:00	8.4520	0.6640	2.7483	0.4753
5	00:02:00	8.4860	0.6980	2.8891	0.4732
6	00:04:00	8.5240	0.7360	3.0464	0.4708
7	00:08:00	8.5660	0.7780	3.2202	0.4682
8	00:15:01	8.6000	0.8120	3.3609	0.4661
9	00:30:02	8.6280	0.8400	3.4768	0.4643
10	01:00:04	8.6460	0.8580	3.5513	0.4632
11	02:00:08	8.6580	0.8700	3.6010	0.4624
12	04:00:17	8.6680	0.8800	3.6424	0.4618
13	08:00:35	8.6840	0.8960	3.7086	0.4608
14	12:00:52	8.6880	0.9000	3.7252	0.4605
15	24:01:45	8.7020	0.9140	3.7831	0.4597
16	25:30:28	8.7020	0.9140	3.7831	0.4597

Consolidation Test Results (Sequence 8) Load 640.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 9) Rebound 320.000 kPa

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 26-May-18

Test Number:

Sample Number: LLO12 ST10

Soil Description:

Boring Number:

Clay (Cl), Some Gravel, Trace Sand

Depth: 7.6-8.05m

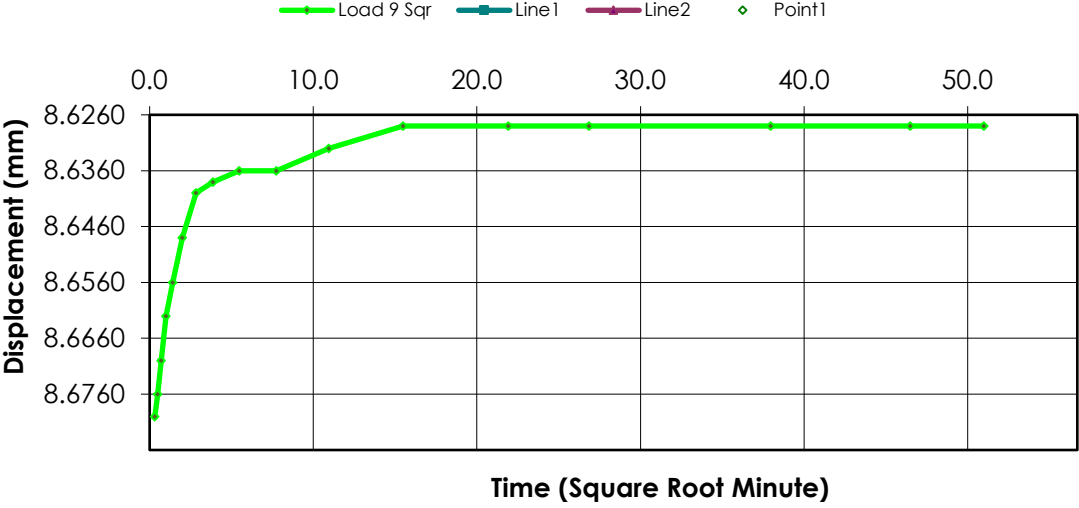
Remarks:

Sample Type: Undisturbed

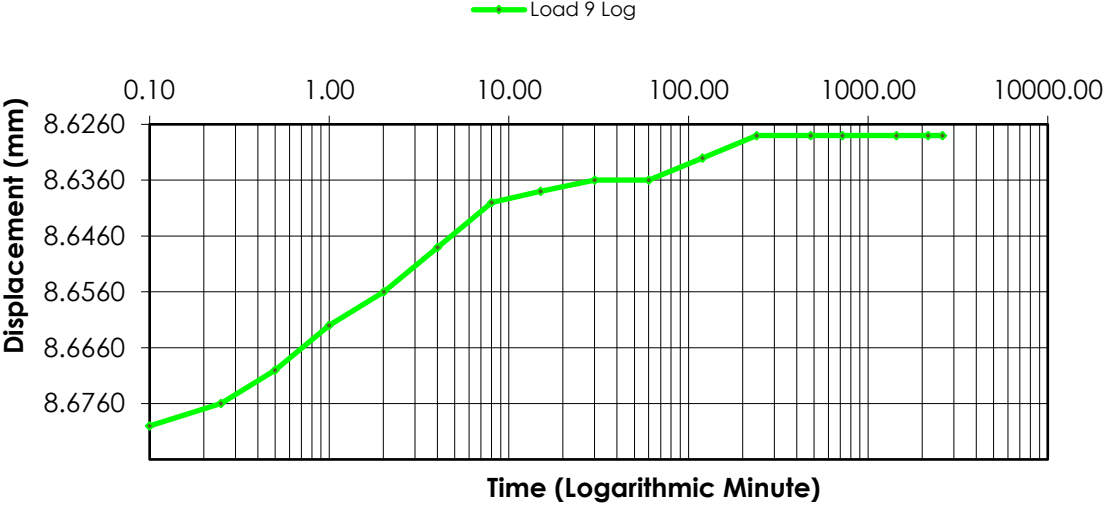
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.7020	0.9140	3.7831	0.4597
1	00:00:06	8.6800	0.9020	3.7334	0.4604
2	00:00:15	8.6760	0.8980	3.7169	0.4607
3	00:00:30	8.6700	0.8920	3.6921	0.4610
4	00:01:00	8.6620	0.8840	3.6589	0.4615
5	00:02:01	8.6560	0.8780	3.6341	0.4619
6	00:04:01	8.6480	0.8700	3.6010	0.4624
7	00:08:01	8.6400	0.8620	3.5679	0.4629
8	00:15:01	8.6380	0.8600	3.5596	0.4630
9	00:30:03	8.6360	0.8580	3.5513	0.4632
10	01:00:05	8.6360	0.8580	3.5513	0.4632
11	02:00:09	8.6320	0.8540	3.5348	0.4634
12	04:00:18	8.6280	0.8500	3.5182	0.4637
13	08:00:35	8.6280	0.8500	3.5182	0.4637
14	12:00:53	8.6280	0.8500	3.5182	0.4637
15	24:01:46	8.6280	0.8500	3.5182	0.4637
16	36:02:39	8.6280	0.8500	3.5182	0.4637
17	43:19:36	8.6280	0.8500	3.5182	0.4637

**Consolidation Test Results
(Sequence 9) Rebound 320.000 kPa**

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 10) Rebound 160.000 kPa

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 26-May-18

Test Number:

Sample Number: LLO12 ST10

Soil Description:

Boring Number:

Clay (Cl), Some Gravel, Trace Sand

Depth: 7.6-8.05m

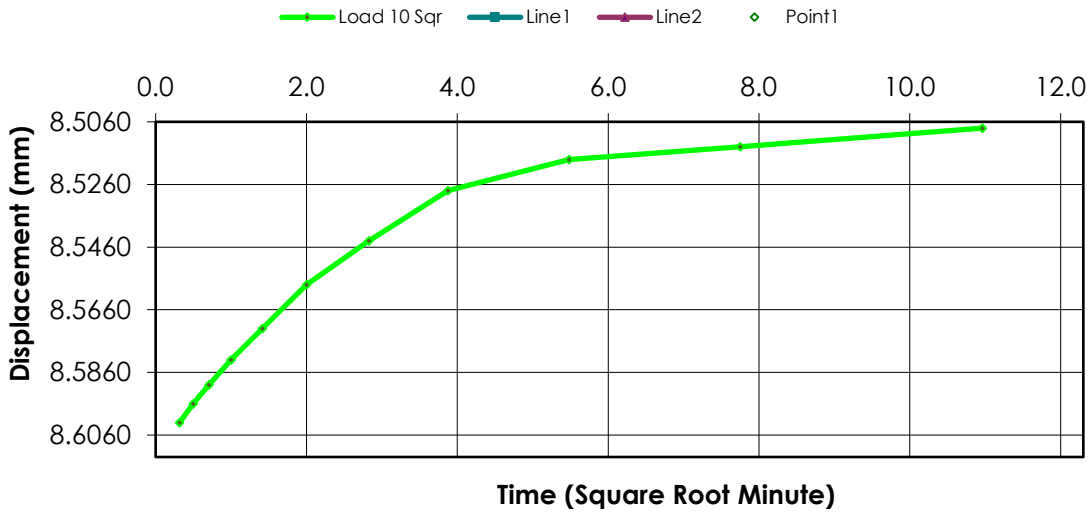
Remarks:

Sample Type: Undisturbed

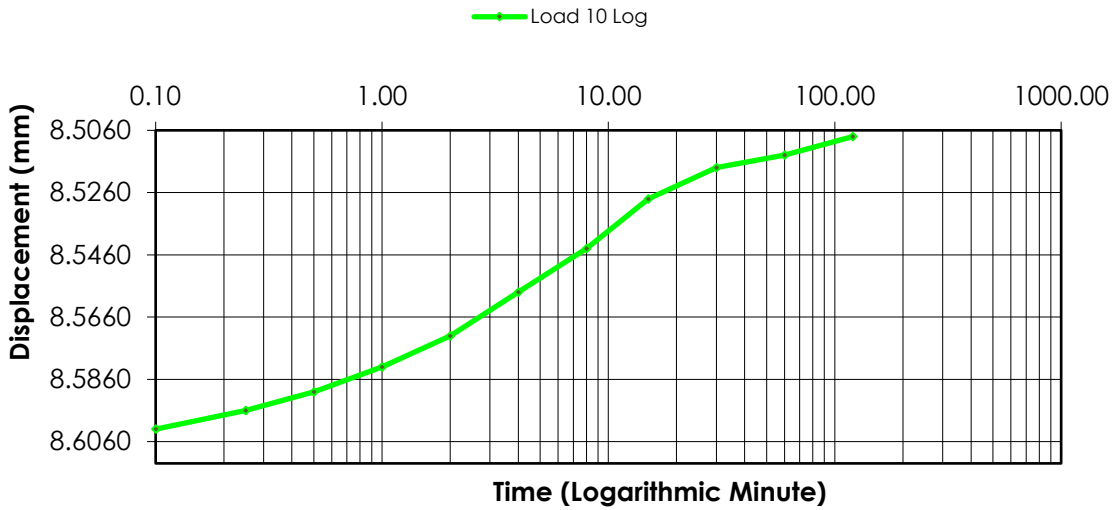
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.6280	0.8500	3.5182	0.4637
1	00:00:06	8.6020	0.8400	3.4768	0.4643
2	00:00:15	8.5960	0.8340	3.4520	0.4647
3	00:00:30	8.5900	0.8280	3.4272	0.4651
4	00:01:00	8.5820	0.8200	3.3940	0.4656
5	00:02:00	8.5720	0.8100	3.3526	0.4662
6	00:04:00	8.5580	0.7960	3.2947	0.4671
7	00:08:00	8.5440	0.7820	3.2368	0.4679
8	00:15:01	8.5280	0.7660	3.1705	0.4689
9	00:30:02	8.5180	0.7560	3.1291	0.4696
10	01:00:04	8.5140	0.7520	3.1126	0.4698
11	02:00:09	8.5080	0.7460	3.0877	0.4702

Consolidation Test Results
(Sequence 10) Rebound 160.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 11) Load 320.000 kPa

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 26-May-18

Test Number:

Sample Number: LLO12 ST10

Soil Description:

Boring Number:

Clay (Cl), Some Gravel, Trace Sand

Depth: 7.6-8.05m

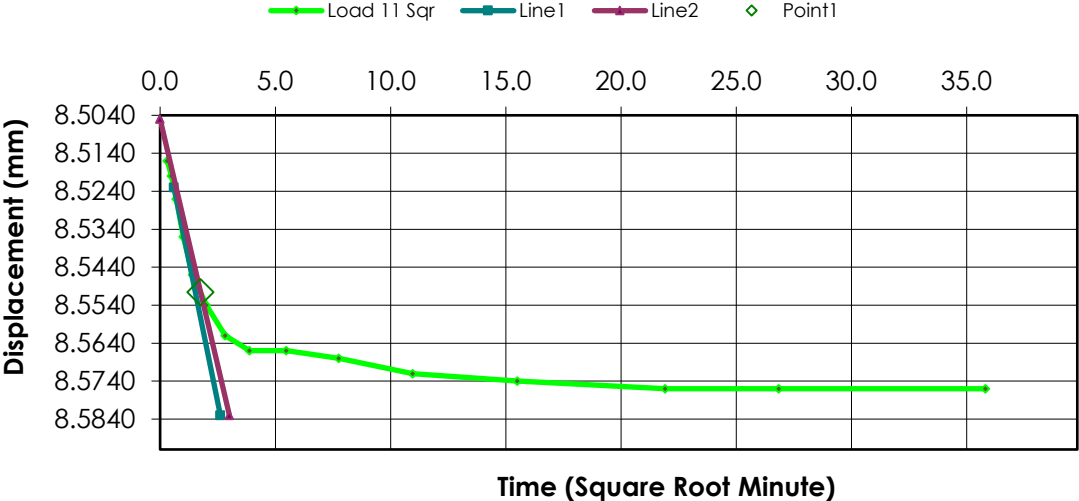
Remarks:

Sample Type: Undisturbed

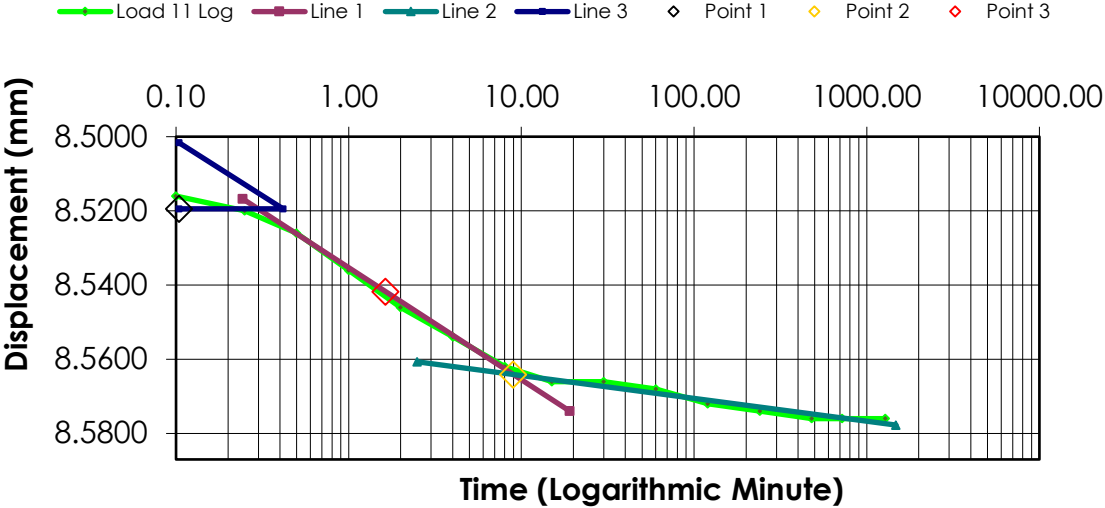
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.5080	0.7460	3.0877	0.4702
1	00:00:06	8.5160	0.7440	3.0795	0.4703
2	00:00:15	8.5200	0.7480	3.0960	0.4701
3	00:00:30	8.5260	0.7540	3.1209	0.4697
4	00:01:00	8.5360	0.7640	3.1623	0.4691
5	00:02:00	8.5460	0.7740	3.2036	0.4684
6	00:04:01	8.5540	0.7820	3.2368	0.4679
7	00:08:01	8.5620	0.7900	3.2699	0.4674
8	00:15:01	8.5660	0.7940	3.2864	0.4672
9	00:30:02	8.5660	0.7940	3.2864	0.4672
10	01:00:05	8.5680	0.7960	3.2947	0.4671
11	02:00:09	8.5720	0.8000	3.3113	0.4668
12	04:00:18	8.5740	0.8020	3.3195	0.4667
13	08:00:35	8.5760	0.8040	3.3278	0.4666
14	12:00:53	8.5760	0.8040	3.3278	0.4666
15	21:22:56	8.5760	0.8040	3.3278	0.4666

Consolidation Test Results (Sequence 11) Load 320.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 12) Load 640.000 kPa

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 26-May-18

Test Number:

Sample Number: LLO12 ST10

Soil Description:

Boring Number:

Clay (Cl), Some Gravel, Trace Sand

Depth: 7.6-8.05m

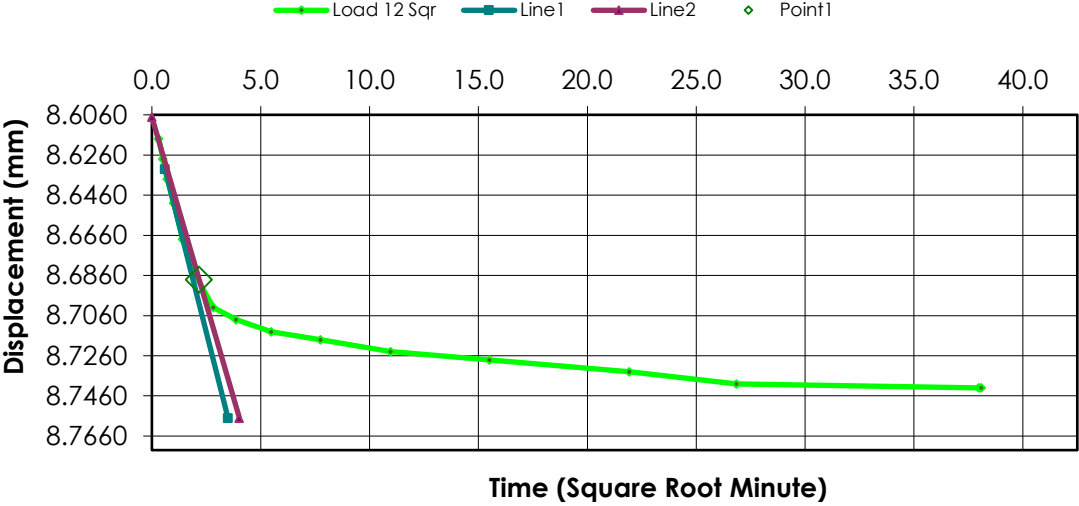
Remarks:

Sample Type: Undisturbed

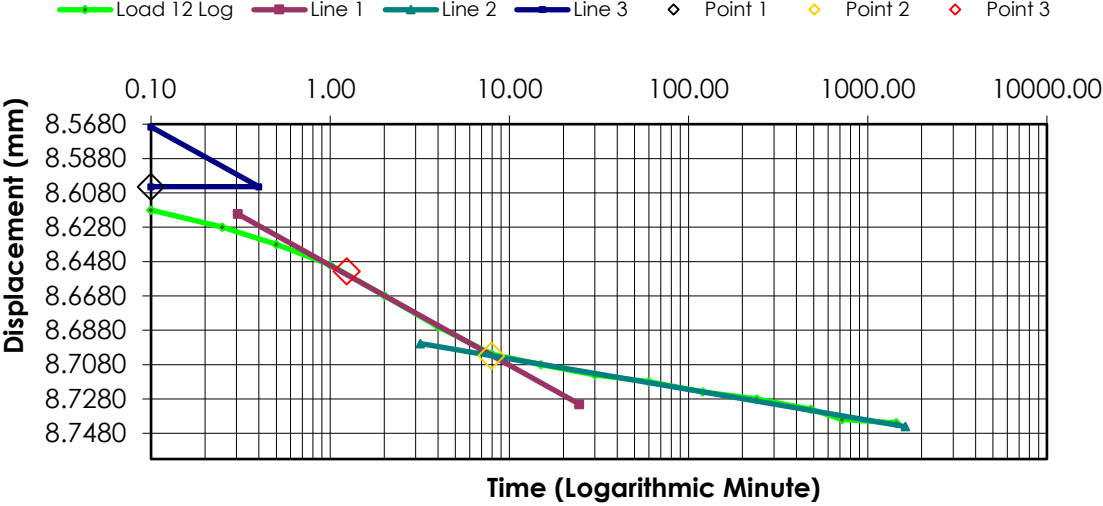
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.5760	0.8040	3.3278	0.4666
1	00:00:06	8.6180	0.8280	3.4272	0.4651
2	00:00:15	8.6280	0.8380	3.4685	0.4644
3	00:00:30	8.6380	0.8480	3.5099	0.4638
4	00:01:00	8.6500	0.8600	3.5596	0.4630
5	00:02:01	8.6680	0.8780	3.6341	0.4619
6	00:04:01	8.6860	0.8960	3.7086	0.4608
7	00:08:01	8.7020	0.9120	3.7748	0.4598
8	00:15:01	8.7080	0.9180	3.7997	0.4594
9	00:30:03	8.7140	0.9240	3.8245	0.4590
10	01:00:05	8.7180	0.9280	3.8411	0.4588
11	02:00:09	8.7240	0.9340	3.8659	0.4584
12	04:00:18	8.7280	0.9380	3.8825	0.4581
13	08:00:36	8.7340	0.9440	3.9073	0.4578
14	12:00:53	8.7400	0.9500	3.9321	0.4574
15	24:01:46	8.7420	0.9520	3.9404	0.4573
16	24:11:26	8.7420	0.9520	3.9404	0.4573

Consolidation Test Results (Sequence 12) Load 640.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 13) Load 1280.000 kPa

Project: SR1

Project Number: 110773396

Location:

Job Number:

Test Date: 26-May-18

Test Number:

Sample Number: LLO12 ST10

Soil Description:

Boring Number:

Clay (Cl), Some Gravel, Trace Sand

Depth: 7.6-8.05m

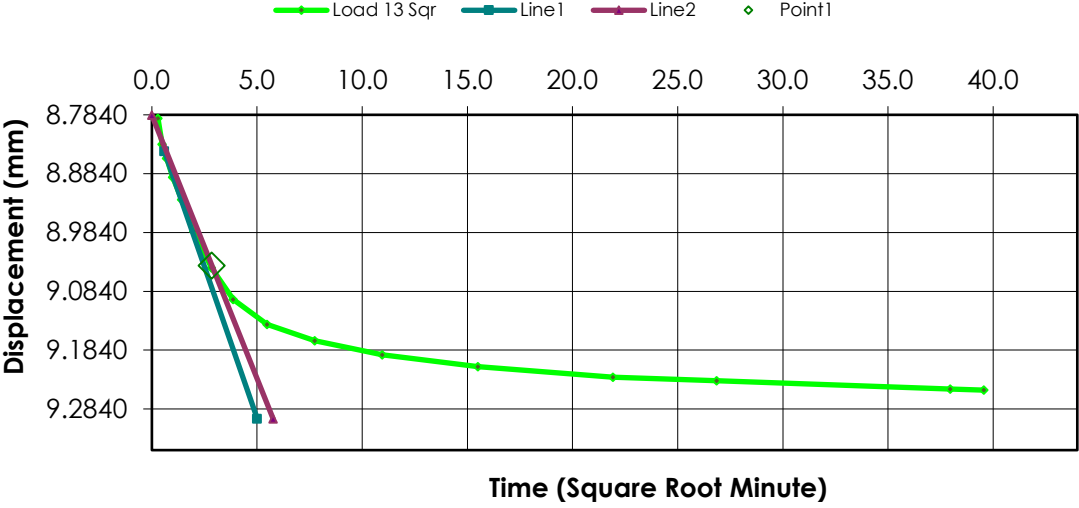
Remarks:

Sample Type: Undisturbed

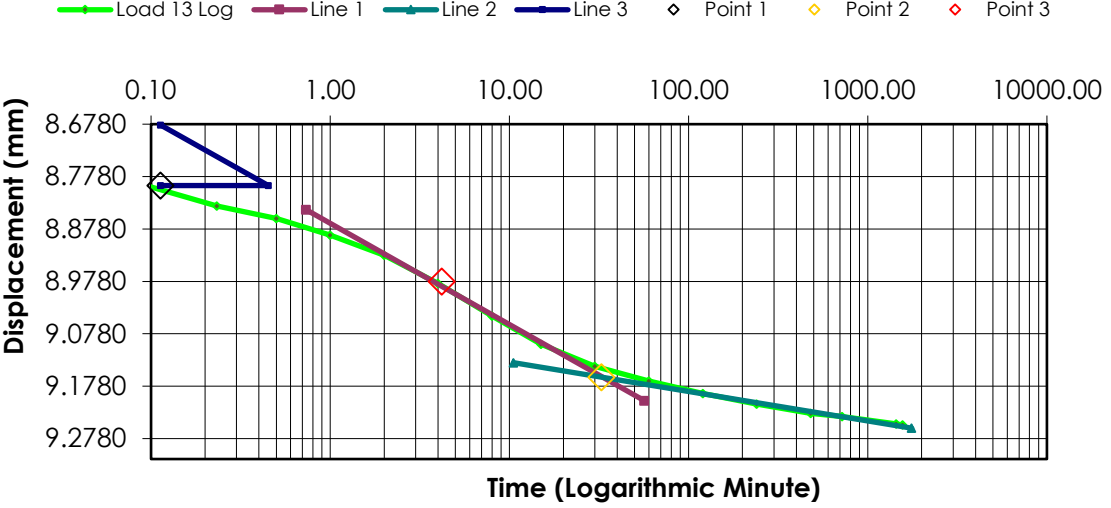
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.7420	0.9520	3.9404	0.4573
1	00:00:05	8.7900	0.9480	3.9238	0.4575
2	00:00:14	8.8340	0.9920	4.1060	0.4548
3	00:00:30	8.8580	1.0160	4.2053	0.4532
4	00:01:00	8.8900	1.0480	4.3377	0.4512
5	00:02:00	8.9280	1.0860	4.4950	0.4489
6	00:04:00	8.9820	1.1400	4.7185	0.4455
7	00:08:00	9.0440	1.2020	4.9752	0.4416
8	00:15:01	9.0980	1.2560	5.1987	0.4382
9	00:30:02	9.1400	1.2980	5.3725	0.4355
10	01:00:04	9.1680	1.3260	5.4884	0.4338
11	02:00:08	9.1920	1.3500	5.5877	0.4323
12	04:00:17	9.2120	1.3700	5.6705	0.4310
13	08:00:38	9.2300	1.3880	5.7450	0.4299
14	12:00:57	9.2360	1.3940	5.7699	0.4295
15	24:01:50	9.2500	1.4080	5.8278	0.4286
16	26:04:35	9.2520	1.4100	5.8361	0.4285

Consolidation Test Results (Sequence 13) Load 1280.000 kPa

Consolidation Graph (Square Root Time)



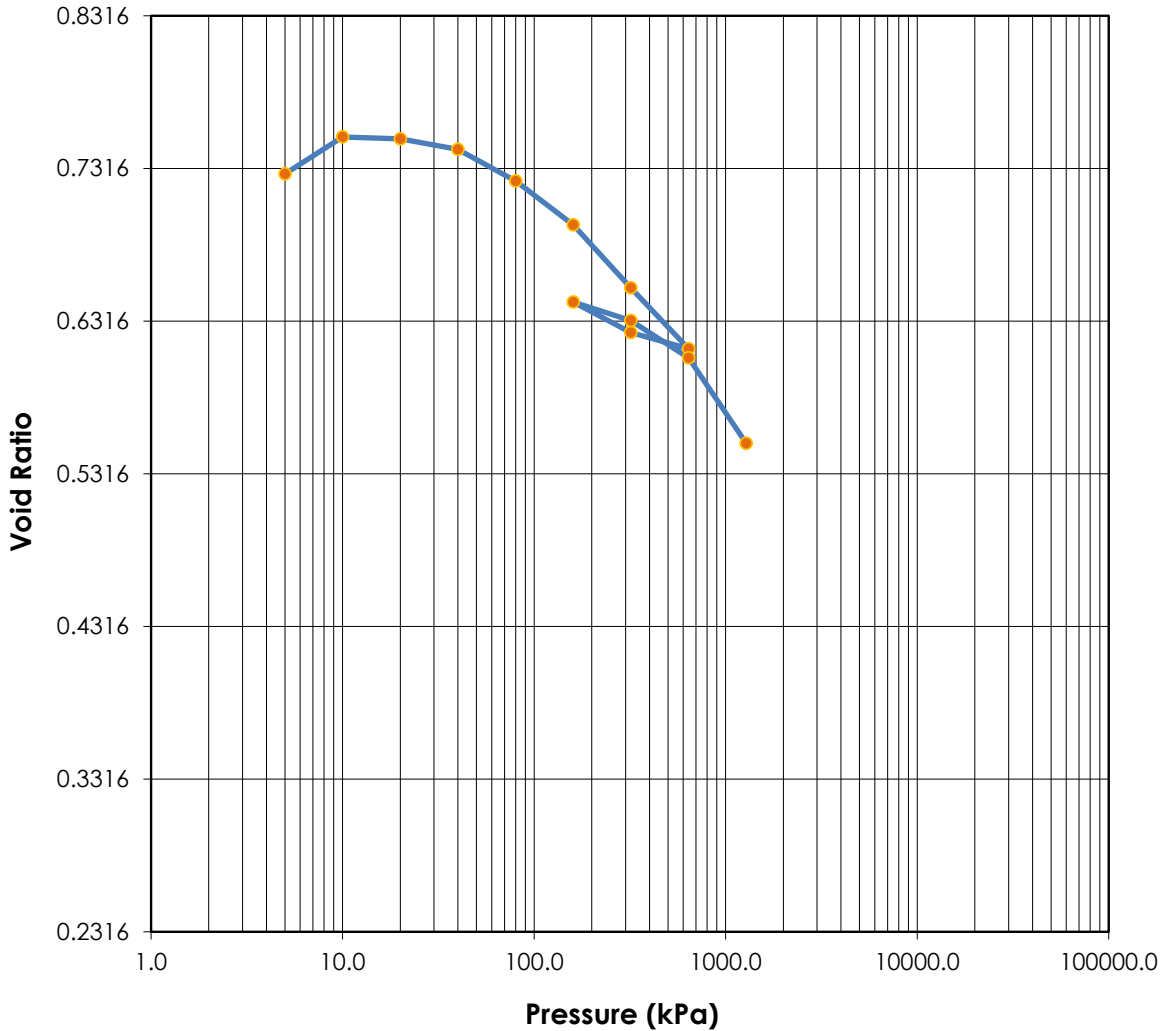
Consolidation Graph (Logarithmic Time)





Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876



	Before	After	Liquid Limits:	46	Test Date:	15-Oct-18
Moisture (%):	27.5	25.4	Plastic Limits:	17		
Dry Density (g/cm³):	1.531	1.692	Plasticity Index (%):	29		
Saturation (%):	99	100				
Void Ratio:	0.7278	0.5515	Specific Gravity:	2.65	Assumed	
Soil Description:	Clay (Cl), Some Sand					
Project Number:	110773396	Depth:	2.25-2.70m		Remarks:	
Sample Number:	LLO17A ST5	Boring Number:				
Project:	SRI 2018 Investigation					
Client:	Alberta Transportation					
Location:						

Tested By: E. Wahl

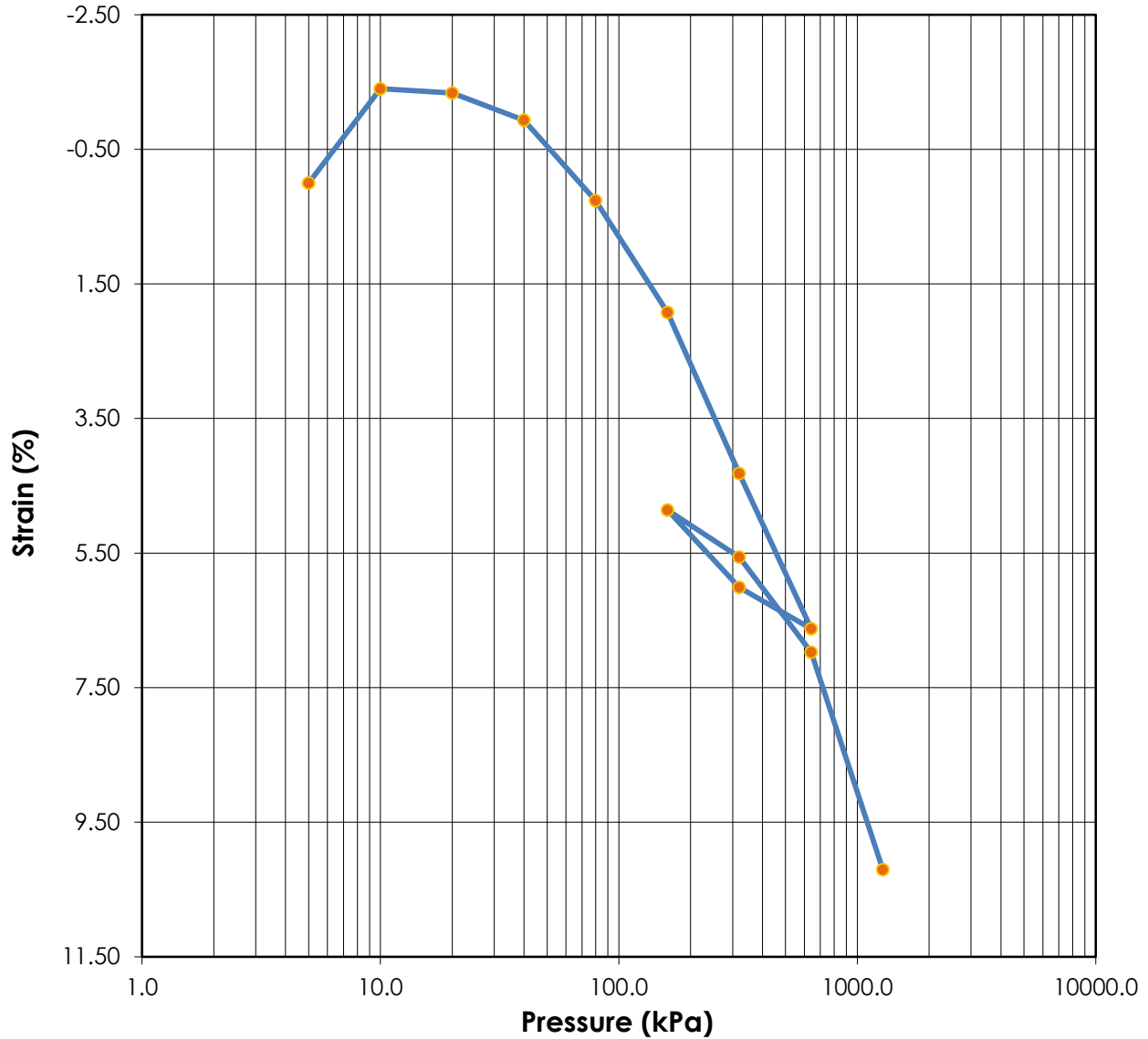
Reviewed By: C. Lamoureux

Reporting of these test results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request. The data presented above is for the sole use of the client stipulated above. Stantec is not responsible, nor can be held liable, for the use of this report by any other party, with or without the knowledge of Stantec.



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876

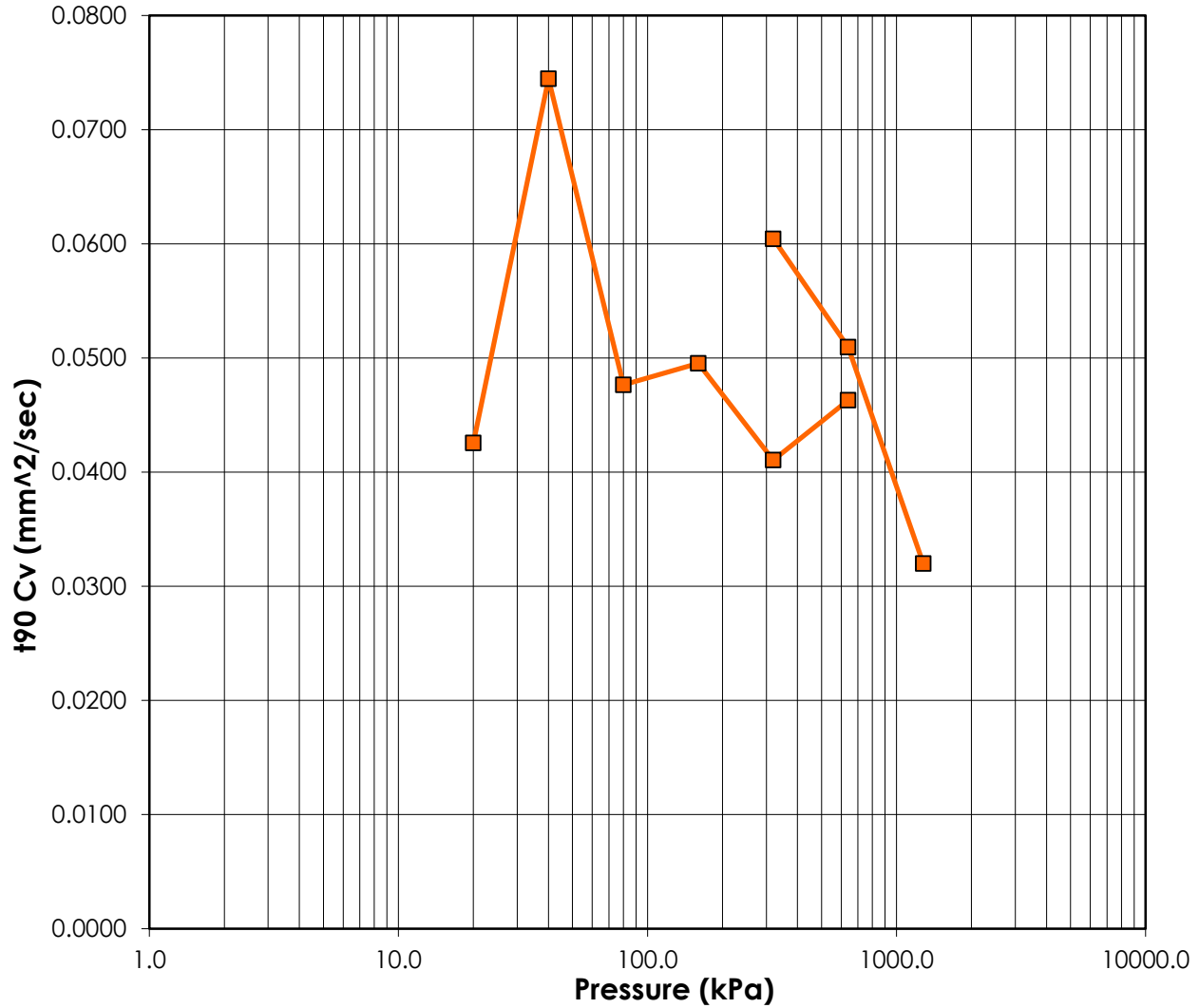


	Before	After	Liquid Limits:	46	Test Date:	15-Oct-18
Moisture (%):	27.5	25.4	Plastic Limits:	17		
Dry Density (g/cm3):	1.531	1.692	Plasticity Index (%):	29		
Saturation (%):	99	100	Specific Gravity:	2.65	Assumed	
Void Ratio:	0.7278	0.5515				
Sample Description:	Clay (Cl), Some Sand					
Project Number:	110773396	Depth:	2.25-2.70m			
Sample Number:	LLO17A ST5	Boring Number:				
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						
			Remarks:			



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876



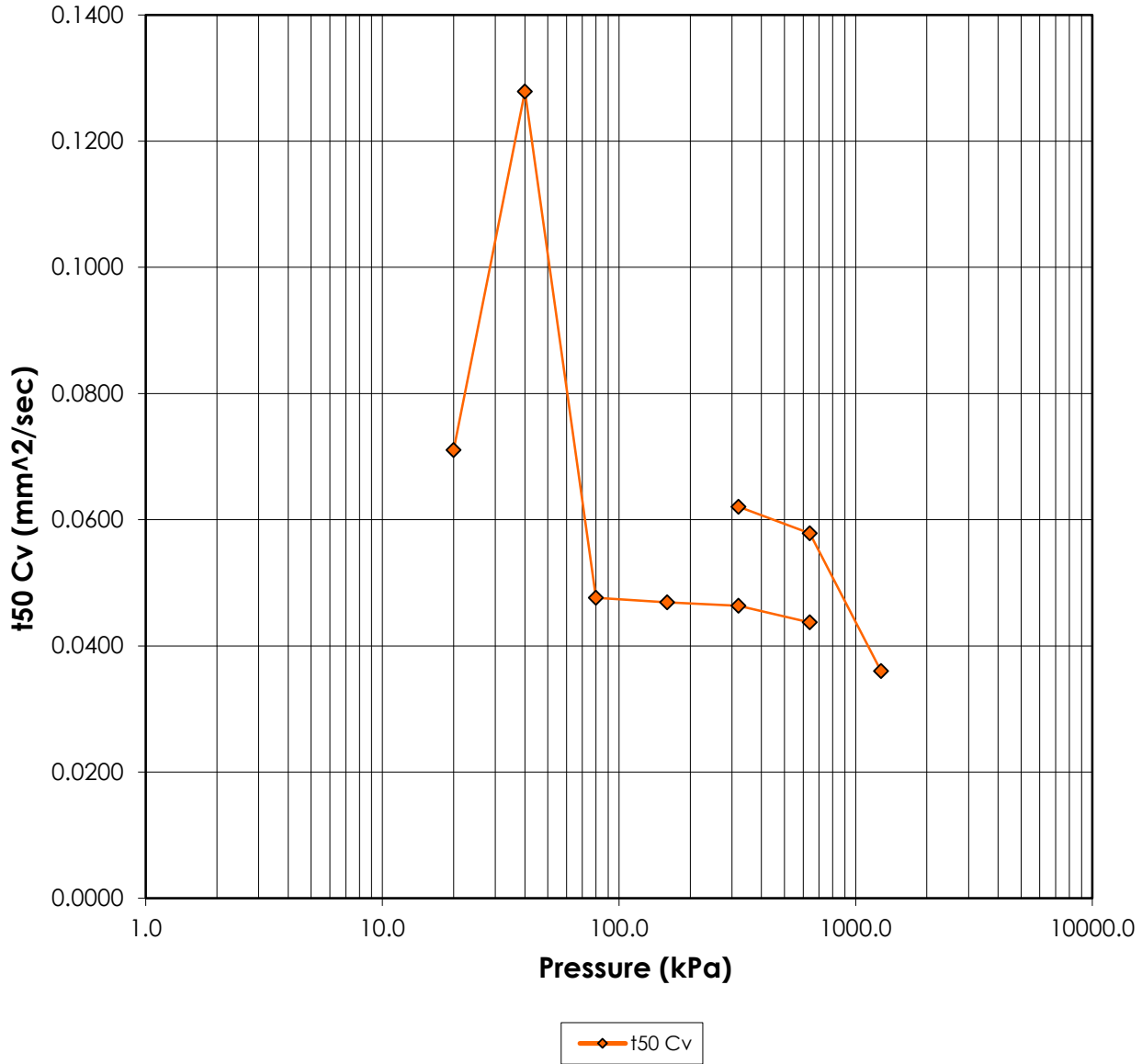
—■— $t_{90} C_v$

	Before	After	Liquid Limits:	46	Test Date:	15-Oct-18
Moisture (%):	27.5	25.4	Plastic Limits:	17		
Dry Density (g/cm³):	1.531	1.692	Plasticity Index (%):	29		
Saturation (%):	99	100	Specific Gravity:	2.65	Assumed	
Void Ratio:	0.7278	0.5515				
Soil Description:	Clay (Cl), Some Sand					
Project Number:	110773396		Depth:	2.25-2.70m		
Sample Number:	LLO17A ST5		Boring Number:			
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						
	Remarks:					



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
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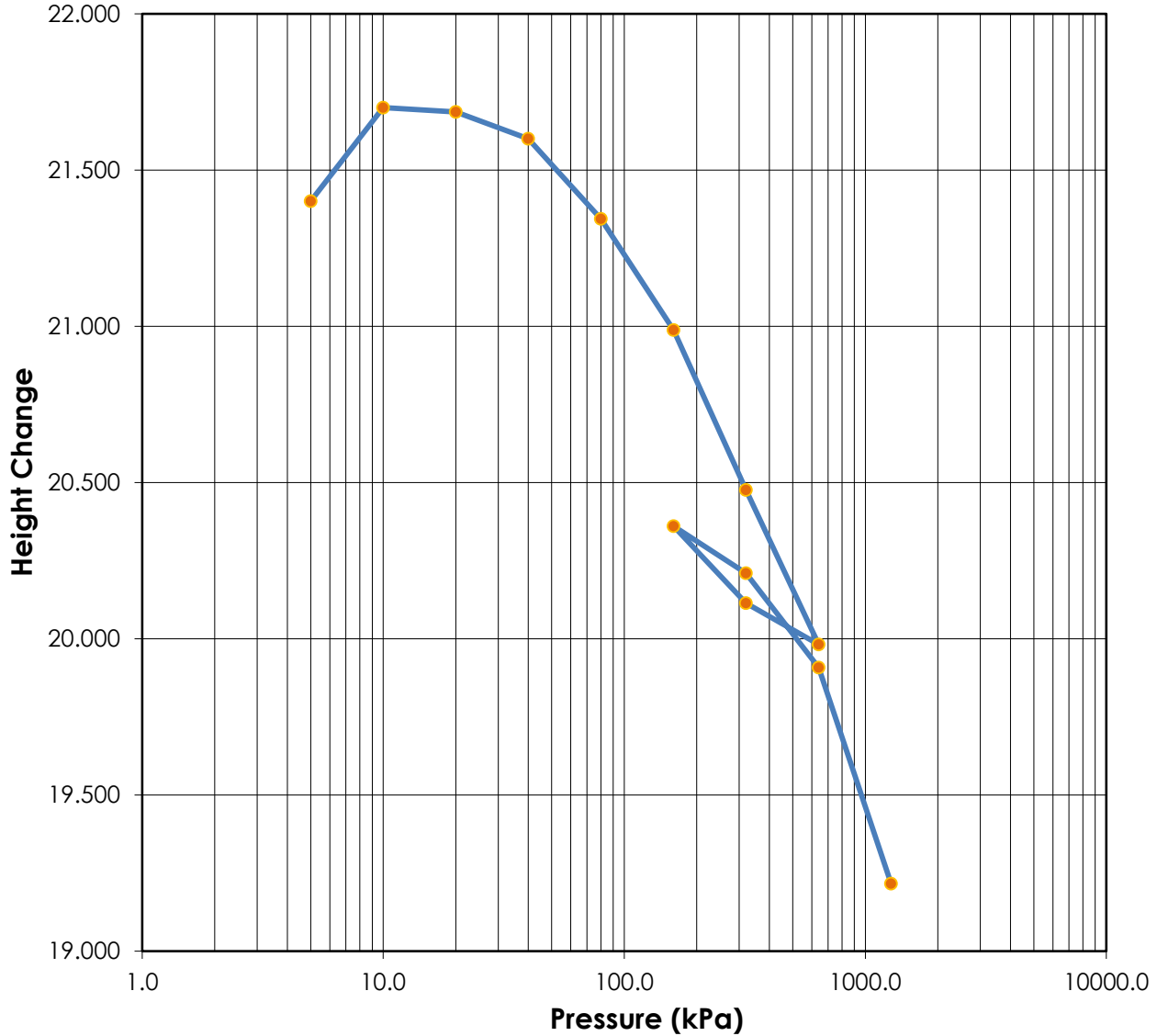


	Before	After	Liquid Limits:	46	Test Date:	15-Oct-18
Moisture (%):	27.5	25.4	Plastic Limits:	17		
Dry Density (g/cm³):	1.531	1.692	Plasticity Index (%):	29		
Saturation (%):	99	100	Specific Gravity:	2.65	Assumed	
Void Ratio:	0.7278	0.5515				
Soil Description:	Clay (Cl), Some Sand					
Project Number:	110773396		Depth:	2.25-2.70m		
Sample Number:	LLO17A ST5		Boring Number:			
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						
						Remarks:



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

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	Before	After	Liquid Limits:	46	Test Date:	15-Oct-18
Moisture (%):	27.5	25.4	Plastic Limits:	17		
Dry Density (g/cm3):	1.531	1.692	Plasticity Index (%):	29		
Saturation (%):	99	100	Specific Gravity:	2.65	Assumed	
Void Ratio:	0.7278	0.5515				
Soil Description:	Clay (Cl), Some Sand					
Project Number:	110773396	Depth:	2.25-2.70m			
Sample Number:	LLO17A ST5	Boring Number:				
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						
Remarks:						

Consolidation Test Results Summary

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Sample Number: LLO17A ST5

Sample Description:

Boring Number:

Clay (Cl), Some Sand

Depth: 2.25-2.70m

Remarks:

Test Number:

Sample Type: Undisturbed

Test Date: 15-Oct-18

Index	Load Sequence (kPa)	Cumulative Change in Height (mm)	Specimen Height (mm)	Height of Void (mm)	Vertical Strain (%)	Void Ratio	t90 Fitting Time (min)	t50 Fitting Time (min)	t90 Cv (mm ² /sec)	t50 Cv (mm ² /sec)
0	0.000	0.0000	21.4000	9.0158	0.00	0.7280	0.000	0.000	0.000	0.000
1	5.000	0.0000	21.4000	9.0158	0.00	0.7280	0.000	0.000	0.000	0.000
2	10.000	-0.3000	21.7000	9.3158	-1.40	0.7522	0.000	0.000	0.000	0.000
3	20.000	-0.2860	21.6860	9.3018	-1.34	0.7511	39.055	5.433	0.043	0.071
4	40.000	-0.2000	21.6000	9.2158	-0.93	0.7442	22.140	2.995	0.074	0.128
5	80.000	0.0560	21.3440	8.9598	0.26	0.7235	33.792	7.855	0.048	0.048
6	160.000	0.4120	20.9880	8.6038	1.93	0.6947	31.431	7.710	0.050	0.047
7	320.000	0.9240	20.4760	8.0918	4.32	0.6534	36.091	7.424	0.041	0.046
8	640.000	1.4180	19.9820	7.5978	6.63	0.6135	30.464	7.498	0.046	0.044
9	320.000	1.2860	20.1140	7.7298	6.01	0.6242	0.000	0.000	0.000	0.000
10	160.000	1.0400	20.3600	7.9758	4.86	0.6440	0.000	0.000	0.000	0.000
11	320.000	1.1900	20.2100	7.8258	5.56	0.6319	23.876	5.403	0.060	0.062
12	640.000	1.4920	19.9080	7.5238	6.97	0.6075	27.487	5.627	0.051	0.058
13	1280.000	2.1840	19.2160	6.8318	10.21	0.5517	40.777	8.419	0.032	0.036

Predicted value indicated with *

Consolidation Test

Consolidation Specimen Information

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Sample Number: LLO17A ST5
Boring Number:
Depth: 2.25-2.70m
Sample Type: Undisturbed

Sample Description:
 Clay (Cl), Some Sand
Remarks:

Test Number:

Liquid Limit: 46	Initial Void Ratio: 0.7278	Initial Height (mm): 21.40
Plastic Limit: 17	Plasticity Index (%): 29	Initial Diameter (mm): 50.88
Specific Gravity: 2.65	Weight of Ring (g): 89.71	
Assumed		

Parameters	Initial Specimen	Final Specimen
Moist Weight + Container (g)	96.81	86.42
Dry Soil + Container (g)	76.85	69.68
Weight of Container (g)	4.13	3.80
Moisture Content (%)	27.5	25.4
Void Ratio	0.7278	0.5515
Saturation (%)	99	100
Dry Density (g/cm ³)	1.531	1.692

**Consolidation Test Results
(Sequence 1) Load 5.000 kPa**

Project: SR1 2018 Investigation
Location:
Job Number:

Project Number: 110773396

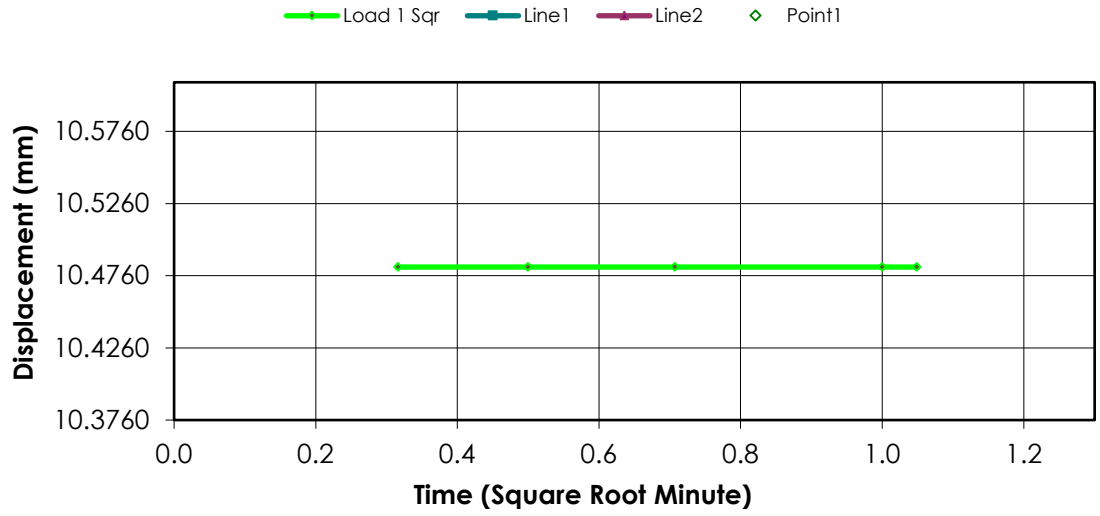
Test Date: 15-Oct-18
Test Number:

Sample Number: LLO17A ST5 **Soil Description:**
Boring Number: Clay (Cl), Some Sand
Depth: 2.25-2.70m **Remarks:**
Sample Type: Undisturbed

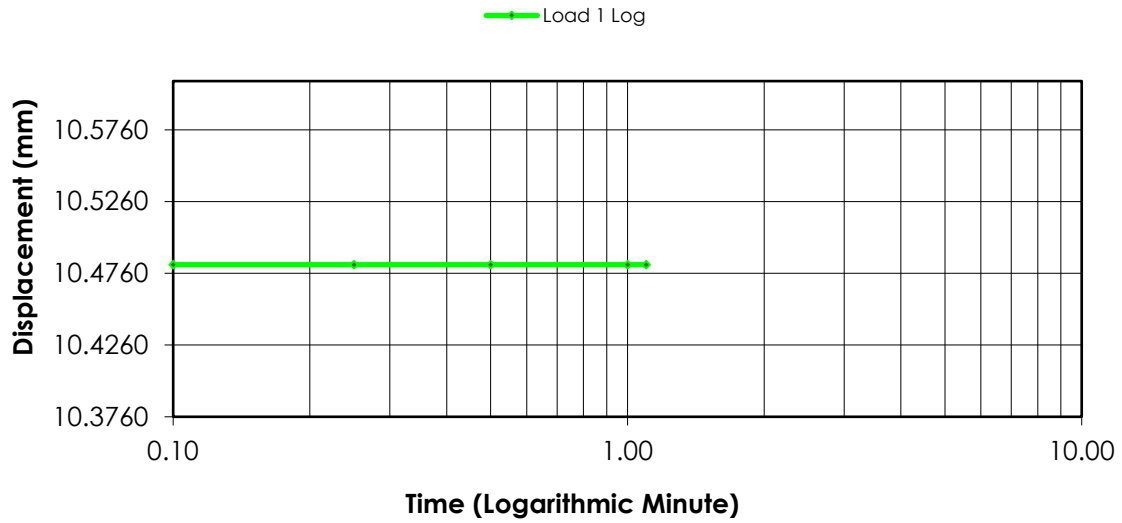
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	10.4820	0.0000	0.0000	0.7278
1	00:00:06	10.4820	0.0000	0.0000	0.7278
2	00:00:15	10.4820	0.0000	0.0000	0.7278
3	00:00:30	10.4820	0.0000	0.0000	0.7278
4	00:01:00	10.4820	0.0000	0.0000	0.7278
5	00:01:06	10.4820	0.0000	0.0000	0.7278

Consolidation Test Results (Sequence 1) Load 5.000 kPa

Consolidation Graph (Square-root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 2) Load 10.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Test Number:

Sample Number: LLO17A ST5

Soil Description:

Boring Number:

Clay (Cl), Some Sand

Depth: 2.25-2.70m

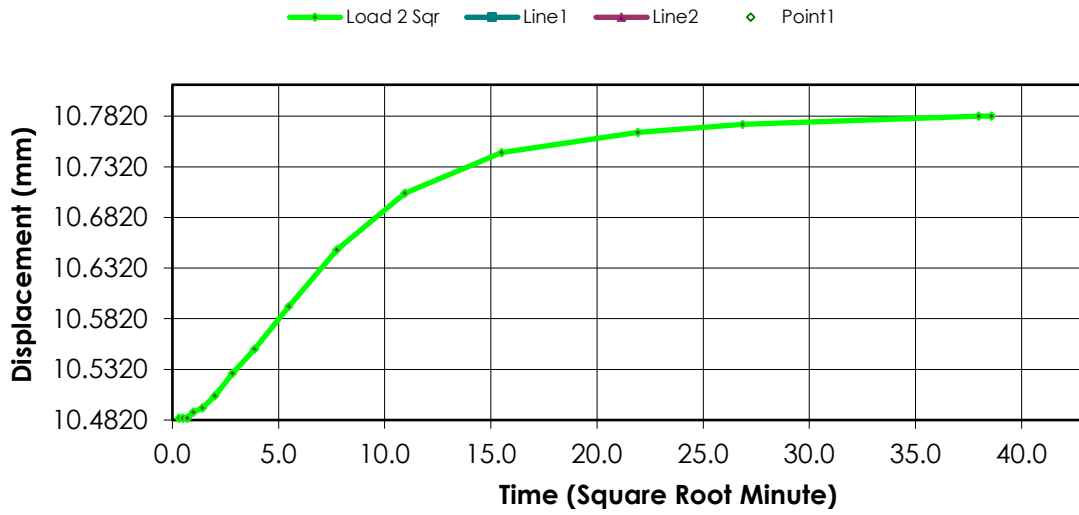
Remarks:

Sample Type: Undisturbed

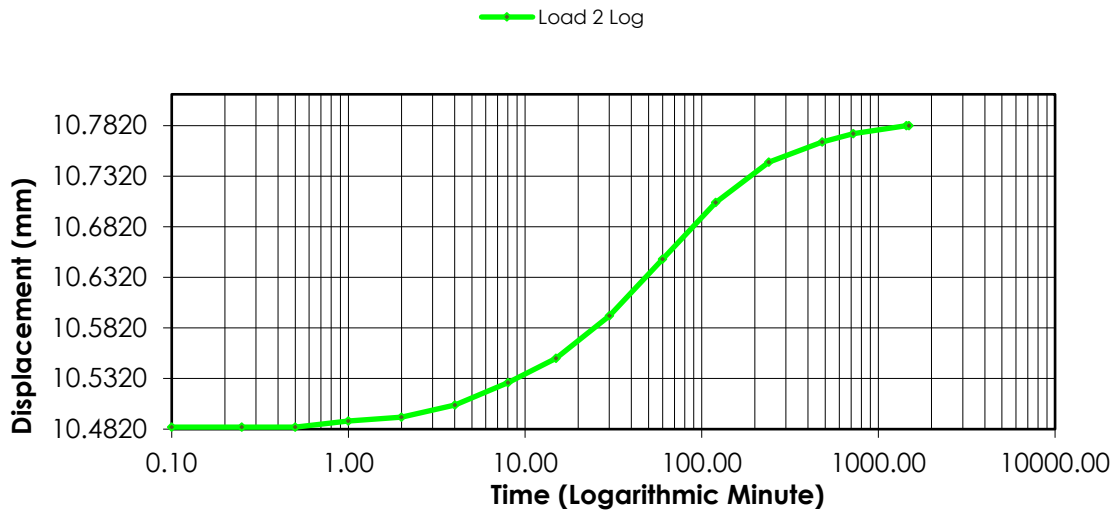
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	10.4820	0.0000	0.0000	0.7278
1	00:00:06	10.4840	-0.0020	-0.0093	0.7279
2	00:00:15	10.4840	-0.0020	-0.0093	0.7279
3	00:00:30	10.4840	-0.0020	-0.0093	0.7279
4	00:01:00	10.4900	-0.0080	-0.0374	0.7284
5	00:02:00	10.4940	-0.0120	-0.0561	0.7288
6	00:04:01	10.5060	-0.0240	-0.1121	0.7297
7	00:08:01	10.5280	-0.0460	-0.2150	0.7315
8	00:15:01	10.5520	-0.0700	-0.3271	0.7334
9	00:30:03	10.5940	-0.1120	-0.5234	0.7368
10	01:00:06	10.6500	-0.1680	-0.7850	0.7413
11	02:00:11	10.7060	-0.2240	-1.0467	0.7459
12	04:00:23	10.7460	-0.2640	-1.2336	0.7491
13	08:00:46	10.7660	-0.2840	-1.3271	0.7507
14	12:01:09	10.7740	-0.2920	-1.3645	0.7514
15	24:02:18	10.7820	-0.3000	-1.4019	0.7520
16	24:49:00	10.7820	-0.3000	-1.4019	0.7520

Consolidation Test Results (Sequence 2) Load 10.000 kPa

Consolidation Graph (Square Root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 3) Load 20.000 kPa

Project: SR1 2018 Investigation
Location:
Job Number:

Project Number: 110773396

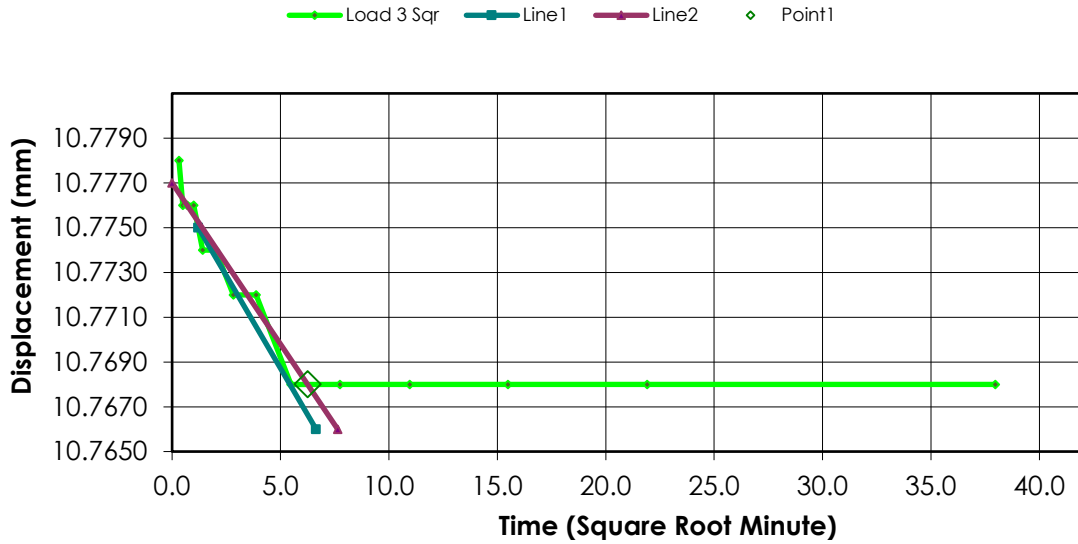
Test Date: 15-Oct-18
Test Number:

Sample Number: LLO17A ST5 **Soil Description:**
Boring Number: Clay (Cl), Some Sand
Depth: 2.25-2.70m **Remarks:**
Sample Type: Undisturbed

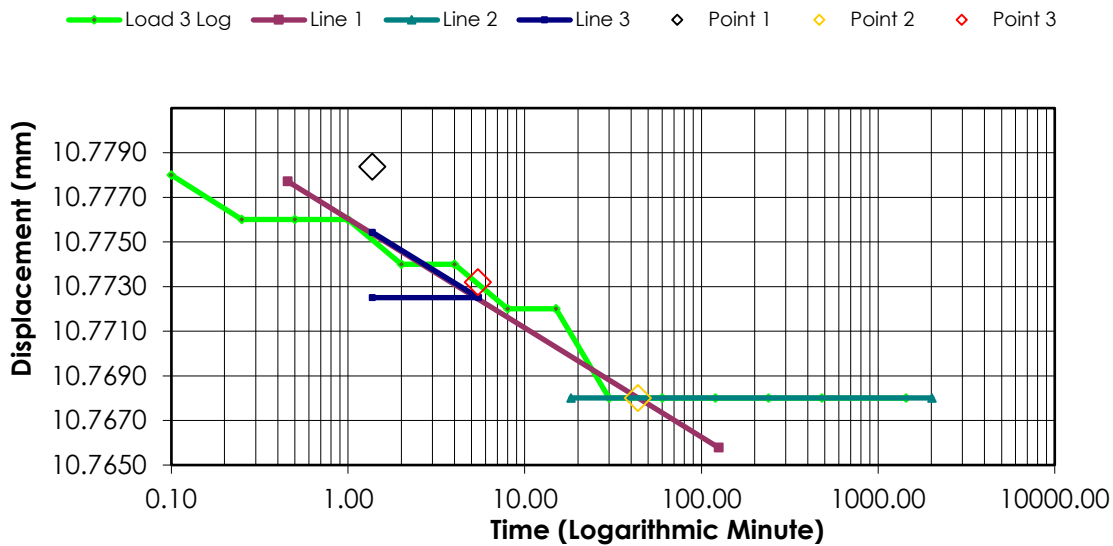
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	10.7820	-0.3000	-1.4019	0.7520
1	00:00:06	10.7780	-0.2960	-1.3832	0.7517
2	00:00:15	10.7760	-0.2940	-1.3738	0.7515
3	00:00:30	10.7760	-0.2940	-1.3738	0.7515
4	00:01:00	10.7760	-0.2940	-1.3738	0.7515
5	00:02:00	10.7740	-0.2920	-1.3645	0.7514
6	00:04:00	10.7740	-0.2920	-1.3645	0.7514
7	00:08:00	10.7720	-0.2900	-1.3551	0.7512
8	00:15:01	10.7720	-0.2900	-1.3551	0.7512
9	00:30:02	10.7680	-0.2860	-1.3365	0.7509
10	01:00:00	10.7680	-0.2860	-1.3364	0.7509
11	02:00:00	10.7680	-0.2860	-1.3364	0.7509
12	04:00:00	10.7680	-0.2860	-1.3364	0.7509
13	08:00:00	10.7680	-0.2860	-1.3364	0.7509
14	24:01:13	10.7680	-0.2860	-1.3364	0.7509

Consolidation Test Results (Sequence 3) Load 20.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 4) Load 40.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Test Number:

Sample Number: LLO17A ST5

Soil Description:

Boring Number:

Clay (Cl), Some Sand

Depth: 2.25-2.70m

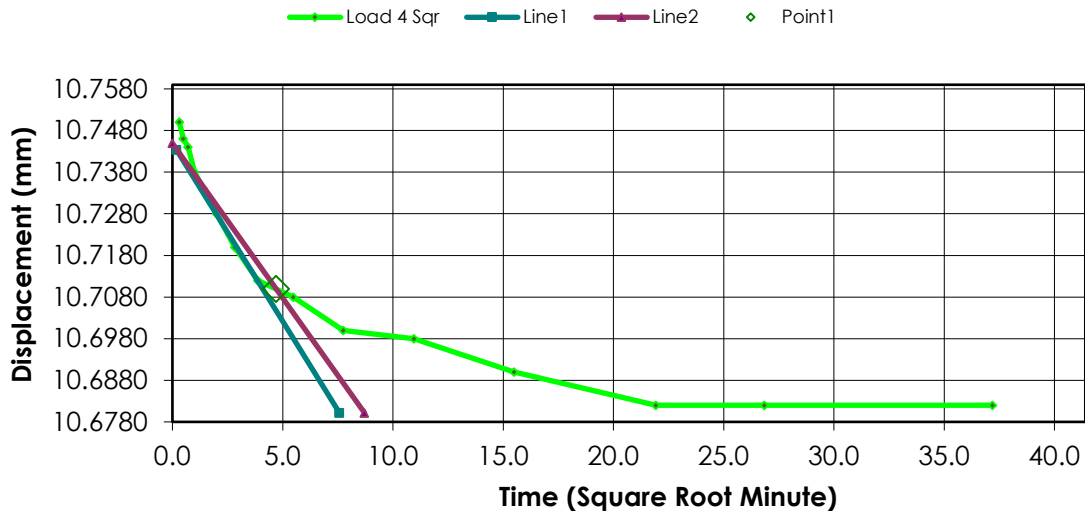
Remarks:

Sample Type: Undisturbed

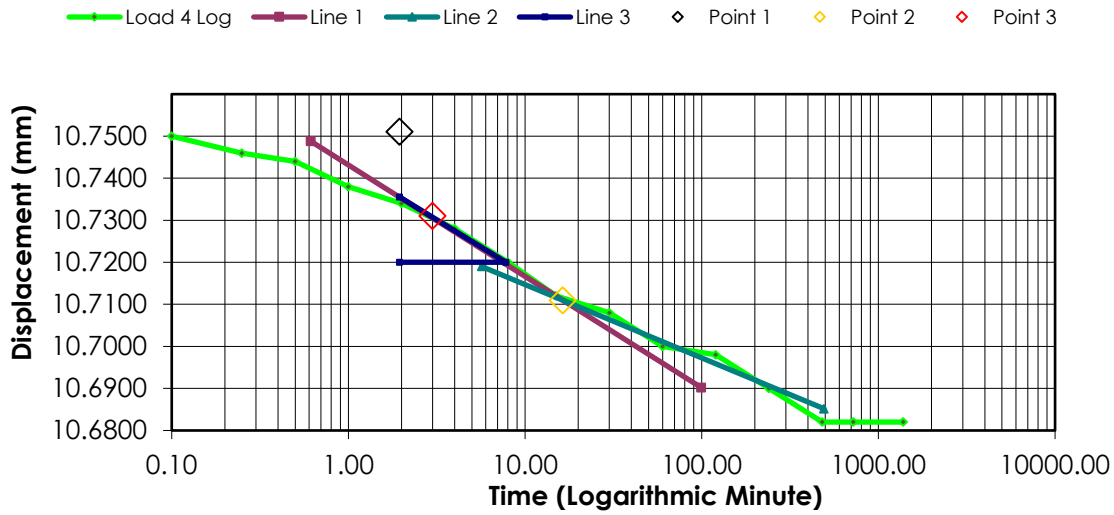
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	10.7680	-0.2860	-1.3364	0.7509
1	00:00:06	10.7500	-0.2680	-1.2523	0.7494
2	00:00:15	10.7460	-0.2640	-1.2336	0.7491
3	00:00:30	10.7440	-0.2620	-1.2243	0.7489
4	00:01:00	10.7380	-0.2560	-1.1963	0.7485
5	00:02:00	10.7340	-0.2520	-1.1776	0.7481
6	00:04:00	10.7280	-0.2460	-1.1495	0.7476
7	00:08:01	10.7200	-0.2380	-1.1122	0.7470
8	00:15:01	10.7120	-0.2300	-1.0748	0.7464
9	00:30:03	10.7080	-0.2260	-1.0561	0.7460
10	01:00:06	10.7000	-0.2180	-1.0187	0.7454
11	02:00:12	10.6980	-0.2160	-1.0093	0.7452
12	04:00:23	10.6900	-0.2080	-0.9720	0.7446
13	08:00:46	10.6820	-0.2000	-0.9346	0.7439
14	12:01:10	10.6820	-0.2000	-0.9346	0.7439
15	23:03:14	10.6820	-0.2000	-0.9346	0.7439

Consolidation Test Results (Sequence 4) Load 40.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 5) Load 80.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Test Number:

Sample Number: LLO17A ST5

Soil Description:

Boring Number:

Clay (Cl), Some Sand

Depth: 2.25-2.70m

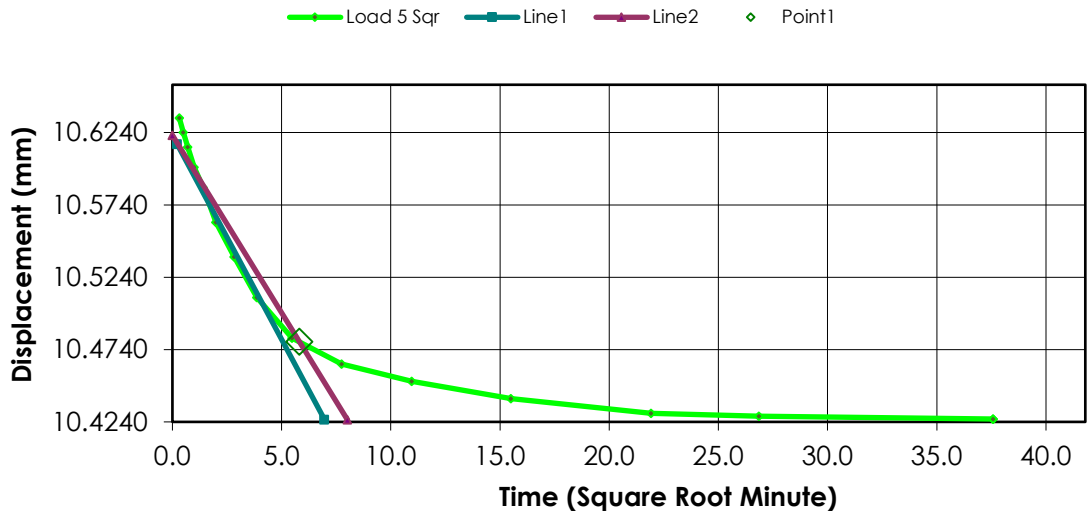
Remarks:

Sample Type: Undisturbed

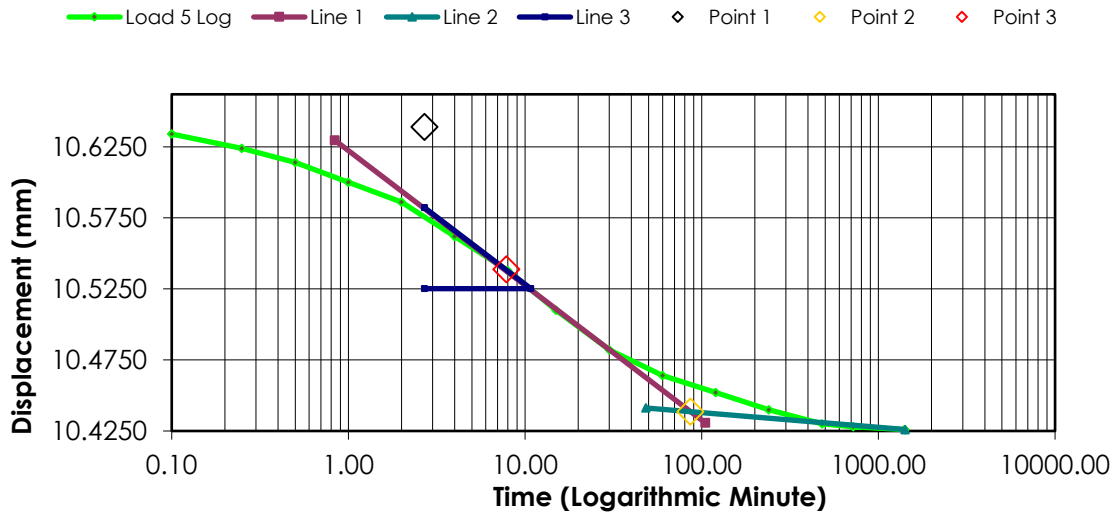
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	10.6820	-0.2000	-0.9346	0.7439
1	00:00:06	10.6340	-0.1520	-0.7103	0.7401
2	00:00:15	10.6240	-0.1420	-0.6636	0.7392
3	00:00:30	10.6140	-0.1320	-0.6168	0.7384
4	00:01:00	10.6000	-0.1180	-0.5514	0.7373
5	00:02:00	10.5860	-0.1040	-0.4860	0.7362
6	00:04:00	10.5620	-0.0800	-0.3738	0.7342
7	00:08:00	10.5380	-0.0560	-0.2617	0.7323
8	00:15:01	10.5100	-0.0280	-0.1308	0.7300
9	00:30:02	10.4820	0.0000	0.0000	0.7278
10	01:00:05	10.4640	0.0180	0.0841	0.7263
11	02:00:10	10.4520	0.0300	0.1402	0.7254
12	04:00:21	10.4400	0.0420	0.1963	0.7244
13	08:00:44	10.4300	0.0520	0.2430	0.7236
14	12:01:07	10.4280	0.0540	0.2523	0.7234
15	23:32:55	10.4260	0.0560	0.2617	0.7233
16	23:32:57	10.4260	0.0560	0.2617	0.7233

Consolidation Test Results (Sequence 5) Load 80.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 6) Load 160.000 kPa

Project: SR1 2018 Investigation
Location:
Job Number:

Project Number: 110773396

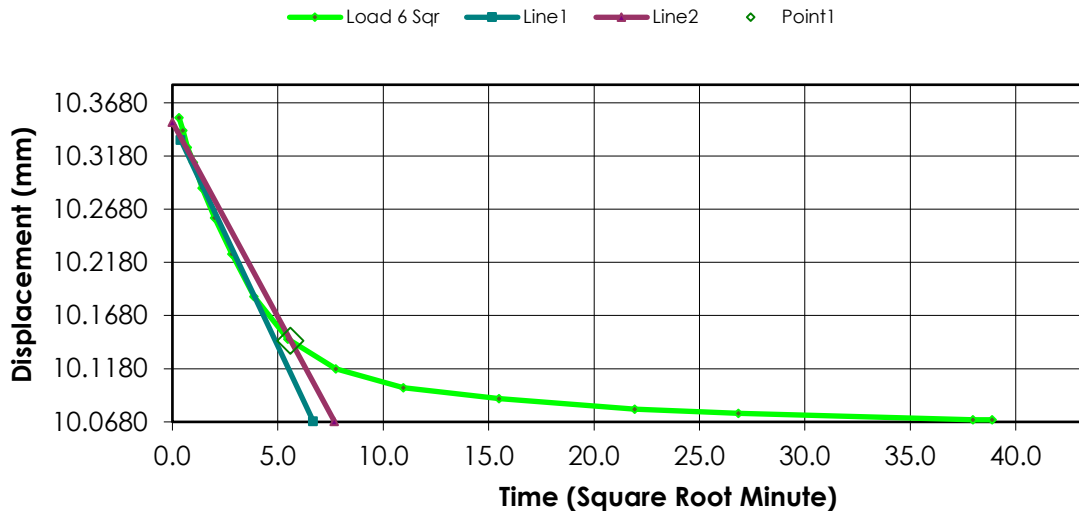
Test Date: 15-Oct-18
Test Number:

Sample Number: LLO17A ST5 **Soil Description:**
Boring Number: Clay (Cl), Some Sand
Depth: 2.25-2.70m **Remarks:**
Sample Type: Undisturbed

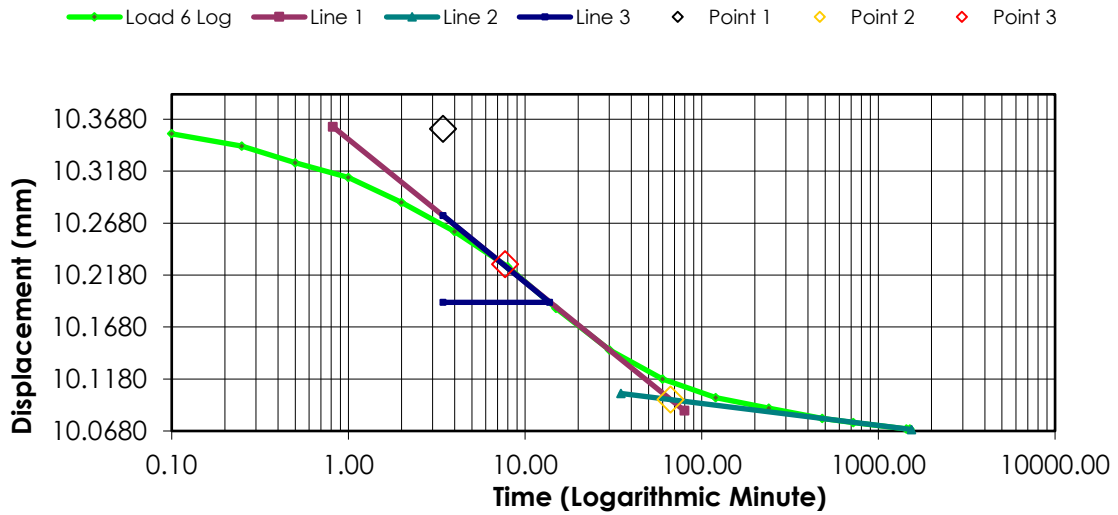
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	10.4260	0.0560	0.2617	0.7233
1	00:00:06	10.3540	0.1280	0.5981	0.7174
2	00:00:15	10.3420	0.1400	0.6542	0.7165
3	00:00:30	10.3260	0.1560	0.7290	0.7152
4	00:01:00	10.3120	0.1700	0.7944	0.7141
5	00:02:00	10.2880	0.1940	0.9065	0.7121
6	00:04:00	10.2600	0.2220	1.0374	0.7099
7	00:08:00	10.2260	0.2560	1.1963	0.7071
8	00:15:01	10.1860	0.2960	1.3832	0.7039
9	00:30:02	10.1460	0.3360	1.5701	0.7007
10	01:00:05	10.1180	0.3640	1.7009	0.6984
11	02:00:10	10.1000	0.3820	1.7850	0.6969
12	04:00:22	10.0900	0.3920	1.8318	0.6961
13	08:00:45	10.0800	0.4020	1.8785	0.6953
14	12:01:08	10.0760	0.4060	1.8972	0.6950
15	24:02:16	10.0700	0.4120	1.9252	0.6945
16	25:12:23	10.0700	0.4120	1.9252	0.6945

Consolidation Test Results (Sequence 6) Load 160.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 7) Load 320.000 kPa

Project: SR1 2018 Investigation
Location:
Job Number:

Project Number: 110773396

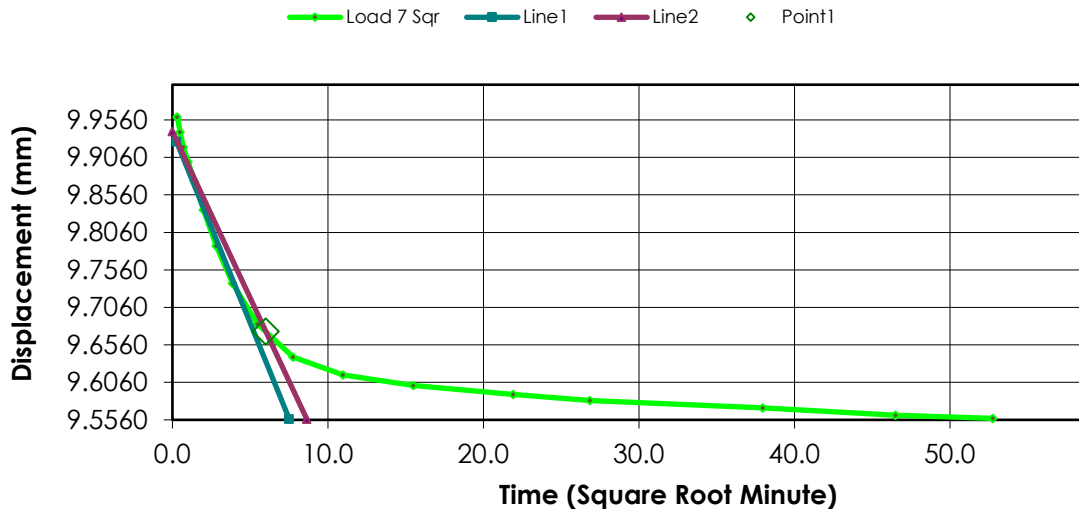
Test Date: 15-Oct-18
Test Number:

Sample Number: LLO17A ST5 **Soil Description:**
Boring Number: Clay (Cl), Some Sand
Depth: 2.25-2.70m **Remarks:**
Sample Type: Undisturbed

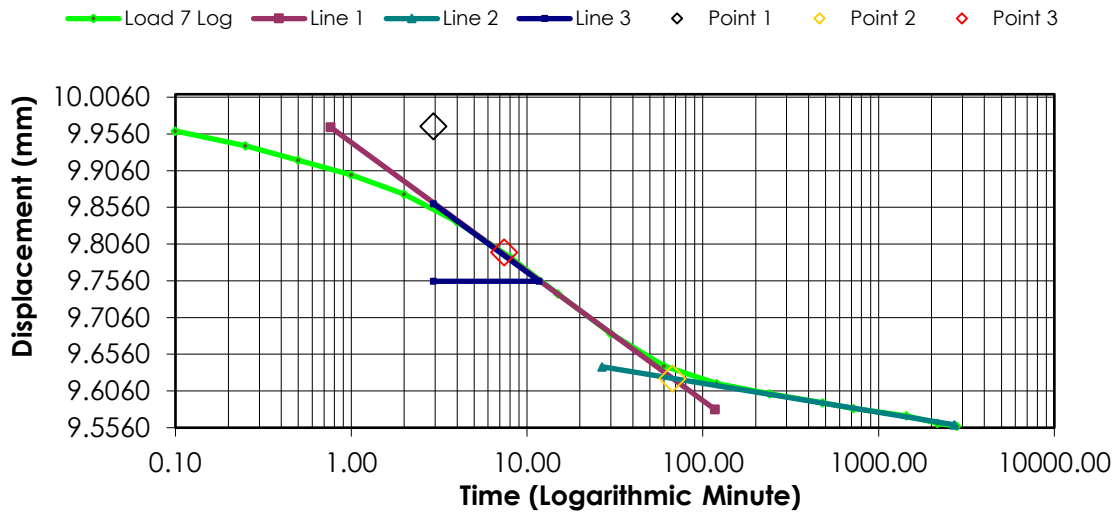
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	10.0700	0.4120	1.9252	0.6945
1	00:00:06	9.9600	0.5220	2.4393	0.6856
2	00:00:15	9.9400	0.5420	2.5327	0.6840
3	00:00:30	9.9200	0.5620	2.6262	0.6824
4	00:01:00	9.9000	0.5820	2.7196	0.6808
5	00:02:00	9.8740	0.6080	2.8411	0.6787
6	00:04:00	9.8360	0.6460	3.0187	0.6756
7	00:08:00	9.7880	0.6940	3.2430	0.6718
8	00:15:01	9.7380	0.7440	3.4766	0.6677
9	00:30:02	9.6840	0.7980	3.7290	0.6634
10	01:00:05	9.6400	0.8420	3.9346	0.6598
11	02:00:10	9.6160	0.8660	4.0467	0.6579
12	04:00:19	9.6020	0.8800	4.1122	0.6567
13	08:00:39	9.5900	0.8920	4.1682	0.6558
14	12:00:59	9.5820	0.9000	4.2056	0.6551
15	24:01:57	9.5720	0.9100	4.2523	0.6543
16	36:02:56	9.5620	0.9200	4.2991	0.6535
17	46:24:30	9.5580	0.9240	4.3178	0.6532

Consolidation Test Results (Sequence 7) Load 320.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 8) Load 640.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Test Number:

Sample Number: LLO17A ST5

Soil Description:

Boring Number:

Clay (Cl), Some Sand

Depth: 2.25-2.70m

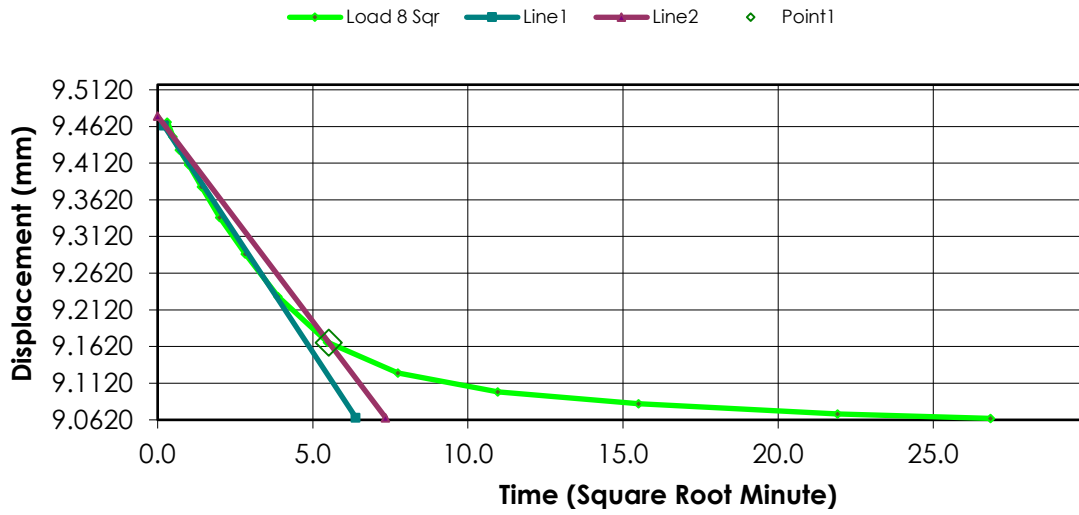
Remarks:

Sample Type: Undisturbed

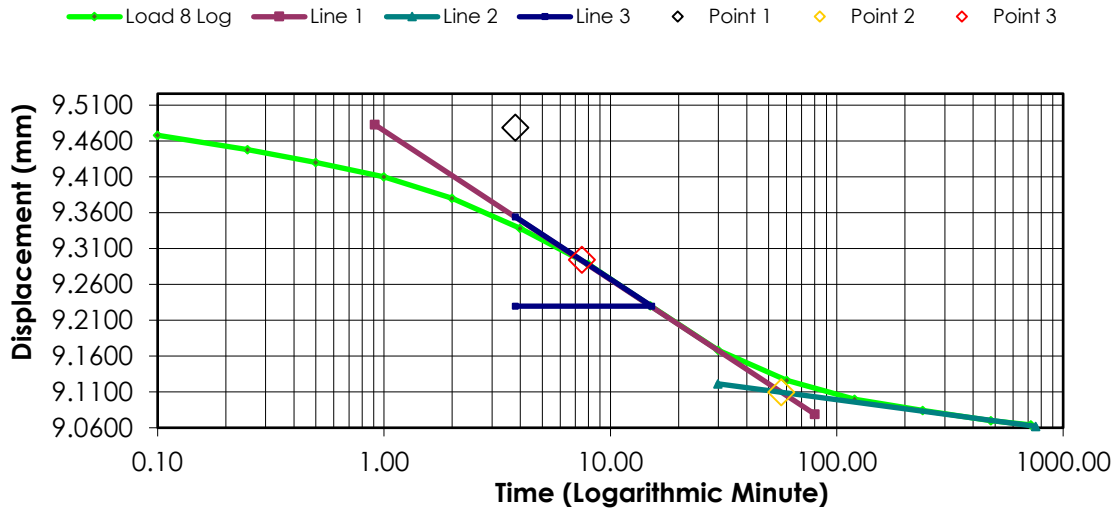
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	9.5580	0.9240	4.3178	0.6532
1	00:00:06	9.4680	1.0140	4.7383	0.6459
2	00:00:15	9.4480	1.0340	4.8318	0.6443
3	00:00:30	9.4300	1.0520	4.9159	0.6428
4	00:01:00	9.4100	1.0720	5.0093	0.6412
5	00:02:00	9.3800	1.1020	5.1495	0.6388
6	00:04:00	9.3380	1.1440	5.3458	0.6354
7	00:08:00	9.2880	1.1940	5.5794	0.6314
8	00:15:01	9.2300	1.2520	5.8505	0.6267
9	00:30:02	9.1680	1.3140	6.1402	0.6217
10	01:00:05	9.1260	1.3560	6.3364	0.6183
11	02:00:10	9.1000	1.3820	6.4579	0.6162
12	04:00:19	9.0840	1.3980	6.5327	0.6149
13	08:00:39	9.0700	1.4120	6.5981	0.6138
14	12:00:55	9.0640	1.4180	6.6262	0.6133

Consolidation Test Results (Sequence 8) Load 640.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 9) Rebound 320.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Test Number:

Sample Number: LLO17A ST5

Soil Description:

Boring Number:

Clay (Cl), Some Sand

Depth: 2.25-2.70m

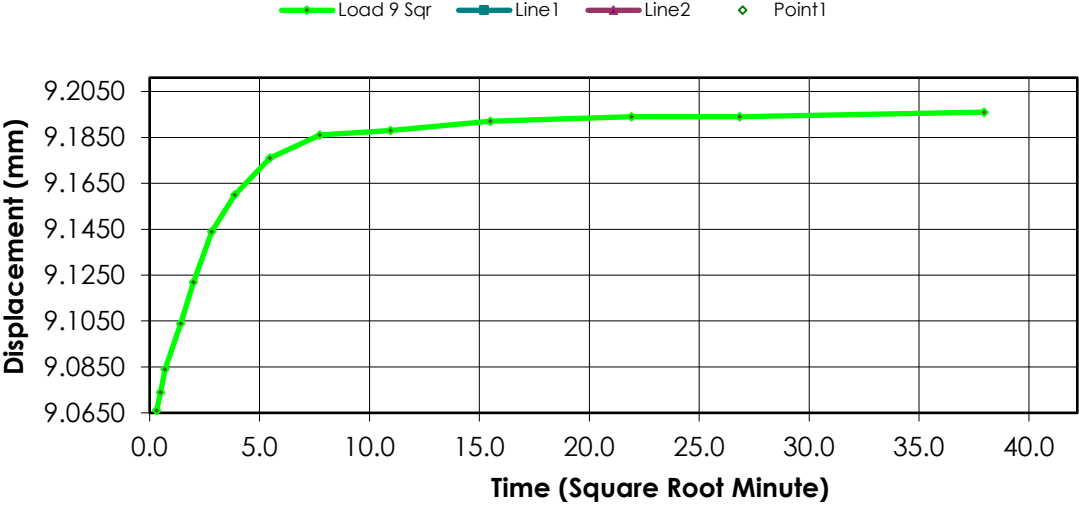
Remarks:

Sample Type: Undisturbed

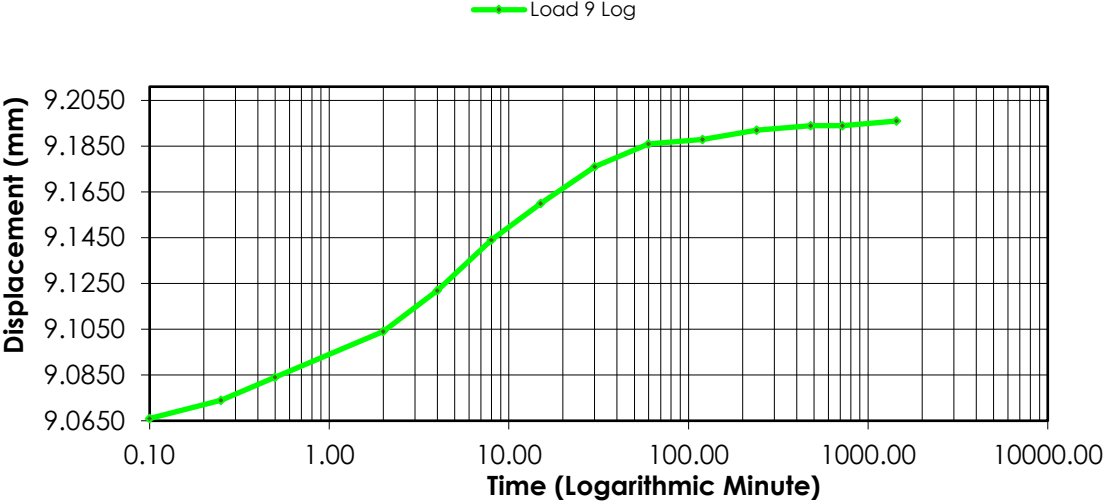
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	9.0640	1.4180	6.6262	0.6133
1	00:00:06	9.0660	1.4160	6.6168	0.6135
2	00:00:15	9.0740	1.4080	6.5794	0.6141
3	00:00:30	9.0840	1.3980	6.5327	0.6149
5	00:02:00	9.1040	1.3780	6.4393	0.6165
6	00:04:00	9.1220	1.3600	6.3551	0.6180
7	00:08:00	9.1440	1.3380	6.2523	0.6198
8	00:15:01	9.1600	1.3220	6.1776	0.6210
9	00:30:02	9.1760	1.3060	6.1028	0.6223
10	01:00:04	9.1860	1.2960	6.0561	0.6231
11	02:00:09	9.1880	1.2940	6.0467	0.6233
12	04:00:19	9.1920	1.2900	6.0280	0.6236
13	08:00:39	9.1940	1.2880	6.0187	0.6238
14	12:00:59	9.1940	1.2880	6.0187	0.6238
15	24:01:57	9.1960	1.2860	6.0093	0.6240

Consolidation Test Results (Sequence 9) Rebound 320.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 10) Rebound 160.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Test Number:

Sample Number: LLO17A ST5

Soil Description:

Boring Number:

Clay (Cl), Some Sand

Depth: 2.25-2.70m

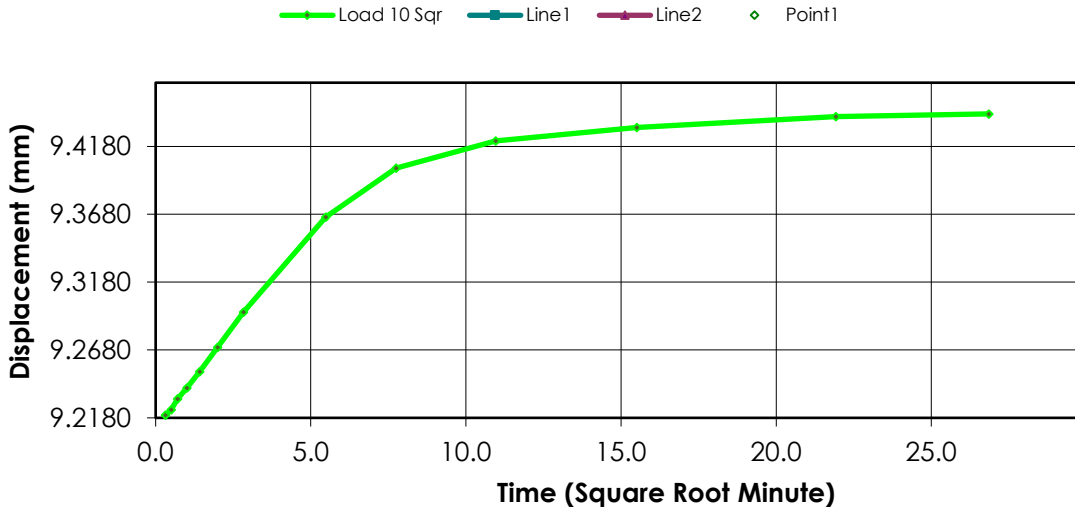
Remarks:

Sample Type: Undisturbed

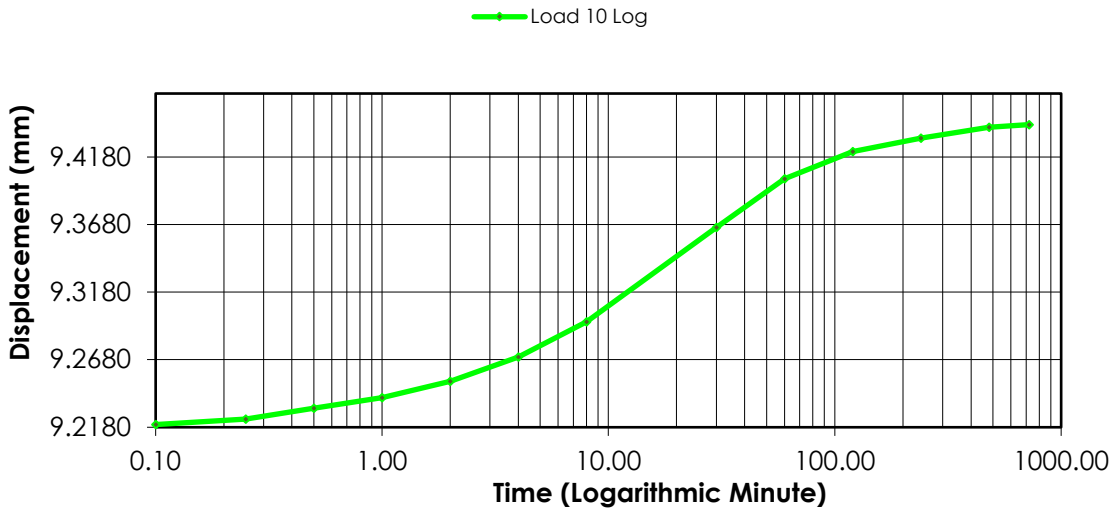
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	9.1960	1.2860	6.0093	0.6240
1	00:00:06	9.2200	1.2620	5.8972	0.6259
2	00:00:15	9.2240	1.2580	5.8785	0.6262
3	00:00:30	9.2320	1.2500	5.8411	0.6269
4	00:01:00	9.2400	1.2420	5.8037	0.6275
5	00:02:00	9.2520	1.2300	5.7477	0.6285
6	00:04:00	9.2700	1.2120	5.6636	0.6299
7	00:08:00	9.2960	1.1860	5.5421	0.6320
9	00:30:02	9.3660	1.1160	5.2150	0.6377
10	01:00:05	9.4020	1.0800	5.0467	0.6406
11	02:00:09	9.4220	1.0600	4.9533	0.6422
12	04:00:19	9.4320	1.0500	4.9065	0.6430
13	08:00:39	9.4400	1.0420	4.8692	0.6437
14	12:00:58	9.4420	1.0400	4.8598	0.6438

Consolidation Test Results
(Sequence 10) Rebound 160.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 11) Load 320.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Test Number:

Sample Number: LLO17A ST5

Soil Description:

Boring Number:

Clay (Cl), Some Sand

Depth: 2.25-2.70m

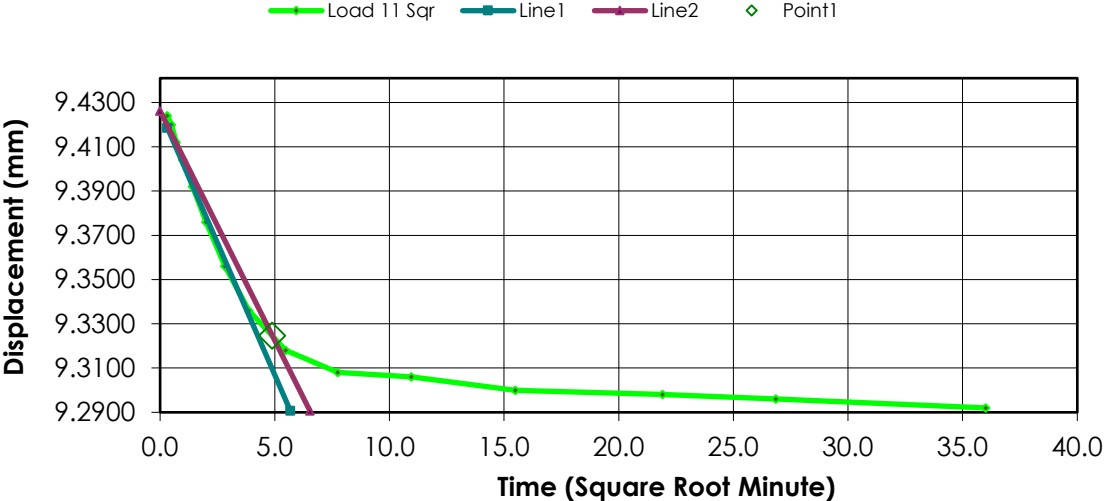
Remarks:

Sample Type: Undisturbed

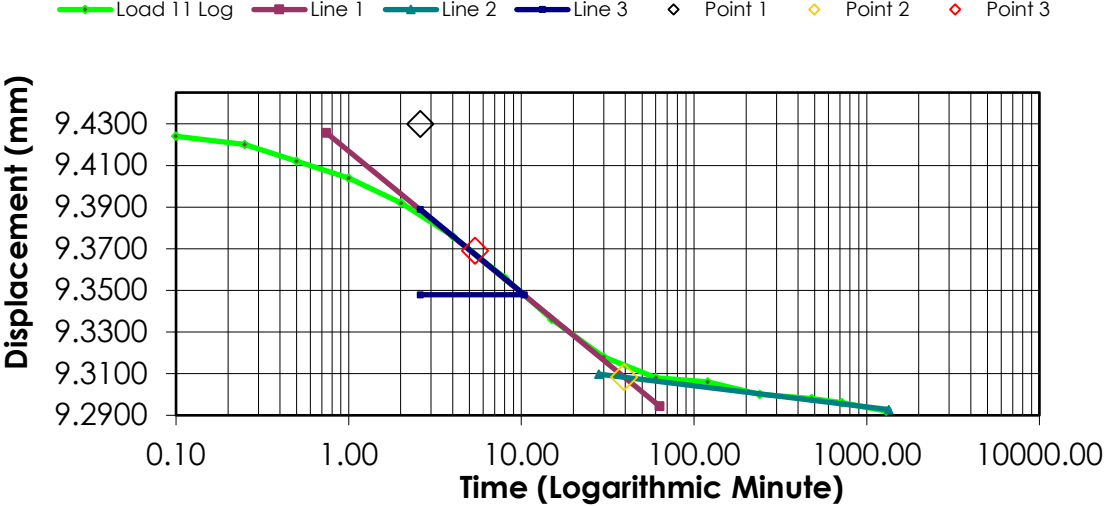
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	9.4420	1.0400	4.8598	0.6438
1	00:00:06	9.4240	1.0580	4.9439	0.6424
2	00:00:15	9.4200	1.0620	4.9626	0.6420
3	00:00:30	9.4120	1.0700	5.0000	0.6414
4	00:01:00	9.4040	1.0780	5.0374	0.6407
5	00:02:01	9.3920	1.0900	5.0935	0.6398
6	00:04:01	9.3760	1.1060	5.1682	0.6385
7	00:08:01	9.3560	1.1260	5.2617	0.6369
8	00:15:02	9.3360	1.1460	5.3551	0.6353
9	00:30:03	9.3180	1.1640	5.4393	0.6338
10	01:00:05	9.3080	1.1740	5.4860	0.6330
11	02:00:10	9.3060	1.1760	5.4953	0.6328
12	04:00:20	9.3000	1.1820	5.5234	0.6324
13	08:00:40	9.2980	1.1840	5.5327	0.6322
14	12:00:59	9.2960	1.1860	5.5421	0.6320
15	21:36:35	9.2920	1.1900	5.5607	0.6317

Consolidation Test Results (Sequence 11) Load 320.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 12) Load 640.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Test Number:

Sample Number: LLO17A ST5

Soil Description:

Boring Number:

Clay (Cl), Some Sand

Depth: 2.25-2.70m

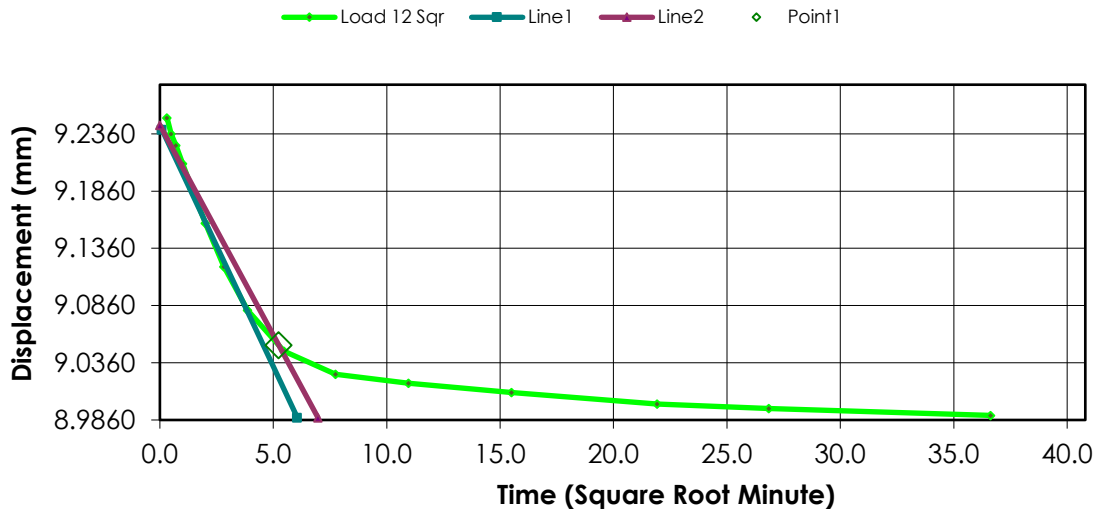
Remarks:

Sample Type: Undisturbed

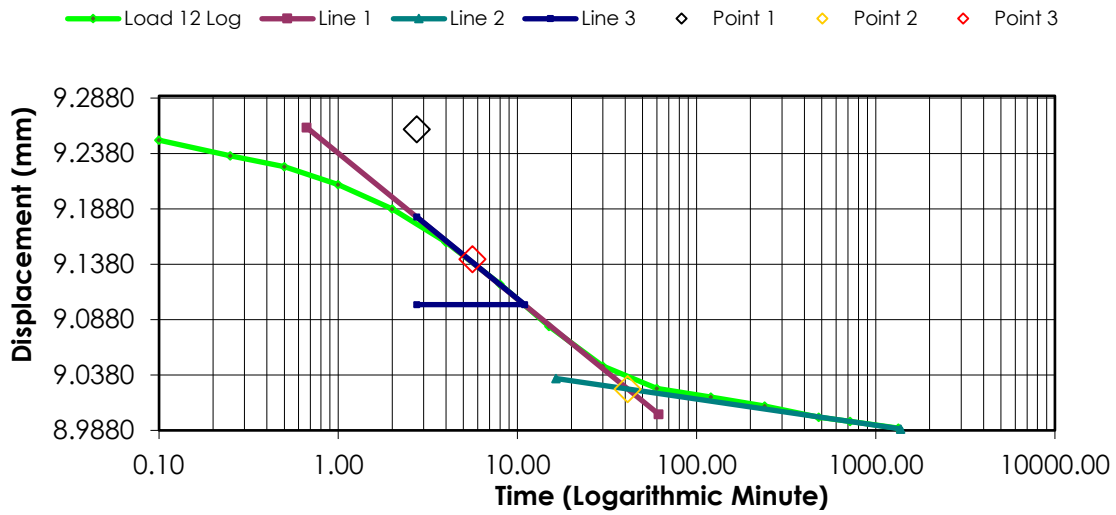
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	9.2920	1.1900	5.5607	0.6317
1	00:00:06	9.2500	1.2320	5.7570	0.6283
2	00:00:15	9.2360	1.2460	5.8224	0.6272
3	00:00:30	9.2260	1.2560	5.8692	0.6264
4	00:01:00	9.2100	1.2720	5.9439	0.6251
5	00:02:00	9.1880	1.2940	6.0467	0.6233
6	00:04:00	9.1580	1.3240	6.1869	0.6209
7	00:08:01	9.1200	1.3620	6.3645	0.6178
8	00:15:01	9.0820	1.4000	6.5421	0.6147
9	00:30:02	9.0460	1.4360	6.7103	0.6118
10	01:00:05	9.0260	1.4560	6.8037	0.6102
11	02:00:10	9.0180	1.4640	6.8411	0.6096
12	04:00:19	9.0100	1.4720	6.8785	0.6089
13	08:00:39	9.0000	1.4820	6.9252	0.6081
14	12:00:59	8.9960	1.4860	6.9439	0.6078
15	22:21:21	8.9900	1.4920	6.9720	0.6073

Consolidation Test Results (Sequence 12) Load 640.000 kPa

Consolidation Graph (Square root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 13) Load 1280.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Test Number:

Sample Number: LLO17A ST5

Soil Description:

Boring Number:

Clay (Cl), Some Sand

Depth: 2.25-2.70m

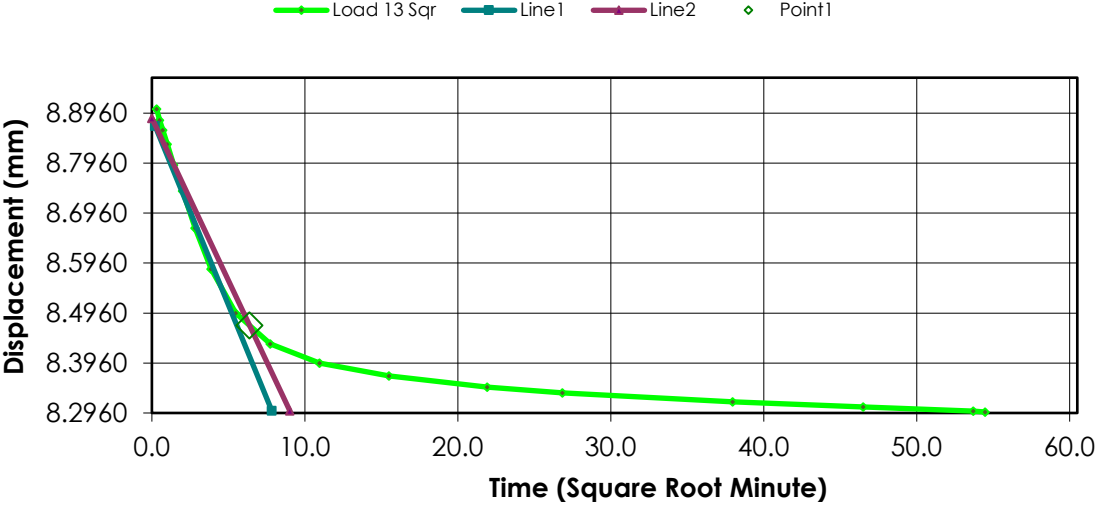
Remarks:

Sample Type: Undisturbed

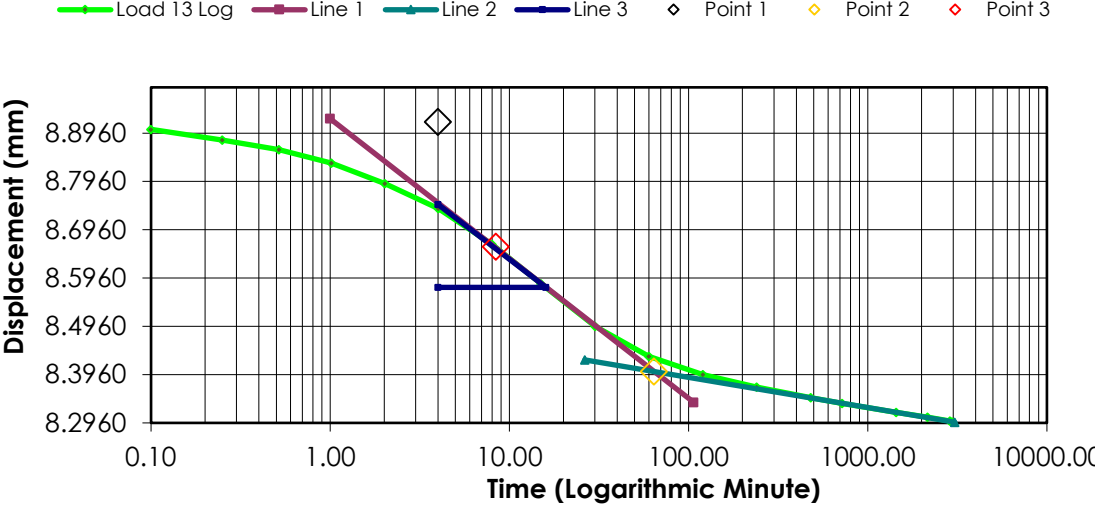
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.9900	1.4920	6.9720	0.6073
1	00:00:06	8.9040	1.5780	7.3738	0.6004
2	00:00:15	8.8820	1.6000	7.4766	0.5986
3	00:00:31	8.8620	1.6200	7.5701	0.5970
4	00:01:01	8.8340	1.6480	7.7009	0.5947
5	00:02:01	8.7920	1.6900	7.8972	0.5913
6	00:04:01	8.7400	1.7420	8.1402	0.5871
7	00:08:01	8.6660	1.8160	8.4860	0.5812
8	00:15:02	8.5840	1.8980	8.8692	0.5745
9	00:30:03	8.4960	1.9860	9.2804	0.5674
10	01:00:05	8.4340	2.0480	9.5701	0.5624
11	02:00:10	8.3960	2.0860	9.7477	0.5594
12	04:00:20	8.3700	2.1120	9.8692	0.5573
13	08:00:40	8.3480	2.1340	9.9720	0.5555
14	12:00:59	8.3360	2.1460	10.0280	0.5545
15	24:01:58	8.3180	2.1640	10.1122	0.5531
16	36:02:57	8.3080	2.1740	10.1589	0.5523
17	48:03:56	8.3000	2.1820	10.1963	0.5516
18	49:27:25	8.2980	2.1840	10.2056	0.5515

Consolidation Test Results (Sequence 13) Load 1280.000 kPa

Consolidation Graph (Squareroot Time)



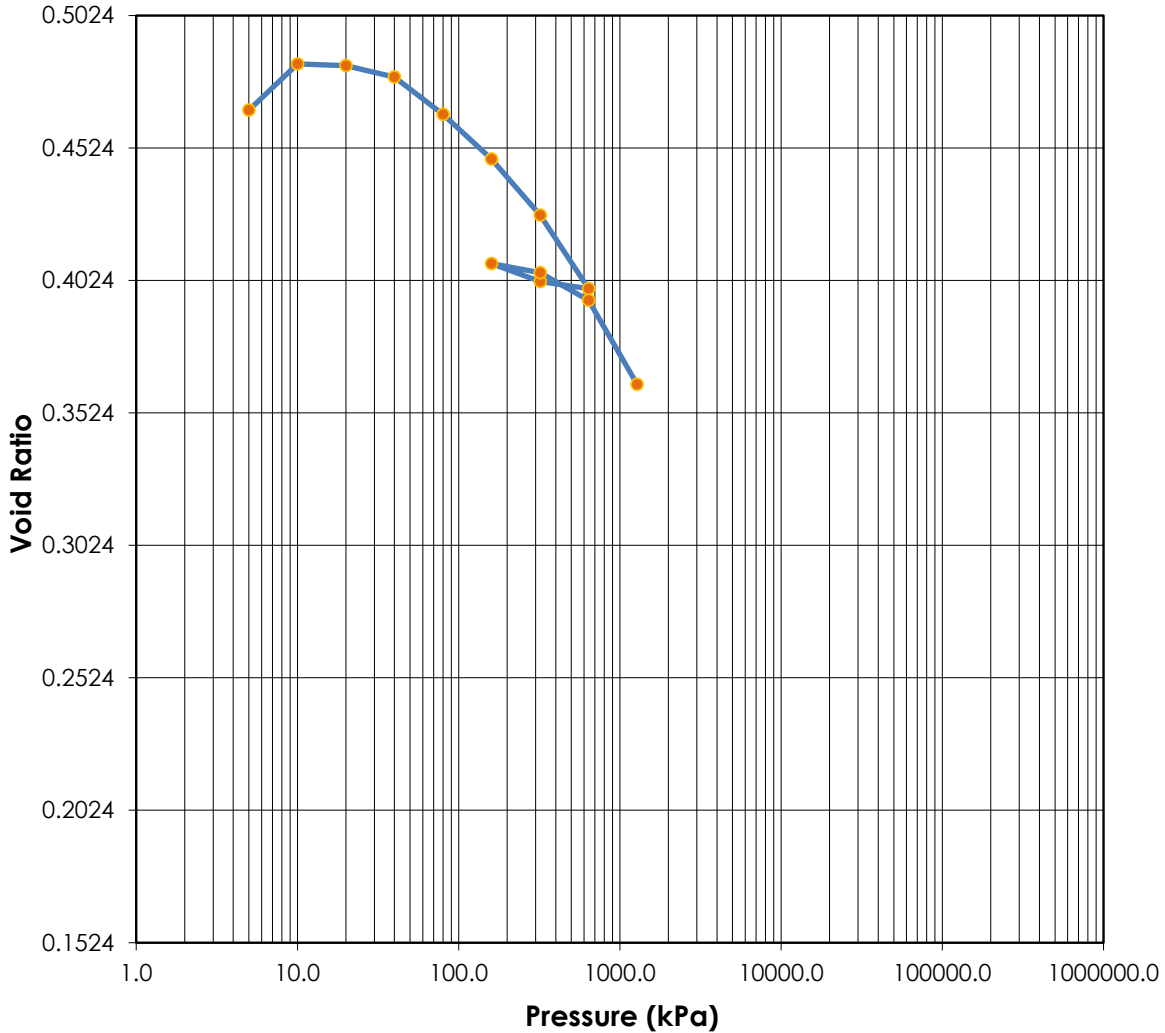
Consolidation Graph (Logarithmic Time)





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One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876



	Before	After	Liquid Limits:	37	Test Date:	07-Nov-18
Moisture (%):	15.4	16.5	Plastic Limits:	15		
Dry Density (g/cm³):	1.803	2.045	Plasticity Index (%):	22		
Saturation (%):	87	100				
Void Ratio:	0.4665	0.3629	Specific Gravity:	2.65	Assumed	
Soil Description:	Clay (Cl), Some Sand, Some Gravel					
Project Number:	110773396	Depth:	4.05-4.5m			
Sample Number:	LLO17A ST9	Boring Number:				
Project:	SRI 2018 Investigation					Remarks:
Client:	Alberta Transportation					
Location:						

Tested By: E. Wahl

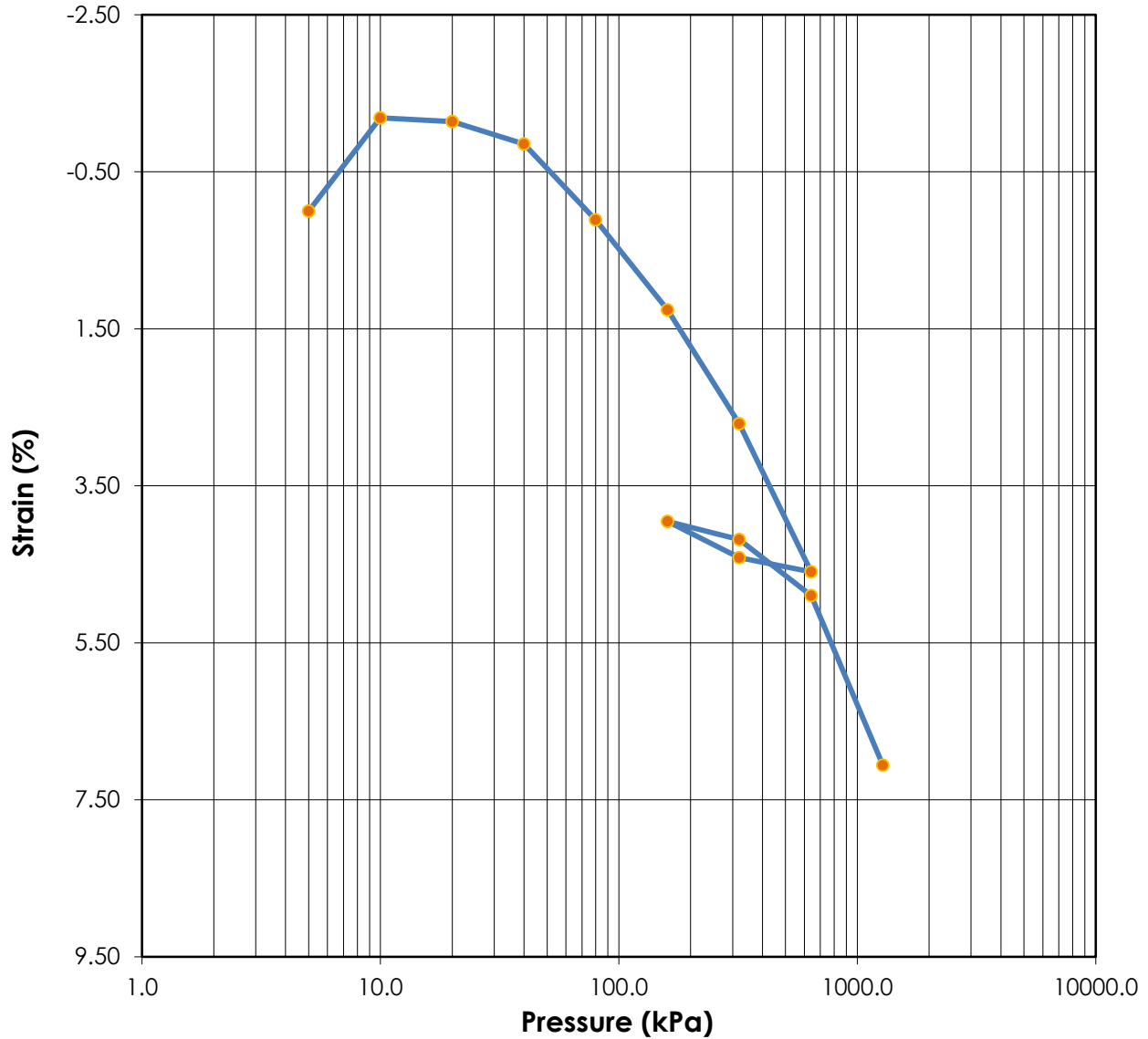
Reviewed By: C. Lamoureux

Reporting of these test results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request. The data presented above is for the sole use of the client stipulated above. Stantec is not responsible, nor can be held liable, for the use of this report by any other party, with or without the knowledge of Stantec.



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876

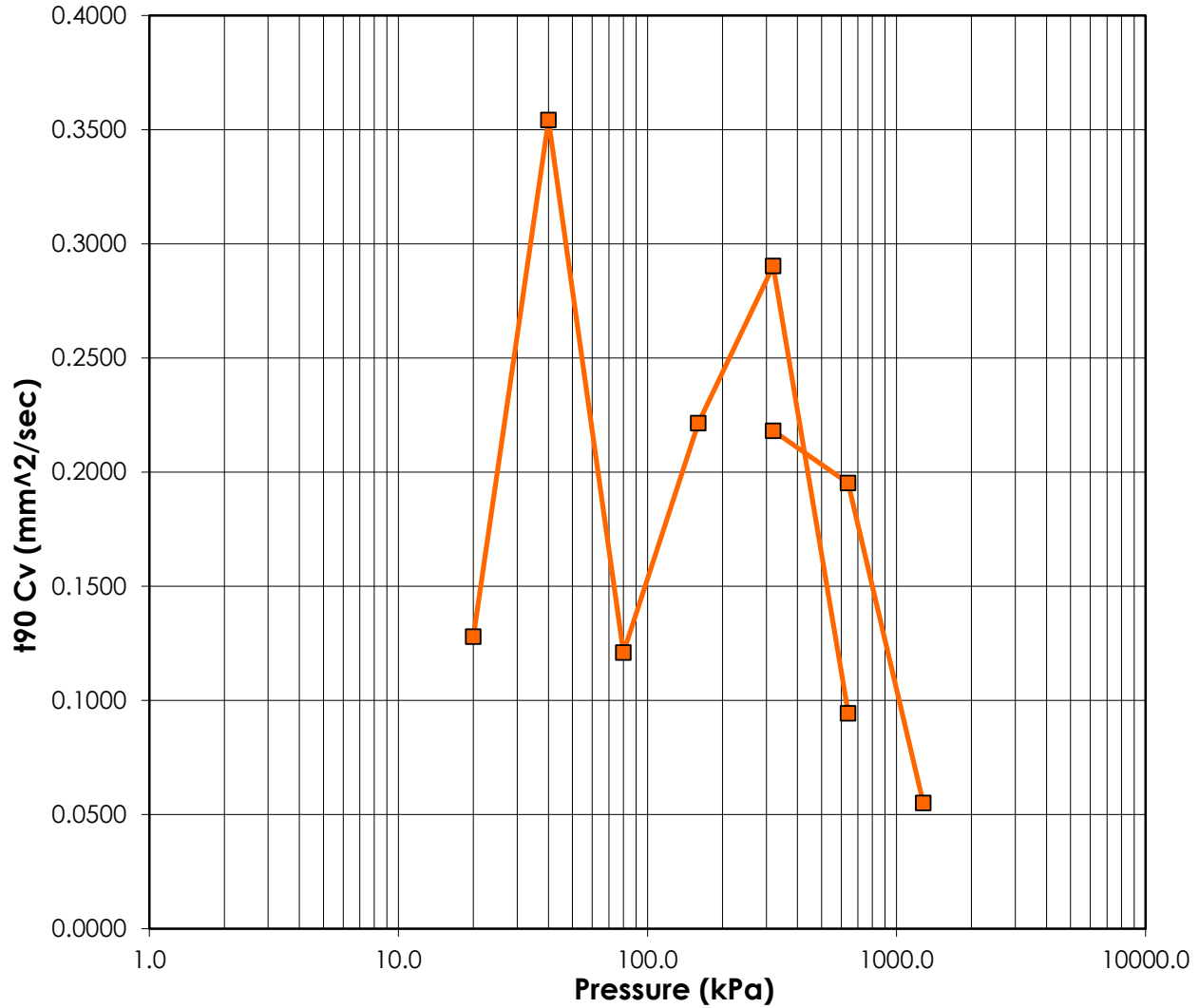


	Before	After	Liquid Limits:	37	Test Date:	07-Nov-18
Moisture (%):	15.4	16.5	Plastic Limits:	15		
Dry Density (g/cm3):	1.803	2.045	Plasticity Index (%):	22		
Saturation (%):	87	100	Specific Gravity:	2.65	Assumed	
Void Ratio:	0.4665	0.3629				
Sample Description:	Clay (Cl), Some Sand, Some Gravel					
Project Number:	110773396	Depth:	4.05-4.5m			
Sample Number:	LLO17A ST9	Boring Number:				
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						
			Remarks:			



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876



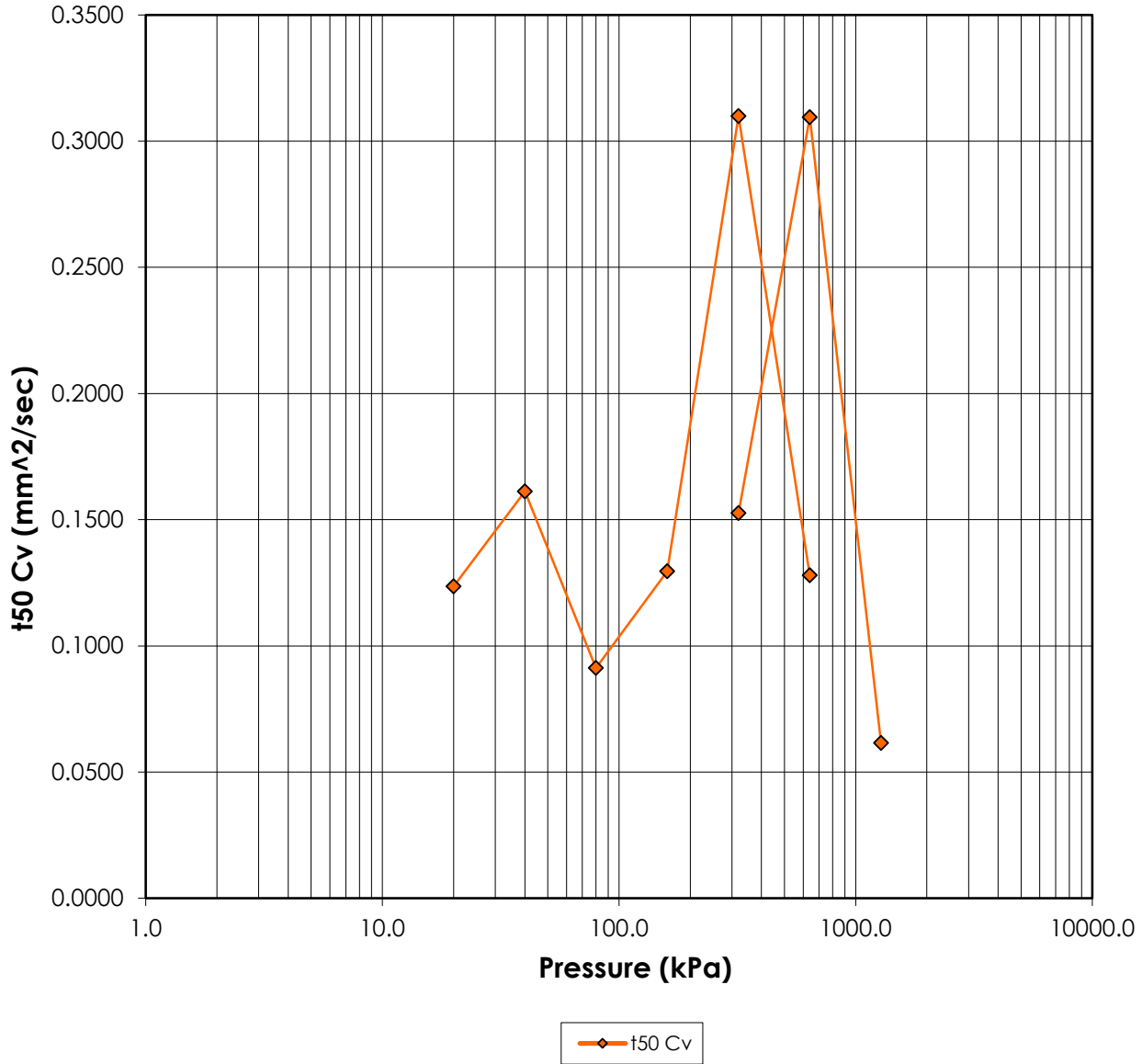
—■— $t_{90} C_v$

	Before	After	Liquid Limits:	37	Test Date:	07-Nov-18
Moisture (%):	15.4	16.5	Plastic Limits:	15		
Dry Density (g/cm³):	1.803	2.045	Plasticity Index (%):	22		
Saturation (%):	87	100				
Void Ratio:	0.4665	0.3629	Specific Gravity:	2.65	Assumed	
Soil Description:	Clay (Cl), Some Sand, Some Gravel					
Project Number:	110773396		Depth:	4.05-4.5m		
Sample Number:	LLO17A ST9		Boring Number:			
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						
	Remarks:					



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

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 Tel: (403) 253-7876

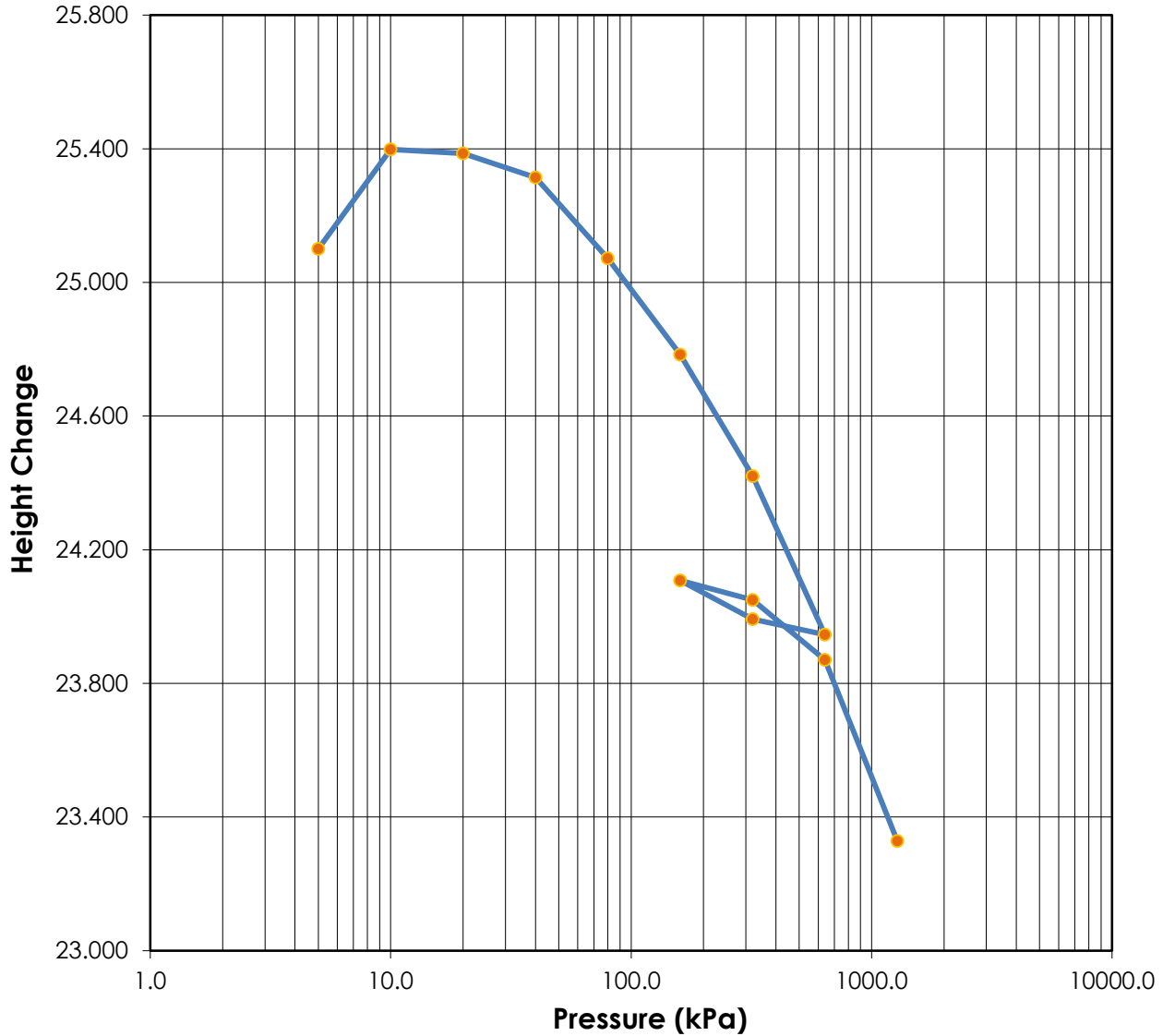


	Before	After	Liquid Limits:	37	Test Date:	07-Nov-18
Moisture (%):	15.4	16.5	Plastic Limits:	15		
Dry Density (g/cm³):	1.803	2.045	Plasticity Index (%):	22		
Saturation (%):	87	100				
Void Ratio:	0.4665	0.3629	Specific Gravity:	2.65	Assumed	
Soil Description:	Clay (Cl), Some Sand, Some Gravel					
Project Number:	110773396		Depth:	4.05-4.5m	Remarks:	
Sample Number:	LLO17A ST9		Boring Number:			
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

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	Before	After	Liquid Limits:	37	Test Date:	07-Nov-18
Moisture (%):	15.4	16.5	Plastic Limits:	15		
Dry Density (g/cm3):	1.803	2.045	Plasticity Index (%):	22		
Saturation (%):	87	100	Specific Gravity:	2.65	Assumed	
Void Ratio:	0.4665	0.3629				
Soil Description:	Clay (Cl), Some Sand, Some Gravel					
Project Number:	110773396	Depth:	4.05-4.5m			
Sample Number:	LLO17A ST9	Boring Number:				
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						
			Remarks:			

Consolidation Test Results Summary

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Sample Number: LLO17A ST9

Sample Description:

Boring Number:

Clay (Cl), Some Sand, Some Gravel

Depth: 4.05-4.5m

Remarks:

Test Number:

Sample Type: Undisturbed

Test Date: 07-Nov-18

Index	Load Sequence (kPa)	Cumulative Change in Height (mm)	Specimen Height (mm)	Height of Void (mm)	Vertical Strain (%)	Void Ratio	t90 Fitting Time (min)	t50 Fitting Time (min)	t90 Cv (mm ² /sec)	t50 Cv (mm ² /sec)
0	0.000	0.0000	25.1000	7.9872	0.00	0.4667	0.000	0.000	0.000	0.000
1	5.000	0.0000	25.1000	7.9872	0.00	0.4667	0.000	0.000	0.000	0.000
2	10.000	-0.2980	25.3980	8.2852	-1.19	0.4842	0.000	0.000	0.000	0.000
3	20.000	-0.2860	25.3860	8.2732	-1.14	0.4835	17.807	4.282	0.128	0.124
4	40.000	-0.2140	25.3140	8.2012	-0.85	0.4792	6.393	3.264	0.354	0.161
5	80.000	0.0280	25.0720	7.9592	0.11	0.4651	18.361	5.658	0.121	0.091
6	160.000	0.3160	24.7840	7.6712	1.26	0.4483	9.802	3.893	0.221	0.130
7	320.000	0.6800	24.4200	7.3072	2.71	0.4270	7.259	1.579	0.290	0.310
8	640.000	1.1540	23.9460	6.8332	4.60	0.3993	21.469	3.679	0.094	0.128
9	320.000	1.1080	23.9920	6.8792	4.41	0.4020	0.000	0.000	0.000	0.000
10	160.000	0.9920	24.1080	6.9952	3.95	0.4088	0.000	0.000	0.000	0.000
11	320.000	1.0500	24.0500	6.9372	4.18	0.4054	9.371	3.111	0.218	0.153
12	640.000	1.2300	23.8700	6.7572	4.90	0.3949	10.315	1.511	0.195	0.310
13	1280.000	1.7720	23.3280	6.2152	7.06	0.3632	34.889	7.261	0.055	0.062

Predicted value indicated with *

Consolidation Test Consolidation Specimen Information

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 07-Nov-18

Sample Number: LLO17A ST9

Sample Description:

Boring Number:

Clay (Cl), Some Sand, Some Gravel

Depth: 4.05-4.5m

Remarks:

Sample Type: Undisturbed

Test Number:

Liquid Limit: 37

Initial Void Ratio: 0.4665

Initial Height (mm): 25.10

Plastic Limit: 15

Plasticity Index (%): 22

Initial Diameter (mm): 60.00

Specific Gravity: 2.65

Weight of Ring (g): 1904.10

Assumed

Parameters	Initial Specimen	Final Specimen
Moist Weight + Container (g)	118.73	151.21
Dry Soil + Container (g)	103.42	130.34
Weight of Container (g)	4.00	4.11
Moisture Content (%)	15.4	16.5
Void Ratio	0.4665	0.3629
Saturation (%)	87	100
Dry Density (g/cm ³)	1.803	2.045

**Consolidation Test Results
(Sequence 1) Load 5.000 kPa**

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 07-Nov-18

Test Number:

Sample Number: LLO17A ST9

Soil Description:

Boring Number:

Clay (Cl), Some Sand, Some Gravel

Depth: 4.05-4.5m

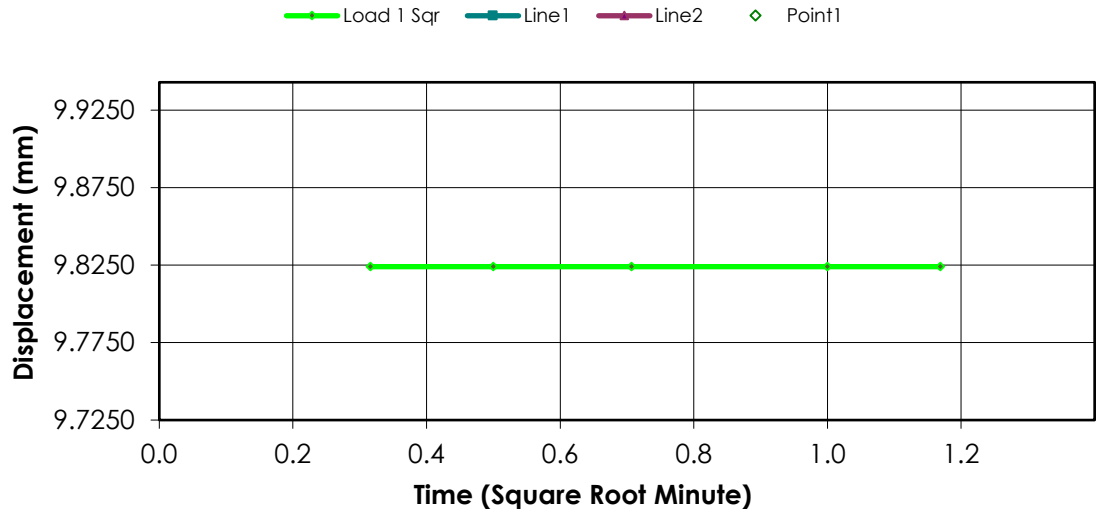
Remarks:

Sample Type: Undisturbed

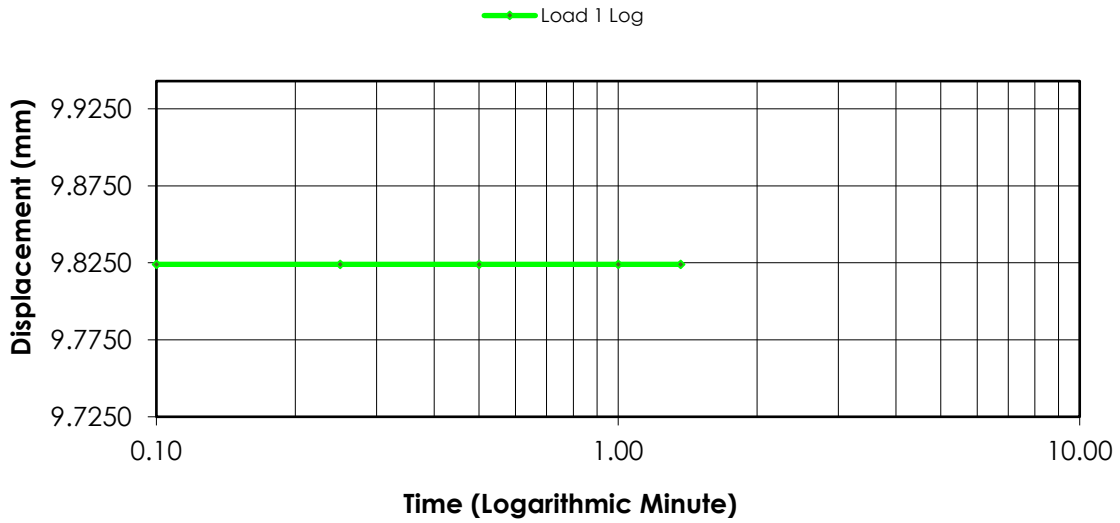
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	9.8240	0.0000	0.0000	0.4665
1	00:00:06	9.8240	0.0000	0.0000	0.4665
2	00:00:15	9.8240	0.0000	0.0000	0.4665
3	00:00:30	9.8240	0.0000	0.0000	0.4665
4	00:01:00	9.8240	0.0000	0.0000	0.4665
5	00:01:22	9.8240	0.0000	0.0000	0.4665

Consolidation Test Results (Sequence 1) Load 5.000 kPa

Consolidation Graph (Square-root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 2) Load 10.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 07-Nov-18

Test Number:

Sample Number: LLO17A ST9

Soil Description:

Boring Number:

Clay (Cl), Some Sand, Some Gravel

Depth: 4.05-4.5m

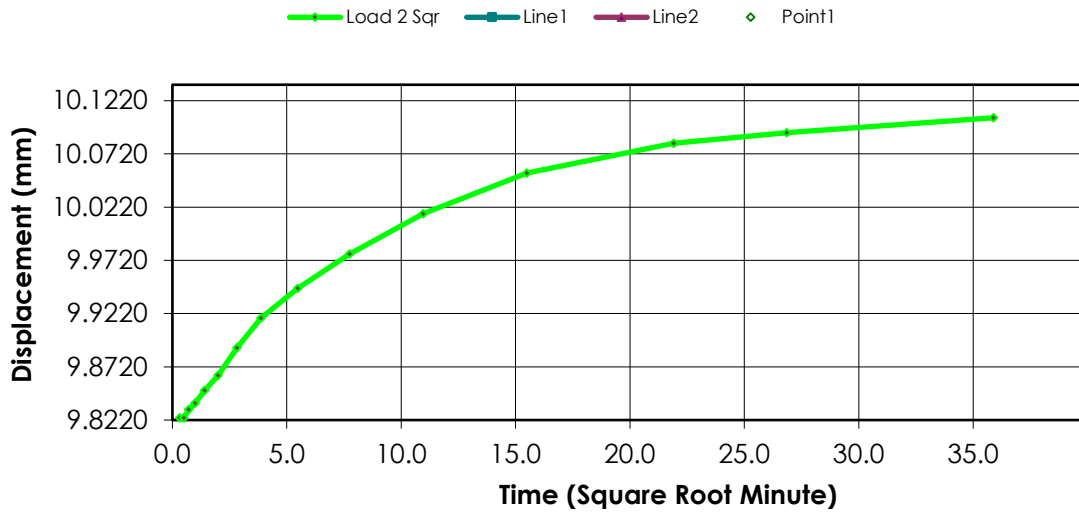
Remarks:

Sample Type: Undisturbed

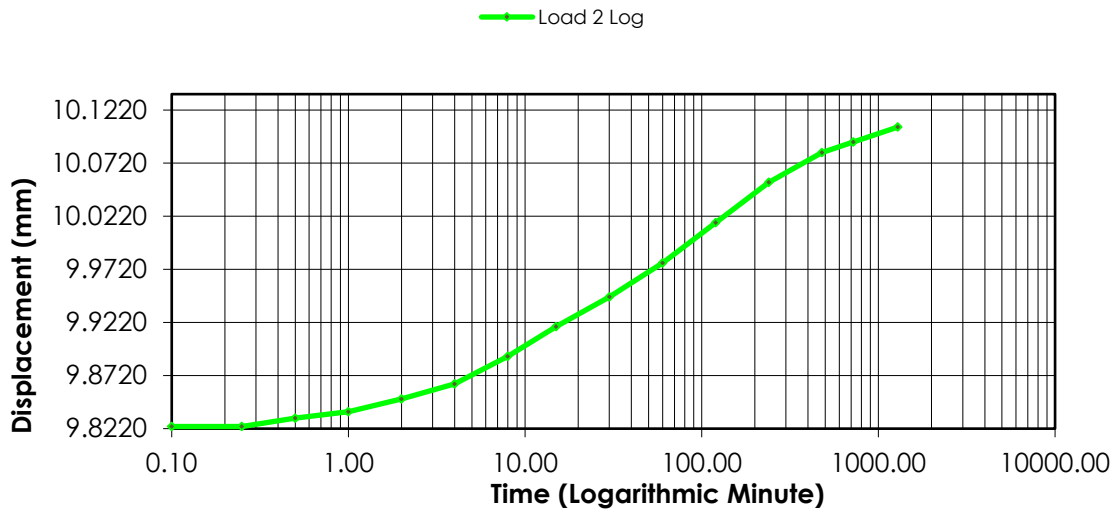
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	9.8240	0.0000	0.0000	0.4665
1	00:00:06	9.8240	-0.0160	-0.0637	0.4674
2	00:00:15	9.8240	-0.0160	-0.0637	0.4674
3	00:00:30	9.8320	-0.0240	-0.0956	0.4679
4	00:01:00	9.8380	-0.0300	-0.1195	0.4682
5	00:02:00	9.8500	-0.0420	-0.1673	0.4689
6	00:04:00	9.8640	-0.0560	-0.2231	0.4698
7	00:08:00	9.8900	-0.0820	-0.3267	0.4713
8	00:15:01	9.9180	-0.1100	-0.4382	0.4729
9	00:30:02	9.9460	-0.1380	-0.5498	0.4745
10	01:00:05	9.9780	-0.1700	-0.6773	0.4764
11	02:00:10	10.0160	-0.2080	-0.8287	0.4786
12	04:00:20	10.0540	-0.2460	-0.9801	0.4809
13	08:00:39	10.0820	-0.2740	-1.0916	0.4825
14	12:00:59	10.0920	-0.2840	-1.1315	0.4831
15	21:28:13	10.1060	-0.2980	-1.1873	0.4839

**Consolidation Test Results
(Sequence 2) Load 10.000 kPa**

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 3) Load 20.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 07-Nov-18

Test Number:

Sample Number: LLO17A ST9

Soil Description:

Boring Number:

Clay (Cl), Some Sand, Some Gravel

Depth: 4.05-4.5m

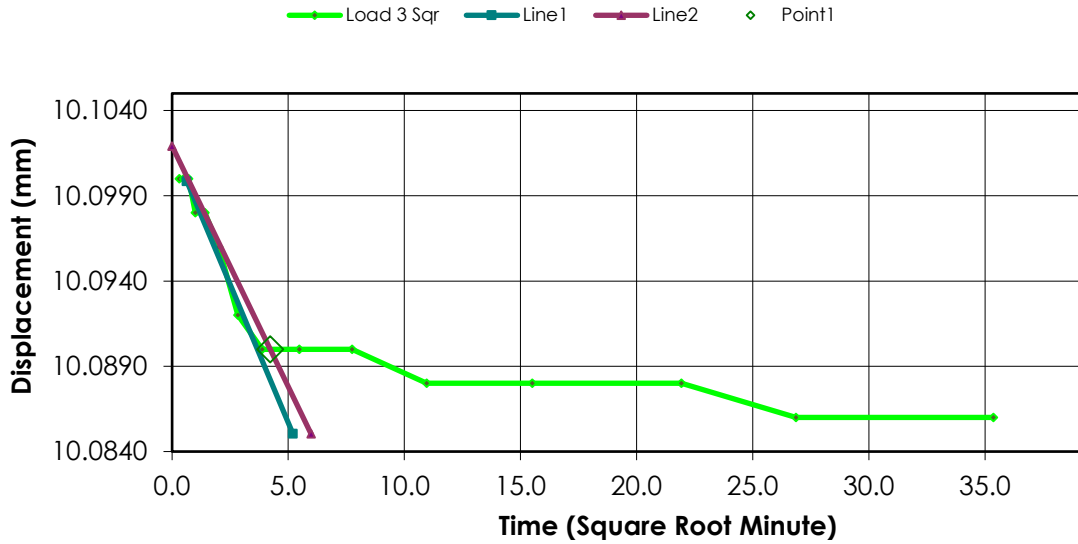
Remarks:

Sample Type: Undisturbed

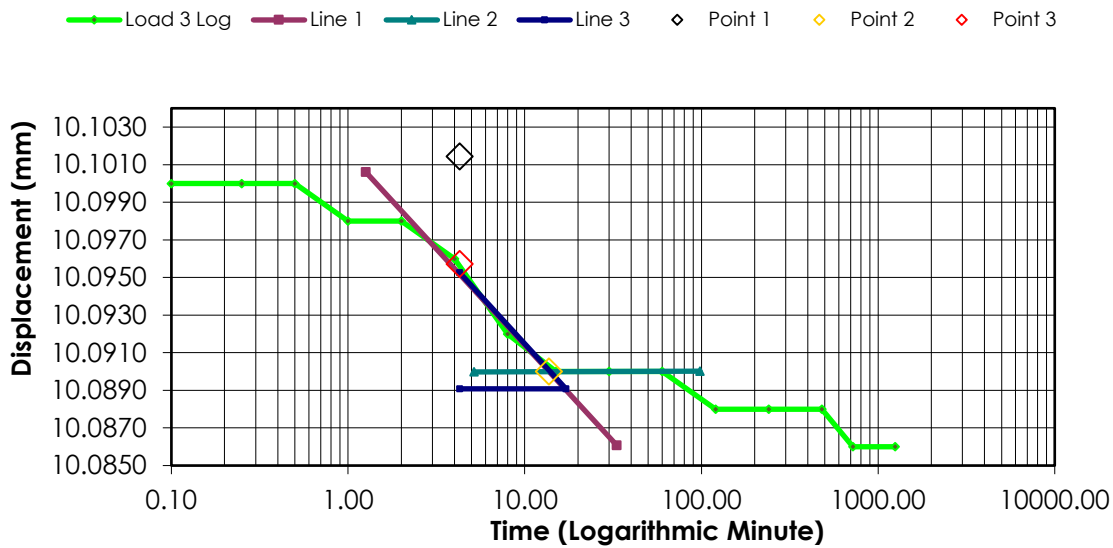
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	10.1060	-0.2980	-1.1873	0.4839
1	00:00:06	10.1000	-0.3000	-1.1952	0.4840
2	00:00:15	10.1000	-0.3000	-1.1952	0.4840
3	00:00:30	10.1000	-0.3000	-1.1952	0.4840
4	00:01:00	10.0980	-0.2980	-1.1873	0.4839
5	00:02:00	10.0980	-0.2980	-1.1873	0.4839
6	00:04:00	10.0960	-0.2960	-1.1793	0.4838
7	00:08:01	10.0920	-0.2920	-1.1633	0.4835
8	00:15:01	10.0900	-0.2900	-1.1554	0.4834
9	00:30:02	10.0900	-0.2900	-1.1554	0.4834
10	01:00:05	10.0900	-0.2900	-1.1554	0.4834
11	02:00:10	10.0880	-0.2880	-1.1474	0.4833
12	04:00:20	10.0880	-0.2880	-1.1474	0.4833
13	08:00:39	10.0880	-0.2880	-1.1474	0.4833
14	12:00:59	10.0860	-0.2860	-1.1394	0.4832
15	20:50:25	10.0860	-0.2860	-1.1394	0.4832

Consolidation Test Results (Sequence 3) Load 20.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



**Consolidation Test Results
(Sequence 4) Load 40.000 kPa**

Project: SR1 2018 Investigation
Location:
Job Number:

Project Number: 110773396

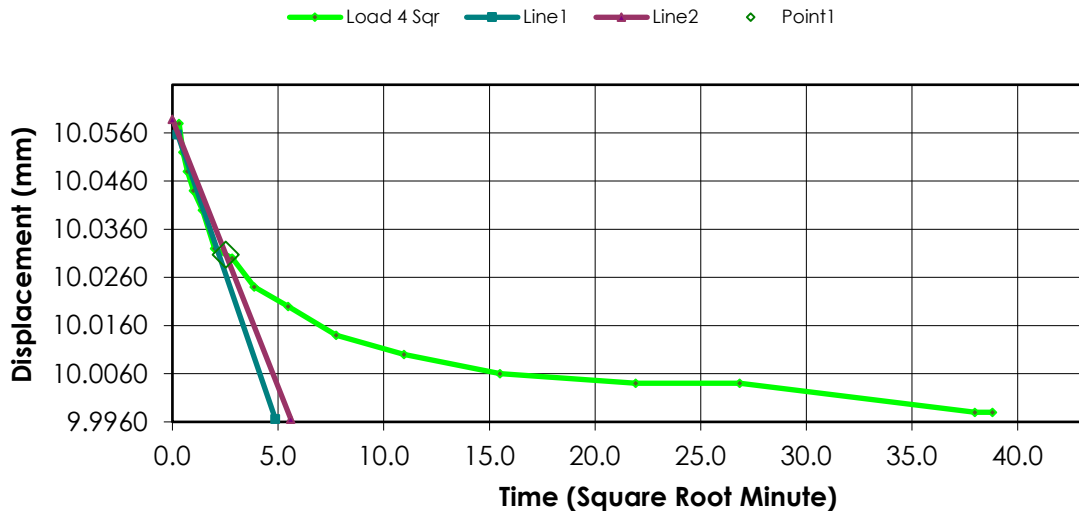
Test Date: 07-Nov-18
Test Number:

Sample Number: LLO17A ST9 **Soil Description:**
Boring Number: Clay (Cl), Some Sand, Some Gravel
Depth: 4.05-4.5m **Remarks:**
Sample Type: Undisturbed

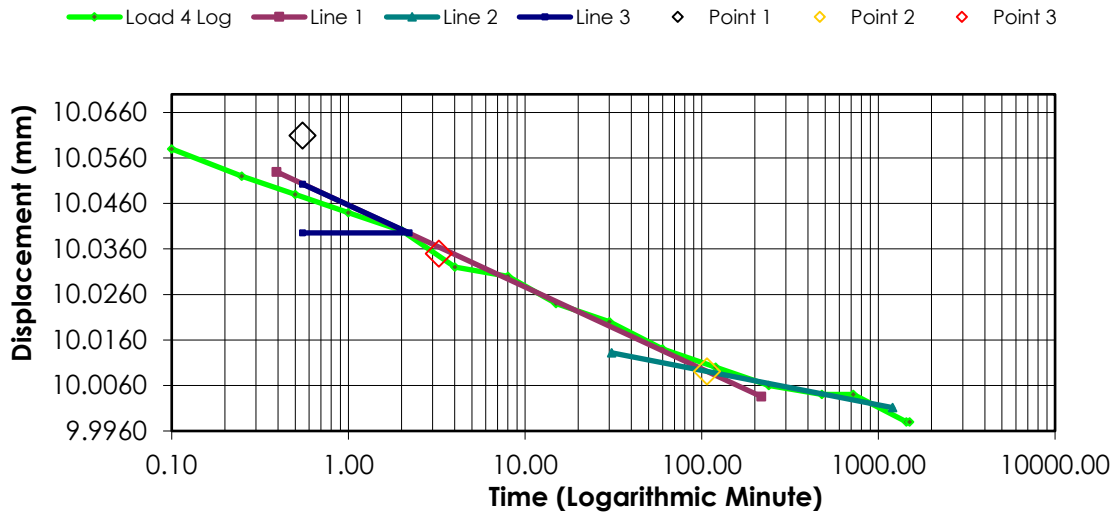
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	10.0860	-0.2860	-1.1394	0.4832
1	00:00:06	10.0580	-0.2740	-1.0916	0.4825
2	00:00:15	10.0520	-0.2680	-1.0677	0.4821
3	00:00:30	10.0480	-0.2640	-1.0518	0.4819
4	00:01:00	10.0440	-0.2600	-1.0359	0.4817
5	00:02:01	10.0400	-0.2560	-1.0199	0.4814
6	00:04:01	10.0320	-0.2480	-0.9880	0.4810
7	00:08:01	10.0300	-0.2460	-0.9801	0.4809
8	00:15:01	10.0240	-0.2400	-0.9562	0.4805
9	00:30:03	10.0200	-0.2360	-0.9402	0.4803
10	01:00:05	10.0140	-0.2300	-0.9163	0.4799
11	02:00:10	10.0100	-0.2260	-0.9004	0.4797
12	04:00:20	10.0060	-0.2220	-0.8845	0.4795
13	08:00:40	10.0040	-0.2200	-0.8765	0.4793
14	12:01:00	10.0040	-0.2200	-0.8765	0.4793
15	24:01:58	9.9980	-0.2140	-0.8526	0.4790
16	25:06:05	9.9980	-0.2140	-0.8526	0.4790

Consolidation Test Results (Sequence 4) Load 40.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



**Consolidation Test Results
(Sequence 5) Load 80.000 kPa**

Project: SR1 2018 Investigation
Location:
Job Number:

Project Number: 110773396

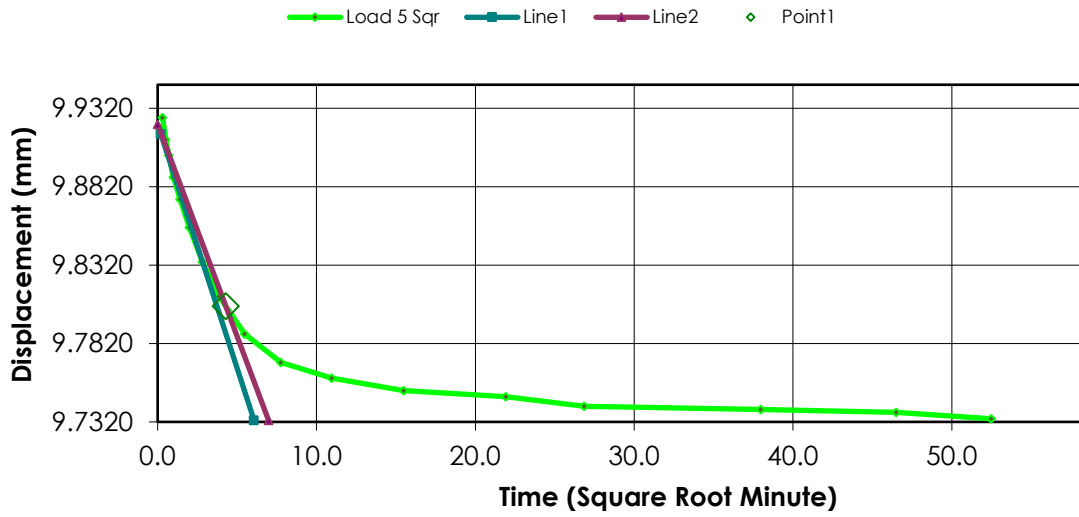
Test Date: 07-Nov-18
Test Number:

Sample Number: LLO17A ST9 **Soil Description:**
Boring Number: Clay (Cl), Some Sand, Some Gravel
Depth: 4.05-4.5m **Remarks:**
Sample Type: Undisturbed

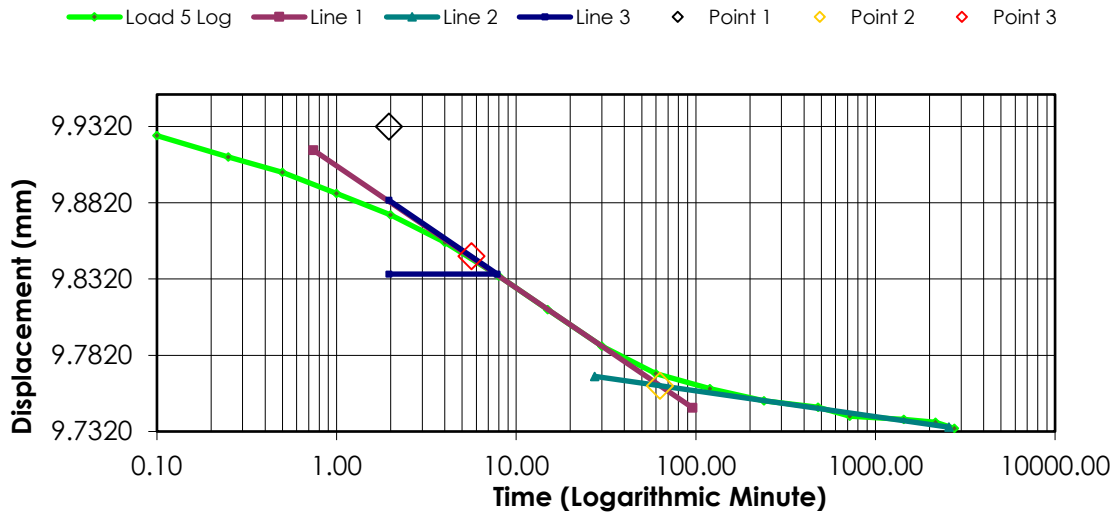
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	9.9980	-0.2140	-0.8526	0.4790
1	00:00:06	9.9260	-0.1640	-0.6534	0.4761
2	00:00:15	9.9120	-0.1500	-0.5976	0.4752
3	00:00:30	9.9020	-0.1400	-0.5578	0.4747
4	00:01:00	9.8880	-0.1260	-0.5020	0.4738
5	00:02:00	9.8740	-0.1120	-0.4462	0.4730
6	00:04:01	9.8560	-0.0940	-0.3745	0.4720
7	00:08:01	9.8340	-0.0720	-0.2869	0.4707
8	00:15:01	9.8120	-0.0500	-0.1992	0.4694
9	00:30:03	9.7880	-0.0260	-0.1036	0.4680
10	01:00:05	9.7700	-0.0080	-0.0319	0.4669
11	02:00:10	9.7600	0.0020	0.0080	0.4664
12	04:00:20	9.7520	0.0100	0.0398	0.4659
13	08:00:40	9.7480	0.0140	0.0558	0.4657
14	12:00:59	9.7420	0.0200	0.0797	0.4653
15	24:01:59	9.7400	0.0220	0.0876	0.4652
16	36:02:58	9.7380	0.0240	0.0956	0.4651
17	45:54:57	9.7340	0.0280	0.1116	0.4648

Consolidation Test Results (Sequence 5) Load 80.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 6) Load 160.000 kPa

Project: SR1 2018 Investigation
Location:
Job Number:

Project Number: 110773396

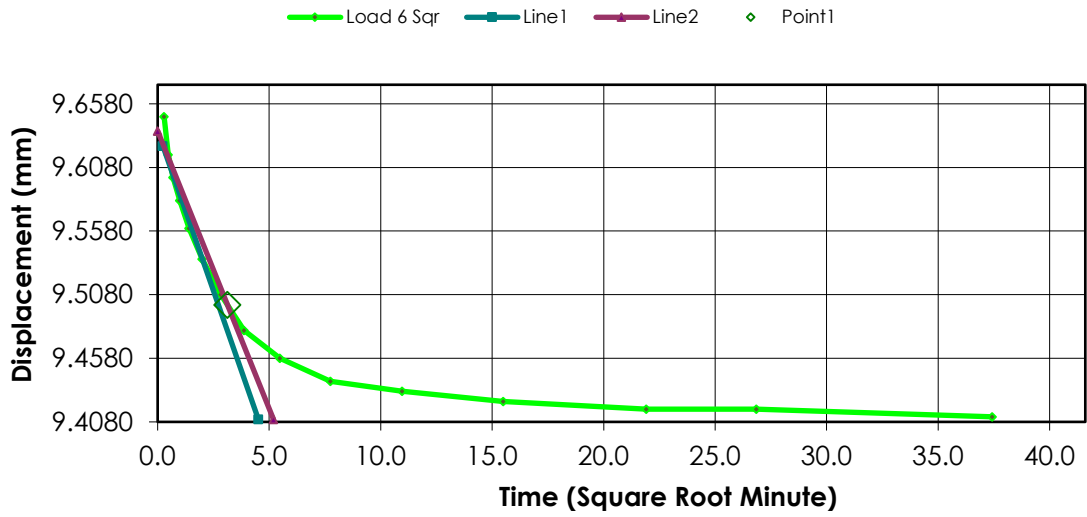
Test Date: 07-Nov-18
Test Number:

Sample Number: LLO17A ST9 **Soil Description:**
Boring Number: Clay (Cl), Some Sand, Some Gravel
Depth: 4.05-4.5m **Remarks:**
Sample Type: Undisturbed

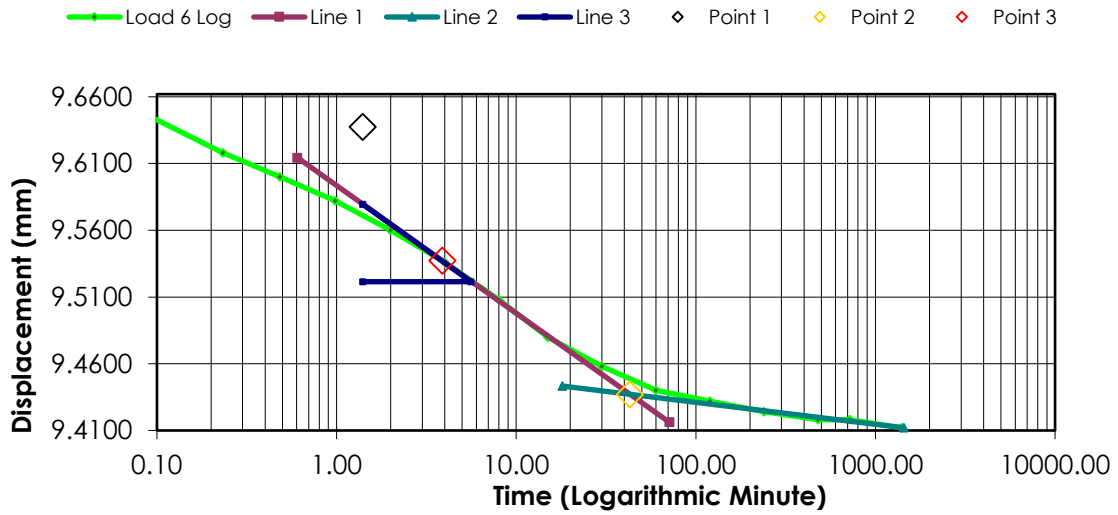
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	9.7340	0.0280	0.1116	0.4648
1	00:00:05	9.6480	0.0800	0.3187	0.4618
2	00:00:14	9.6180	0.1100	0.4382	0.4601
3	00:00:29	9.6000	0.1280	0.5100	0.4590
4	00:00:59	9.5820	0.1460	0.5817	0.4579
5	00:02:00	9.5600	0.1680	0.6693	0.4567
6	00:04:00	9.5360	0.1920	0.7649	0.4553
7	00:08:00	9.5080	0.2200	0.8765	0.4536
8	00:15:01	9.4800	0.2480	0.9880	0.4520
9	00:30:02	9.4580	0.2700	1.0757	0.4507
10	01:00:04	9.4400	0.2880	1.1474	0.4497
11	02:00:09	9.4320	0.2960	1.1793	0.4492
12	04:00:14	9.4240	0.3040	1.2112	0.4487
13	08:00:34	9.4180	0.3100	1.2351	0.4484
14	12:00:54	9.4180	0.3100	1.2351	0.4484
15	23:21:10	9.4120	0.3160	1.2590	0.4480

Consolidation Test Results (Sequence 6) Load 160.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 7) Load 320.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 07-Nov-18

Test Number:

Sample Number: LLO17A ST9

Soil Description:

Boring Number:

Clay (Cl), Some Sand, Some Gravel

Depth: 4.05-4.5m

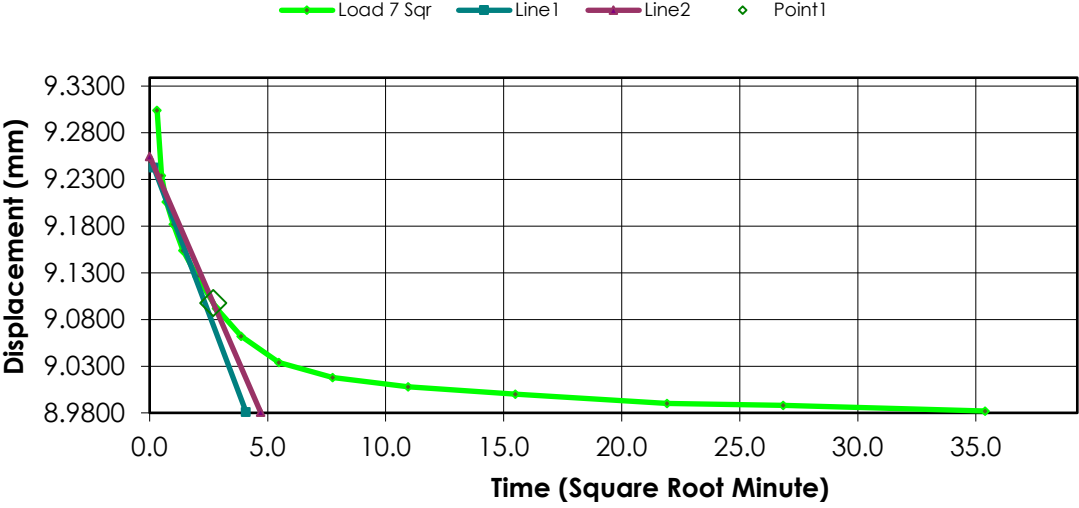
Remarks:

Sample Type: Undisturbed

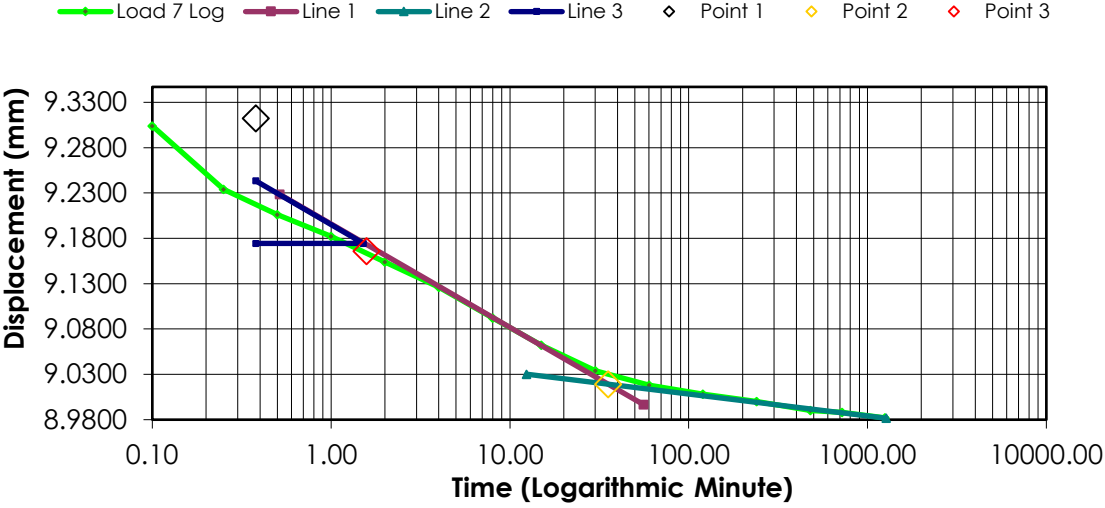
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	9.4120	0.3160	1.2590	0.4480
1	00:00:06	9.3040	0.3580	1.4263	0.4456
2	00:00:15	9.2340	0.4280	1.7052	0.4415
3	00:00:30	9.2060	0.4560	1.8167	0.4398
4	00:01:00	9.1820	0.4800	1.9124	0.4384
5	00:02:00	9.1540	0.5080	2.0239	0.4368
6	00:04:01	9.1260	0.5360	2.1355	0.4352
7	00:08:01	9.0920	0.5700	2.2709	0.4332
8	00:15:01	9.0620	0.6000	2.3904	0.4314
9	00:30:03	9.0340	0.6280	2.5020	0.4298
10	01:00:05	9.0180	0.6440	2.5657	0.4289
11	02:00:10	9.0080	0.6540	2.6056	0.4283
12	04:00:20	9.0000	0.6620	2.6374	0.4278
13	08:00:40	8.9900	0.6720	2.6773	0.4272
14	12:01:00	8.9880	0.6740	2.6853	0.4271
15	20:52:43	8.9820	0.6800	2.7092	0.4268

Consolidation Test Results (Sequence 7) Load 320.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 8) Load 640.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 07-Nov-18

Test Number:

Sample Number: LLO17A ST9

Soil Description:

Boring Number:

Clay (Cl), Some Sand, Some Gravel

Depth: 4.05-4.5m

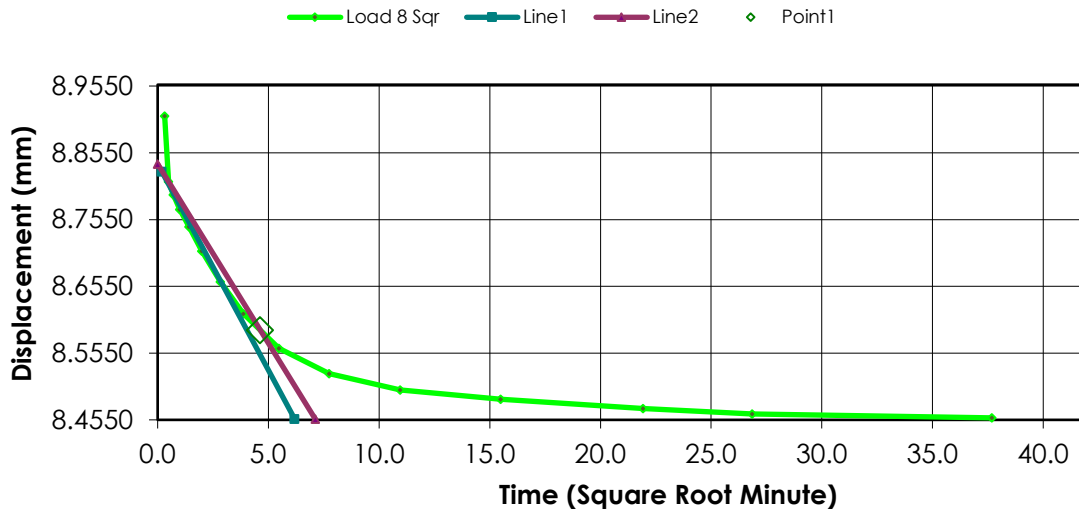
Remarks:

Sample Type: Undisturbed

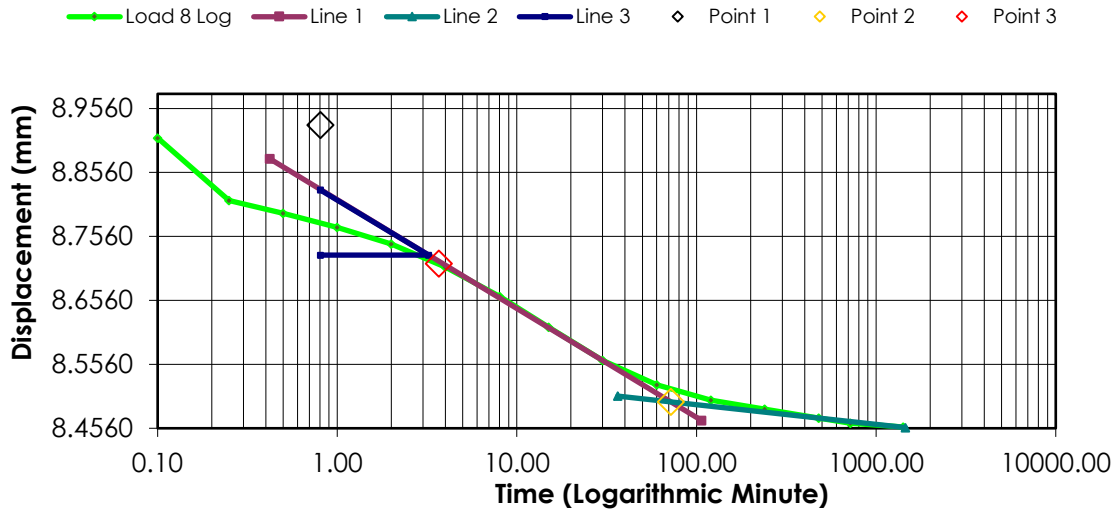
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.9820	0.6800	2.7092	0.4268
1	00:00:06	8.9100	0.7020	2.7968	0.4255
2	00:00:15	8.8120	0.8000	3.1873	0.4197
3	00:00:30	8.7920	0.8200	3.2669	0.4186
4	00:01:00	8.7700	0.8420	3.3546	0.4173
5	00:02:00	8.7440	0.8680	3.4582	0.4158
6	00:04:00	8.7080	0.9040	3.6016	0.4137
7	00:08:01	8.6620	0.9500	3.7849	0.4110
8	00:15:01	8.6140	0.9980	3.9761	0.4082
9	00:30:02	8.5620	1.0500	4.1833	0.4051
10	01:00:05	8.5240	1.0880	4.3347	0.4029
11	02:00:10	8.5000	1.1120	4.4303	0.4015
12	04:00:19	8.4860	1.1260	4.4861	0.4007
13	08:00:39	8.4720	1.1400	4.5418	0.3999
14	12:00:59	8.4640	1.1480	4.5737	0.3994
15	23:39:41	8.4580	1.1540	4.5976	0.3991

Consolidation Test Results (Sequence 8) Load 640.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 9) Rebound 320.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 07-Nov-18

Test Number:

Sample Number: LLO17A ST9

Soil Description:

Boring Number:

Clay (Cl), Some Sand, Some Gravel

Depth: 4.05-4.5m

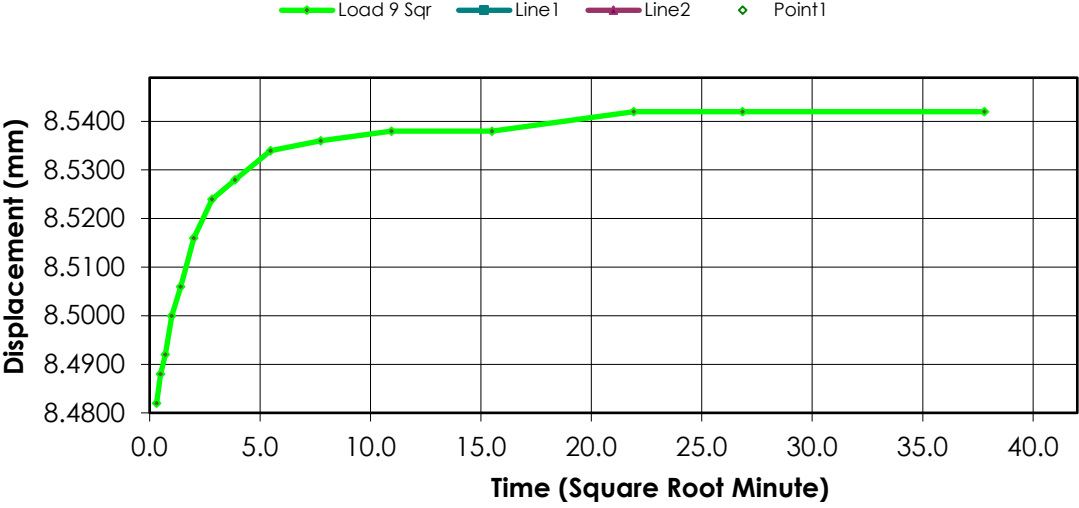
Remarks:

Sample Type: Undisturbed

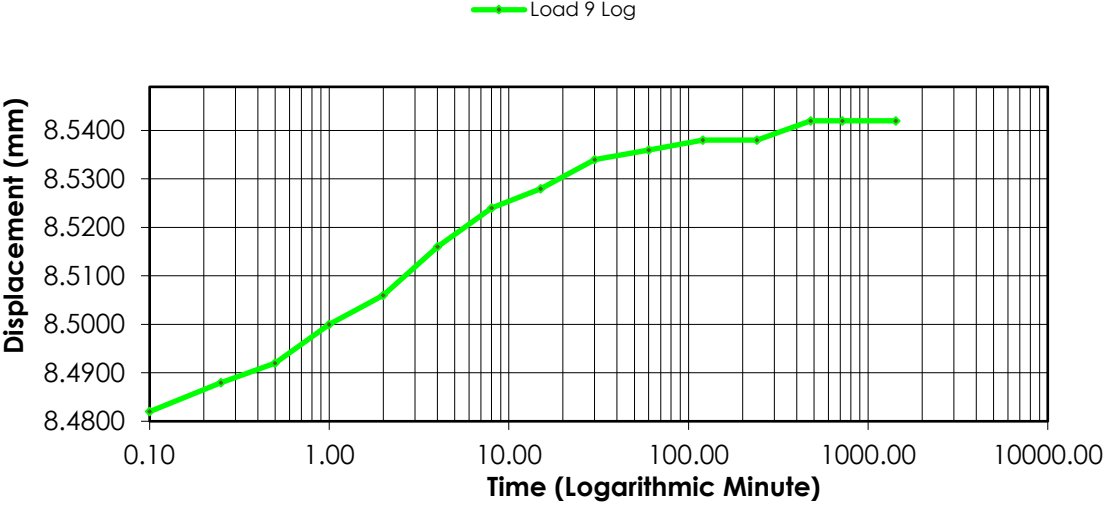
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.4580	1.1540	4.5976	0.3991
1	00:00:06	8.4820	1.1680	4.6534	0.3982
2	00:00:15	8.4880	1.1620	4.6295	0.3986
3	00:00:30	8.4920	1.1580	4.6135	0.3988
4	00:01:00	8.5000	1.1500	4.5817	0.3993
5	00:02:00	8.5060	1.1440	4.5578	0.3996
6	00:04:01	8.5160	1.1340	4.5179	0.4002
7	00:08:01	8.5240	1.1260	4.4861	0.4007
8	00:15:01	8.5280	1.1220	4.4701	0.4009
9	00:30:03	8.5340	1.1160	4.4462	0.4013
10	01:00:05	8.5360	1.1140	4.4382	0.4014
11	02:00:10	8.5380	1.1120	4.4303	0.4015
12	04:00:20	8.5380	1.1120	4.4303	0.4015
13	08:00:40	8.5420	1.1080	4.4143	0.4017
14	12:00:59	8.5420	1.1080	4.4143	0.4017
15	23:49:12	8.5420	1.1080	4.4143	0.4017

Consolidation Test Results (Sequence 9) Rebound 320.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 10) Rebound 160.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 07-Nov-18

Test Number:

Sample Number: LLO17A ST9

Soil Description:

Boring Number:

Clay (Cl), Some Sand, Some Gravel

Depth: 4.05-4.5m

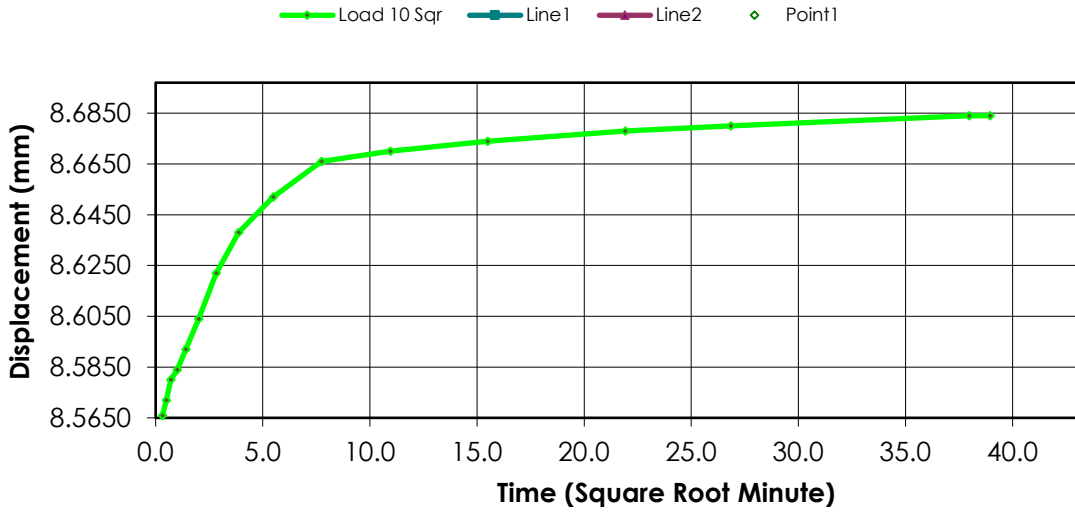
Remarks:

Sample Type: Undisturbed

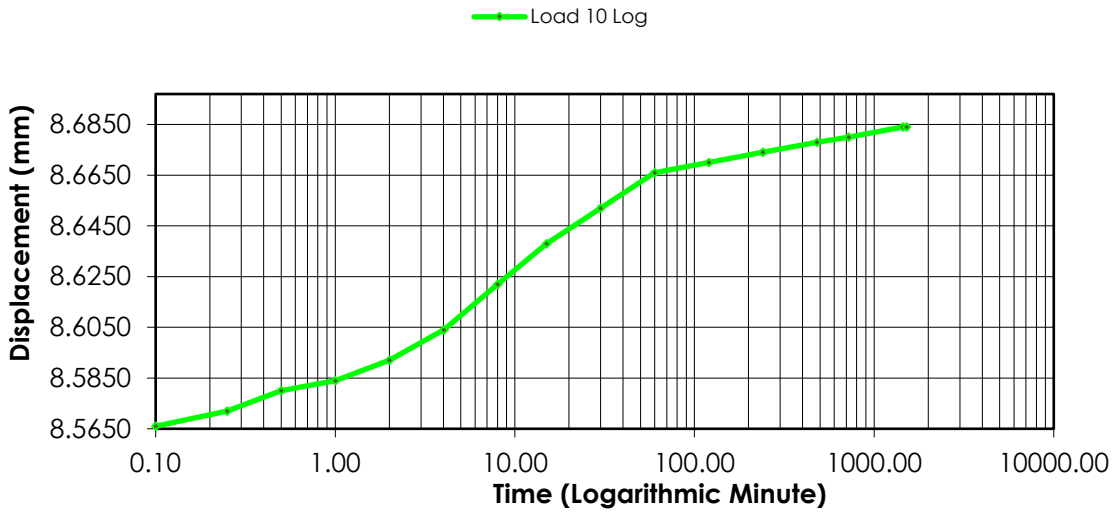
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.5420	1.1080	4.4143	0.4017
1	00:00:06	8.5660	1.1100	4.4223	0.4016
2	00:00:15	8.5720	1.1040	4.3984	0.4020
3	00:00:30	8.5800	1.0960	4.3665	0.4024
4	00:01:00	8.5840	1.0920	4.3506	0.4027
5	00:02:00	8.5920	1.0840	4.3187	0.4031
6	00:04:01	8.6040	1.0720	4.2709	0.4038
7	00:08:01	8.6220	1.0540	4.1992	0.4049
8	00:15:01	8.6380	1.0380	4.1355	0.4058
9	00:30:03	8.6520	1.0240	4.0797	0.4067
10	01:00:05	8.6660	1.0100	4.0239	0.4075
11	02:00:10	8.6700	1.0060	4.0080	0.4077
12	04:00:20	8.6740	1.0020	3.9920	0.4079
13	08:00:39	8.6780	0.9980	3.9761	0.4082
14	12:00:59	8.6800	0.9960	3.9681	0.4083
15	24:01:59	8.6840	0.9920	3.9522	0.4085
16	25:16:20	8.6840	0.9920	3.9522	0.4085

Consolidation Test Results
(Sequence 10) Rebound 160.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 11) Load 320.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 07-Nov-18

Test Number:

Sample Number: LLO17A ST9

Soil Description:

Boring Number:

Clay (Cl), Some Sand, Some Gravel

Depth: 4.05-4.5m

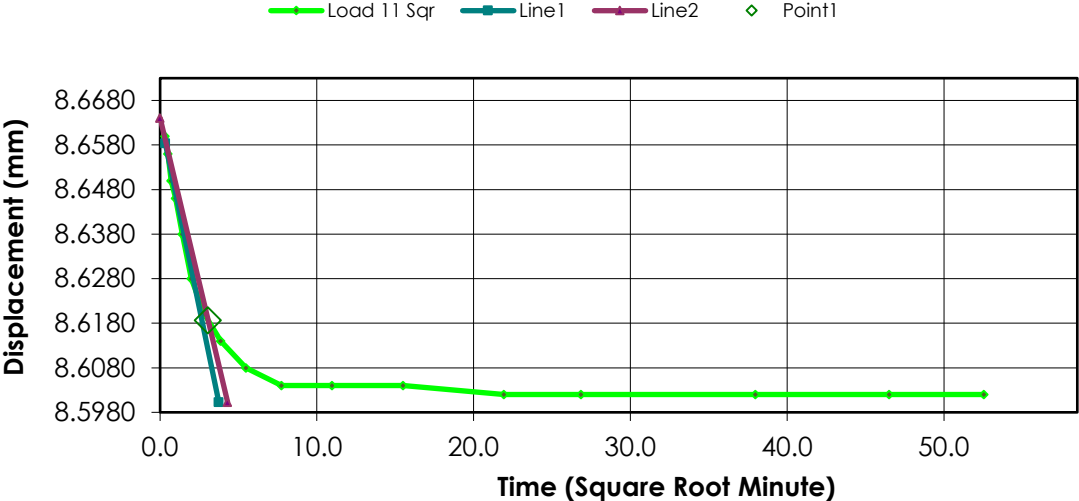
Remarks:

Sample Type: Undisturbed

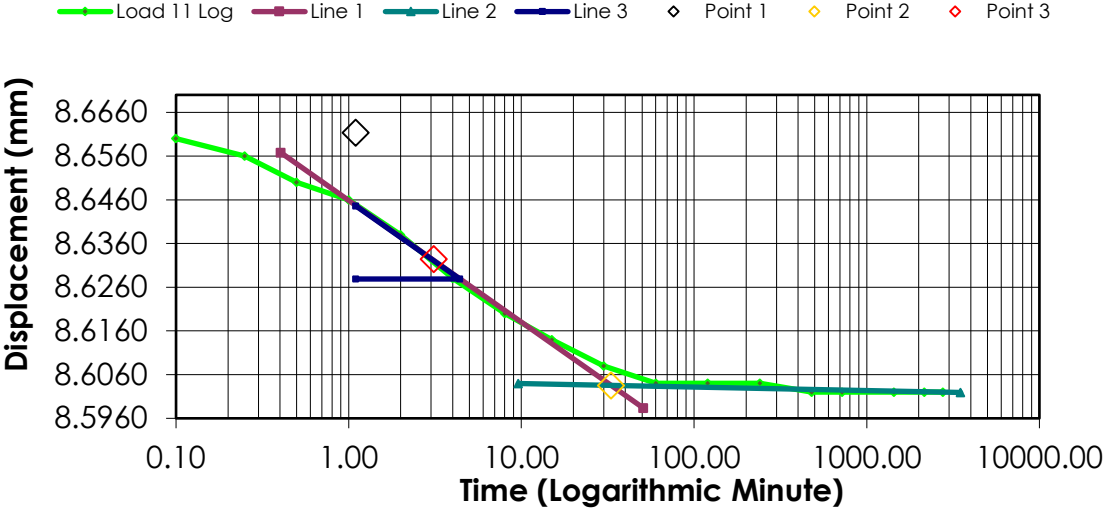
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.6840	0.9920	3.9522	0.4085
1	00:00:06	8.6600	0.9920	3.9522	0.4085
2	00:00:15	8.6560	0.9960	3.9681	0.4083
3	00:00:30	8.6500	1.0020	3.9920	0.4079
4	00:01:00	8.6460	1.0060	4.0080	0.4077
5	00:02:00	8.6380	1.0140	4.0398	0.4072
6	00:04:00	8.6280	1.0240	4.0797	0.4067
7	00:08:01	8.6200	1.0320	4.1116	0.4062
8	00:15:01	8.6140	1.0380	4.1355	0.4058
9	00:30:03	8.6080	1.0440	4.1594	0.4055
10	01:00:05	8.6040	1.0480	4.1753	0.4052
11	02:00:10	8.6040	1.0480	4.1753	0.4052
12	04:00:20	8.6040	1.0480	4.1753	0.4052
13	08:00:39	8.6020	1.0500	4.1833	0.4051
14	12:00:59	8.6020	1.0500	4.1833	0.4051
15	24:01:58	8.6020	1.0500	4.1833	0.4051
16	36:02:57	8.6020	1.0500	4.1833	0.4051
17	46:01:49	8.6020	1.0500	4.1833	0.4051

Consolidation Test Results (Sequence 11) Load 320.000 kPa

Consolidation Graph (Square Root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 12) Load 640.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 07-Nov-18

Test Number:

Sample Number: LLO17A ST9

Soil Description:

Boring Number:

Clay (Cl), Some Sand, Some Gravel

Depth: 4.05-4.5m

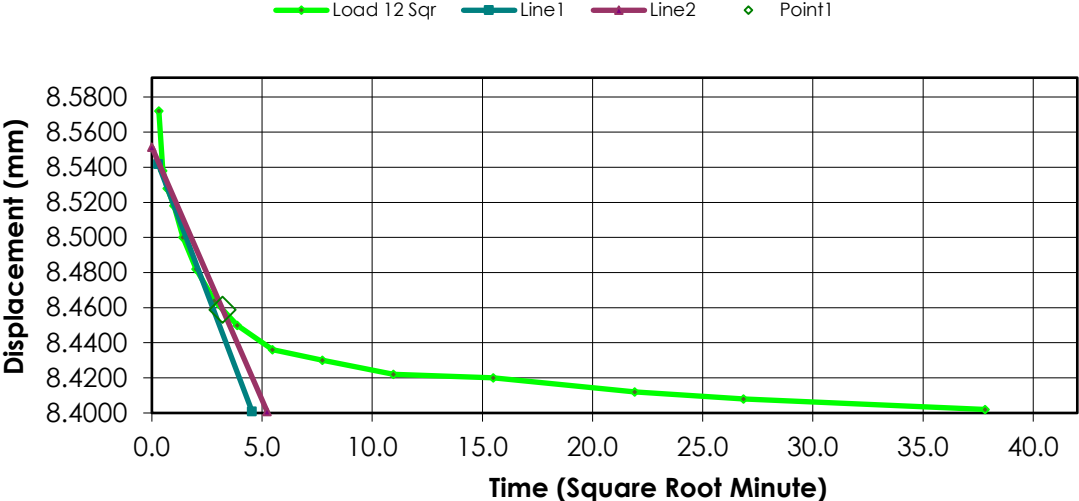
Remarks:

Sample Type: Undisturbed

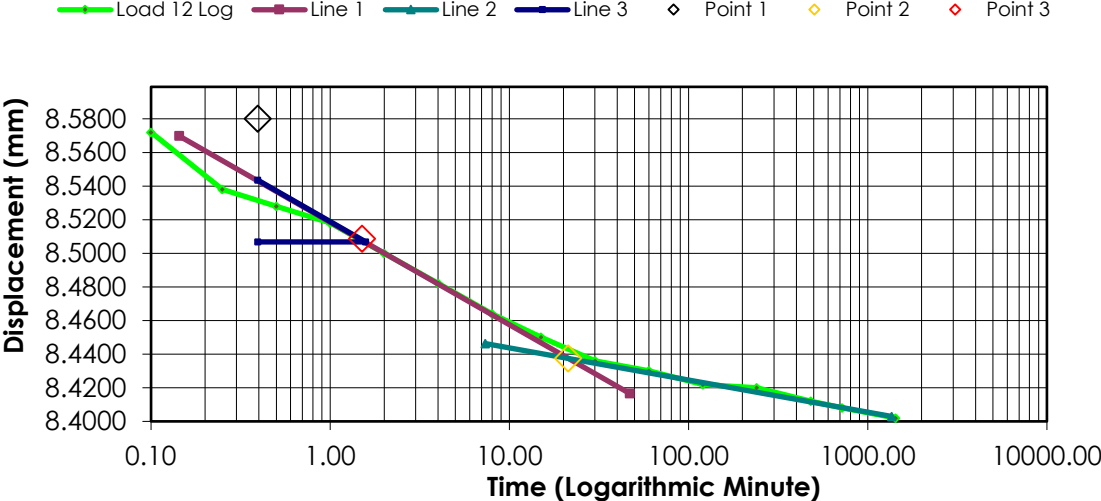
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.6020	1.0500	4.1833	0.4051
1	00:00:06	8.5720	1.0600	4.2231	0.4045
2	00:00:15	8.5380	1.0940	4.3586	0.4026
3	00:00:30	8.5280	1.1040	4.3984	0.4020
4	00:01:00	8.5180	1.1140	4.4382	0.4014
5	00:02:00	8.5000	1.1320	4.5100	0.4003
6	00:04:01	8.4820	1.1500	4.5817	0.3993
7	00:08:01	8.4640	1.1680	4.6534	0.3982
8	00:15:02	8.4500	1.1820	4.7092	0.3974
9	00:30:03	8.4360	1.1960	4.7649	0.3966
10	01:00:05	8.4300	1.2020	4.7888	0.3963
11	02:00:10	8.4220	1.2100	4.8207	0.3958
12	04:00:20	8.4200	1.2120	4.8287	0.3957
13	08:00:36	8.4120	1.2200	4.8606	0.3952
14	12:00:54	8.4080	1.2240	4.8765	0.3950
15	23:50:52	8.4020	1.2300	4.9004	0.3946

Consolidation Test Results (Sequence 12) Load 640.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 13) Load 1280.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 07-Nov-18

Test Number:

Sample Number: LLO17A ST9

Soil Description:

Boring Number:

Clay (Cl), Some Sand, Some Gravel

Depth: 4.05-4.5m

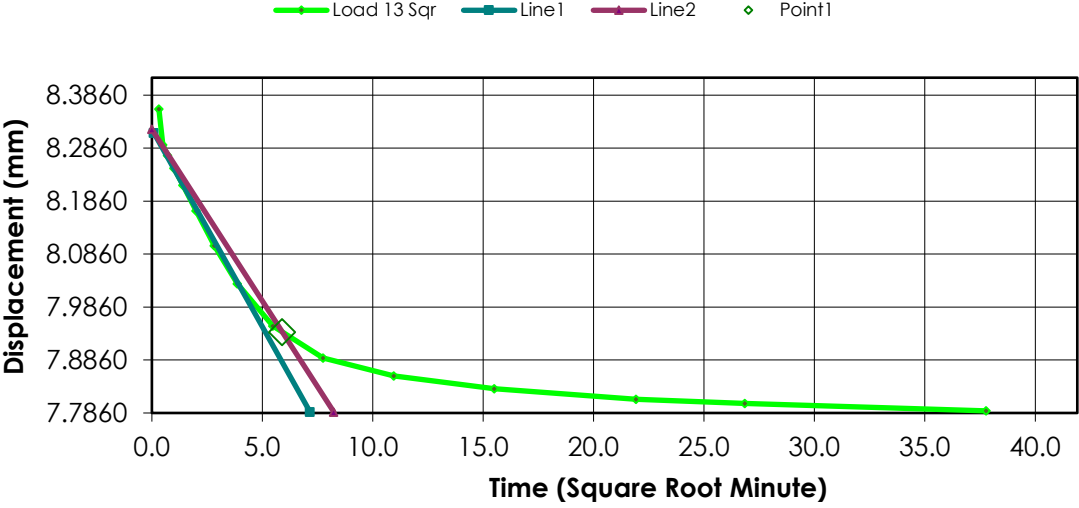
Remarks:

Sample Type: Undisturbed

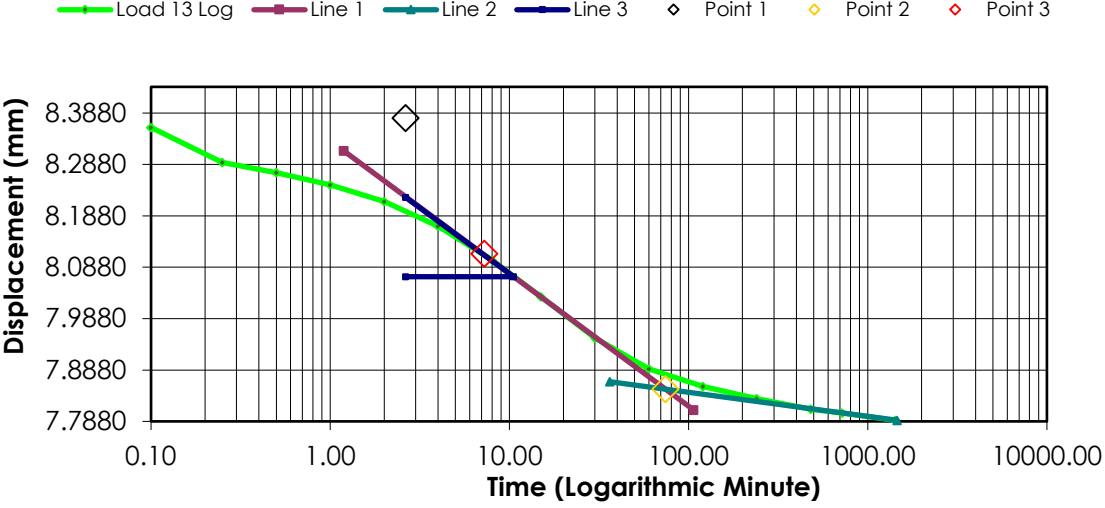
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.4020	1.2300	4.9004	0.3946
1	00:00:06	8.3600	1.2020	4.7888	0.3963
2	00:00:15	8.2920	1.2700	5.0598	0.3923
3	00:00:30	8.2720	1.2900	5.1394	0.3911
4	00:01:00	8.2480	1.3140	5.2351	0.3897
5	00:02:00	8.2160	1.3460	5.3625	0.3878
6	00:04:00	8.1680	1.3940	5.5538	0.3850
7	00:08:01	8.1020	1.4600	5.8167	0.3812
8	00:15:01	8.0300	1.5320	6.1036	0.3770
9	00:30:03	7.9500	1.6120	6.4223	0.3723
10	01:00:05	7.8900	1.6720	6.6614	0.3688
11	02:00:10	7.8560	1.7060	6.7968	0.3668
12	04:00:20	7.8320	1.7300	6.8924	0.3654
13	08:00:40	7.8120	1.7500	6.9721	0.3642
14	12:00:59	7.8040	1.7580	7.0040	0.3638
15	23:46:41	7.7900	1.7720	7.0598	0.3629

Consolidation Test Results (Sequence 13) Load 1280.000 kPa

Consolidation Graph (Square Root Time)



Consolidation Graph (Logarithmic Time)

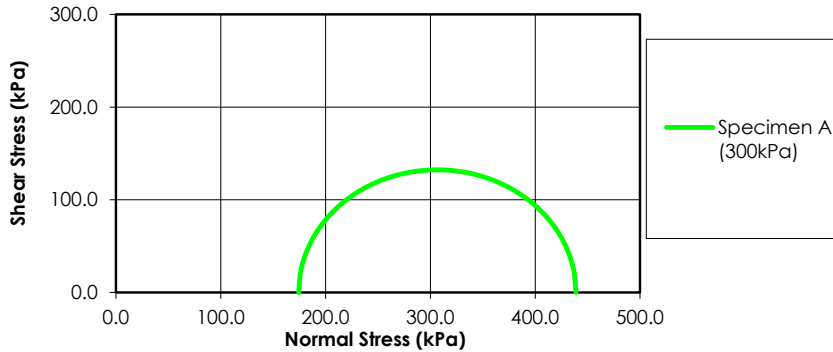


Reviewed By: C. Lamoureux

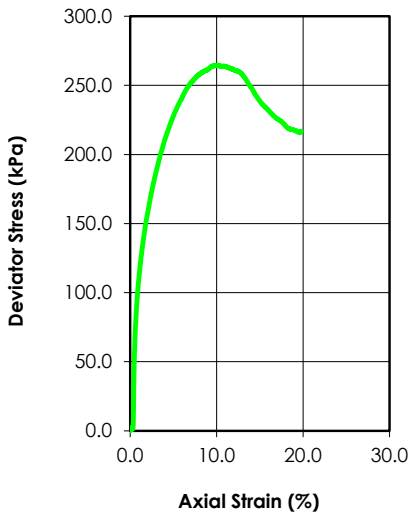
Date: 12-Jun-18

Tested By: E. Wahl

Effective Stress at Maximum Deviator Stress Criterion



Deviator Stress Vs. Axial Strain

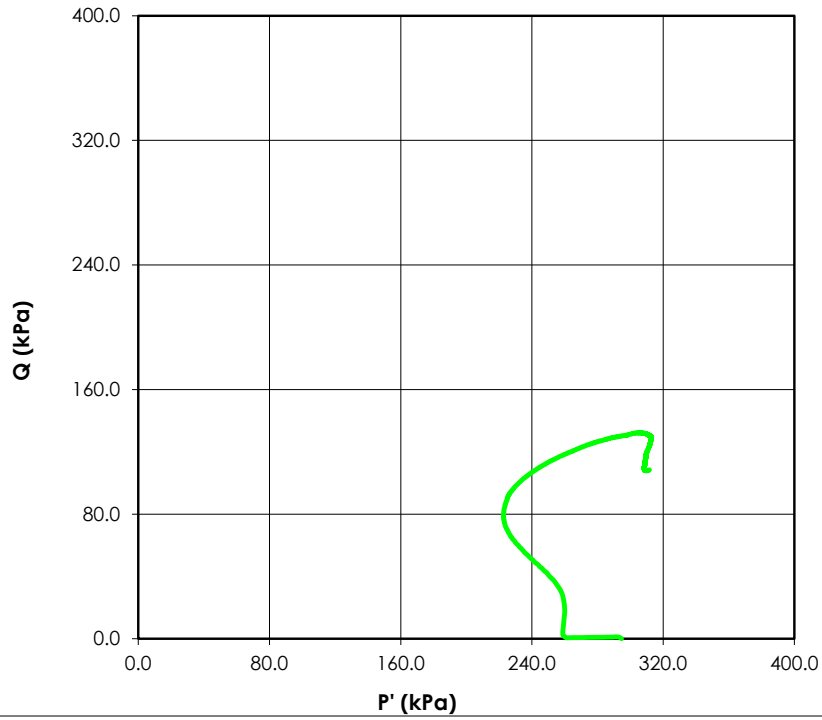


	Specimen					
	Initial	A	B	C	D	
Water Content (%)	21.6					
Dry Density (g/cm ³)	1.707					
Saturation (%)	100					
Void Ratio	0.579					
Diameter (mm)	72.56					
Height (mm)	160.60					
Specific Gravity	2.70					
Liquid Limit	55					
Plastic Limit	18					
After Consolidation		A	B	C	D	
B-Value	0.95					
Water Content (%)	18.8					
Dry Density (g/cm ³)	1.737					
Saturation (%)	100					
Void Ratio	0.554					
Effective Stress (kPa)	294.6					
Back Press. (kPa)	135.4					
Rate of Strain	0.01106					
Maximum Deviator Stress Criterion		After Shear	A	B	C	D
C (kPa)	-	σ'_1 at Failure (kPa)	438.93			
C' (kPa)	-	σ'_3 at Failure (kPa)	174.33			
ϕ (deg)	-					
ϕ' (deg)	-					

Project:	SR1	
Location:	-	
Project Number:	110773396.302.702.310	
Boring Number:	-	
Sample Number:	LLO09 Combo	
Depth:	2.4-4.2m	
Sample Type:	Remolded	
Description:	Clay (CH)	
Test Type	Consolidated Undrained	
Remarks	From borehole LLO09, sample is comprised of BS3 (2.4-2.6m), SS4 (3.0-3.45m), and BS5 (4.0-4.2m).	

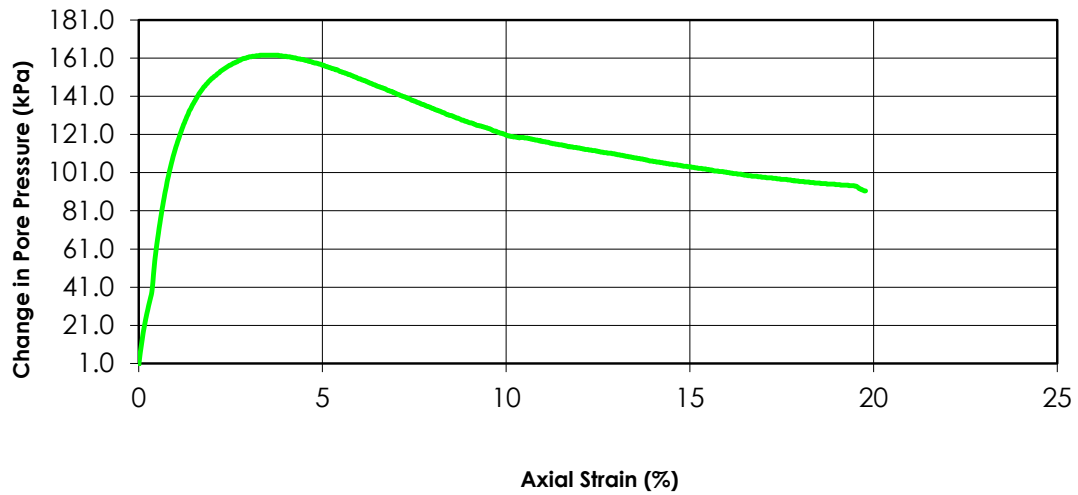
Reporting of these test results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request. The data presented above is for the sole use of the client stipulated above. Stantec is not responsible, nor can be held liable, for the use of this report by any other party, with or without the knowledge of Stantec.

Stress Paths (Effective)

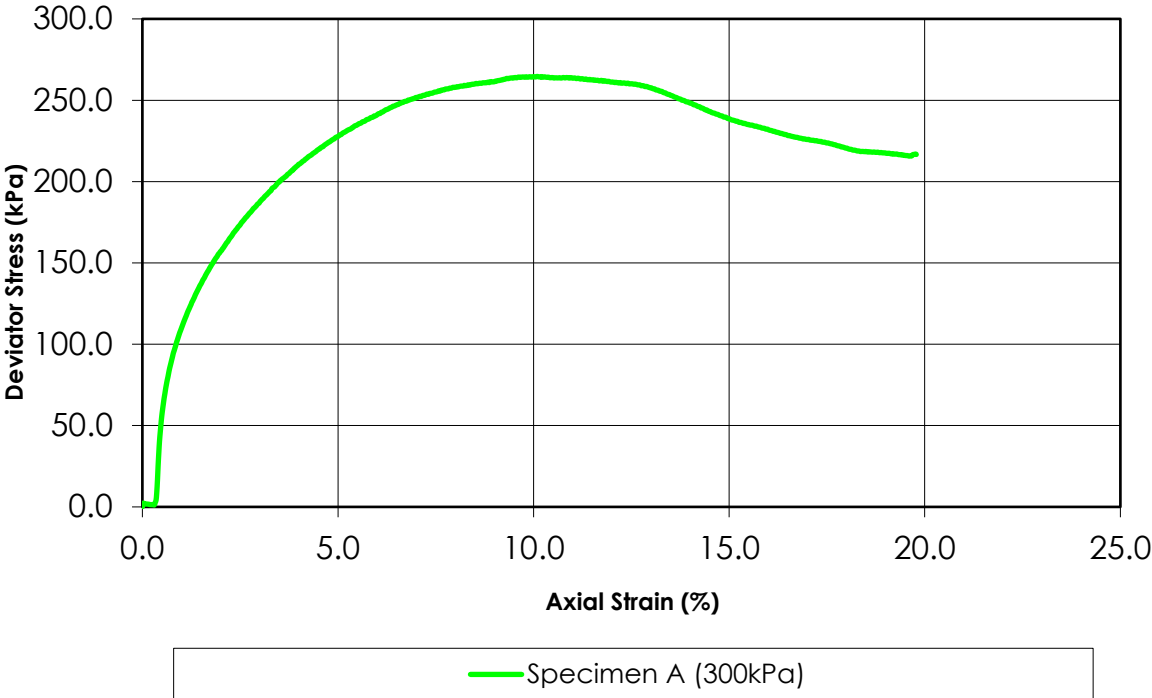


— Specimen A (300kPa)

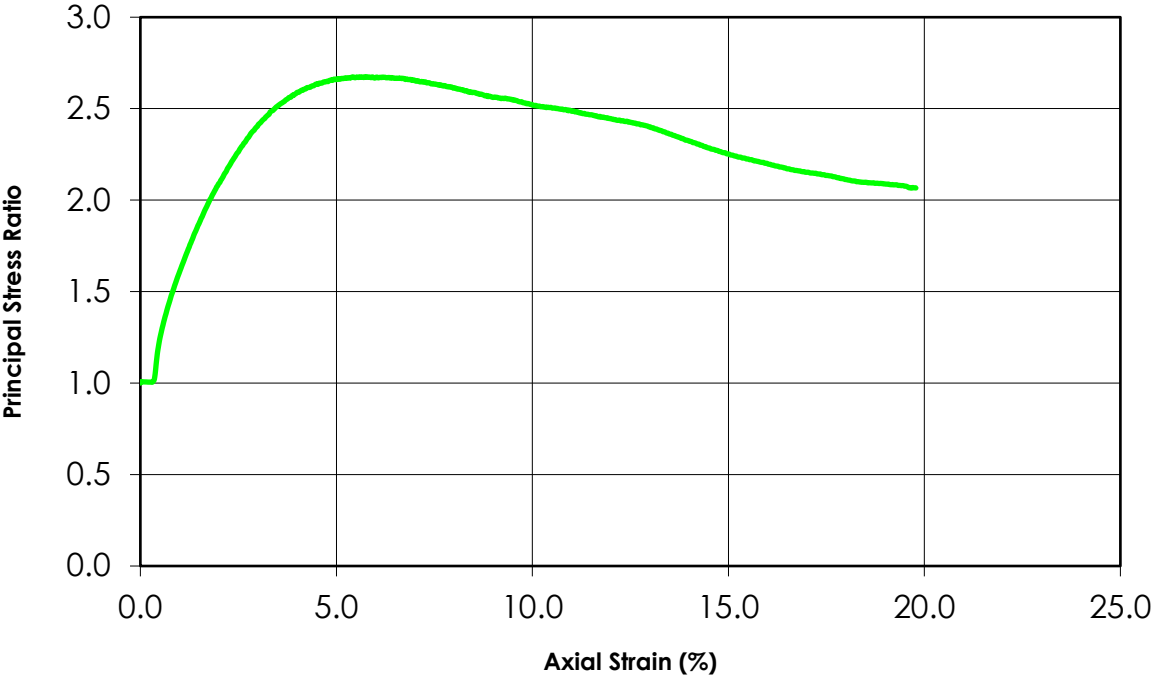
Change in Pore Pressure vs. Axial Strain



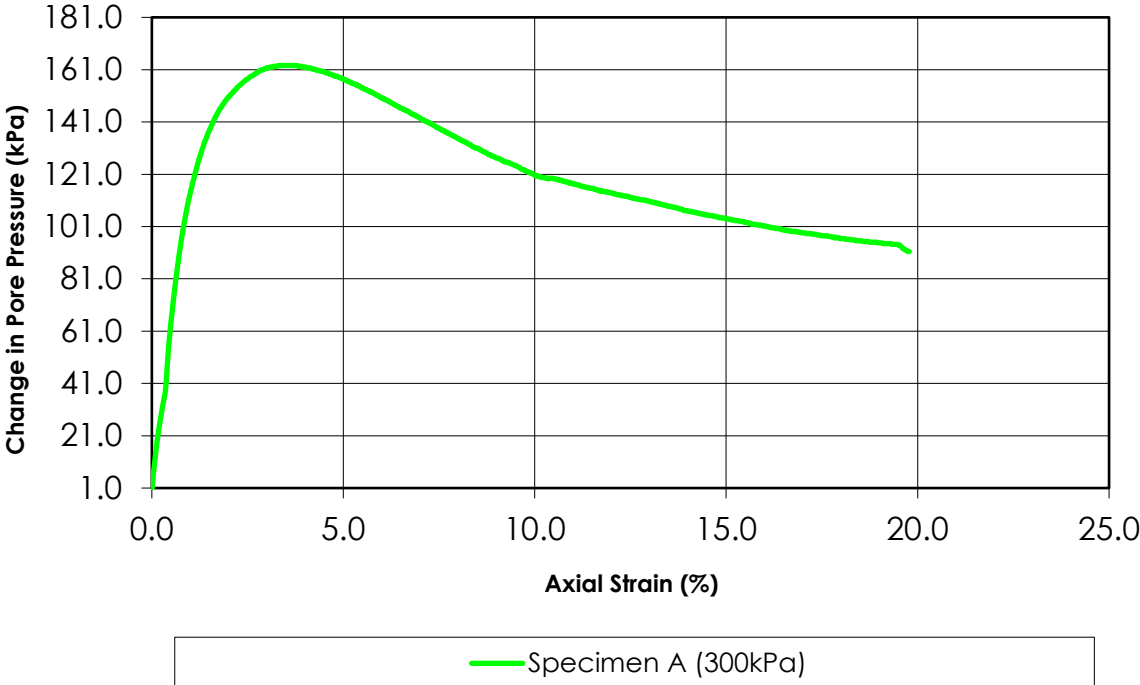
Deviator Stress vs. Axial Strain



Principal Stress Ratio vs. Axial Strain

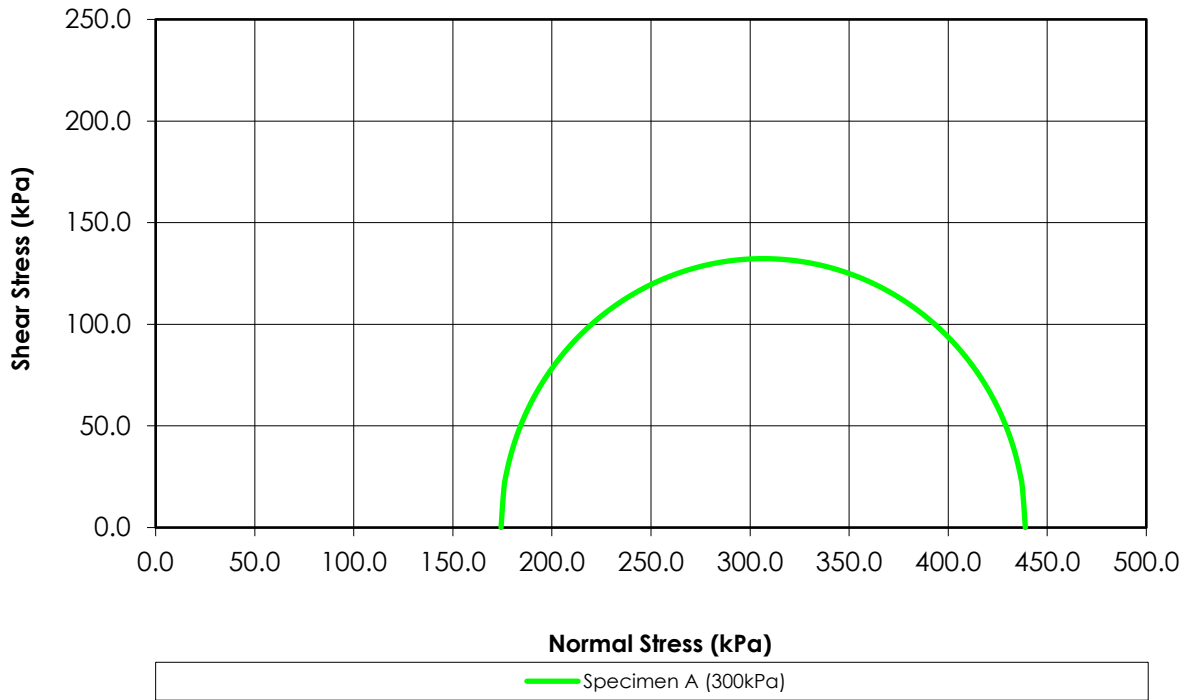


Change in Pore Pressure vs. Axial Strain

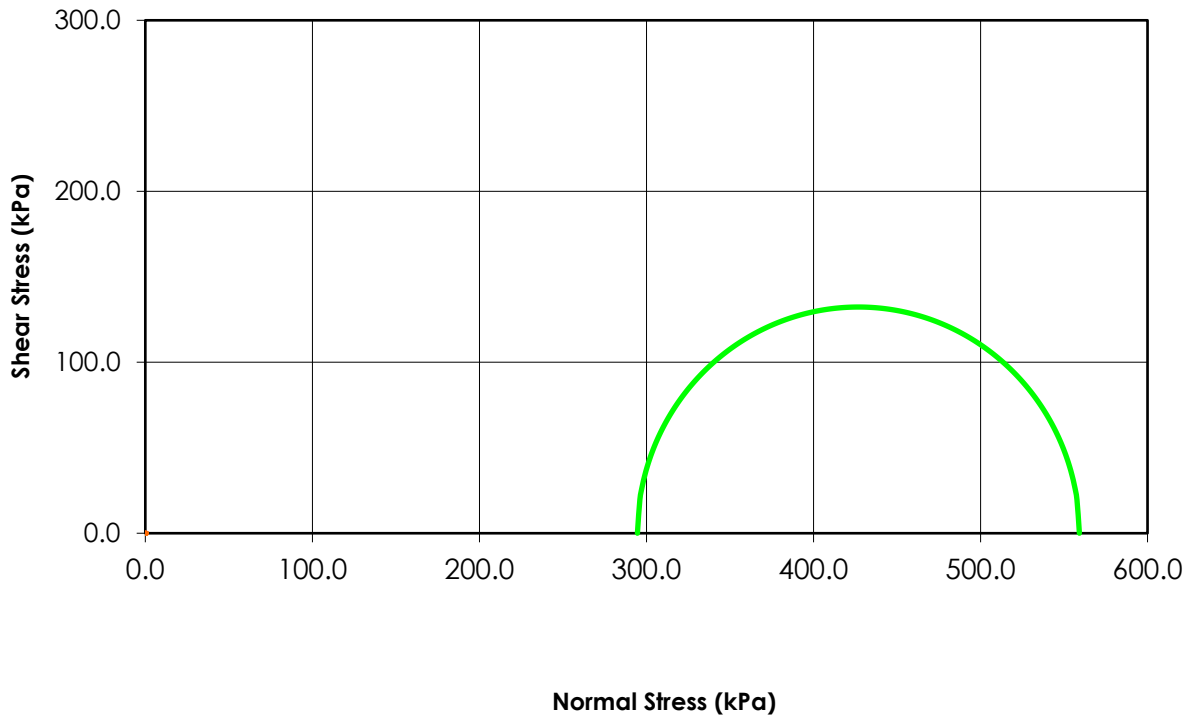


Mohr Stress Circles at Maximum Deviator Stress Criterion

Effective Stress

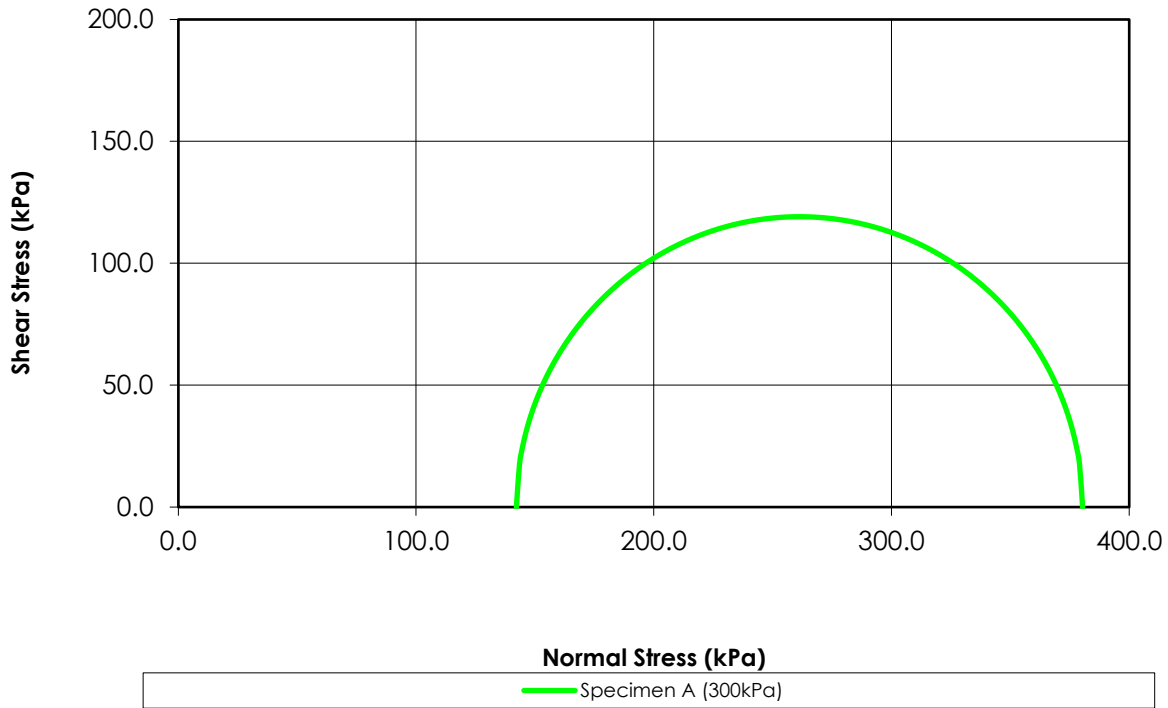


Total Stress

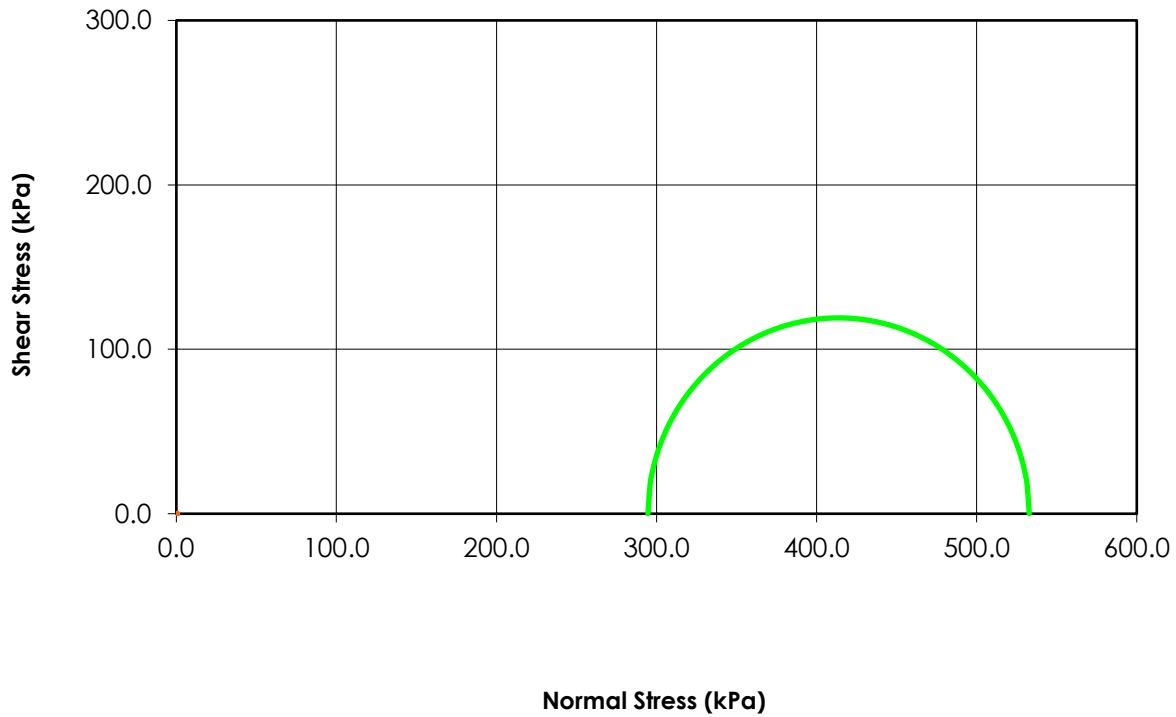


Mohr Stress Circles at Maximum Principal Stress Ratio Criterion

Effective Stress

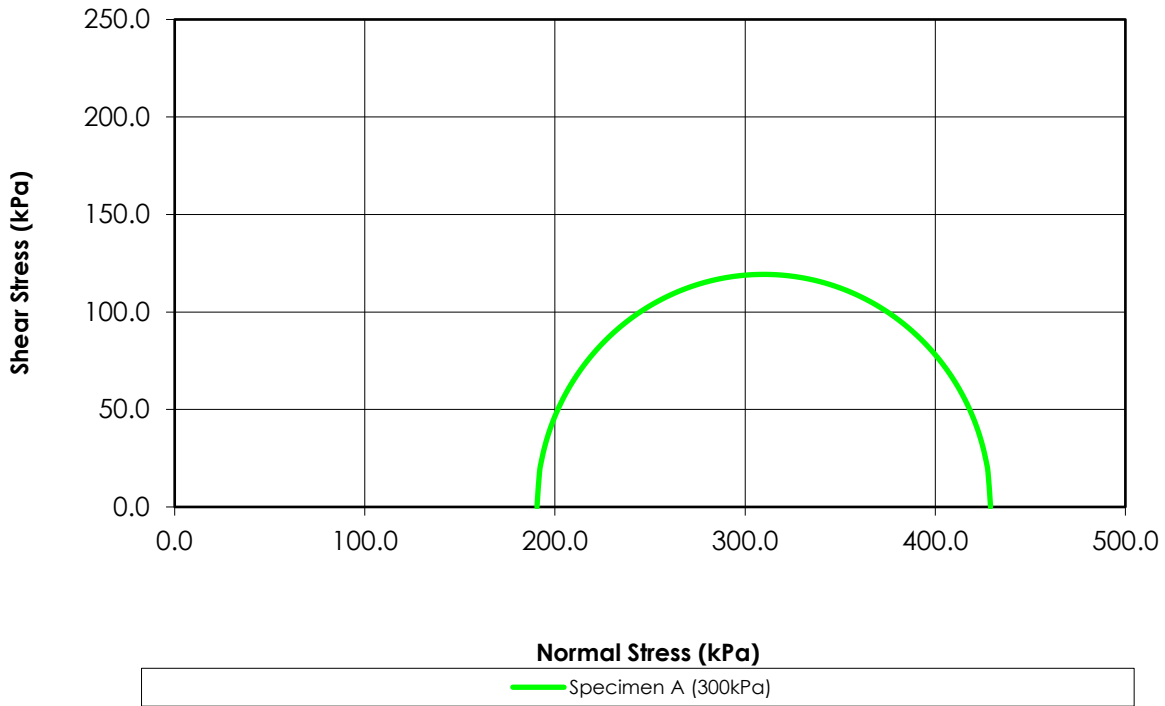


Total Stress

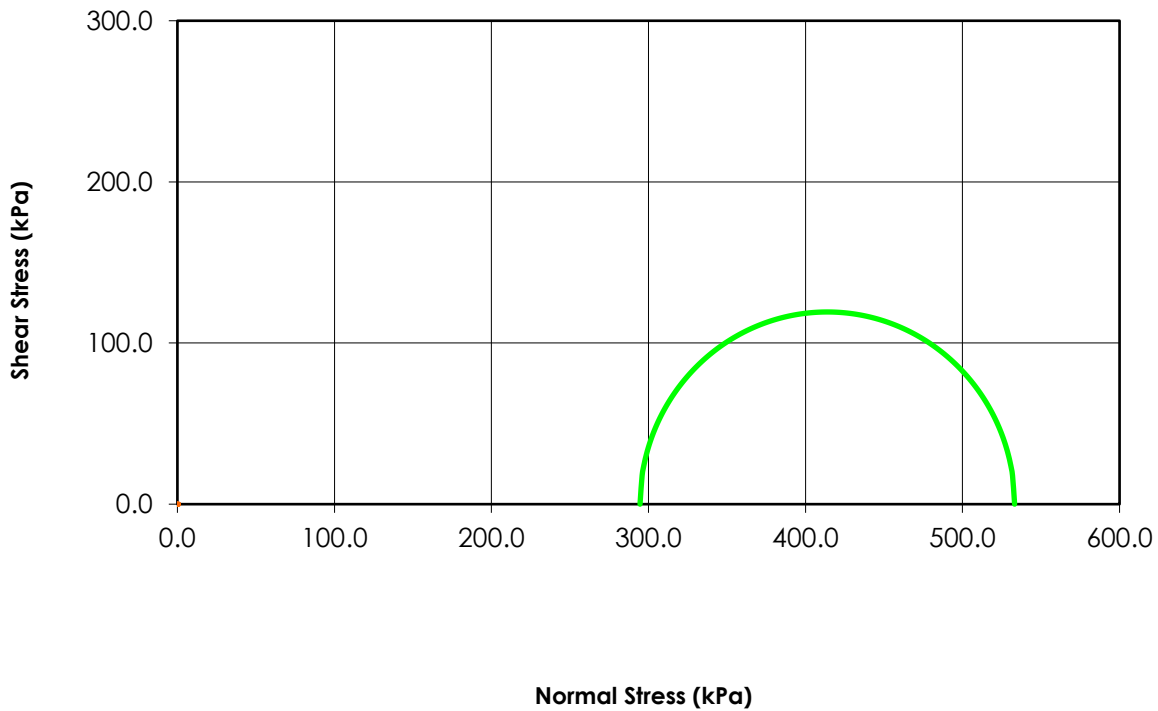


Mohr Stress Circles at 15% Axial Strain Criterion

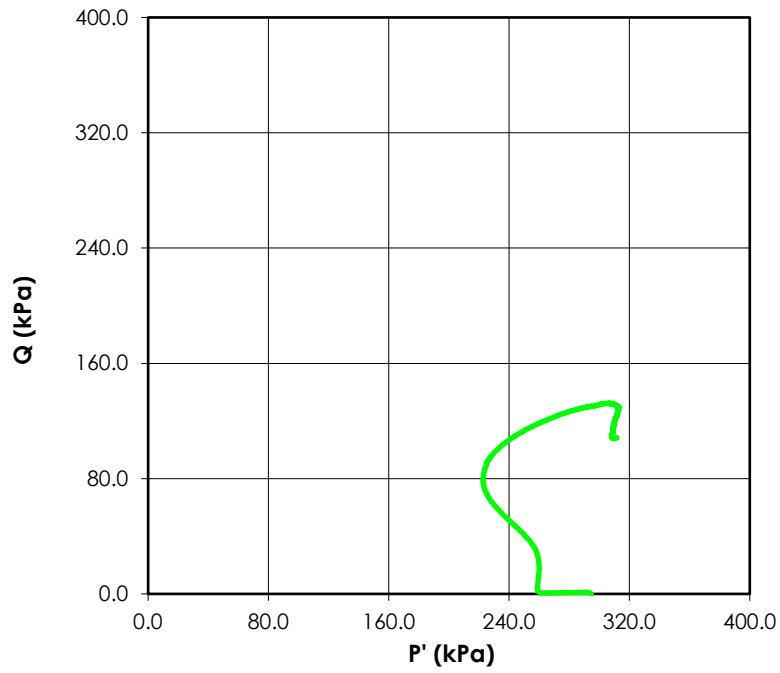
Effective Stress



Total Stress

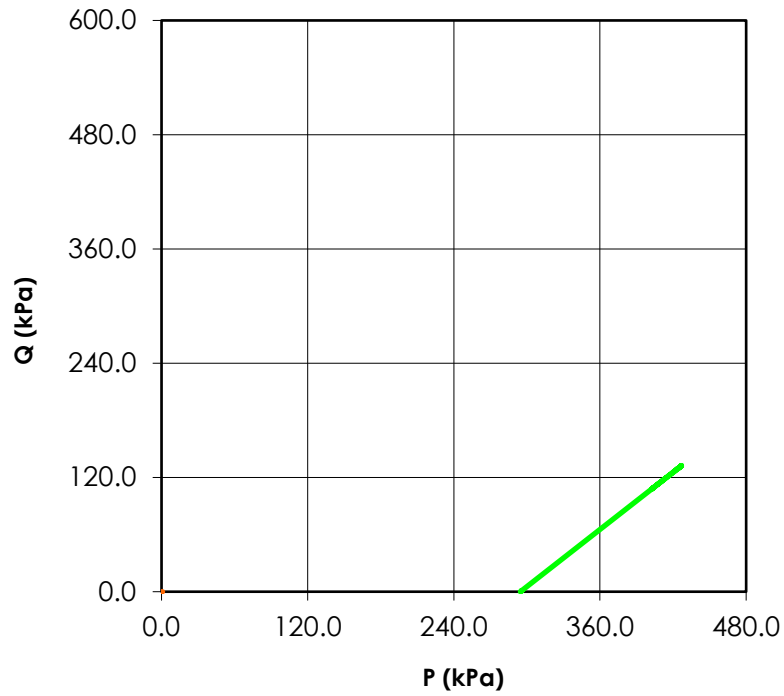


Stress Paths (Effective)



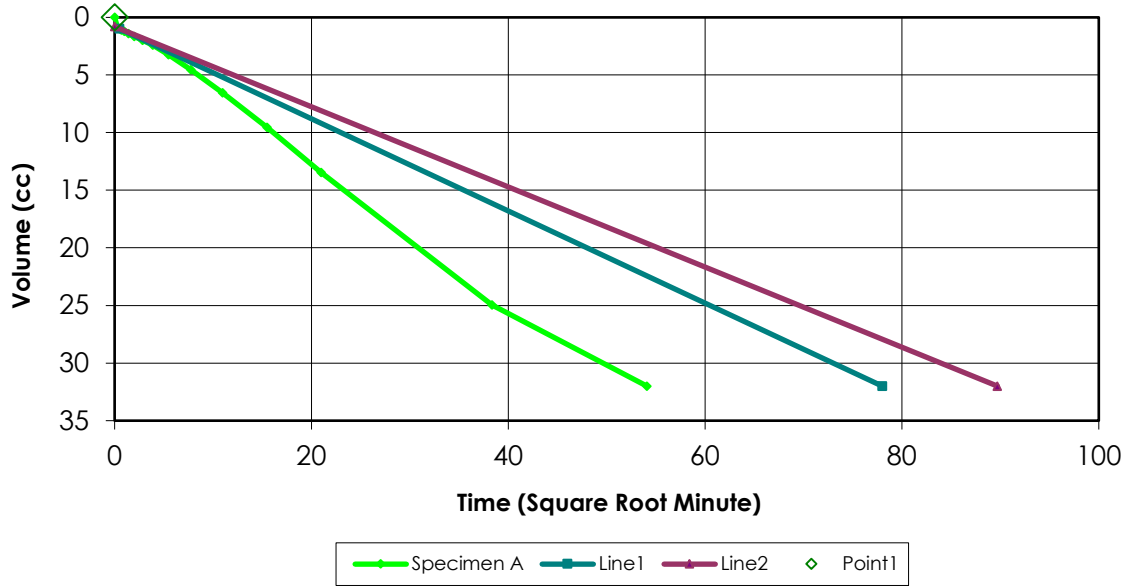
— Specimen A (300kPa)

Stress Paths (Total)

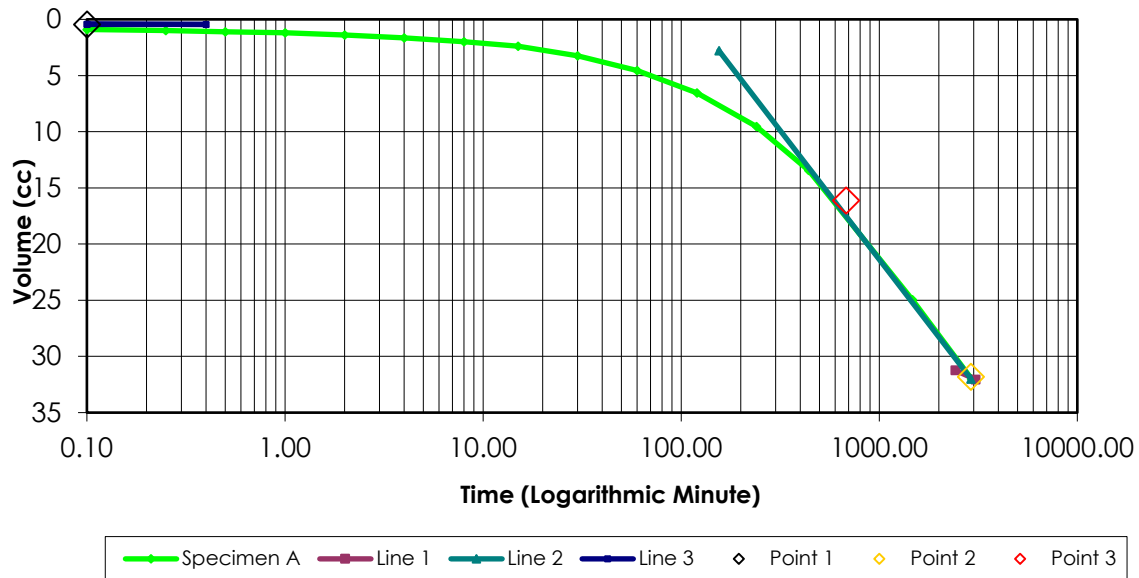


Specimen A Consolidation Graphs

Consolidation Graph (Square Root Time)



Consolidation Graph (Logarithmic Time)



**B-Value Calculations - Specimen A
CU Triaxial Test**

Stantec Consulting Ltd.

Client: Alberta Transportation Project No. 110773396
Project Name: SRI

Project Location: _____

Hole No. - _____ B-Value: 0.95

Reading No.	Sample Pressure (kPa)	Chamber Pressure (kPa)	Pore Pressure Change (kPa)	Chamber Pressure Change (kPa)	B-Value
0	80.0	60.0	N/A	N/A	N/A
1	80.0	60.0	0.0	0.0	
2	150.0	130.0	70.0	70.0	0.64
3	80.0	60.0	-70.0	-70.0	
4	80.0	60.0	0.0	0.0	
5	150.0	60.0	70.0	0.0	0.89
6	80.0	60.0	-70.0	0.0	
7	80.0	60.0	0.0	0.0	
8	150.0	60.0	70.0	0.0	0.90
9	150.0	130.0	0.0	70.0	
10	150.0	130.0	0.0	0.0	
11	220.0	130.0	70.0	0.0	0.95

Laboratory Supervisor

Consolidation Calculations Specimen**A**
CU Triaxial Test

Stantec Consulting Ltd.

Client: Alberta Transportation Project No. 110773396
Project Name: SR1

Project Location: _____

Hole No. - _____

Depth: 2.4-4.2mCell Pressure (kPa) 430 Test Type = CU
Back Pressure (kPa) 130
Effective Pressure (kPa) 300Initial Sample Diameter (mm) 72.56 Burette Reading at Start of Test (cc)= 0
Initial Sample Height (mm) 160.6
Initial Sample Area (cm²) 41.35
Initial Volume (cm³) 664.1

Time	Burette Reading (cc)	Volume Change (cc)
00:00:00	48.65	N/A
00:00:06	47.75	0.900
00:00:15	47.65	1.000
00:00:30	47.55	1.100
00:01:00	47.45	1.200
00:02:00	47.25	1.400
00:04:00	47.00	1.650
00:08:00	46.65	2.000
00:15:00	46.25	2.400
00:30:00	45.40	3.250
01:00:00	44.10	4.550
02:00:00	42.10	6.550
04:00:00	39.10	9.550
07:20:00	35.20	13.450
24:30:00	23.70	24.950
48:45:00	16.65	32.000

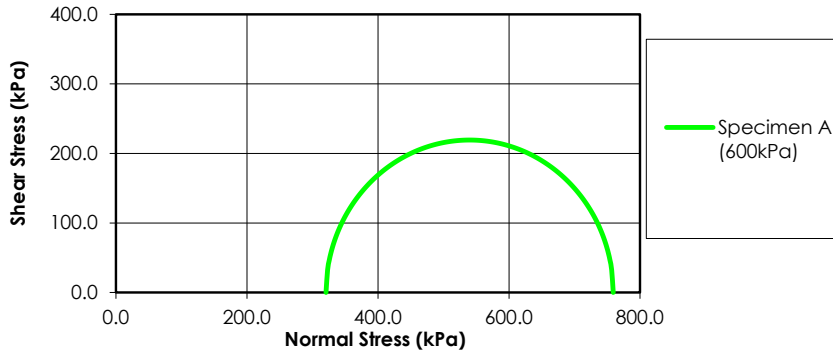
Laboratory Supervisor

Reviewed By: C. Lamoureux

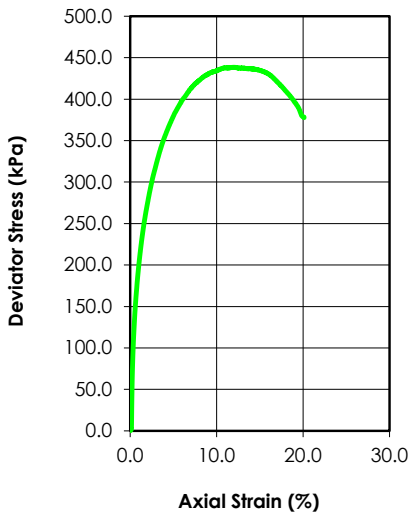
Date: 20-Jun-18

Tested By: E. Wahl

Effective Stress at Maximum Deviator Stress Criterion



Deviator Stress Vs. Axial Strain

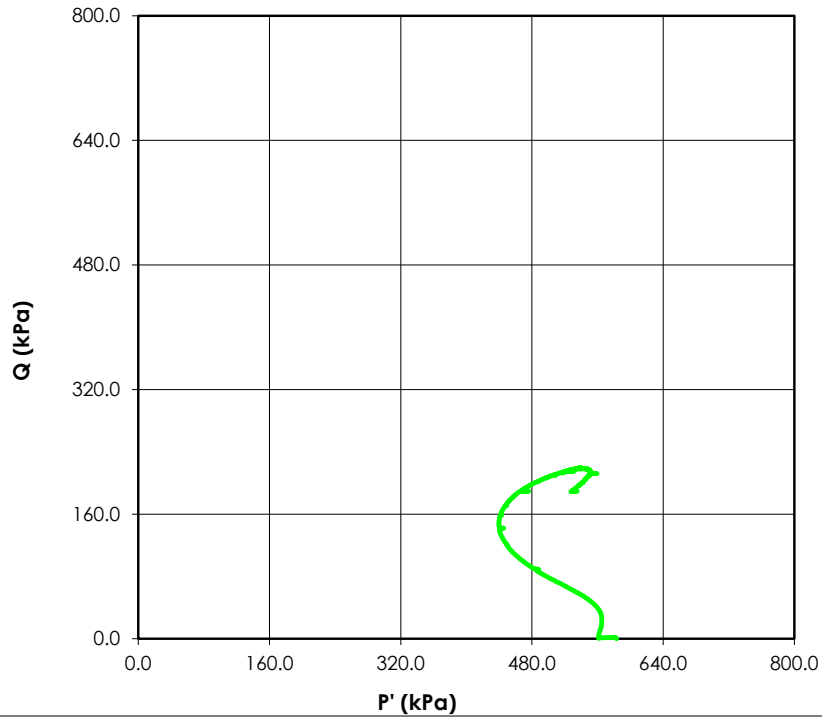


	Specimen				
	A	B	C	D	
Initial					
Water Content (%)	18.2				
Dry Density (g/cm ³)	1.790				
Saturation (%)	97				
Void Ratio	0.505				
Diameter (mm)	72.30				
Height (mm)	147.53				
Specific Gravity	2.70				
Liquid Limit	53				
Plastic Limit	18				
After Consolidation					
B-Value	0.96				
Water Content (%)	13.7				
Dry Density (g/cm ³)	1.837				
Saturation (%)	100				
Void Ratio	0.470				
Effective Stress (kPa)	583.3				
Back Press. (kPa)	76.7				
Rate of Strain	0.01011				
Maximum Deviator Stress Criterion					
	After Shear	A	B	C	D
C (kPa)	-	σ'_1 at Failure (kPa)	759.17		
C' (kPa)	-	σ'_3 at Failure (kPa)	320.67		
ϕ (deg)	-				
ϕ' (deg)	-				

Project:	SR1	
Location:	-	
Project Number:	110773396.302.702.310	
Boring Number:	-	
Sample Number:	LLO10 Combo	
Depth:	1.5-4.2m	
Sample Type:	Remolded	
Description:	Clay (CH)	
Test Type	Consolidated Undrained	
Remarks	From borehole LLO10, sample is comprised of SS2 (1.5-1.95m), BS3 (2.4-2.6m), SS5 (3.23-3.68m), and BS6 (4.0-4.2m).	

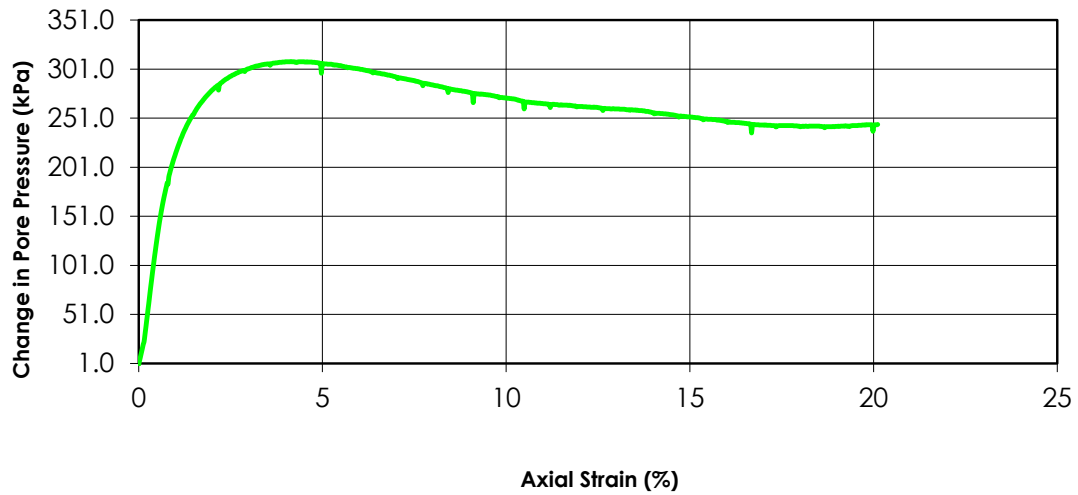
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Stress Paths (Effective)

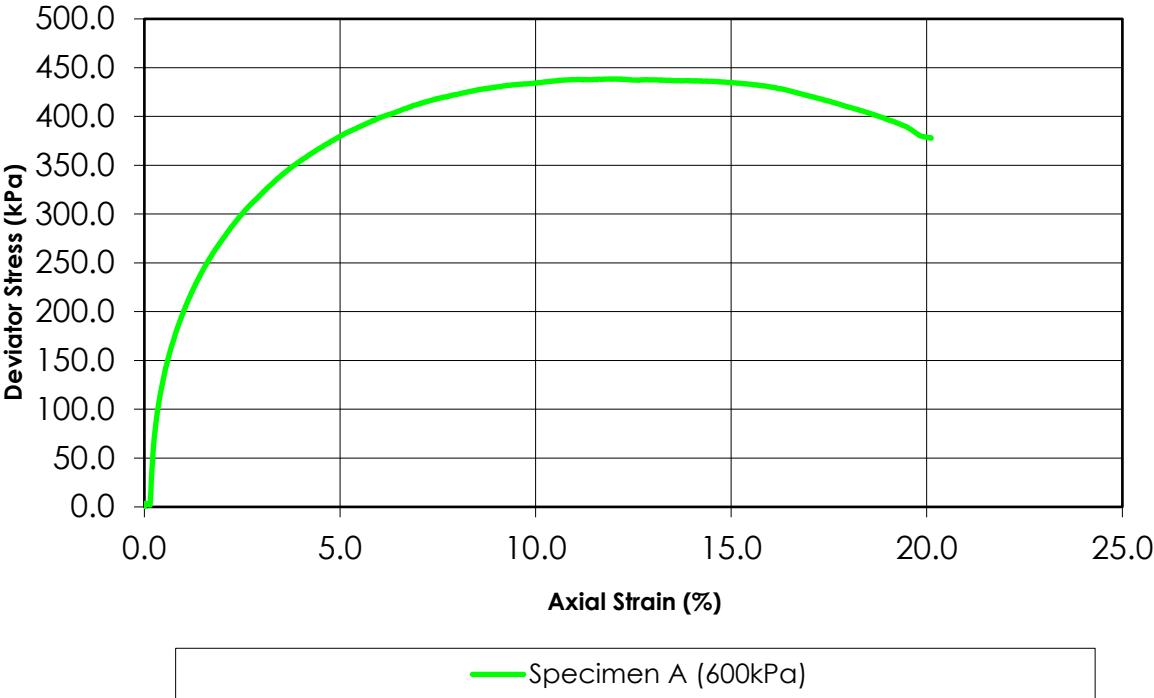


— Specimen A (600kPa)

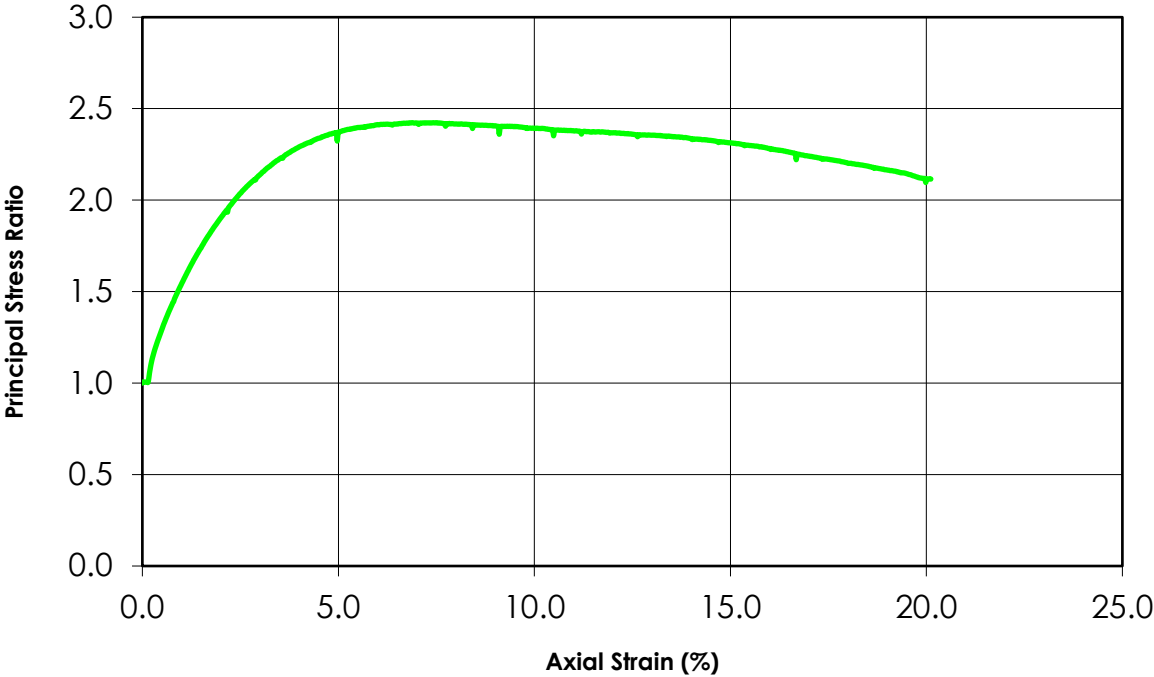
Change in Pore Pressure vs. Axial Strain



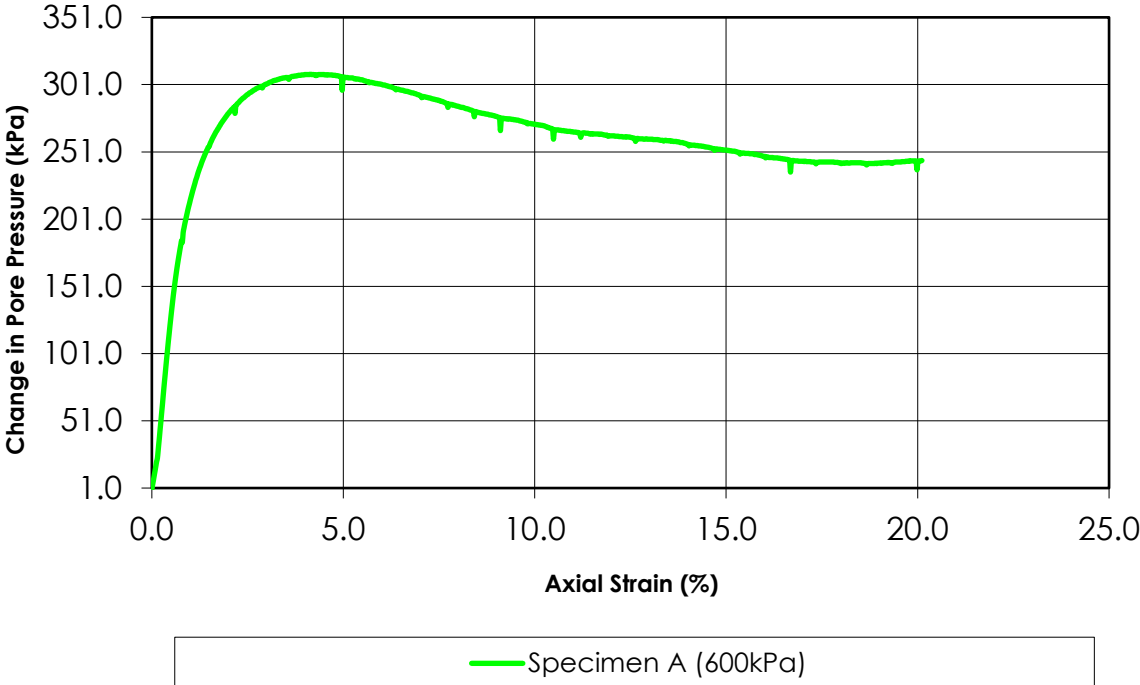
Deviator Stress vs. Axial Strain



Principal Stress Ratio vs. Axial Strain

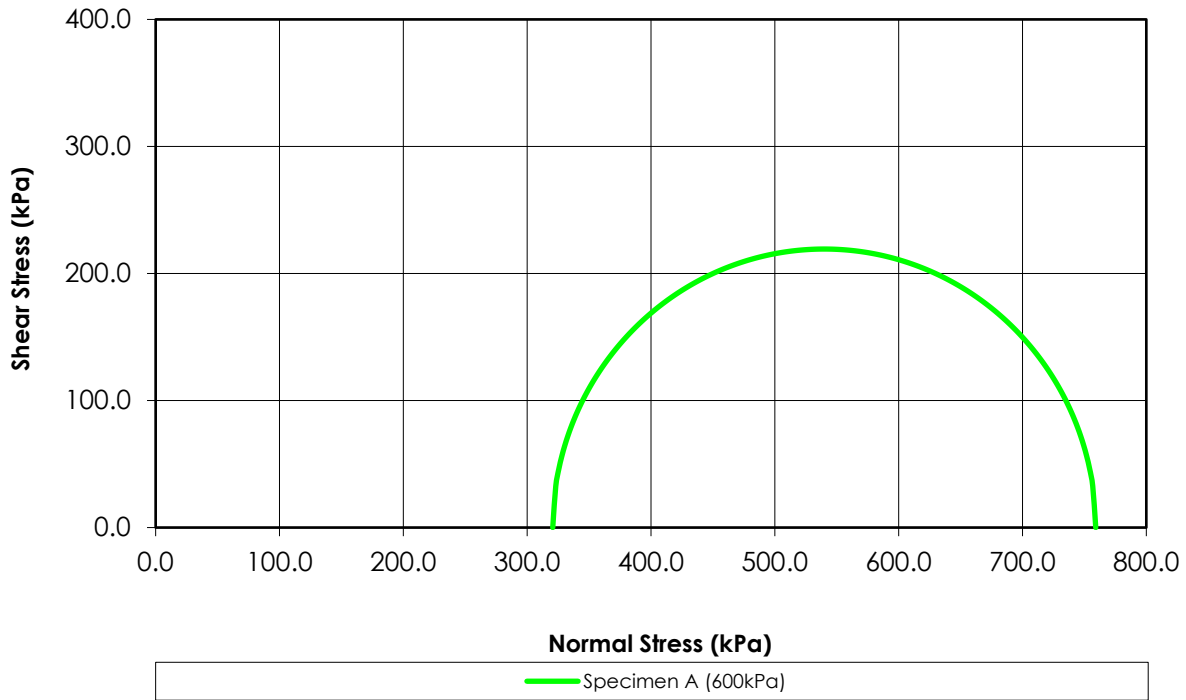


Change in Pore Pressure vs. Axial Strain

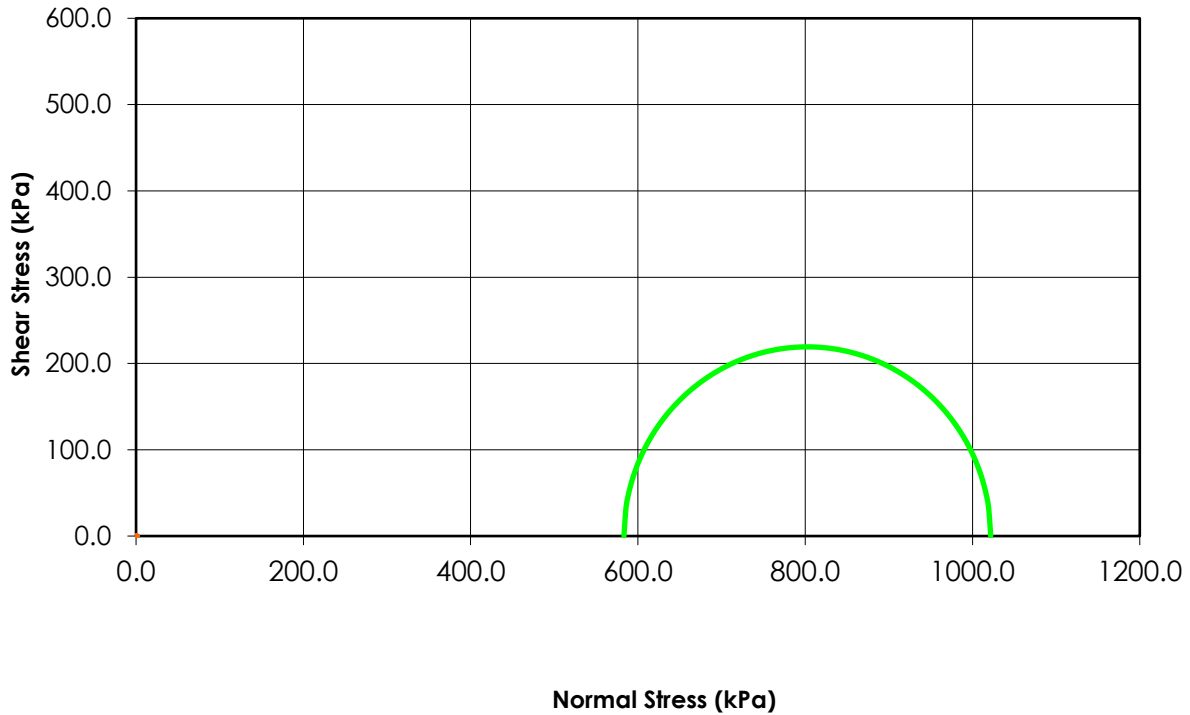


Mohr Stress Circles at Maximum Deviator Stress Criterion

Effective Stress

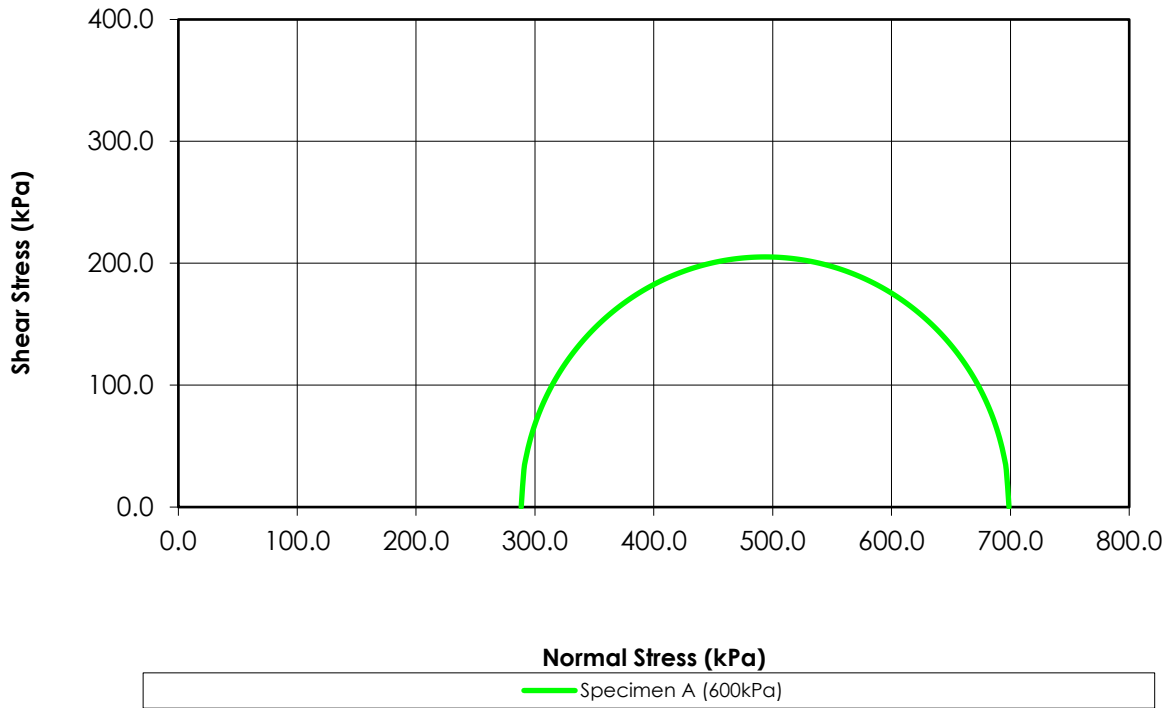


Total Stress

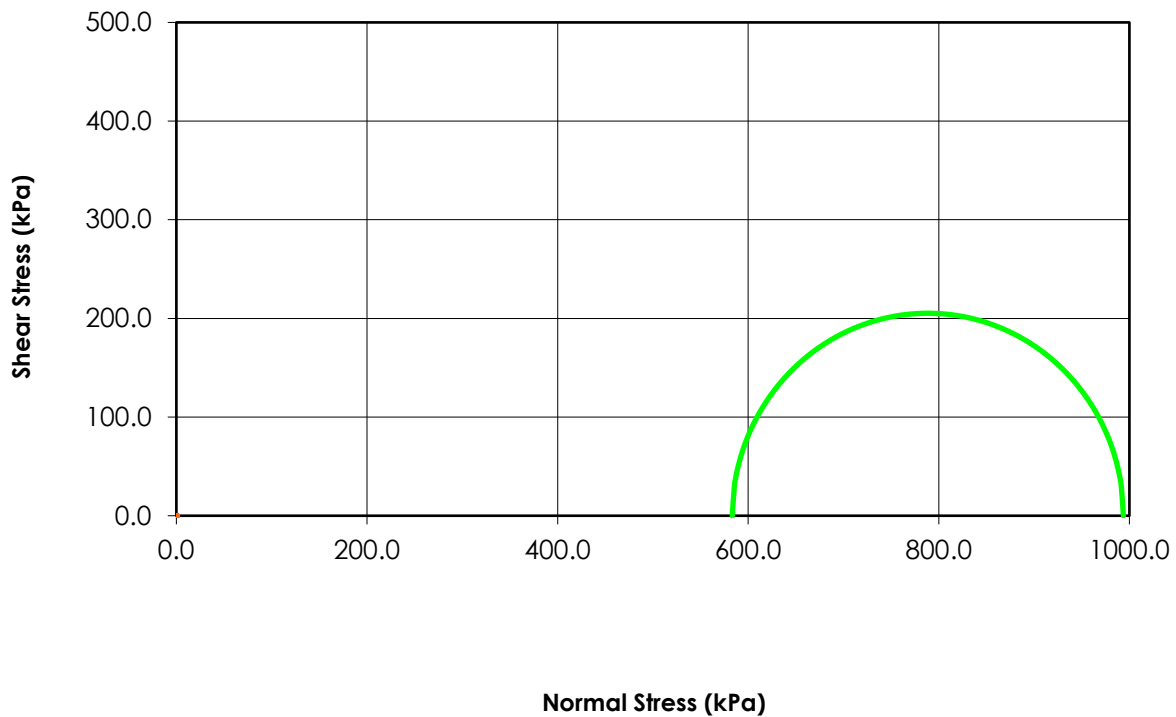


Mohr Stress Circles at Maximum Principal Stress Ratio Criterion

Effective Stress

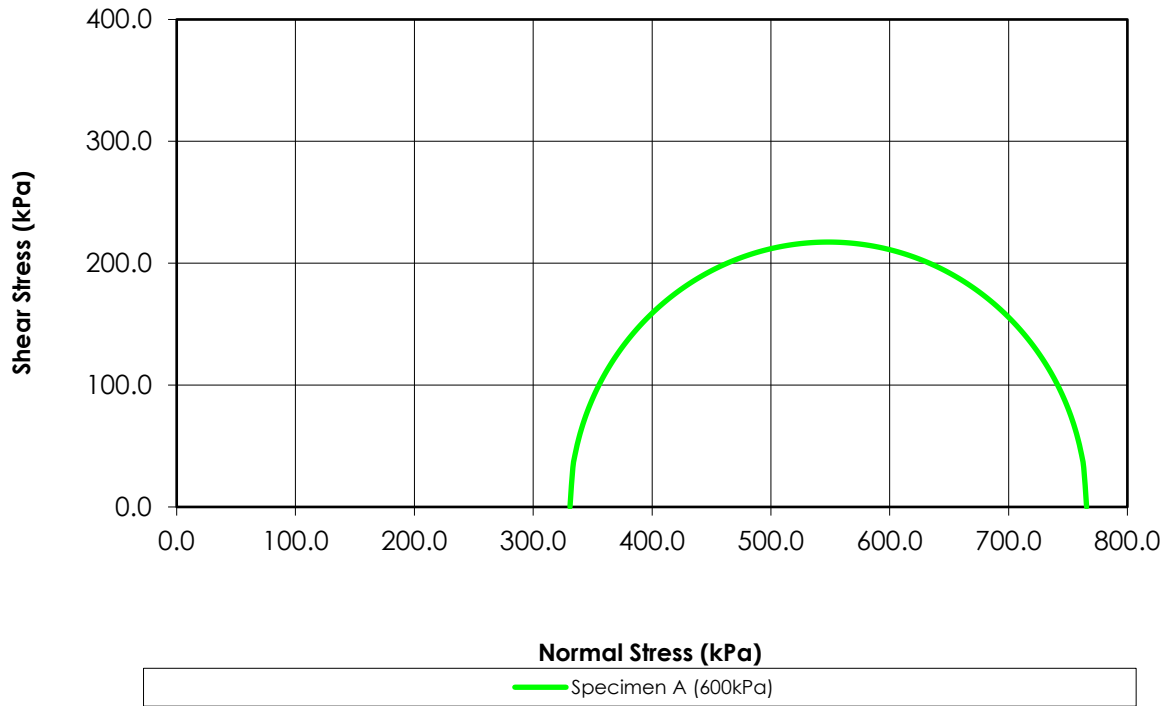


Total Stress

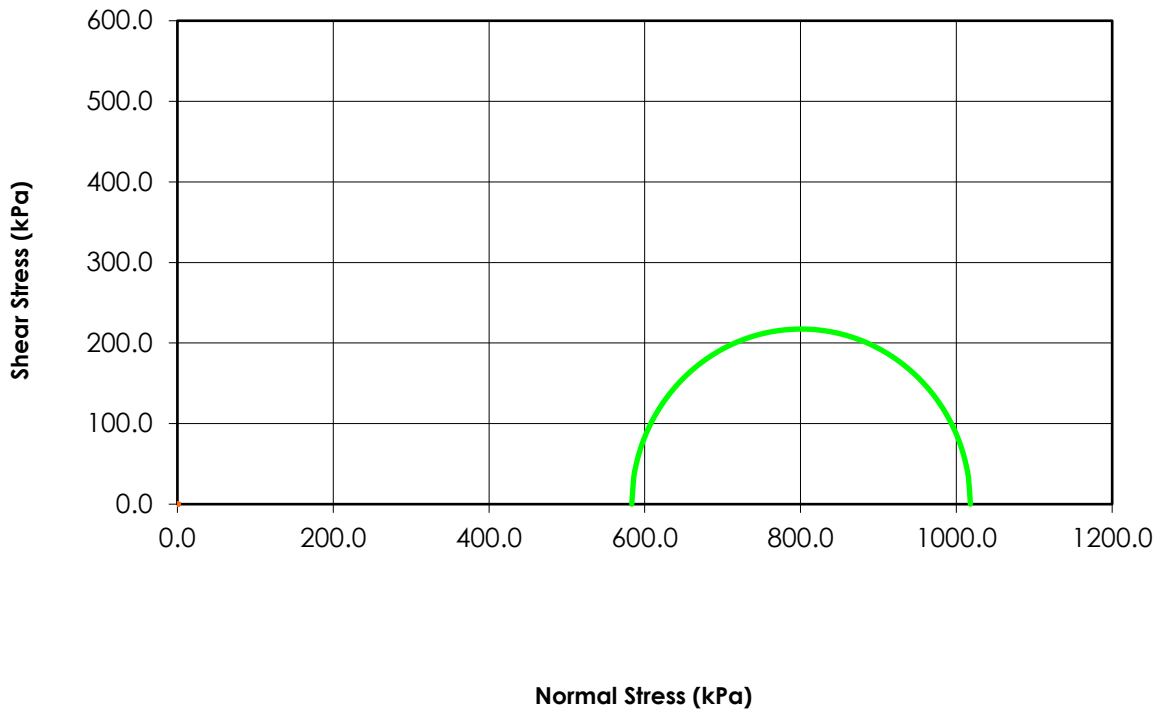


Mohr Stress Circles at 15% Axial Strain Criterion

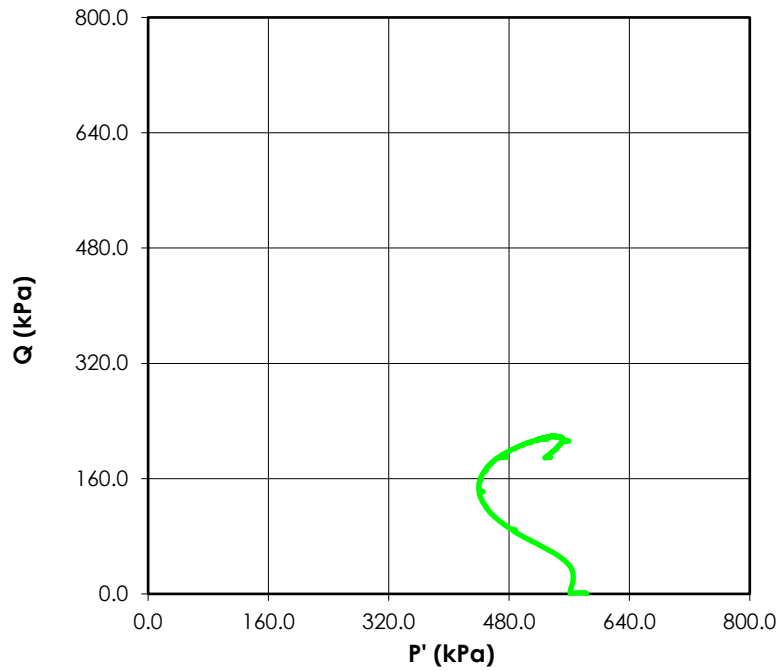
Effective Stress



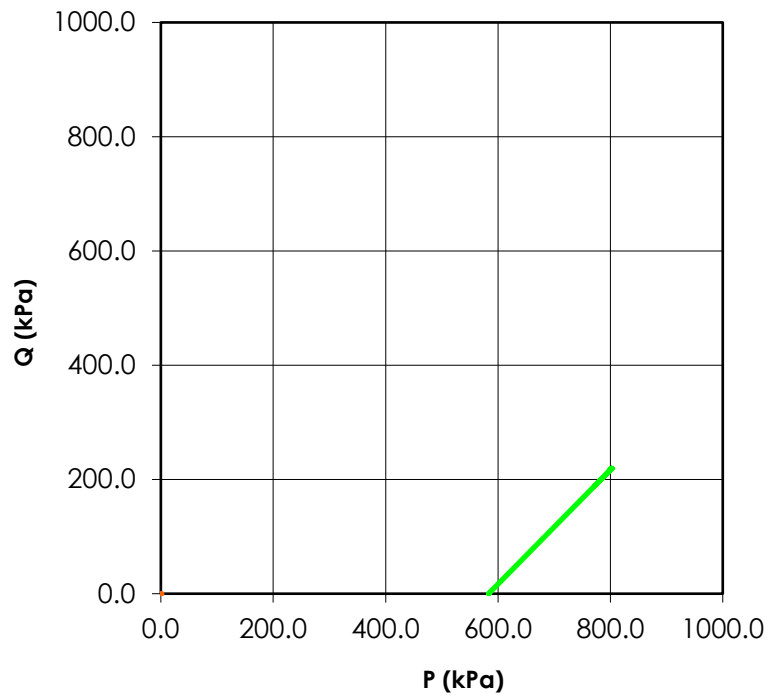
Total Stress



Stress Paths (Effective)

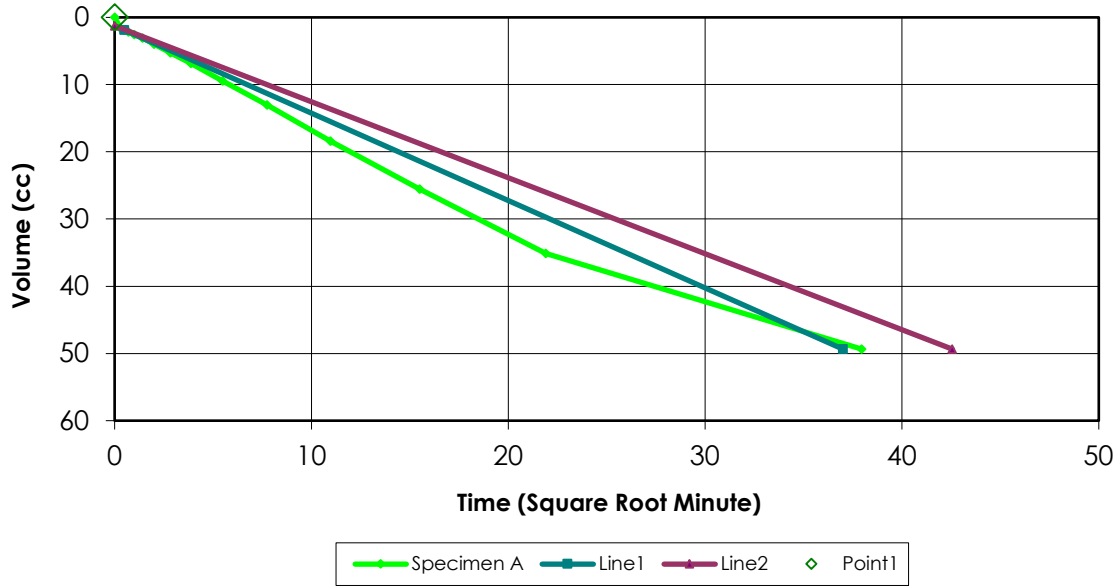


Stress Paths (Total)

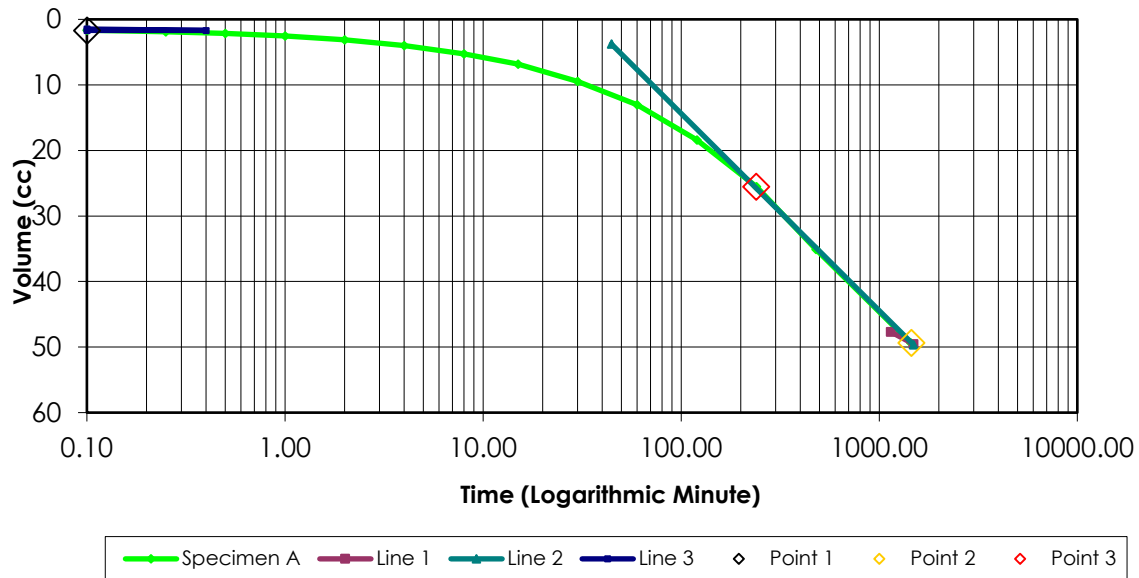


Specimen A Consolidation Graphs

Consolidation Graph (Square Root Time)



Consolidation Graph (Logarithmic Time)



B-Value Calculations - Specimen A
CU Triaxial Test

Stantec Consulting Ltd.

Client: Alberta Transportation Project No. 110773396
Project Name: SRI

Project Location: _____

Hole No. - _____ B-Value: 0.96

Reading No.	Sample Pressure (kPa)	Chamber Pressure (kPa)	Pore Pressure Change (kPa)	Chamber Pressure Change (kPa)	B-Value
0	80.0	60.0	N/A	N/A	N/A
1	80.0	60.0	0.0	0.0	
2	150.0	60.0	70.0	0.0	0.91
3	80.0	60.0	-70.0	0.0	
4	80.0	60.0	0.0	0.0	
5	150.0	60.0	70.0	0.0	0.96

Laboratory Supervisor

Consolidation Calculations Specimen**A**
CU Triaxial Test

Stantec Consulting Ltd.

Client: Alberta Transportation Project No. 110773396
Project Name: SR1

Project Location: _____

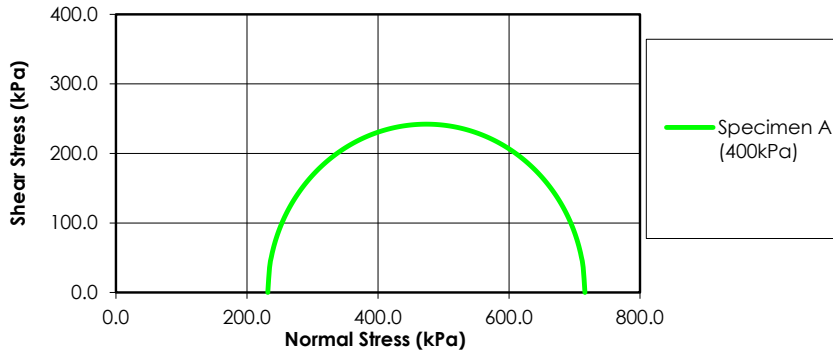
Hole No. - _____

Depth: 1.5-4.2mCell Pressure (kPa) 660 Test Type = CU
Back Pressure (kPa) 60
Effective Pressure (kPa) 600Initial Sample Diameter (mm) 72.3 Burette Reading at Start of Test (cc)= 0
Initial Sample Height (mm) 147.5
Initial Sample Area (cm²) 41.06
Initial Volume (cm³) 605.7

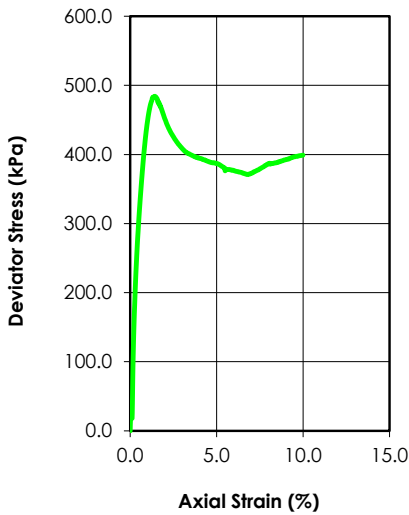
Time	Burette Reading (cc)	Volume Change (cc)
00:00:00	49.45	N/A
00:00:06	47.80	1.650
00:00:15	47.55	1.900
00:00:30	47.30	2.150
00:01:00	46.90	2.550
00:02:00	46.35	3.100
00:04:00	45.45	4.000
00:08:00	44.20	5.250
00:15:00	42.60	6.850
00:30:00	40.00	9.450
01:00:00	36.40	13.050
02:00:00	31.05	18.400
04:00:00	23.90	25.550
08:00:00	14.35	35.100
24:00:00	0.10	49.350

Laboratory Supervisor

Effective Stress at Maximum Deviator Stress Criterion



Deviator Stress Vs. Axial Strain



	Specimen					
	Initial	A	B	C	D	
Water Content (%)	27.0					
Dry Density (g/cm ³)	1.549					
Saturation (%)	98					
Void Ratio	0.740					
Diameter (mm)	72.80					
Height (mm)	169.98					
Specific Gravity	2.70					
Liquid Limit	59					
Plastic Limit	20					
After Consolidation		A	B	C	D	
B-Value	0.96					
Water Content (%)	23.7					
Dry Density (g/cm ³)	1.577					
Saturation (%)	100					
Void Ratio	0.712					
Effective Stress (kPa)	384.7					
Back Press. (kPa)	145.3					
Rate of Strain	0.01174					
Maximum Deviator Stress Criterion		After Shear	A	B	C	D
C (kPa)	-	σ'_1 at Failure (kPa)	715.96			
C' (kPa)	-	σ'_3 at Failure (kPa)	231.80			
ϕ (deg)	-					
ϕ' (deg)	-					

Project:	SR1	
Location:	-	
Project Number:	110773396.302.702.310	
Boring Number:	-	
Sample Number:	LLO12 ST4	
Depth:	3.0-3.45m	
Sample Type:	Undisturbed	
Description:	Clay (CH)	
Test Type	Consolidated Undrained	
Remarks		

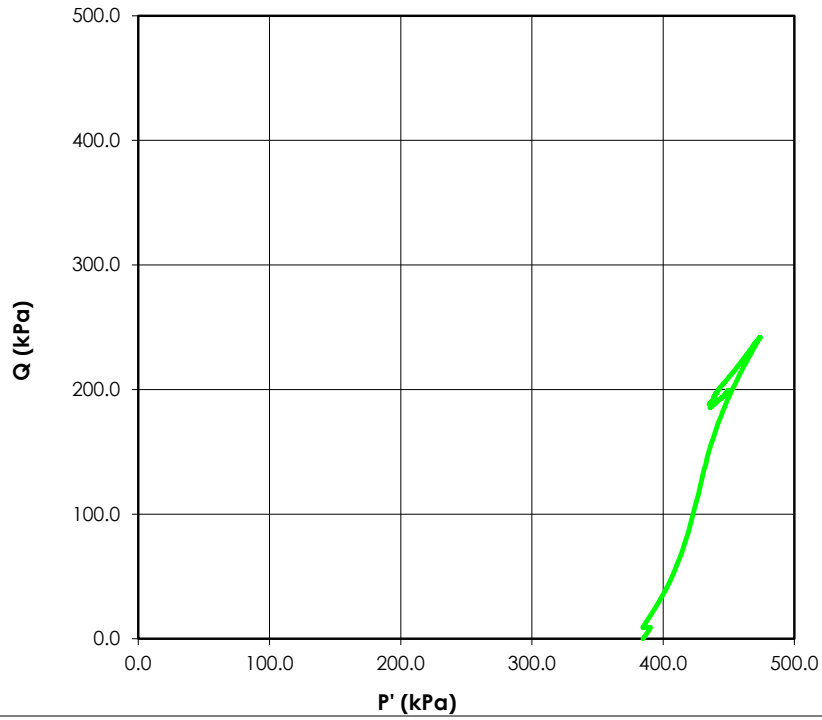
Reviewed By: C. Lamoureux

Date: 9-Jun-18

Tested By: E. Wahl

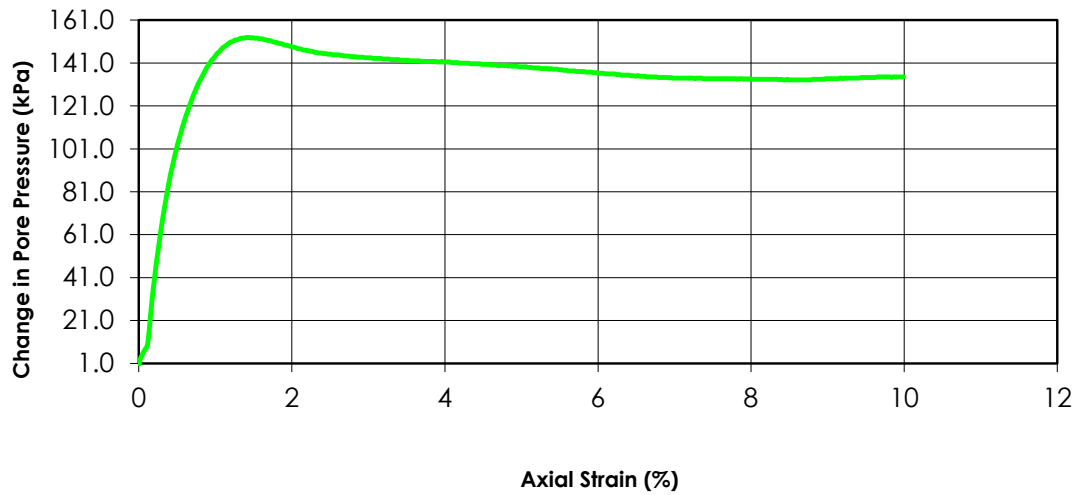
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Stress Paths (Effective)

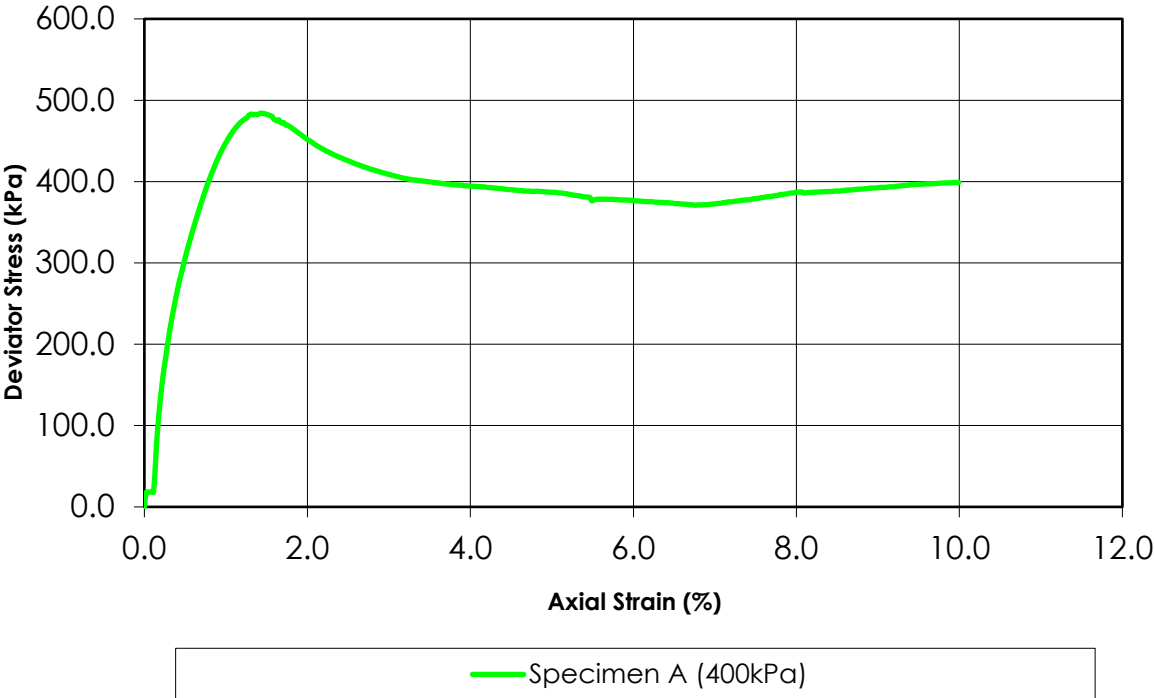


— Specimen A (400kPa)

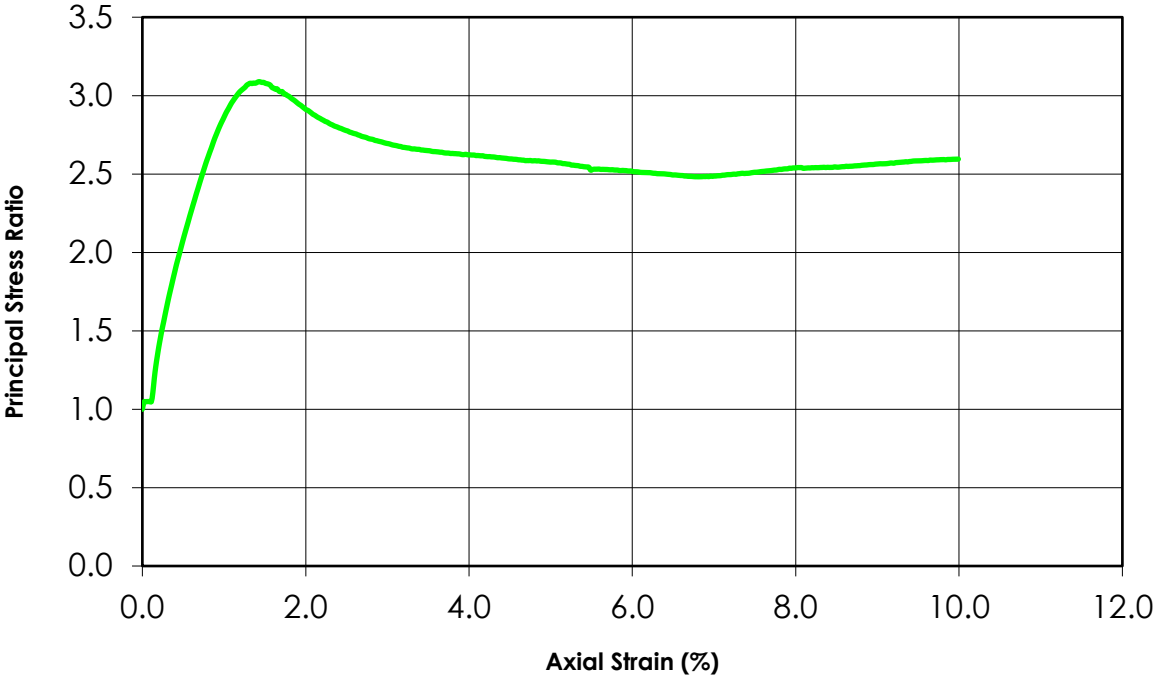
Change in Pore Pressure vs. Axial Strain



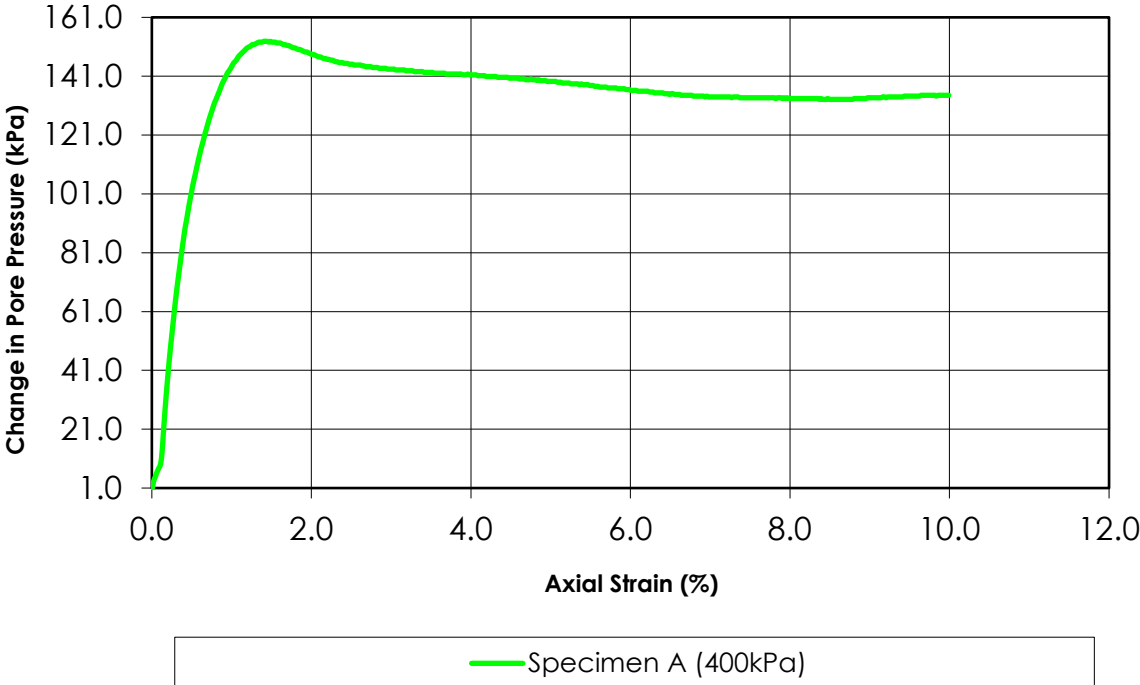
Deviator Stress vs. Axial Strain



Principal Stress Ratio vs. Axial Strain

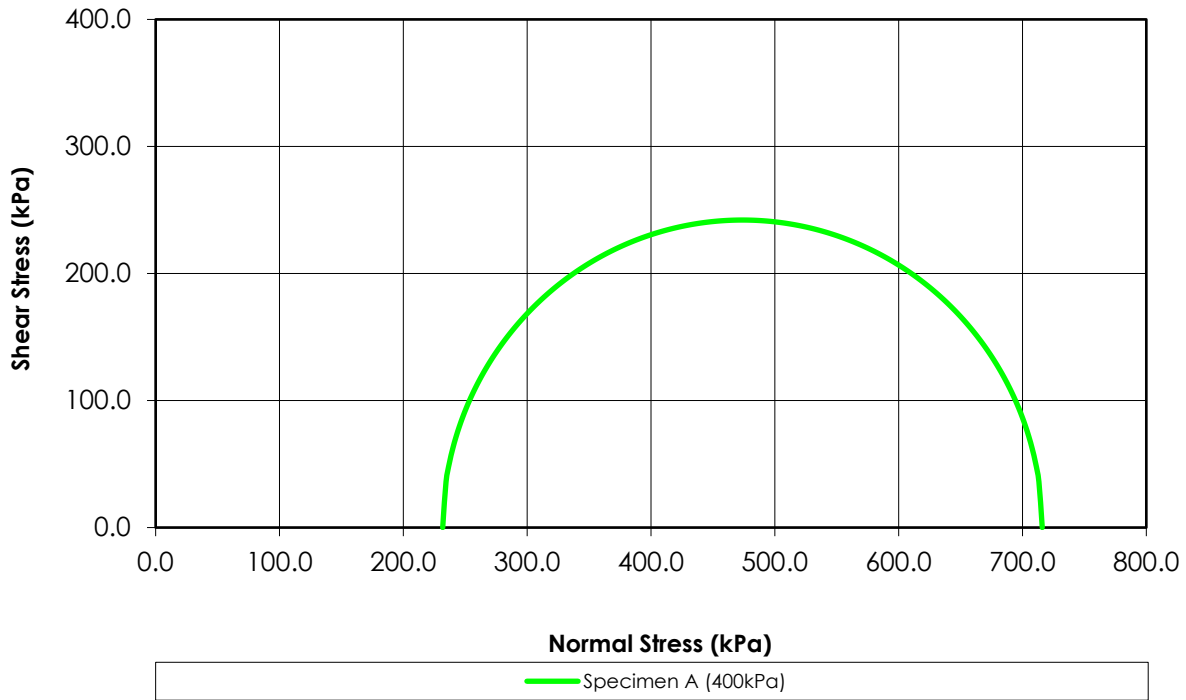


Change in Pore Pressure vs. Axial Strain

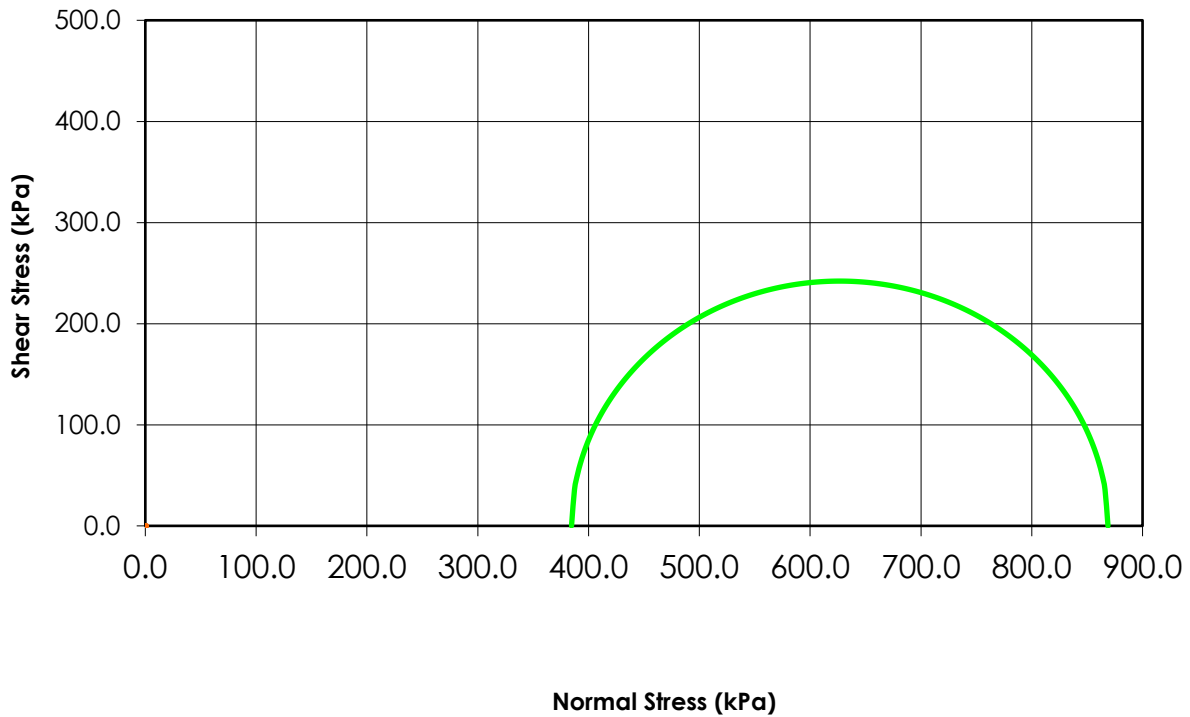


Mohr Stress Circles at Maximum Deviator Stress Criterion

Effective Stress

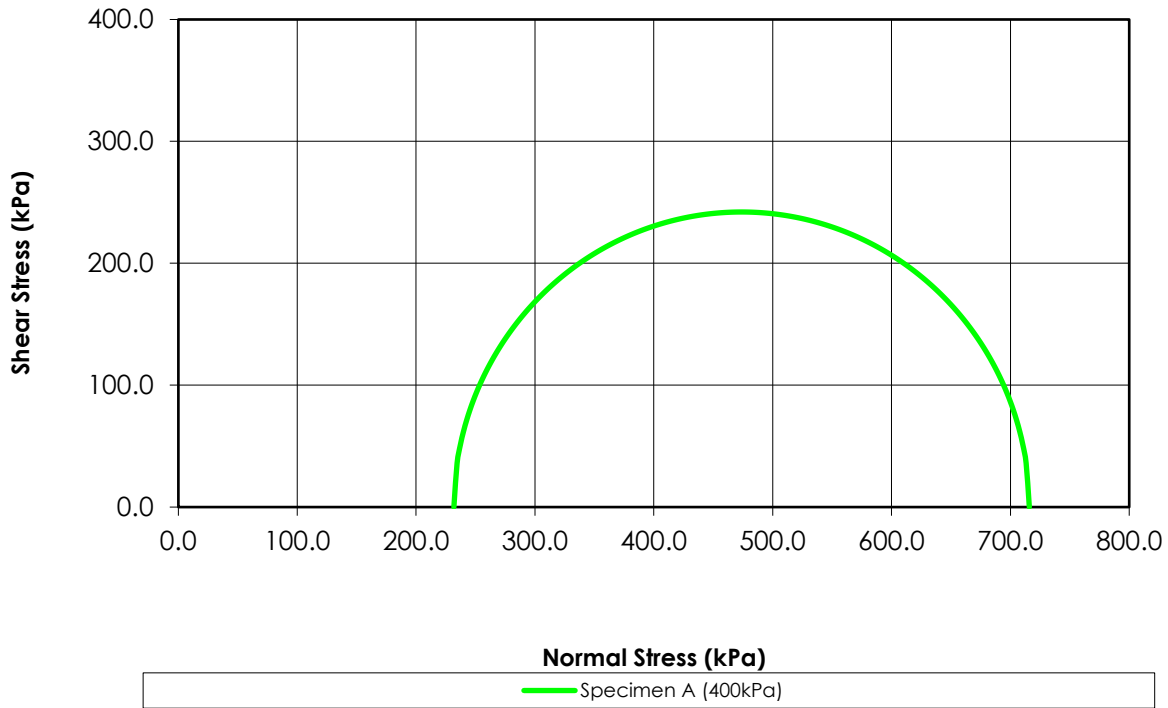


Total Stress

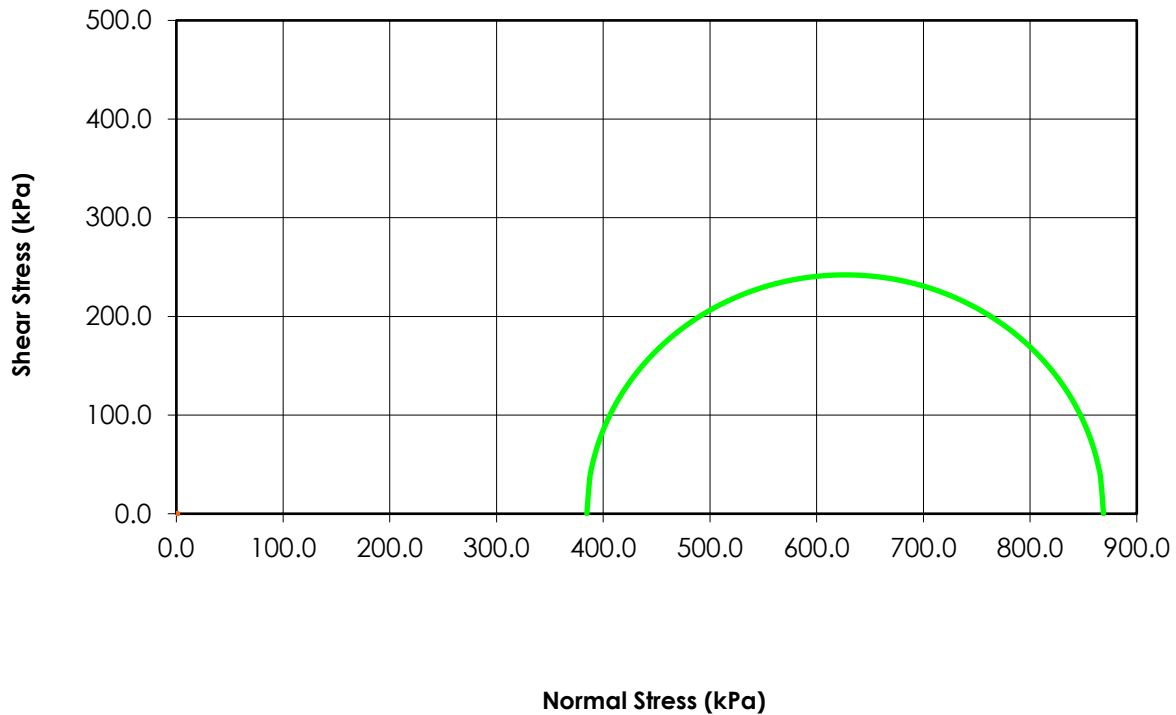


Mohr Stress Circles at Maximum Principal Stress Ratio Criterion

Effective Stress

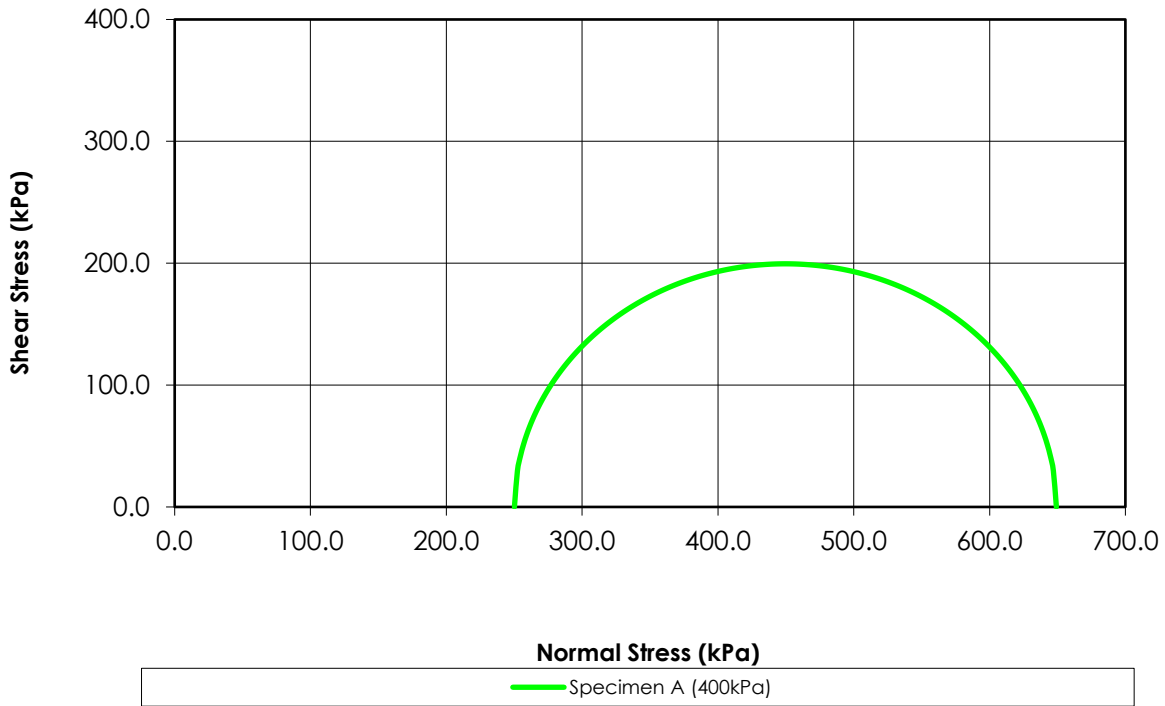


Total Stress

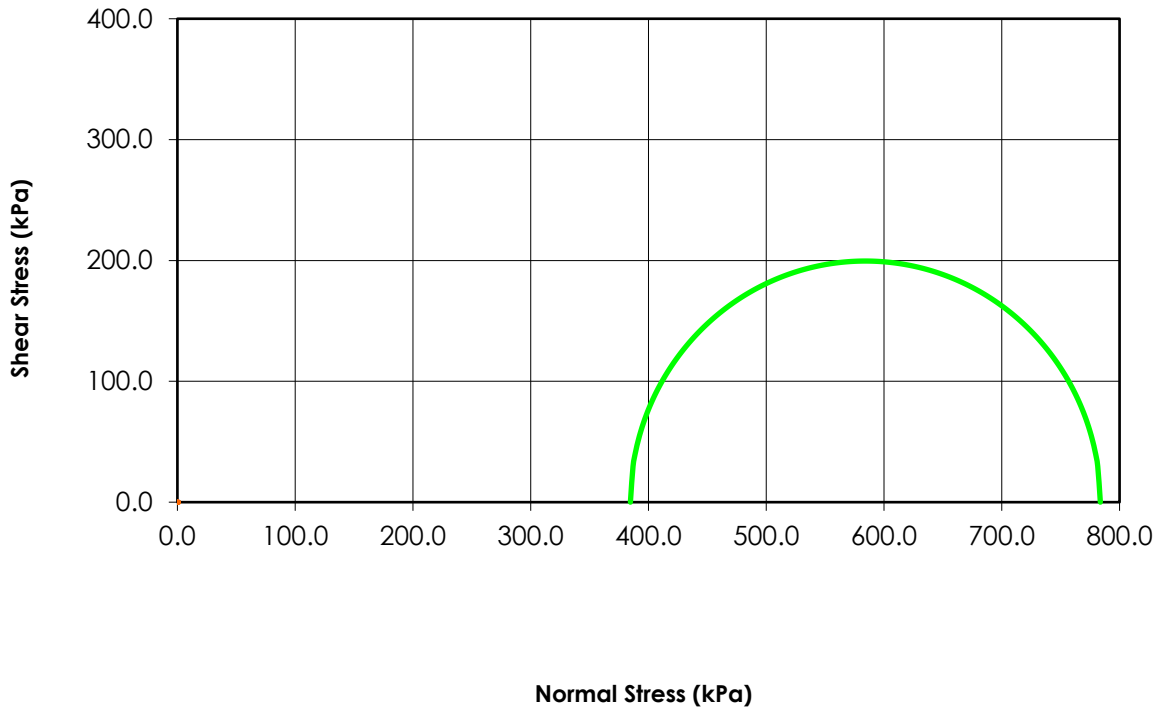


Mohr Stress Circles at 15% Axial Strain Criterion

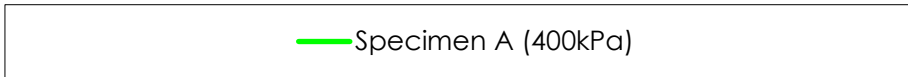
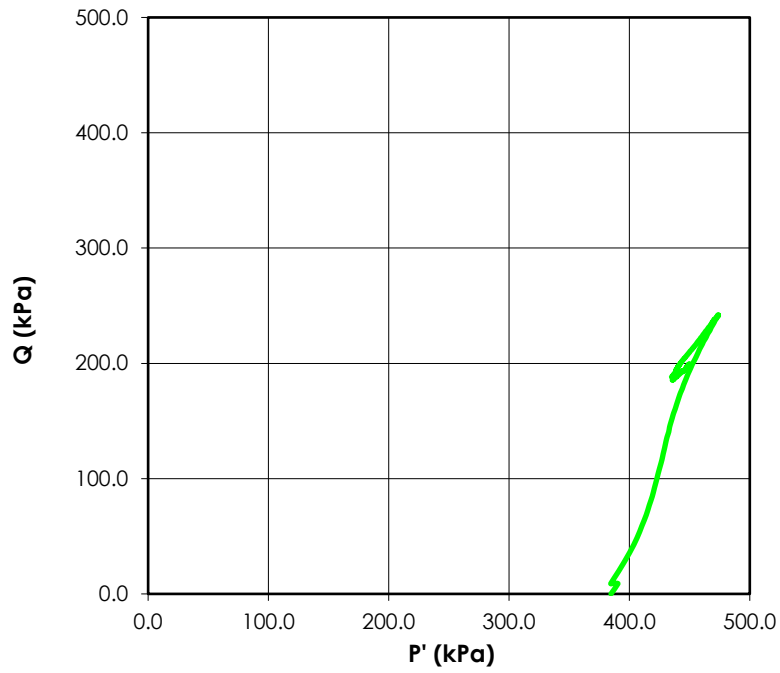
Effective Stress



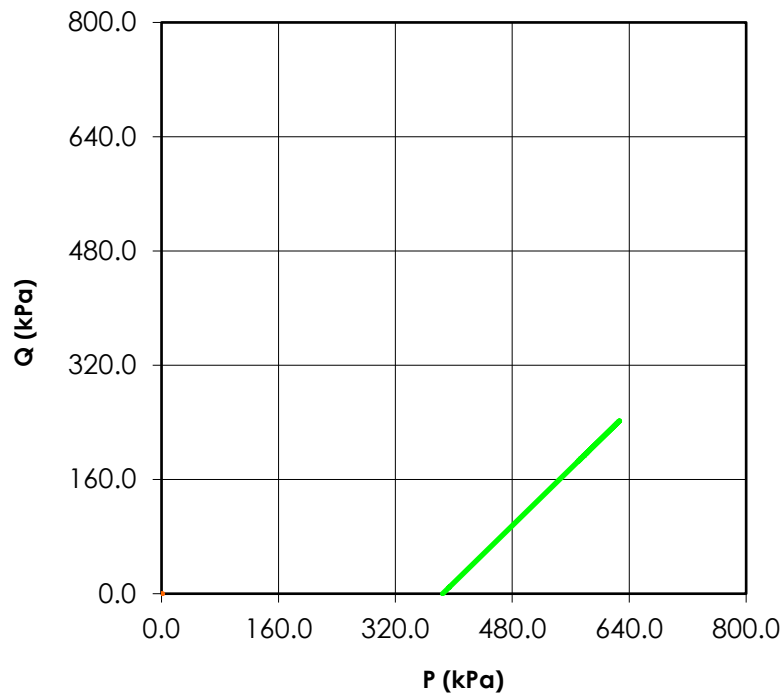
Total Stress



Stress Paths (Effective)

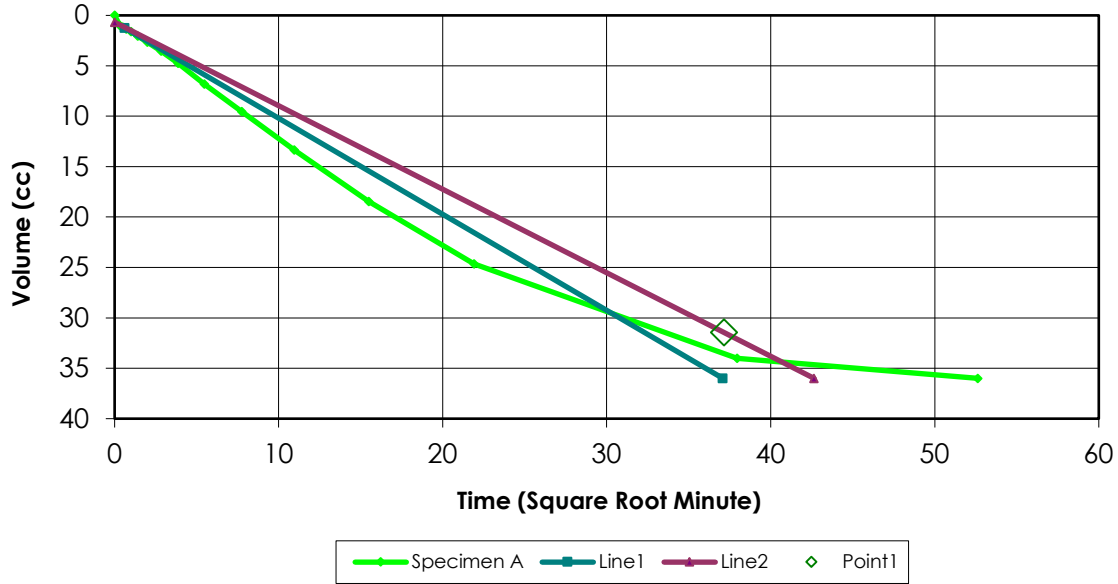


Stress Paths (Total)

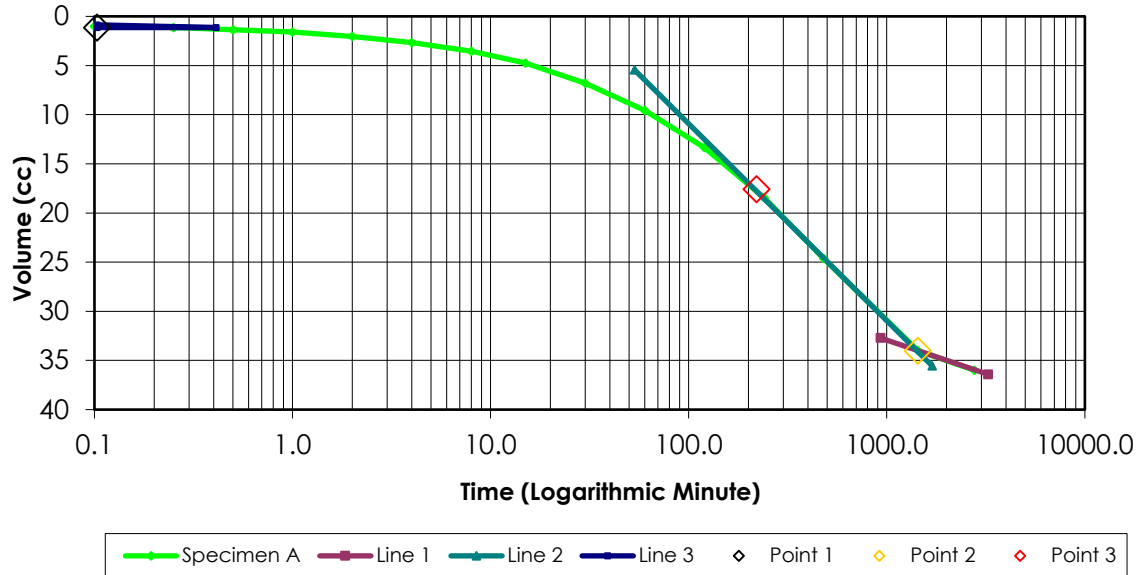


Specimen A Consolidation Graphs

Consolidation Graph (Square Root Time)



Consolidation Graph (Logarithmic Time)



B-Value Calculations - Specimen A
CU Triaxial Test

Stantec Consulting Ltd.

Client: Alberta Transportation Project No. 110773396
 Project Name: SRI

Project Location: - _____

Hole No. - _____ B-Value: 0.96

Reading No.	Sample Pressure (kPa)	Chamber Pressure (kPa)	Pore Pressure Change (kPa)	Chamber Pressure Change (kPa)	B-Value
0	80.0	60.0	N/A	N/A	N/A
1	80.0	60.0	0.0	0.0	
2	150.0	60.0	70.0	0.0	0.42
3	150.0	130.0	0.0	70.0	
4	150.0	130.0	0.0	0.0	
5	220.0	130.0	70.0	0.0	0.73
6	150.0	130.0	-70.0	0.0	
7	150.0	130.0	0.0	0.0	
8	220.0	130.0	70.0	0.0	0.81
9	150.0	130.0	-70.0	0.0	
10	150.0	130.0	0.0	0.0	
11	220.0	130.0	70.0	0.0	0.88
12	150.0	130.0	-70.0	0.0	
13	150.0	130.0	0.0	0.0	
14	220.0	130.0	70.0	0.0	0.84
15	150.0	130.0	-70.0	0.0	
16	150.0	130.0	0.0	0.0	
17	220.0	130.0	70.0	0.0	0.96

 Laboratory Supervisor

Consolidation Calculations Specimen**A**
CU Triaxial Test

Stantec Consulting Ltd.

Client: Alberta Transportation Project No. 110773396
Project Name: SR1

Project Location: - _____

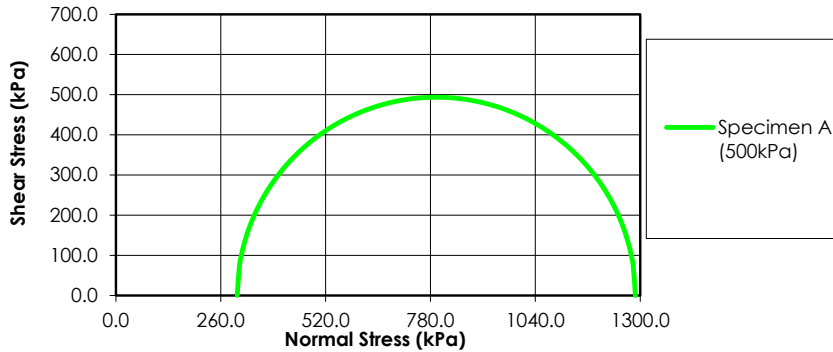
Hole No. - _____

Depth: 3.0-3.45mCell Pressure (kPa) 530 Test Type = CU
Back Pressure (kPa) 130
Effective Pressure (kPa) 400Initial Sample Diameter (mm) 72.8 Burette Reading at Start of Test (cc)= 0
Initial Sample Height (mm) 170
Initial Sample Area (cm²) 41.63
Initial Volume (cm³) 707.5

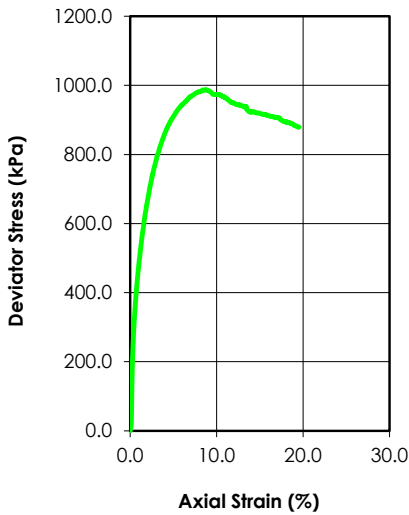
Time	Burette Reading (cc)	Volume Change (cc)
00:00:00	46.55	N/A
00:00:06	45.55	1.000
00:00:15	45.40	1.150
00:00:30	45.20	1.350
00:01:00	44.95	1.600
00:02:00	44.50	2.050
00:04:00	43.90	2.650
00:08:00	43.00	3.550
00:15:00	41.80	4.750
00:30:00	39.75	6.800
01:00:00	37.00	9.550
02:00:00	33.20	13.350
04:00:00	28.10	18.450
08:00:00	21.90	24.650
24:00:00	12.55	34.000
46:10:00	10.55	36.000

Laboratory Supervisor

Effective Stress at Maximum Deviator Stress Criterion



Deviator Stress Vs. Axial Strain



	Specimen			
	A	B	C	D
Initial				
Water Content (%)	20.5			
Dry Density (g/cm ³)	1.796			
Saturation (%)	100			
Void Ratio	0.501			
Diameter (mm)	72.02			
Height (mm)	169.12			
Specific Gravity	2.70			
Liquid Limit	39			
Plastic Limit	17			
After Consolidation				
B-Value	0.95			
Water Content (%)	17.4			
Dry Density (g/cm ³)	1.891			
Saturation (%)	100			
Void Ratio	0.428			
Effective Stress (kPa)	490.0			
Back Press. (kPa)	70.0			
Rate of Strain	0.01159			
Maximum Deviator Stress Criterion				
	After Shear	A	B	C
C (kPa)	-	σ' ₁ at Failure (kPa)	1288.02	
C' (kPa)	-	σ' ₃ at Failure (kPa)	300.71	
Ø (deg)	-			
Ø' (deg)	-			

Project:	SR1	
Location:	-	
Project Number:	110773396.302.702.310	
Boring Number:	-	
Sample Number:	LLO12 ST6	
Depth:	4.6-5.05m	
Sample Type:	Undisturbed	
Description:	Clay (Cl), Some Gravel, Some Sand	
Test Type	Consolidated Undrained	
Remarks		

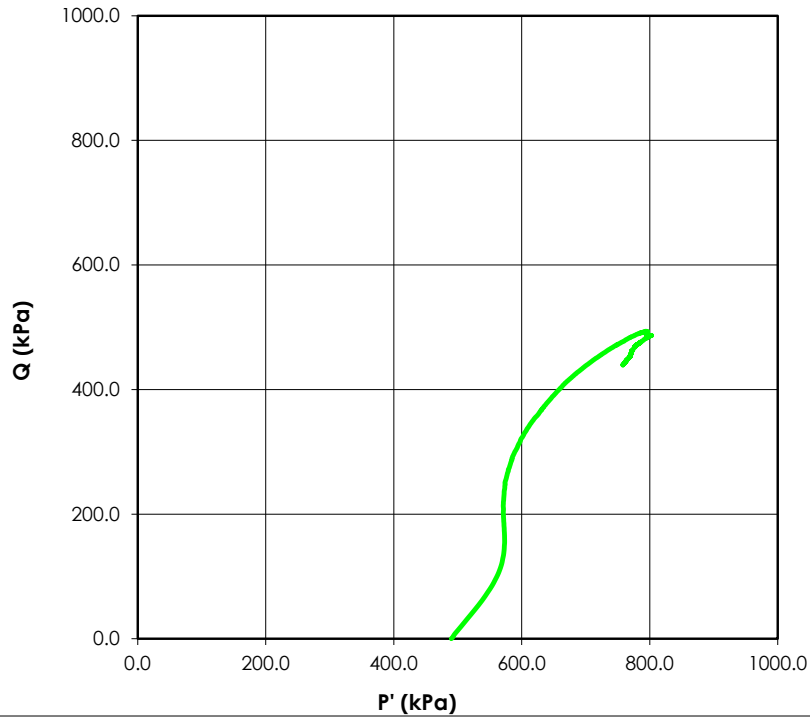
Reviewed By: C. Lamoureux

Date: 11-Jun-18

Tested By: E. Wahl

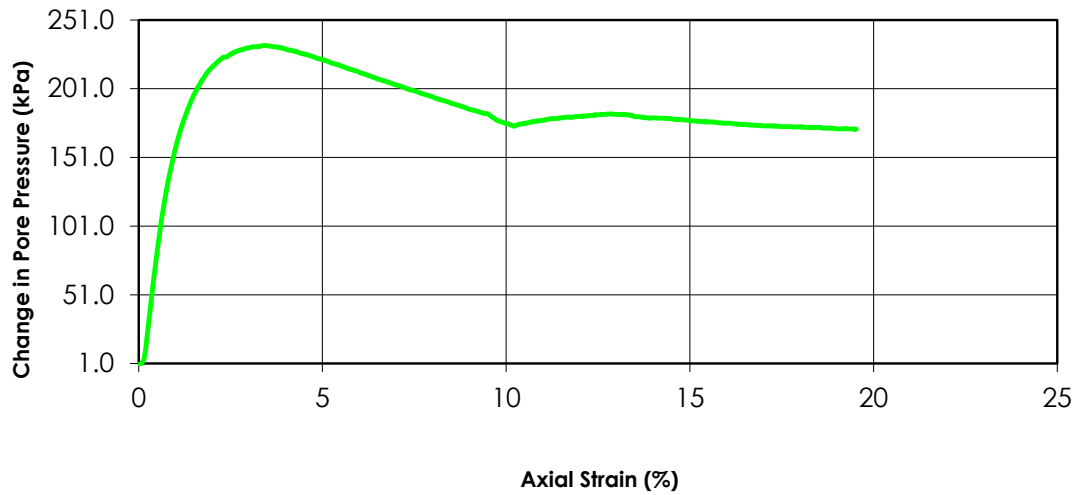
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Stress Paths (Effective)

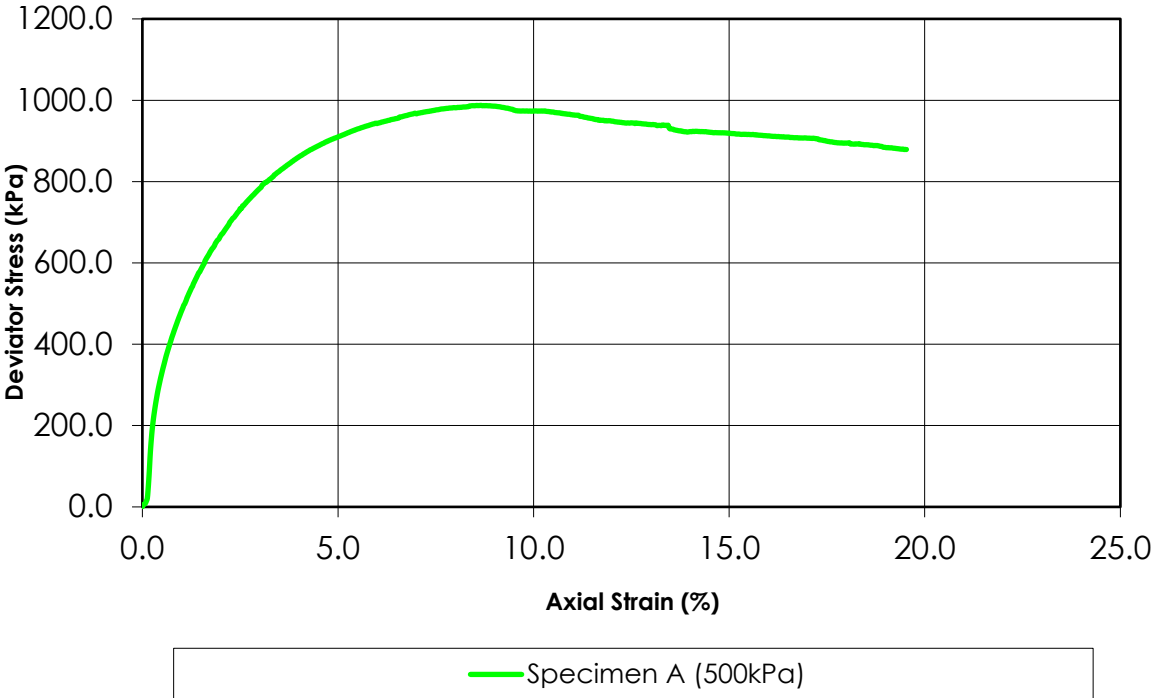


— Specimen A (500kPa)

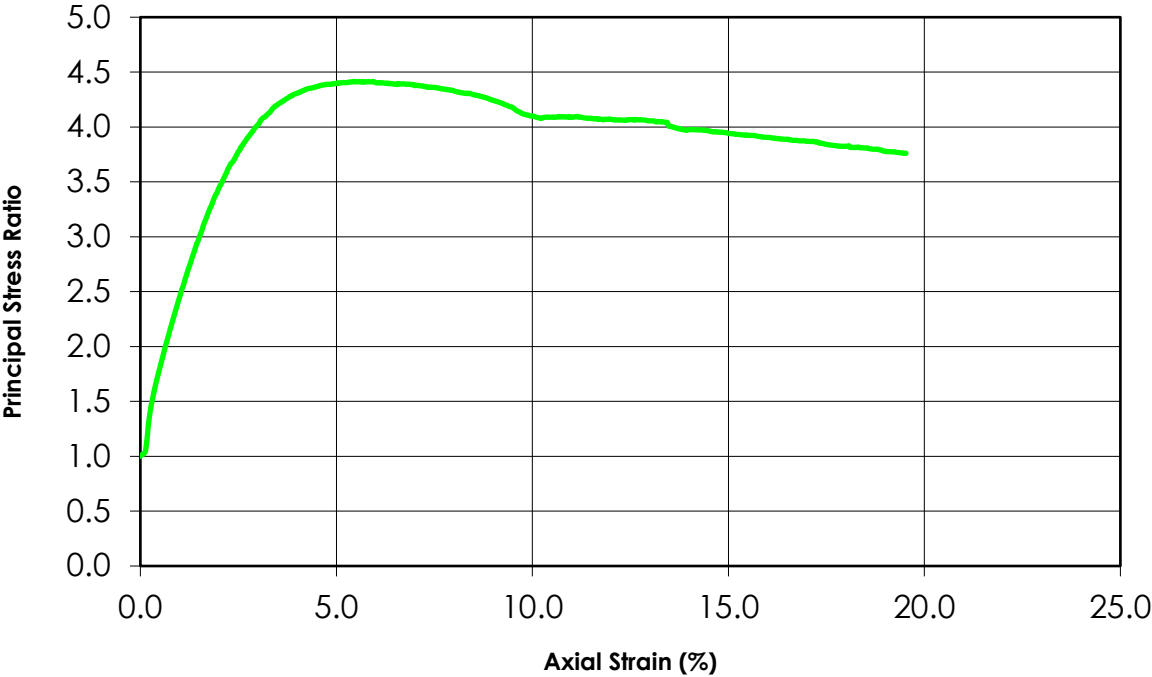
Change in Pore Pressure vs. Axial Strain



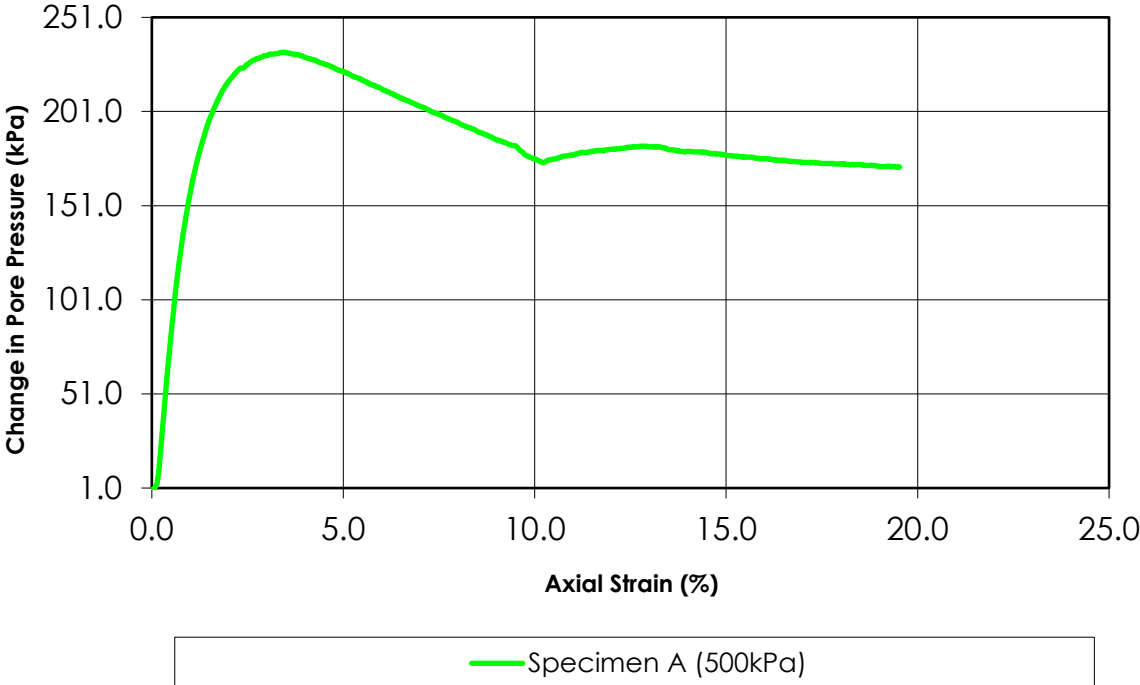
Deviator Stress vs. Axial Strain



Principal Stress Ratio vs. Axial Strain

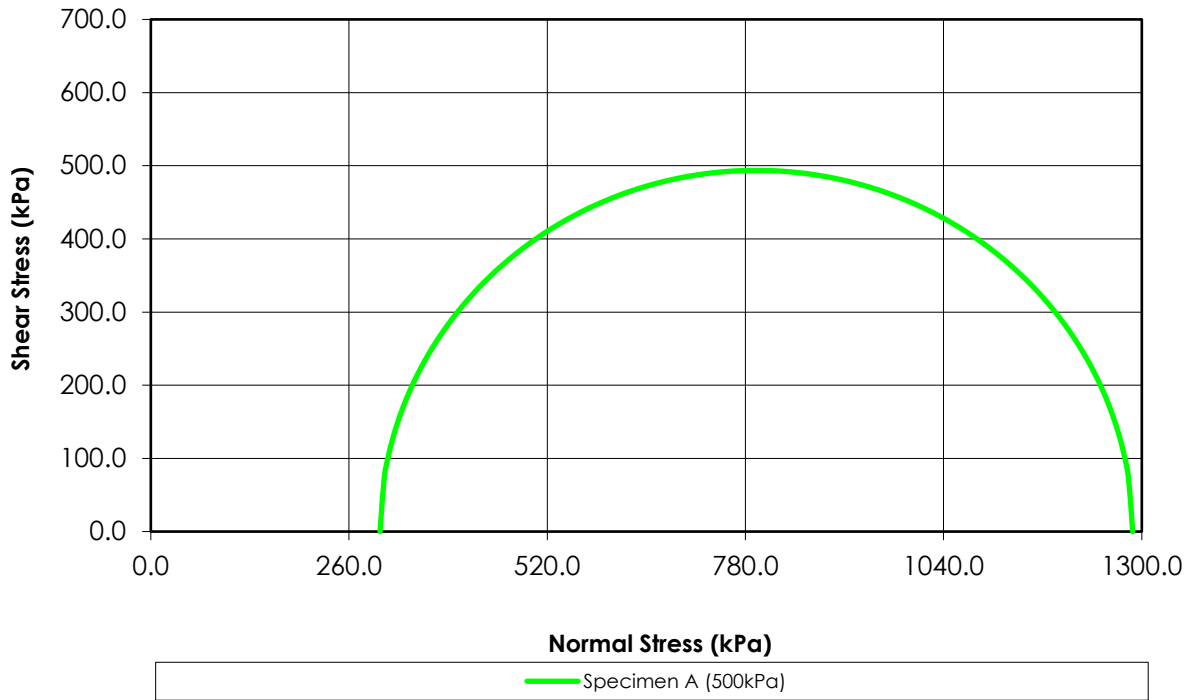


Change in Pore Pressure vs. Axial Strain

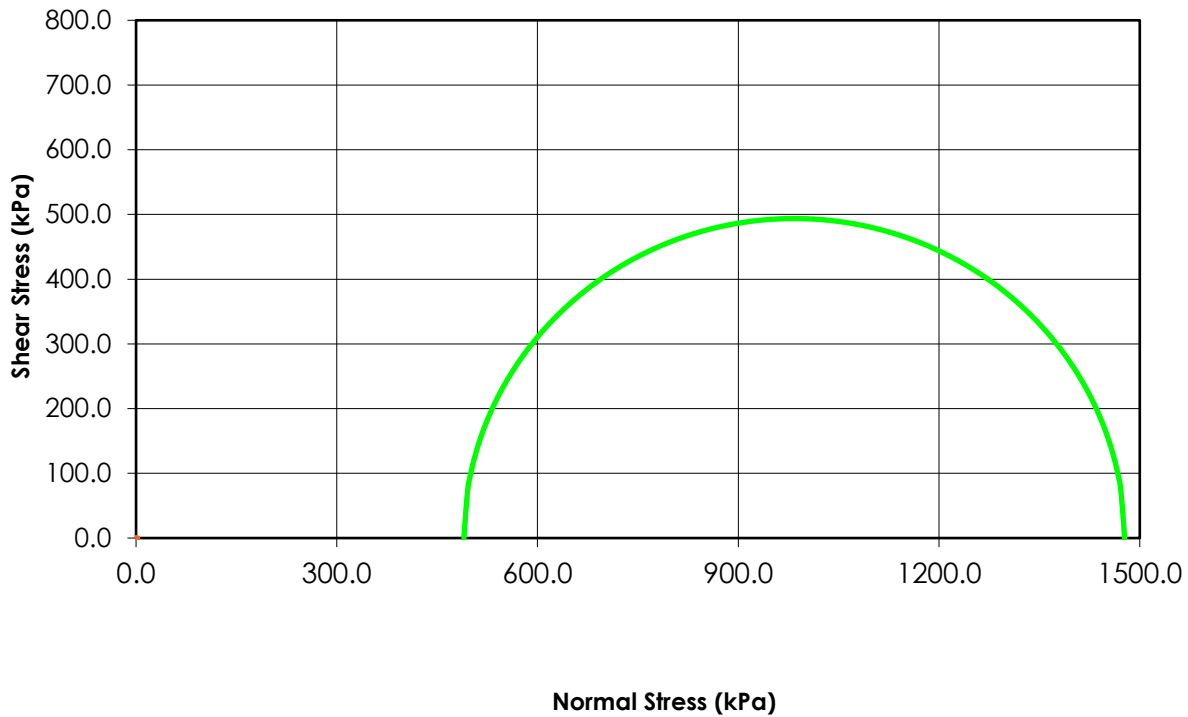


Mohr Stress Circles at Maximum Deviator Stress Criterion

Effective Stress

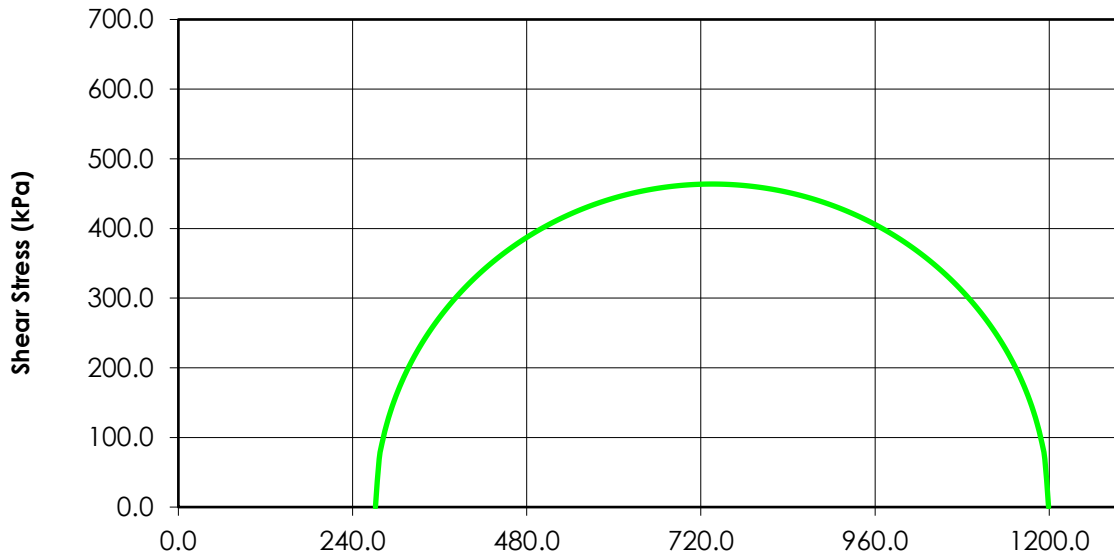


Total Stress



Mohr Stress Circles at Maximum Principal Stress Ratio Criterion

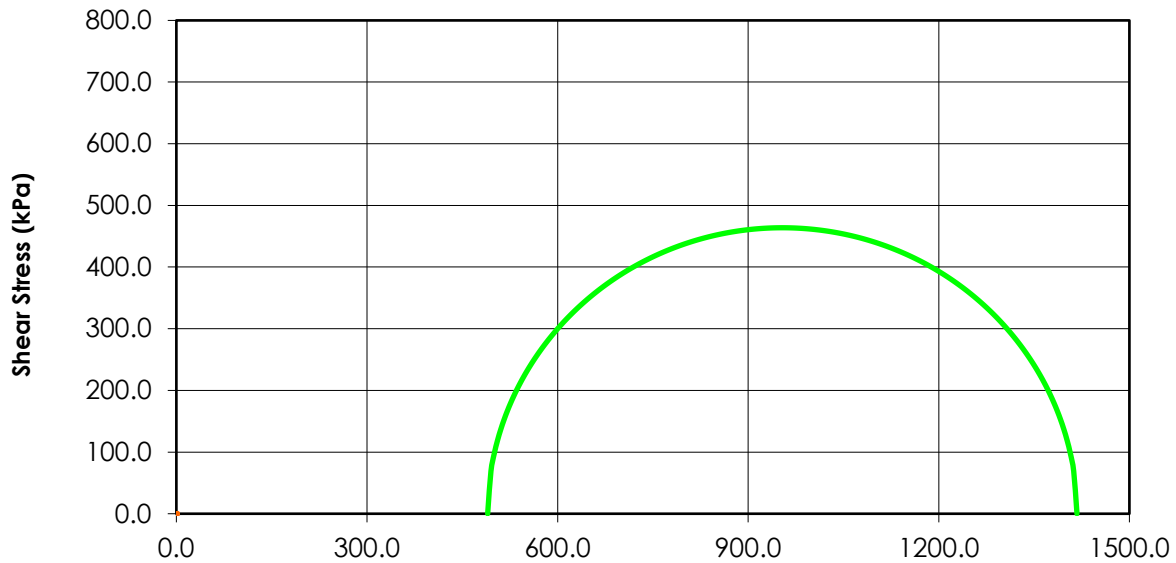
Effective Stress



Normal Stress (kPa)

— Specimen A (500kPa)

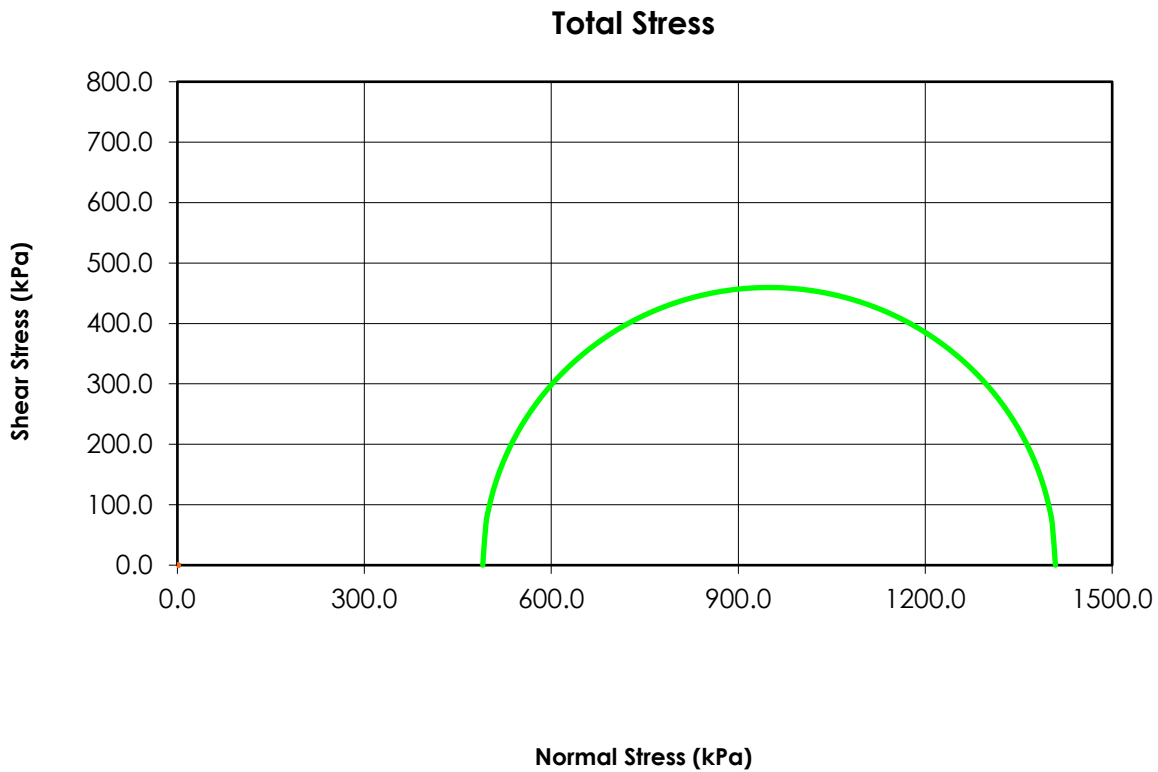
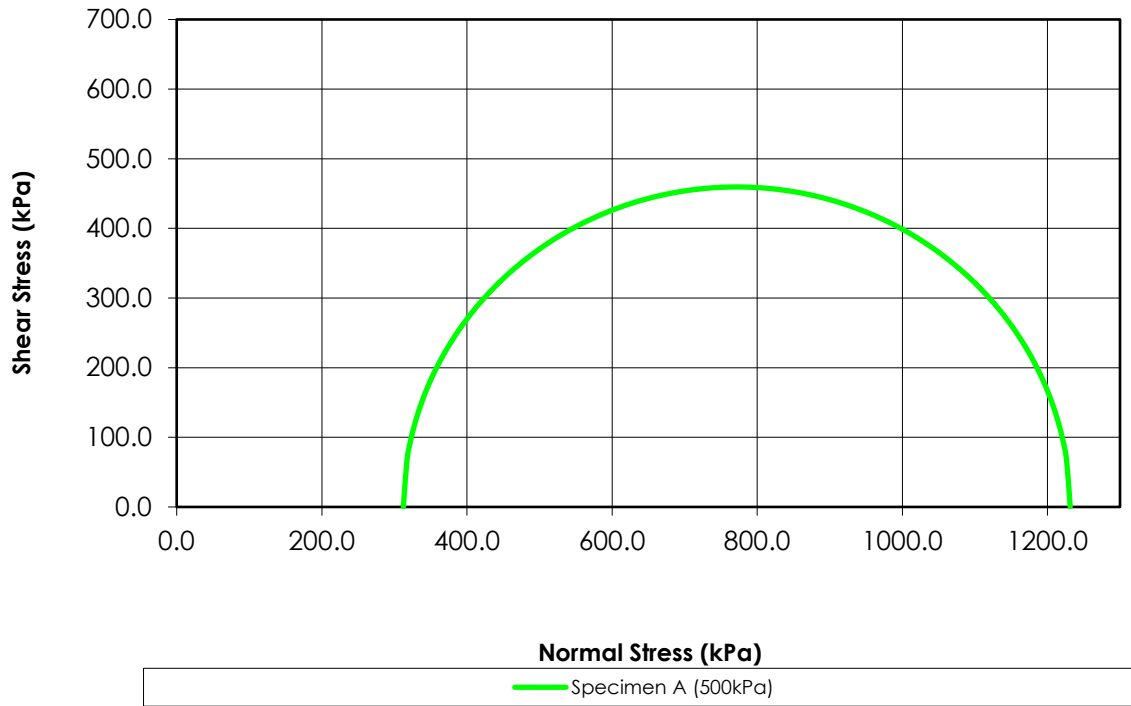
Total Stress



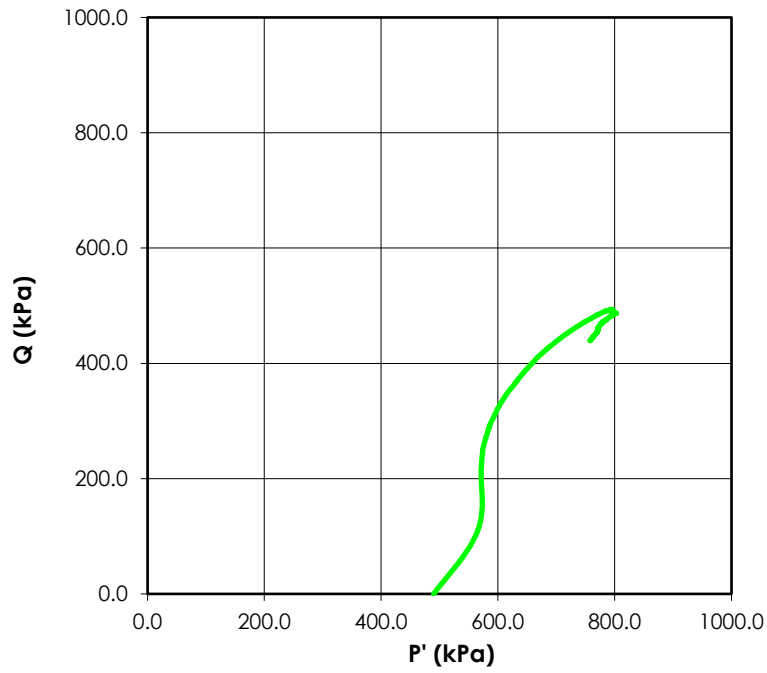
Normal Stress (kPa)

Mohr Stress Circles at 15% Axial Strain Criterion

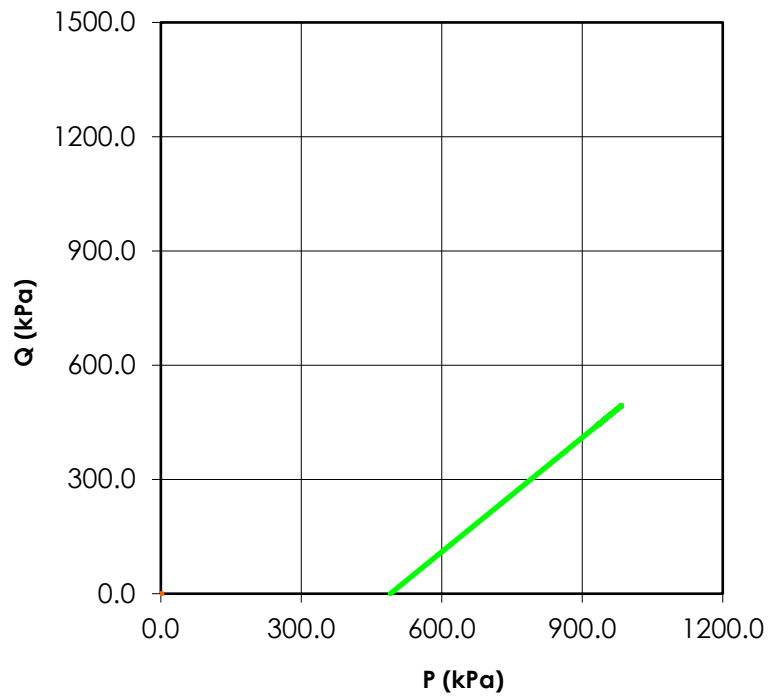
Effective Stress



Stress Paths (Effective)

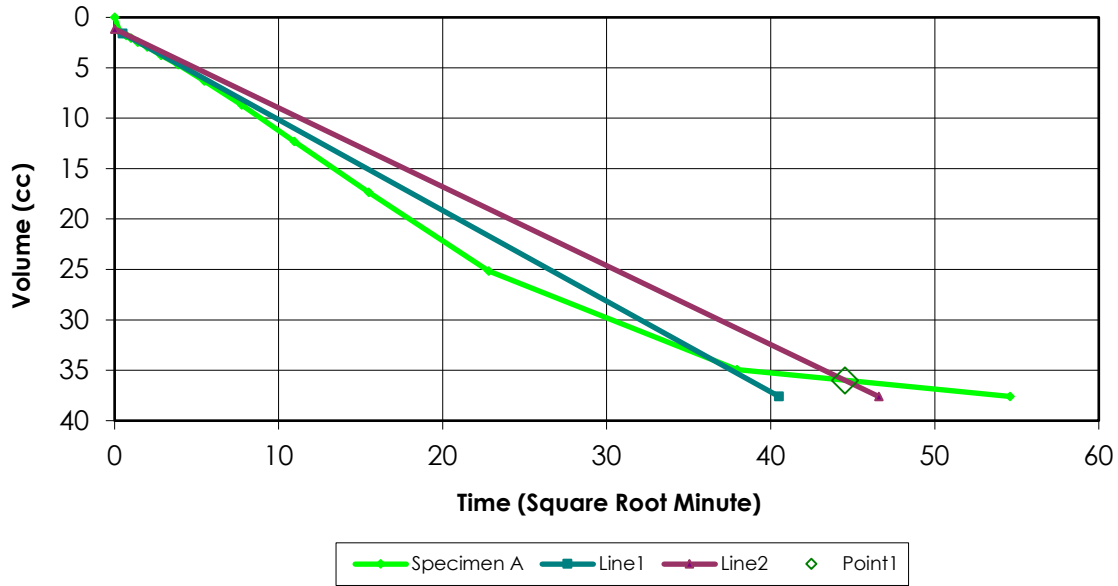


Stress Paths (Total)

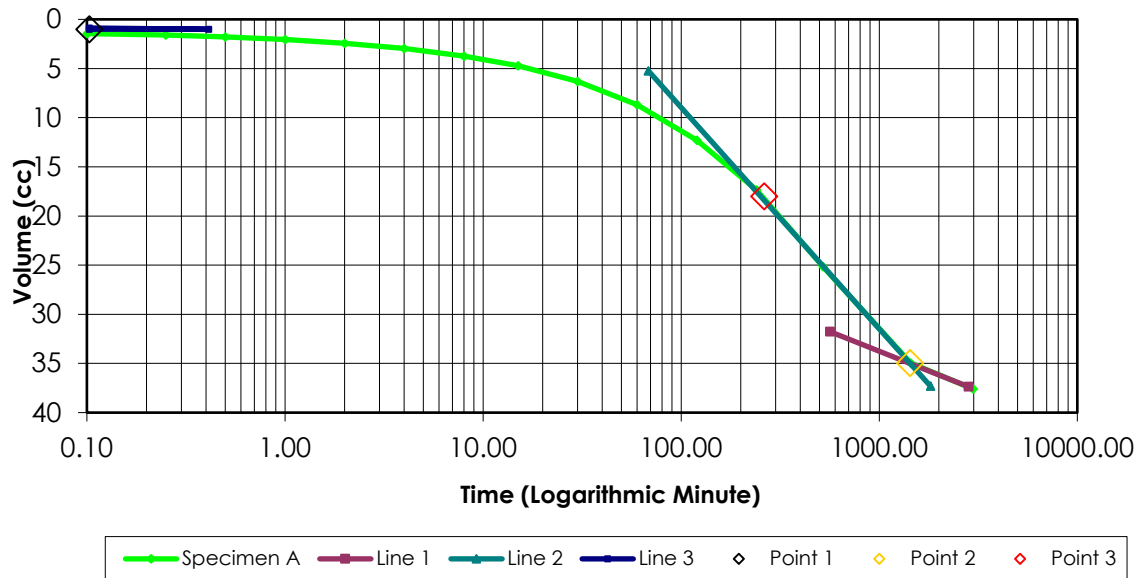


Specimen A Consolidation Graphs

Consolidation Graph (Square Root Time)



Consolidation Graph (Logarithmic Time)



B-Value Calculations - Specimen A
CU Triaxial Test

Stantec Consulting Ltd.

Client: Alberta Transportation Project No. 110773396
 Project Name: SRI

Project Location: _____

Hole No. - _____ B-Value: 0.95

Reading No.	Sample Pressure (kPa)	Chamber Pressure (kPa)	Pore Pressure Change (kPa)	Chamber Pressure Change (kPa)	B-Value
0	80.0	60.0	N/A	N/A	N/A
1	80.0	60.0	0.0	0.0	
2	150.0	60.0	70.0	0.0	0.58
3	80.0	60.0	-70.0	0.0	
4	80.0	60.0	0.0	0.0	
5	150.0	60.0	70.0	0.0	0.72
6	80.0	60.0	-70.0	0.0	
7	80.0	60.0	0.0	0.0	
8	150.0	60.0	70.0	0.0	0.75
9	80.0	60.0	-70.0	0.0	
10	80.0	60.0	0.0	0.0	
11	150.0	60.0	70.0	0.0	0.88
12	80.0	60.0	-70.0	0.0	
13	80.0	60.0	0.0	0.0	
14	150.0	60.0	70.0	0.0	0.93
15	80.0	60.0	-70.0	0.0	
16	80.0	60.0	0.0	0.0	
17	150.0	60.0	70.0	0.0	0.95

 Laboratory Supervisor

Consolidation Calculations Specimen**A**
CU Triaxial Test

Stantec Consulting Ltd.

Client: Alberta Transportation Project No. 110773396
Project Name: SR1

Project Location: _____

Hole No. - _____

Depth: 4.6-5.05mCell Pressure (kPa) 560 Test Type = CU
Back Pressure (kPa) 60
Effective Pressure (kPa) 500Initial Sample Diameter (mm) 72.02 Burette Reading at Start of Test (cc)= 0
Initial Sample Height (mm) 169.1
Initial Sample Area (cm²) 40.74
Initial Volume (cm³) 689

Time	Burette Reading (cc)	Volume Change (cc)
00:00:00	47.05	N/A
00:00:06	45.60	1.450
00:00:15	45.45	1.600
00:00:30	45.25	1.800
00:01:00	45.00	2.050
00:02:00	44.60	2.450
00:04:00	44.10	2.950
00:08:00	43.30	3.750
00:15:00	42.35	4.700
00:30:00	40.75	6.300
01:00:00	38.35	8.700
02:00:00	34.75	12.300
04:00:00	29.70	17.350
08:40:00	21.90	25.150
24:00:00	12.10	34.950
49:40:00	9.45	37.600

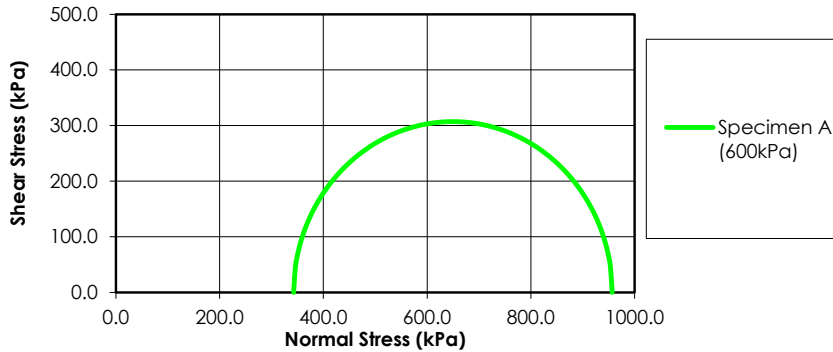
Laboratory Supervisor

Reviewed By: C. Lamoureux

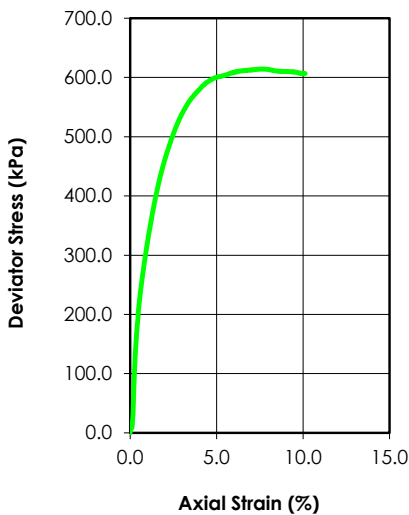
Date: 10-Jun-18

Tested By: E. Wahl

Effective Stress at Maximum Deviator Stress Criterion



Deviator Stress Vs. Axial Strain

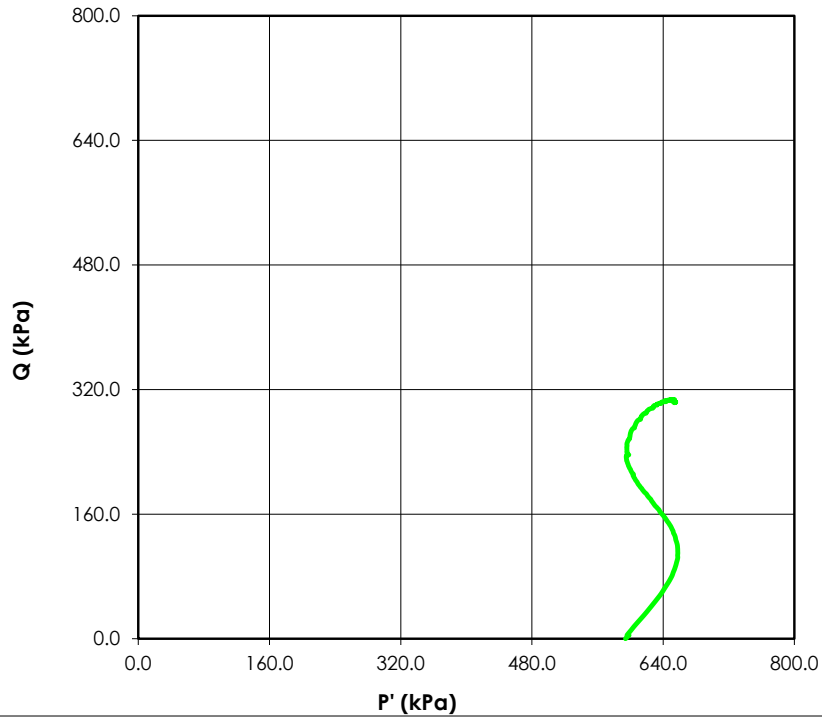


	Specimen					
	Initial	A	B	C	D	
Water Content (%)	16.8					
Dry Density (g/cm ³)	1.859					
Saturation (%)	100					
Void Ratio	0.449					
Diameter (mm)	71.96					
Height (mm)	171.28					
Specific Gravity	2.70					
Liquid Limit	34					
Plastic Limit	15					
After Consolidation		A	B	C	D	
B-Value	0.95					
Water Content (%)	14.0					
Dry Density (g/cm ³)	1.950					
Saturation (%)	100					
Void Ratio	0.385					
Effective Stress (kPa)	594.1					
Back Press. (kPa)	65.9					
Rate of Strain	0.01167					
Maximum Deviator Stress Criterion		After Shear	A	B	C	D
C (kPa)	-	σ'_1 at Failure (kPa)	956.84			
C' (kPa)	-	σ'_3 at Failure (kPa)	342.54			
ϕ (deg)	-					
ϕ' (deg)	-					

Project:	SR1	
Location:	-	
Project Number:	110773396.302.702.310	
Boring Number:	-	
Sample Number:	LLO12 ST10	
Depth:	7.6-8.05m	
Sample Type:	Undisturbed	
Description:	Clay (Cl), Some Gravel, Trace Sand	
Test Type	Consolidated Undrained	
Remarks		

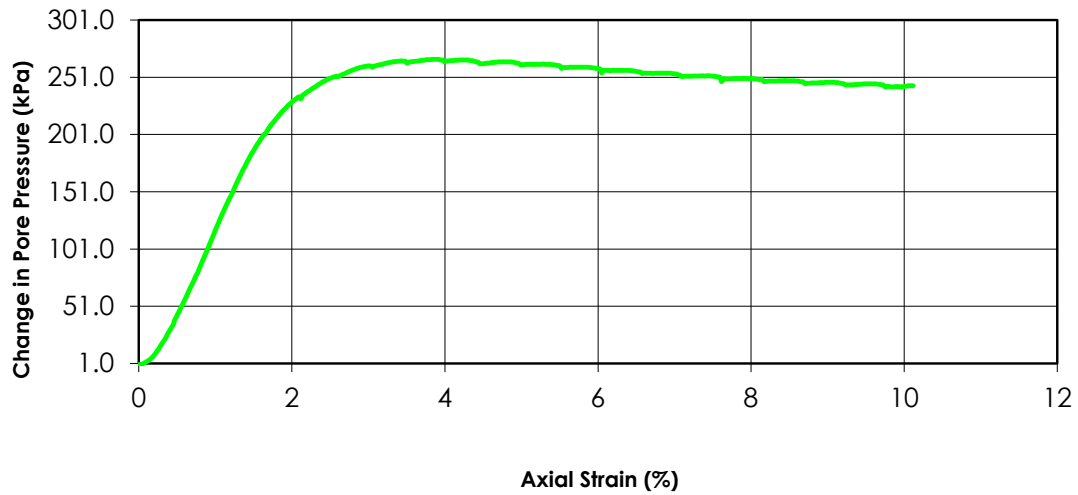
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Stress Paths (Effective)

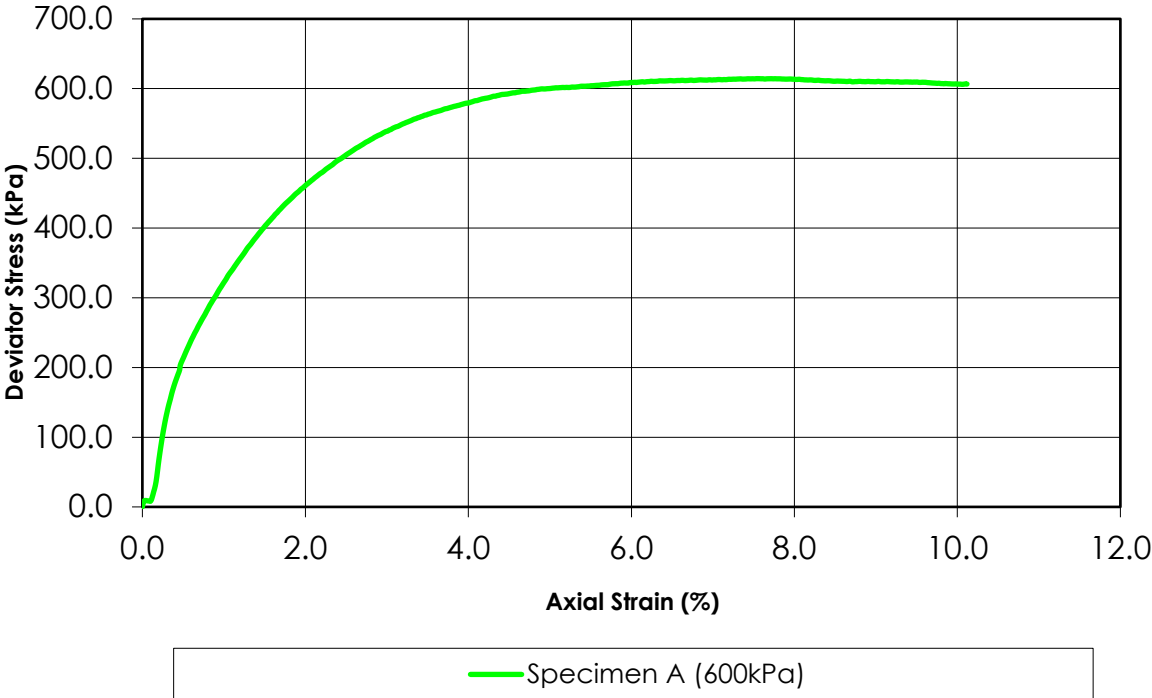


— Specimen A (600kPa)

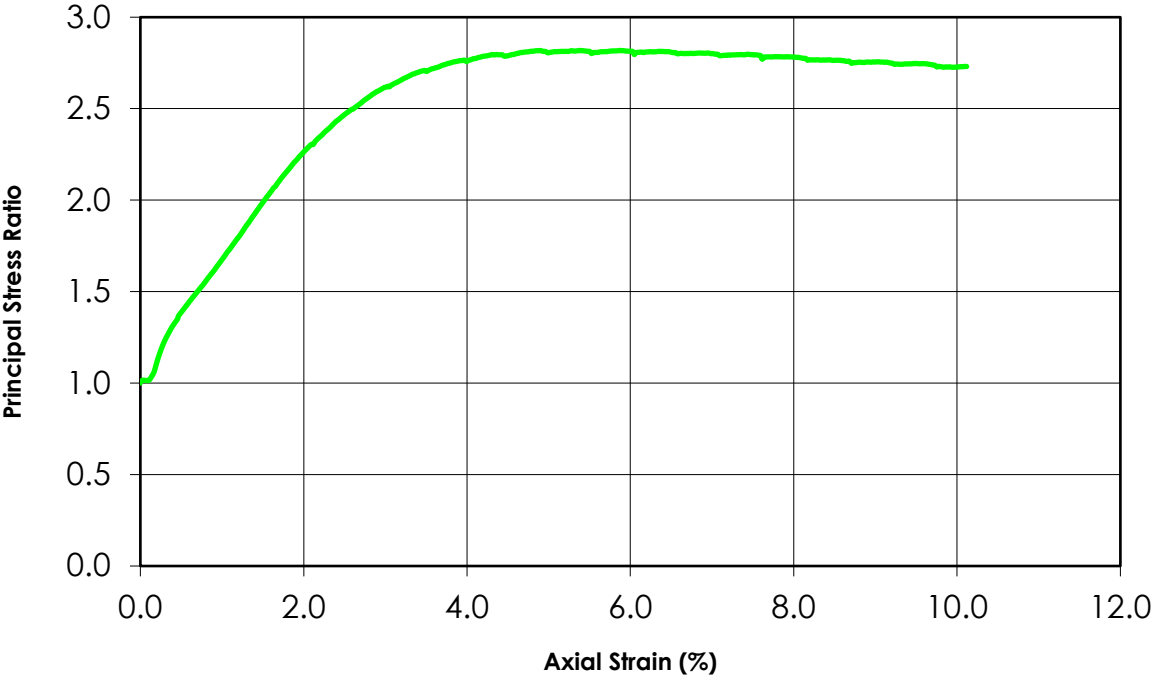
Change in Pore Pressure vs. Axial Strain



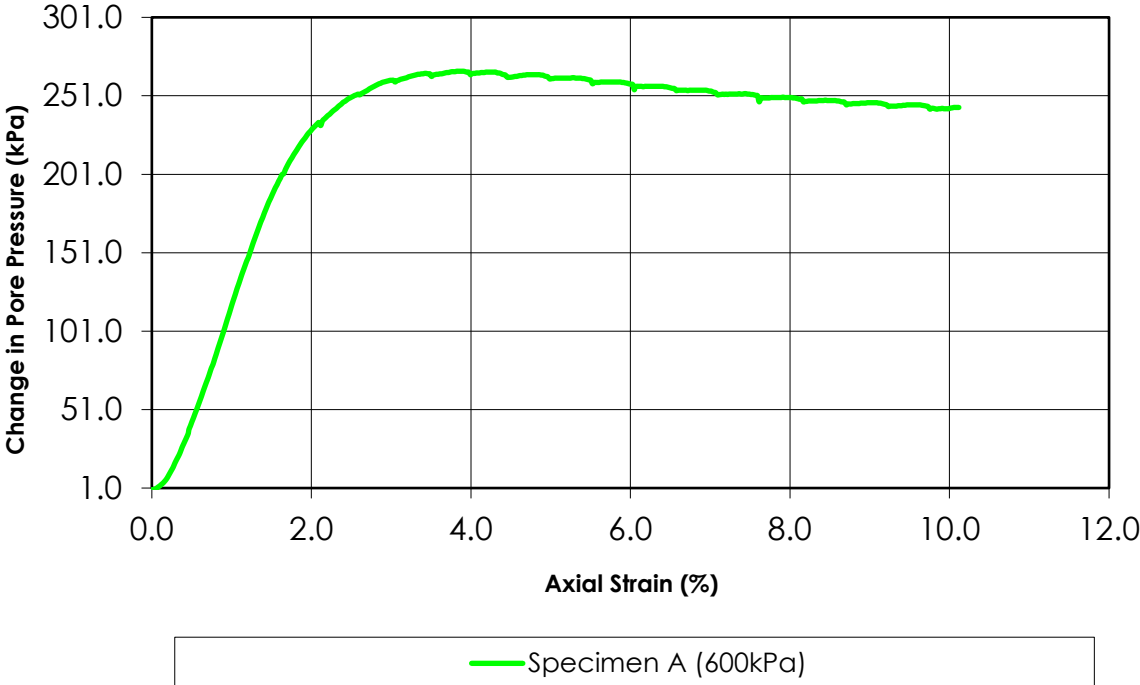
Deviator Stress vs. Axial Strain



Principal Stress Ratio vs. Axial Strain

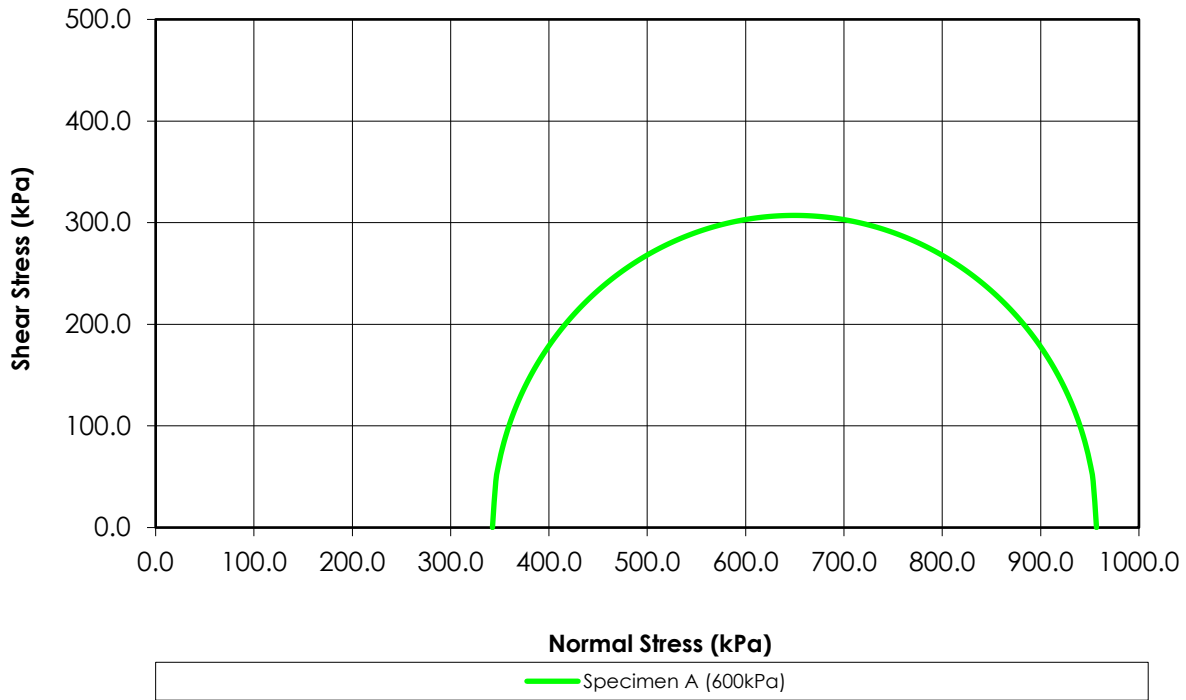


Change in Pore Pressure vs. Axial Strain

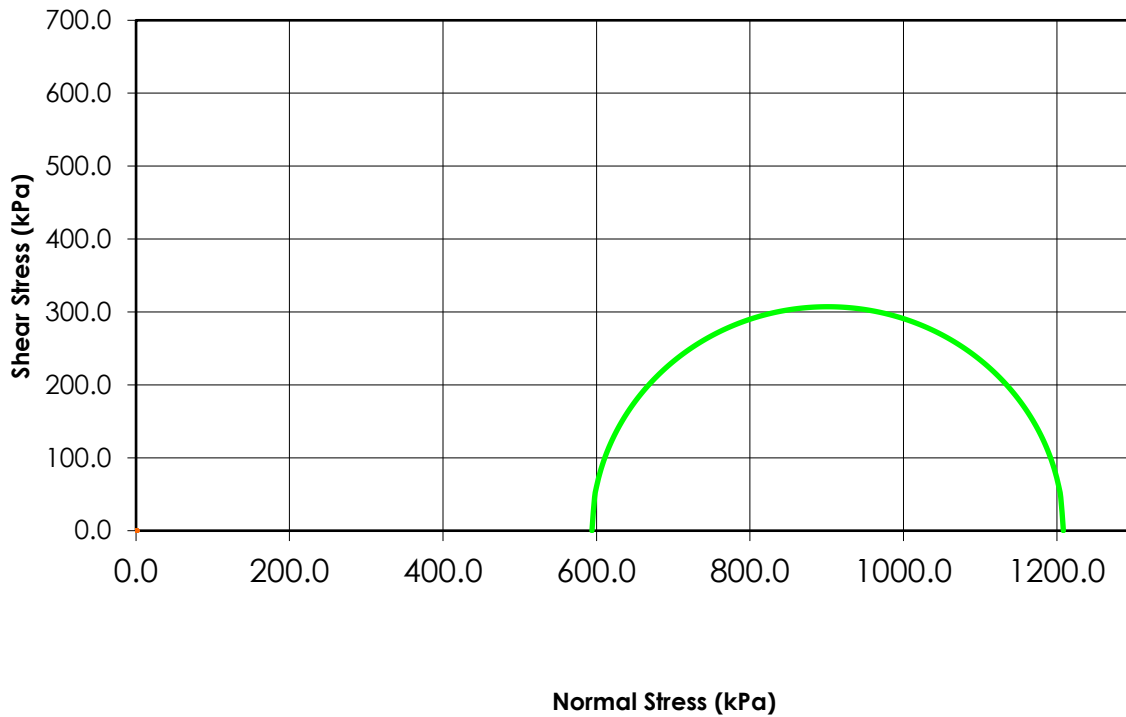


Mohr Stress Circles at Maximum Deviator Stress Criterion

Effective Stress

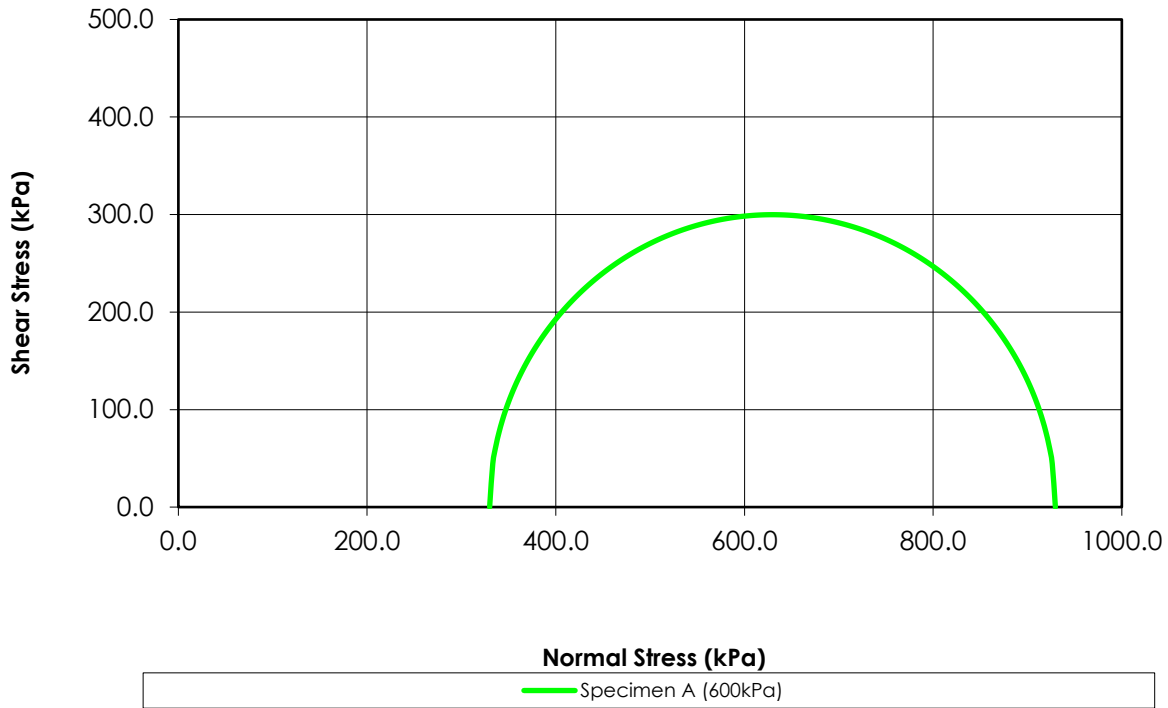


Total Stress

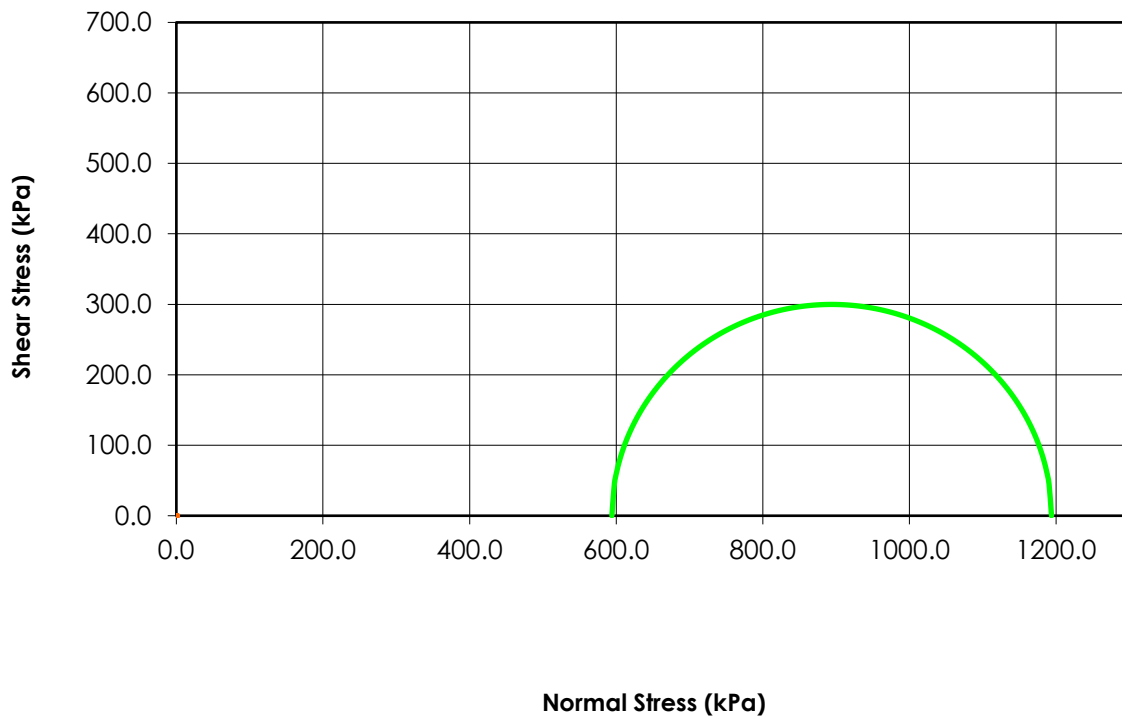


Mohr Stress Circles at Maximum Principal Stress Ratio Criterion

Effective Stress

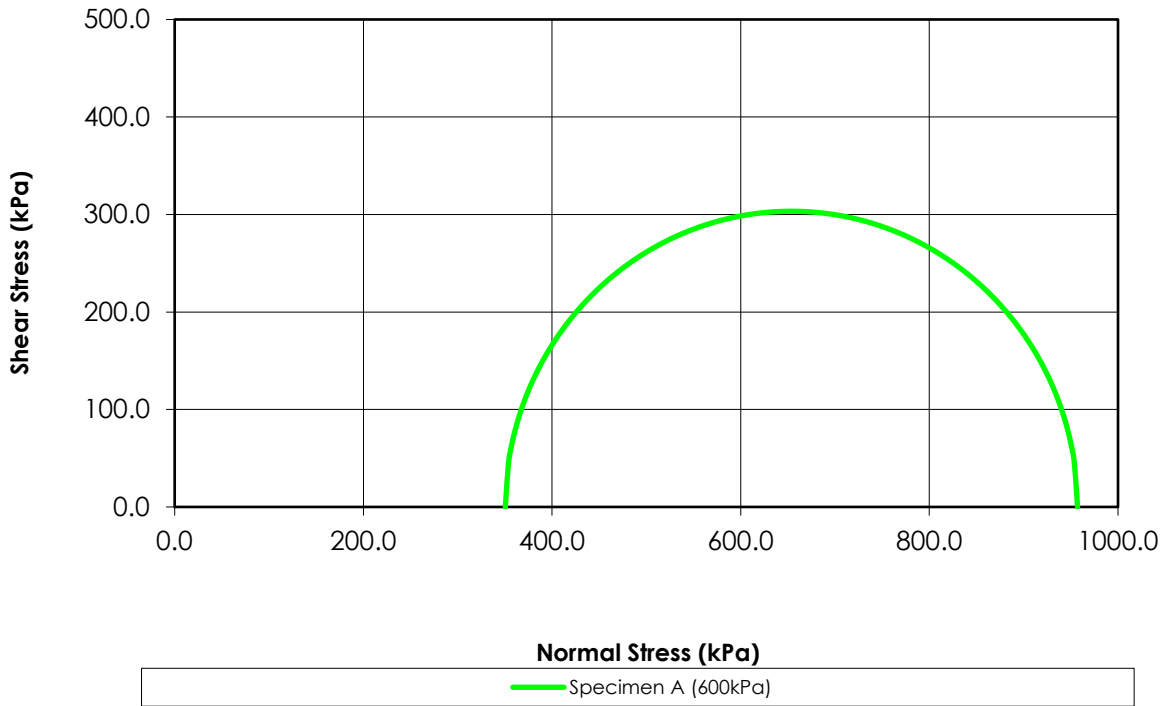


Total Stress

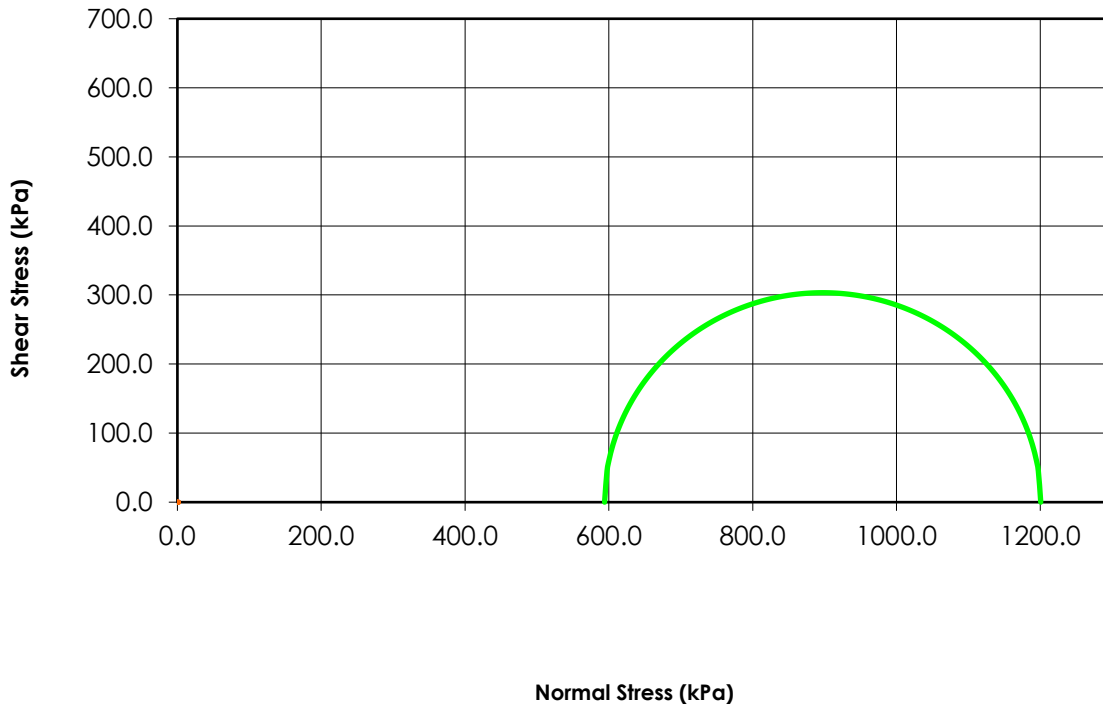


Mohr Stress Circles at 15% Axial Strain Criterion

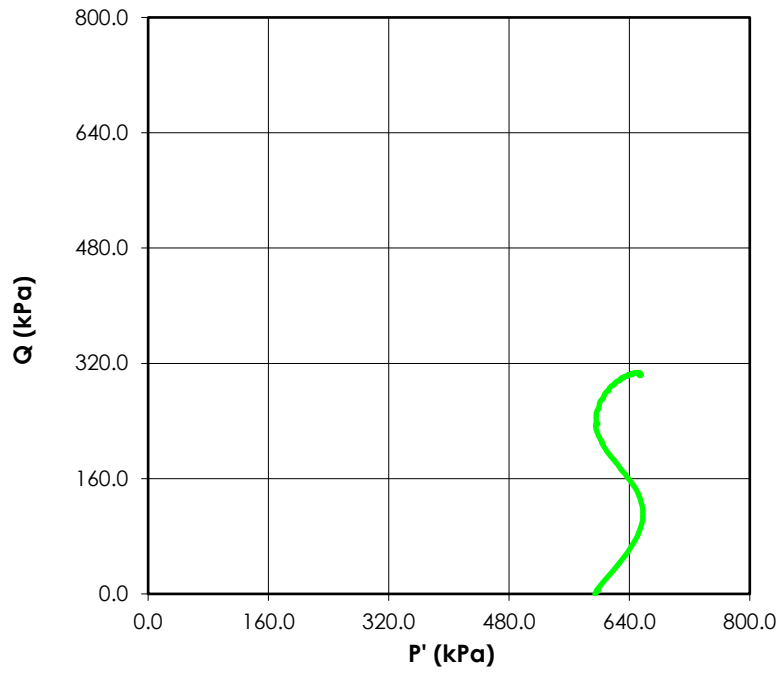
Effective Stress



Total Stress

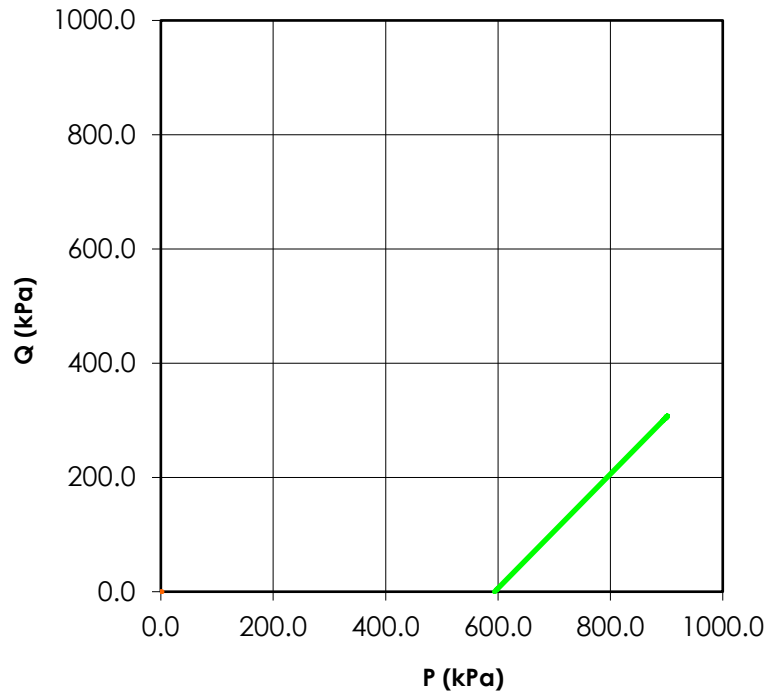


Stress Paths (Effective)



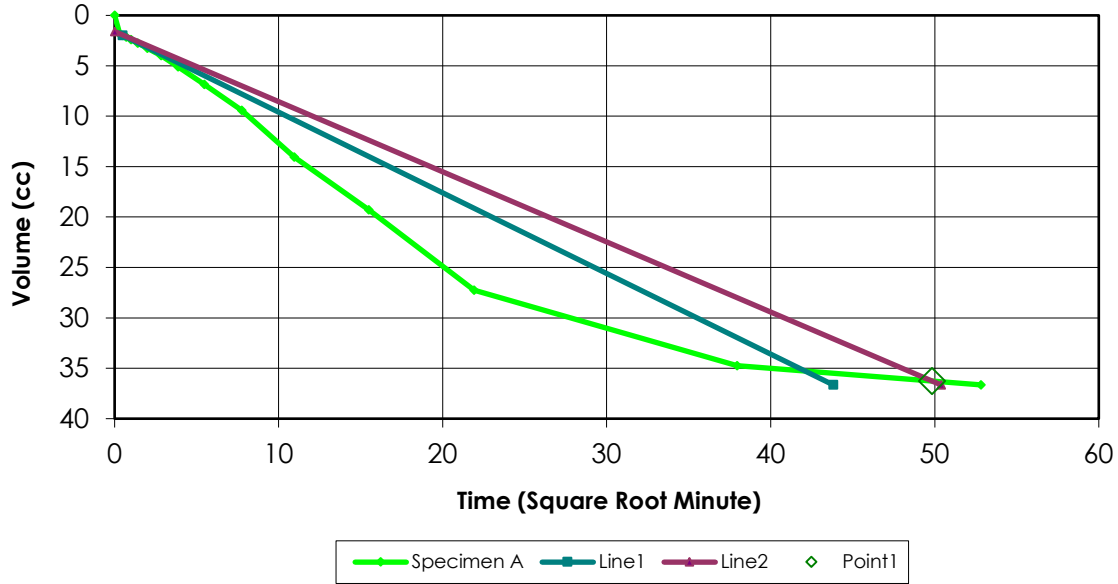
— Specimen A (600kPa)

Stress Paths (Total)

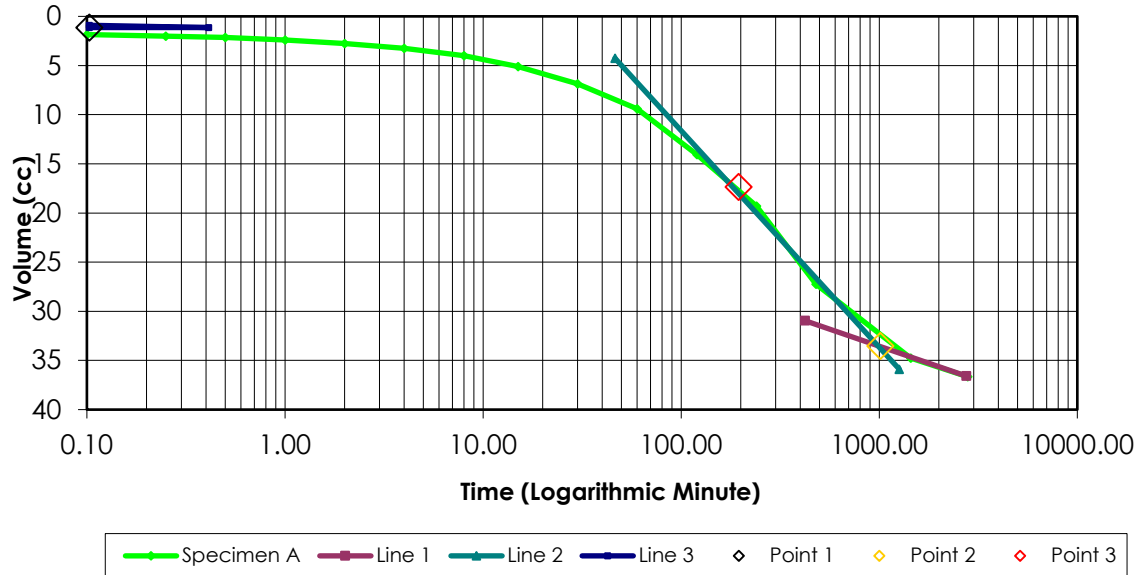


Specimen A Consolidation Graphs

Consolidation Graph (Square Root Time)



Consolidation Graph (Logarithmic Time)



B-Value Calculations - Specimen A
CU Triaxial Test

Stantec Consulting Ltd.

Client: Alberta Transportation Project No. 110773396
 Project Name: SRI

Project Location: _____

Hole No. - _____ B-Value: 0.95

Reading No.	Sample Pressure (kPa)	Chamber Pressure (kPa)	Pore Pressure Change (kPa)	Chamber Pressure Change (kPa)	B-Value
0	80.0	60.0	N/A	N/A	N/A
1	80.0	60.0	0.0	0.0	
2	150.0	130.0	70.0	70.0	0.31
3	80.0	60.0	-70.0	-70.0	
4	80.0	60.0	0.0	0.0	
5	150.0	60.0	70.0	0.0	0.52
6	80.0	60.0	-70.0	0.0	
7	80.0	60.0	0.0	0.0	
8	150.0	60.0	70.0	0.0	0.68
9	80.0	60.0	-70.0	0.0	
10	80.0	60.0	0.0	0.0	
11	150.0	60.0	70.0	0.0	0.68
12	80.0	60.0	-70.0	0.0	
13	80.0	60.0	0.0	0.0	
14	150.0	60.0	70.0	0.0	0.93
15	80.0	60.0	-70.0	0.0	
16	80.0	60.0	0.0	0.0	
17	150.0	60.0	70.0	0.0	0.95

 Laboratory Supervisor

Consolidation Calculations Specimen**A**
CU Triaxial Test

Stantec Consulting Ltd.

Client: Alberta Transportation Project No. 110773396
Project Name: SR1

Project Location: _____

Hole No. - _____

Depth: 7.6-8.05mCell Pressure (kPa) 660 Test Type = CU
Back Pressure (kPa) 60
Effective Pressure (kPa) 600Initial Sample Diameter (mm) 71.96 Burette Reading at Start of Test (cc)= 0
Initial Sample Height (mm) 171.3
Initial Sample Area (cm²) 40.67
Initial Volume (cm³) 696.6

Time	Burette Reading (cc)	Volume Change (cc)
00:00:00	46.40	N/A
00:00:06	44.55	1.850
00:00:15	44.40	2.000
00:00:30	44.25	2.150
00:01:00	44.00	2.400
00:02:00	43.65	2.750
00:04:00	43.15	3.250
00:08:00	42.40	4.000
00:15:00	41.30	5.100
00:30:00	39.55	6.850
01:00:00	37.00	9.400
02:00:00	32.35	14.050
04:00:00	27.10	19.300
08:00:00	19.15	27.250
24:00:00	11.65	34.750
46:30:00	9.75	36.650

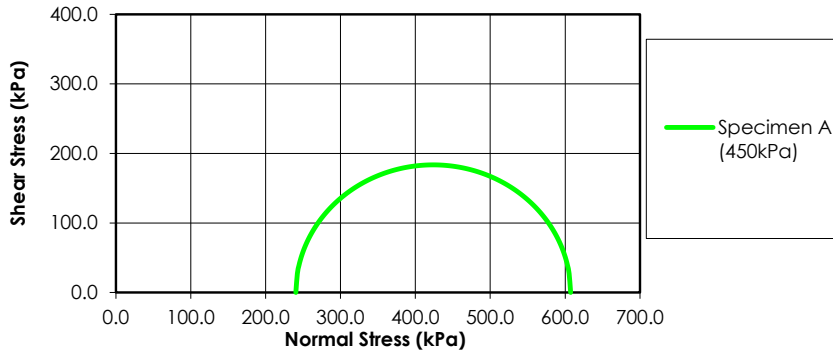
Laboratory Supervisor

Reviewed By: C. Lamoureux

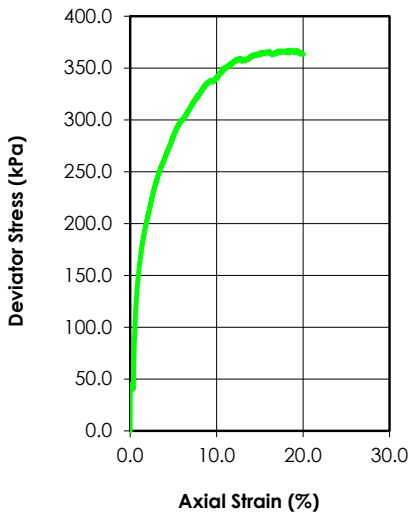
Date: 14-Jun-18

Tested By: E. Wahl

Effective Stress at Maximum Deviator Stress Criterion



Deviator Stress Vs. Axial Strain

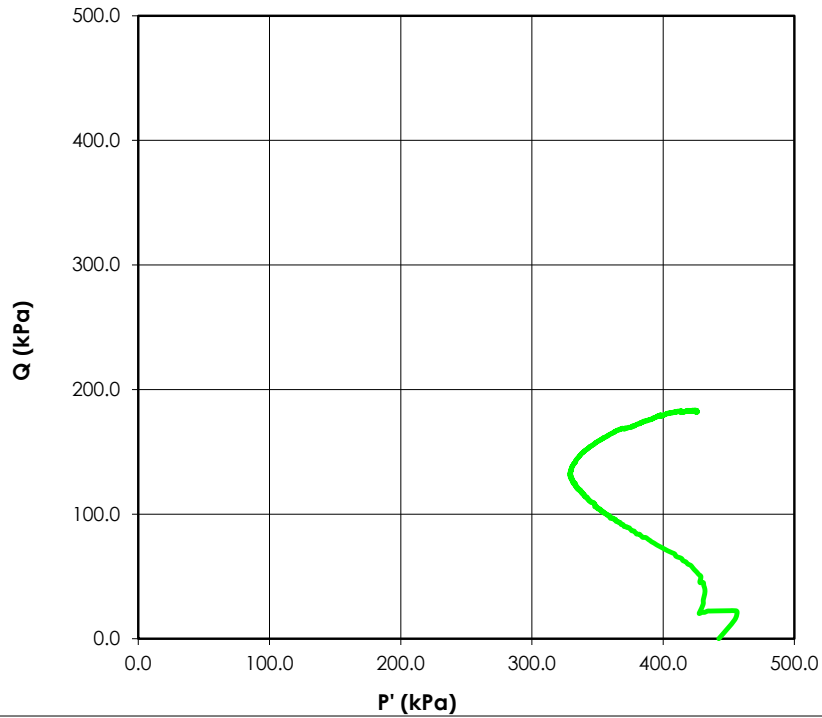


	Specimen					
	Initial	A	B	C	D	
Water Content (%)	20.6					
Dry Density (g/cm ³)	1.712					
Saturation (%)	97					
Void Ratio	0.574					
Diameter (mm)	72.42					
Height (mm)	154.58					
Specific Gravity	2.70					
Liquid Limit	45					
Plastic Limit	16					
After Consolidation		A	B	C	D	
B-Value	0.95					
Water Content (%)	16.5					
Dry Density (g/cm ³)	1.856					
Saturation (%)	100					
Void Ratio	0.455					
Effective Stress (kPa)	442.4					
Back Press. (kPa)	137.6					
Rate of Strain	0.01037					
Maximum Deviator Stress Criterion		After Shear	A	B	C	D
C (kPa)	-	σ'_1 at Failure (kPa)	607.36			
C' (kPa)	-	σ'_3 at Failure (kPa)	240.30			
ϕ (deg)	-					
ϕ' (deg)	-					

Project:	SR1	<p>Failure Photographs</p>
Location:	-	
Project Number:	110773396.302.702.310	
Boring Number:	-	
Sample Number:	LLO15 Combo	
Depth:	1.5-3.45m	
Sample Type:	Remolded	
Description:	Clay (CL)	
Test Type	Consolidated Undrained	
Remarks	From borehole LLO15, sample is comprised of SS2 (1.5-1.95m), BS3 (2.4-2.6m), and SS4 (3.0-3.45m).	

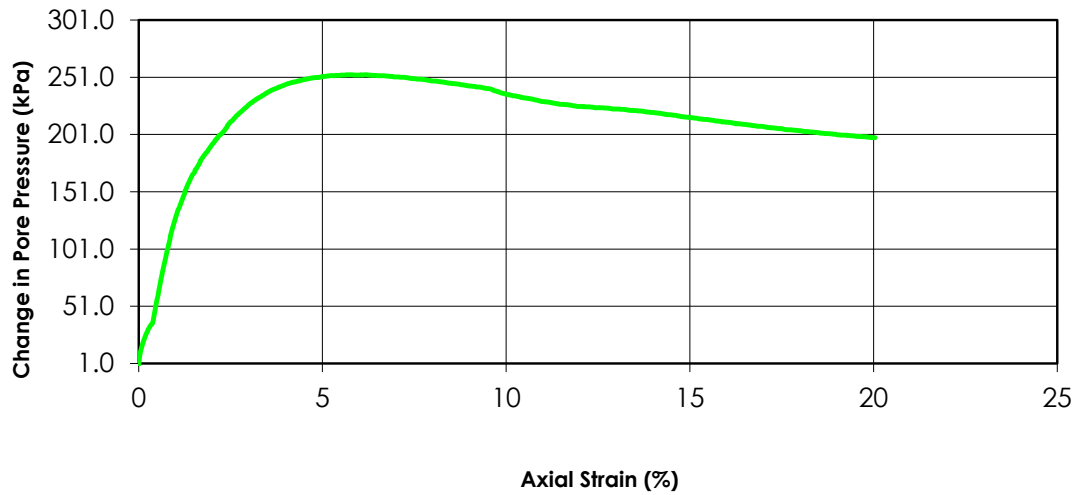
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Stress Paths (Effective)

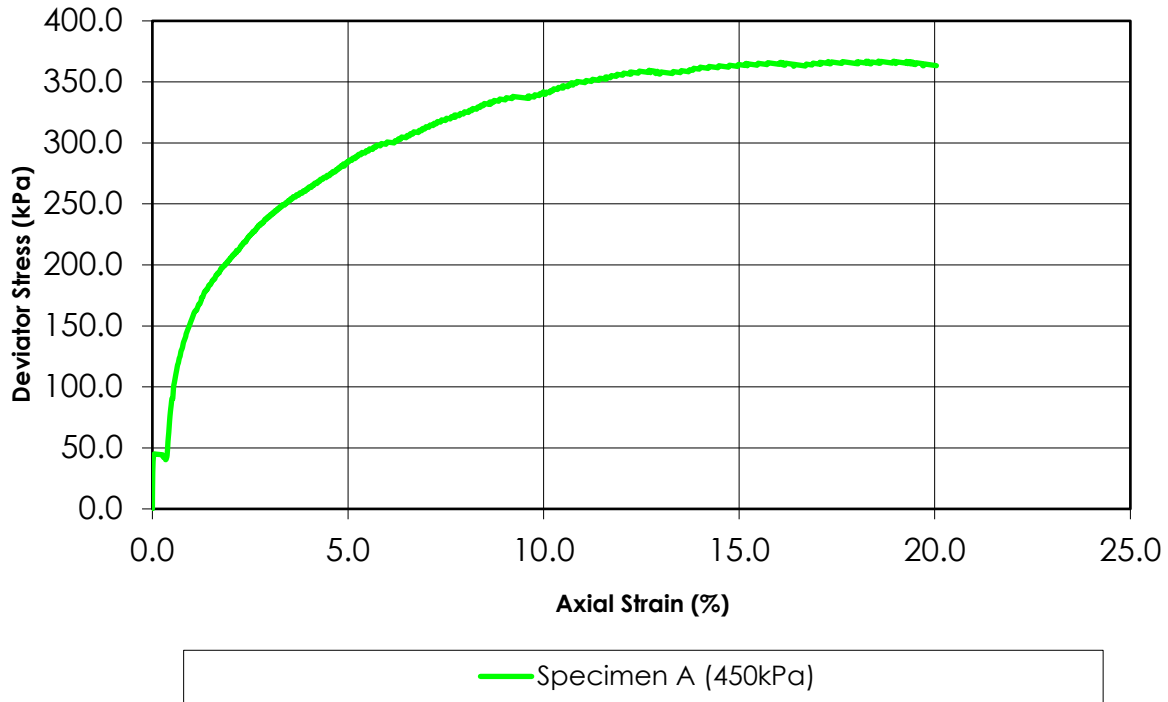


— Specimen A (450kPa)

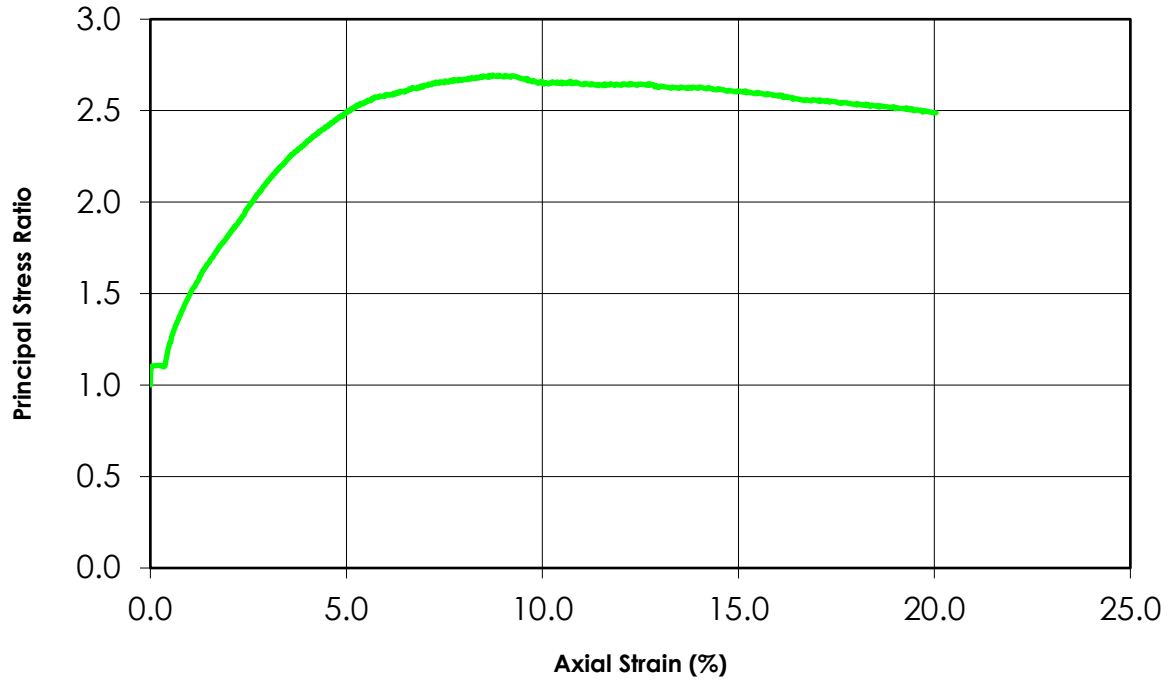
Change in Pore Pressure vs. Axial Strain



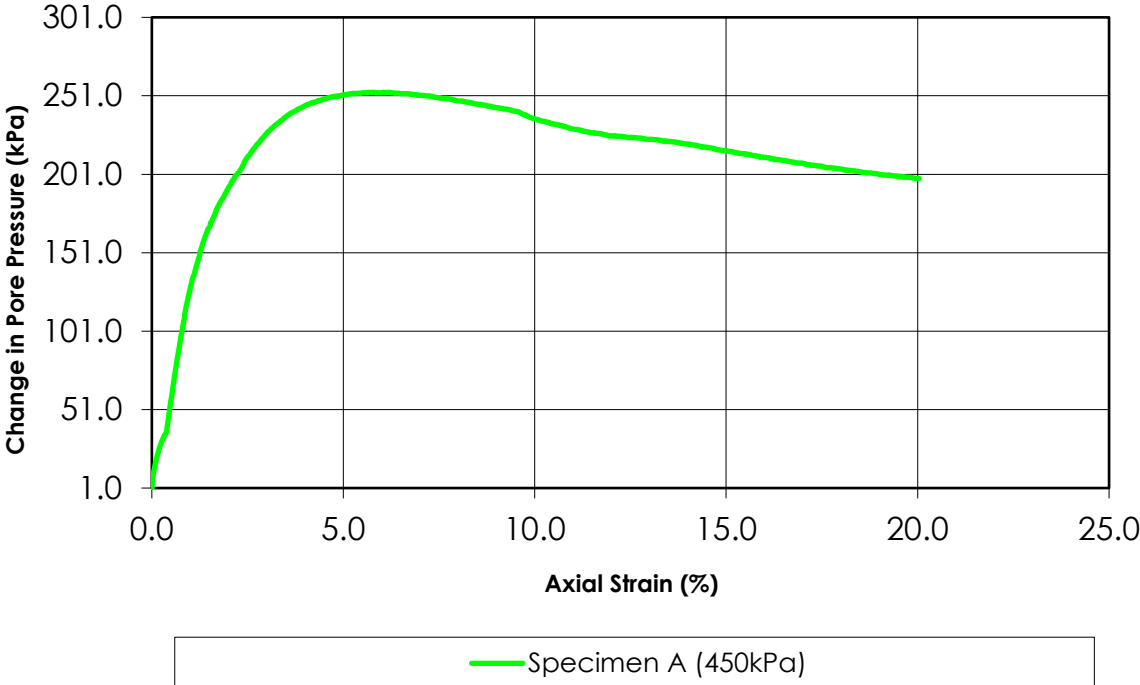
Deviator Stress vs. Axial Strain



Principal Stress Ratio vs. Axial Strain

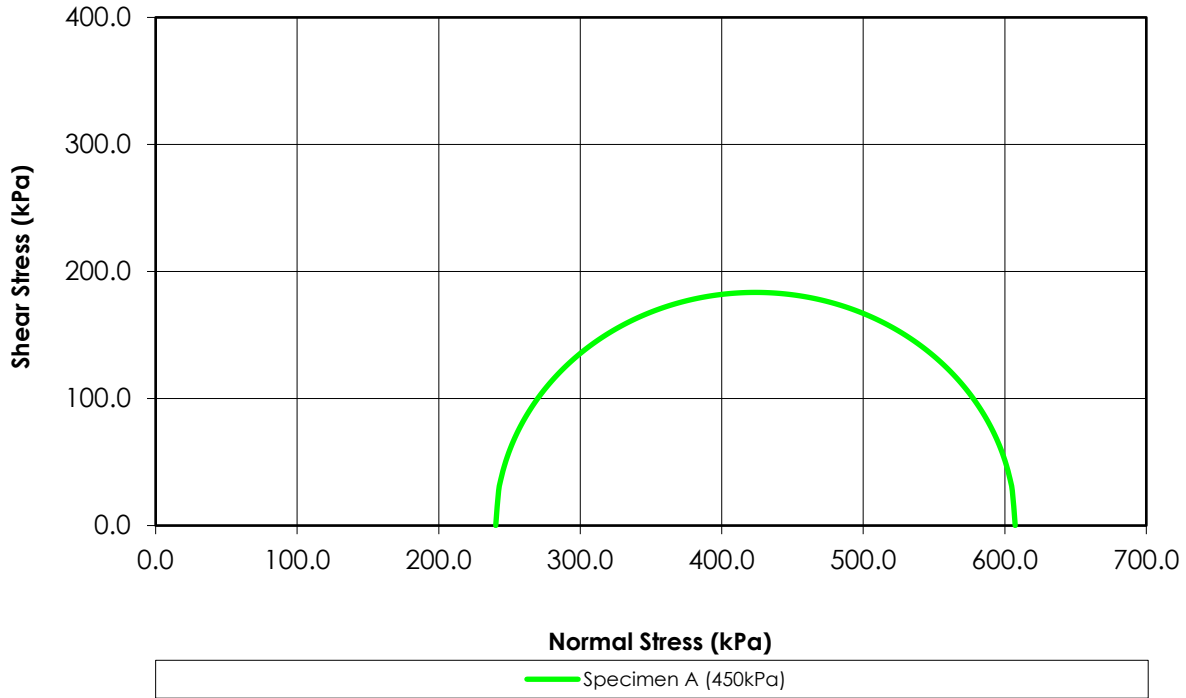


Change in Pore Pressure vs. Axial Strain

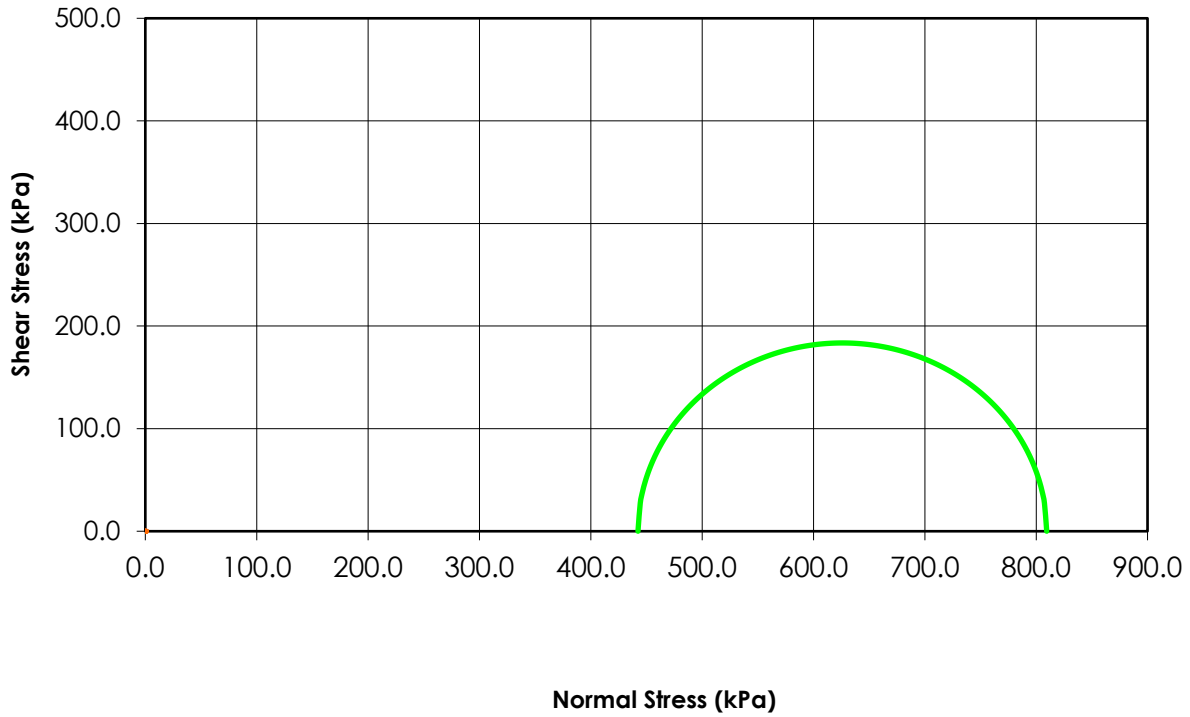


Mohr Stress Circles at Maximum Deviator Stress Criterion

Effective Stress

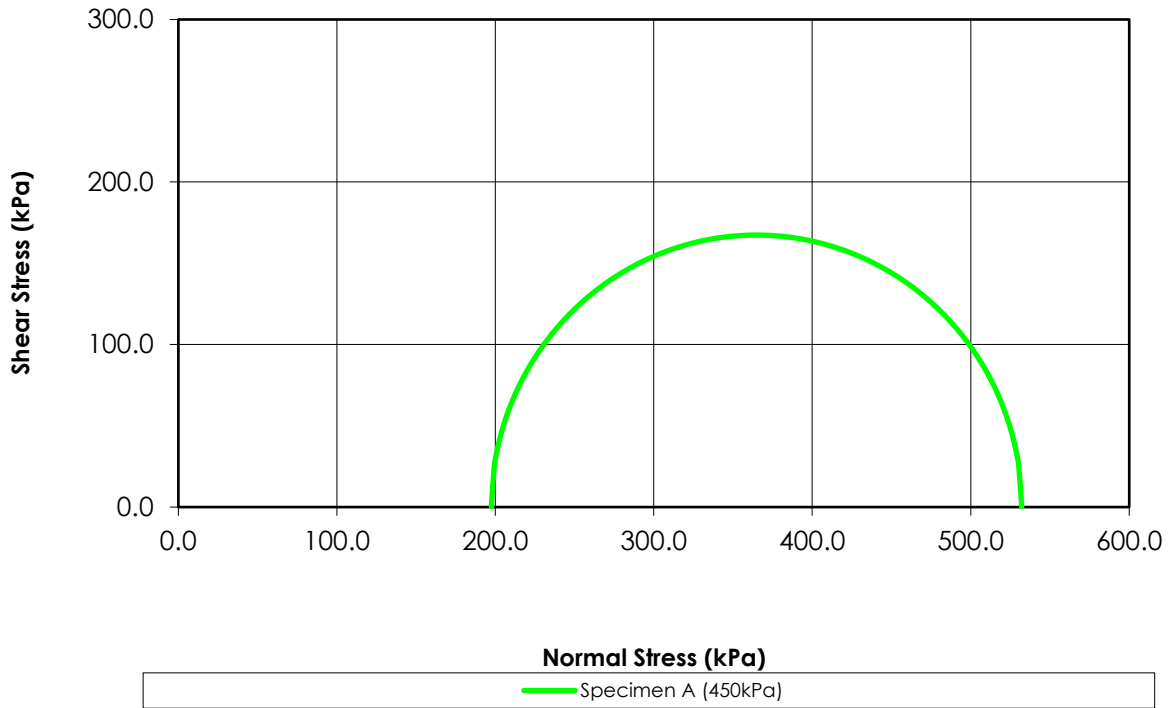


Total Stress

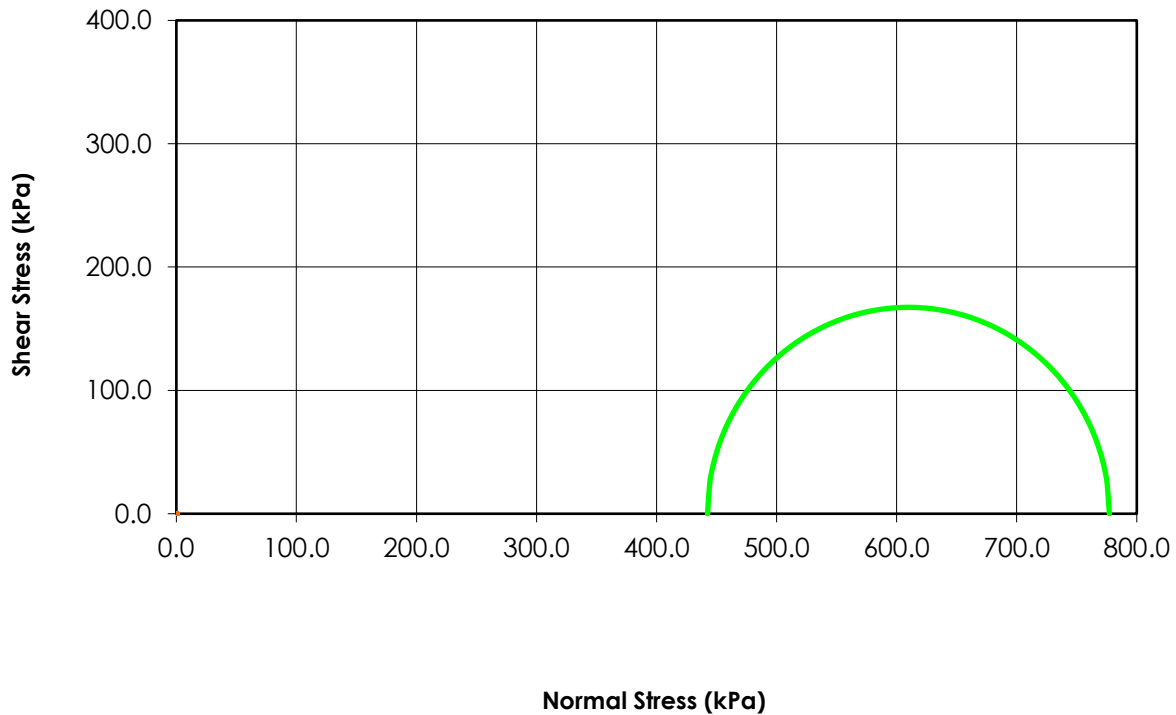


Mohr Stress Circles at Maximum Principal Stress Ratio Criterion

Effective Stress

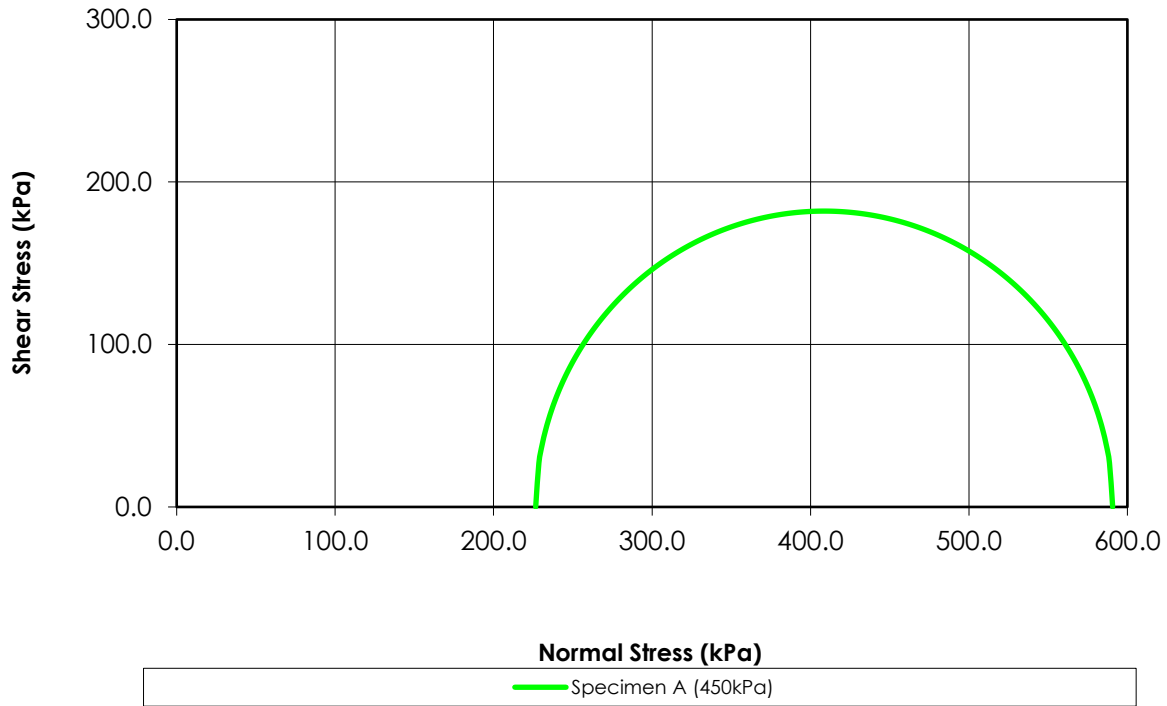


Total Stress

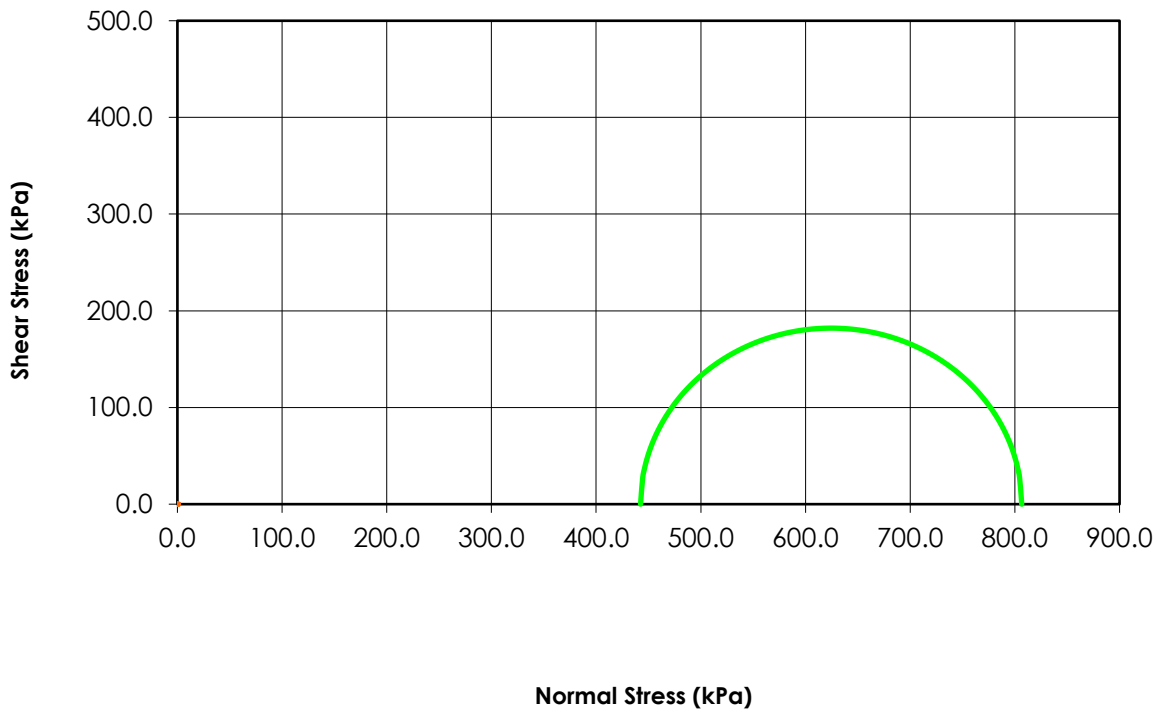


Mohr Stress Circles at 15% Axial Strain Criterion

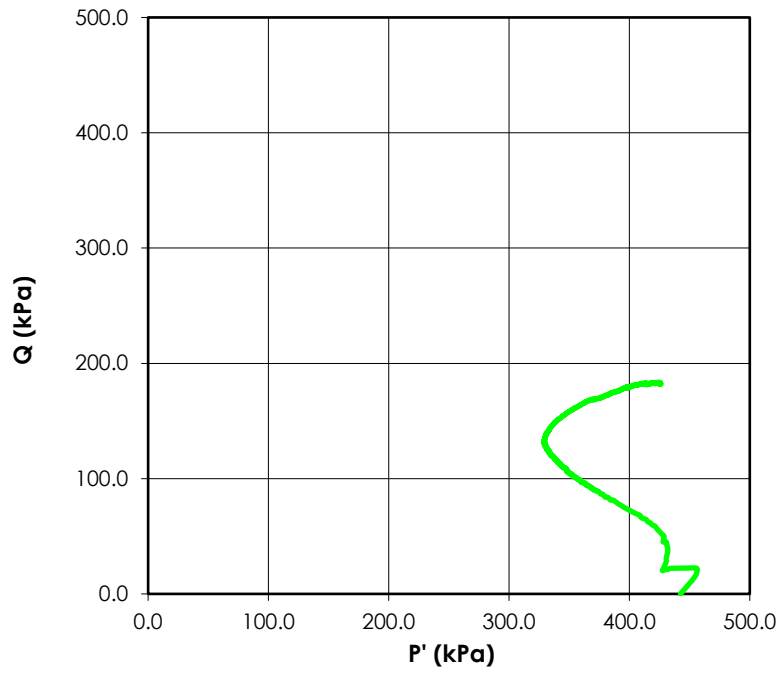
Effective Stress



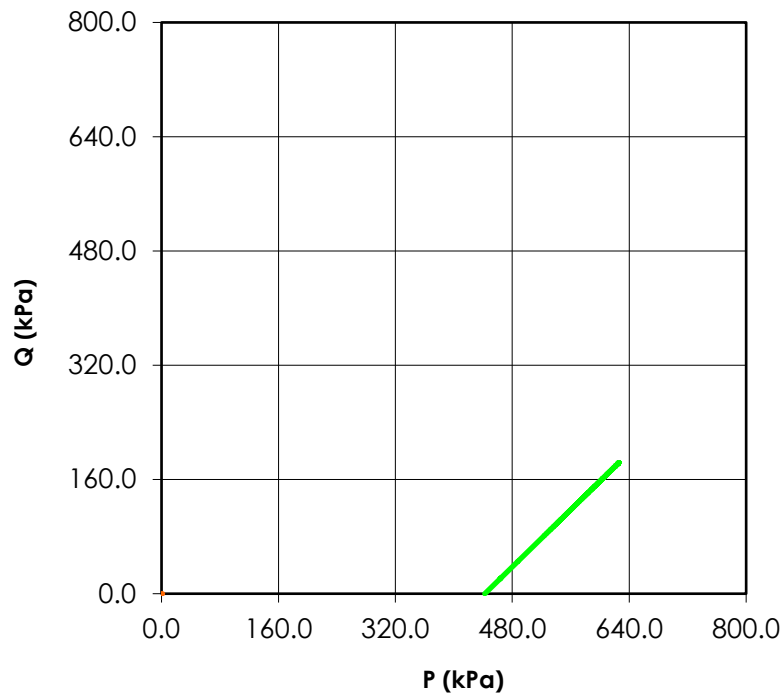
Total Stress



Stress Paths (Effective)

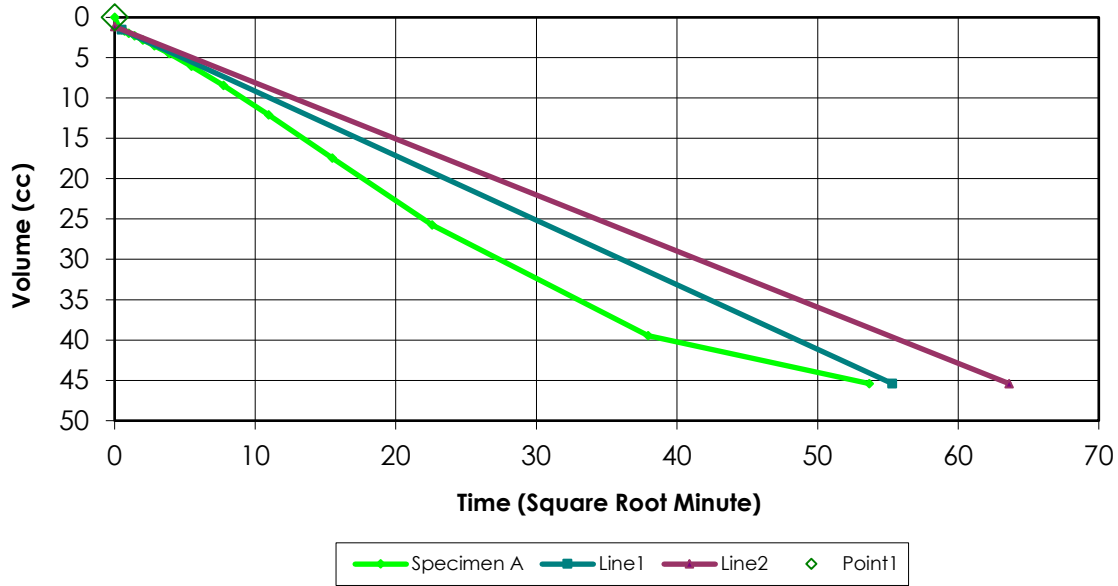


Stress Paths (Total)

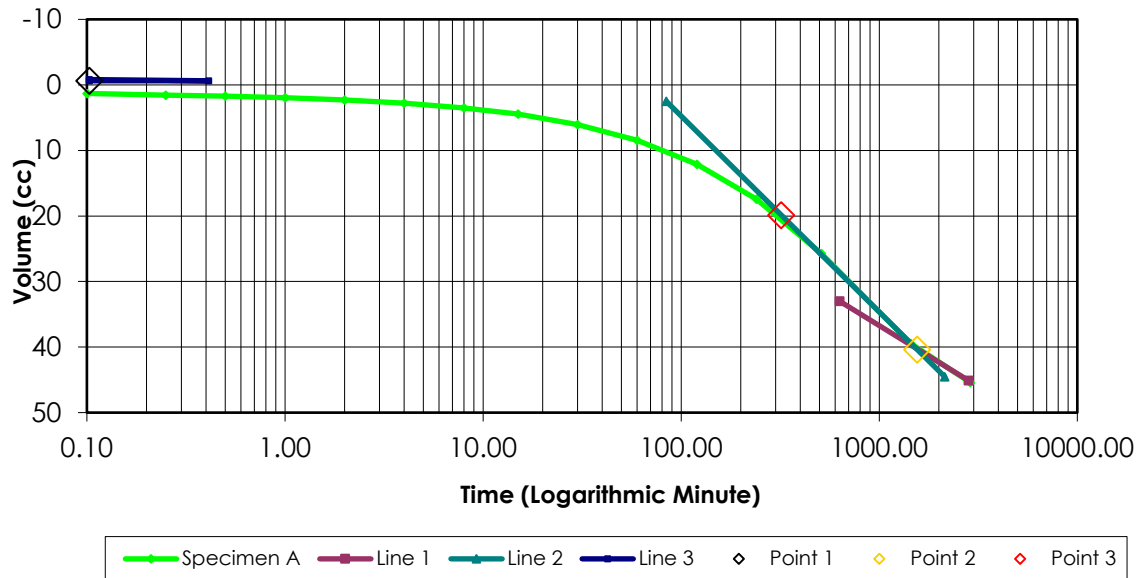


Specimen A Consolidation Graphs

Consolidation Graph (Square Root Time)



Consolidation Graph (Logarithmic Time)



**B-Value Calculations - Specimen A
CU Triaxial Test**

Stantec Consulting Ltd.

Client: Alberta Transportation Project No. 110773396
Project Name: SRI

Project Location: _____

Hole No. - _____ B-Value: 0.95

Reading No.	Sample Pressure (kPa)	Chamber Pressure (kPa)	Pore Pressure Change (kPa)	Chamber Pressure Change (kPa)	B-Value
0	80.0	60.0	N/A	N/A	N/A
1	80.0	60.0	0.0	0.0	
2	150.0	60.0	70.0	0.0	0.71
3	80.0	60.0	-70.0	0.0	
4	80.0	60.0	0.0	0.0	
5	150.0	60.0	70.0	0.0	0.75
6	80.0	60.0	-70.0	0.0	
7	80.0	60.0	0.0	0.0	
8	150.0	60.0	70.0	0.0	0.75
9	150.0	130.0	0.0	70.0	
10	150.0	130.0	0.0	0.0	
11	220.0	130.0	70.0	0.0	0.95

Laboratory Supervisor

Consolidation Calculations Specimen**A**
CU Triaxial Test

Stantec Consulting Ltd.

Client: Alberta Transportation Project No. 110773396
Project Name: SR1

Project Location: _____

Hole No. - _____

Depth: 1.5-3.45mCell Pressure (kPa) 580 Test Type = CU
Back Pressure (kPa) 130
Effective Pressure (kPa) 450Initial Sample Diameter (mm) 72.42 Burette Reading at Start of Test (cc)= 0
Initial Sample Height (mm) 154.6
Initial Sample Area (cm²) 41.19
Initial Volume (cm³) 636.7

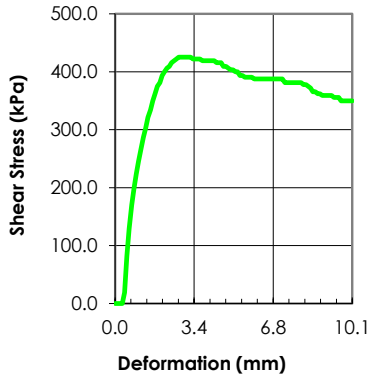
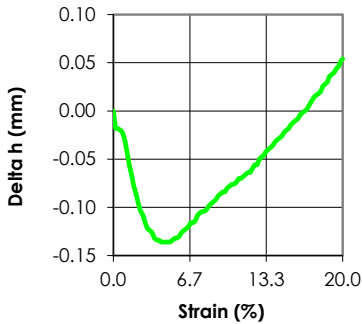
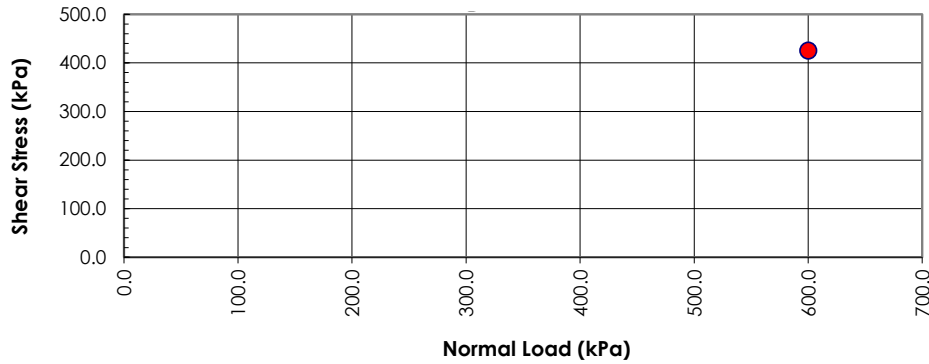
Time	Burette Reading (cc)	Volume Change (cc)
00:00:00	46.35	N/A
00:00:06	45.05	1.300
00:00:15	44.80	1.550
00:00:30	44.65	1.700
00:01:00	44.40	1.950
00:02:00	44.05	2.300
00:04:00	43.55	2.800
00:08:00	42.85	3.500
00:15:00	41.90	4.450
00:30:00	40.30	6.050
01:00:00	37.90	8.450
02:00:00	34.25	12.100
04:00:00	28.90	17.450
08:30:00	20.60	25.750
24:00:00	6.90	39.450
48:00:00	0.95	45.400

Laboratory Supervisor

Reviewed By: C. Lamoureux

Date: 28-Jun-18

Tested By: E. Wahl



Initial	Specimen			
	A	B	C	D
Moisture (%)	16.9			
Dry Density (g/cm ³)	1.901			
Void Ratio	0.421			
Saturation (%)	100			
Diameter (mm)	50.68			
Height (mm)	25.48			

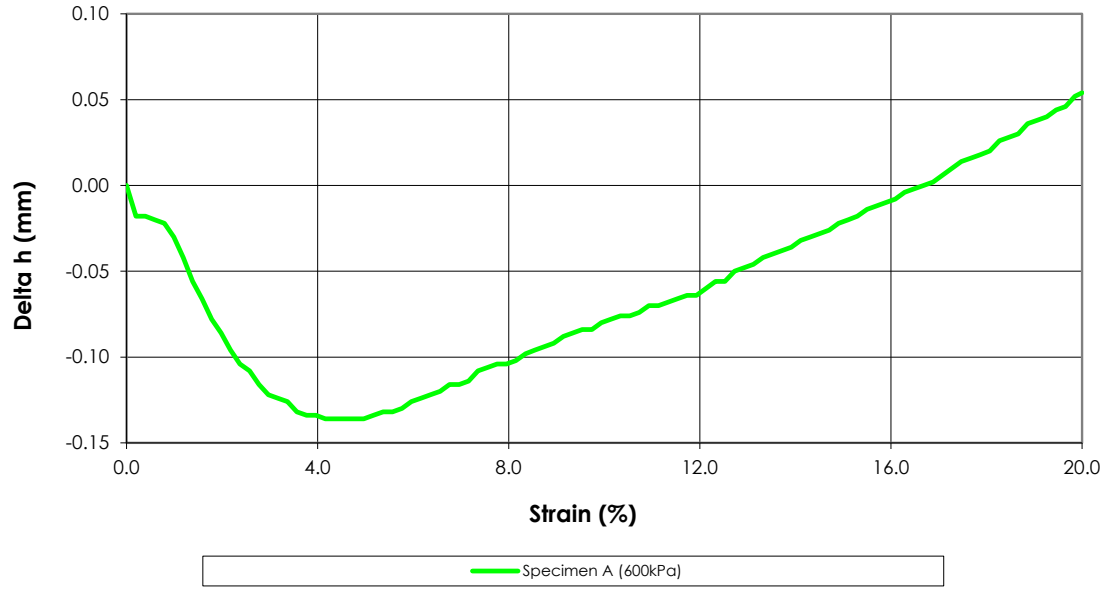
Final	A	B	C	D
Moisture (%)	10.9			
Dry Density (g/cm ³)	1.987			
Void Ratio	0.359			
Saturation (%)	100			
Diameter (mm)	50.68			
Height (mm)	23.69			
Normal Stress (kPa)	600.0			
Peak Stress (kPa)	425.2			
Residual Stress (kPa)	-			
Max. Shear Strain (%)	20.004			
Rate (mm/min)	0.02112			

Project Date	
Date	28-Jun-18

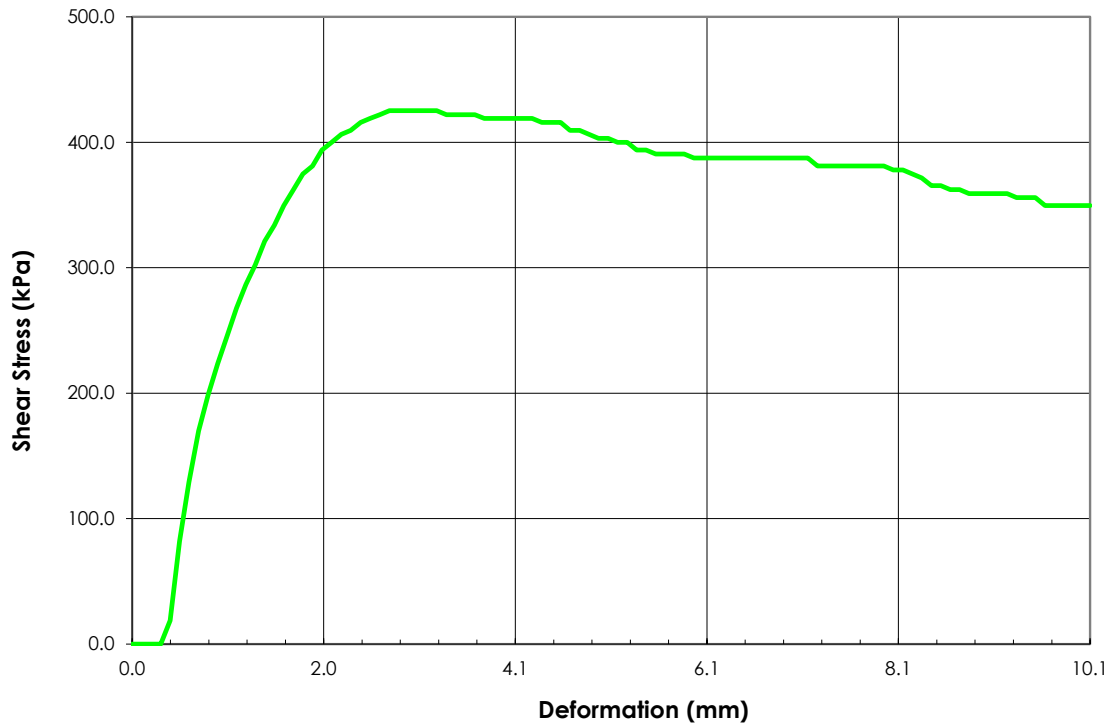
Project:	SR1
Location:	-
Project Number:	110773396.302.702.310
Boring Number:	-
Sample Number:	LLO01 HQ28
Depth:	21.99-22.16m
Sample Type:	Undisturbed
Description:	Mudstone
Test Type:	Direct Shear
Remarks:	

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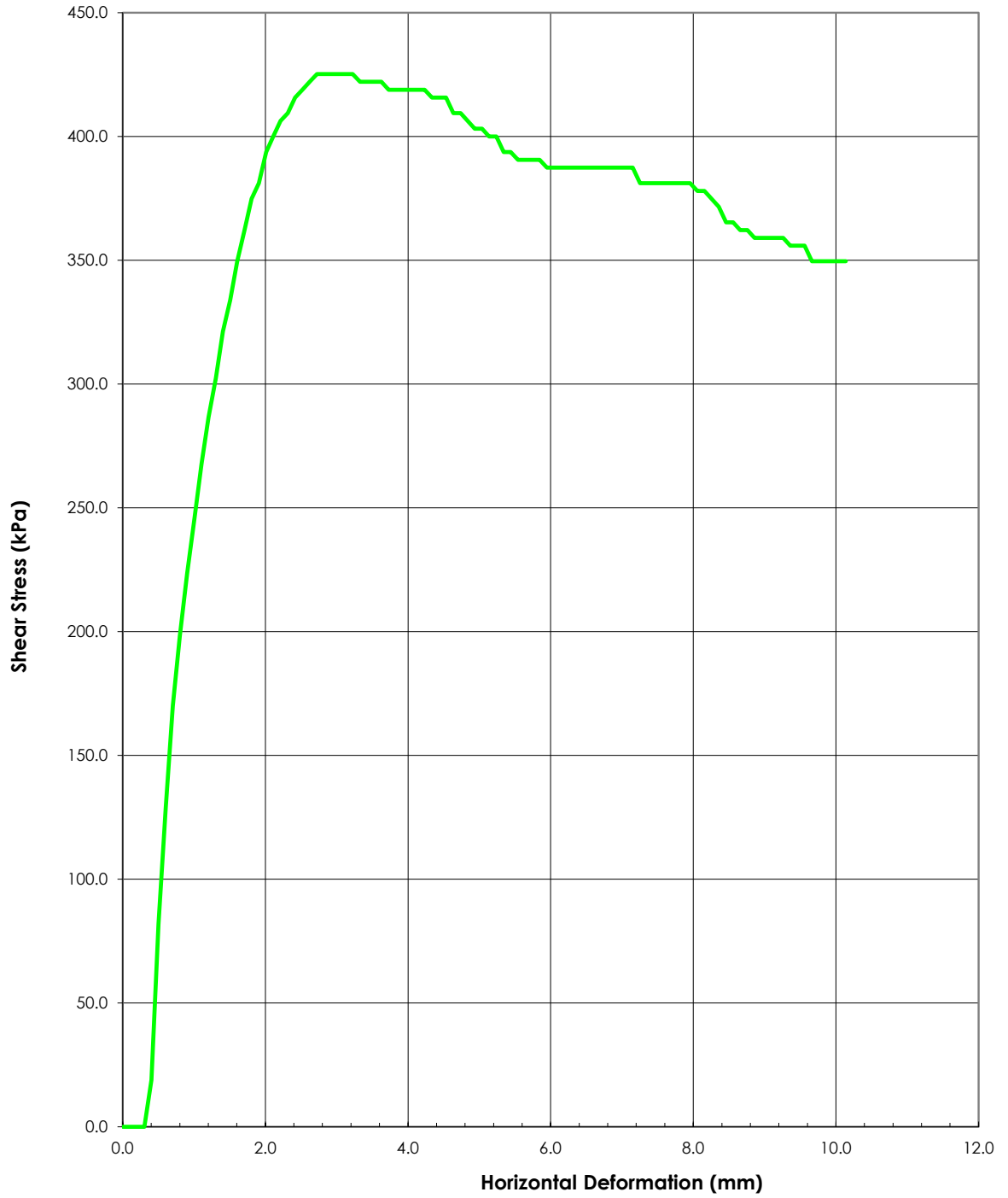
Delta h



Stress-Deformation



Specimen A Stress-Deformation



Specimen Information
Direct Shear Test

Stantec Consulting Ltd.

Project Information

Project: SR1
 Location:
 Project Number: 110773396
 Client: Alberta Transportation
 Sample Location:
 Sample Number: LLO01 HQ28
 Boring Number:

Tested By: E. Wahl
 Reduced By:
 Checked By: C. Lamoureux

Sample Description/Remarks	
Specimen A Description	Mudstone
Remarks	
Specimen B Description	-
Remarks	
Specimen C Description	-
Remarks	
Specimen D Description	-
Remarks	

Moisture Density Data

	Specimen A		Specimen B		Specimen C		Specimen D	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final
Height (mm)	25.48	23.69						
Diameter (mm)	50.68	50.68						
Total Wet Weight of Ring & Soil (g)	2101.9	2101.0						
Weight of Ring (g)	1987.7	1987.7						
Wet Weight of Soil (g)	114.20	113.30						
Wt of Wet Soil & Dish (g)	-	117.02						
Wt of Dry Soil & Dish (g)	-	105.88						
Wt. Of Dish (g)	-	3.90						

Consolidation Calculations

	Specimen A	Specimen B	Specimen C	Specimen D
Initial Ref. Height (mm)	7.380			
Final Ref. Height (mm)	5.594			
Height after Consol (mm)	23.694			

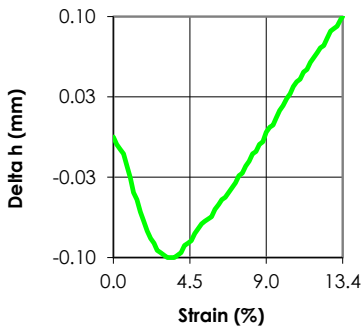
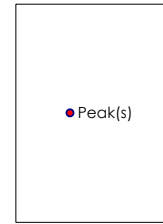
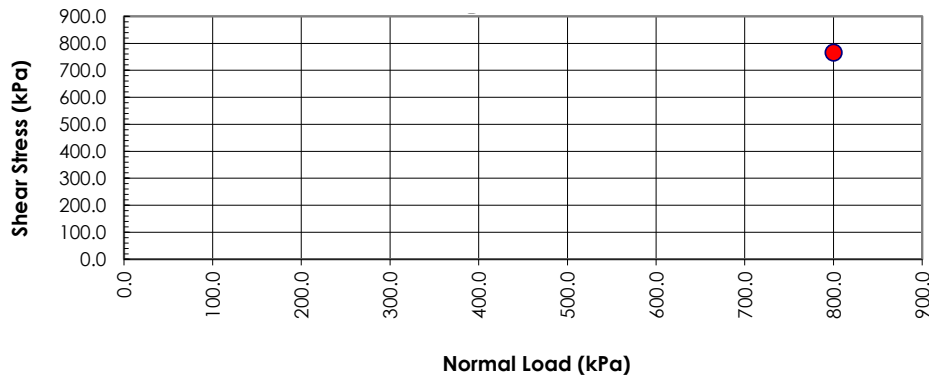
Calculations

	Specimen A		Specimen B		Specimen C		Specimen D	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final
Specific Gravity	2.70	2.70						
Area (cm ²)	20.17	20.17						
Volume (cm ³)	51.40	51.40						
Moisture Content (%)	16.9	10.9						
Wet Density (g/cm ³)	2.222	2.204						
Dry Density (g/cm ³)	1.901	1.987						
Saturation (%)	100	100						
Void Ratio	0.421	0.359						
Porosity (%)	29.602	20.852						

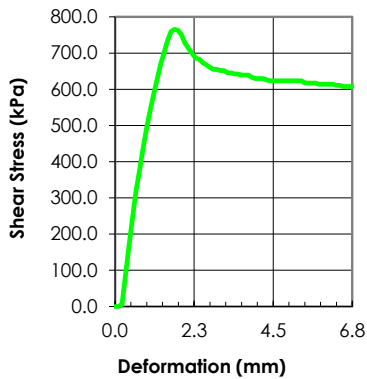
Reviewed By: C. Lamoureux

Date: 26-Jun-18

Tested By: E. Wahl



— Specimen A (800kPa)



Initial	Specimen			
	A	B	C	D
Moisture (%)	9.5			
Dry Density (g/cm ³)	2.043			
Void Ratio	0.322			
Saturation (%)	80			
Diameter (mm)	50.68			
Height (mm)	25.48			

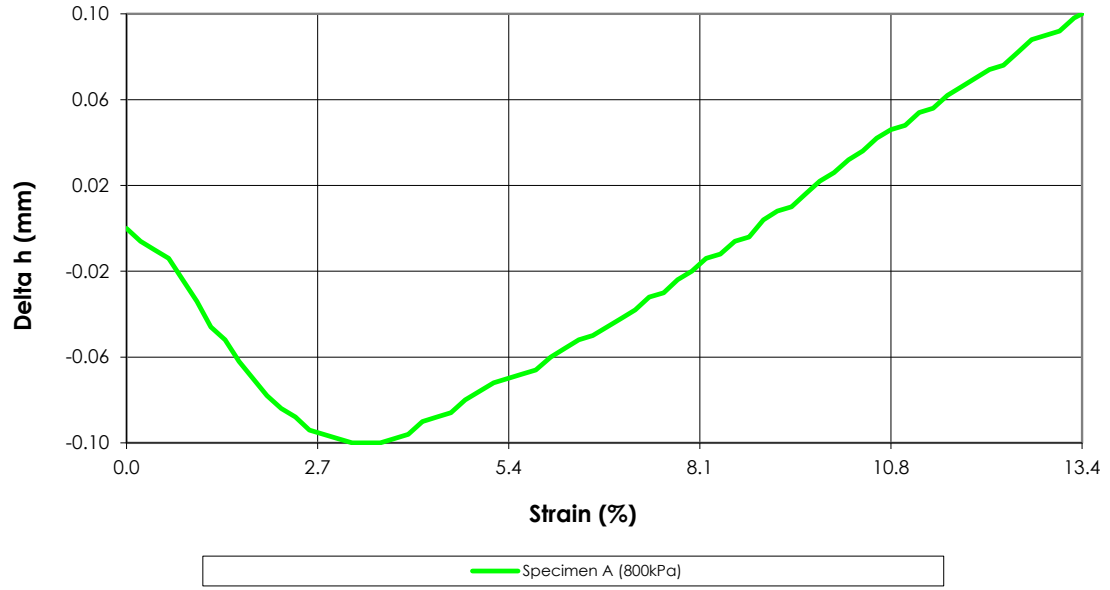
Final	A	B	C	D
Moisture (%)	9.3			
Dry Density (g/cm ³)	2.034			
Void Ratio	0.328			
Saturation (%)	100			
Diameter (mm)	50.68			
Height (mm)	23.99			
Normal Stress (kPa)	800.0			
Peak Stress (kPa)	765.4			
Residual Stress (kPa)	-			
Max. Shear Strain (%)	13.449			
Rate (mm/min)	0.02112			

Project Date	
Date	26-June-18

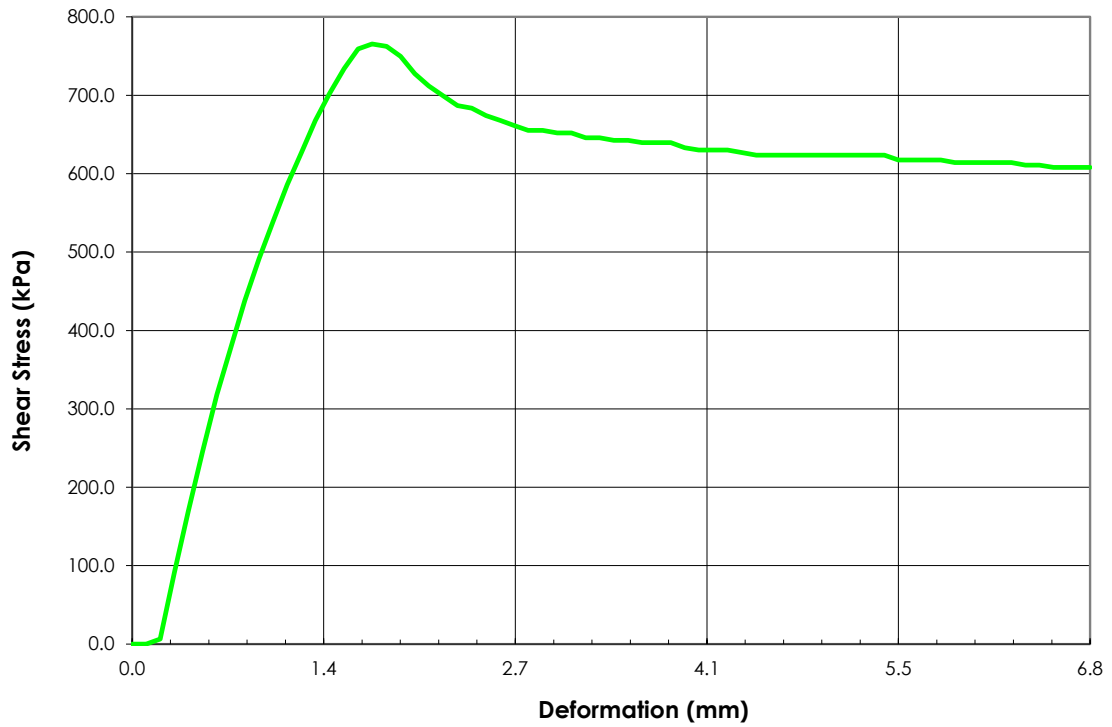
Project:	SR1
Location:	-
Project Number:	110773396
Boring Number:	-
Sample Number:	LLO01 HQ29
Depth:	23.95-24.17m
Sample Type:	Undisturbed
Description:	Mudstone
Test Type:	Direct Shear
Remarks:	

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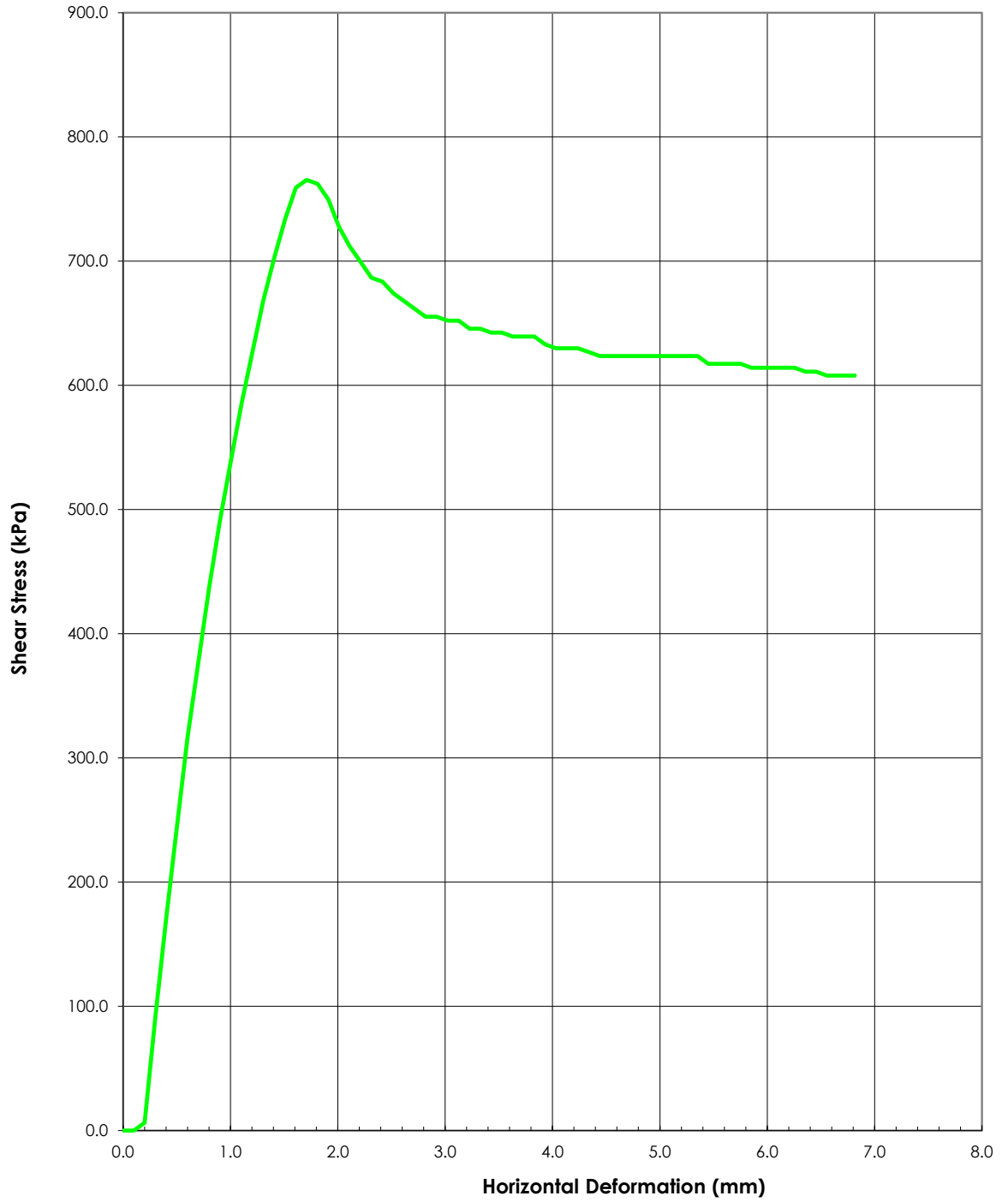
Delta h



Stress-Deformation



Specimen A Stress-Deformation



Specimen Information
Direct Shear Test

Stantec Consulting Ltd.

Project Information

Project: SR1
 Location:
 Project Number: 110773396.302.702.310
 Client: Alberta Transportation
 Sample Location:
 Sample Number: LLO01 HQ29
 Boring Number:

Tested By: E. Wahl
 Reduced By:
 Checked By: C. Lamoureux

Sample Description/Remarks	
Specimen A Description	Mudstone
Remarks	
Specimen B Description	-
Remarks	
Specimen C Description	-
Remarks	
Specimen D Description	-
Remarks	

Moisture Density Data

	Specimen A		Specimen B		Specimen C		Specimen D	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final
Height (mm)	25.48	23.99	-	-	-	-	-	-
Diameter (mm)	50.68	50.68	-	-	-	-	-	-
Total Wet Weight of Ring & Soil (g)	2102.8	2102.1	-	-	-	-	-	-
Weight of Ring (g)	1987.8	1987.8	-	-	-	-	-	-
Wet Weight of Soil (g)	115.0	114.3	-	-	-	-	-	-
Wt of Wet Soil & Dish (g)	-	116.88	-	-	-	-	-	-
Wt of Dry Soil & Dish (g)	-	107.23	-	-	-	-	-	-
Wt. Of Dish (g)	-	3.82	-	-	-	-	-	-

Consolidation Calculations

	Specimen A	Specimen B	Specimen C	Specimen D
Initial Ref. Height (mm)	10.294	-	-	-
Final Ref. Height (mm)	8.802	-	-	-
Height after Consol (mm)	23.988	-	-	-

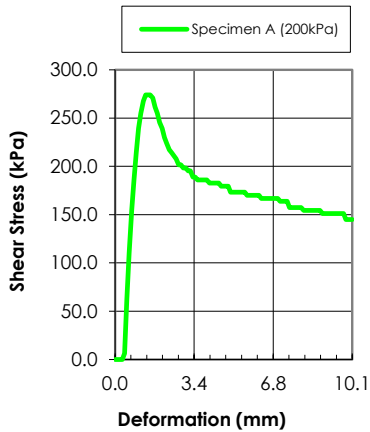
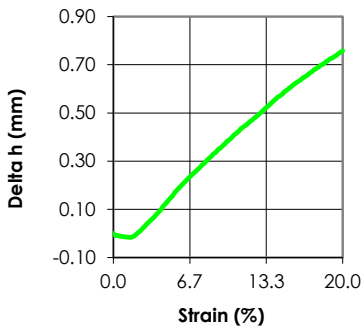
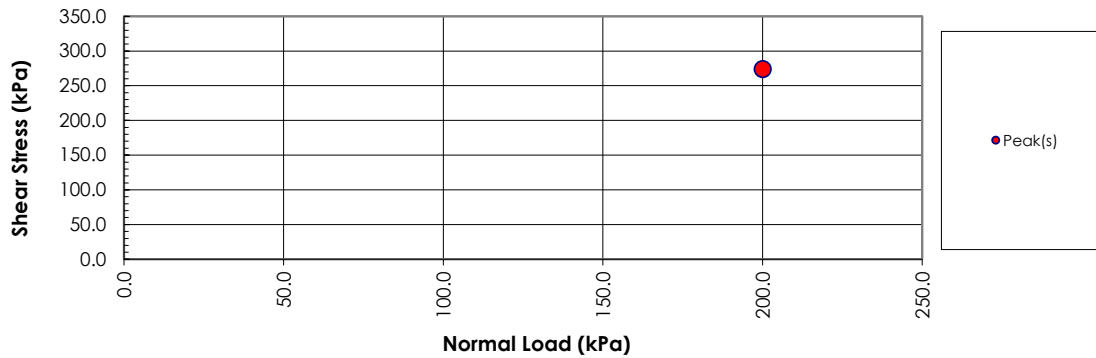
Calculations

	Specimen A		Specimen B		Specimen C		Specimen D	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final
Specific Gravity	2.70	2.70	-	-	-	-	-	-
Area (cm ²)	20.17	20.17	-	-	-	-	-	-
Volume (cm ³)	51.40	51.40	-	-	-	-	-	-
Moisture Content (%)	9.5	9.3	-	-	-	-	-	-
Wet Density (g/cm ³)	2.237	2.224	-	-	-	-	-	-
Dry Density (g/cm ³)	2.043	2.034	-	-	-	-	-	-
Saturation (%)	80	100	-	-	-	-	-	-
Void Ratio	0.322	0.328	-	-	-	-	-	-
Porosity (%)	24.331	19.984	-	-	-	-	-	-

Reviewed By: C. Lamoureux

Date: 3-Jul-18

Tested By: E. Wahl



Initial	Specimen			
	A	B	C	D
Moisture (%)	12.9			
Dry Density (g/cm ³)	1.949			
Void Ratio	0.386			
Saturation (%)	90			
Diameter (mm)	50.68			
Height (mm)	25.48			

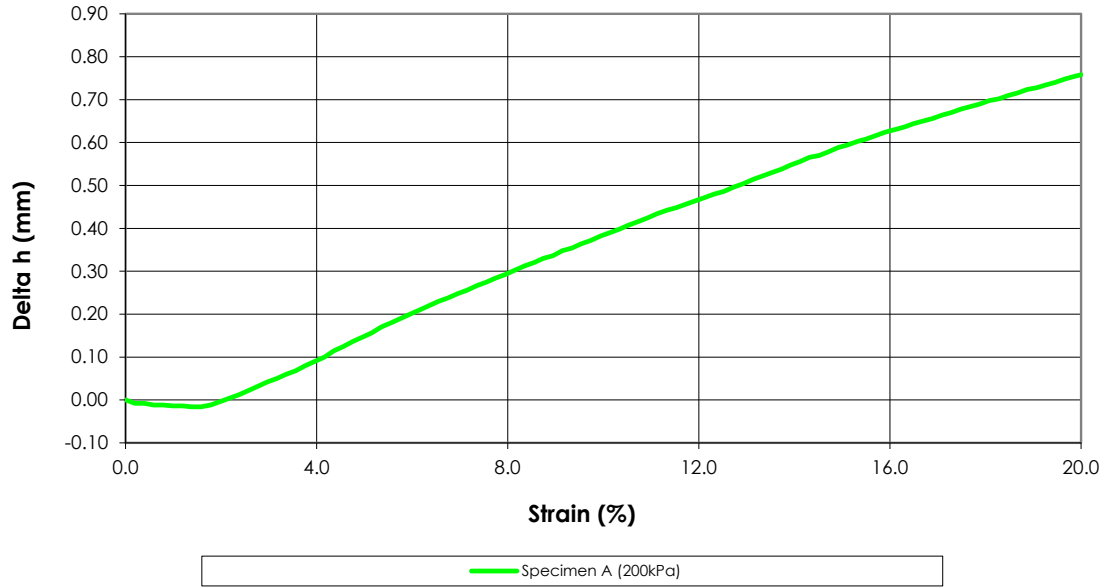
Final	A	B	C	D
Moisture (%)	14.0			
Dry Density (g/cm ³)	1.916			
Void Ratio	0.409			
Saturation (%)	99			
Diameter (mm)	50.68			
Height (mm)	24.97			
Normal Stress (kPa)	200.0			
Peak Stress (kPa)	274.0			
Residual Stress (kPa)	-			
Max. Shear Strain (%)	20.004			
Rate (mm/min)	0.02112			

Project Date	
Date	3-Jul-18

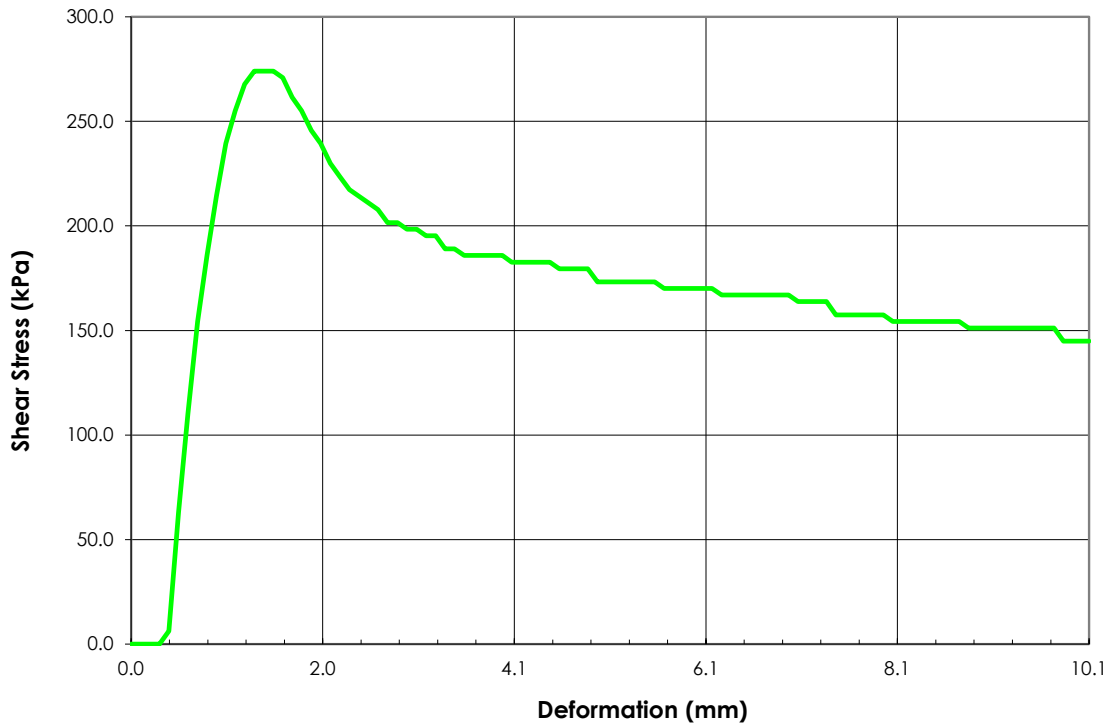
Project:	SR1
Location:	-
Project Number:	110773396.302.702.310
Boring Number:	-
Sample Number:	LLO06 HQ21
Depth:	17.53-18.03m
Sample Type:	Undisturbed
Description:	Mudstone
Test Type:	Direct Shear
Remarks:	

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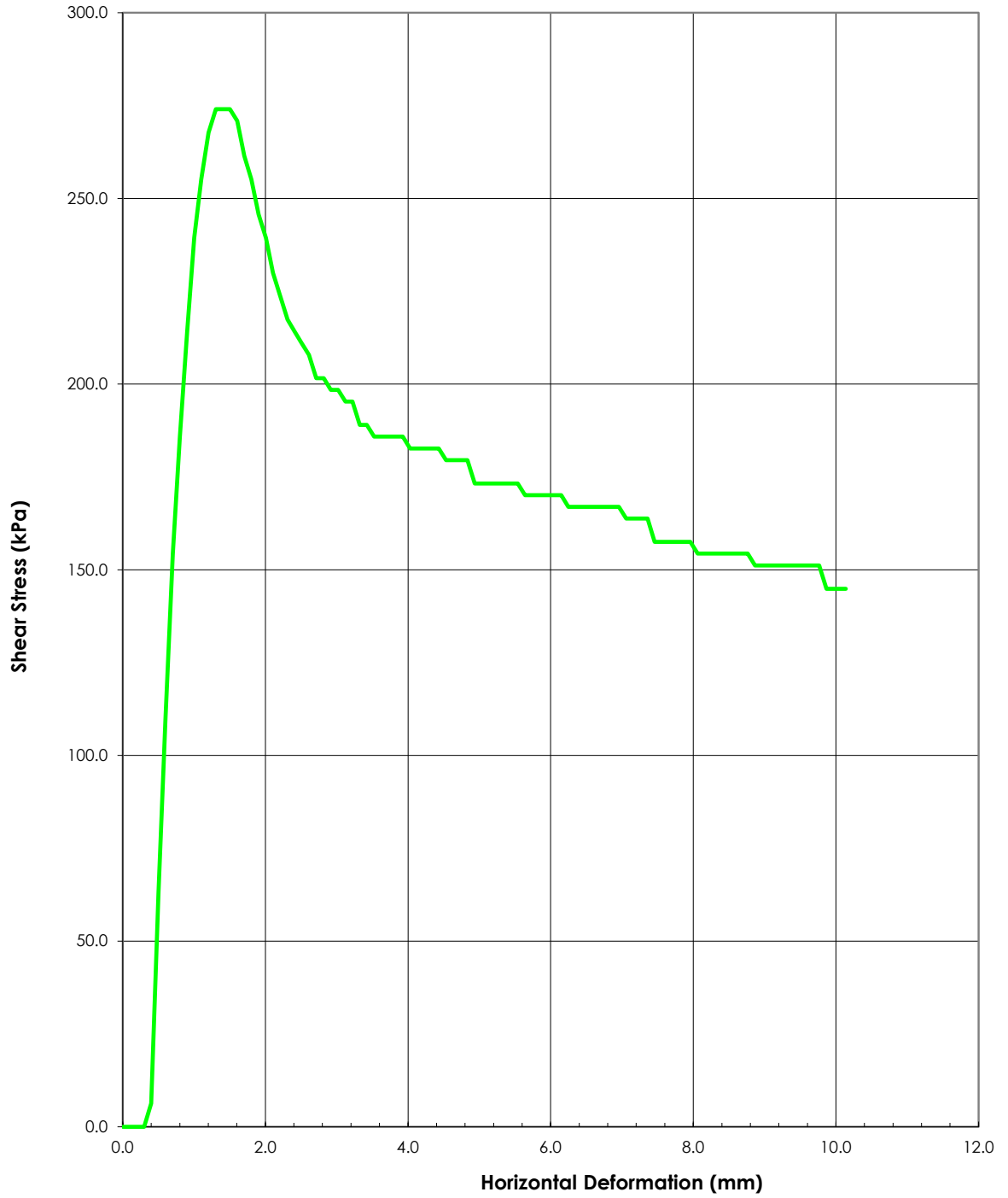
Delta h



Stress-Deformation



Specimen A Stress-Deformation



Specimen Information
Direct Shear Test

Stantec Consulting Ltd.

Project Information

Project: SR1
 Location:
 Project Number: 110773396
 Client: Alberta Transportation
 Sample Location:
 Sample Number: LLO06 HQ21
 Boring Number:

Tested By: E. Wahl
 Reduced By:
 Checked By: C. Lamoureux

Sample Description/Remarks	
Specimen A Description	Mudstone
Remarks	
Specimen B Description	-
Remarks	
Specimen C Description	-
Remarks	
Specimen D Description	-
Remarks	

Moisture Density Data

	Specimen A		Specimen B		Specimen C		Specimen D	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final
Height (mm)	25.48	24.97						
Diameter (mm)	50.68	50.68						
Total Wet Weight of Ring & Soil (g)	2100.7	2099.9						
Weight of Ring (g)	1987.6	1987.6						
Wet Weight of Soil (g)	113.10	112.30						
Wt of Wet Soil & Dish (g)	-	115.52						
Wt of Dry Soil & Dish (g)	-	101.75						
Wt. Of Dish (g)	-	3.74						

Consolidation Calculations

	Specimen A	Specimen B	Specimen C	Specimen D
Initial Ref. Height (mm)	10.118			
Final Ref. Height (mm)	9.612			
Height after Consol (mm)	24.974			

Calculations

	Specimen A		Specimen B		Specimen C		Specimen D	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final
Specific Gravity	2.70	2.70						
Area (cm2)	20.17	20.17						
Volume (cm3)	51.40	51.40						
Moisture Content (%)	12.9	14.0						
Wet Density (g/cm3)	2.200	2.185						
Dry Density (g/cm3)	1.949	1.916						
Saturation (%)	90	99						
Void Ratio	0.386	0.409						
Porosity (%)	27.829	27.611						

APPENDIX E.2: GLACIOLACUSTRINE (GL)



Atterberg Limits
ASTM D4318
Method B- One Point

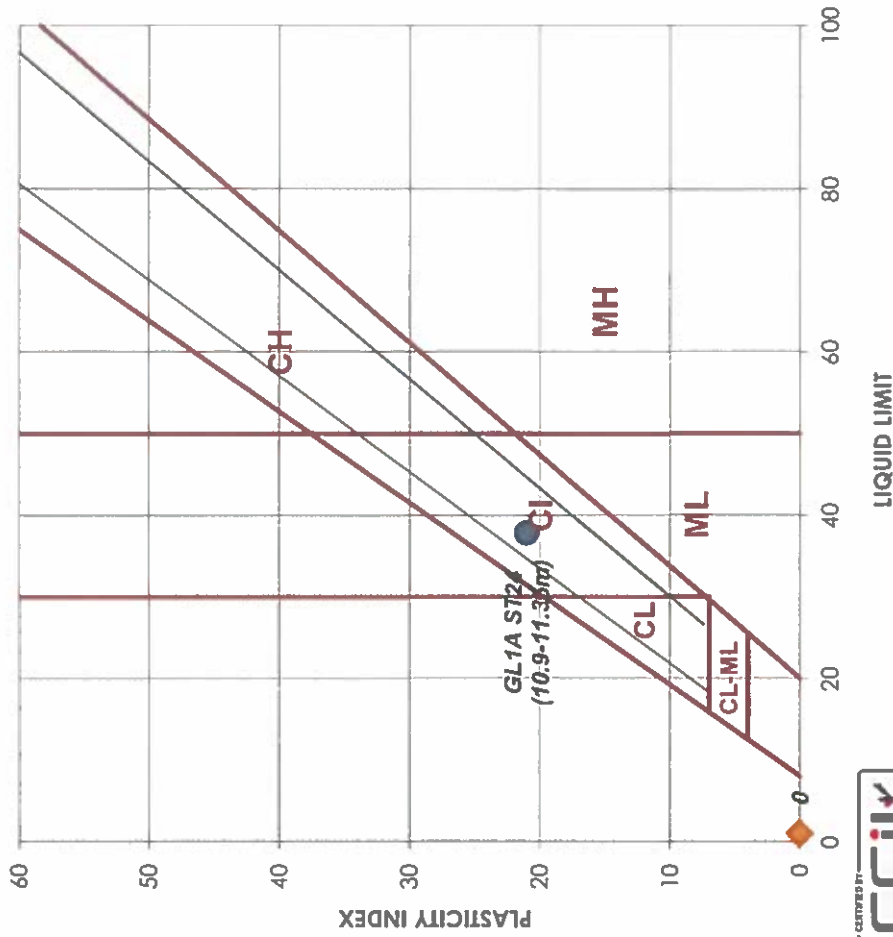
Client: Alberta Transportation
Project Name: SR1 2018 Investigation
Project No: 110773396
Date Received: September 29, 2018
Date Tested: November 19, 2018
Tested By: B. Peikay

OFFICE: 325 - 25th Street SE
Suite 200
Calgary, Alberta
Canada T2A 7H8
Tel: (403) 716-8000

LABORATORY: 10830 - 46th Street SE
Calgary, Alberta
Canada T2C 1G4
Tel: (403) 253-7876

Sample:

LIQUID		LIQUID	
1	2	1	2
GL1A ST24 (10.9-11.35m)			
21	20	Number of Blows	
26.52	31.48	Container Number	
19.45	22.99	Wt. Sample (wet+tare) (g)	
1.18	1.15	Wt. Sample (dry+tare) (g)	
18.3	21.8	Wt. Tare (g)	
7.1	8.5	Wt. Dry Soil (g)	
38.7%	38.9%	Water Content (%)	
37.9%	37.8%	Corrected Water Content (%)	
PLASTIC			
1	2	1	2
Container Number			
23.7	22.70	Wt. Sample (wet+tare) (g)	
22.3	21.41	Wt. Sample (dry+tare) (g)	
13.93	13.74	Wt. Tare (g)	
8.4	7.7	Wt. Dry Soil (g)	
1.4	1.3	Wt. Water (g)	
16.7%	16.8%	Water Content (%)	
AVERAGE VALUES			
1	2	AVERAGE VALUES	
LL	38	LL	
PL	17	PL	
PI	21	PI	
Natural MC (%)	21.0%	Natural MC (%)	
CLASSIFICATION			
CI		NON-PLASTIC	



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Reviewed By:



Atterberg Limits
ASTM D4318
Method B - One Point

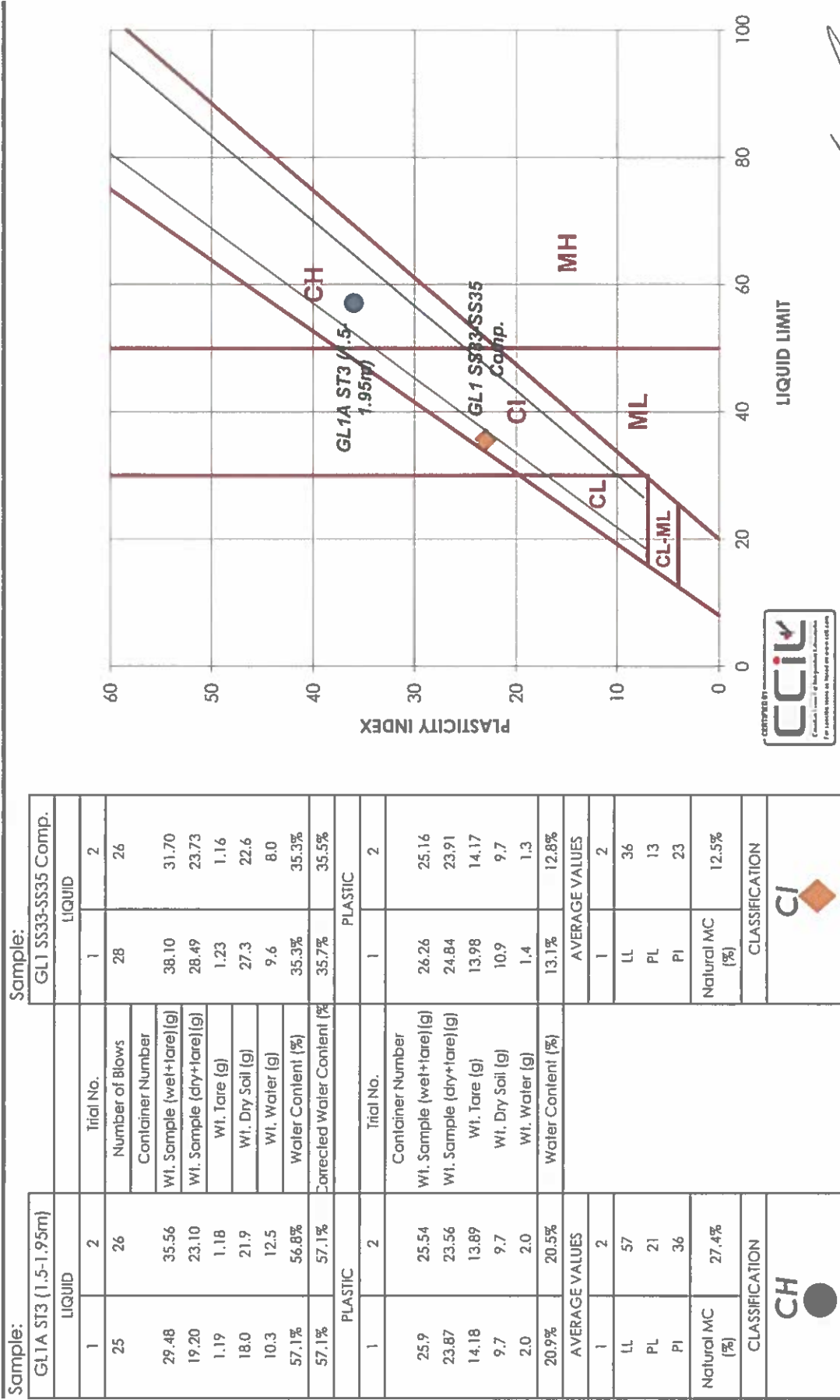
Client: Alberta Transportation
Project Name: SR1 2018 Investigation

LABORATORY
10830 - 46th Street SE
Calgary, Alberta
Canada T2C 1G4

Project No: 110773396
Date Received: September 28, 2018
Date Tested: November 2, 2018
Tested By: E. Wahl & B. Pelkey

Tel: (403) 253-7876

Tel: (403) 716-8000



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Reviewed By:



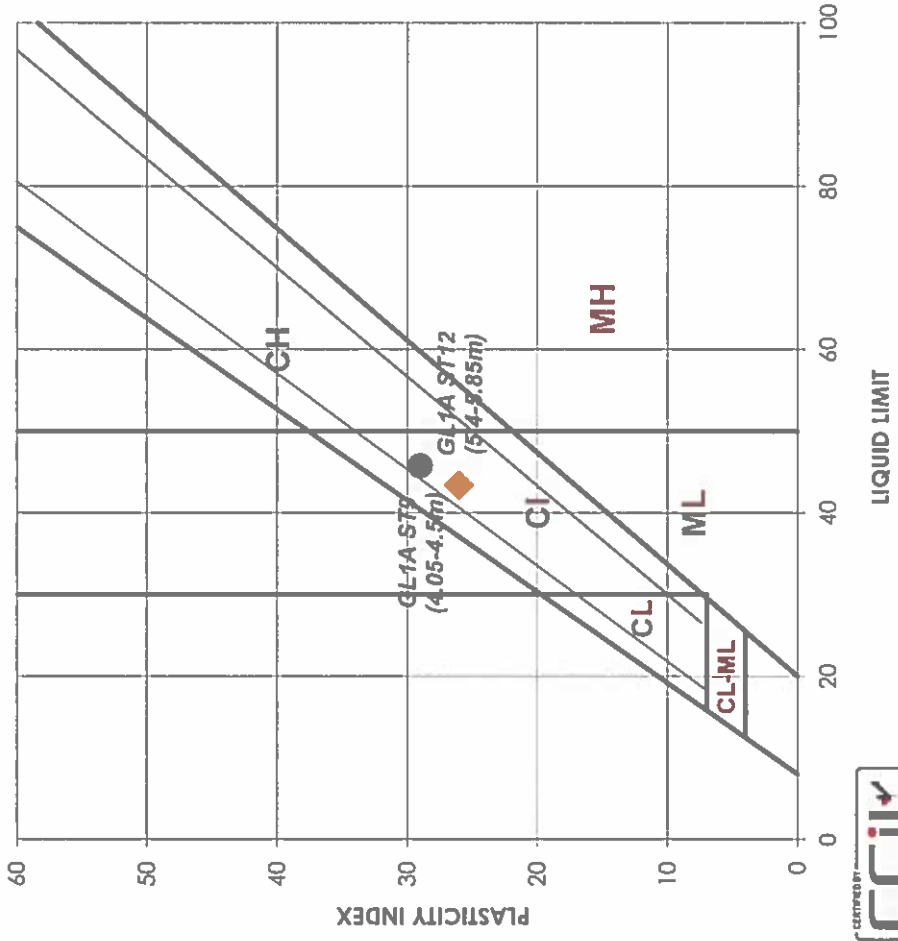
Atterberg Limits
ASTM D4318
Method B- One Point

Client: Alberta Transportation
Project Name: SR1 2018 Investigation
Project No.: 110773396
Date Received: September 28, 2018
Date Tested: November 13, 2018
Tested By: E. Wahl

OFFICE
325 - 25th Street SE
Suite 200
Calgary, Alberta
Canada T2A 7H8
Tel: (403) 716-8000

LABORATORY
10830 - 46th Street SE
Calgary, Alberta
Canada T2C 1G4
Tel: (403) 253-7876

Sample:		GL1A ST19 (4.05-4.5m)		GL1A ST12 (5.4-5.85m)	
		LIQUID		LIQUID	
1	2	1	2	1	2
23	23	26	24	26	24
Container Number		32.22		35.61	
Wt. Sample (wet+tare)[g]		22.83		25.19	
Wt. Sample (dry+tare)[g]		1.23		1.14	
Wt. Tare (g)		21.6		24.1	
Wt. Dry Soil (g)		9.4		10.4	
Wt. Water (g)		43.5%		43.3%	
Water Content (%)		45.9%		43.7%	
Corrected Water Content [%]		43.7%		43.1%	
		PLASTIC		PLASTIC	
1	2	1	2	1	2
Container Number		24.19		24.34	
Wt. Sample (wet+tare)[g]		22.72		22.84	
Wt. Sample (dry+tare)[g]		13.79		13.86	
Wt. Tare (g)		8.9		9.0	
Wt. Dry Soil (g)		1.5		1.5	
Wt. Water (g)		16.5%		16.7%	
Water Content (%)		17.2%		16.8%	
Corrected Water Content [%]		16.5%		16.7%	
		AVERAGE VALUES		AVERAGE VALUES	
1	2	1	2	1	2
LL	46	LL	43	LL	43
PL	17	PL	17	PL	17
PI	29	PI	26	PI	26
Natural MC (%)	23.4%	Natural MC (%)	21.8%	Natural MC (%)	21.8%
CLASSIFICATION		CI		CLASSIFICATION	
		CI		CI	



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Reviewed By: _____



Aterberg Limits
ASTM D4318
Method B- One Point

Client: Alberta Transportation
Project Name: SRT 2018 Investigation

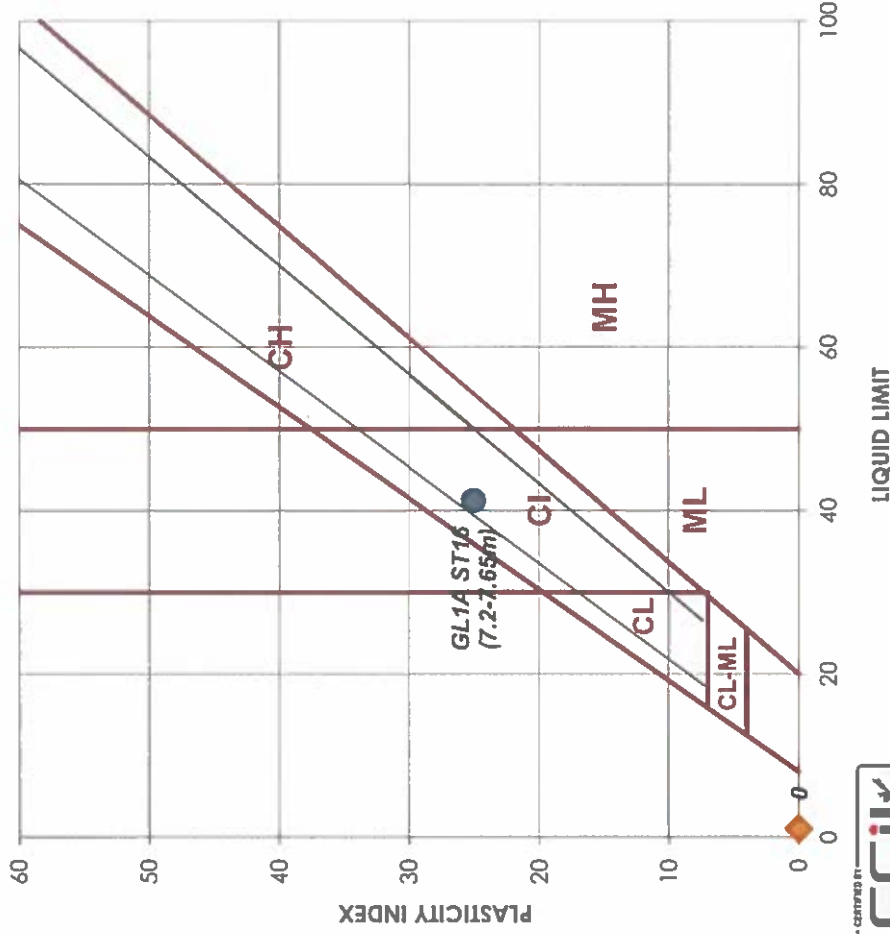
LABORATORY
10830 - 46th Street SE
Calgary, Alberta
Canada T2C 1G4

OFFICE
325 - 25th Street SE
Suite 200
Calgary, Alberta
Canada T2A 7H8
Tel: (403) 716-8000

Project No: 110773396
Date Received: September 29, 2018
Date Tested: November 13, 2018
Tested By: E. Wahl

Sample: GL1A ST16 (7.2-7.65m)

LIQUID		LIQUID	
Trial No.	2	Trial No.	1
27	27	Number of Blows	2
31.57	33.43	Container Number	
22.77	24.07	Wt. Sample (wet+tare)[g]	
1.24	1.14	Wt. Sample (dry+tare)[g]	
21.5	22.9	Wt. Tare (g)	
8.8	9.4	Wt. Dry Soil (g)	
40.9%	40.8%	Wt. Water (g)	
41.3%	41.2%	Water Content (%)	
PLASTIC		PLASTIC	
1	2	Trial No.	1
23.84	23.80	Container Number	
22.45	22.39	Wt. Sample (wet+tare)(g)	
13.86	13.74	Wt. Sample (dry+tare)(g)	
8.6	8.7	Wt. Tare (g)	
1.4	1.4	Wt. Dry Soil (g)	
16.2%	16.3%	Wt. Water (g)	
AVERAGE VALUES		AVERAGE VALUES	
1	2	1	2
LL	41	LL	
PL	16	PL	
PI	25	PI	
Natural MC (%)	21.5%	Natural MC (%)	
CLASSIFICATION		CLASSIFICATION	
CI		NON-PLASTIC	



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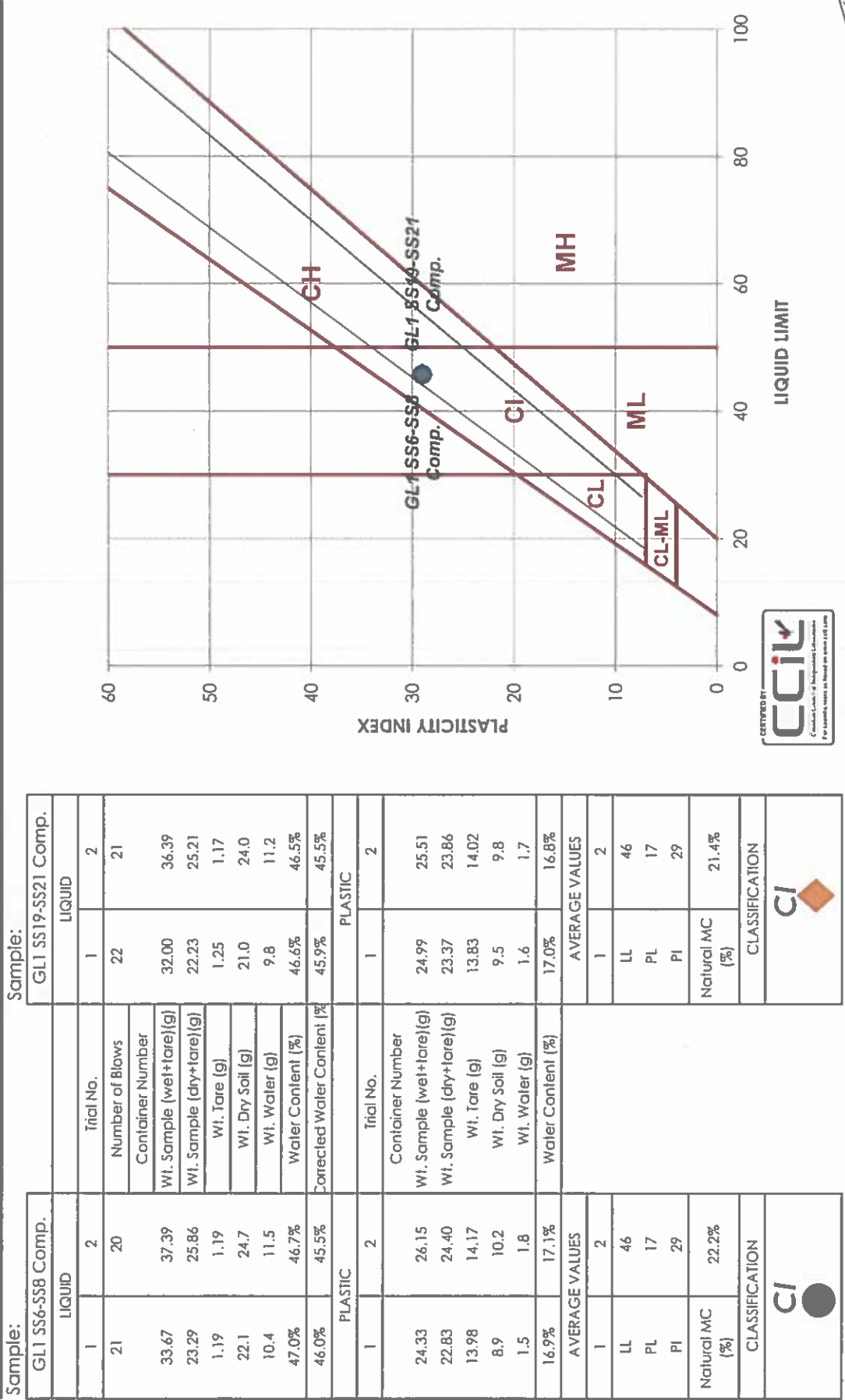


Afterberg Limits
 ASTM D4318
 Method B- One Point

Client: Alberta Transportation
Project Name: SR1 2018 Investigation
Project No.: 110773396
Date Received: September 28, 2018
Date Tested: November 2, 2018
Tested By: E. Wahl & B. Pelkey

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 Canada T2A 7H8
 Tel: (403) 716-8000

LABORATORY
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 Calgary, Alberta
 Canada T2C 1G4
 Tel: (403) 253-7876



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Reviewed By: _____



Aterberg Limits
ASTM D4318
Method B- One Point

Client: Alberta Transportation
Project Name: SRI 2018 Investigation
Project No: 110773396
Date Received: September 28, 2018
Date Tested: November 2, 2018
Tested By: E. Wahl & B. Pelkey

OFFICE: 325 - 25th Street SE
Suite 200
Calgary, Alberta
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Tel: (403) 716-8000

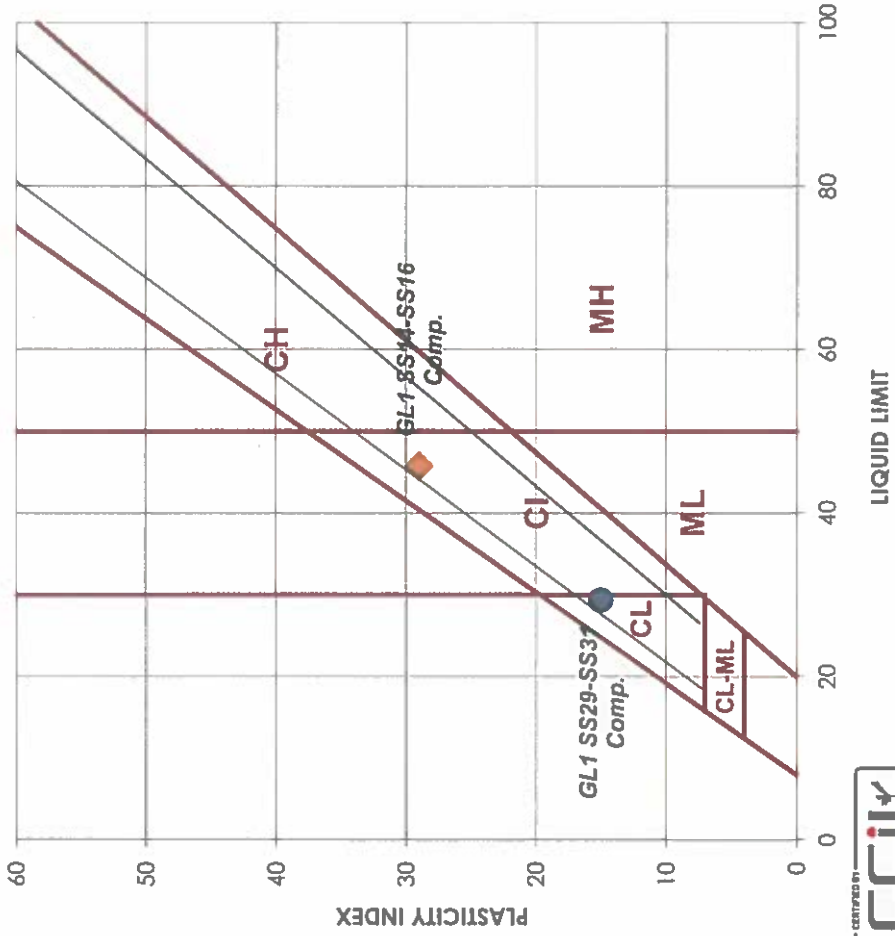
LABORATORY: 10830 - 46th Street SE
Calgary, Alberta
Canada T2C 1G4
Tel: (403) 253-7876

Sample: GLI SS29-SS31 Comp.

LIQUID		TRIAL NO.		GLI SS14-SS16 Comp.	
1	2	1	2	1	2
21	20	25	23		
Container Number		29.19		29.79	
Wt. Sample (wet+tare)[g]		20.37		20.79	
Wt. Sample (dry+tare)[g]		1.20		1.20	
Wt. Tare [g]		19.2		19.6	
Wt. Dry Soil [g]		8.8		9.0	
Wt. Water [g]		46.0%		45.9%	
Water Content [%]		46.0%		45.5%	
Corrected Water Content [%]					
PLASTIC					
TRIAL NO.		1		2	
Container Number		23.71		27.63	
Wt. Sample (wet+tare)[g]		22.33		25.65	
Wt. Sample (dry+tare)[g]		13.86		13.82	
Wt. Tare [g]		8.5		11.8	
Wt. Dry Soil [g]		1.4		2.0	
Wt. Water [g]		16.3%		16.7%	
Water Content [%]					
AVERAGE VALUES					
1		2			
LL		46			
PL		17			
PI		29			
Natural MC [%]		21.6%			
CLASSIFICATION					
CL-CI					

Sample: GLI SS14-SS16 Comp.

LIQUID		TRIAL NO.		GLI SS29-SS31 Comp.	
1	2	1	2	1	2
21	20	25	23		
Container Number		29.19		29.79	
Wt. Sample (wet+tare)[g]		20.37		20.79	
Wt. Sample (dry+tare)[g]		1.20		1.20	
Wt. Tare [g]		19.2		19.6	
Wt. Dry Soil [g]		8.8		9.0	
Wt. Water [g]		46.0%		45.9%	
Water Content [%]		46.0%		45.5%	
Corrected Water Content [%]					
PLASTIC					
TRIAL NO.		1		2	
Container Number		23.71		27.63	
Wt. Sample (wet+tare)[g]		22.33		25.65	
Wt. Sample (dry+tare)[g]		13.86		13.82	
Wt. Tare [g]		8.5		11.8	
Wt. Dry Soil [g]		1.4		2.0	
Wt. Water [g]		16.3%		16.7%	
Water Content [%]					
AVERAGE VALUES					
1		2			
LL		46			
PL		17			
PI		29			
Natural MC [%]		21.6%			
CLASSIFICATION					
CL-CI					



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Atterberg Limits
ASTM D4318
Method B- One Point

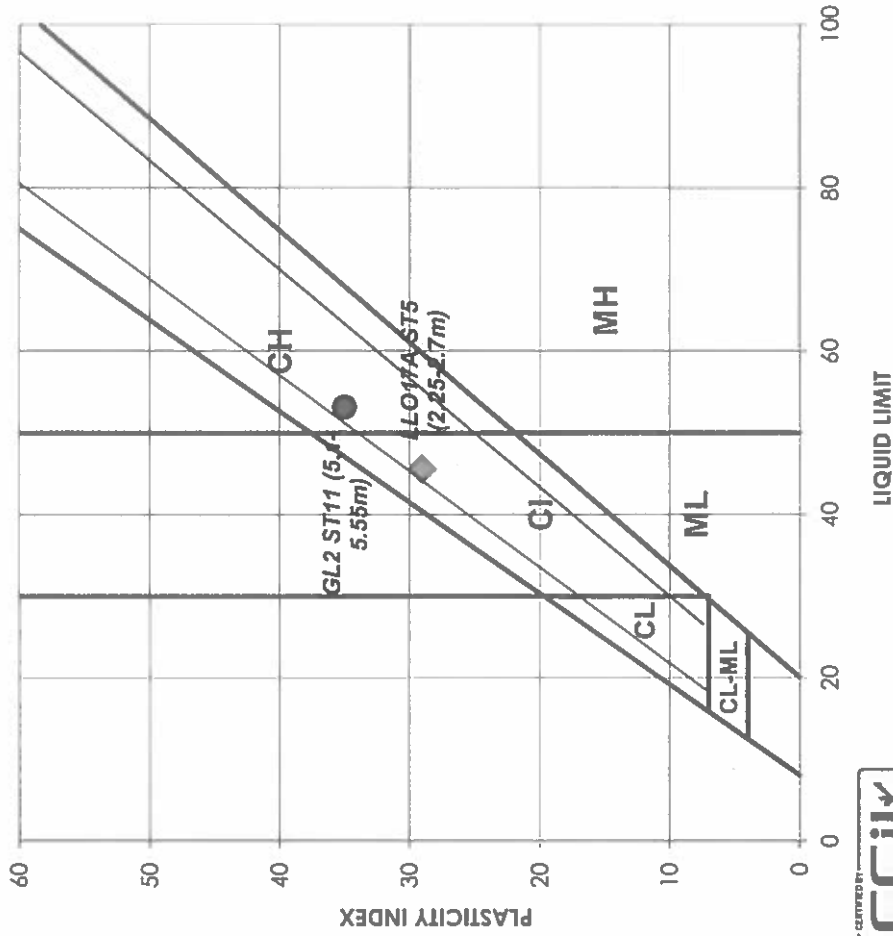
Client: Alberta Transportation
Project Name: SR1 2018 Investigation
Project No.: 110773396
Date Received: 09-27-18 & 09-29-18
Date Tested: October 26, 2018
Tested By: E. Wahl & B. Peiskey

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Tel: (403) 716-8000

Sample: GL2 ST11 (5.1-5.55m) LIQUID LLO17A ST5 (2.25-2.7m) LIQUID

GL2 ST11 (5.1-5.55m)		LLO17A ST5 (2.25-2.7m)	
LIQUID		LIQUID	
1	2	1	2
28	26	22	23
Number of Blows		36.25	
Container Number		25.19	
31.77	33.59	35.61	36.25
21.20	22.40	24.74	25.19
1.16	1.12	1.25	1.17
20.0	21.3	23.5	24.0
10.6	11.2	10.9	11.1
52.7%	52.6%	46.3%	46.0%
53.5%	52.8%	45.6%	45.6%
Corrected Water Content (%)		45.6%	
PLASTIC		PLASTIC	
1	2	1	2
Trial No.		26.72	
Container Number		24.90	
26.39	26.49	26.26	26.72
24.46	24.53	24.49	24.90
13.9	13.80	13.83	14.05
10.6	10.7	10.7	10.9
1.9	2.0	1.8	1.8
18.3%	18.3%	16.6%	16.8%
Water Content (%)		16.8%	
AVERAGE VALUES		AVERAGE VALUES	
1	2	1	2
LL	53	LL	46
PL	18	PL	17
PI	35	PI	29
Natural MC (%)	25.6%	Natural MC (%)	27.4%
CLASSIFICATION		CLASSIFICATION	
CH		CI	



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Afterberg Limits
ASTM D4318
Method B- One Point

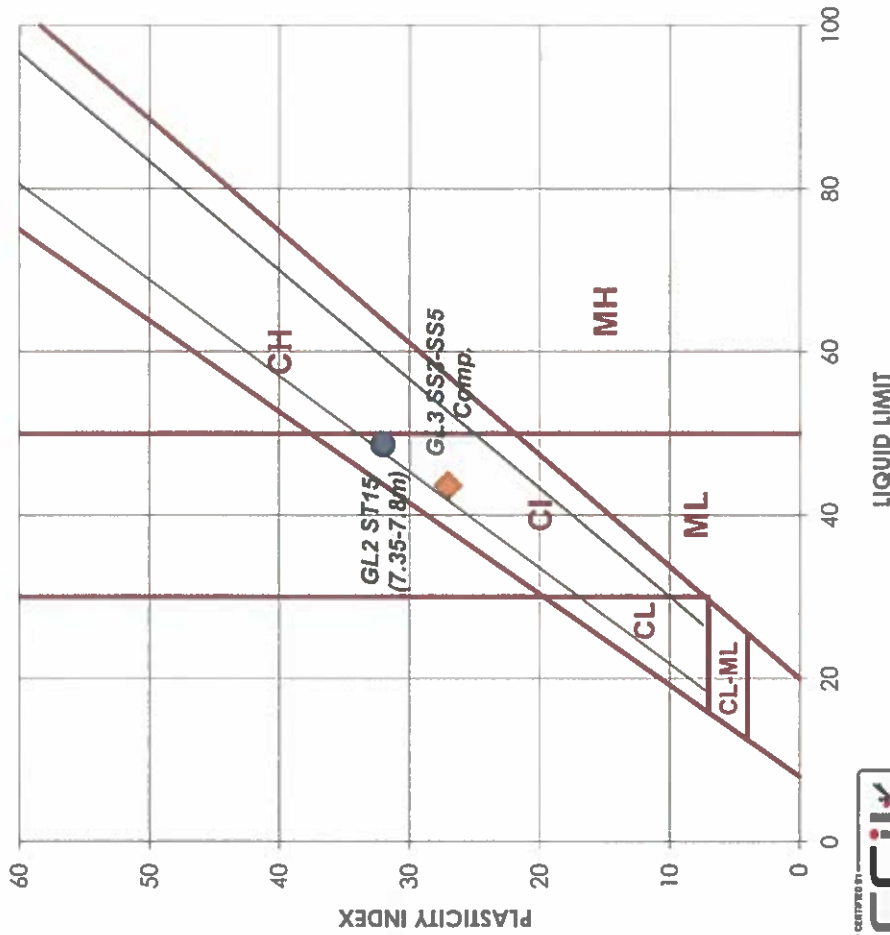
Client: Alberta Transportation
Project Name: SRI 2018 Investigation
Project No: 110773396
Date Received: 09-27-18 & 09-29-18
Date Tested: October 26, 2018
Tested By: E. Wahl & B. Pelkey

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Sample:

Sample: GL2 ST15 (7.35-7.8m)		Sample: GL3 SS3-SS5 Comp.	
LIQUID		LIQUID	
1	2	1	2
25	25	24	25
Container Number		33.01	
29.71	34.81	32.09	23.35
20.36	23.83	1.22	1.23
1.20	1.18	21.5	22.1
19.2	22.7	9.4	9.7
9.4	11.0	43.7%	43.7%
48.8%	48.5%	43.5%	43.7%
48.8%	48.5%	PLASTIC	
PLASTIC		PLASTIC	
1	2	1	2
27.6	25.61	24.77	26.33
25.54	23.86	23.16	24.49
13.78	13.83	13.80	13.78
11.8	10.0	9.4	10.7
2.1	1.8	1.6	1.8
17.5%	17.4%	17.2%	17.2%
AVERAGE VALUES		AVERAGE VALUES	
1	2	1	2
LL	49	LL	44
PL	17	PL	17
PI	32	PI	27
Natural MC (%)	22.7%	Natural MC (%)	22.6%
CLASSIFICATION		CLASSIFICATION	
CI-CH		CI	



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Afterberg Limits
ASTM D4318
Method B- One Point

Client: Alberta Transportation
Project Name: SR1 2018 Investigation

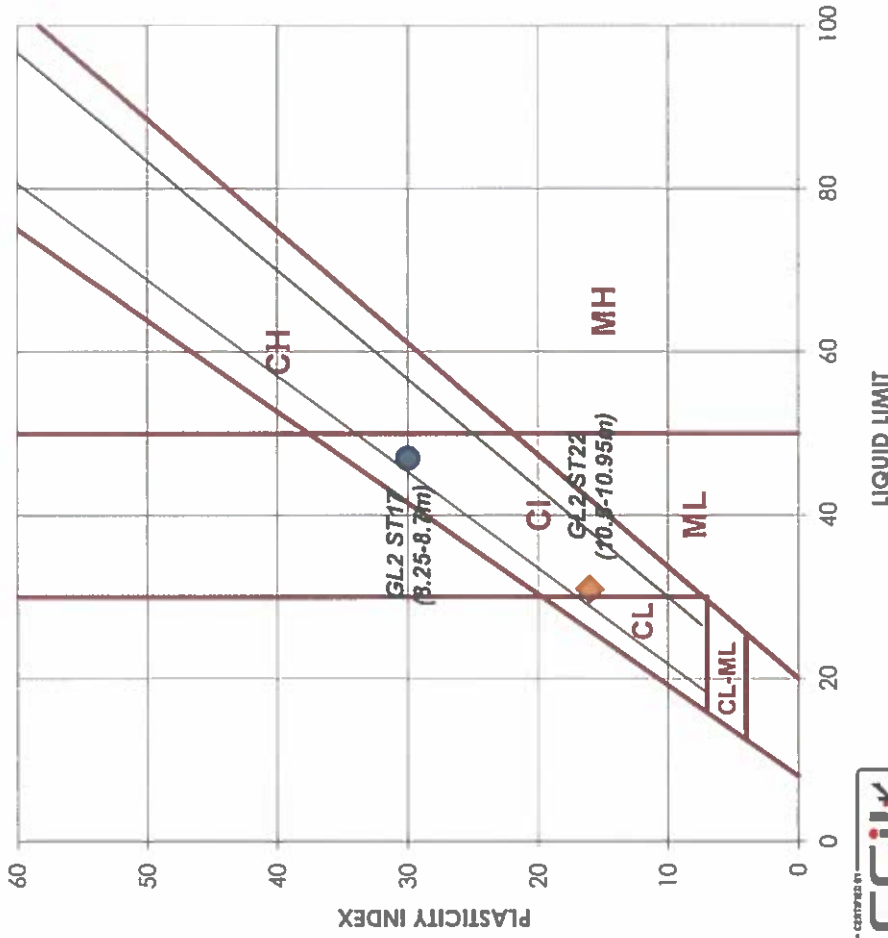
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Canada T2C 1G4

Project No: 110773396
Date Received: September 27, 2018
Date Tested: November 14, 2018
Tested By: E. Wahl

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Suite 200
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Tel: (403) 716-8000

Sample: GL2 ST17 (8.25-8.7m) Sample: GL2 ST22 (10.5-10.95m)

LIQUID		LIQUID	
Trial No.	1	Trial No.	2
24	23	23	24
Container Number		34.37	
23.27	31.19	26.50	25.00
16.18	21.56	1.25	1.16
1.24	1.15	25.3	23.8
14.9	20.4	7.9	7.4
7.1	9.6	31.2%	31.1%
47.5%	47.2%	30.9%	31.0%
47.2%	46.7%	PLASTIC	
PLASTIC		PLASTIC	
Trial No.	1	Trial No.	2
23.31	23.58	24.13	24.07
21.93	22.17	22.79	22.73
13.8	13.87	13.98	14.03
8.1	8.3	8.8	8.7
1.4	1.4	1.3	1.3
17.0%	17.0%	15.2%	15.4%
AVERAGE VALUES		AVERAGE VALUES	
1	2	1	2
LL	47	LL	31
PL	17	PL	15
PI	30	PI	16
Natural MC (%)	26.3%	Natural MC (%)	18.6%
CLASSIFICATION		CLASSIFICATION	
CI		CI-CL	



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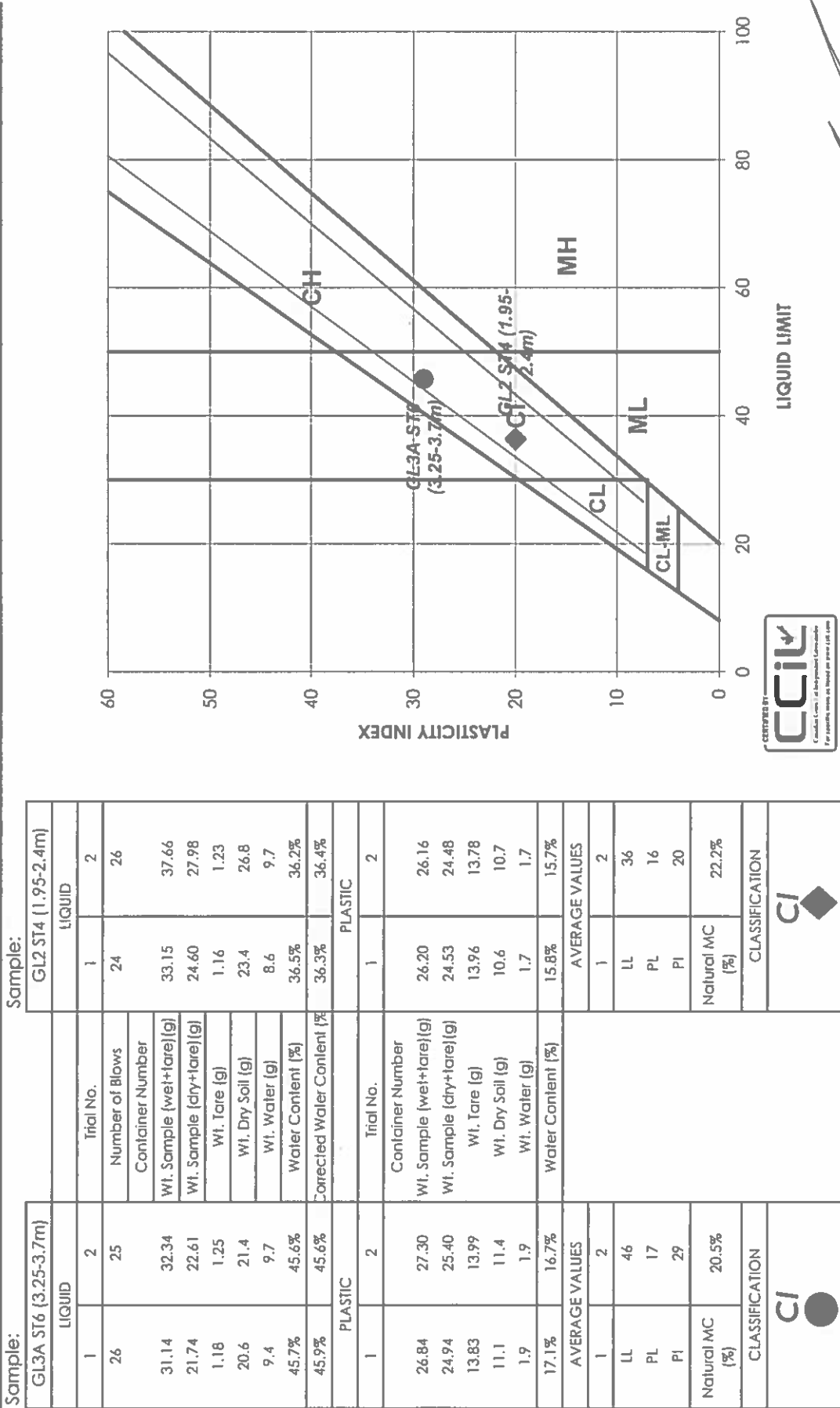


Atterberg Limits
ASTM D4318
Method B- One Point

Client: Alberta Transportation
Project Name: SR1 2018 Investigation
Project No: 110773396
Date Received: October 25, 2018
Date Tested: E. Wahl
Tested By:

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Atterberg Limits
ASTM D4318
Method B- One Point

Client: Alberta Transportation
Project Name: SRI 2018 Investigation
Project No: 110773396
Date Received: September 29, 2018
Date Tested: October 26, 2018
Tested By: E. Wacht & B. Pelkey

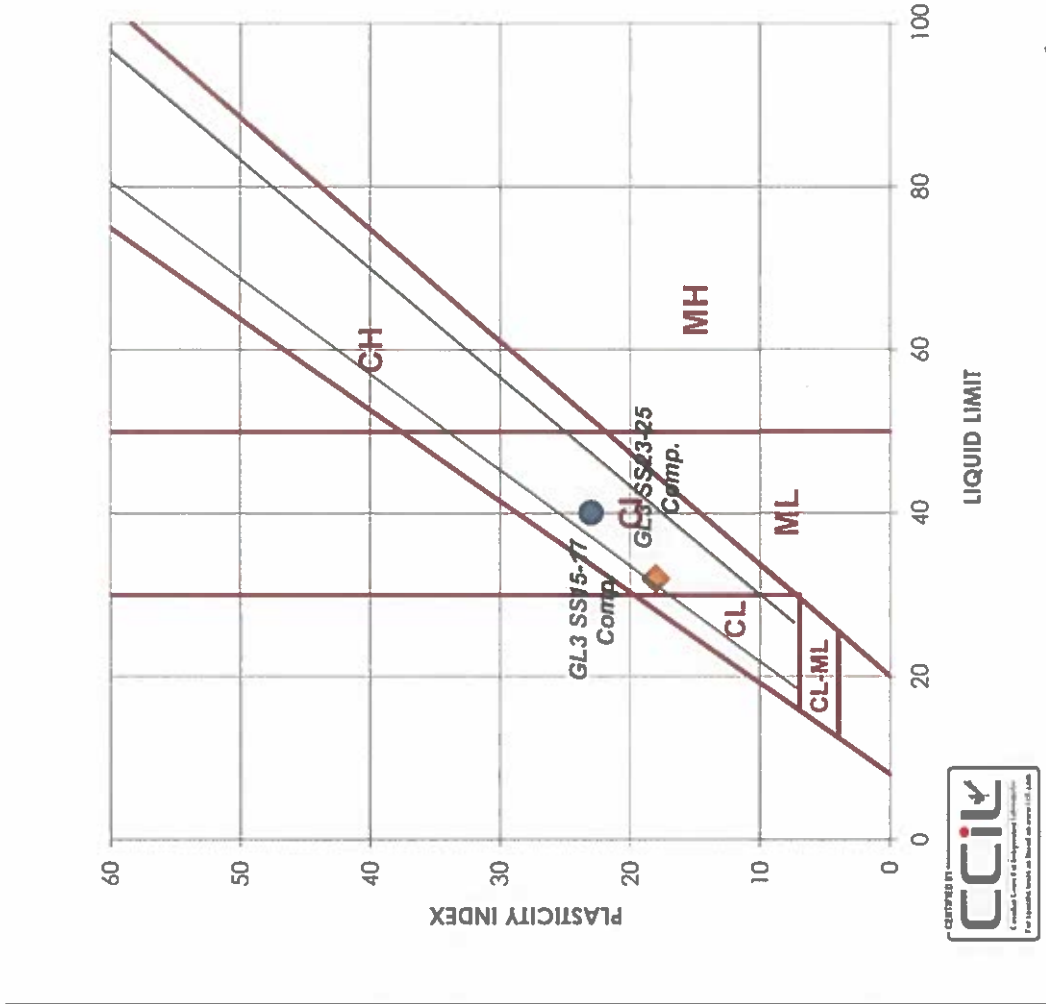
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Tel: (403) 253-7876

Sample: GL3 SS15-17 Comp.

LIQUID		LIQUID	
1	2	1	2
28	30	26	25
33.67	37.58	31.21	33.35
24.49	27.30	23.94	25.58
1.18	1.15	1.17	1.21
23.3	26.2	22.8	24.4
9.2	10.3	7.3	7.8
39.4%	39.3%	31.9%	31.9%
39.9%	40.2%	32.1%	31.9%
PLASTIC		PLASTIC	
1	2	1	2
26.84	27.30	25.78	23.16
24.94	25.40	24.29	21.97
13.83	13.99	13.96	13.61
11.1	11.4	10.3	8.4
1.9	1.9	1.5	1.2
17.1%	16.7%	14.4%	14.2%
AVERAGE VALUES		AVERAGE VALUES	
1	2	1	2
LL	40	LL	32
PL	17	PL	14
PI	23	PI	18
Natural MC (%)	18.1%	Natural MC (%)	13.2%
CLASSIFICATION		CLASSIFICATION	
CI		CI-CL	

Sample: GL3 SS23-25 Comp.



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Afterberg Limits
ASTM D4318
Method B- One Point

Client: Alberta Transportation
Project Name: SR1 2018 Investigation
Project No.: 110773396
Date Received: September 29, 2018
Date Tested: October 26, 2018
Tested By: E. Wahl & B. Pelkey

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Tel: (403) 253-7876

Sample: GL3 SS30-32A Comp.

LIQUID		LIQUID	
1	2	1	2
26	25	22	22
33.58	35.27	43.07	41.91
26.85	28.22	35.90	34.97
1.15	1.23	1.21	1.26
25.7	27.0	34.7	33.7
6.7	7.1	7.2	6.9
26.2%	26.1%	20.7%	20.6%
26.3%	26.1%	20.4%	20.3%

Sample: GL3 SS32B-34A Comp.

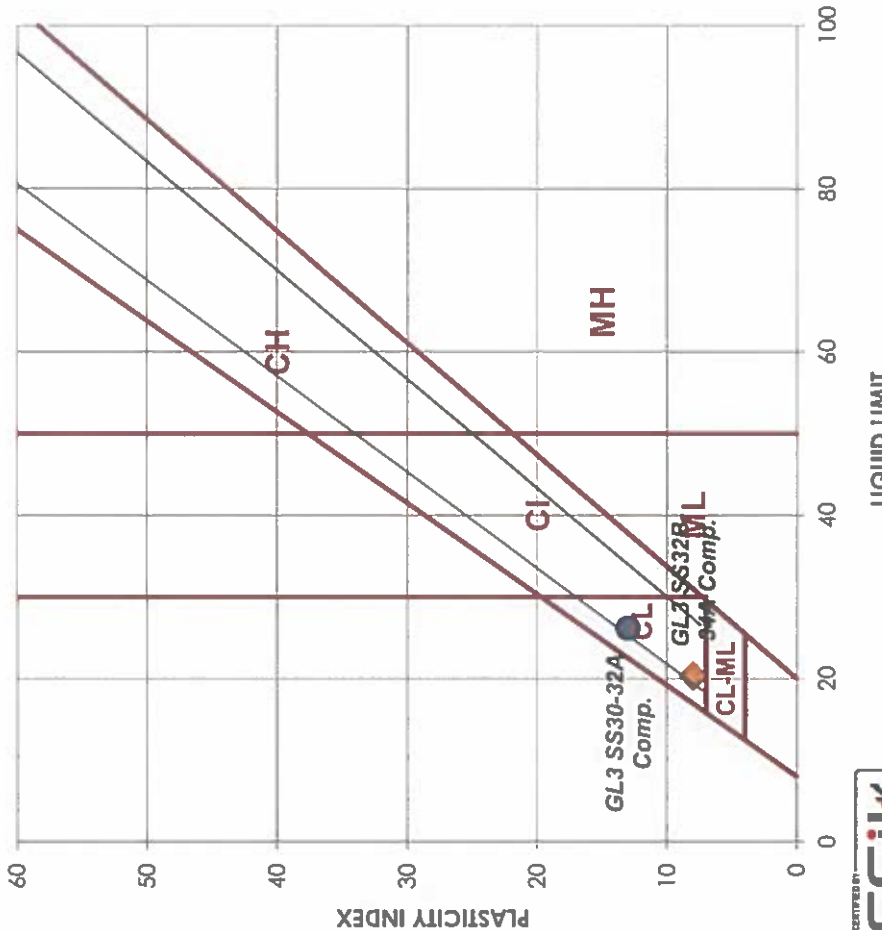
LIQUID		LIQUID	
1	2	1	2
26.1	26.68	26.40	26.49
24.68	25.23	25.00	25.11
13.83	13.99	13.78	13.86
10.9	11.2	11.2	11.3
1.4	1.5	1.4	1.4
13.1%	12.9%	12.5%	12.3%

AVERAGE VALUES

AVERAGE VALUES		AVERAGE VALUES	
1	2	1	2
LL	26	LL	20
PL	13	PL	12
PI	13	PI	8
Natural MC (%)	10.5%	Natural MC (%)	8.7%

CLASSIFICATION

CL



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Reviewed By:



Atterberg Limits
ASTM D4318
Method B- One Point

Client: Alberta Transportation
Project Name: SR1 2018 Investigation

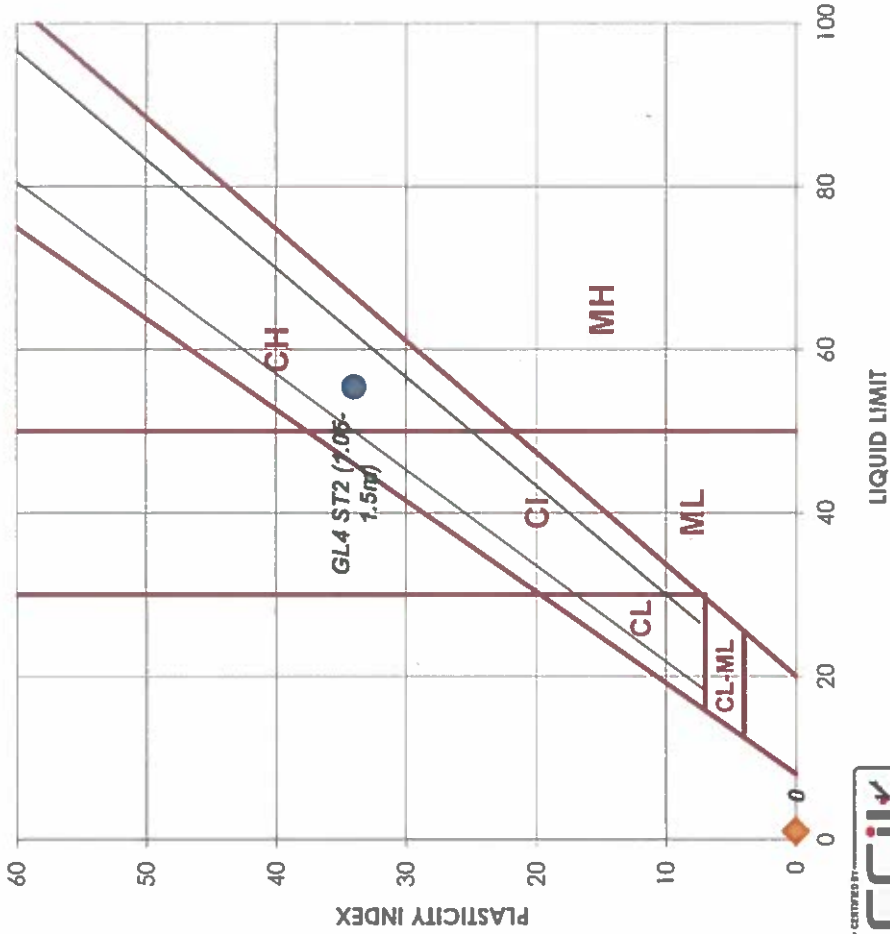
Office: 325 - 25th Street SE
Suite 200
Calgary, Alberta
Canada T2A 7H8
Tel: (403) 716-8000

Laboratory: 10830 - 46th Street SE
Calgary, Alberta
Canada T2C 1G4
Tel: (403) 253-7876

Project No: 110773396
Date Received: September 25, 2018
Date Tested: November 19, 2018
Tested By: B. Pelkey

Sample:

LIQUID		LIQUID	
Trial No.	2	Trial No.	2
28	29	28	29
29.63	27.60	29.63	27.60
19.59	18.28	19.59	18.28
1.20	1.20	1.20	1.20
18.4	17.1	18.4	17.1
10.0	9.3	10.0	9.3
54.6%	54.6%	54.6%	54.6%
55.3%	55.6%	55.3%	55.6%
PLASTIC		PLASTIC	
1	2	1	2
22.82	23.37	22.82	23.37
21.28	21.73	21.28	21.73
13.79	13.79	13.79	13.79
7.5	7.9	7.5	7.9
1.5	1.6	1.5	1.6
20.6%	20.7%	20.6%	20.7%
AVERAGE VALUES		AVERAGE VALUES	
1	2	1	2
LL	55	LL	55
PL	21	PL	21
PI	34	PI	34
Natural MC (%)	23.4%	Natural MC (%)	23.4%
CLASSIFICATION		CLASSIFICATION	
CH		NON-PLASTIC	



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Reviewed By:



Atterberg Limits
ASTM D4318
Method B-One Point

Client: Alberta Transportation
Project Name: SR1 2018 Investigation
Project No: 110773396
Date Received: October 25, 2018
Date Tested: October 25, 2018
Tested By: B. Peikay

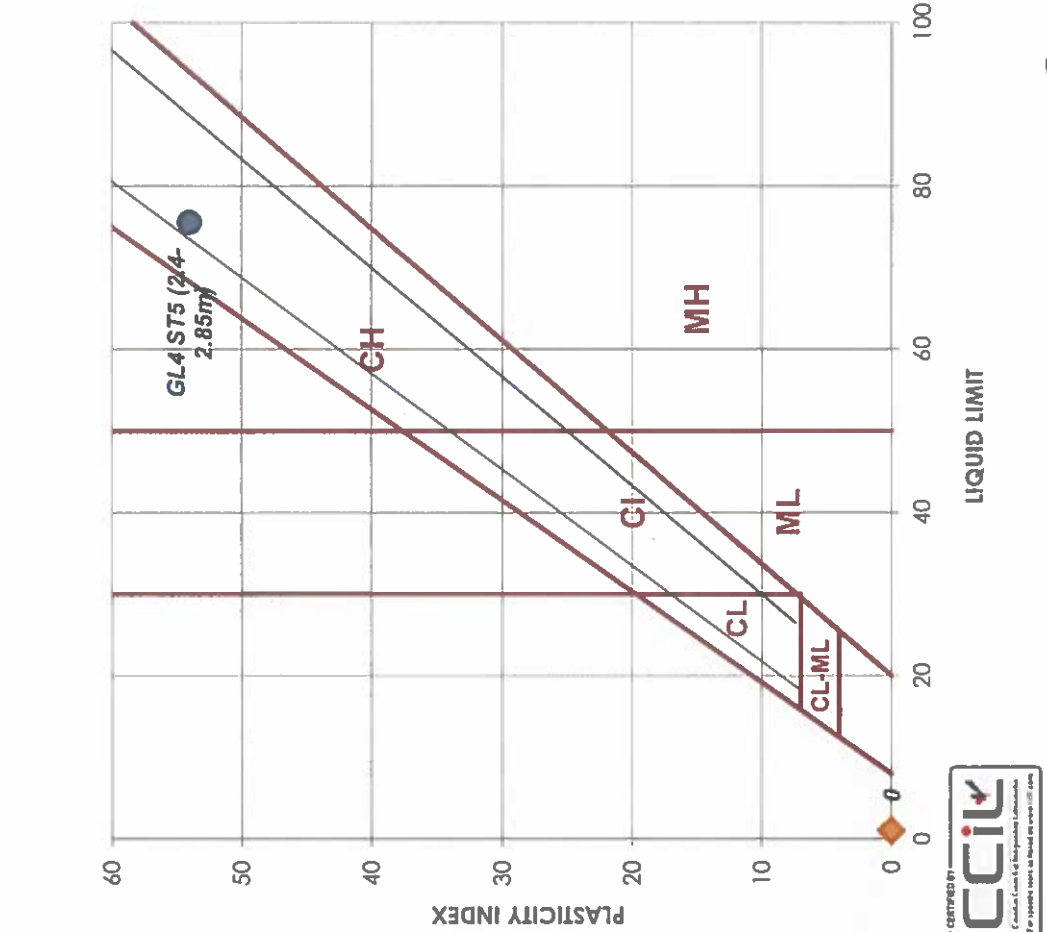
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Calgary, Alberta
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Calgary, Alberta
Canada T2C 1G4
Tel: (403) 253-7876

Sample: GL4 ST5 (2.4-2.85m)

LIQUID		LIQUID	
1	2	1	2
24	25	24	25
Number of Blows			
Container Number			
21.89	25.46	21.89	25.46
12.96	14.99	12.96	14.99
1.16	1.19	1.16	1.19
11.8	13.8	11.8	13.8
8.9	10.5	8.9	10.5
75.7%	75.9%	75.7%	75.9%
75.3%	75.9%	75.3%	75.9%
Corrected Water Content [%]			
PLASTIC			
1	2	1	2
Container Number			
22.89	23.11	22.89	23.11
21.24	21.40	21.24	21.40
13.78	13.85	13.78	13.85
7.5	7.6	7.5	7.6
1.7	1.7	1.7	1.7
22.1%	22.6%	22.1%	22.6%
Water Content [%]			
AVERAGE VALUES			
1	2	1	2
LL	76	LL	76
PL	22	PL	22
PI	54	PI	54
Natural MC (%)	33.9%	Natural MC (%)	33.9%
CLASSIFICATION			
CH		NON-PLASTIC	

Sample:



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Reviewed By:



Stantec Grain Size Analysis

ASTM C136, ASTM C117

Client: Alberta Transportation
Project Name: SRI 2018 Investigation

Project No: 110773396

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SAMPLE No.: SS6-SS8 Comp.

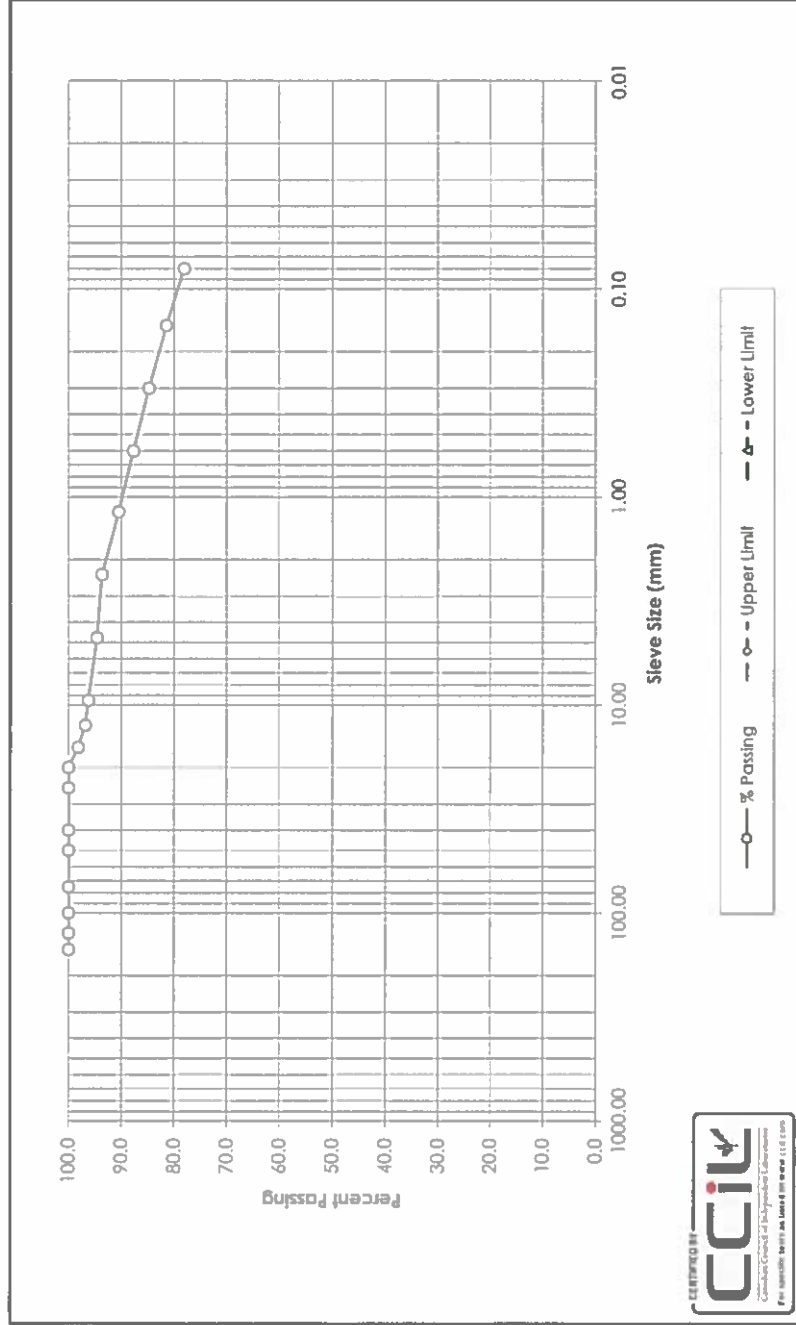
SOURCE: GL1

TESTED BY: B. Pelkey & S. McKay

DATE RECEIVED: September 29, 2018

DATE TESTED: October 30, 2018

SAMPLE DESCRIPTION: Clay (Cl), Some Sand, Trace Gravel



Comments: Sample description (MUSCS) derived from both the Grain Size and Atterberg Limits analyses.

Reviewed by:

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Stantec Grain Size Analysis

ASTM C136, ASTM C117

Client: Alberta Transportation
Project Name: SR1 2018 Investigation

Project No: 110773396

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Calgary, Alberta
Canada T2C 1G4

Tel: (403) 716-8000
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SAMPLE No.: SS14-SS16 Comp.

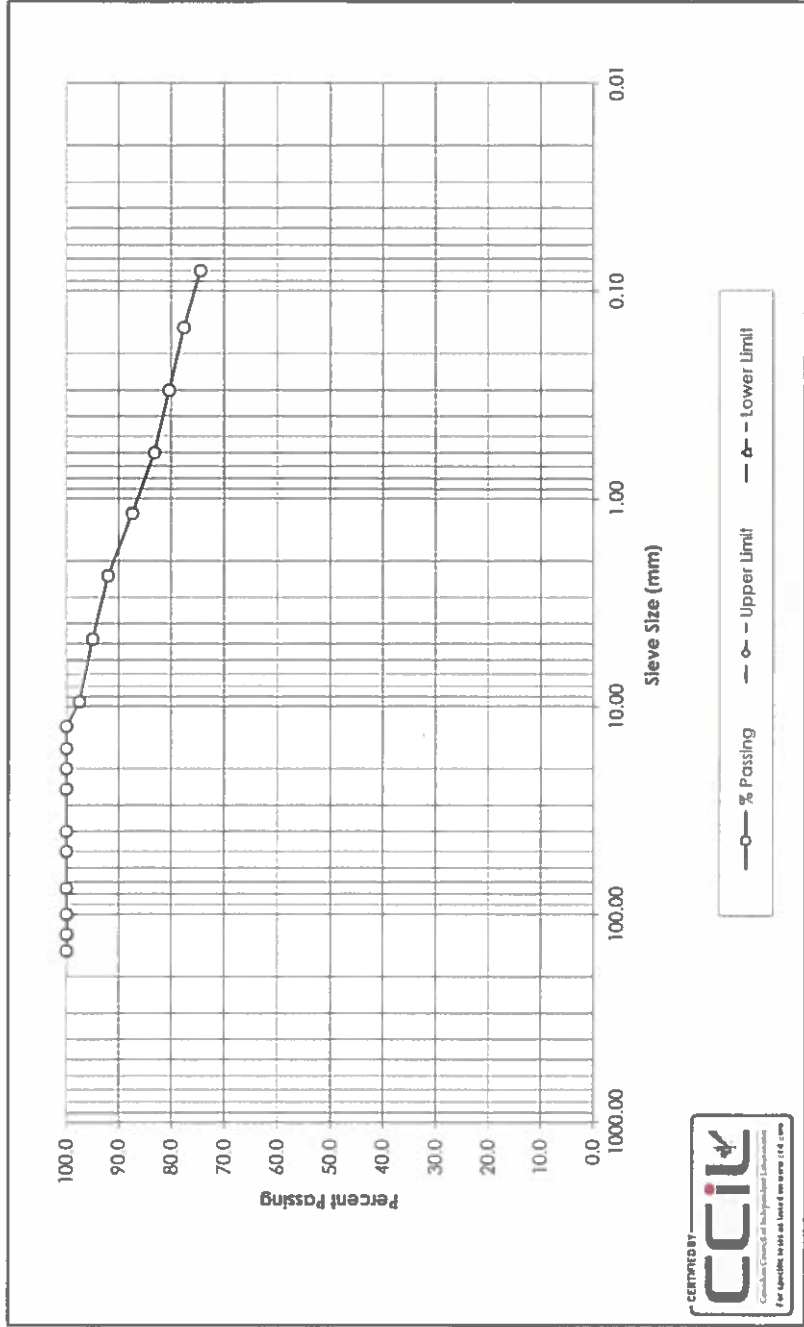
SOURCE: GLI

TESTED BY: B. Peilkey & S. McKay

DATE RECEIVED: September 29, 2018

DATE TESTED: October 30, 2018

SAMPLE DESCRIPTION: Clay (Cl), Some Sand, Trace Gravel



Sieve (mm)	Sample % Passing	Specifications	
		Lower	Upper
150.0	100.0	-	-
125.0	100.0	-	-
100.0	100.0	-	-
75.0	100.0	-	-
50.0	100.0	-	-
40.0	100.0	-	-
25.0	100.0	-	-
20.0	100.0	-	-
16.0	100.0	-	-
12.5	100.0	-	-
9.5	97.6	-	-
4.75	95.1	-	-
2.36	92.1	-	-
1.18	87.4	-	-
0.600	83.2	-	-
0.300	80.4	-	-
0.150	77.7	-	-
0.080	74.5	-	-
Cobble:	0.0%	D ₁₀ :	-
Gravel:	5.0%	D ₃₀ :	-
Sand:	20.6%	D ₆₀ :	-
Fines:	74.4%	C _u :	-
		C _c :	-

Comments: Sample description (MUSCS) derived from both the Grain Size and Atterberg Limits analyses.

Reviewed by:

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Stantec Grain Size Analysis

ASTM C136, ASTM C117

Client: Alberta Transportation
Project Name: SR1 2018 Investigation

Project No: 110773396

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SAMPLE No.: SS19-SS21 Comp.

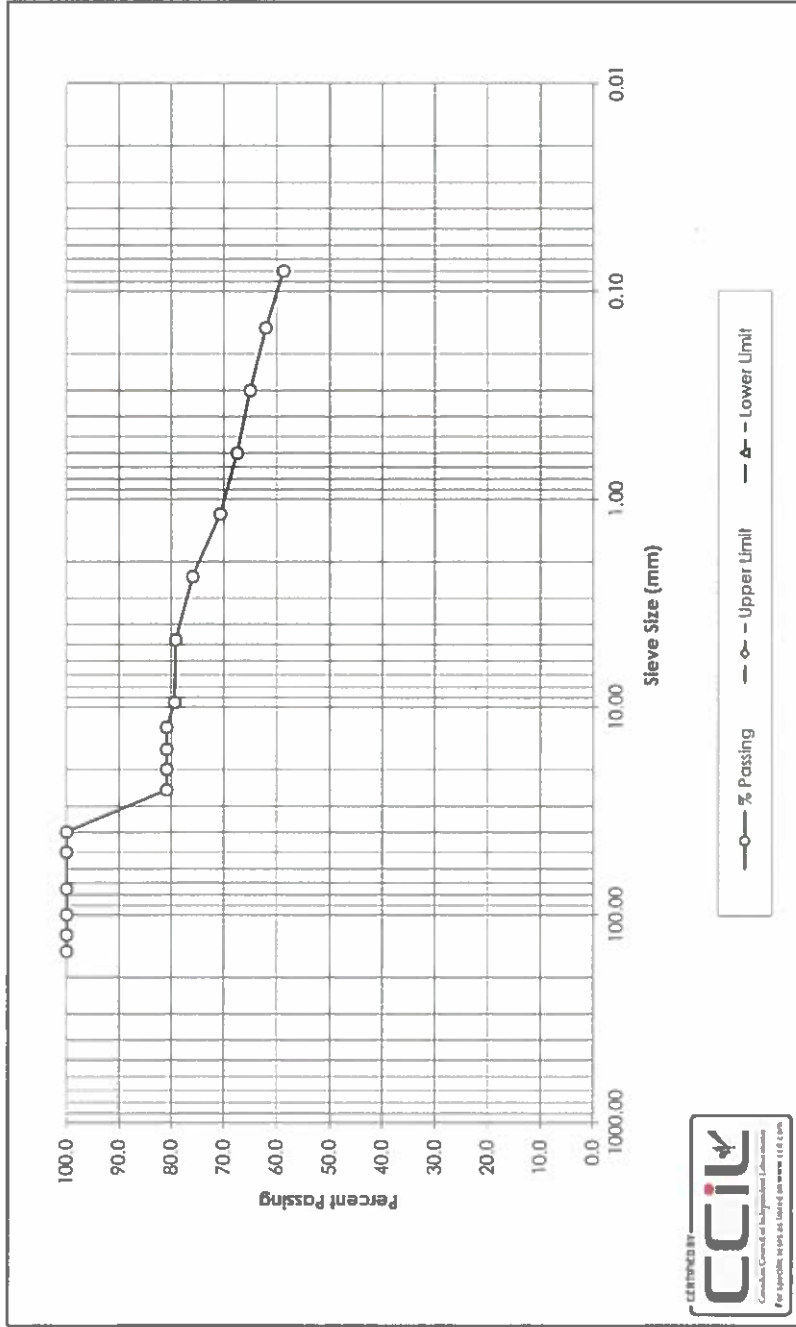
SOURCE: GL1

TESTED BY: B. Peilkey & S. McKay

DATE RECEIVED: September 29, 2018

DATE TESTED: October 30, 2018

SAMPLE DESCRIPTION: Clay (Cl), Some Gravel, Some Sand



Sieve (mm)	Sample % Passing	Specifications	
		Lower	Upper
150.0	100.0	-	-
125.0	100.0	-	-
100.0	100.0	-	-
75.0	100.0	-	-
50.0	100.0	-	-
40.0	100.0	-	-
25.0	80.9	-	-
20.0	80.9	-	-
16.0	80.9	-	-
12.5	80.9	-	-
9.5	79.4	-	-
4.75	79.2	-	-
2.36	75.9	-	-
1.18	70.7	-	-
0.600	67.5	-	-
0.300	65.0	-	-
0.150	62.0	-	-
0.080	58.7	-	-

Cobble: 0.0% D₁₀: - Gravel: 20.8% D₃₀: - Sand: 20.5% D₆₀: 0.1072 Fines: 58.7% C_u: - C_c: -

Comments: Sample description (MUSCS) derived from both the Grain Size and Atterberg Limits analyses.

Reviewed by:

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Stantec Grain Size Analysis

ASTM C136, ASTM C117

Client: Alberta Transportation
Project Name: SRI 2018 Investigation

Project No: 110773396

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SAMPLE No.: SS29-SS31 Comp.

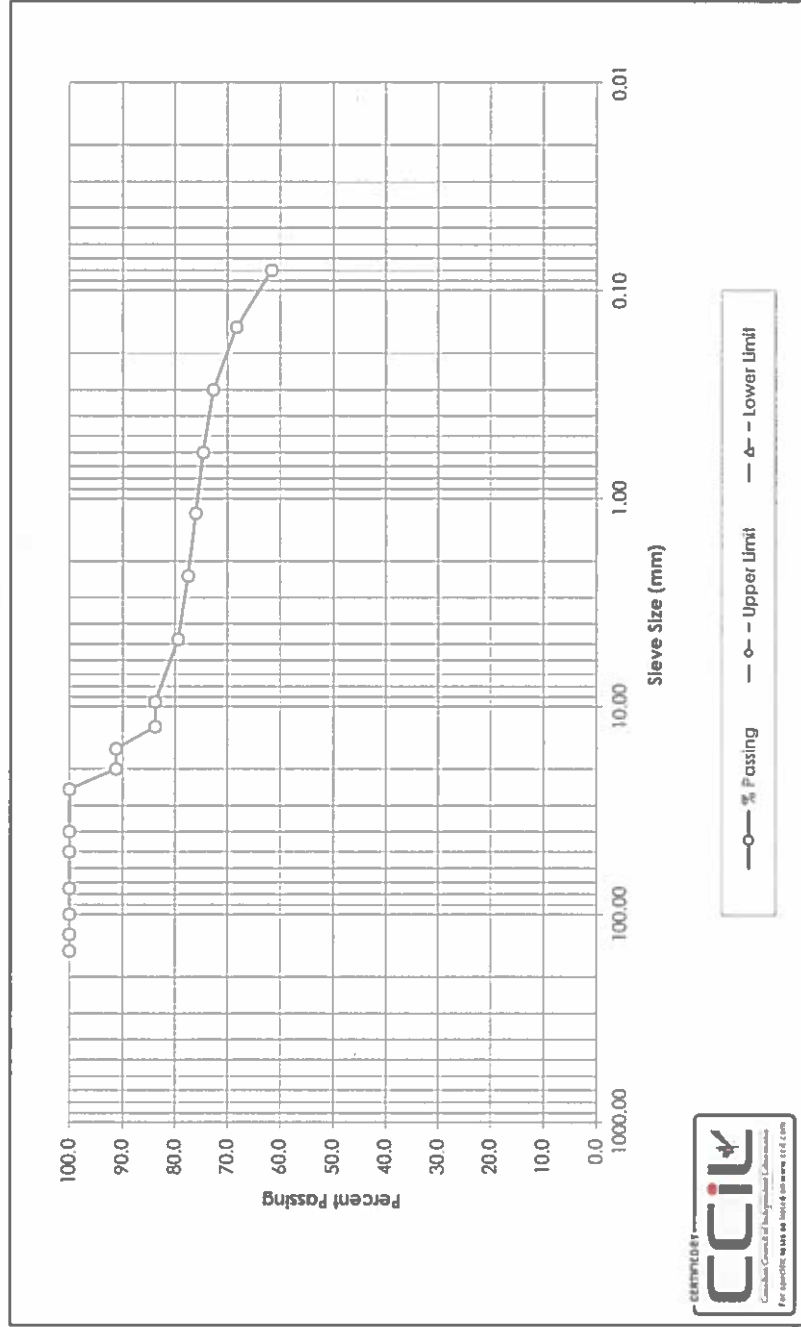
SOURCE: GLI

TESTED BY: B. Pelkey & S. McKay

DATE RECEIVED: September 29, 2018

DATE TESTED: October 30, 2018

SAMPLE DESCRIPTION: Gravelly Clay (CL-CI), Some Sand



Comments: Sample description (MUSCS) derived from both the Grain Size and Atterberg Limits analyses.

Sieve (mm)	Sample % Passing	Specifications	
		Lower	Upper
150.0	100.0	-	-
125.0	100.0	-	-
100.0	100.0	-	-
75.0	100.0	-	-
50.0	100.0	-	-
40.0	100.0	-	-
25.0	100.0	-	-
20.0	91.2	-	-
16.0	91.2	-	-
12.5	83.8	-	-
9.5	83.8	-	-
4.75	79.4	-	-
2.36	77.6	-	-
1.18	76.1	-	-
0.600	74.7	-	-
0.300	72.7	-	-
0.150	68.3	-	-
0.080	61.7	-	-

Cobble:	0.0%	D ₁₀ :	-
Gravel:	20.6%	D ₃₀ :	-
Sand:	17.7%	D ₆₀ :	-
Fines:	61.7%	C _u :	-
		C _c :	-

Reviewed by:

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Stantec Grain Size Analysis

ASTM C136, ASTM C117

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Project Name: SR1 2018 Investigation

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SAMPLE No.: SS33-35 Comp.

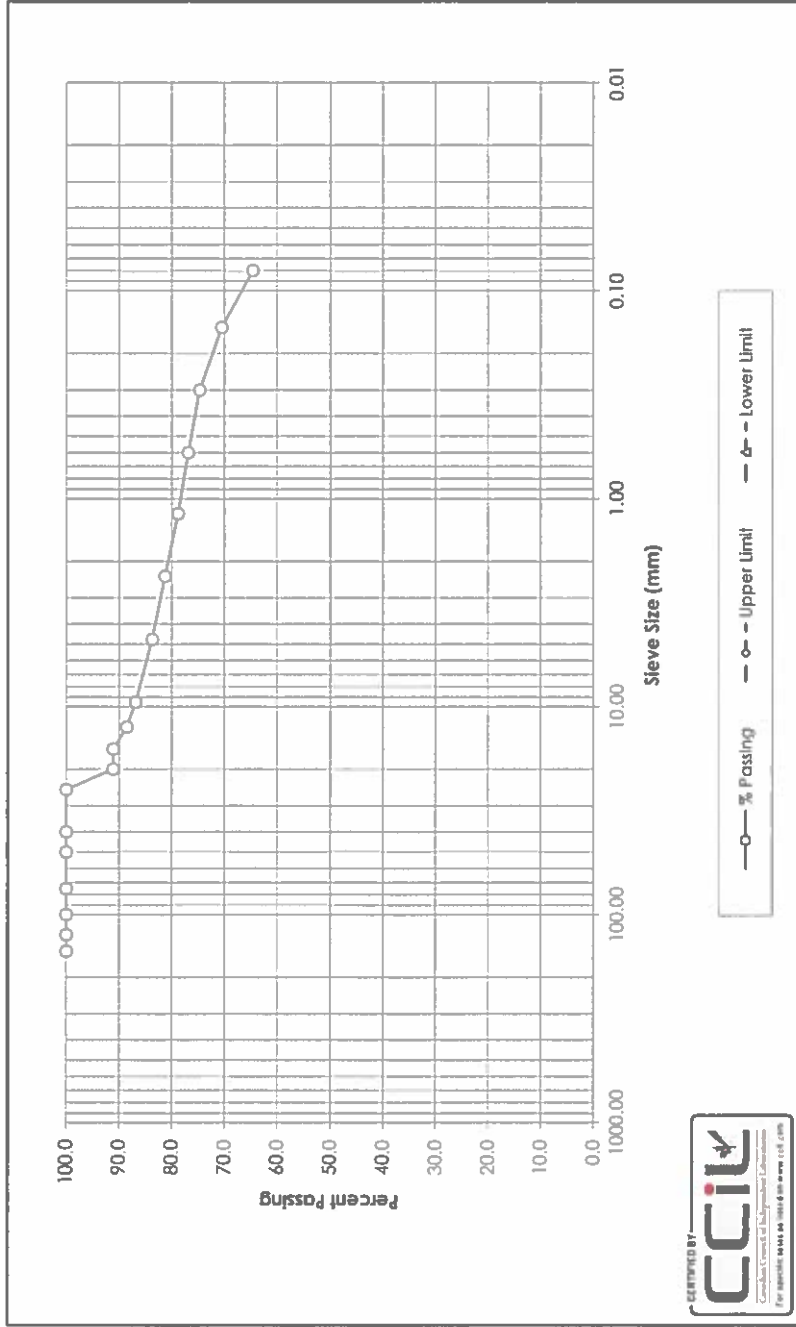
SOURCE: GLI

TESTED BY: B. Pelkey & S. McKay

DATE RECEIVED: September 29, 2018

DATE TESTED: October 30, 2018

SAMPLE DESCRIPTION: Clay (Cl), Some Sand, Some Gravel



Sieve (mm)	Sample % Passing	Specifications	
		Lower	Upper
150.0	100.0	-	-
125.0	100.0	-	-
100.0	100.0	-	-
75.0	100.0	-	-
50.0	100.0	-	-
40.0	100.0	-	-
25.0	100.0	-	-
20.0	91.1	-	-
16.0	91.1	-	-
12.5	88.6	-	-
9.5	84.9	-	-
4.75	83.7	-	-
2.36	81.3	-	-
1.18	78.8	-	-
0.600	76.9	-	-
0.300	74.7	-	-
0.150	70.5	-	-
0.080	64.6	-	-

Cobble: 0.0%	D ₁₀ :	-
Gravel: 16.3%	D ₃₀ :	-
Sand: 19.0%	D ₆₀ :	-
Fines: 64.7%	C _u :	-
	C _c :	-

Comments: Sample description (MUSCS) derived from both the Grain Size and Atterberg limits analyses.

Reviewed by:

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ASTM C136, ASTM C117

Client: Alberta Transportation
Project Name: SR1 2018 Investigation

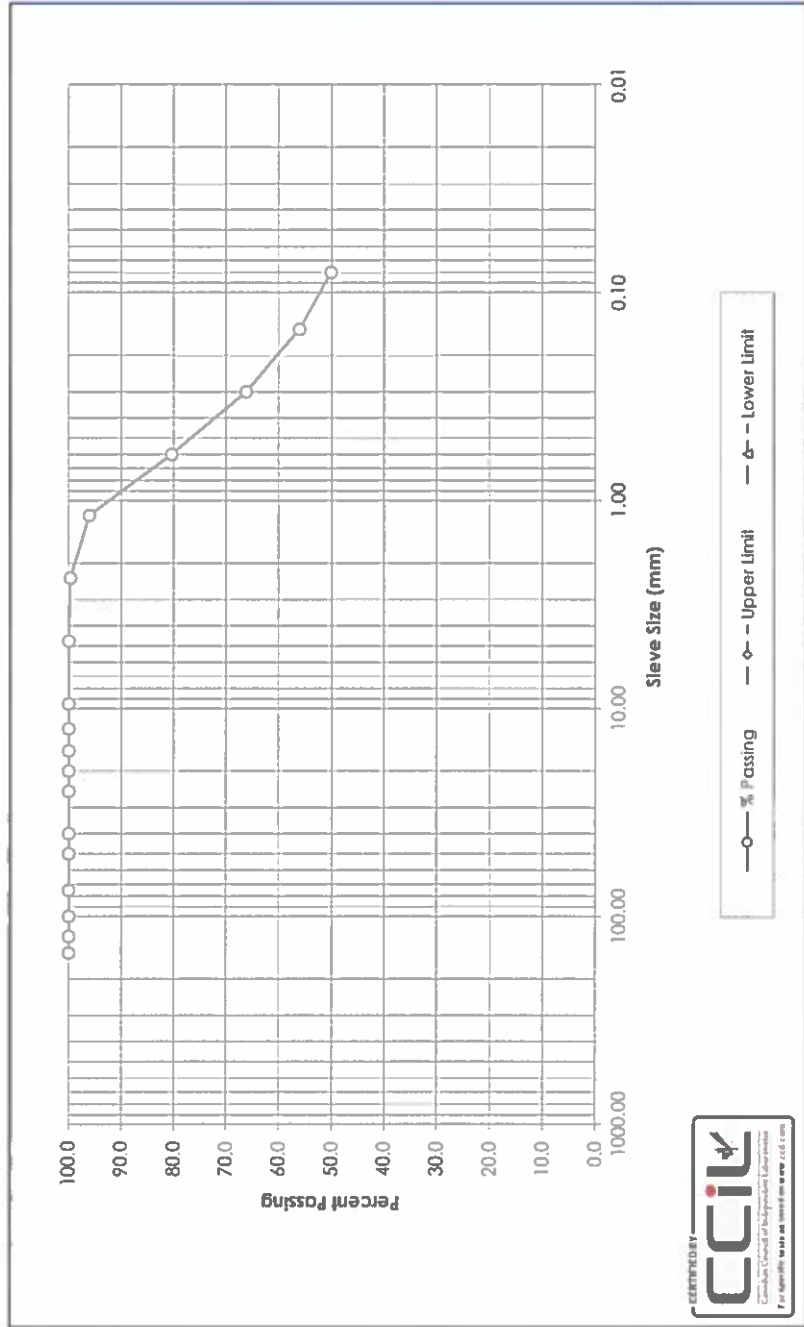
Project No: 110773396

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SAMPLE No.: ST3 (1.5-1.95m)
SOURCE: GL1A
TESTED BY: B. Pelkey & S. McKay

DATE RECEIVED: September 28, 2018
DATE TESTED: October 30, 2018
SAMPLE DESCRIPTION: Clay (CH) and Sand



Comments: Sample description (MUSCS) derived from both the Grain Size and Atterberg Limits analyses.

Sieve	Sample % Passing	Specifications Lower	Specifications Upper
150.0	100.0	-	-
125.0	100.0	-	-
100.0	100.0	-	-
75.0	100.0	-	-
50.0	100.0	-	-
40.0	100.0	-	-
25.0	100.0	-	-
20.0	100.0	-	-
16.0	100.0	-	-
12.5	100.0	-	-
9.5	100.0	-	-
4.75	100.0	-	-
2.36	99.7	-	-
1.18	96.1	-	-
0.600	80.4	-	-
0.300	66.2	-	-
0.150	56.1	-	-
0.080	50.1	-	-
Cobble:	0.0%	D ₁₀ :	-
Gravel:	0.0%	D ₃₀ :	-
Sand:	49.9%	D ₆₀ :	0.2108
Fines:	50.1%	C _u :	-
		C _c :	-

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Stantec Grain Size Analysis

ASTM C136, ASTM C117

Client: Alberta Transportation
Project Name: SR1 2018 Investigation
Project No: 110773396

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SAMPLE No.: ST9 (4.05-4.5m)

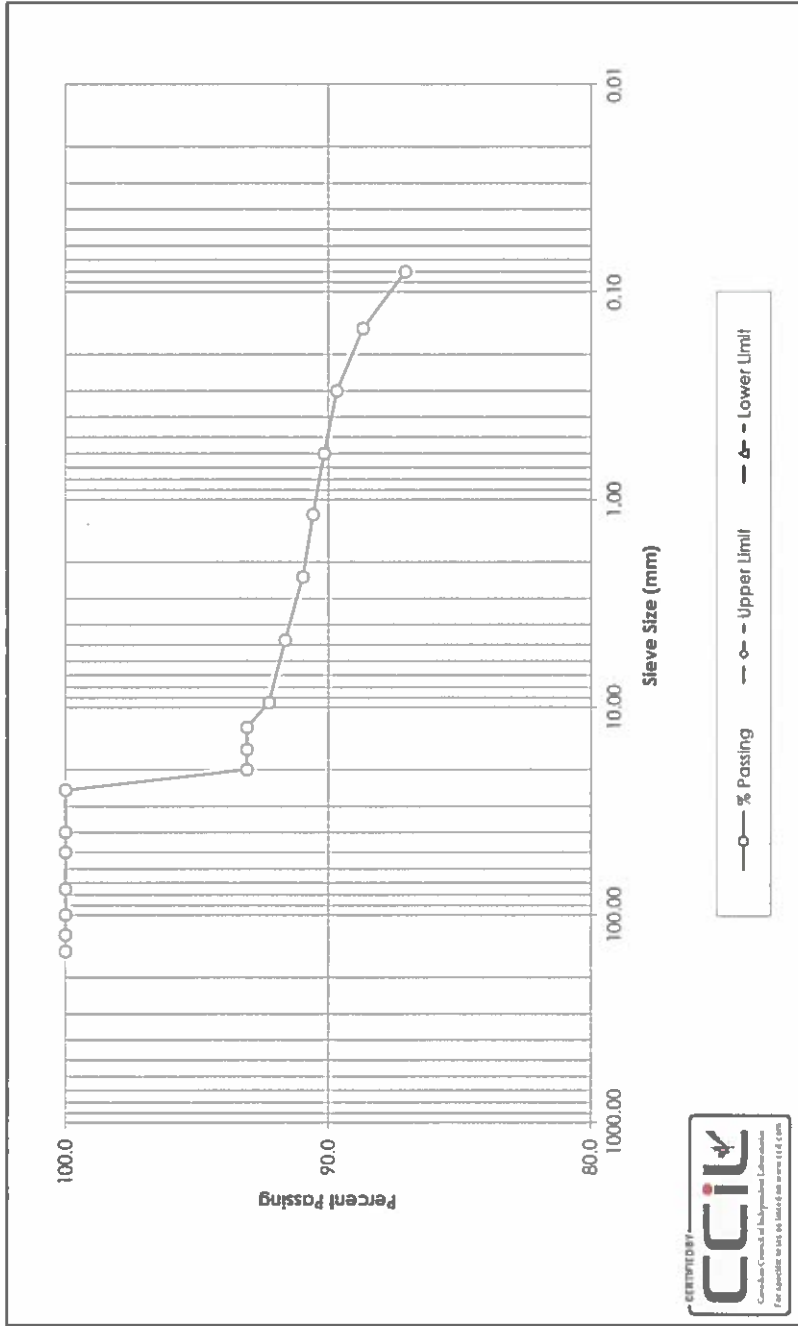
SOURCE: GLIA

TESTED BY: S. McKay

DATE RECEIVED: September 28, 2018

DATE TESTED: November 5, 2018

SAMPLE DESCRIPTION: Clay (Cl), Trace Gravel, Trace Sand



Sieve (mm)	Sample % Passing	Specifications	
		Lower	Upper
150.0	100.0	-	-
125.0	100.0	-	-
100.0	100.0	-	-
75.0	100.0	-	-
50.0	100.0	-	-
40.0	100.0	-	-
25.0	100.0	-	-
20.0	93.1	-	-
14.0	93.1	-	-
12.5	93.1	-	-
9.5	92.2	-	-
4.75	91.6	-	-
2.36	91.0	-	-
1.18	90.6	-	-
0.600	90.2	-	-
0.300	89.7	-	-
0.150	88.7	-	-
0.080	87.0	-	-

Comments: Sample description (MUSCS) derived from both the Grain Size and Atterberg Limits analyses.

Reviewed by:

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Grain Size Analysis

ASTM C136, ASTM C117

Client: Alberta Transportation
Project Name: SR1 2018 Investigation

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SAMPLE No.: ST12 (5.4-5.85m)

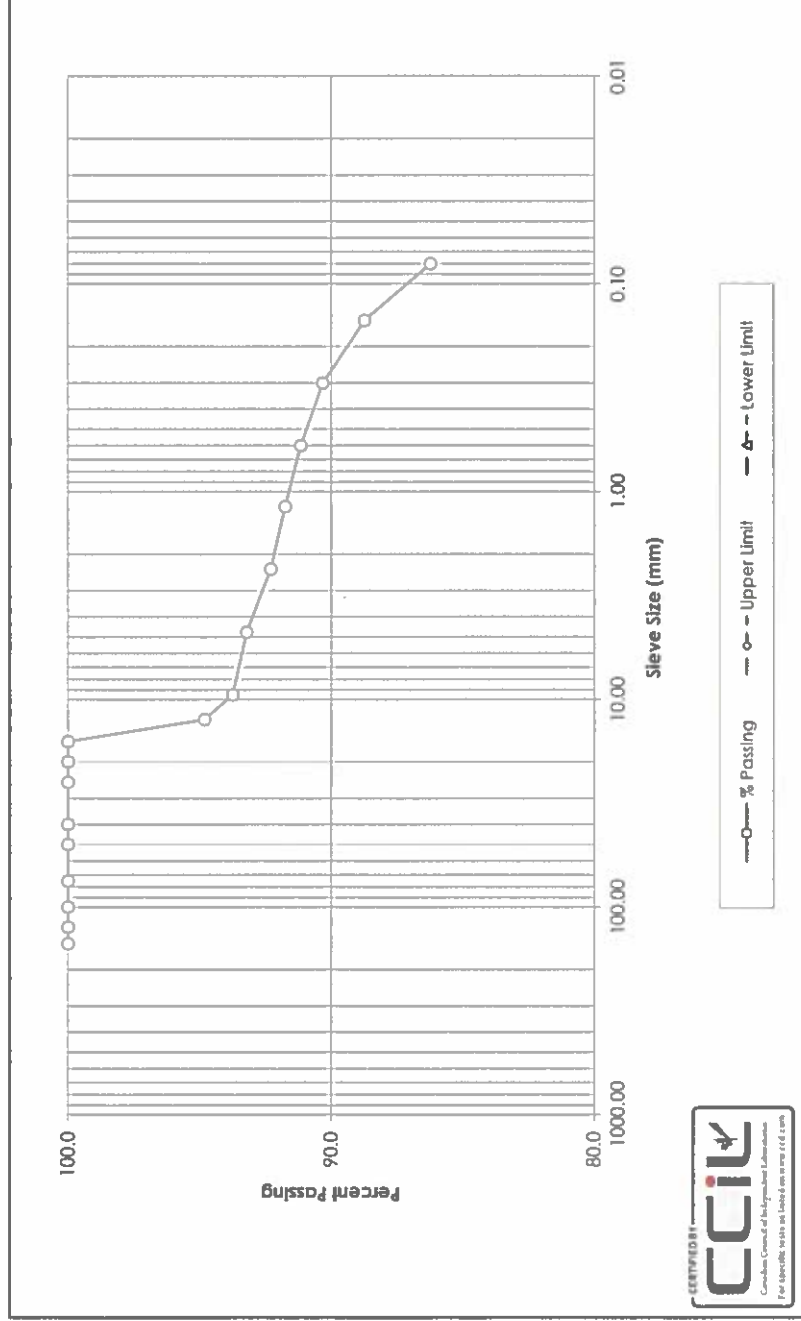
SOURCE: GL1A

TESTED BY: S. McKay

DATE RECEIVED: September 28, 2018

DATE TESTED: November 5, 2018

SAMPLE DESCRIPTION: Clay (Cl), Trace Sand, Trace Gravel



Sieve (mm)	Sample % Passing	Specifications	
		Lower	Upper
150.0	100.0	-	-
125.0	100.0	-	-
100.0	100.0	-	-
75.0	100.0	-	-
50.0	100.0	-	-
40.0	100.0	-	-
25.0	100.0	-	-
20.0	100.0	-	-
16.0	100.0	-	-
12.5	94.8	-	-
9.5	93.7	-	-
4.75	93.2	-	-
2.36	92.3	-	-
1.18	91.7	-	-
0.600	91.2	-	-
0.300	90.3	-	-
0.150	88.7	-	-
0.080	86.2	-	-

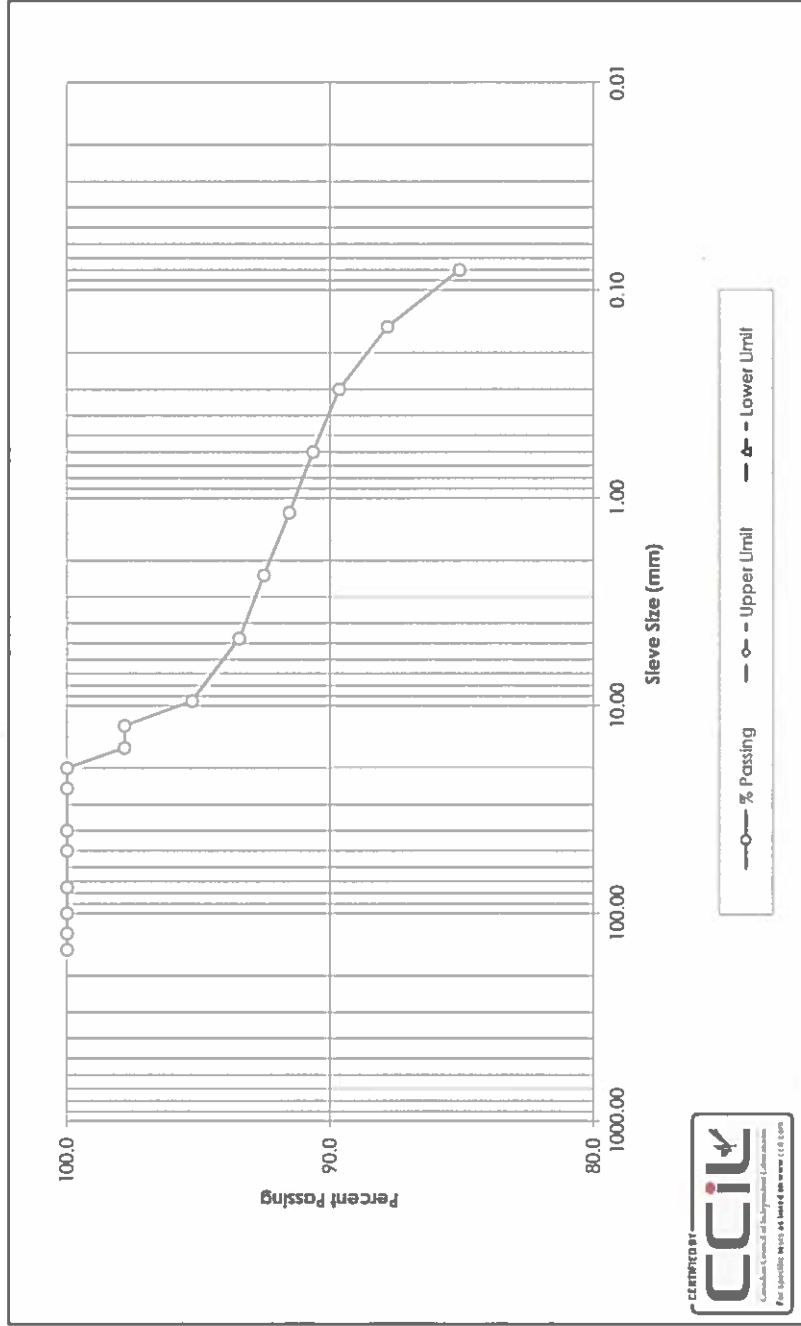
Cobble:	0.0%	D ₁₀ :	-
Gravel:	6.8%	D ₃₀ :	-
Sand:	7.0%	D ₆₀ :	-
Fines:	86.2%	C _u :	-
		C _c :	-

Comments: Sample description (MUSCS) derived from both the Grain Size and Atterberg Limits analyses.

Reviewed by:

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SAMPLE No.: ST16 (7.2-7.65m) DATE RECEIVED: September 29, 2018
SOURCE: GL1A DATE TESTED: November 5, 2018
TESTED BY: S. McKay SAMPLE DESCRIPTION: Clay (Cl), Trace Sand, Trace Gravel



Comments: Sample description (MUSCS) derived from both the Grain Size and Atterberg Limits analyses.

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Reviewed by:



Grain Size Analysis

ASTM C136, ASTM C117

Client: Alberta Transportation
Project Name: SR1 2018 Investigation

Project No: 110773396

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SAMPLE NO.: ST24 (10.9-11.35m)

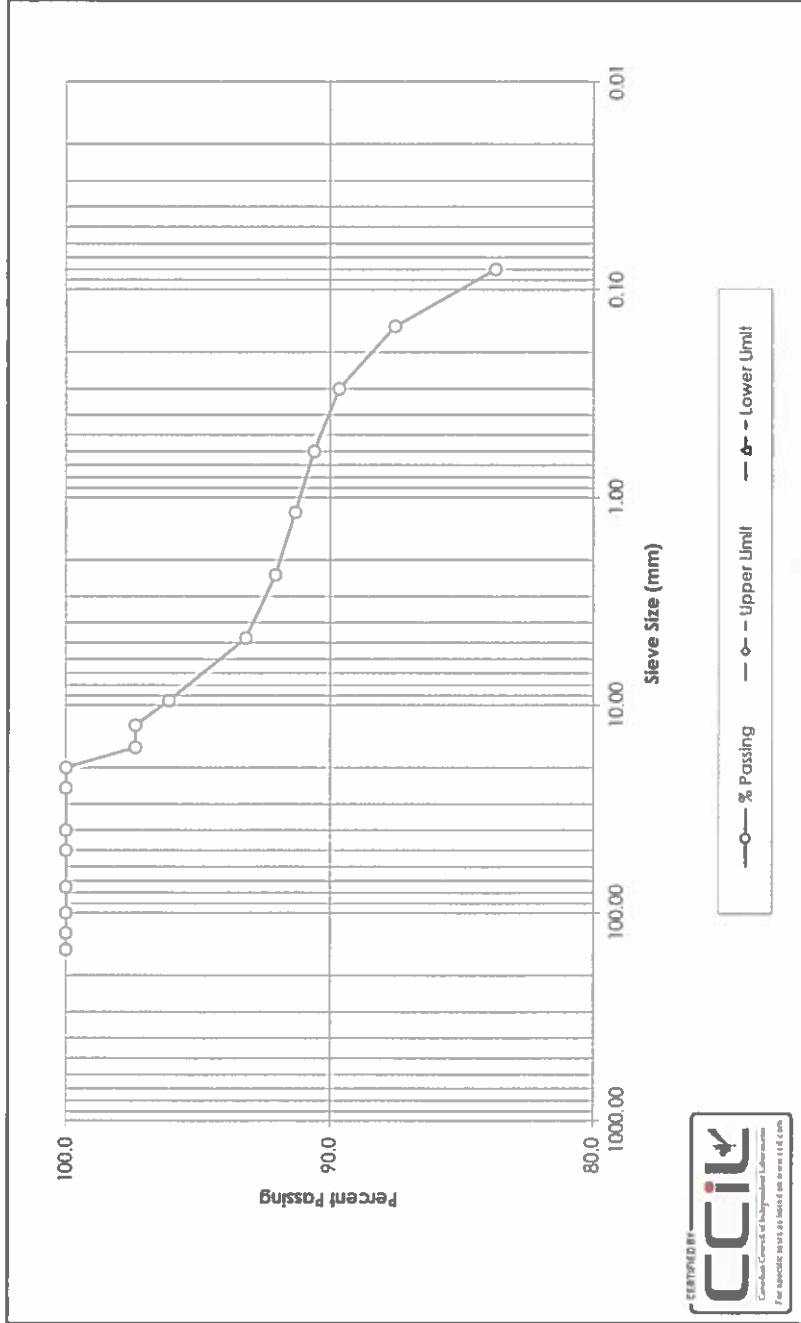
SOURCE: GL1A

TESTED BY: B. Pelkey

DATE RECEIVED: September 29, 2018

DATE TESTED: November 19, 2018

SAMPLE DESCRIPTION: Clay (Cl), Trace Sand, Trace Gravel



Sieve (mm)	Sample % Passing	Specifications	
		Lower	Upper
150.0	100.0	-	-
125.0	100.0	-	-
100.0	100.0	-	-
75.0	100.0	-	-
50.0	100.0	-	-
40.0	100.0	-	-
25.0	100.0	-	-
20.0	100.0	-	-
16.0	97.4	-	-
12.5	97.4	-	-
9.5	96.1	-	-
4.75	93.2	-	-
2.36	92.1	-	-
1.18	91.3	-	-
0.600	90.6	-	-
0.300	89.6	-	-
0.150	87.5	-	-
0.080	83.7	-	-
Cobble:	0.0%	D ₁₀ :	-
Gravel:	6.8%	D ₃₀ :	-
Sand:	9.5%	D ₆₀ :	-
Fines:	83.7%	C ₁₀ :	-
		C ₂₀ :	-

Comments: Sample description (MUSCS) derived from both the Grain Size and Atterberg Limits analyses.

Reviewed by:

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Stantec Grain Size Analysis

ASTM C136, ASTM C117

Client: Alberta Transportation
Project Name: SRI 2018 Investigation

Project No: 110773396

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SAMPLE No.: ST4 (1.95-2.4m)

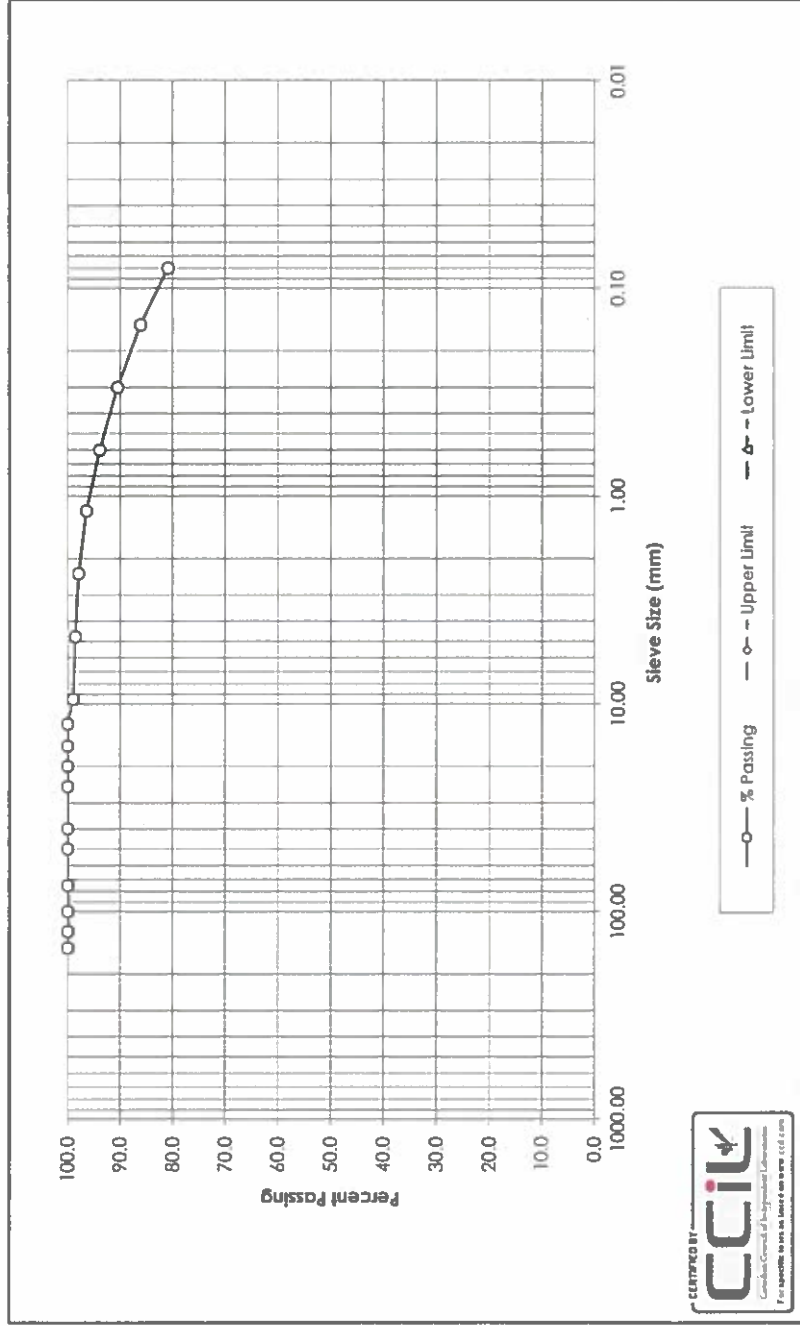
SOURCE: GL2

TESTED BY: B. Pekey

DATE RECEIVED: September 29, 2018

DATE TESTED: October 17, 2018

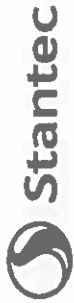
SAMPLE DESCRIPTION: Clay (Cl), Some Sand, Trace Gravel



Comments: Sample description (MUSCS) derived from both the Grain Size and Atterberg Limits analyses.

Reviewed by:

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Grain Size Analysis

ASTM C136, ASTM C117

Client: Alberta Transportation

Project Name: SR1 2018 Investigation

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SAMPLE No.: ST11 (5.1-5.55m)

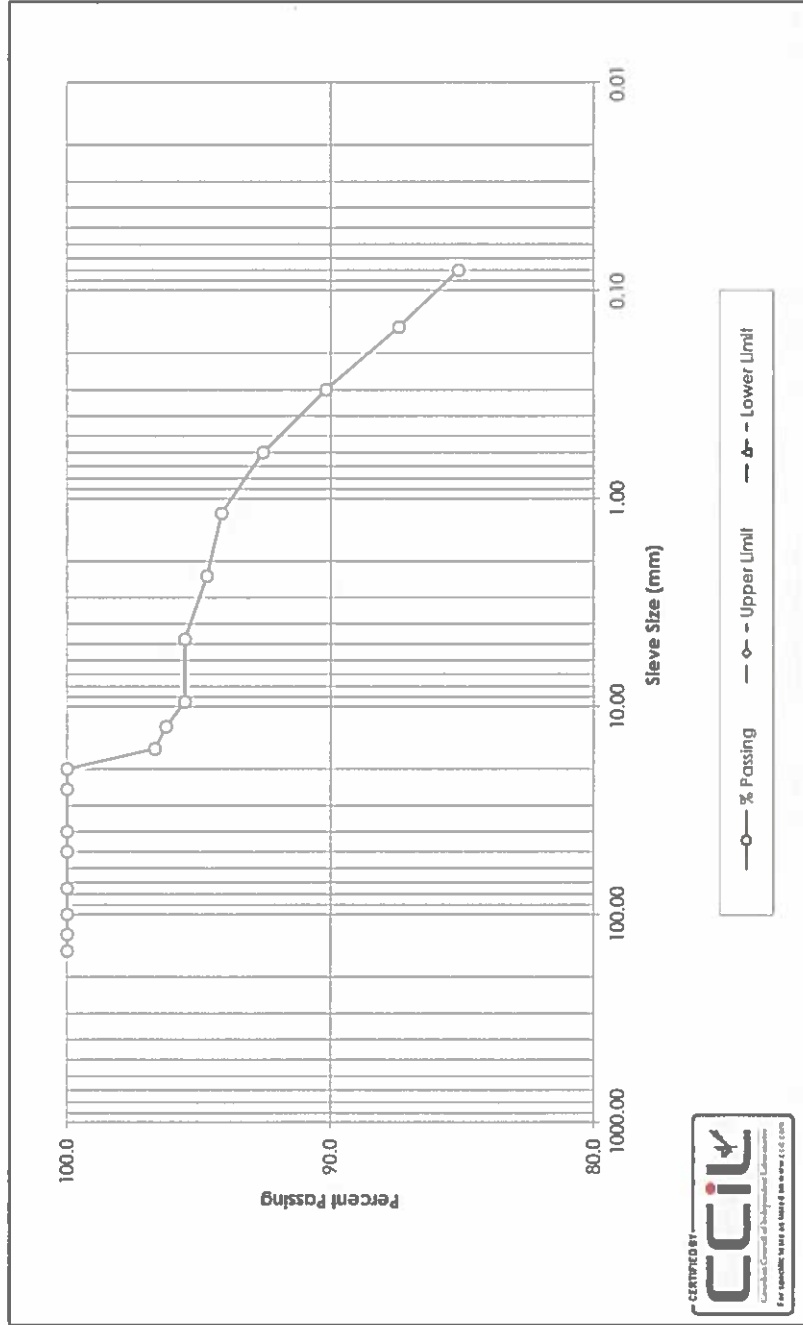
SOURCE: GL2

TESTED BY: B. Pelkey

DATE RECEIVED: September 26, 2018

DATE TESTED: October 17, 2018

SAMPLE DESCRIPTION: Clay (CH), Same Sand, Trace Gravel



Comments: Sample description (MUSCS) derived from both the Grain Size and Atterberg Limits analyses.

Reviewed by:

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Grain Size Analysis

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SAMPLE No.: ST15 (7.35-7.8m)

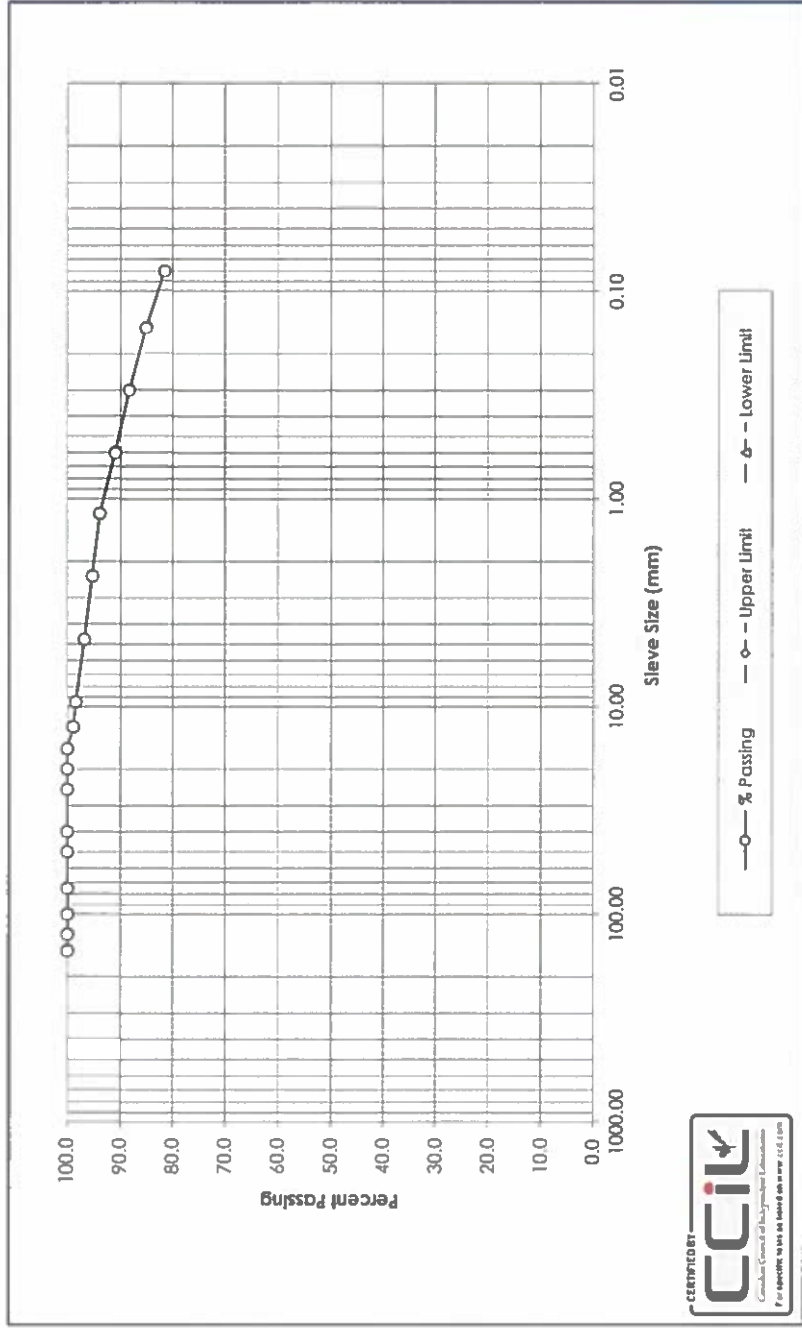
SOURCE: GL2

TESTED BY: B. Pelkey

DATE RECEIVED: September 26, 2018

DATE TESTED: October 17, 2018

SAMPLE DESCRIPTION: Clay (Cl-CH), Some Sand, Trace Gravel



Sieve (mm)	Sample % Passing	Specifications	
		Lower	Upper
150.0	100.0	-	-
125.0	100.0	-	-
100.0	100.0	-	-
75.0	100.0	-	-
50.0	100.0	-	-
40.0	100.0	-	-
25.0	100.0	-	-
20.0	100.0	-	-
16.0	100.0	-	-
12.5	98.9	-	-
9.5	98.4	-	-
4.75	96.8	-	-
2.36	95.3	-	-
1.18	93.9	-	-
0.600	91.0	-	-
0.300	88.4	-	-
0.150	85.1	-	-
0.080	81.5	-	-
Cobble:	0.0%	D ₁₀ :	-
Gravel:	3.2%	D ₃₀ :	-
Sand:	15.3%	D ₆₀ :	-
Fines:	81.5%	C _u :	-
		C _c :	-

Comments: Sample description (MUSCS) derived from both the Grain Size and Atterberg Limits analyses.

Reviewed by:

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Stantec Grain Size Analysis

ASTM C136, ASTM C117

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Project Name: SR1 2018 Investigation

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SAMPLE No.: ST17 (8.25-8.7m)

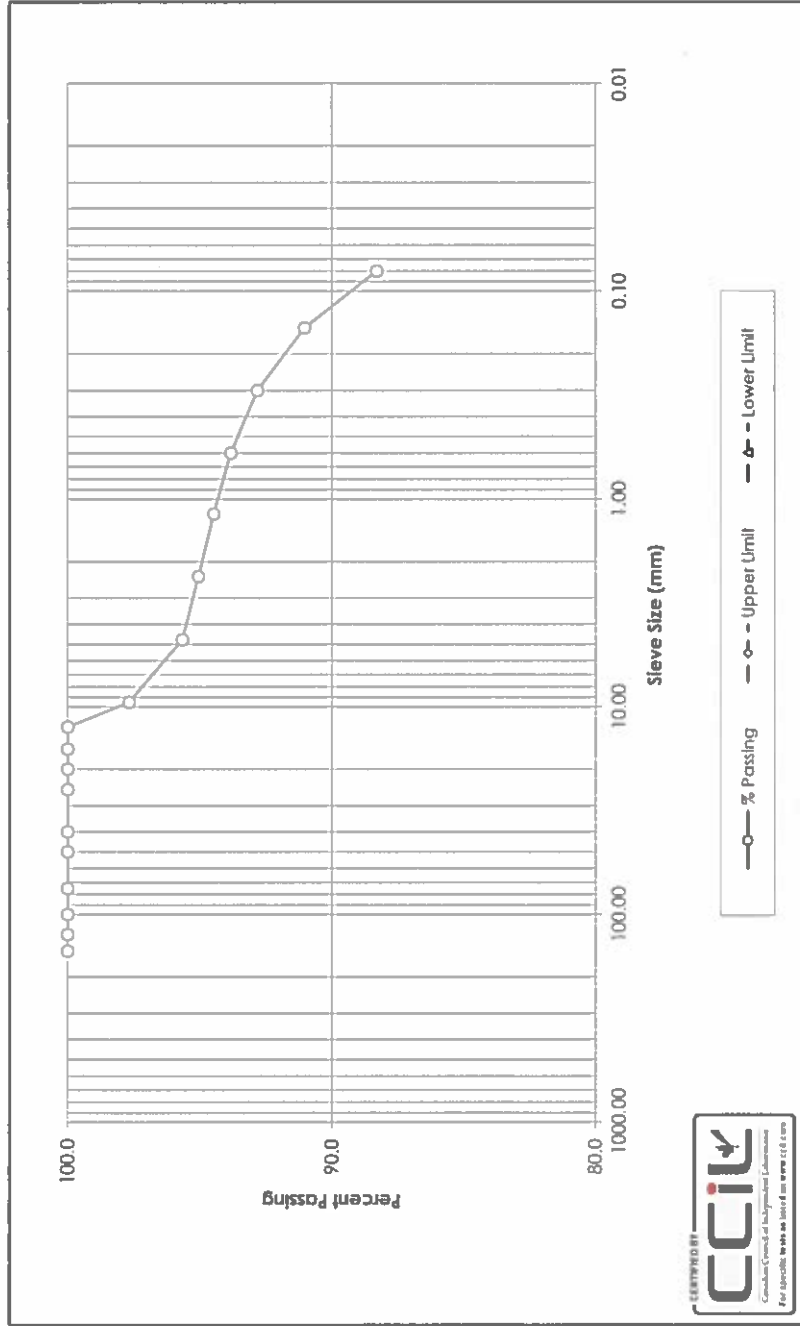
SOURCE: GL2

TESTED BY: S. McKay

DATE RECEIVED: September 27, 2018

DATE TESTED: November 5, 2018

SAMPLE DESCRIPTION: Clay (Cl), Trace Sand, Trace Gravel



Comments: Sample description (MUSCS) derived from both the Grain Size and Atterberg Limits analyses.

Reviewed by:

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Stantec Grain Size Analysis

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SAMPLE No.: ST22 (10.5-10.95m)

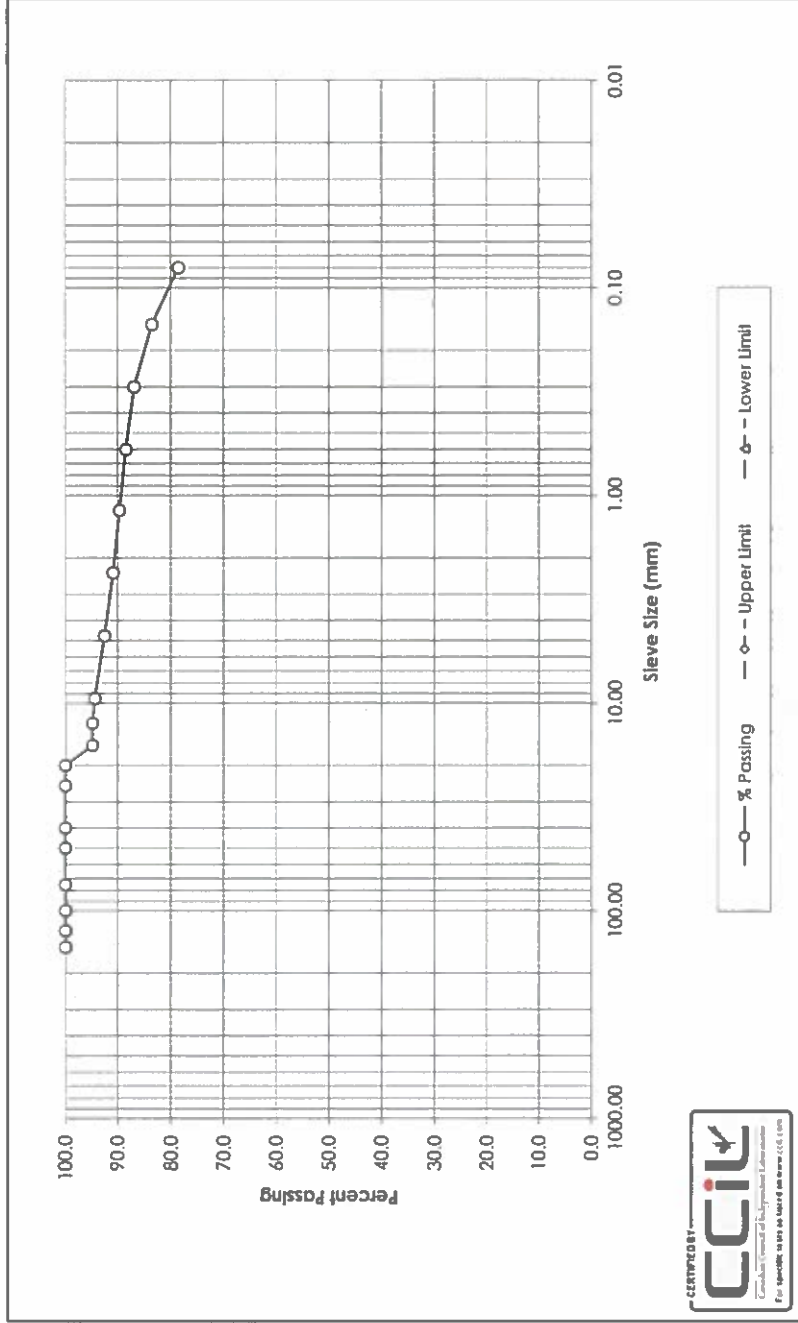
SOURCE: GL2

TESTED BY: S. McKay

DATE RECEIVED: September 27, 2018

DATE TESTED: November 5, 2018

SAMPLE DESCRIPTION: Clay (CI-CL), Some Sand, Trace Gravel



Sieve (mm)	Sample % Passing	Specifications	
		Lower	Upper
150.0	100.0	-	-
125.0	100.0	-	-
100.0	100.0	-	-
75.0	100.0	-	-
50.0	100.0	-	-
40.0	100.0	-	-
25.0	100.0	-	-
20.0	100.0	-	-
16.0	94.8	-	-
12.5	94.8	-	-
9.5	94.4	-	-
4.75	92.5	-	-
2.36	90.9	-	-
1.18	89.6	-	-
0.600	88.4	-	-
0.300	86.8	-	-
0.150	83.6	-	-
0.080	78.6	-	-
Cobbles:	0.0%	D ₁₀ :	-
Gravel:	7.5%	D ₃₀ :	-
Sand:	14.0%	D ₆₀ :	-
Fines:	78.5%	C _u :	-
		C _c :	-

Comments: Sample description (MUSCS) derived from both the Grain Size and Atterberg Limits analyses.

Reviewed by:

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Stantec Grain Size Analysis

ASTM C136, ASTM C117

Client: Alberta Transportation
Project Name: SRI 2018 Investigation

Project No: 110773396

OFFICE

325 - 25th Street SE
Suite 200
Calgary, Alberta
Canada T2A 7H8

LABORATORY

10830 - 46th Street SE
Calgary, Alberta
Canada T2C 1G4

Tel: (403) 716-8000

SAMPLE No.: SS3-5 Comp.

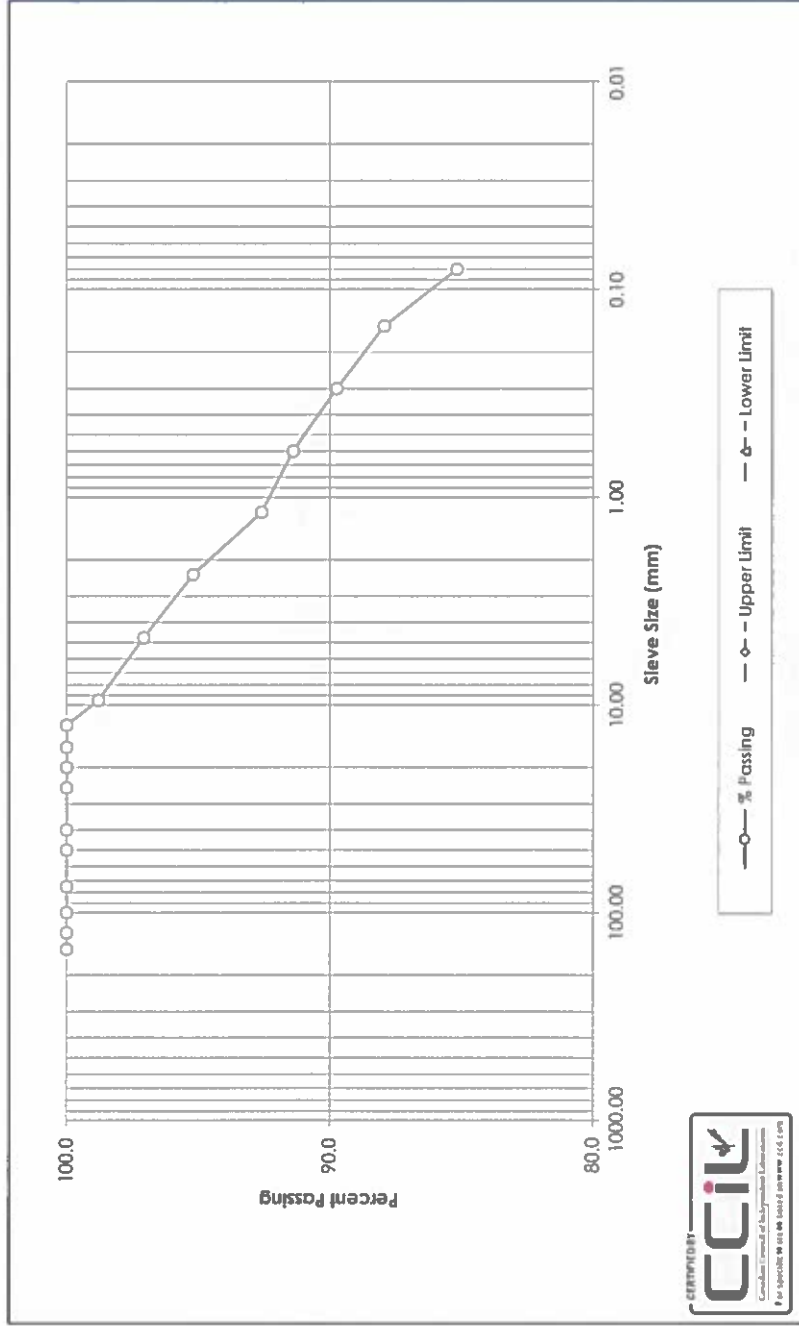
SOURCE: GL3

TESTED BY: B. Pelkey

DATE RECEIVED: September 29, 2018

DATE TESTED: October 24, 2018

SAMPLE DESCRIPTION: Clay (Cl), Some Sand, Trace Gravel



Comments: Sample description (MUSCS) derived from both the Grain Size and Atterberg Limits analyses.

Reviewed by:

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SAMPLE No.: SS15-17 Comp.

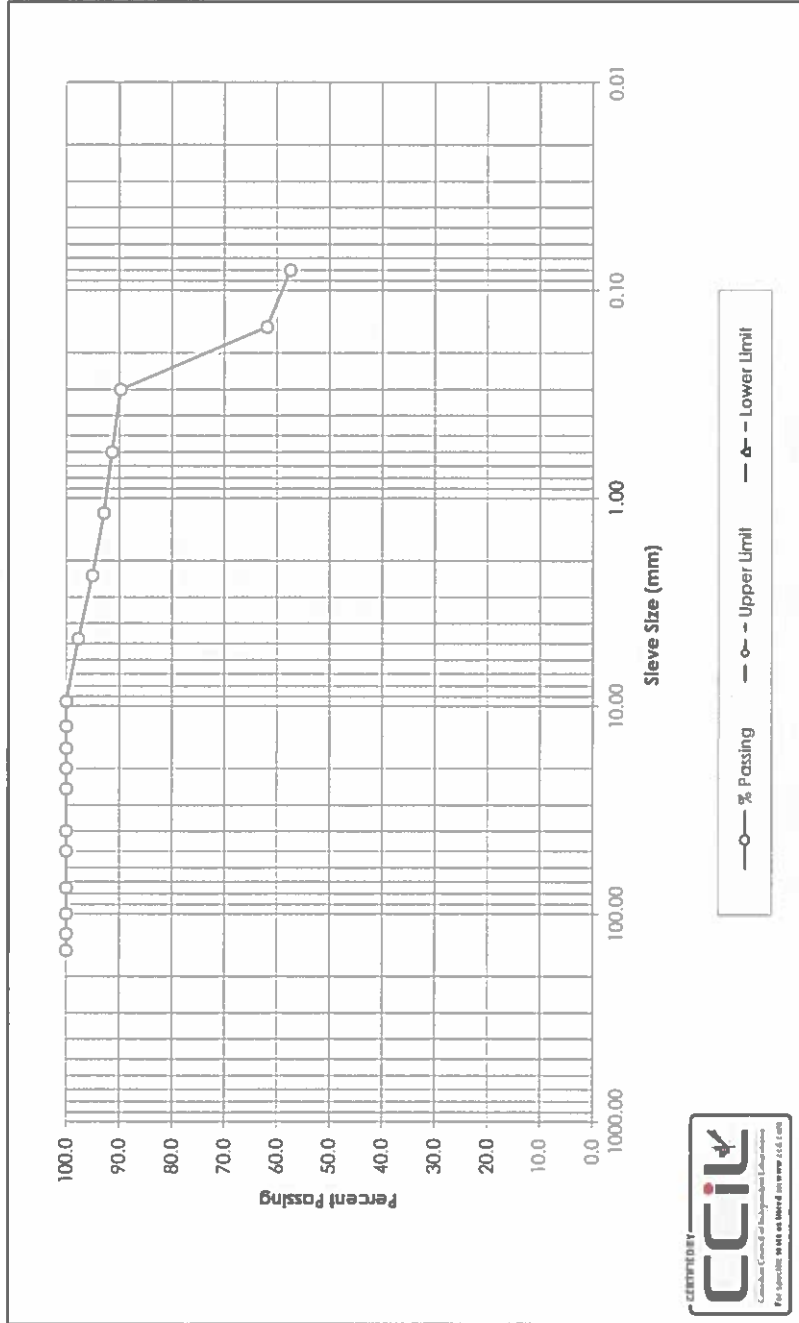
SOURCE: GL3

TESTED BY: B. Pelkey

DATE RECEIVED: September 29, 2018

DATE TESTED: October 24, 2018

SAMPLE DESCRIPTION: Clay (Cl) and Sand, Trace Gravel



Comments: Sample description (MUSCS) derived from both the Grain Size and Atterberg Limits analyses.

Sieve (mm)	Sample % Passing	Specifications	
		Lower	Upper
150.0	100.0	-	-
125.0	100.0	-	-
100.0	100.0	-	-
75.0	100.0	-	-
50.0	100.0	-	-
40.0	100.0	-	-
25.0	100.0	-	-
20.0	100.0	-	-
16.0	100.0	-	-
12.5	100.0	-	-
9.5	97.7	-	-
4.75	97.7	-	-
2.36	95.1	-	-
1.18	92.9	-	-
0.600	91.4	-	-
0.300	89.8	-	-
0.150	61.9	-	-
0.080	57.4	-	-
Cobble:	0.0%	D ₁₀ :	-
Gravel:	2.3%	D ₃₀ :	-
Sand:	40.3%	D ₆₀ :	0.1207
Fines:	57.4%	C _u :	-
		C _c :	-

Reviewed by:

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Stantec Grain Size Analysis

ASTM C136, ASTM C117

Client: Alberta Transportation
Project Name: SRI 2018 Investigation

Project No: 110773396

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SAMPLE NO.: SS23-25 Comp.

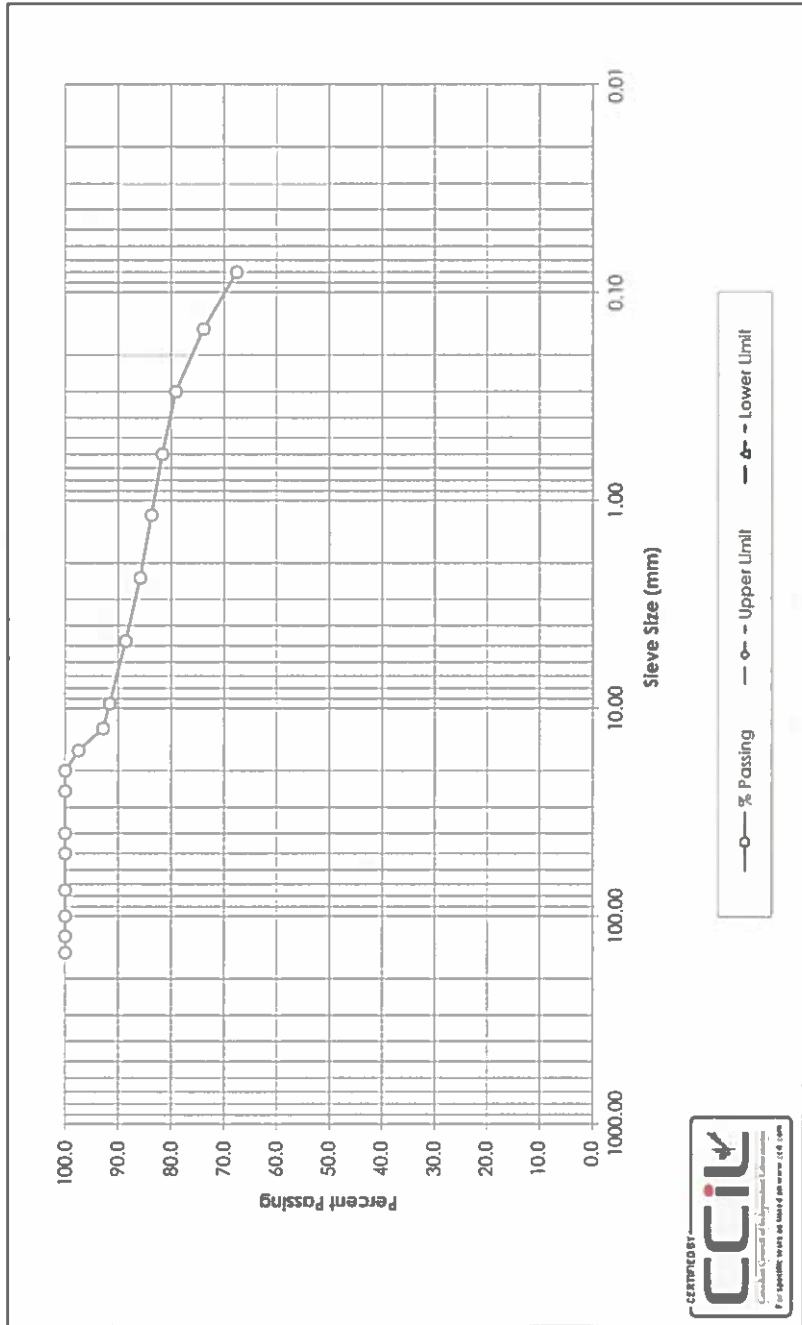
SOURCE: GL3

TESTED BY: B. Pelkey

DATE RECEIVED: September 29, 2018

DATE TESTED: October 24, 2018

SAMPLE DESCRIPTION: Sandy Clay (CI-CU), Some Gravel



Comments: Sample description (MUSCS) derived from both the Grain Size and Atterberg Limits analyses.

Reviewed by:

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Stantec Grain Size Analysis

ASTM C136, ASTM C117

Client: Alberta Transportation
Project Name: SR1 2018 Investigation

Project No: 110773396

OFFICE

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Tel: (403) 253-7876

SAMPLE NO.: SS30-32A Comp.

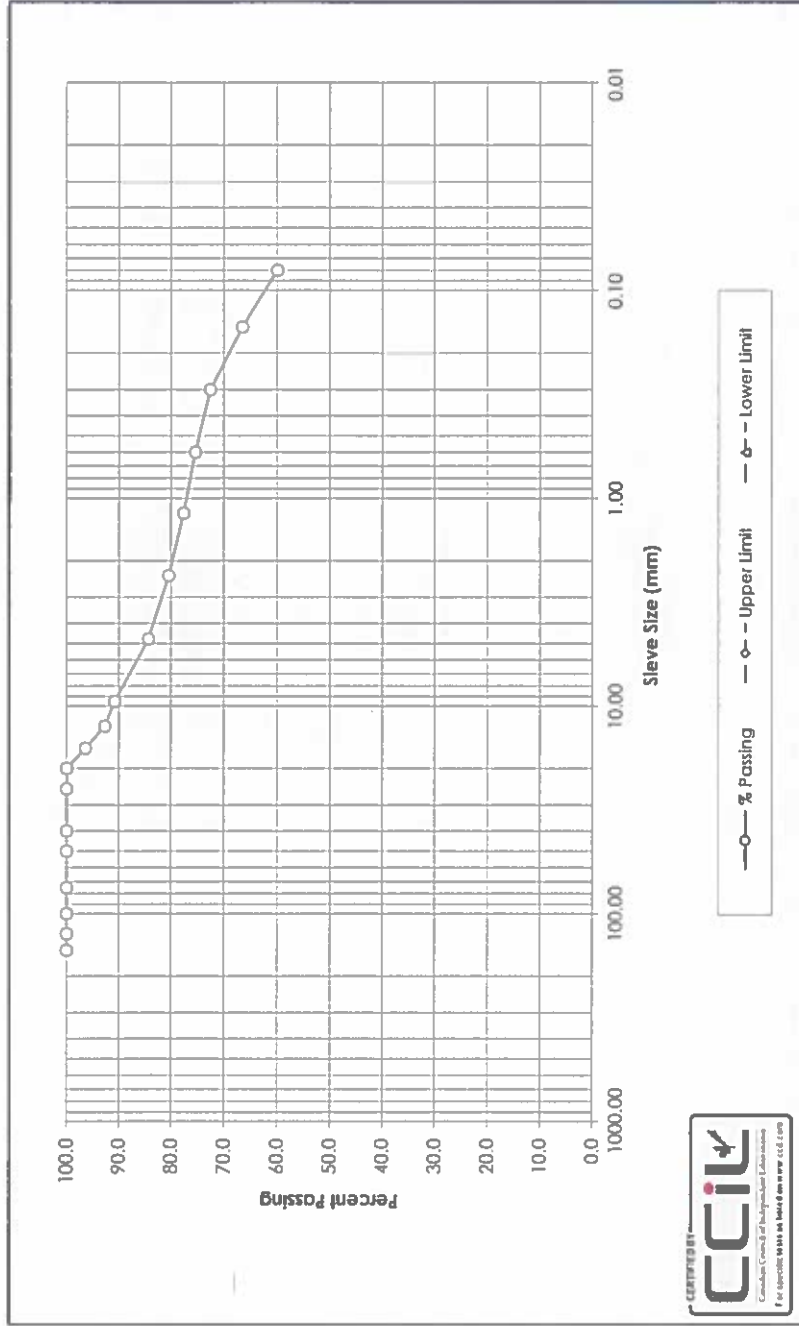
SOURCE: GL3

TESTED BY: B. Peikay

DATE RECEIVED: September 29, 2018

DATE TESTED: October 24, 2018

SAMPLE DESCRIPTION: Sandy Clay (CL) Some Gravel



Sieve (mm)	Sample % Passing	Specifications	
		Lower	Upper
150.0	100.0	-	-
125.0	100.0	-	-
100.0	100.0	-	-
75.0	100.0	-	-
50.0	100.0	-	-
40.0	100.0	-	-
25.0	100.0	-	-
20.0	100.0	-	-
16.0	96.4	-	-
12.5	92.7	-	-
9.5	90.8	-	-
4.75	84.3	-	-
2.36	80.4	-	-
1.18	77.6	-	-
0.600	75.4	-	-
0.300	72.5	-	-
0.150	66.5	-	-
0.080	60.0	-	-
Cobble:	0.0%	D ₁₀ :	-
Gravel:	15.7%	D ₃₀ :	-
Sand:	24.3%	D ₆₀ :	0.0801
Fines:	60.0%	C _u :	-
		C _c :	-

Comments: Sample description (MUSCS) derived from both the Grain Size and Atterberg Limits analyses.

Reviewed by:

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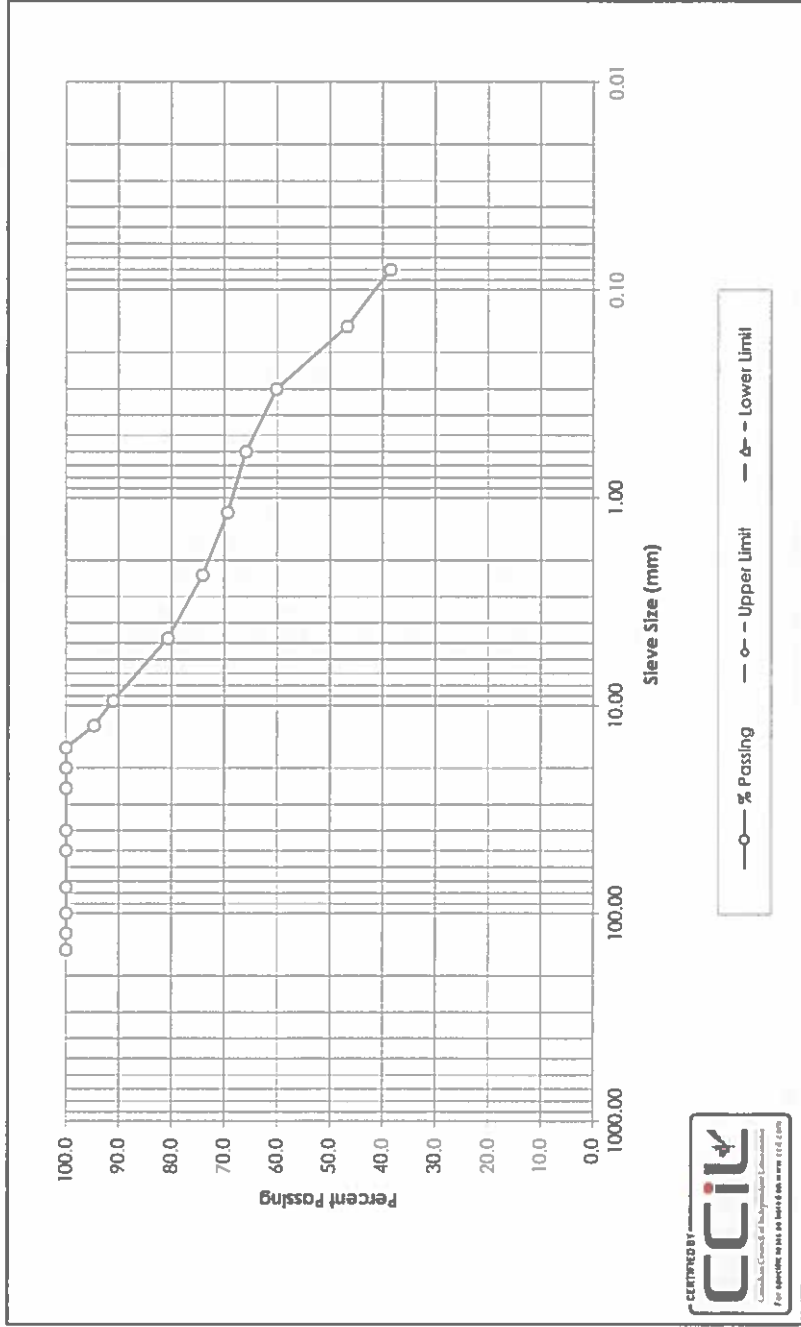
Client: Alberta Transportation
 Project Name: SR1_2018 Investigation
 Project No.: 110773396
 ASTM C136, ASTM C117

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LABORATORY
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 Tel: (403) 253-7876

SAMPLE No.: SS32B-34A Comp.
 SOURCE: GL3
 TESTED BY: B. Pelkey

DATE RECEIVED: September 29, 2018
 DATE TESTED: October 24, 2018
 SAMPLE DESCRIPTION: Sand and Clay (CL) Some Gravel



Comments: Sample description (MUSCS) derived from both the Grain Size and Atterberg Limits analyses.

Reviewed by:

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Grain Size Analysis

ASTM C136, ASTM C117

Client: Alberta Transportation
Project Name: SRI 2018 Investigation

Project No: 110773396

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Tel: (403) 716-8000

SAMPLE No.: ST6 (3.25-3.7m)

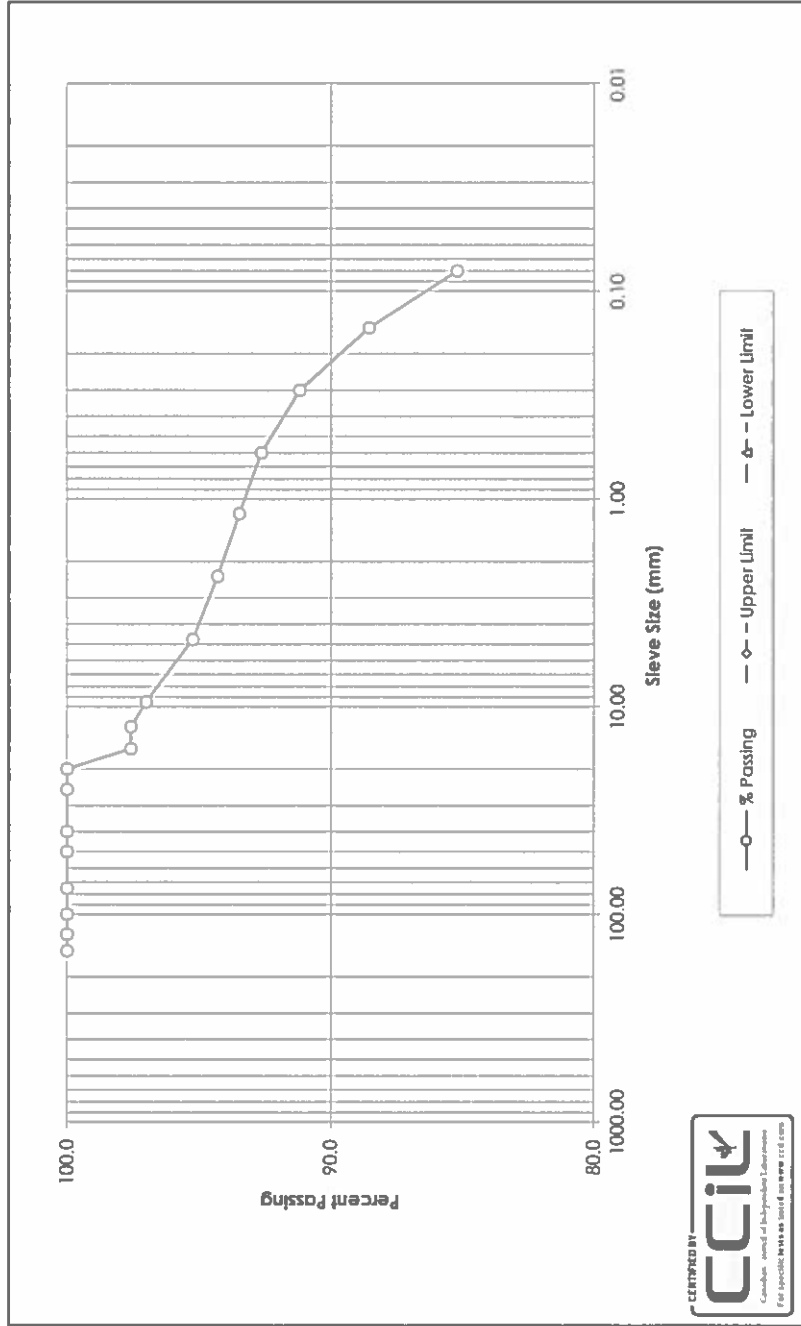
SOURCE: GL3A

TESTED BY: B. Pelkey

DATE RECEIVED: September 29, 2018

DATE TESTED: October 17, 2018

SAMPLE DESCRIPTION: Clay (Cl), Some Sand, Trace Gravel



Comments: Sample description (MUSCS) derived from both the Grain Size and Atterberg Limits test results.

Reviewed by:

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Grain Size Analysis

ASTM C136, ASTM C117

Client: Alberta Transportation
Project Name: SRI 2018 Investigation

Project No: 110773396

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SAMPLE NO.: ST2 (1.05-1.5m)

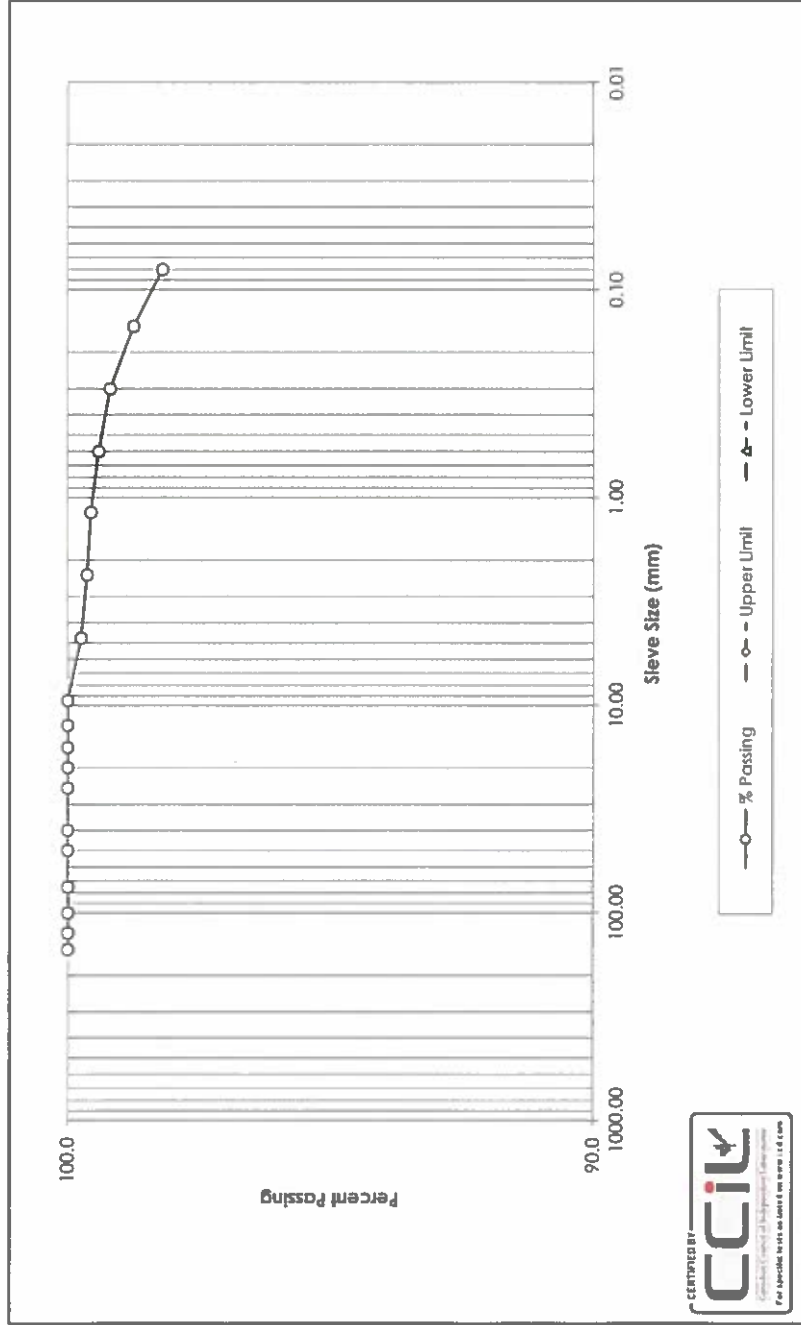
SOURCE: GL4

TESTED BY: B. Pekey

DATE RECEIVED: September 25, 2018

DATE TESTED: November 19, 2018

SAMPLE DESCRIPTION: Clay (CH), Trace Sand



Sieve (mm)	Sample % Passing	Specifications	
		Lower	Upper
150.0	100.0	-	-
125.0	100.0	-	-
100.0	100.0	-	-
75.0	100.0	-	-
50.0	100.0	-	-
40.0	100.0	-	-
25.0	100.0	-	-
20.0	100.0	-	-
16.0	100.0	-	-
12.5	100.0	-	-
9.5	100.0	-	-
4.75	99.7	-	-
2.36	99.6	-	-
1.18	99.6	-	-
0.600	99.4	-	-
0.300	99.2	-	-
0.150	98.7	-	-
0.080	98.2	-	-
Cobble:	0.0%	D ₁₀ :	-
Gravel:	0.3%	D ₃₀ :	-
Sand:	1.6%	D ₆₀ :	-
Fines:	98.1%	C _u :	-
		C _c :	-

Comments: Sample description (MUSCS) derived from both the Grain Size and Atterberg Limits analyses.

Reviewed by:

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Grain Size Analysis

ASTM C136, ASTM C117

Client: Alberta Transportation
Project Name: SR1 2018 Investigation

Project No: 110773396

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SAMPLE NO.: ST5 (2.42-2.85m)

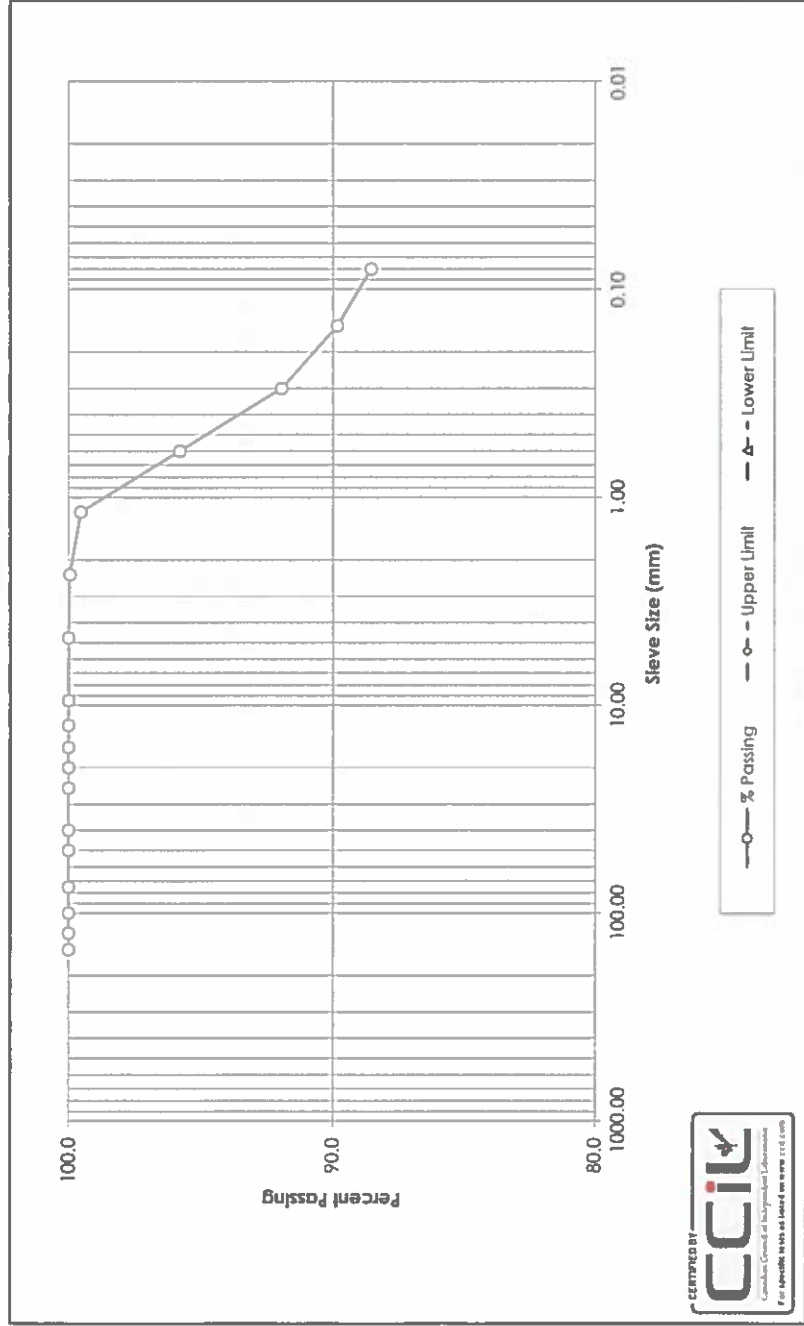
SOURCE: GL4

TESTED BY: B. Pelkey

DATE RECEIVED: -

DATE TESTED: October 11, 2018

SAMPLE DESCRIPTION: Clay (CH), Some Sand



Comments: Sample description (MUSCS) derived from both the Grain Size and Atterberg Limits analyses.

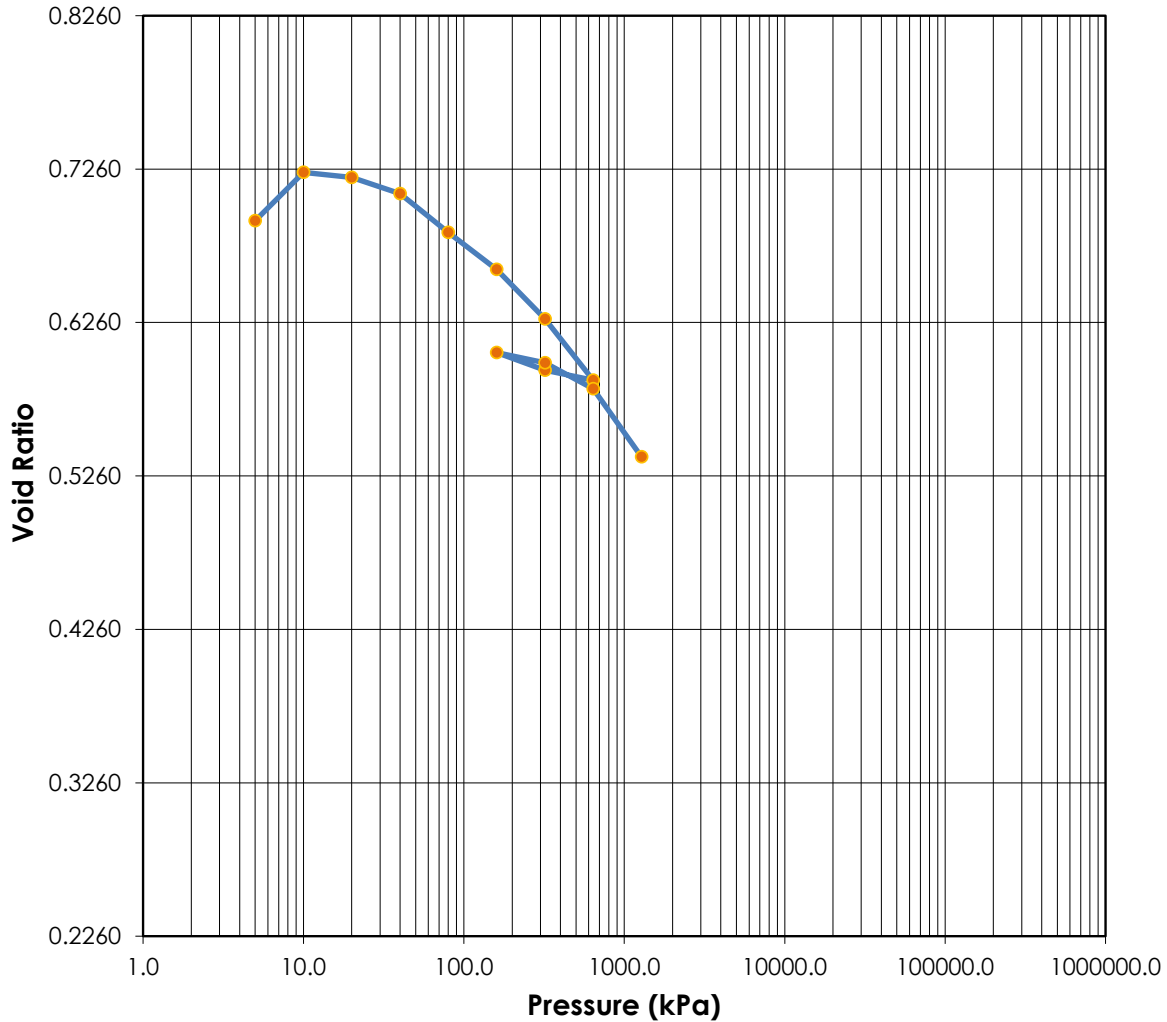
Reviewed by:

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Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876



	Before	After	Liquid Limits:	57	Test Date:	24-Oct-18
Moisture (%):	27.4	22.0	Plastic Limits:	21		
Dry Density (g/cm³):	1.563	1.936	Plasticity Index (%):	36		
Saturation (%):	100	100				
Void Ratio:	0.6922	0.5382	Specific Gravity:	2.65	Assumed	
Soil Description:	Clay (CH) and Sand					
Project Number:	110773396	Depth:	1.5-1.95m			
Sample Number:	GL1A ST3	Boring Number:				
Project:	SRT 2018 Investigation					
Client:	Alberta Transportation					
Location:						
			Remarks:			

Tested By: E. Wahl

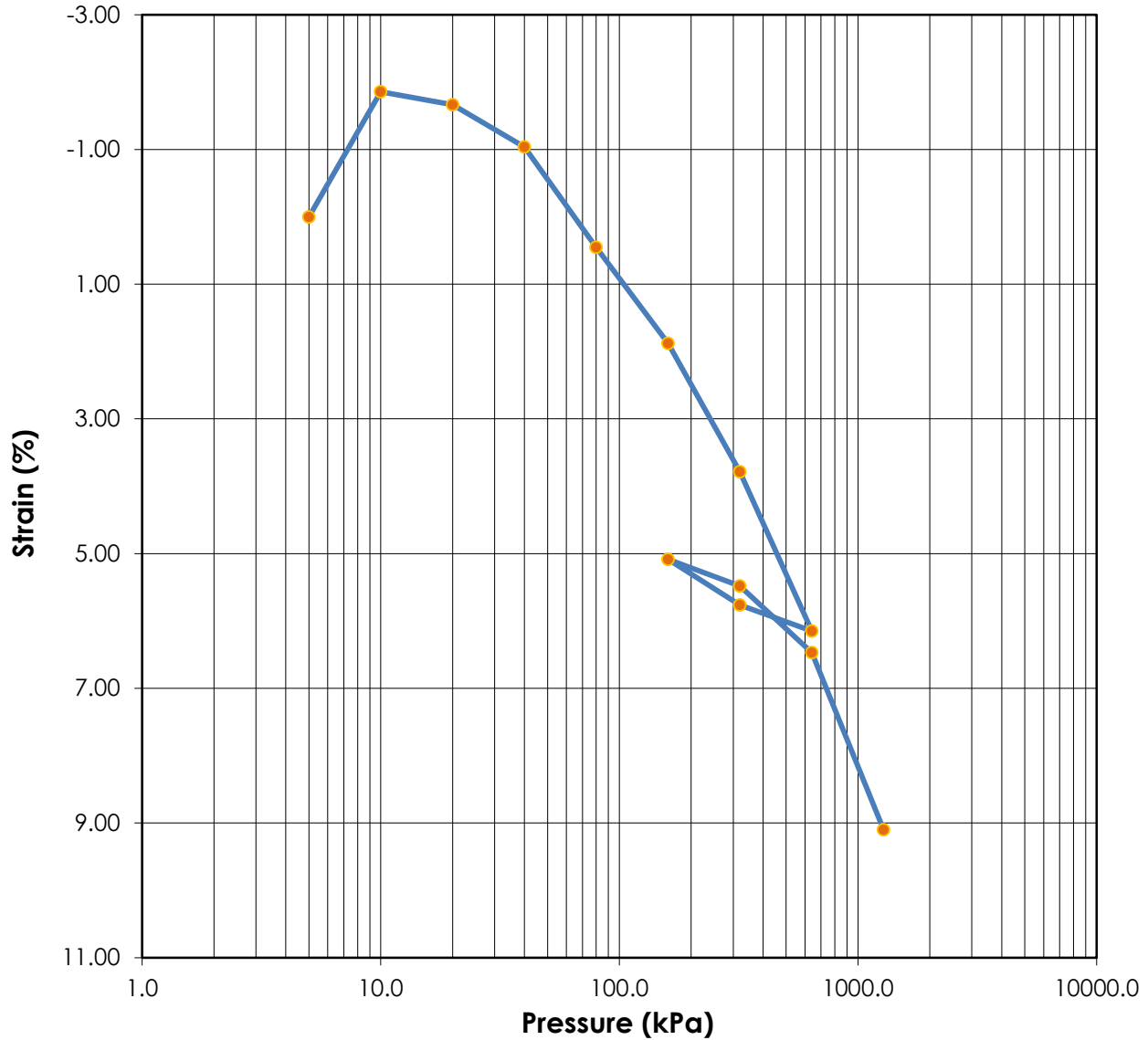
Reviewed By: C. Lamoureux

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Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
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 Tel: (403) 253-7876

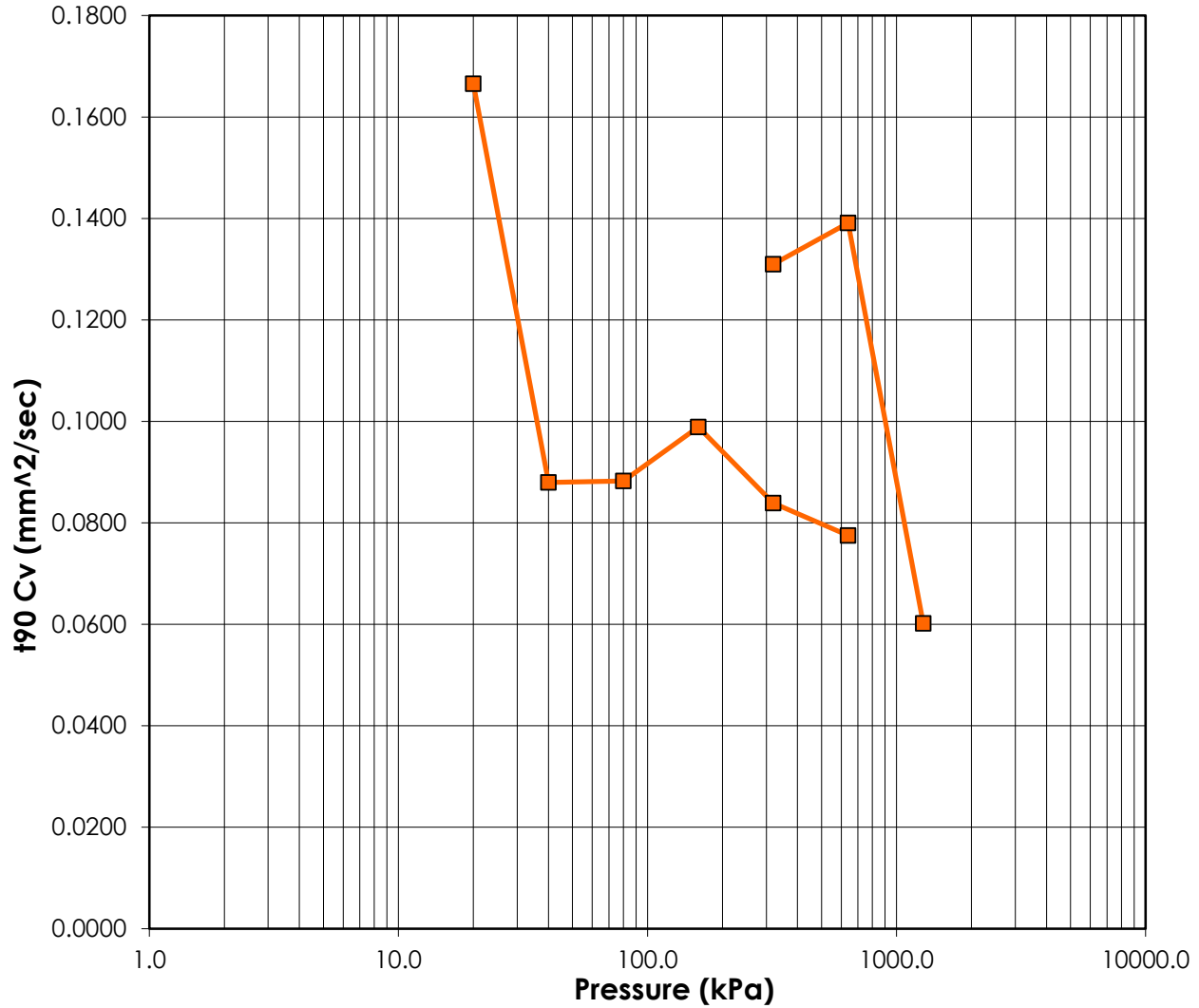


	Before	After	Liquid Limits:	57	Test Date:	24-Oct-18
Moisture (%):	27.4	22.0	Plastic Limits:	21		
Dry Density (g/cm3):	1.563	1.936	Plasticity Index (%):	36		
Saturation (%):	100	100	Specific Gravity:	2.65	Assumed	
Void Ratio:	0.6922	0.5382				
Sample Description:	Clay (CH) and Sand					
Project Number:	110773396	Depth:	1.5-1.95m			
Sample Number:	GL1A ST3	Boring Number:				
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						
			Remarks:			



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
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 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876



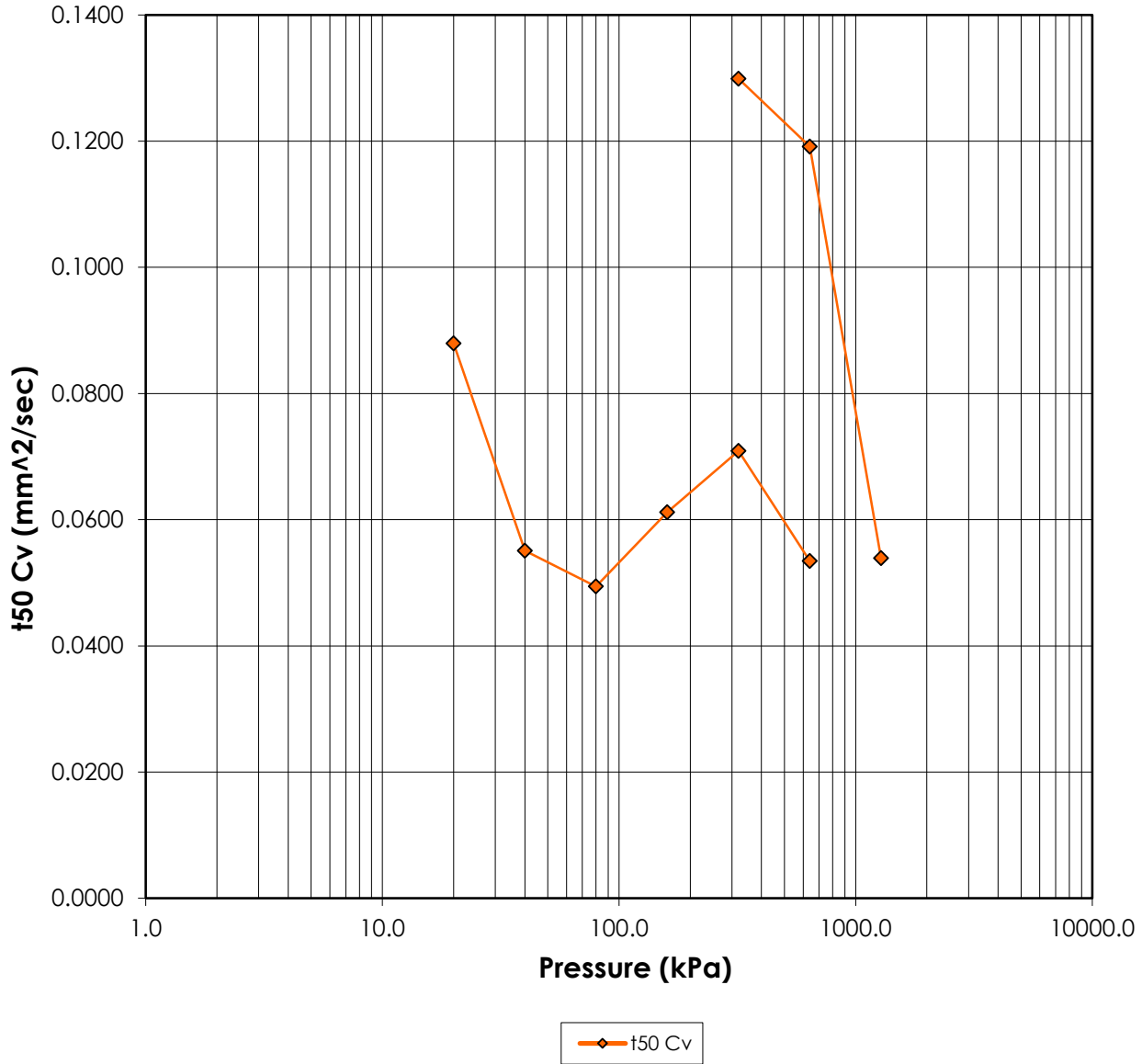
—■— $t_{90} C_v$

	Before	After	Liquid Limits:	57	Test Date:	24-Oct-18
Moisture (%):	27.4	22.0	Plastic Limits:	21		
Dry Density (g/cm³):	1.563	1.936	Plasticity Index (%):	36		
Saturation (%):	100	100				
Void Ratio:	0.6922	0.5382	Specific Gravity:	2.65	Assumed	
Soil Description:	Clay (CH) and Sand					
Project Number:	110773396	Depth:	1.5-1.95m			
Sample Number:	GL1A ST3	Boring Number:				
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						
			Remarks:			



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

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 Tel: (403) 253-7876

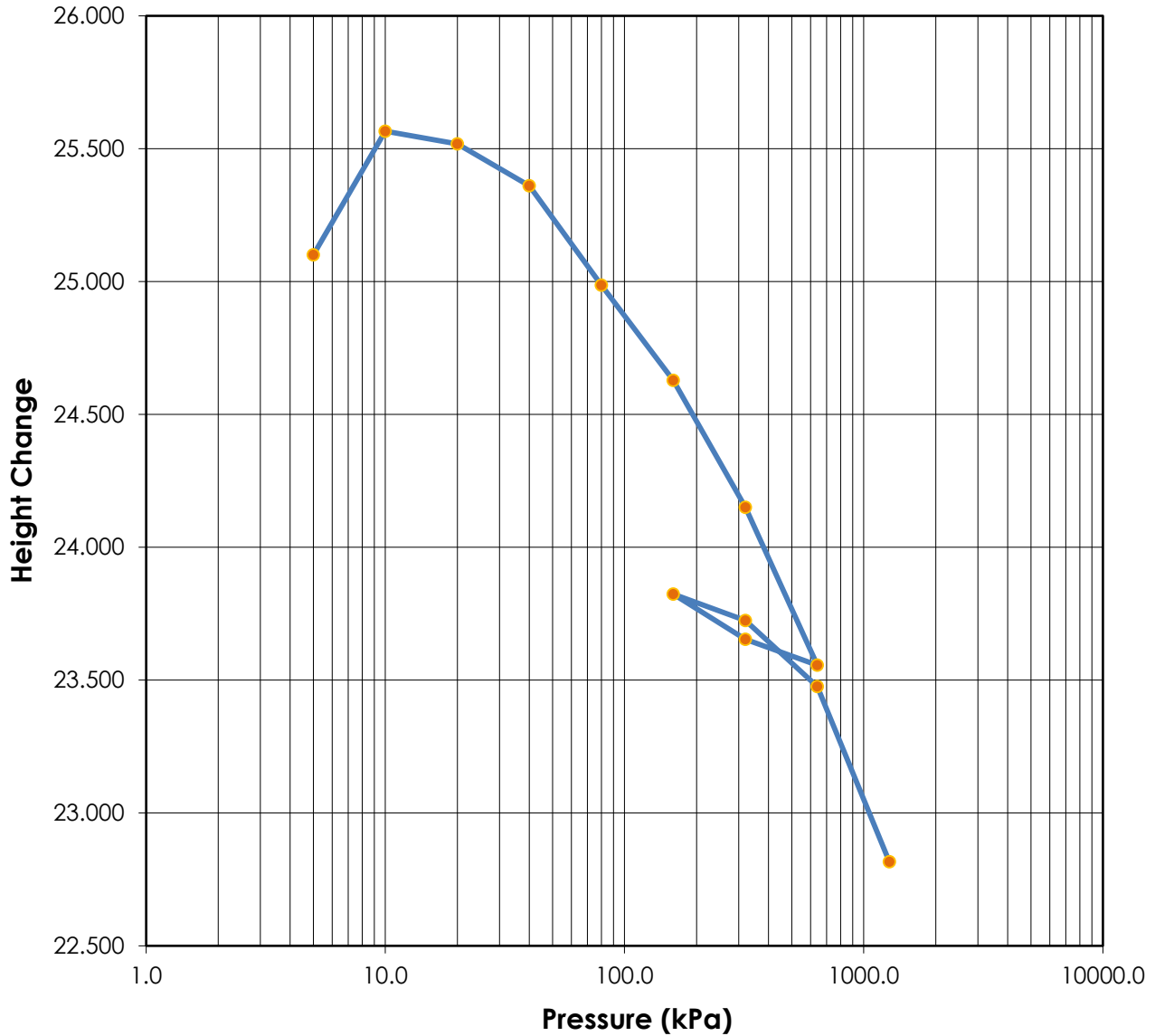


	Before	After	Liquid Limits:	57	Test Date:	24-Oct-18
Moisture (%):	27.4	22.0	Plastic Limits:	21		
Dry Density (g/cm³):	1.563	1.936	Plasticity Index (%):	36		
Saturation (%):	100	100	Specific Gravity:	2.65	Assumed	
Void Ratio:	0.6922	0.5382				
Soil Description:	Clay (CH) and Sand					
Project Number:	110773396	Depth:	1.5-1.95m			
Sample Number:	GL1A ST3	Boring Number:				
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						
			Remarks:			



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876



	Before	After	Liquid Limits:	57	Test Date:	24-Oct-18
Moisture (%):	27.4	22.0	Plastic Limits:	21		
Dry Density (g/cm3):	1.563	1.936	Plasticity Index (%):	36		
Saturation (%):	100	100	Specific Gravity:	2.65	Assumed	
Void Ratio:	0.6922	0.5382				
Soil Description:	Clay (CH) and Sand					
Project Number:	110773396	Depth:	1.5-1.95m			
Sample Number:	GL1A ST3	Boring Number:				
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						
						Remarks:

Consolidation Test Results Summary

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Sample Number: GL1A ST3

Sample Description:

Boring Number:

Clay (CH) and Sand

Depth: 1.5-1.95m

Remarks:

Test Number:

Sample Type: Undisturbed

Test Date: 24-Oct-18

Index	Load Sequence (kPa)	Cumulative Change in Height (mm)	Specimen Height (mm)	Height of Void (mm)	Vertical Strain (%)	Void Ratio	t90 Fitting Time (min)	t50 Fitting Time (min)	t90 Cv (mm ² /sec)	t50 Cv (mm ² /sec)
0	0.000	0.0000	25.1000	10.2696	0.00	0.6925	0.000	0.000	0.000	0.000
1	5.000	0.0000	25.1000	10.2696	0.00	0.6925	0.000	0.000	0.000	0.000
2	10.000	-0.4660	25.5660	10.7356	-1.86	0.7239	0.000	0.000	0.000	0.000
3	20.000	-0.4180	25.5180	10.6876	-1.67	0.7207	13.817	6.077	0.167	0.088
4	40.000	-0.2600	25.3600	10.5296	-1.04	0.7100	25.828	9.588	0.088	0.055
5	80.000	0.1140	24.9860	10.1556	0.45	0.6848	25.000	10.372	0.088	0.049
6	160.000	0.4720	24.6280	9.7976	1.88	0.6606	21.671	8.140	0.099	0.061
7	320.000	0.9500	24.1500	9.3196	3.78	0.6284	24.559	6.750	0.084	0.071
8	640.000	1.5440	23.5560	8.7256	6.15	0.5884	25.295	8.518	0.078	0.053
9	320.000	1.4460	23.6540	8.8236	5.76	0.5950	0.000	0.000	0.000	0.000
10	160.000	1.2760	23.8240	8.9936	5.08	0.6064	0.000	0.000	0.000	0.000
11	320.000	1.3760	23.7240	8.8936	5.48	0.5997	15.186	3.557	0.131	0.130
12	640.000	1.6240	23.4760	8.6456	6.47	0.5830	13.999	3.797	0.139	0.119
13	1280.000	2.2840	22.8160	7.9856	9.10	0.5385	30.559	7.929	0.060	0.054

Predicted value indicated with *

Consolidation Test Consolidation Specimen Information

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 24-Oct-18

Sample Number: GL1A ST3

Sample Description:

Boring Number:

Clay (CH) and Sand

Depth: 1.5-1.95m

Remarks:

Sample Type: Undisturbed

Test Number:

Liquid Limit: 57

Initial Void Ratio: 0.6922

Initial Height (mm): 25.10

Plastic Limit: 21

Plasticity Index (%): 36

Initial Diameter (mm): 60.00

Specific Gravity: 2.65

Weight of Ring (g): 1900.8

Assumed

Parameters	Initial Specimen	Final Specimen
Moist Weight + Container (g)	107.24	141.58
Dry Soil + Container (g)	85.04	116.76
Weight of Container (g)	3.98	3.95
Moisture Content (%)	27	22
Void Ratio	0.6922	0.5382
Saturation (%)	100	100
Dry Density (g/cm ³)	1.563	1.936

Consolidation Test Results
(Sequence 1) Load 5.000 kPa

Project: SR1 2018 Investigation
Location:
Job Number:

Project Number: 110773396

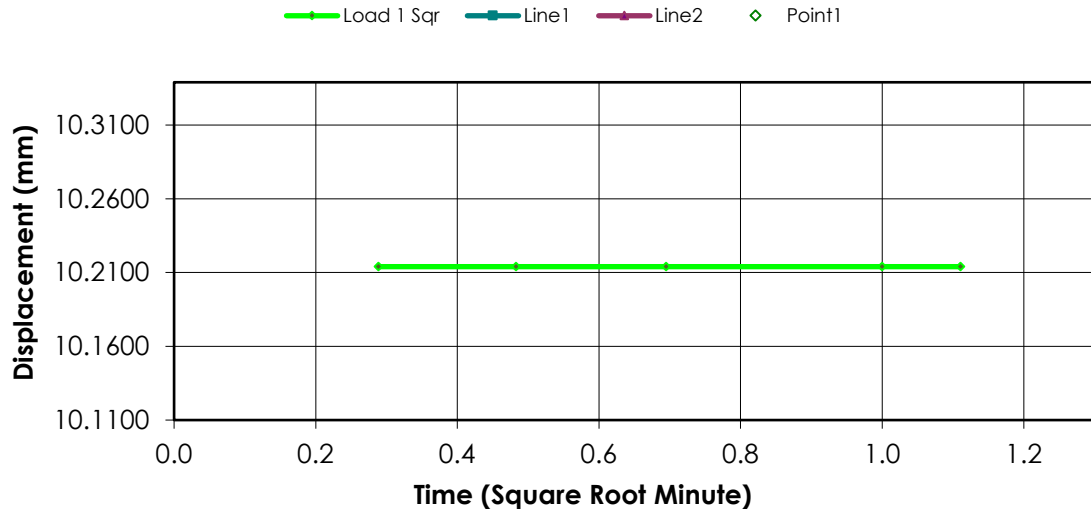
Test Date: 24-Oct-18
Test Number:

Sample Number: GL1A ST3 **Soil Description:**
Boring Number: Clay (CH) and Sand
Depth: 1.5-1.95m **Remarks:**
Sample Type: Undisturbed

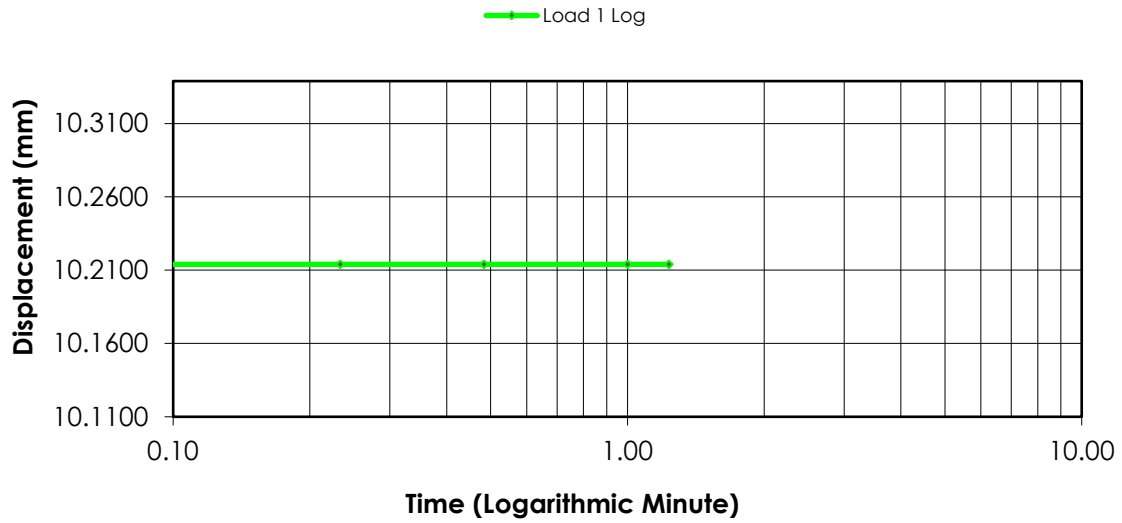
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	10.2140	0.0000	0.0000	0.6922
1	00:00:05	10.2140	0.0000	0.0000	0.6922
2	00:00:14	10.2140	0.0000	0.0000	0.6922
3	00:00:29	10.2140	0.0000	0.0000	0.6922
4	00:01:00	10.2140	0.0000	0.0000	0.6922
5	00:01:14	10.2140	0.0000	0.0000	0.6922

Consolidation Test Results (Sequence 1) Load 5.000 kPa

Consolidation Graph (Square-root Time)



Consolidation Graph (Logarithmic Time)



**Consolidation Test Results
(Sequence 2) Load 10.000 kPa**

Project: SR1 2018 Investigation
Location:
Job Number:

Project Number: 110773396

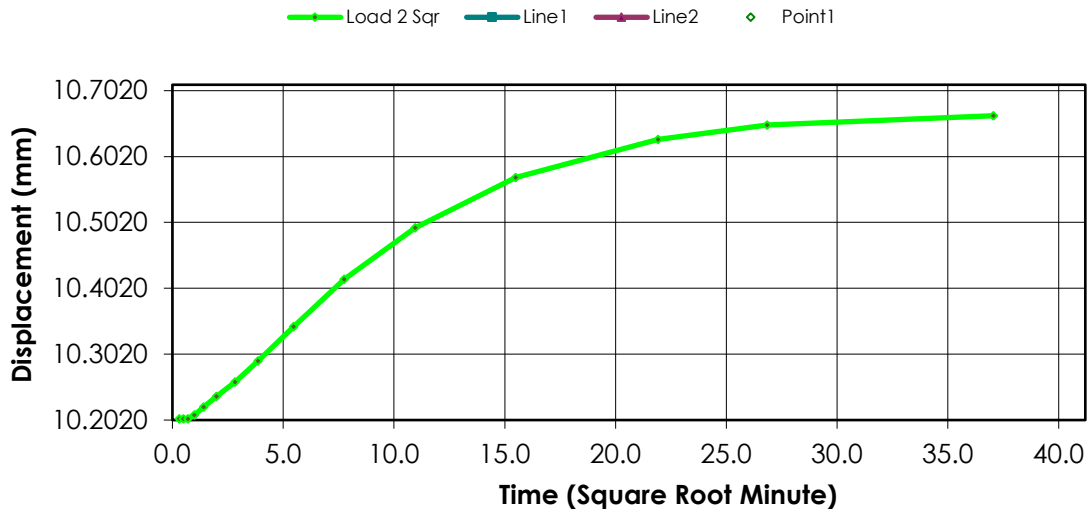
Test Date: 24-Oct-18
Test Number:

Sample Number: GL1A ST3 **Soil Description:**
Boring Number: Clay (CH) and Sand
Depth: 1.5-1.95m **Remarks:**
Sample Type: Undisturbed

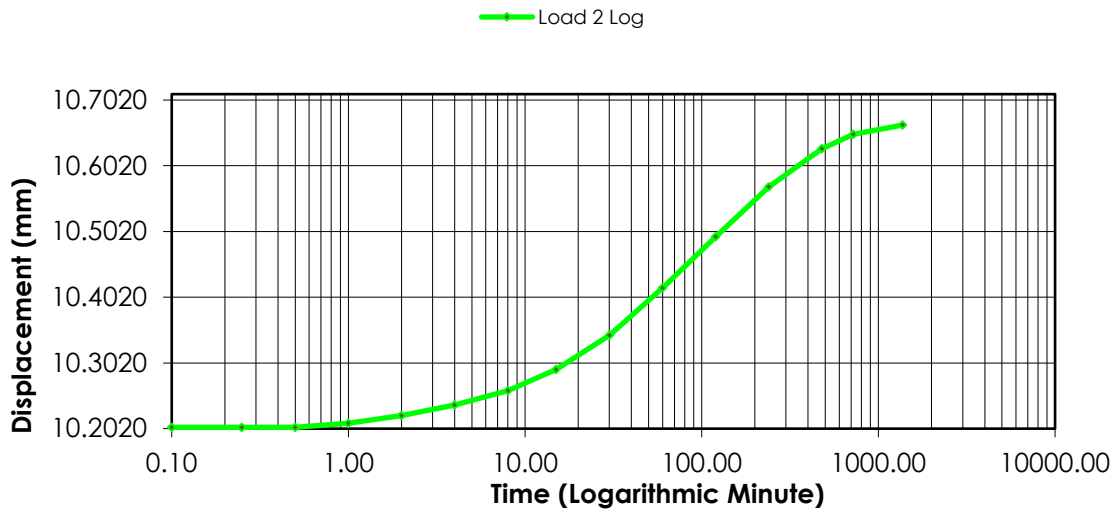
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	10.4340	-0.2600	-1.0359	0.7097
1	00:00:06	10.2040	-0.0060	-0.0239	0.6926
2	00:00:15	10.2040	-0.0060	-0.0239	0.6926
3	00:00:30	10.2040	-0.0060	-0.0239	0.6926
4	00:01:00	10.2100	-0.0120	-0.0478	0.6930
5	00:02:00	10.2220	-0.0240	-0.0956	0.6938
6	00:04:00	10.2380	-0.0400	-0.1594	0.6949
7	00:08:01	10.2600	-0.0620	-0.2470	0.6963
8	00:15:01	10.2920	-0.0940	-0.3745	0.6985
9	00:30:02	10.3440	-0.1460	-0.5817	0.7020
10	01:00:05	10.4160	-0.2180	-0.8685	0.7069
11	02:00:10	10.4940	-0.2960	-1.1793	0.7121
12	04:00:20	10.5700	-0.3720	-1.4821	0.7172
13	08:00:39	10.6280	-0.4300	-1.7131	0.7212
14	12:00:58	10.6500	-0.4520	-1.8008	0.7226
15	22:53:47	10.6640	-0.4660	-1.8566	0.7236

**Consolidation Test Results
(Sequence 2) Load 10.000 kPa**

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



**Consolidation Test Results
(Sequence 3) Load 20.000 kPa**

Project: SR1 2018 Investigation
Location:
Job Number:

Project Number: 110773396

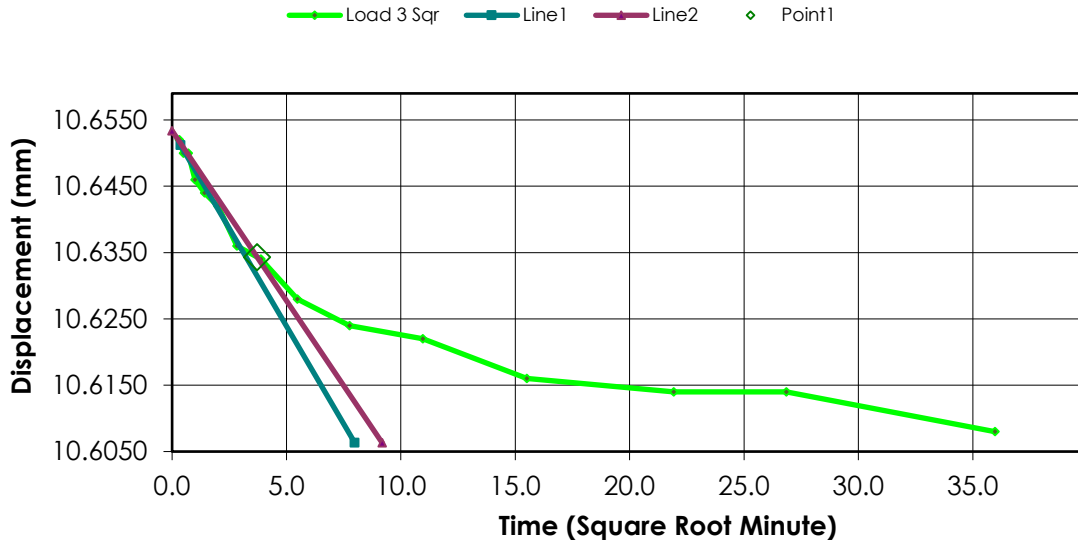
Test Date: 24-Oct-18
Test Number:

Sample Number: GL1A ST3 **Soil Description:**
Boring Number: Clay (CH) and Sand
Depth: 1.5-1.95m **Remarks:**
Sample Type: Undisturbed

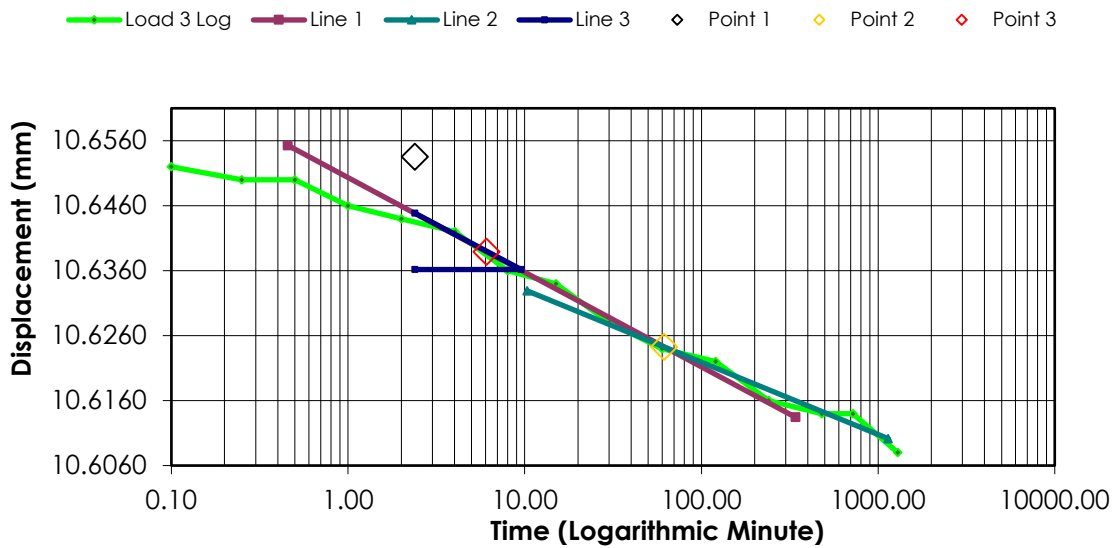
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	10.6640	-0.4660	-1.8566	0.7236
1	00:00:06	10.6520	-0.4620	-1.8406	0.7233
2	00:00:15	10.6500	-0.4600	-1.8327	0.7232
3	00:00:30	10.6500	-0.4600	-1.8327	0.7232
4	00:01:00	10.6460	-0.4560	-1.8167	0.7229
5	00:02:00	10.6440	-0.4540	-1.8088	0.7228
6	00:04:01	10.6420	-0.4520	-1.8008	0.7226
7	00:08:01	10.6360	-0.4460	-1.7769	0.7222
8	00:15:02	10.6340	-0.4440	-1.7689	0.7221
9	00:30:03	10.6280	-0.4380	-1.7450	0.7217
10	01:00:05	10.6240	-0.4340	-1.7291	0.7214
11	02:00:10	10.6220	-0.4320	-1.7211	0.7213
12	04:00:20	10.6160	-0.4260	-1.6972	0.7209
13	08:00:40	10.6140	-0.4240	-1.6892	0.7207
14	12:00:59	10.6140	-0.4240	-1.6892	0.7207
15	21:33:12	10.6080	-0.4180	-1.6653	0.7203

Consolidation Test Results (Sequence 3) Load 20.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 4) Load 40.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 24-Oct-18

Test Number:

Sample Number: GL1A ST3

Soil Description:

Boring Number:

Clay (CH) and Sand

Depth: 1.5-1.95m

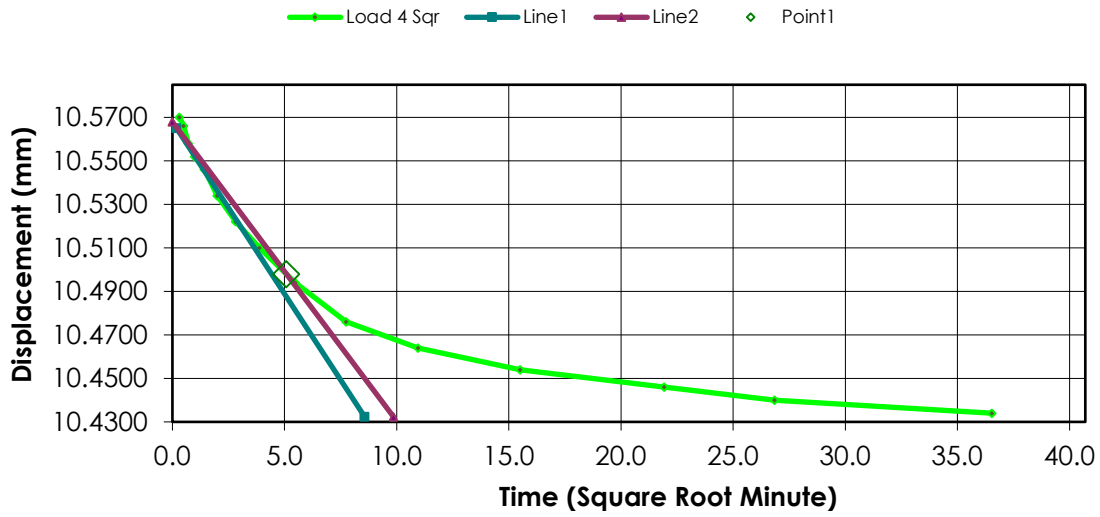
Remarks:

Sample Type: Undisturbed

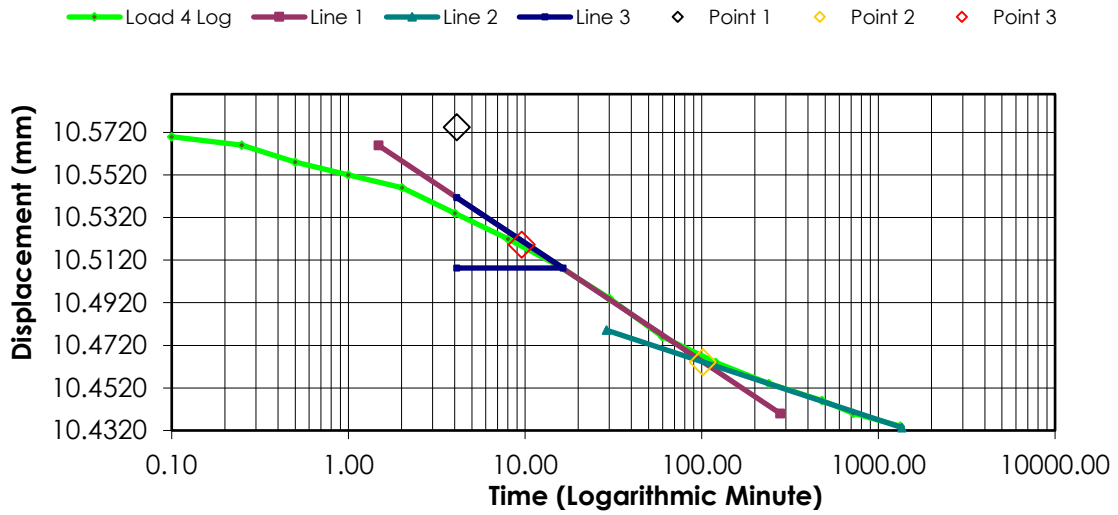
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	10.6080	-0.4180	-1.6653	0.7203
1	00:00:06	10.5700	-0.3960	-1.5777	0.7189
2	00:00:15	10.5660	-0.3920	-1.5618	0.7186
3	00:00:30	10.5580	-0.3840	-1.5299	0.7181
4	00:01:00	10.5520	-0.3780	-1.5060	0.7176
5	00:02:01	10.5460	-0.3720	-1.4821	0.7172
6	00:04:01	10.5340	-0.3600	-1.4343	0.7164
7	00:08:01	10.5220	-0.3480	-1.3865	0.7156
8	00:15:01	10.5100	-0.3360	-1.3386	0.7148
9	00:30:03	10.4940	-0.3200	-1.2749	0.7137
10	01:00:05	10.4760	-0.3020	-1.2032	0.7125
11	02:00:10	10.4640	-0.2900	-1.1554	0.7117
12	04:00:20	10.4540	-0.2800	-1.1155	0.7110
13	08:00:39	10.4460	-0.2720	-1.0837	0.7105
14	12:00:59	10.4400	-0.2660	-1.0598	0.7101
15	22:14:45	10.4340	-0.2600	-1.0359	0.7097

Consolidation Test Results (Sequence 4) Load 40.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 5) Load 80.000 kPa

Project: SR1 2018 Investigation
Location:
Job Number:

Project Number: 110773396

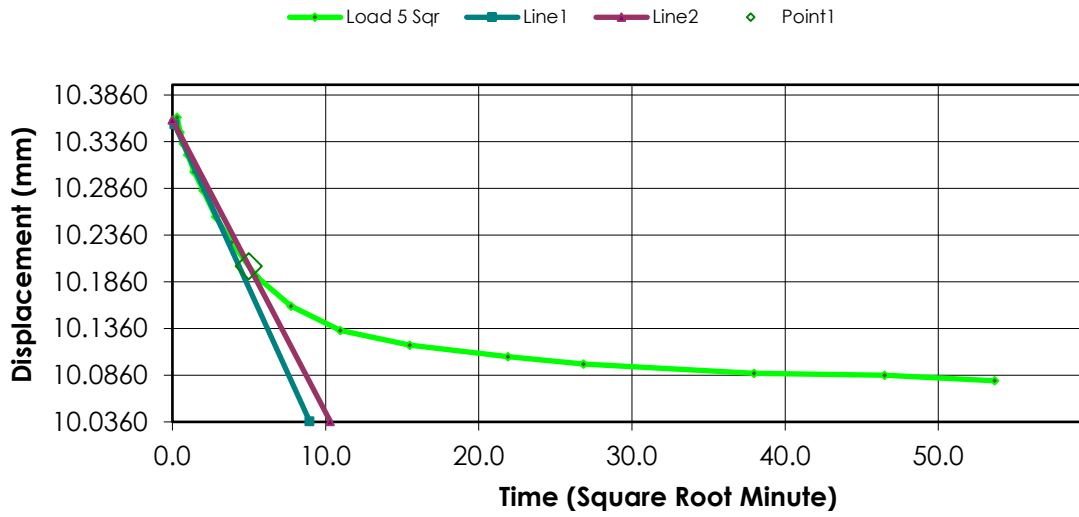
Test Date: 24-Oct-18
Test Number:

Sample Number: GL1A ST3 **Soil Description:**
Boring Number: Clay (CH) and Sand
Depth: 1.5-1.95m **Remarks:**
Sample Type: Undisturbed

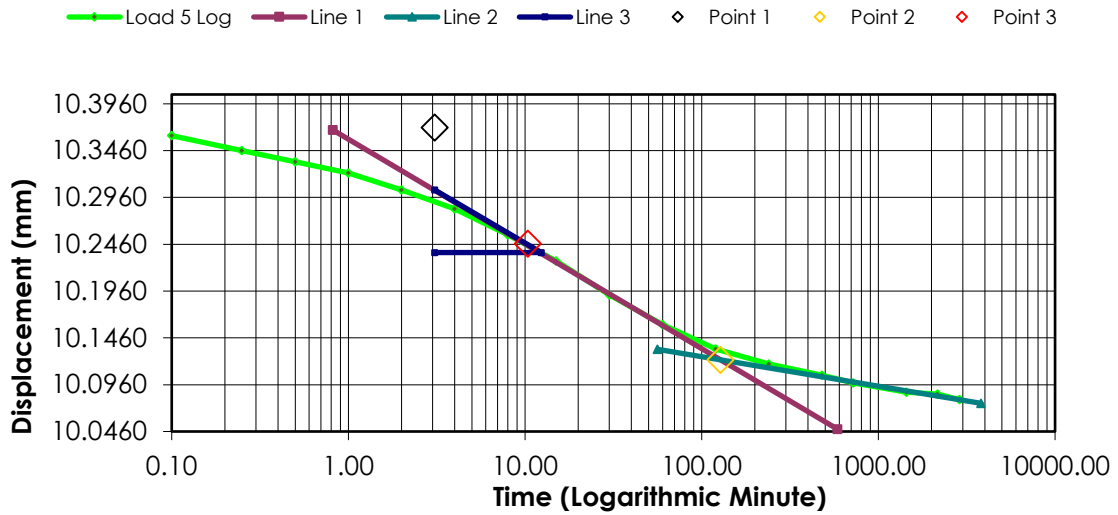
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	10.4340	-0.2600	-1.0359	0.7097
1	00:00:06	10.3620	-0.2100	-0.8367	0.7063
2	00:00:15	10.3460	-0.1940	-0.7729	0.7052
3	00:00:30	10.3340	-0.1820	-0.7251	0.7044
4	00:01:00	10.3220	-0.1700	-0.6773	0.7036
5	00:02:00	10.3040	-0.1520	-0.6056	0.7024
6	00:04:00	10.2840	-0.1320	-0.5259	0.7011
7	00:08:00	10.2560	-0.1040	-0.4143	0.6992
8	00:15:01	10.2280	-0.0760	-0.3028	0.6973
9	00:30:02	10.1920	-0.0400	-0.1594	0.6949
10	01:00:05	10.1600	-0.0080	-0.0319	0.6927
11	02:00:10	10.1340	0.0180	0.0717	0.6909
12	04:00:19	10.1180	0.0340	0.1355	0.6899
13	08:00:39	10.1060	0.0460	0.1833	0.6891
14	12:00:58	10.0980	0.0540	0.2151	0.6885
15	24:01:58	10.0880	0.0640	0.2550	0.6878
16	36:02:57	10.0860	0.0660	0.2629	0.6877
17	48:03:56	10.0800	0.0720	0.2869	0.6873

Consolidation Test Results (Sequence 5) Load 80.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 6) Load 160.000 kPa

Project: SR1 2018 Investigation
Location:
Job Number:

Project Number: 110773396

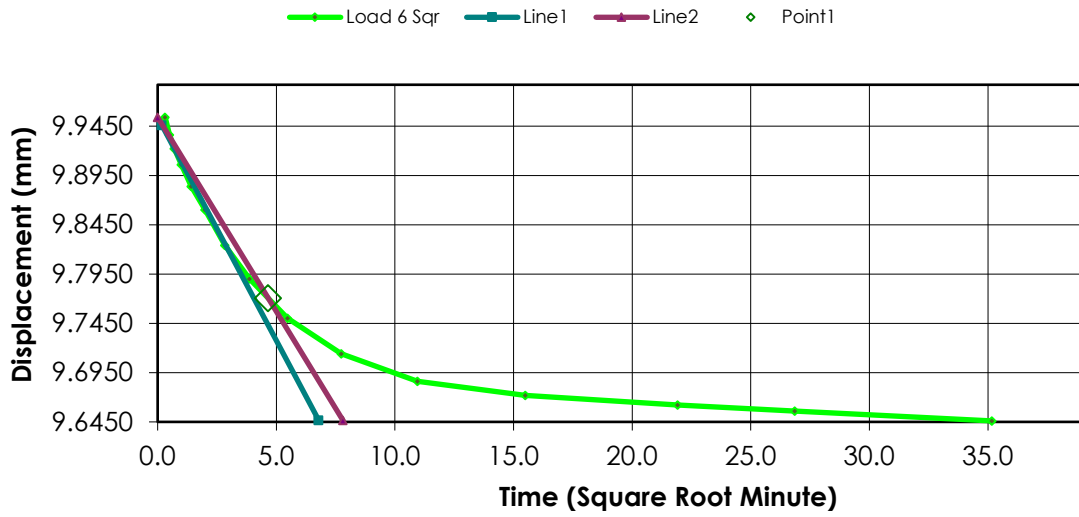
Test Date: 24-Oct-18
Test Number:

Sample Number: GL1A ST3 **Soil Description:**
Boring Number: Clay (CH) and Sand
Depth: 1.5-1.95m **Remarks:**
Sample Type: Undisturbed

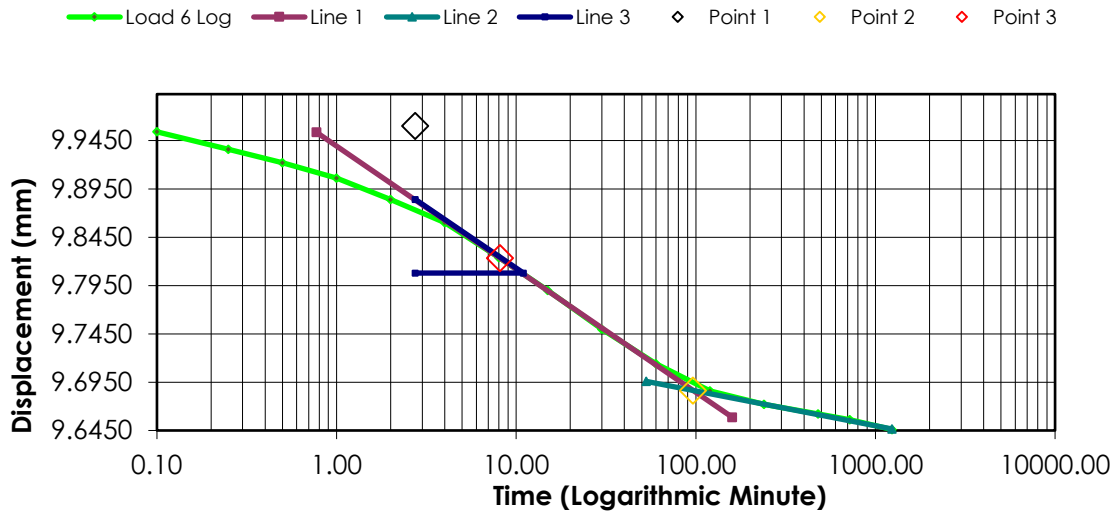
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	10.0380	0.1140	0.4542	0.6845
1	00:00:06	9.9540	0.1640	0.6534	0.6811
2	00:00:15	9.9360	0.1820	0.7251	0.6799
3	00:00:30	9.9220	0.1960	0.7809	0.6789
4	00:01:00	9.9060	0.2120	0.8446	0.6779
5	00:02:00	9.8840	0.2340	0.9323	0.6764
6	00:04:00	9.8600	0.2580	1.0279	0.6748
7	00:08:00	9.8240	0.2940	1.1713	0.6723
8	00:15:01	9.7900	0.3280	1.3068	0.6701
9	00:30:02	9.7500	0.3680	1.4661	0.6674
10	01:00:04	9.7140	0.4040	1.6096	0.6649
11	02:00:09	9.6860	0.4320	1.7211	0.6630
12	04:00:19	9.6720	0.4460	1.7769	0.6621
13	08:00:39	9.6620	0.4560	1.8167	0.6614
14	12:00:58	9.6560	0.4620	1.8406	0.6610
15	20:36:43	9.6460	0.4720	1.8805	0.6603

Consolidation Test Results (Sequence 6) Load 160.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 7) Load 320.000 kPa

Project: SR1 2018 Investigation
Location:
Job Number:

Project Number: 110773396

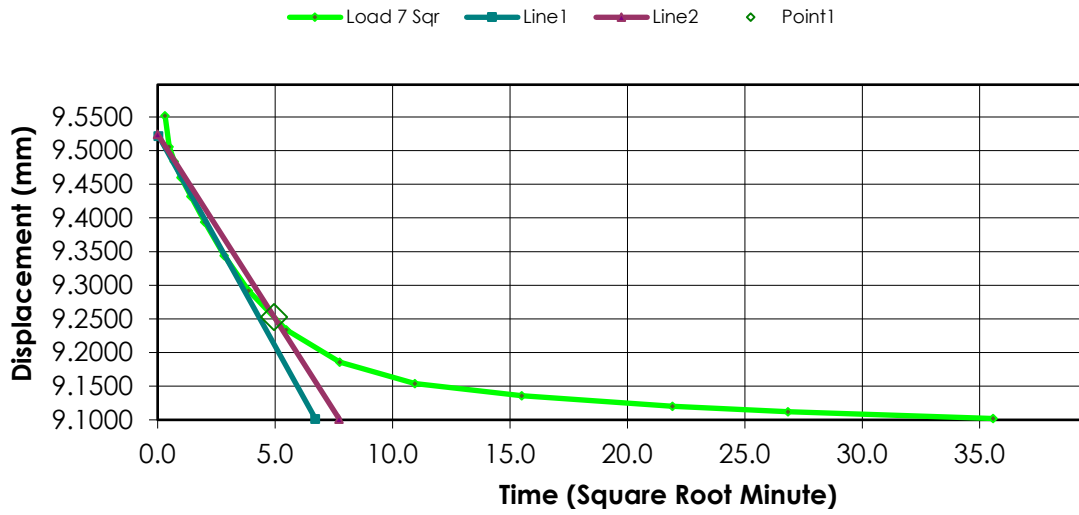
Test Date: 24-Oct-18
Test Number:

Sample Number: GL1A ST3 **Soil Description:**
Boring Number: Clay (CH) and Sand
Depth: 1.5-1.95m **Remarks:**
Sample Type: Undisturbed

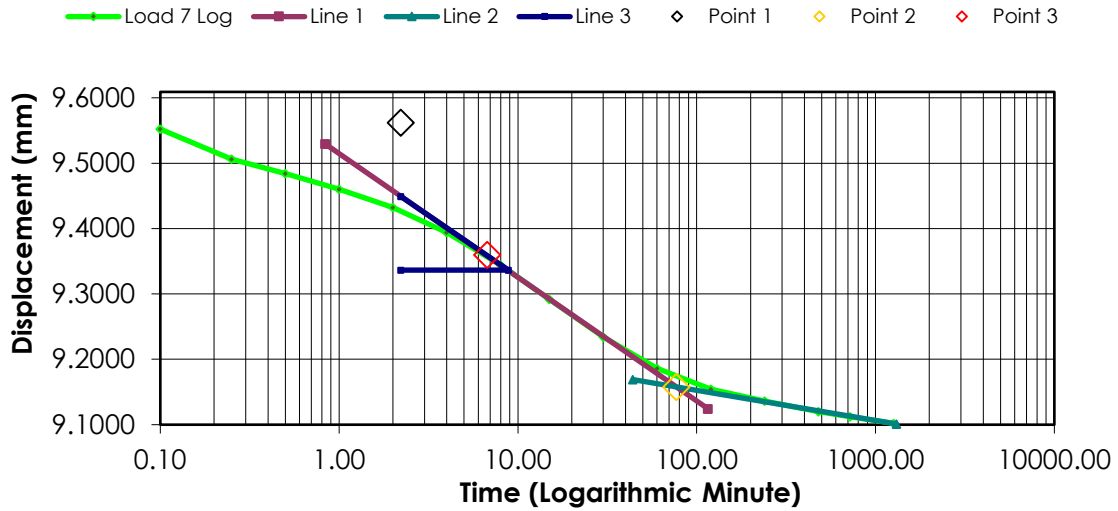
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	10.4340	-0.2600	-1.0359	0.7097
1	00:00:06	9.5520	0.5000	1.9920	0.6585
2	00:00:15	9.5060	0.5460	2.1753	0.6554
3	00:00:30	9.4840	0.5680	2.2629	0.6539
4	00:01:00	9.4600	0.5920	2.3586	0.6523
5	00:02:00	9.4320	0.6200	2.4701	0.6504
6	00:04:00	9.3940	0.6580	2.6215	0.6478
7	00:08:01	9.3440	0.7080	2.8207	0.6444
8	00:15:01	9.2920	0.7600	3.0279	0.6409
9	00:30:03	9.2340	0.8180	3.2590	0.6370
10	01:00:05	9.1860	0.8660	3.4502	0.6338
11	02:00:10	9.1540	0.8980	3.5777	0.6316
12	04:00:20	9.1360	0.9160	3.6494	0.6304
13	08:00:39	9.1200	0.9320	3.7131	0.6293
14	12:00:59	9.1120	0.9400	3.7450	0.6288
15	21:05:54	9.1020	0.9500	3.7849	0.6281

Consolidation Test Results (Sequence 7) Load 320.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 8) Load 640.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 24-Oct-18

Test Number:

Sample Number: GL1A ST3

Soil Description:

Boring Number:

Clay (CH) and Sand

Depth: 1.5-1.95m

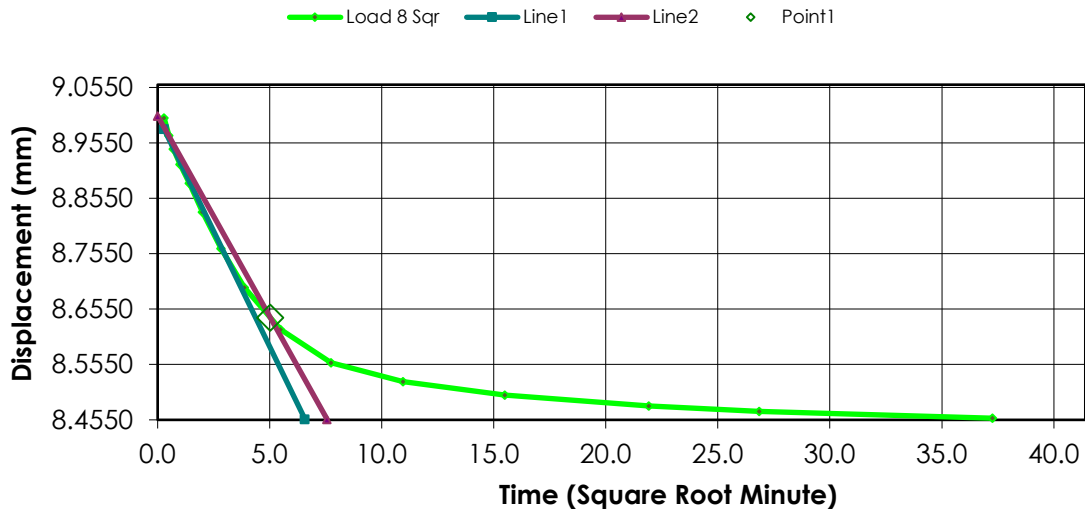
Remarks:

Sample Type: Undisturbed

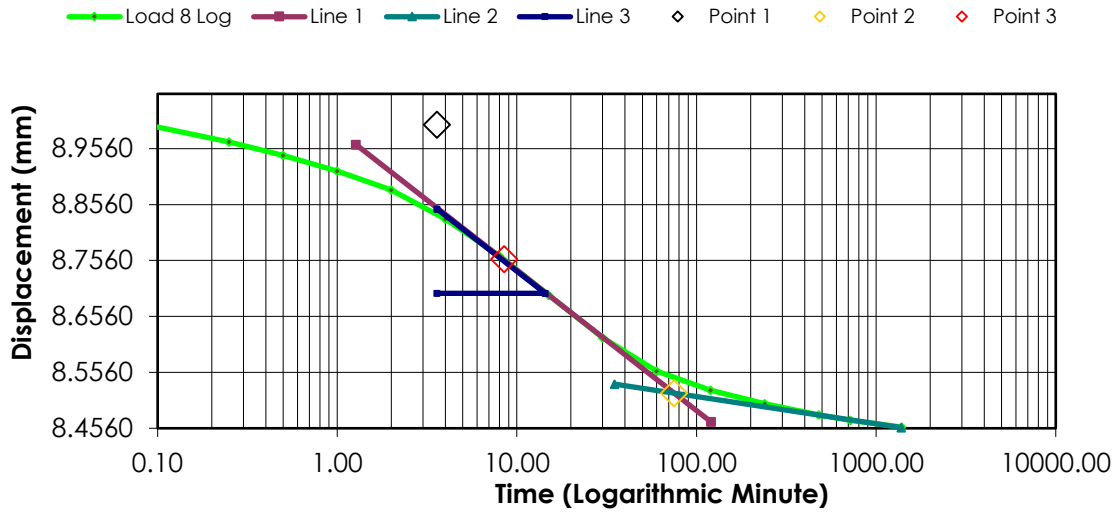
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	9.1020	0.9500	3.7849	0.6281
1	00:00:05	9.0000	1.0020	3.9920	0.6246
2	00:00:15	8.9680	1.0340	4.1195	0.6225
3	00:00:30	8.9440	1.0580	4.2151	0.6208
4	00:01:00	8.9160	1.0860	4.3267	0.6189
5	00:02:00	8.8820	1.1200	4.4622	0.6167
6	00:04:00	8.8300	1.1720	4.6693	0.6132
7	00:08:00	8.7640	1.2380	4.9323	0.6087
8	00:15:01	8.6940	1.3080	5.2112	0.6040
9	00:30:02	8.6180	1.3840	5.5139	0.5989
10	01:00:04	8.5580	1.4440	5.7530	0.5948
11	02:00:09	8.5240	1.4780	5.8884	0.5925
12	04:00:19	8.5000	1.5020	5.9841	0.5909
13	08:00:39	8.4800	1.5220	6.0637	0.5896
14	12:00:58	8.4700	1.5320	6.1036	0.5889
15	23:08:09	8.4580	1.5440	6.1514	0.5881

Consolidation Test Results (Sequence 8) Load 640.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 9) Rebound 320.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 24-Oct-18

Test Number:

Sample Number: GL1A ST3

Soil Description:

Boring Number:

Clay (CH) and Sand

Depth: 1.5-1.95m

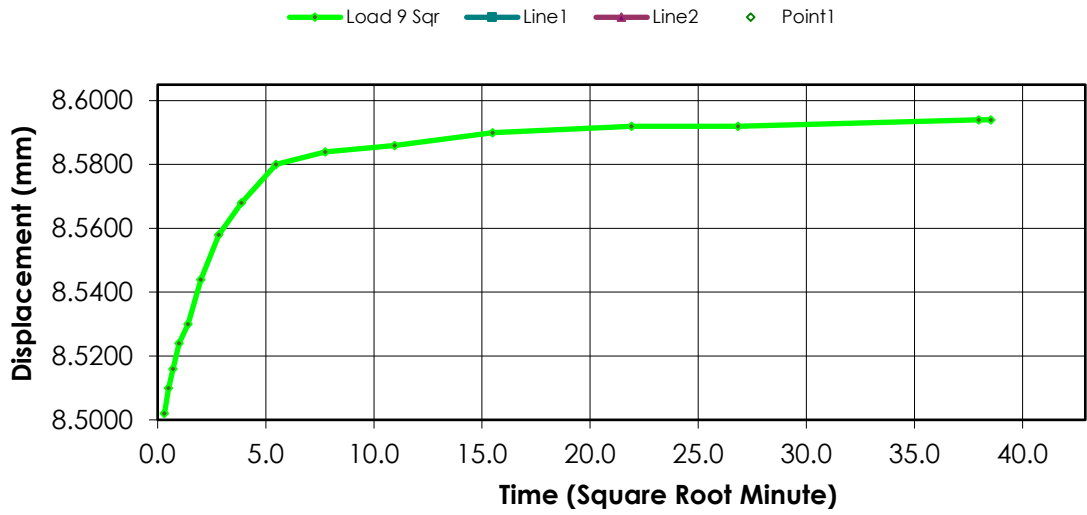
Remarks:

Sample Type: Undisturbed

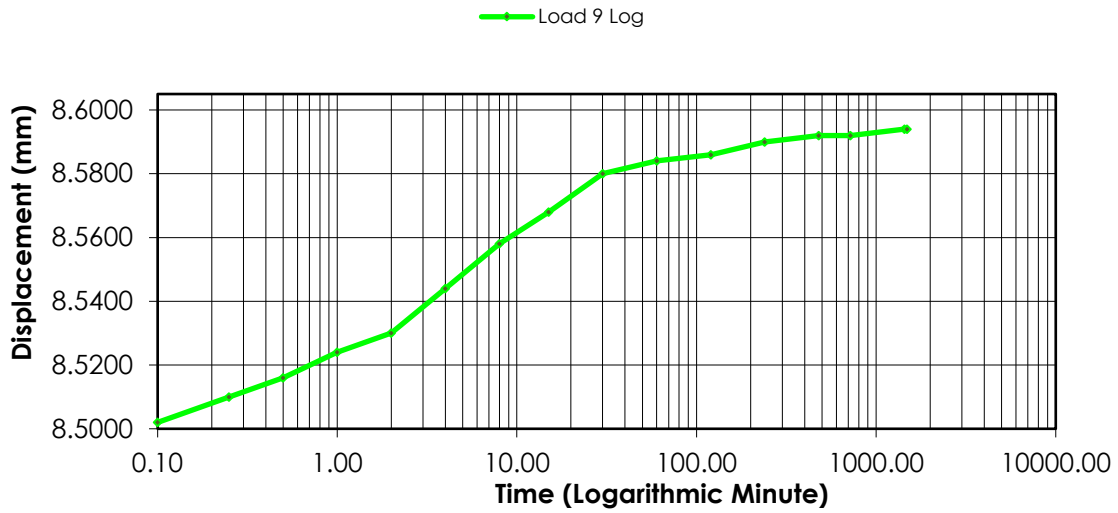
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.4580	1.5440	6.1514	0.5881
1	00:00:06	8.5020	1.5380	6.1275	0.5885
2	00:00:15	8.5100	1.5300	6.0956	0.5890
3	00:00:30	8.5160	1.5240	6.0717	0.5894
4	00:01:00	8.5240	1.5160	6.0398	0.5900
5	00:02:00	8.5300	1.5100	6.0159	0.5904
6	00:04:00	8.5440	1.4960	5.9602	0.5913
7	00:08:00	8.5580	1.4820	5.9044	0.5923
8	00:15:01	8.5680	1.4720	5.8645	0.5929
9	00:30:02	8.5800	1.4600	5.8167	0.5937
10	01:00:05	8.5840	1.4560	5.8008	0.5940
11	02:00:10	8.5860	1.4540	5.7928	0.5941
12	04:00:19	8.5900	1.4500	5.7769	0.5944
13	08:00:39	8.5920	1.4480	5.7689	0.5945
14	12:00:59	8.5920	1.4480	5.7689	0.5945
15	24:01:58	8.5940	1.4460	5.7610	0.5947
16	24:45:27	8.5940	1.4460	5.7610	0.5947

Consolidation Test Results (Sequence 9) Rebound 320.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 10) Rebound 160.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 24-Oct-18

Test Number:

Sample Number: GL1A ST3

Soil Description:

Boring Number:

Clay (CH) and Sand

Depth: 1.5-1.95m

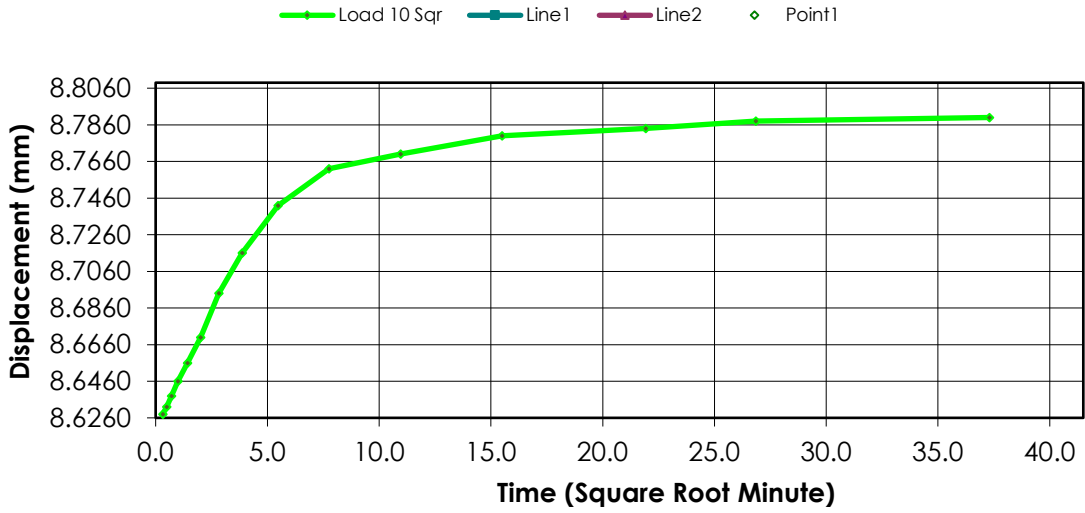
Remarks:

Sample Type: Undisturbed

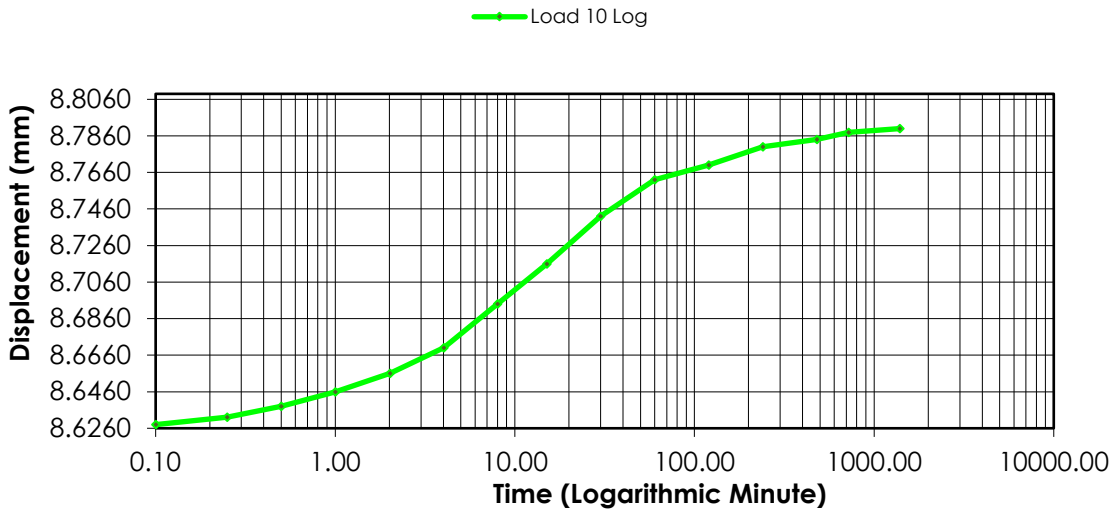
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.5940	1.4460	5.7610	0.5947
1	00:00:06	8.6280	1.4380	5.7291	0.5952
2	00:00:15	8.6320	1.4340	5.7131	0.5955
3	00:00:30	8.6380	1.4280	5.6892	0.5959
4	00:01:00	8.6460	1.4200	5.6574	0.5964
5	00:02:01	8.6560	1.4100	5.6175	0.5971
6	00:04:01	8.6700	1.3960	5.5618	0.5980
7	00:08:01	8.6940	1.3720	5.4661	0.5997
8	00:15:02	8.7160	1.3500	5.3785	0.6012
9	00:30:03	8.7420	1.3240	5.2749	0.6029
10	01:00:05	8.7620	1.3040	5.1952	0.6043
11	02:00:10	8.7700	1.2960	5.1633	0.6048
12	04:00:20	8.7800	1.2860	5.1235	0.6055
13	08:00:40	8.7840	1.2820	5.1076	0.6057
14	12:00:59	8.7880	1.2780	5.0916	0.6060
15	23:11:09	8.7900	1.2760	5.0837	0.6061

Consolidation Test Results
(Sequence 10) Rebound 160.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 11) Load 320.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 24-Oct-18

Test Number:

Sample Number: GL1A ST3

Soil Description:

Boring Number:

Clay (CH) and Sand

Depth: 1.5-1.95m

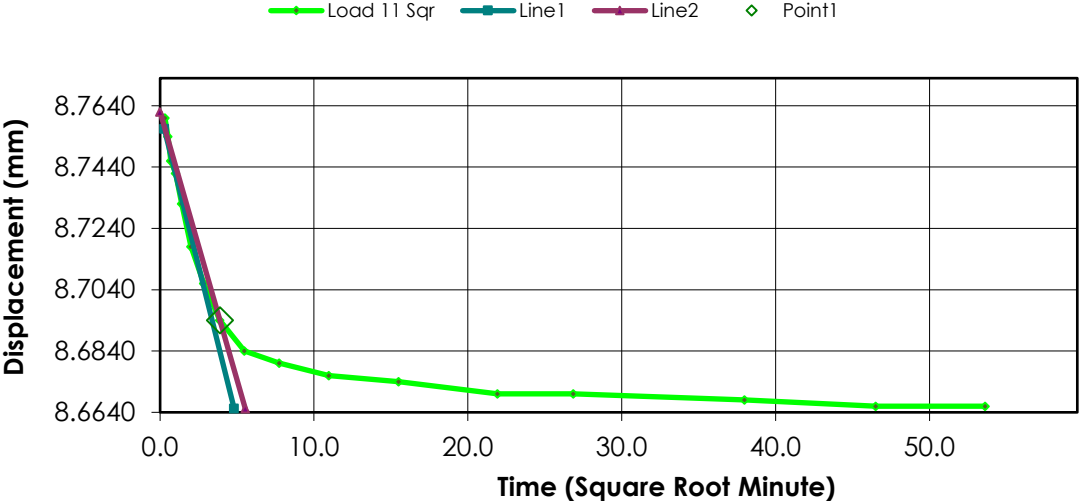
Remarks:

Sample Type: Undisturbed

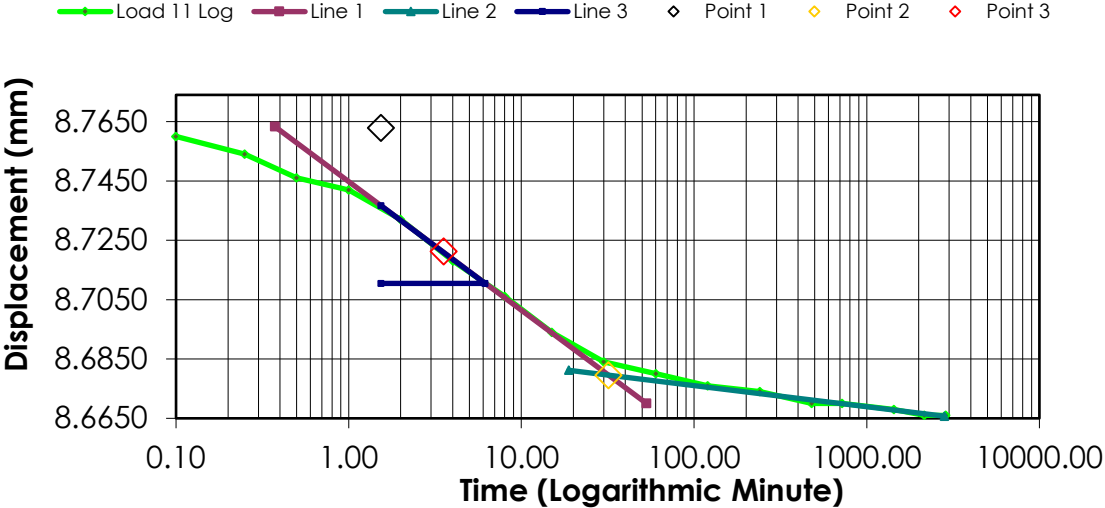
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.7900	1.2760	5.0837	0.6061
1	00:00:06	8.7600	1.2820	5.1076	0.6057
2	00:00:15	8.7540	1.2880	5.1315	0.6053
3	00:00:30	8.7460	1.2960	5.1633	0.6048
4	00:01:00	8.7420	1.3000	5.1793	0.6045
5	00:02:00	8.7320	1.3100	5.2191	0.6038
6	00:04:01	8.7180	1.3240	5.2749	0.6029
7	00:08:01	8.7060	1.3360	5.3227	0.6021
8	00:15:01	8.6940	1.3480	5.3705	0.6013
9	00:30:03	8.6840	1.3580	5.4104	0.6006
10	01:00:05	8.6800	1.3620	5.4263	0.6003
11	02:00:10	8.6760	1.3660	5.4422	0.6001
12	04:00:20	8.6740	1.3680	5.4502	0.5999
13	08:00:40	8.6700	1.3720	5.4661	0.5997
14	12:01:00	8.6700	1.3720	5.4661	0.5997
15	24:01:58	8.6680	1.3740	5.4741	0.5995
16	36:02:57	8.6660	1.3760	5.4821	0.5994
17	47:55:45	8.6660	1.3760	5.4821	0.5994

Consolidation Test Results (Sequence 11) Load 320.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 12) Load 640.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 24-Oct-18

Test Number:

Sample Number: GL1A ST3

Soil Description:

Boring Number:

Clay (CH) and Sand

Depth: 1.5-1.95m

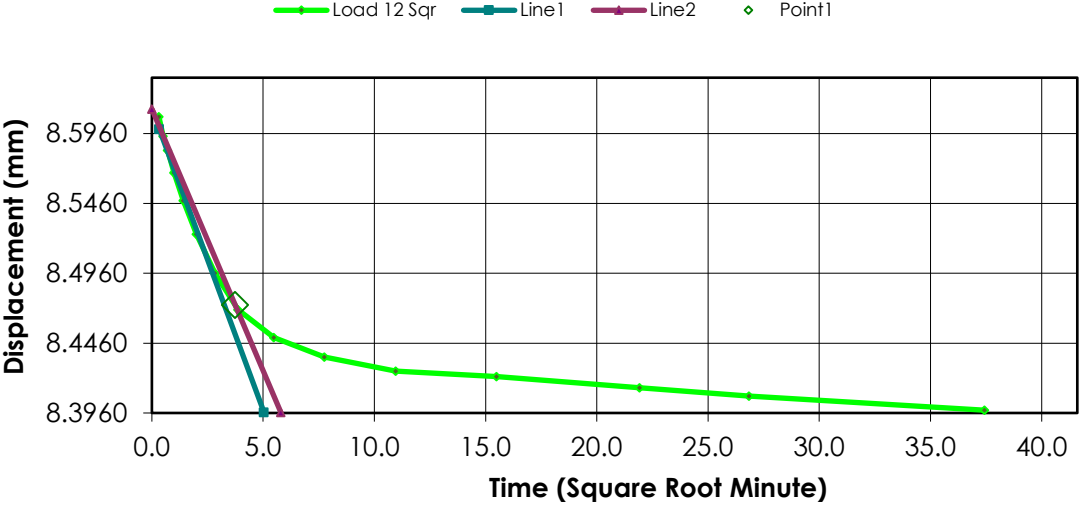
Remarks:

Sample Type: Undisturbed

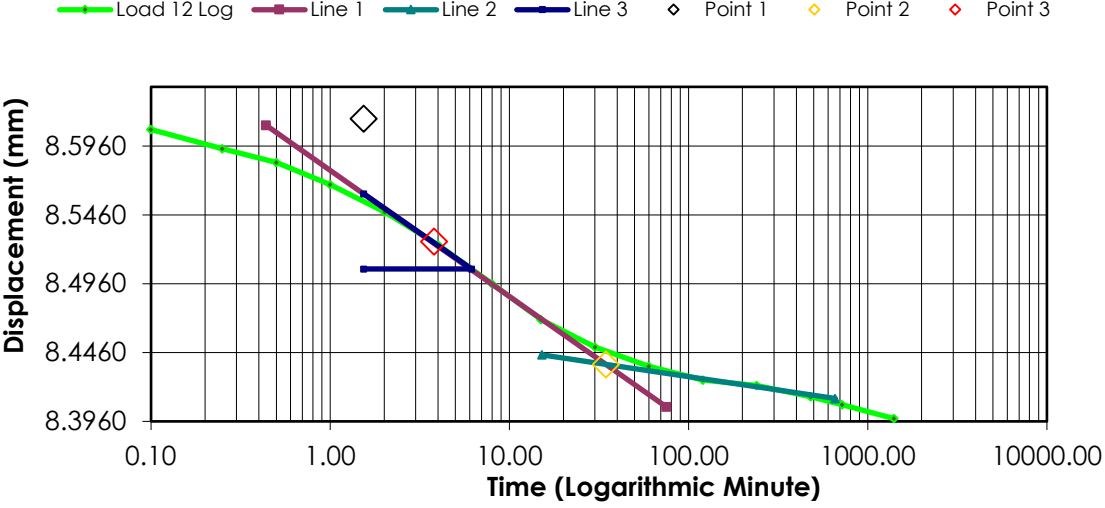
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.6660	1.3760	5.4821	0.5994
1	00:00:06	8.6080	1.4140	5.6335	0.5968
2	00:00:15	8.5940	1.4280	5.6892	0.5959
3	00:00:30	8.5840	1.4380	5.7291	0.5952
4	00:01:00	8.5680	1.4540	5.7928	0.5941
5	00:02:01	8.5480	1.4740	5.8725	0.5928
6	00:04:01	8.5240	1.4980	5.9681	0.5912
7	00:08:01	8.4960	1.5260	6.0797	0.5893
8	00:15:02	8.4700	1.5520	6.1833	0.5875
9	00:30:03	8.4500	1.5720	6.2629	0.5862
10	01:00:05	8.4360	1.5860	6.3187	0.5852
11	02:00:09	8.4260	1.5960	6.3586	0.5846
12	04:00:19	8.4220	1.6000	6.3745	0.5843
13	08:00:39	8.4140	1.6080	6.4064	0.5838
14	12:00:58	8.4080	1.6140	6.4303	0.5834
15	23:21:10	8.3980	1.6240	6.4701	0.5827

Consolidation Test Results (Sequence 12) Load 640.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 13) Load 1280.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 24-Oct-18

Test Number:

Sample Number: GL1A ST3

Soil Description:

Boring Number:

Clay (CH) and Sand

Depth: 1.5-1.95m

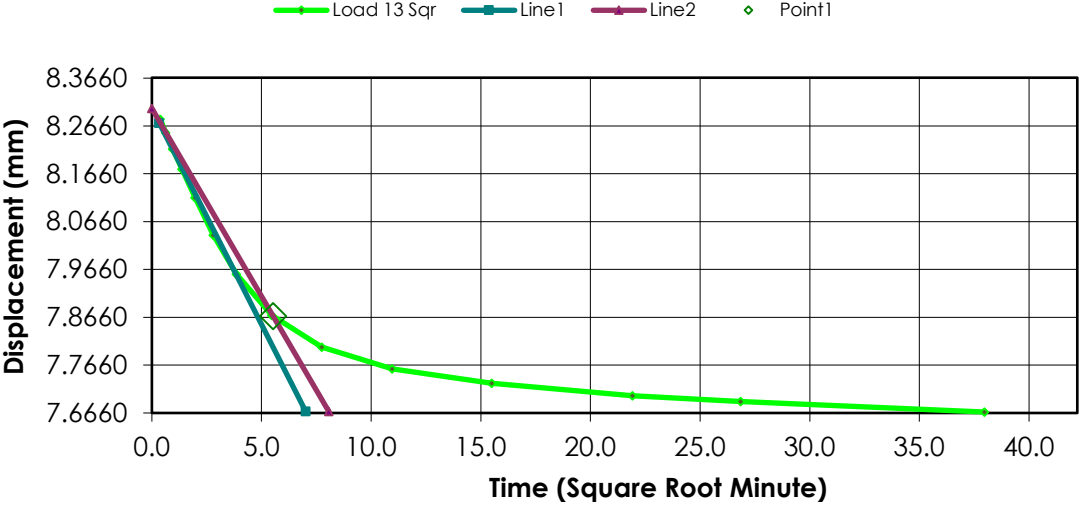
Remarks:

Sample Type: Undisturbed

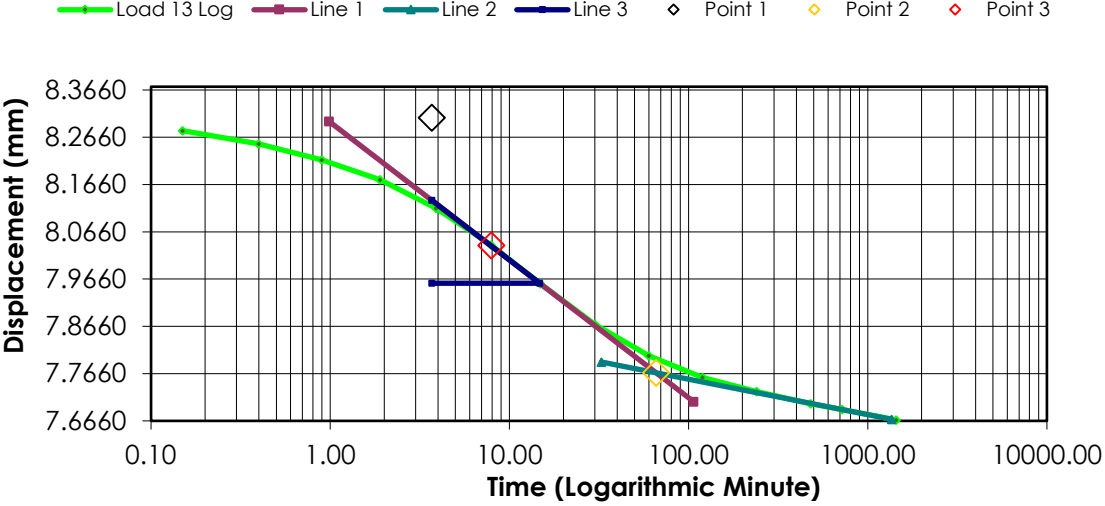
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
1	00:00:00	8.3980	1.5540	6.1912	0.5874
2	00:00:09	8.2800	1.6720	6.6614	0.5794
3	00:00:24	8.2520	1.7000	6.7729	0.5776
4	00:00:54	8.2180	1.7340	6.9084	0.5753
5	00:01:54	8.1760	1.7760	7.0757	0.5724
6	00:03:54	8.1160	1.8360	7.3147	0.5684
7	00:07:54	8.0380	1.9140	7.6255	0.5631
8	00:14:55	7.9560	1.9960	7.9522	0.5576
9	00:29:56	7.8700	2.0820	8.2948	0.5518
10	00:59:59	7.8040	2.1480	8.5578	0.5474
11	02:00:03	7.7580	2.1940	8.7410	0.5443
12	04:00:13	7.7280	2.2240	8.8606	0.5422
13	08:00:33	7.7020	2.2500	8.9641	0.5405
14	12:00:52	7.6900	2.2620	9.0120	0.5397
15	24:01:51	7.6680	2.2840	9.0996	0.5382

Consolidation Test Results (Sequence 13) Load 1280.000 kPa

Consolidation Graph (Squareroot Time)



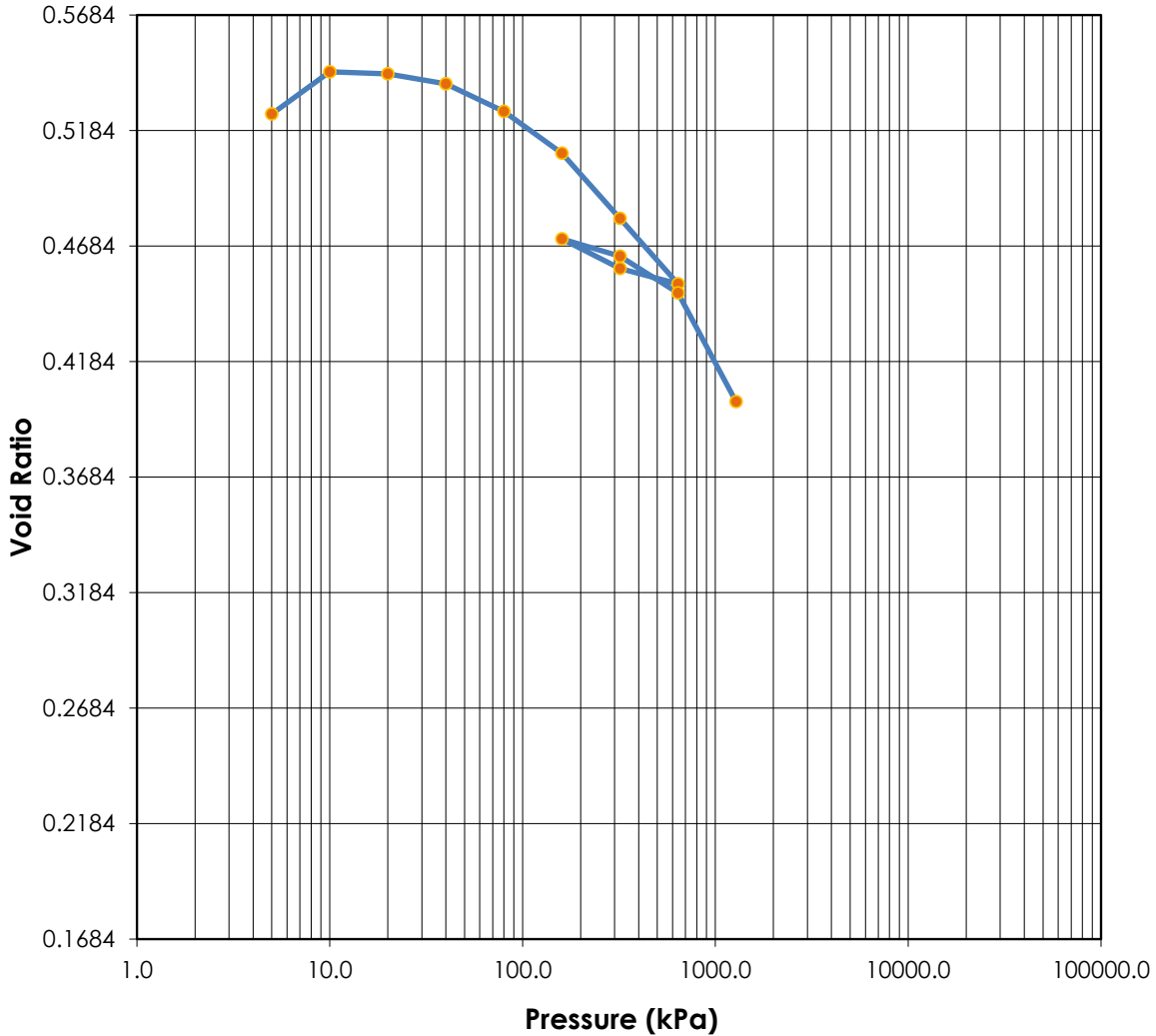
Consolidation Graph (Logarithmic Time)





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One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876



	Before	After	Liquid Limits:	46	Test Date:	29-Oct-18
Moisture (%):	23.4	21.9	Plastic Limits:	17		
Dry Density (g/cm³):	1.734	1.874	Plasticity Index (%):	29		
Saturation (%):	100	100				
Void Ratio:	0.5254	0.4009	Specific Gravity:	2.65	Assumed	
Soil Description:	Clay (Cl), Trace Gravel, Trace Sand					
Project Number:	110773396	Depth:	4.05-4.5m		Remarks:	
Sample Number:	GL1A ST9	Boring Number:				
Project:	SRI 2018 Investigation					
Client:	Alberta Transportation					
Location:						

Tested By: E. Wahl

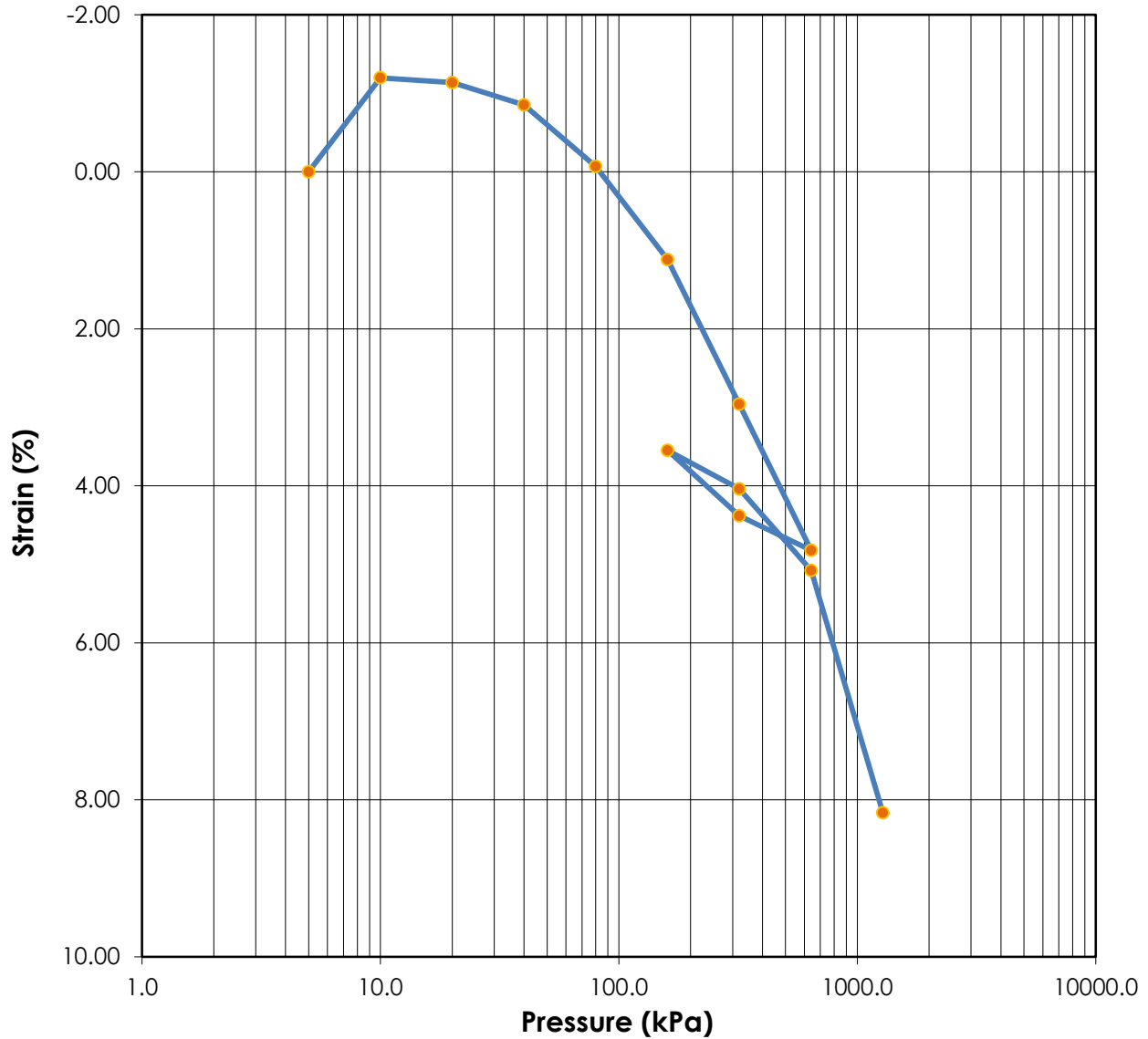
Reviewed By: C. Lamoureux

Reporting of these test results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request. The data presented above is for the sole use of the client stipulated above. Stantec is not responsible, nor can be held liable, for the use of this report by any other party, with or without the knowledge of Stantec.



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876

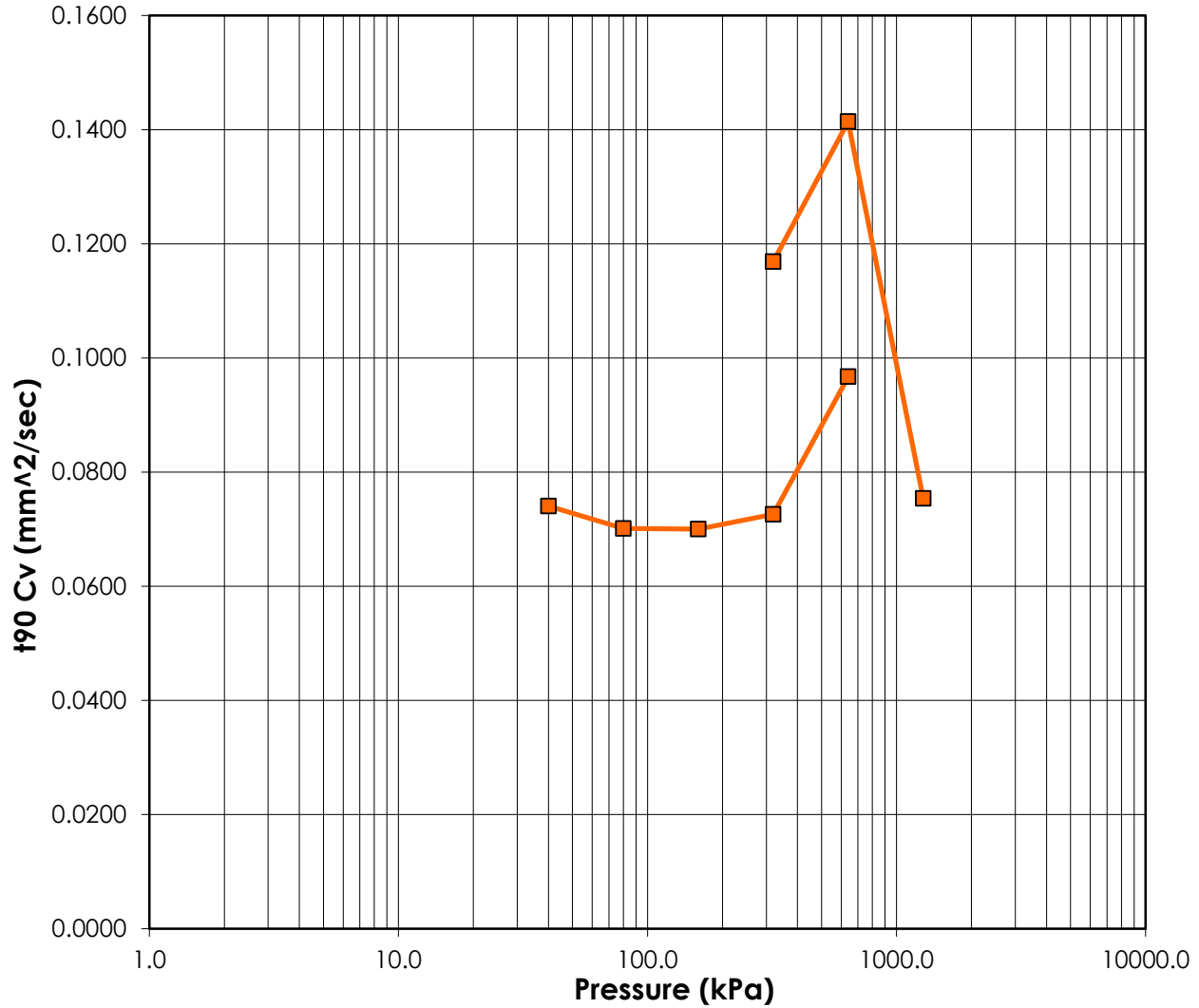


	Before	After	Liquid Limits:	46	Test Date:	29-Oct-18
Moisture (%):	23.4	21.9	Plastic Limits:	17		
Dry Density (g/cm3):	1.734	1.874	Plasticity Index (%):	29		
Saturation (%):	100	100	Specific Gravity:	2.65	Assumed	
Void Ratio:	0.5254	0.4009				
Sample Description:	Clay (Cl), Trace Gravel, Trace Sand					
Project Number:	110773396	Depth:	4.05-4.5m			
Sample Number:	GL1A ST9	Boring Number:				
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						
			Remarks:			



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
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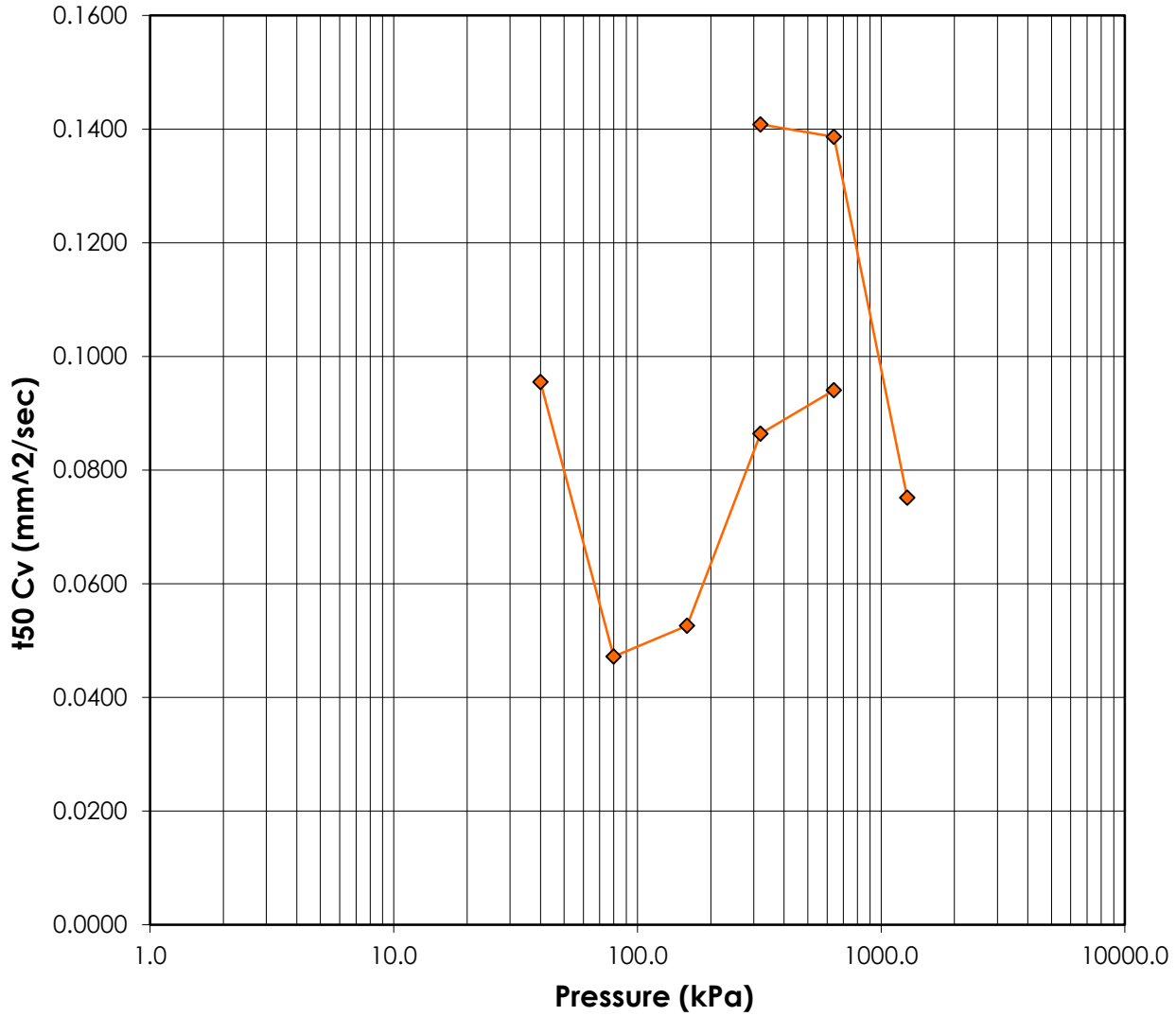
—■— $t_{90} C_v$

	Before	After	Liquid Limits:	46	Test Date:	29-Oct-18
Moisture (%):	23.4	21.9	Plastic Limits:	17		
Dry Density (g/cm³):	1.734	1.874	Plasticity Index (%):	29		
Saturation (%):	100	100				
Void Ratio:	0.5254	0.4009	Specific Gravity:	2.65	Assumed	
Soil Description:	Clay (Cl), Trace Gravel, Trace Sand					
Project Number:	110773396		Depth:	4.05-4.5m		
Sample Number:	GL1A ST9		Boring Number:			
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						
						Remarks:



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One-Dimensional Consolidation Test
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 Tel: (403) 253-7876



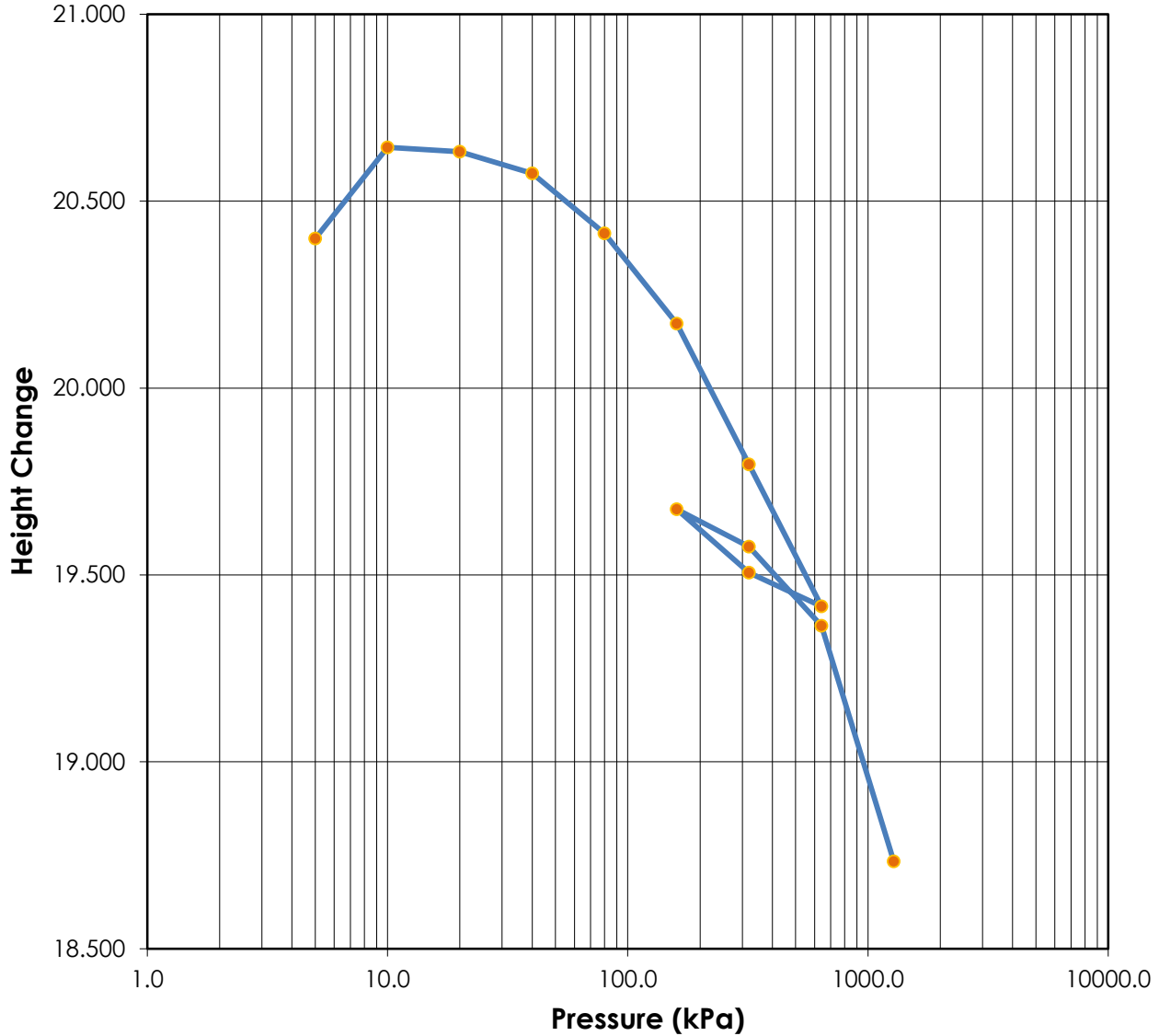
—◆— $t_{50} C_v$

	Before	After	Liquid Limits:	46	Test Date:	29-Oct-18
Moisture (%):	23.4	21.9	Plastic Limits:	17		
Dry Density (g/cm³):	1.734	1.874	Plasticity Index (%):	29		
Saturation (%):	100	100				
Void Ratio:	0.5254	0.4009	Specific Gravity:	2.65	Assumed	
Soil Description:	Clay (Cl), Trace Gravel, Trace Sand					
Project Number:	110773396	Depth:	4.05-4.5m			
Sample Number:	GL1A ST9	Boring Number:				
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						
						Remarks:



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	Before	After	Liquid Limits:	46	Test Date:	29-Oct-18
Moisture (%):	23.4	21.9	Plastic Limits:	17		
Dry Density (g/cm3):	1.734	1.874	Plasticity Index (%):	29		
Saturation (%):	100	100	Specific Gravity:	2.65	Assumed	
Void Ratio:	0.5254	0.4009				
Soil Description:	Clay (Cl), Trace Gravel, Trace Sand					
Project Number:	110773396	Depth:	4.05-4.5m			
Sample Number:	GL1A ST9	Boring Number:				
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						
			Remarks:			

Consolidation Test Results Summary

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Sample Number: GL1A ST9

Sample Description:

Boring Number:

Clay (Cl), Trace Gravel, Trace Sand

Depth: 4.05-4.5m

Remarks:

Test Number:

Sample Type: Undisturbed

Test Date: 29-Oct-18

Index	Load Sequence (kPa)	Cumulative Change in Height (mm)	Specimen Height (mm)	Height of Void (mm)	Vertical Strain (%)	Void Ratio	t90 Fitting Time (min)	t50 Fitting Time (min)	t90 Cv (mm ² /sec)	t50 Cv (mm ² /sec)
0	0.000	0.0000	20.4000	7.0280	0.00	0.5256	0.000	0.000	0.000	0.000
1	5.000	0.0000	20.4000	7.0280	0.00	0.5256	0.000	0.000	0.000	0.000
2	10.000	-0.2440	20.6440	7.2720	-1.20	0.5438	0.000	0.000	0.000	0.000
3	20.000	-0.2320	20.6320	7.2600	-1.14	0.5429	0.000	0.000	0.000	0.000
4	40.000	-0.1740	20.5740	7.2020	-0.85	0.5386	20.199	3.639	0.074	0.095
5	80.000	-0.0140	20.4140	7.0420	-0.07	0.5266	20.991	7.249	0.070	0.047
6	160.000	0.2280	20.1720	6.8000	1.12	0.5085	20.535	6.350	0.070	0.053
7	320.000	0.6040	19.7960	6.4240	2.96	0.4804	19.075	3.724	0.073	0.086
8	640.000	0.9840	19.4160	6.0440	4.82	0.4520	13.773	3.291	0.097	0.094
9	320.000	0.8940	19.5060	6.1340	4.38	0.4587	0.000	0.000	0.000	0.000
10	160.000	0.7240	19.6760	6.3040	3.55	0.4714	0.000	0.000	0.000	0.000
11	320.000	0.8240	19.5760	6.2040	4.04	0.4640	11.587	2.234	0.117	0.141
12	640.000	1.0360	19.3640	5.9920	5.08	0.4481	9.368	2.220	0.141	0.139
13	1280.000	1.6660	18.7340	5.3620	8.17	0.4010	16.452	3.833	0.075	0.075

Predicted value indicated with *

Consolidation Test

Consolidation Specimen Information

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 29-Oct-18

Sample Number: GL1A ST9

Sample Description:

Boring Number:

Clay (Cl), Trace Gravel, Trace Sand

Depth: 4.05-4.5m

Remarks:

Sample Type: Undisturbed

Test Number:

Liquid Limit: 46

Initial Void Ratio: 0.5254

Initial Height (mm): 20.40

Plastic Limit: 17

Plasticity Index (%): 29

Initial Diameter (mm): 50.88

Specific Gravity: 2.65

Weight of Ring (g): 89.71

Assumed

Parameters	Initial Specimen	Final Specimen
Moist Weight + Container (g)	100.02	90.62
Dry Soil + Container (g)	81.74	75.08
Weight of Container (g)	3.72	4.16
Moisture Content (%)	23.4	21.9
Void Ratio	0.5254	0.4009
Saturation (%)	100	100
Dry Density (g/cm ³)	1.734	1.874

**Consolidation Test Results
(Sequence 1) Load 5.000 kPa**

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 29-Oct-18

Test Number:

Sample Number: GL1A ST9

Soil Description:

Boring Number:

Clay (Cl), Trace Gravel, Trace Sand

Depth: 4.05-4.5m

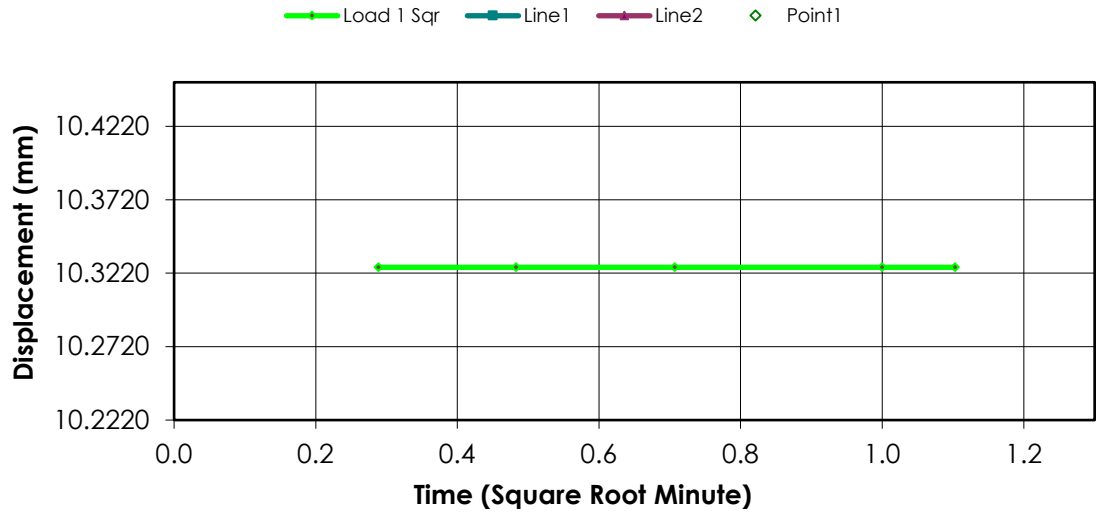
Remarks:

Sample Type: Undisturbed

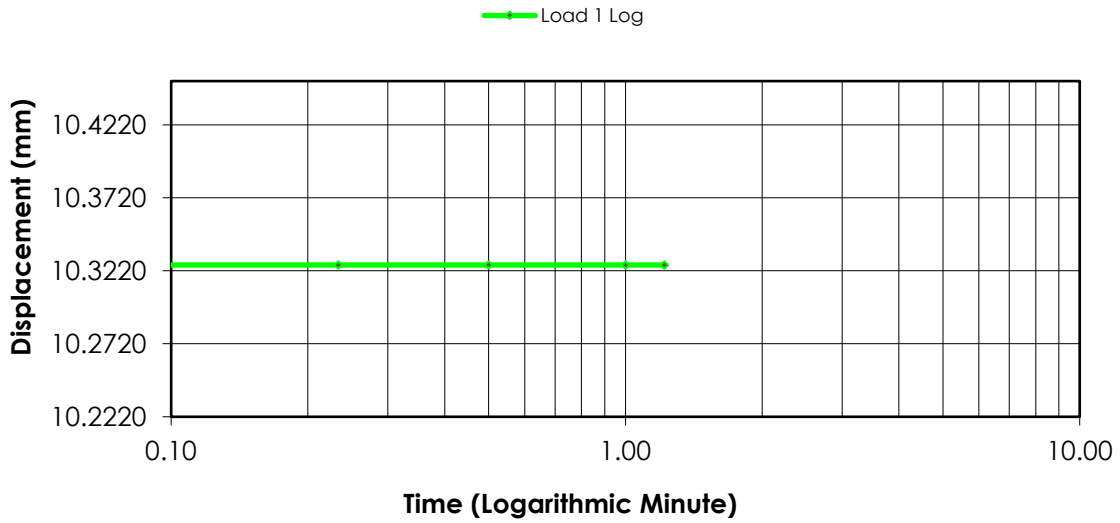
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	10.3260	0.0000	0.0000	0.5254
1	00:00:05	10.3260	0.0000	0.0000	0.5254
2	00:00:14	10.3260	0.0000	0.0000	0.5254
3	00:00:30	10.3260	0.0000	0.0000	0.5254
4	00:01:00	10.3260	0.0000	0.0000	0.5254
5	00:01:13	10.3260	0.0000	0.0000	0.5254

Consolidation Test Results (Sequence 1) Load 5.000 kPa

Consolidation Graph (Square-root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 2) Load 10.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 29-Oct-18

Test Number:

Sample Number: GL1A ST9

Soil Description:

Boring Number:

Clay (Cl), Trace Gravel, Trace Sand

Depth: 4.05-4.5m

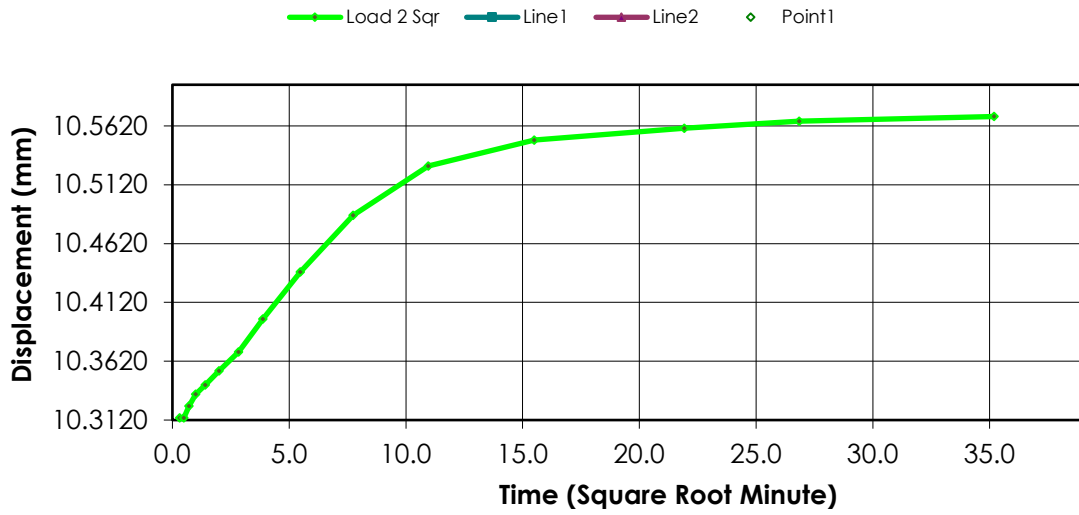
Remarks:

Sample Type: Undisturbed

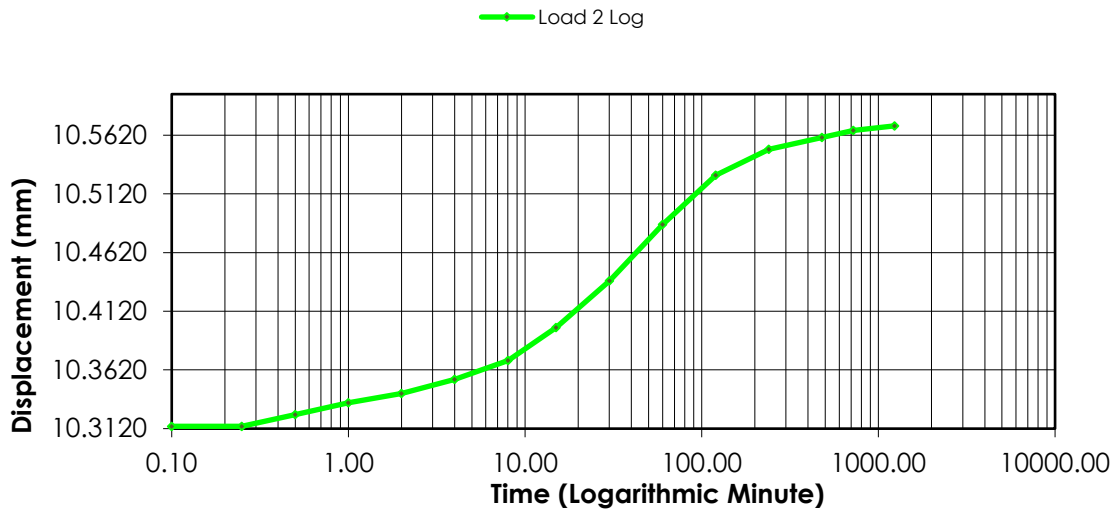
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	10.3260	0.0000	0.0000	0.5254
1	00:00:06	10.3140	0.0120	0.0588	0.5245
2	00:00:15	10.3140	0.0120	0.0588	0.5245
3	00:00:30	10.3240	0.0020	0.0098	0.5253
4	00:01:00	10.3340	-0.0080	-0.0392	0.5260
5	00:02:00	10.3420	-0.0160	-0.0784	0.5266
6	00:04:00	10.3540	-0.0280	-0.1373	0.5275
7	00:08:01	10.3700	-0.0440	-0.2157	0.5287
8	00:15:01	10.3980	-0.0720	-0.3529	0.5308
9	00:30:02	10.4380	-0.1120	-0.5490	0.5338
10	01:00:04	10.4860	-0.1600	-0.7843	0.5374
11	02:00:09	10.5280	-0.2020	-0.9902	0.5405
12	04:00:19	10.5500	-0.2240	-1.0980	0.5422
13	08:00:39	10.5600	-0.2340	-1.1471	0.5429
14	12:00:58	10.5660	-0.2400	-1.1765	0.5434
15	20:38:52	10.5700	-0.2440	-1.1961	0.5437

**Consolidation Test Results
(Sequence 2) Load 10.000 kPa**

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 3) Load 20.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 29-Oct-18

Test Number:

Sample Number: GL1A ST9

Soil Description:

Boring Number:

Clay (Cl), Trace Gravel, Trace Sand

Depth: 4.05-4.5m

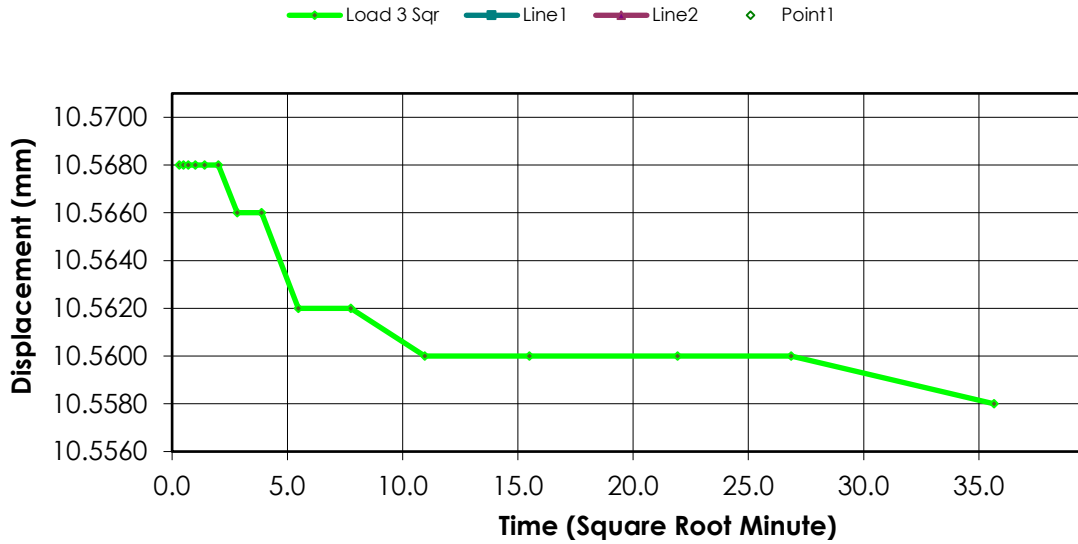
Remarks:

Sample Type: Undisturbed

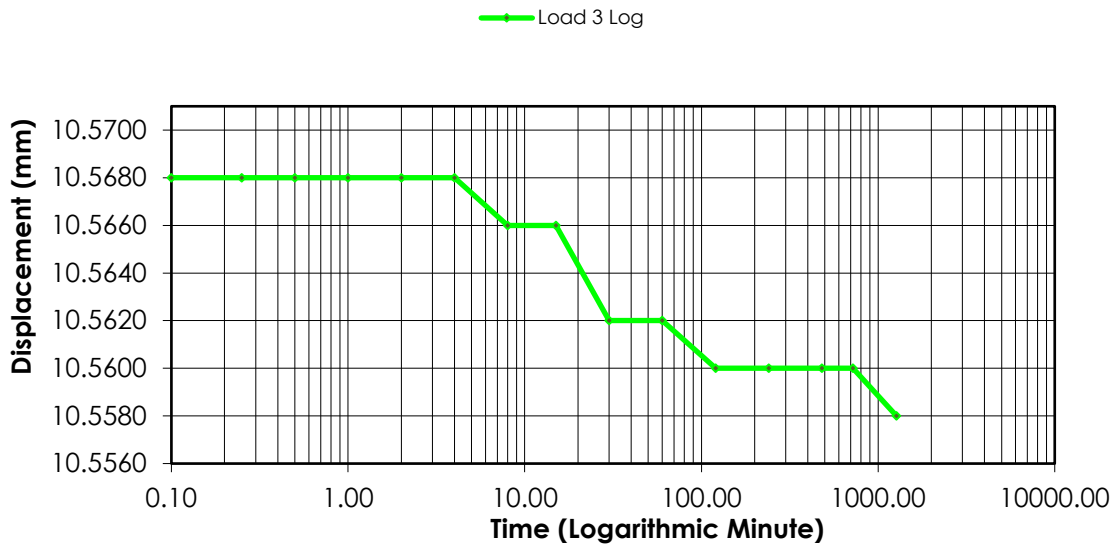
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	10.5700	-0.2440	-1.1961	0.5437
1	00:00:06	10.5680	-0.2420	-1.1863	0.5435
2	00:00:15	10.5680	-0.2420	-1.1863	0.5435
3	00:00:30	10.5680	-0.2420	-1.1863	0.5435
4	00:01:00	10.5680	-0.2420	-1.1863	0.5435
5	00:02:00	10.5680	-0.2420	-1.1863	0.5435
6	00:04:00	10.5680	-0.2420	-1.1863	0.5435
7	00:08:00	10.5660	-0.2400	-1.1765	0.5434
8	00:15:01	10.5660	-0.2400	-1.1765	0.5434
9	00:30:02	10.5620	-0.2360	-1.1569	0.5431
10	01:00:05	10.5620	-0.2360	-1.1569	0.5431
11	02:00:10	10.5600	-0.2340	-1.1471	0.5429
12	04:00:20	10.5600	-0.2340	-1.1471	0.5429
13	08:00:39	10.5600	-0.2340	-1.1471	0.5429
14	12:00:59	10.5600	-0.2340	-1.1471	0.5429
15	21:10:59	10.5580	-0.2320	-1.1373	0.5428

Consolidation Test Results (Sequence 3) Load 20.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 4) Load 40.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 29-Oct-18

Test Number:

Sample Number: GL1A ST9

Soil Description:

Boring Number:

Clay (Cl), Trace Gravel, Trace Sand

Depth: 4.05-4.5m

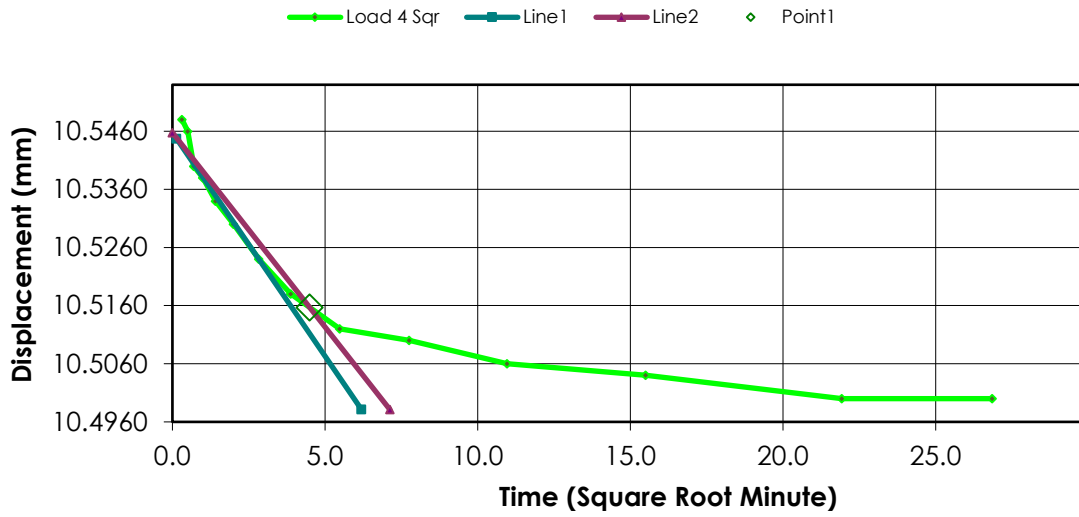
Remarks:

Sample Type: Undisturbed

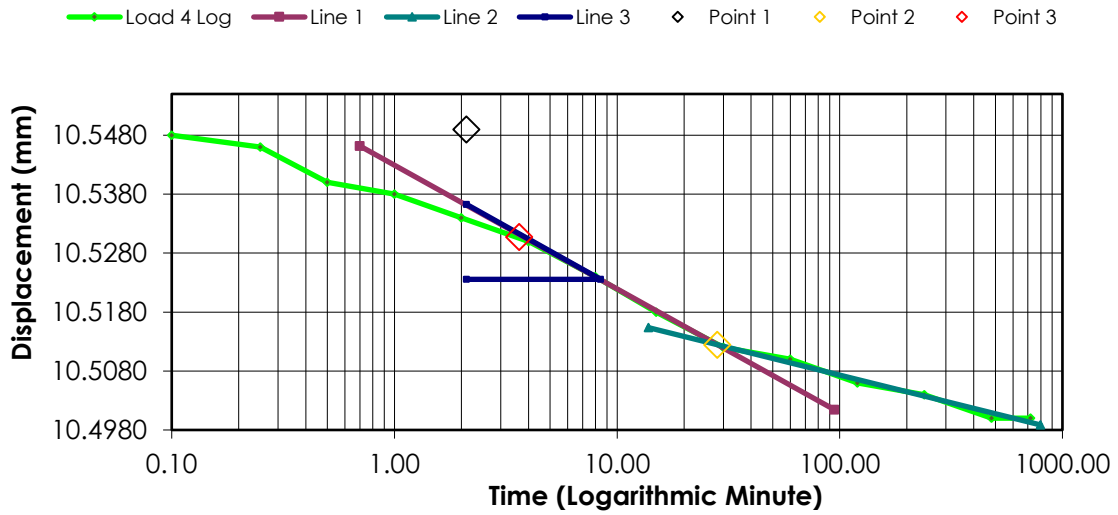
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	10.5580	-0.2320	-1.1373	0.5428
1	00:00:06	10.5480	-0.2220	-1.0882	0.5420
2	00:00:15	10.5460	-0.2200	-1.0784	0.5419
3	00:00:30	10.5400	-0.2140	-1.0490	0.5414
4	00:01:00	10.5380	-0.2120	-1.0392	0.5413
5	00:02:00	10.5340	-0.2080	-1.0196	0.5410
6	00:04:00	10.5300	-0.2040	-1.0000	0.5407
7	00:08:00	10.5240	-0.1980	-0.9706	0.5402
8	00:15:01	10.5180	-0.1920	-0.9412	0.5398
9	00:30:02	10.5120	-0.1860	-0.9118	0.5393
10	01:00:05	10.5100	-0.1840	-0.9020	0.5392
11	02:00:10	10.5060	-0.1800	-0.8824	0.5389
12	04:00:19	10.5040	-0.1780	-0.8725	0.5388
13	08:00:39	10.5000	-0.1740	-0.8529	0.5385
14	12:00:59	10.5000	-0.1740	-0.8529	0.5385

Consolidation Test Results (Sequence 4) Load 40.000 kPa

Consolidation Graph (Square Root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 5) Load 80.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 29-Oct-18

Test Number:

Sample Number: GL1A ST9

Soil Description:

Boring Number:

Clay (Cl), Trace Gravel, Trace Sand

Depth: 4.05-4.5m

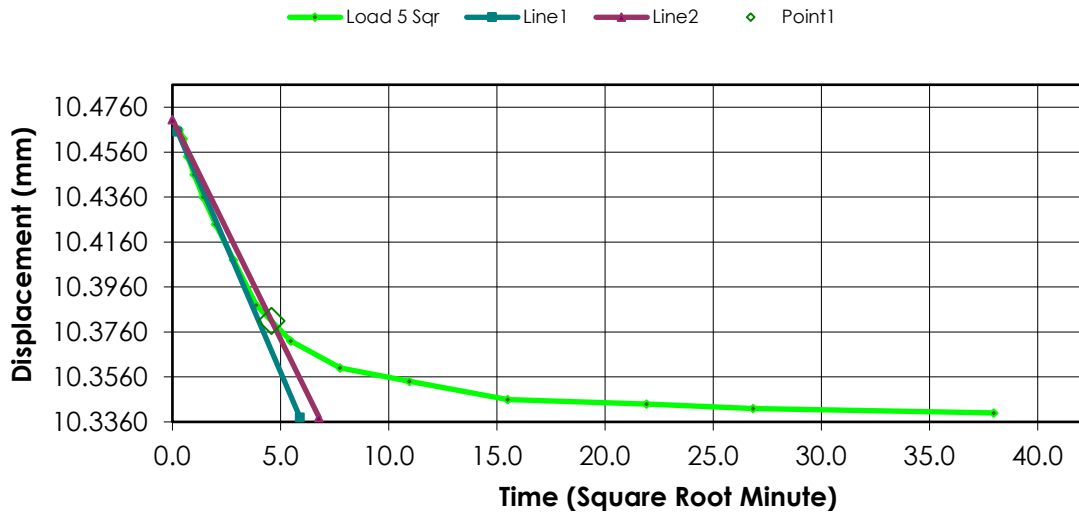
Remarks:

Sample Type: Undisturbed

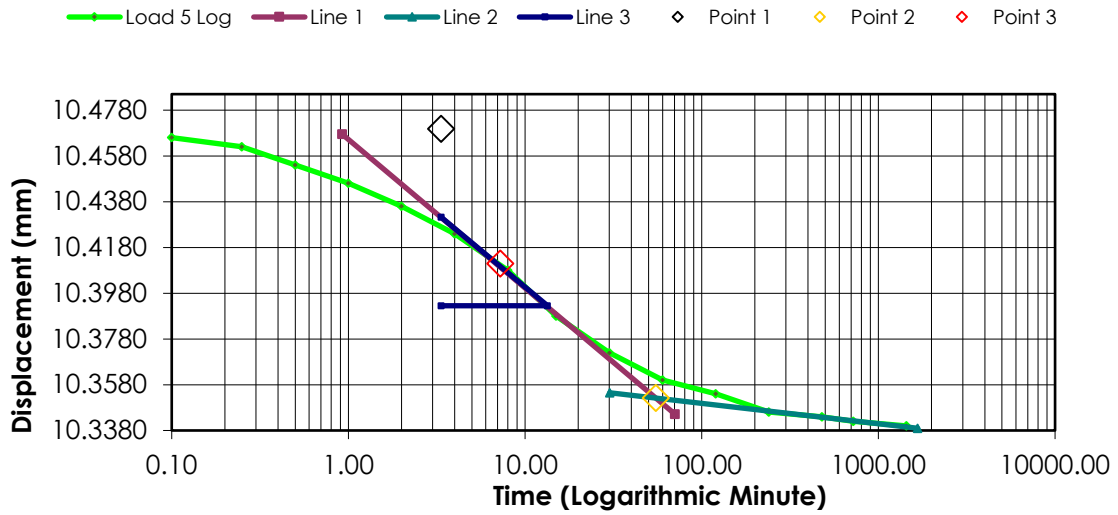
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	10.5000	-0.1740	-0.8529	0.5385
1	00:00:06	10.4660	-0.1400	-0.6863	0.5359
2	00:00:15	10.4620	-0.1360	-0.6667	0.5356
3	00:00:30	10.4540	-0.1280	-0.6275	0.5350
4	00:01:00	10.4460	-0.1200	-0.5882	0.5344
5	00:02:00	10.4360	-0.1100	-0.5392	0.5337
6	00:04:00	10.4240	-0.0980	-0.4804	0.5328
7	00:08:00	10.4080	-0.0820	-0.4020	0.5316
8	00:15:01	10.3880	-0.0620	-0.3039	0.5301
9	00:30:02	10.3720	-0.0460	-0.2255	0.5289
10	01:00:04	10.3600	-0.0340	-0.1667	0.5280
11	02:00:09	10.3540	-0.0280	-0.1373	0.5275
12	04:00:19	10.3460	-0.0200	-0.0980	0.5269
13	08:00:39	10.3440	-0.0180	-0.0882	0.5268
14	12:00:58	10.3420	-0.0160	-0.0784	0.5266
15	24:01:57	10.3400	-0.0140	-0.0686	0.5265

Consolidation Test Results (Sequence 5) Load 80.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 6) Load 160.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 29-Oct-18

Test Number:

Sample Number: GL1A ST9

Soil Description:

Boring Number:

Clay (Cl), Trace Gravel, Trace Sand

Depth: 4.05-4.5m

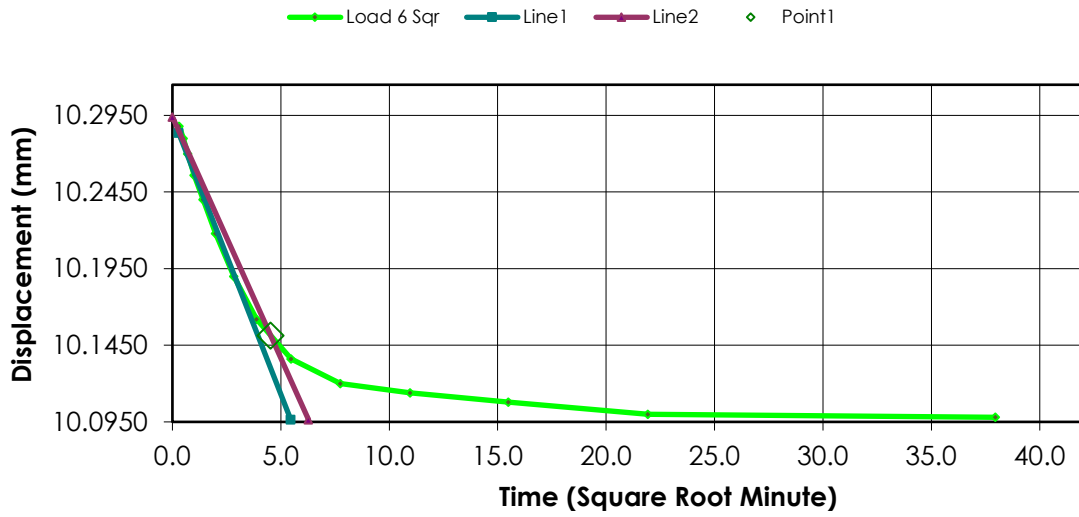
Remarks:

Sample Type: Undisturbed

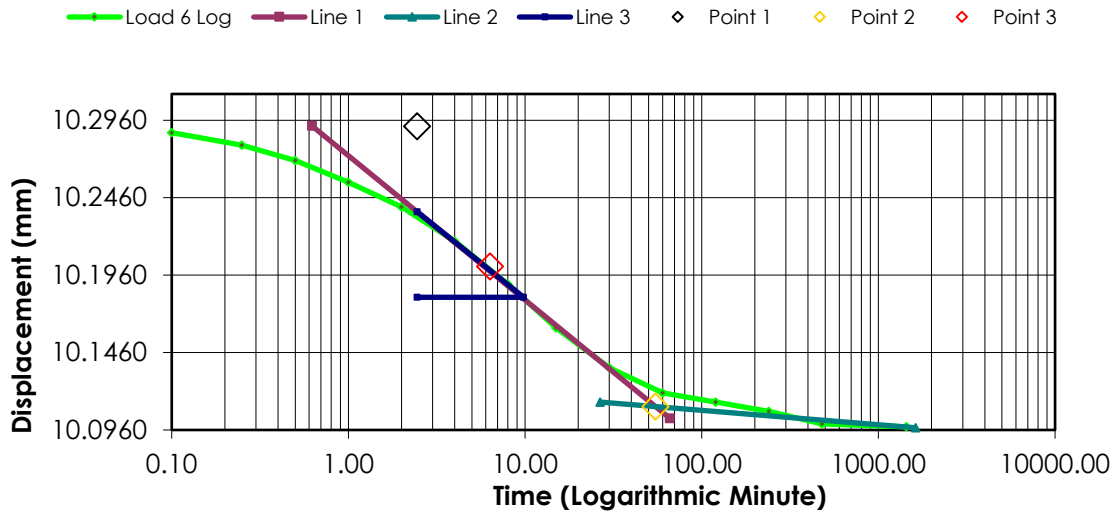
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	10.3400	-0.0140	-0.0686	0.5265
1	00:00:06	10.2880	0.0380	0.1863	0.5226
2	00:00:15	10.2800	0.0460	0.2255	0.5220
3	00:00:30	10.2700	0.0560	0.2745	0.5213
4	00:01:00	10.2560	0.0700	0.3431	0.5202
5	00:02:00	10.2400	0.0860	0.4216	0.5190
6	00:04:00	10.2180	0.1080	0.5294	0.5174
7	00:08:01	10.1900	0.1360	0.6667	0.5153
8	00:15:01	10.1620	0.1640	0.8039	0.5132
9	00:30:03	10.1360	0.1900	0.9314	0.5112
10	01:00:05	10.1200	0.2060	1.0098	0.5100
11	02:00:10	10.1140	0.2120	1.0392	0.5096
12	04:00:20	10.1080	0.2180	1.0686	0.5091
13	08:00:39	10.1000	0.2260	1.1078	0.5085
14	24:00:59	10.0980	0.2280	1.1176	0.5084

Consolidation Test Results (Sequence 6) Load 160.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 7) Load 320.000 kPa

Project: SR1 2018 Investigation
Location:
Job Number:

Project Number: 110773396

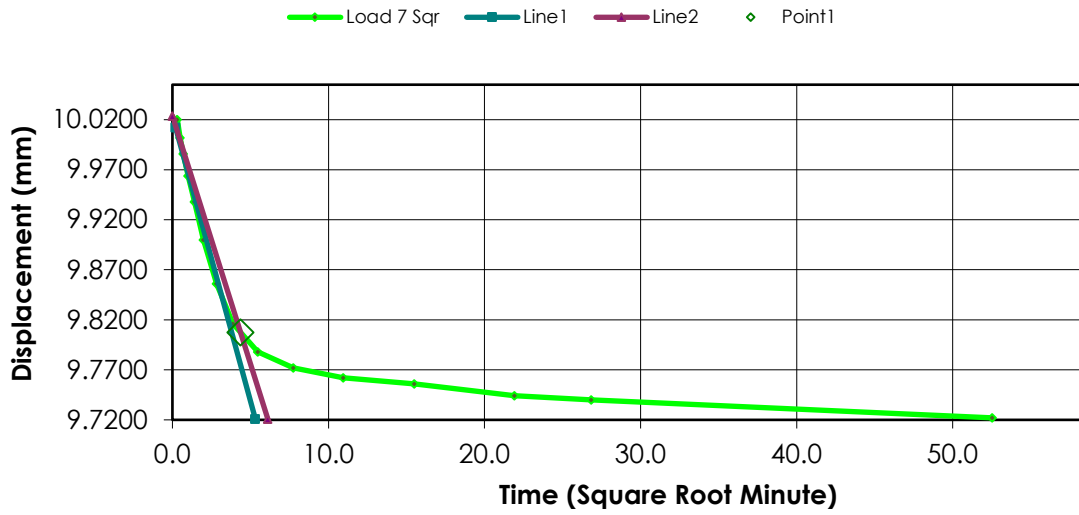
Test Date: 29-Oct-18
Test Number:

Sample Number: GL1A ST9 **Soil Description:**
Boring Number: Clay (Cl), Trace Gravel, Trace Sand
Depth: 4.05-4.5m **Remarks:**
Sample Type: Undisturbed

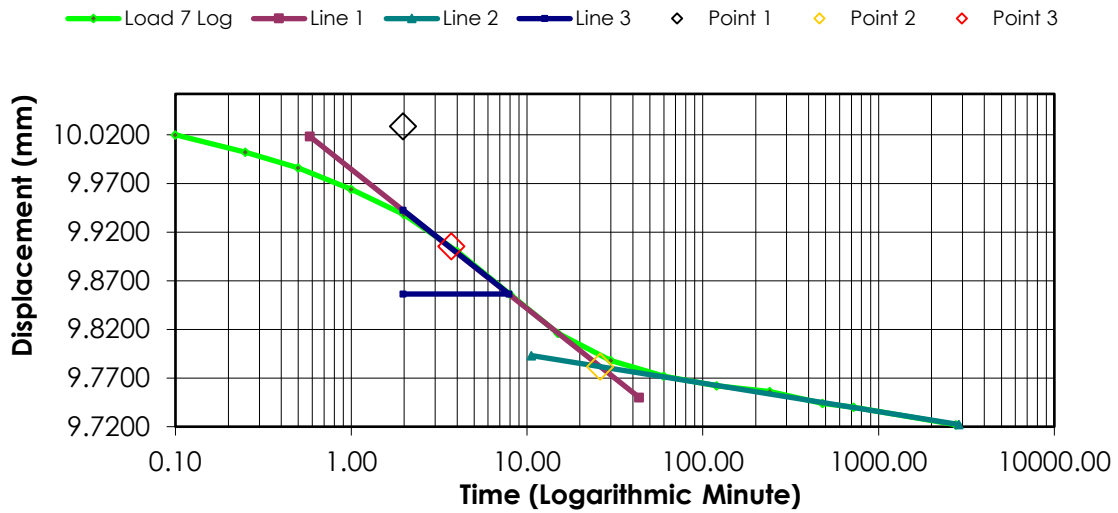
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	10.0980	0.2280	1.1176	0.5084
1	00:00:06	10.0200	0.3060	1.5000	0.5026
2	00:00:15	10.0020	0.3240	1.5882	0.5012
3	00:00:30	9.9860	0.3400	1.6667	0.5000
4	00:01:00	9.9640	0.3620	1.7745	0.4984
5	00:02:00	9.9380	0.3880	1.9020	0.4964
6	00:04:00	9.9000	0.4260	2.0882	0.4936
7	00:08:00	9.8560	0.4700	2.3039	0.4903
8	00:15:01	9.8160	0.5100	2.5000	0.4873
9	00:30:02	9.7880	0.5380	2.6373	0.4852
10	01:00:04	9.7720	0.5540	2.7157	0.4840
11	02:00:09	9.7620	0.5640	2.7647	0.4833
12	04:00:19	9.7560	0.5700	2.7941	0.4828
13	08:00:39	9.7440	0.5820	2.8529	0.4819
14	12:00:59	9.7400	0.5860	2.8725	0.4816
15	46:01:02	9.7220	0.6040	2.9608	0.4803

Consolidation Test Results (Sequence 7) Load 320.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 8) Load 640.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 29-Oct-18

Test Number:

Sample Number: GL1A ST9

Soil Description:

Boring Number:

Clay (Cl), Trace Gravel, Trace Sand

Depth: 4.05-4.5m

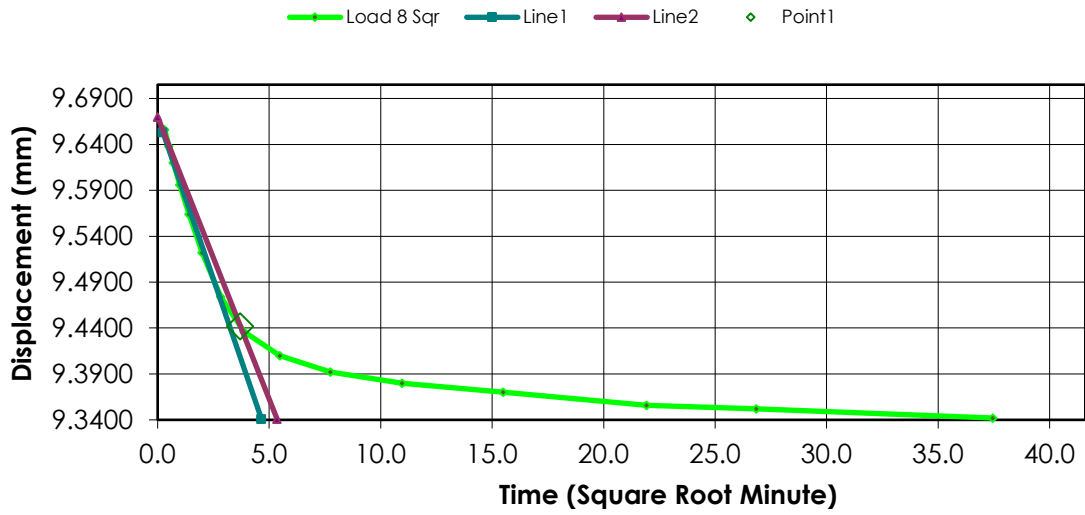
Remarks:

Sample Type: Undisturbed

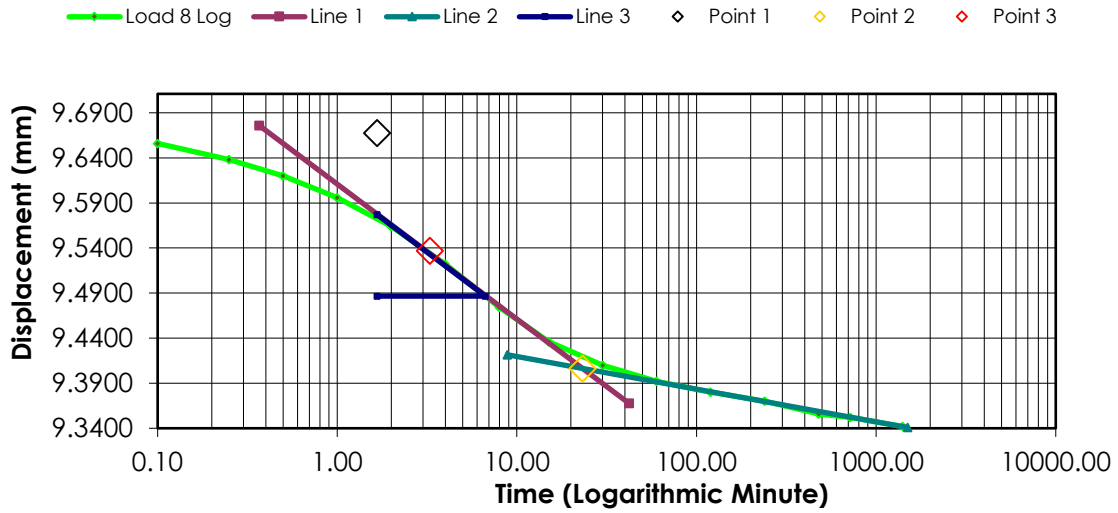
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	9.7220	0.6040	2.9608	0.4803
1	00:00:06	9.6560	0.6700	3.2843	0.4753
2	00:00:15	9.6380	0.6880	3.3725	0.4740
3	00:00:30	9.6200	0.7060	3.4608	0.4726
4	00:01:00	9.5960	0.7300	3.5784	0.4709
5	00:02:00	9.5640	0.7620	3.7353	0.4685
6	00:04:00	9.5220	0.8040	3.9412	0.4653
7	00:08:00	9.4740	0.8520	4.1765	0.4617
8	00:15:01	9.4360	0.8900	4.3627	0.4589
9	00:30:02	9.4100	0.9160	4.4902	0.4569
10	01:00:04	9.3920	0.9340	4.5784	0.4556
11	02:00:08	9.3800	0.9460	4.6373	0.4547
12	04:00:18	9.3700	0.9560	4.6863	0.4540
13	08:00:38	9.3560	0.9700	4.7549	0.4529
14	12:00:57	9.3520	0.9740	4.7745	0.4526
15	23:23:32	9.3420	0.9840	4.8235	0.4519

Consolidation Test Results (Sequence 8) Load 640.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 9) Rebound 320.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 29-Oct-18

Test Number:

Sample Number: GL1A ST9

Soil Description:

Boring Number:

Clay (Cl), Trace Gravel, Trace Sand

Depth: 4.05-4.5m

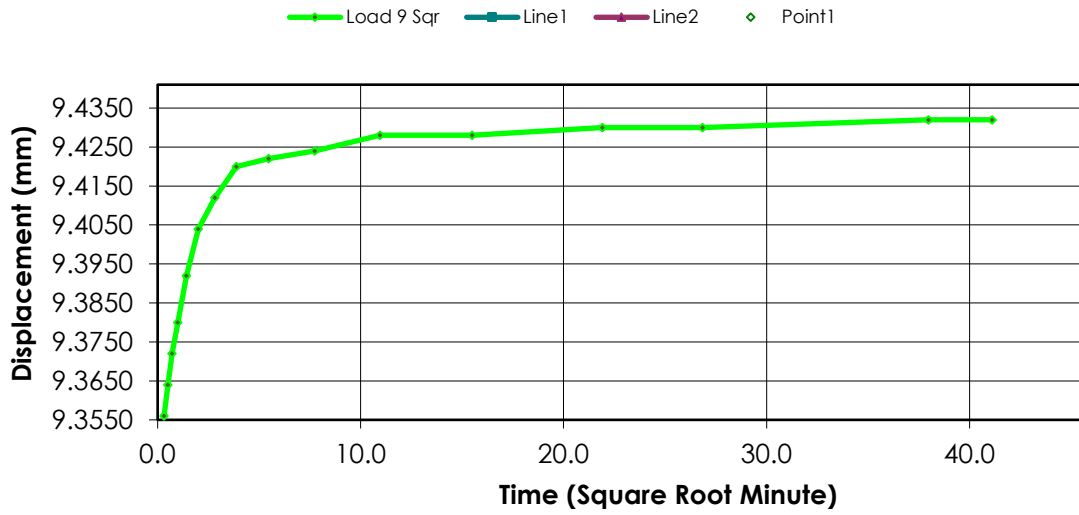
Remarks:

Sample Type: Undisturbed

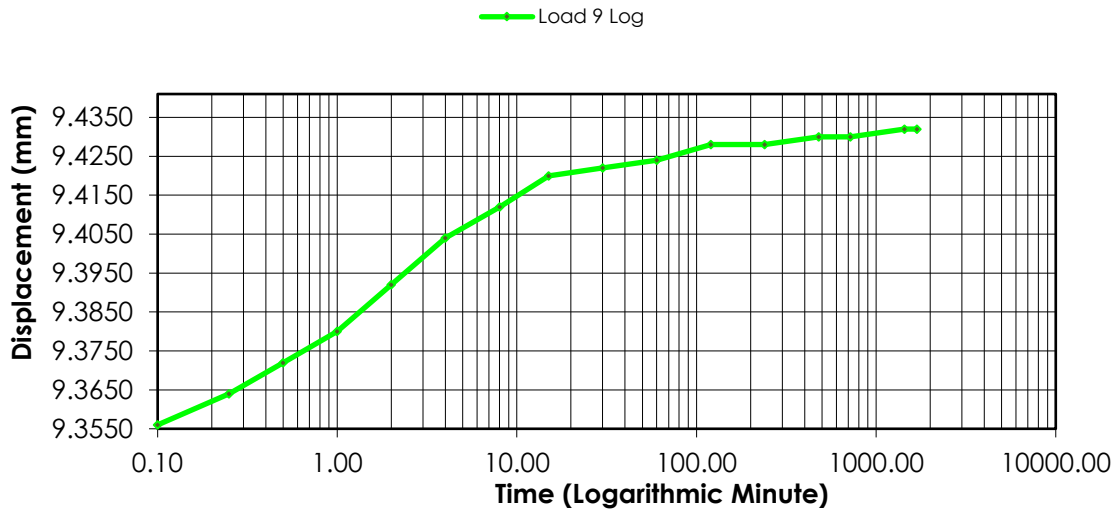
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	9.3420	0.9840	4.8235	0.4519
1	00:00:06	9.3560	0.9700	4.7549	0.4529
2	00:00:15	9.3640	0.9620	4.7157	0.4535
3	00:00:30	9.3720	0.9540	4.6765	0.4541
4	00:01:00	9.3800	0.9460	4.6373	0.4547
5	00:02:00	9.3920	0.9340	4.5784	0.4556
6	00:04:00	9.4040	0.9220	4.5196	0.4565
7	00:08:01	9.4120	0.9140	4.4804	0.4571
8	00:15:01	9.4200	0.9060	4.4412	0.4577
9	00:30:02	9.4220	0.9040	4.4314	0.4578
10	01:00:05	9.4240	0.9020	4.4216	0.4580
11	02:00:10	9.4280	0.8980	4.4020	0.4583
12	04:00:19	9.4280	0.8980	4.4020	0.4583
13	08:00:39	9.4300	0.8960	4.3922	0.4584
14	12:00:58	9.4300	0.8960	4.3922	0.4584
15	24:01:57	9.4320	0.8940	4.3824	0.4586
16	28:10:26	9.4320	0.8940	4.3824	0.4586

Consolidation Test Results (Sequence 9) Rebound 320.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 10) Rebound 160.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 29-Oct-18

Test Number:

Sample Number: GL1A ST9

Soil Description:

Boring Number:

Clay (Cl), Trace Gravel, Trace Sand

Depth: 4.05-4.5m

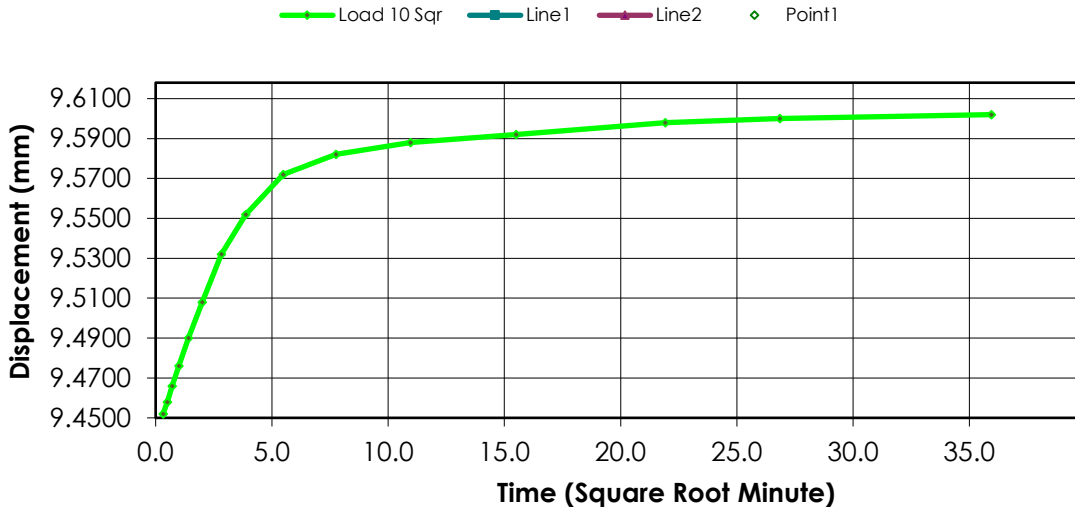
Remarks:

Sample Type: Undisturbed

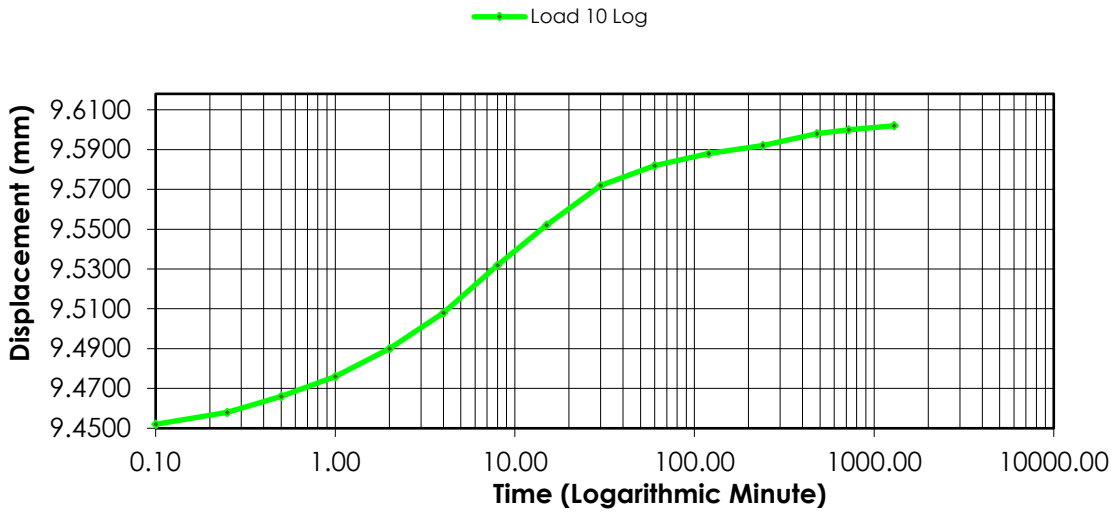
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	9.4320	0.8940	4.3824	0.4586
1	00:00:06	9.4520	0.8740	4.2843	0.4601
2	00:00:15	9.4580	0.8680	4.2549	0.4605
3	00:00:30	9.4660	0.8600	4.2157	0.4611
4	00:01:00	9.4760	0.8500	4.1667	0.4619
5	00:02:00	9.4900	0.8360	4.0980	0.4629
6	00:04:00	9.5080	0.8180	4.0098	0.4643
7	00:08:00	9.5320	0.7940	3.8922	0.4661
8	00:15:01	9.5520	0.7740	3.7941	0.4676
9	00:30:02	9.5720	0.7540	3.6961	0.4691
10	01:00:04	9.5820	0.7440	3.6471	0.4698
11	02:00:09	9.5880	0.7380	3.6176	0.4703
12	04:00:19	9.5920	0.7340	3.5980	0.4706
13	08:00:39	9.5980	0.7280	3.5686	0.4710
14	12:00:59	9.6000	0.7260	3.5588	0.4712
15	21:32:24	9.6020	0.7240	3.5490	0.4713

Consolidation Test Results
(Sequence 10) Rebound 160.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 11) Load 320.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 29-Oct-18

Test Number:

Sample Number: GL1A ST9

Soil Description:

Boring Number:

Clay (Cl), Trace Gravel, Trace Sand

Depth: 4.05-4.5m

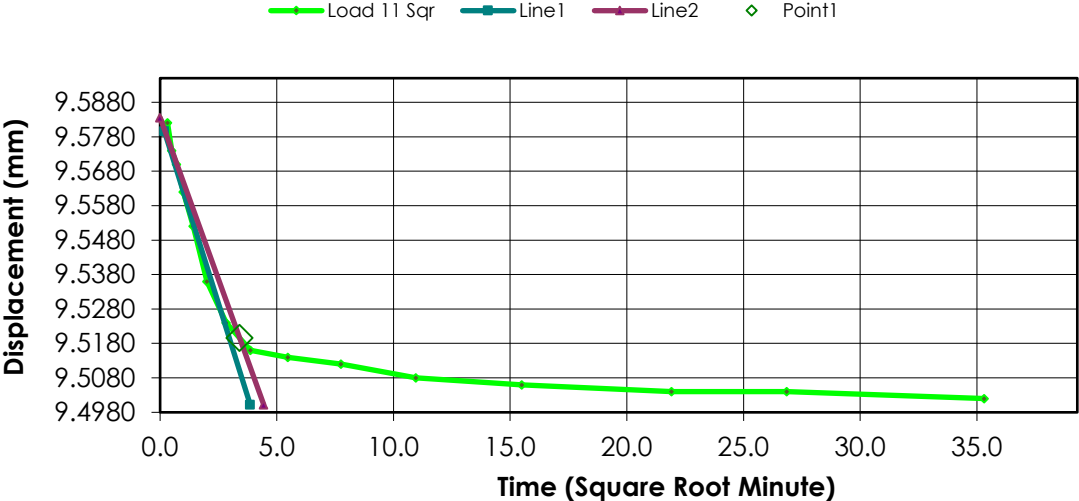
Remarks:

Sample Type: Undisturbed

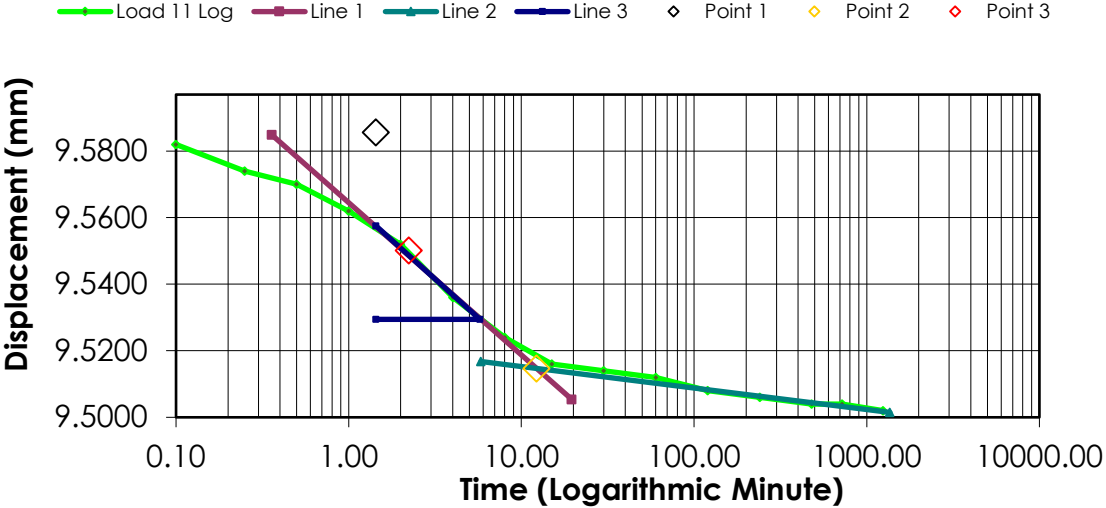
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	9.6020	0.7240	3.5490	0.4713
1	00:00:06	9.5820	0.7440	3.6471	0.4698
2	00:00:15	9.5740	0.7520	3.6863	0.4692
3	00:00:30	9.5700	0.7560	3.7059	0.4689
4	00:01:00	9.5620	0.7640	3.7451	0.4683
5	00:02:00	9.5520	0.7740	3.7941	0.4676
6	00:04:01	9.5360	0.7900	3.8725	0.4664
7	00:08:01	9.5240	0.8020	3.9314	0.4655
8	00:15:02	9.5160	0.8100	3.9706	0.4649
9	00:30:03	9.5140	0.8120	3.9804	0.4647
10	01:00:05	9.5120	0.8140	3.9902	0.4646
11	02:00:10	9.5080	0.8180	4.0098	0.4643
12	04:00:20	9.5060	0.8200	4.0196	0.4641
13	08:00:40	9.5040	0.8220	4.0294	0.4640
14	12:01:00	9.5040	0.8220	4.0294	0.4640
15	20:47:03	9.5020	0.8240	4.0392	0.4638

Consolidation Test Results (Sequence 11) Load 320.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 12) Load 640.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 29-Oct-18

Test Number:

Sample Number: GL1A ST9

Soil Description:

Boring Number:

Clay (Cl), Trace Gravel, Trace Sand

Depth: 4.05-4.5m

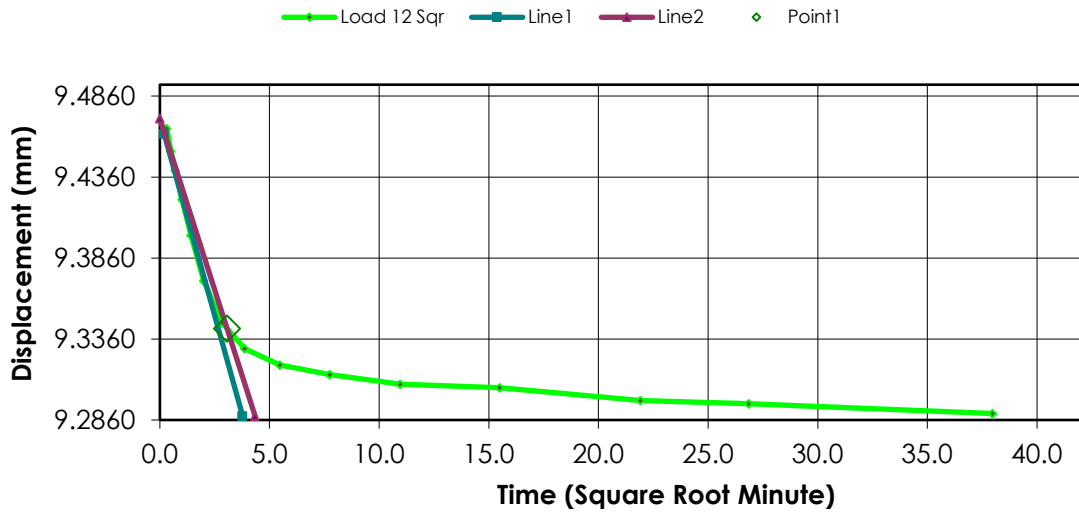
Remarks:

Sample Type: Undisturbed

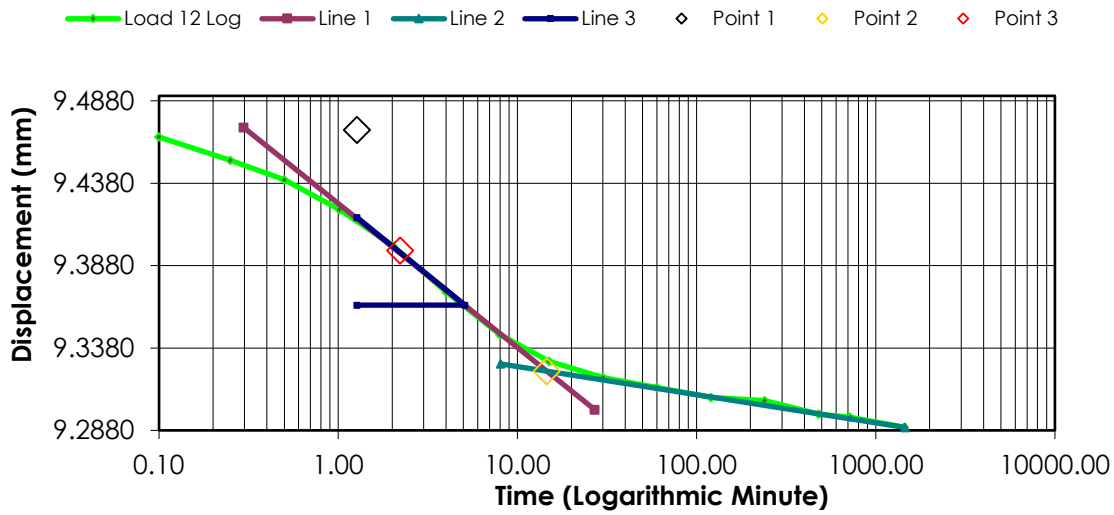
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	9.5020	0.8240	4.0392	0.4638
1	00:00:06	9.4660	0.8600	4.2157	0.4611
2	00:00:15	9.4520	0.8740	4.2843	0.4601
3	00:00:30	9.4400	0.8860	4.3431	0.4592
4	00:01:01	9.4220	0.9040	4.4314	0.4578
5	00:02:01	9.4000	0.9260	4.5392	0.4562
6	00:04:01	9.3720	0.9540	4.6765	0.4541
7	00:08:01	9.3460	0.9800	4.8039	0.4522
8	00:15:01	9.3300	0.9960	4.8824	0.4510
9	00:30:03	9.3200	1.0060	4.9314	0.4502
10	01:00:05	9.3140	1.0120	4.9608	0.4498
11	02:00:10	9.3080	1.0180	4.9902	0.4493
12	04:00:20	9.3060	1.0200	5.0000	0.4492
13	08:00:40	9.2980	1.0280	5.0392	0.4486
14	12:01:00	9.2960	1.0300	5.0490	0.4484
15	24:01:59	9.2900	1.0360	5.0784	0.4480

Consolidation Test Results (Sequence 12) Load 640.000 kPa

Consolidation Graph (Square Root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 13) Load 1280.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 29-Oct-18

Test Number:

Sample Number: GL1A ST9

Soil Description:

Boring Number:

Clay (Cl), Trace Gravel, Trace Sand

Depth: 4.05-4.5m

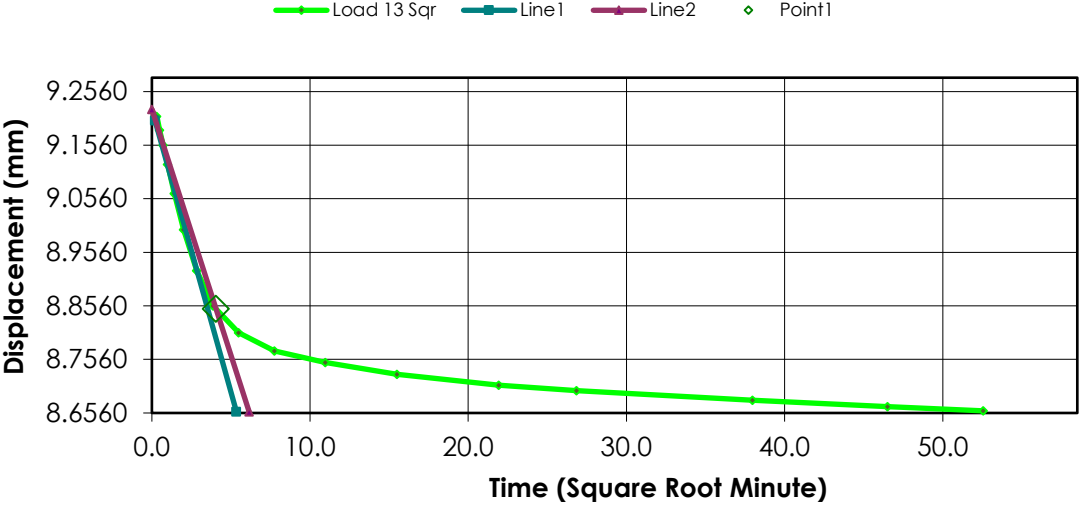
Remarks:

Sample Type: Undisturbed

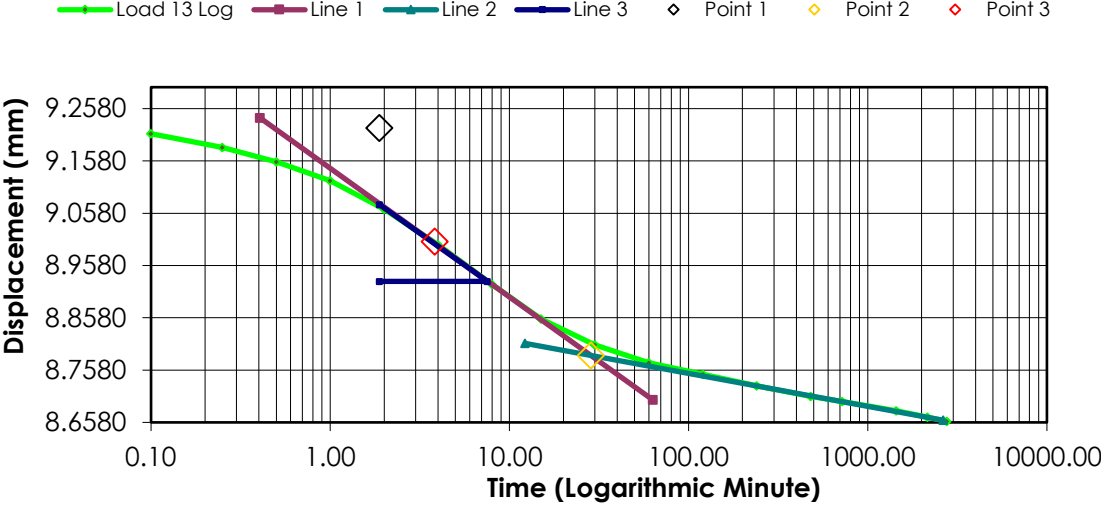
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	9.2900	1.0360	5.0784	0.4480
1	00:00:06	9.2100	1.1160	5.4706	0.4420
2	00:00:15	9.1840	1.1420	5.5980	0.4400
3	00:00:30	9.1560	1.1700	5.7353	0.4380
4	00:01:00	9.1200	1.2060	5.9118	0.4353
5	00:02:00	9.0660	1.2600	6.1765	0.4312
6	00:04:00	8.9980	1.3280	6.5098	0.4261
7	00:08:00	8.9220	1.4040	6.8824	0.4205
8	00:15:01	8.8560	1.4700	7.2059	0.4155
9	00:30:02	8.8060	1.5200	7.4510	0.4118
10	01:00:05	8.7720	1.5540	7.6176	0.4092
11	02:00:10	8.7500	1.5760	7.7255	0.4076
12	04:00:20	8.7280	1.5980	7.8333	0.4059
13	08:00:39	8.7080	1.6180	7.9314	0.4045
14	12:00:59	8.6980	1.6280	7.9804	0.4037
15	24:01:58	8.6800	1.6460	8.0686	0.4024
16	36:02:57	8.6680	1.6580	8.1275	0.4015
17	46:02:05	8.6600	1.6660	8.1667	0.4009

Consolidation Test Results (Sequence 13) Load 1280.000 kPa

Consolidation Graph (Squareroot Time)



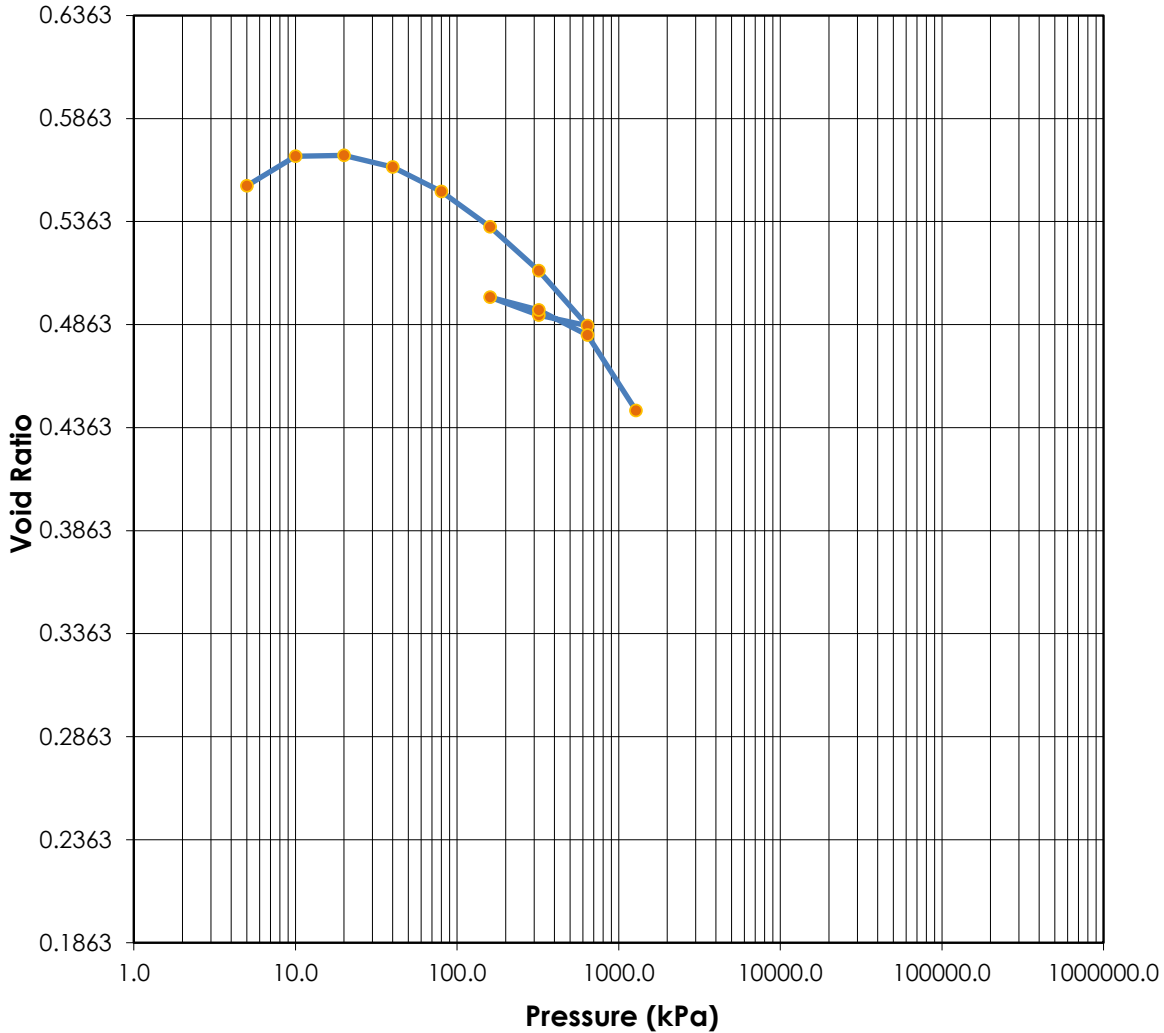
Consolidation Graph (Logarithmic Time)





Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876



	Before	After	Liquid Limits:	43	Test Date:	29-Oct-18
Moisture (%):	21.8	20.4	Plastic Limits:	17		
Dry Density (g/cm³):	1.703	1.824	Plasticity Index (%):	26		
Saturation (%):	100	100				
Void Ratio:	0.5524	0.4436	Specific Gravity:	2.65	Assumed	
Soil Description:	Clay (Cl), Trace Sand, Trace Gravel					
Project Number:	110773396	Depth:	5.4-5.85m			
Sample Number:	GL1A ST12	Boring Number:				
Project:	SR1 2018 Investigation					Remarks:
Client:	Alberta Transportation					
Location:						

Tested By: E. Wahl

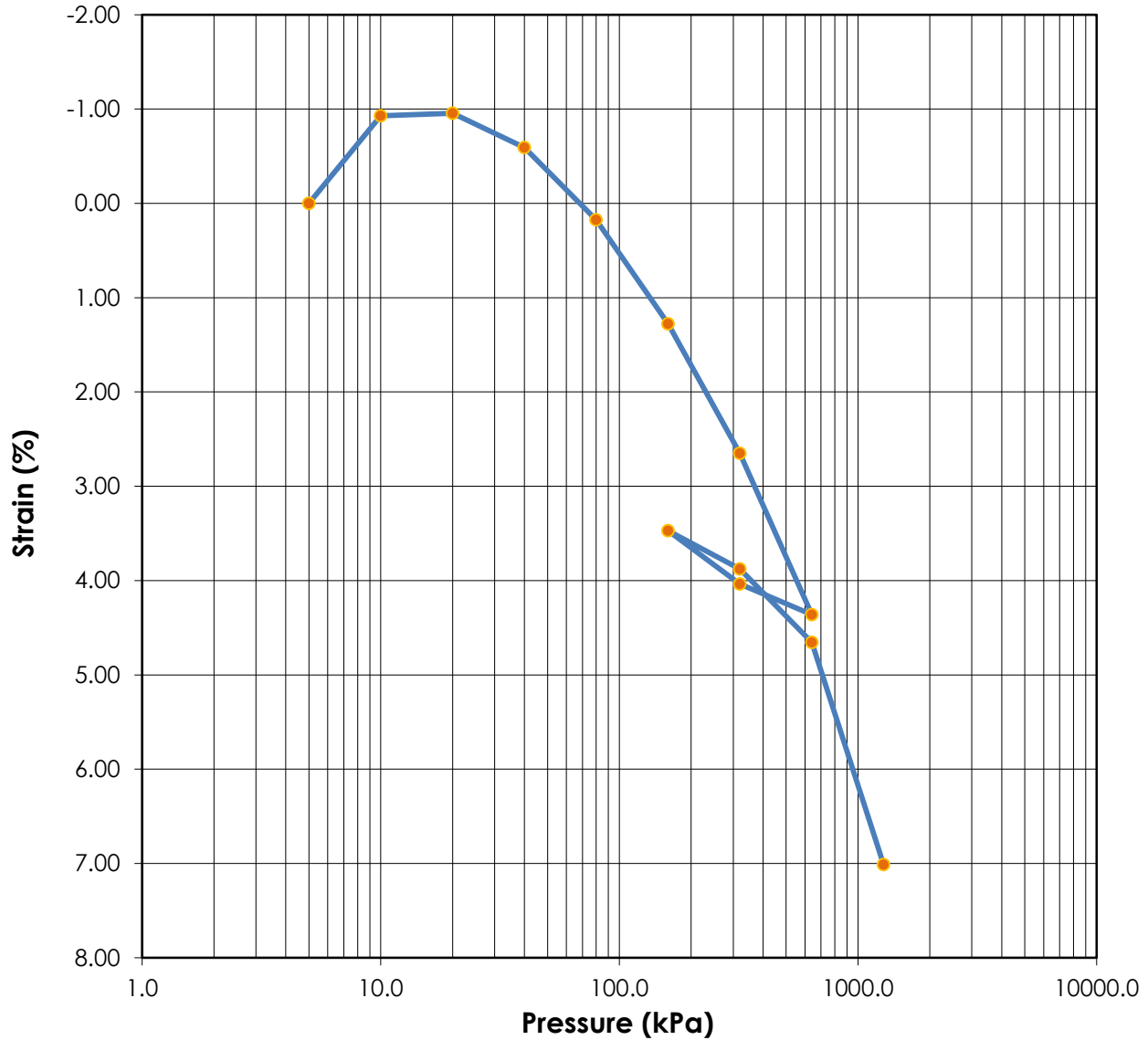
Reviewed By: C. Lamoureux

Reporting of these test results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request. The data presented above is for the sole use of the client stipulated above. Stantec is not responsible, nor can be held liable, for the use of this report by any other party, with or without the knowledge of Stantec.



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876

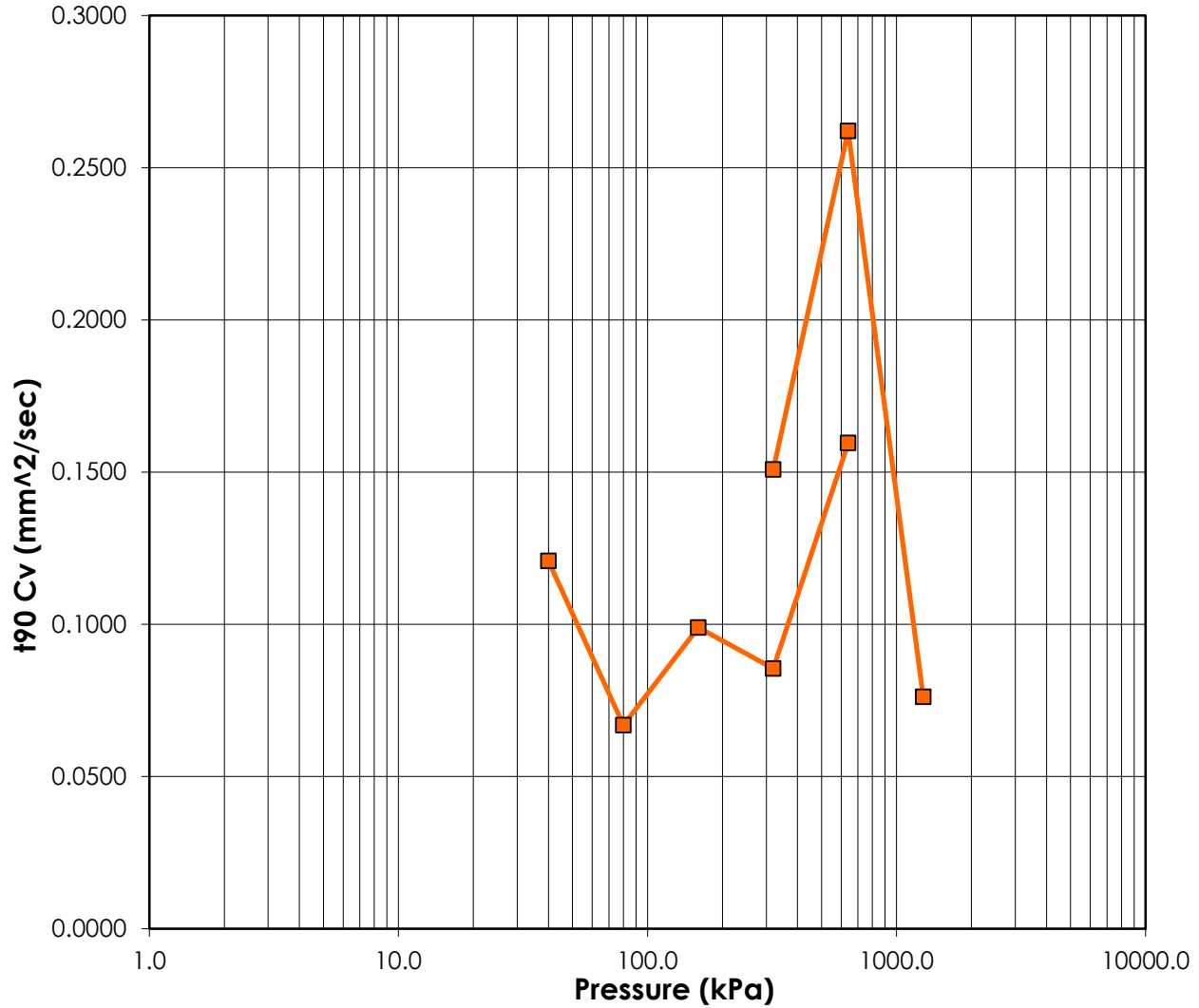


	Before	After	Liquid Limits:	43	Test Date:	29-Oct-18
Moisture (%):	21.8	20.4	Plastic Limits:	17		
Dry Density (g/cm3):	1.703	1.824	Plasticity Index (%):	26		
Saturation (%):	100	100				
Void Ratio:	0.5524	0.4436	Specific Gravity:	2.65	Assumed	
Sample Description:	Clay (Cl), Trace Sand, Trace Gravel					
Project Number:	110773396	Depth:	5.4-5.85m			
Sample Number:	GL1A ST12	Boring Number:				
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						
			Remarks:			



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876



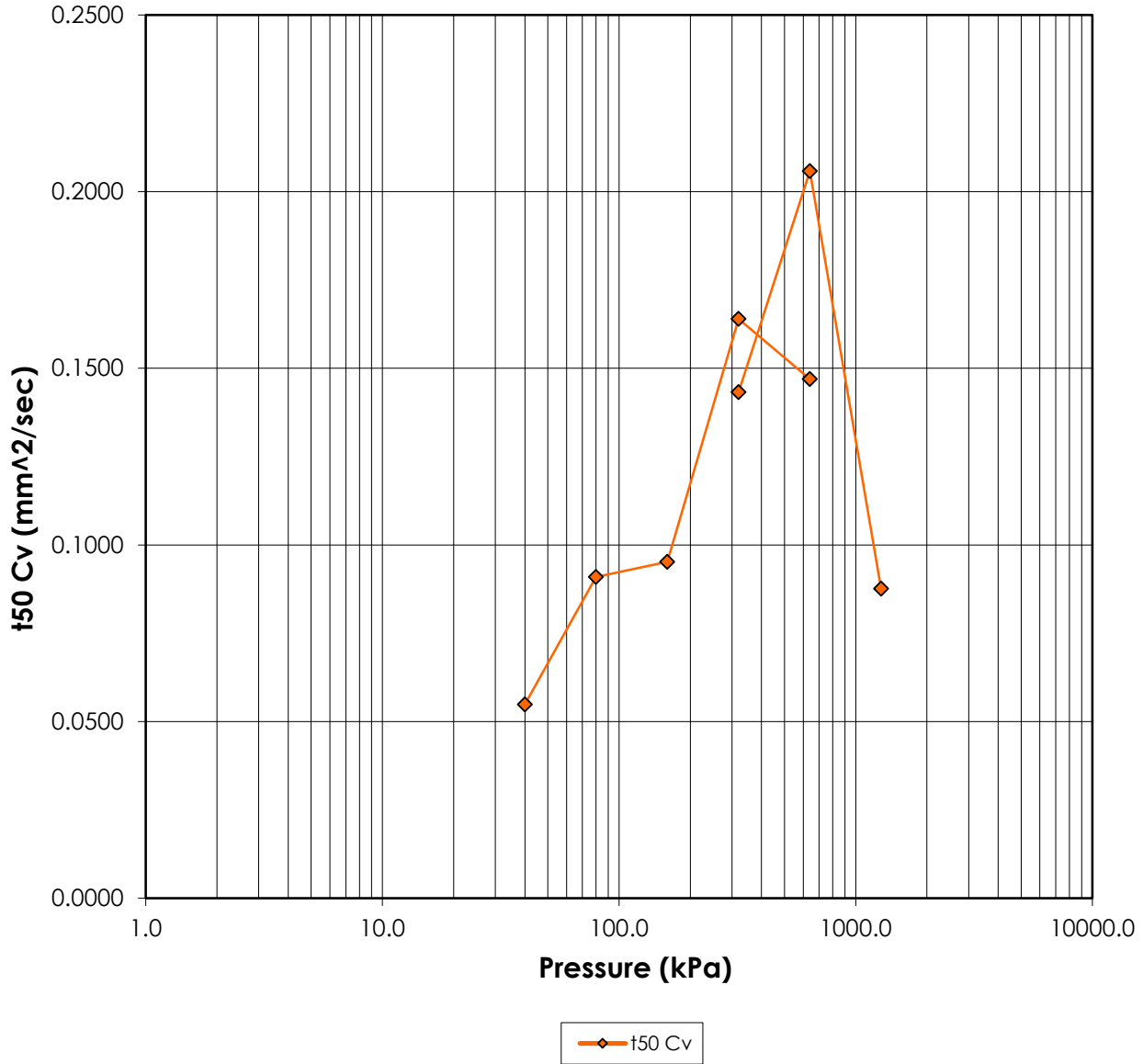
—■— t90 Cv

	Before	After	Liquid Limits:	43	Test Date:	29-Oct-18
Moisture (%):	21.8	20.4	Plastic Limits:	17		
Dry Density (g/cm³):	1.703	1.824	Plasticity Index (%):	26		
Saturation (%):	100	100	Specific Gravity:	2.65	Assumed	
Void Ratio:	0.5524	0.4436				
Soil Description:	Clay (Cl), Trace Sand, Trace Gravel					
Project Number:	110773396		Depth:	5.4-5.85m		
Sample Number:	GL1A ST12		Boring Number:			
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						
						Remarks:



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876

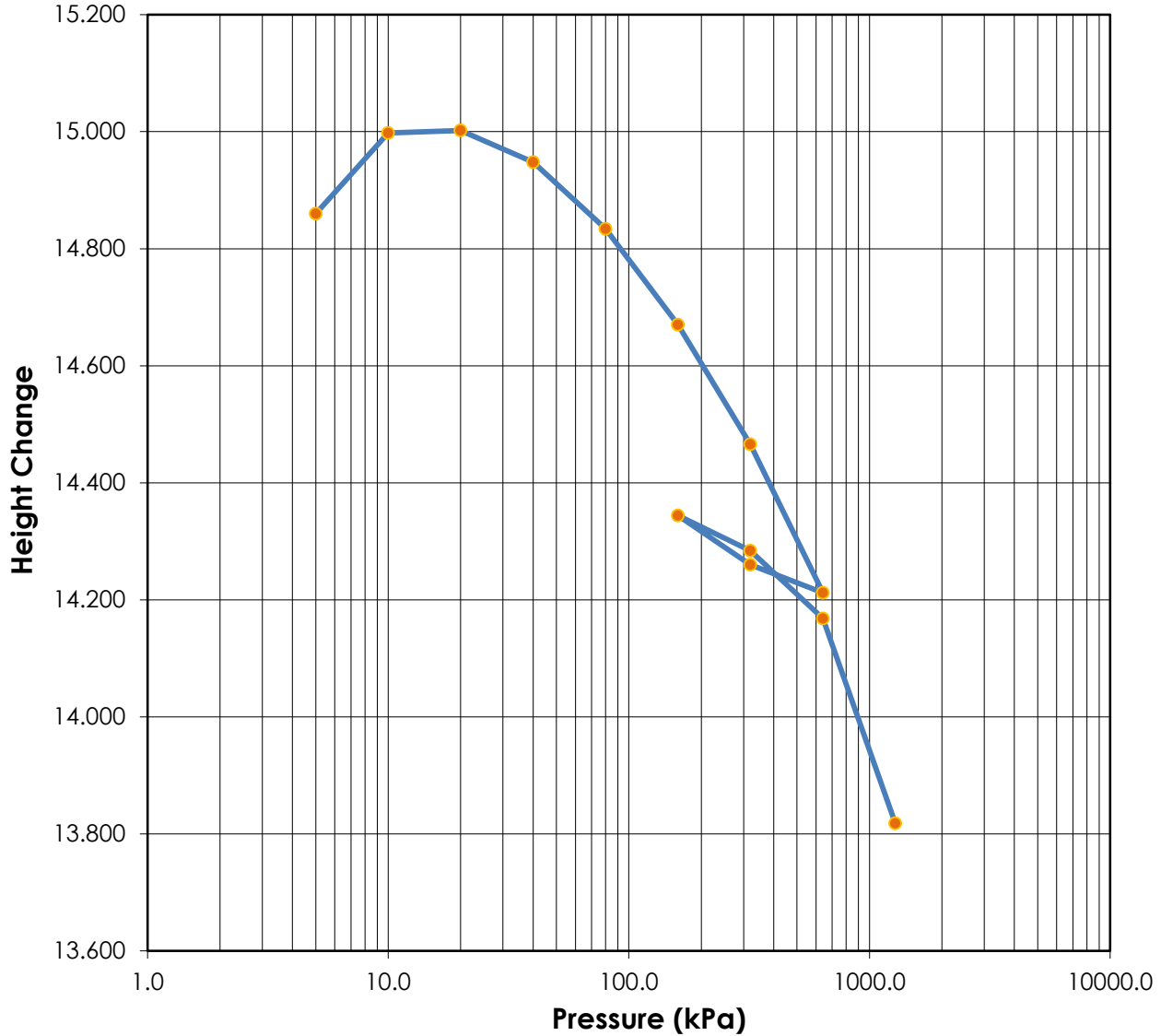


	Before	After	Liquid Limits:	43	Test Date:	29-Oct-18
Moisture (%):	21.8	20.4	Plastic Limits:	17		
Dry Density (g/cm³):	1.703	1.824	Plasticity Index (%):	26		
Saturation (%):	100	100				
Void Ratio:	0.5524	0.4436	Specific Gravity:	2.65	Assumed	
Soil Description:	Clay (Cl), Trace Sand, Trace Gravel					
Project Number:	110773396		Depth:	5.4-5.85m	Remarks:	
Sample Number:	GL1A ST12		Boring Number:			
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						



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ASTM D2435
Test Results

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	Before	After	Liquid Limits:	43	Test Date:	29-Oct-18
Moisture (%):	21.8	20.4	Plastic Limits:	17		
Dry Density (g/cm3):	1.703	1.824	Plasticity Index (%):	26		
Saturation (%):	100	100	Specific Gravity:	2.65	Assumed	
Void Ratio:	0.5524	0.4436				
Soil Description:	Clay (Cl), Trace Sand, Trace Gravel					
Project Number:	110773396	Depth:	5.4-5.85m			
Sample Number:	GL1A ST12	Boring Number:				
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						
			Remarks:			

Consolidation Test Results Summary

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Sample Number: GL1A ST12

Sample Description:

Boring Number:

Clay (Cl), Trace Sand, Trace Gravel

Depth: 5.4-5.85m

Remarks:

Test Number:

Sample Type: Undisturbed

Test Date: 29-Oct-18

Index	Load Sequence (kPa)	Cumulative Change in Height (mm)	Specimen Height (mm)	Height of Void (mm)	Vertical Strain (%)	Void Ratio	t90 Fitting Time (min)	t50 Fitting Time (min)	t90 Cv (mm ² /sec)	t50 Cv (mm ² /sec)
0	0.000	0.0000	14.8600	5.2951	0.00	0.5536	0.000	0.000	0.000	0.000
1	5.000	0.0000	14.8600	5.2951	0.00	0.5536	0.000	0.000	0.000	0.000
2	10.000	-0.1380	14.9980	5.4331	-0.93	0.5680	0.000	0.000	0.000	0.000
3	20.000	-0.1420	15.0020	5.4371	-0.96	0.5684	0.000	0.000	0.000	0.000
4	40.000	-0.0880	14.9480	5.3831	-0.59	0.5628	6.532	3.343	0.121	0.055
5	80.000	0.0260	14.8340	5.2691	0.17	0.5509	11.627	1.986	0.067	0.091
6	160.000	0.1900	14.6700	5.1051	1.28	0.5337	7.682	1.855	0.099	0.095
7	320.000	0.3940	14.4660	4.9011	2.65	0.5124	8.651	1.048	0.085	0.164
8	640.000	0.6480	14.2120	4.6471	4.36	0.4858	4.473	1.128	0.160	0.147
9	320.000	0.6000	14.2600	4.6951	4.04	0.4909	0.000	0.000	0.000	0.000
10	160.000	0.5160	14.3440	4.7791	3.47	0.4996	0.000	0.000	0.000	0.000
11	320.000	0.5760	14.2840	4.7191	3.88	0.4934	4.779	1.169	0.151	0.143
12	640.000	0.6920	14.1680	4.6031	4.66	0.4812	2.706	0.801	0.262	0.206
13	1280.000	1.0420	13.8180	4.2531	7.01	0.4447	8.858	1.790	0.076	0.088

Predicted value indicated with *

Consolidation Test

Consolidation Specimen Information

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 29-Oct-18

Sample Number: GL1A ST12

Sample Description:

Boring Number:

Clay (Cl), Trace Sand, Trace Gravel

Depth: 5.4-5.85m

Remarks:

Sample Type: Undisturbed

Test Number:

Liquid Limit: 43

Initial Void Ratio: 0.5524

Initial Height (mm): 14.86

Plastic Limit: 17

Plasticity Index (%): 26

Initial Diameter (mm): 50.00

Specific Gravity: 2.65

Weight of Ring (g): 60.81

Assumed

Parameters	Initial Specimen	Final Specimen
Moist Weight + Container (g)	93.85	63.22
Dry Soil + Container (g)	77.75	53.18
Weight of Container (g)	3.97	3.98
Moisture Content (%)	21.8	20.4
Void Ratio	0.5524	0.4436
Saturation (%)	100	100
Dry Density (g/cm ³)	1.703	1.824

Consolidation Test Results
(Sequence 1) Load 5.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 29-Oct-18

Test Number:

Sample Number: GL1A ST12

Soil Description:

Boring Number:

Clay (Cl), Trace Sand, Trace Gravel

Depth: 5.4-5.85m

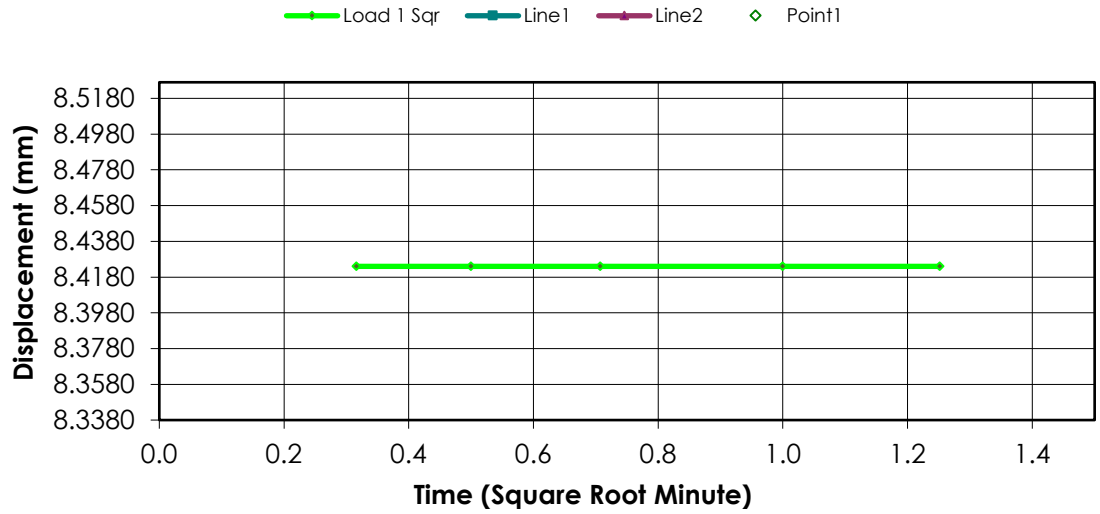
Remarks:

Sample Type: Undisturbed

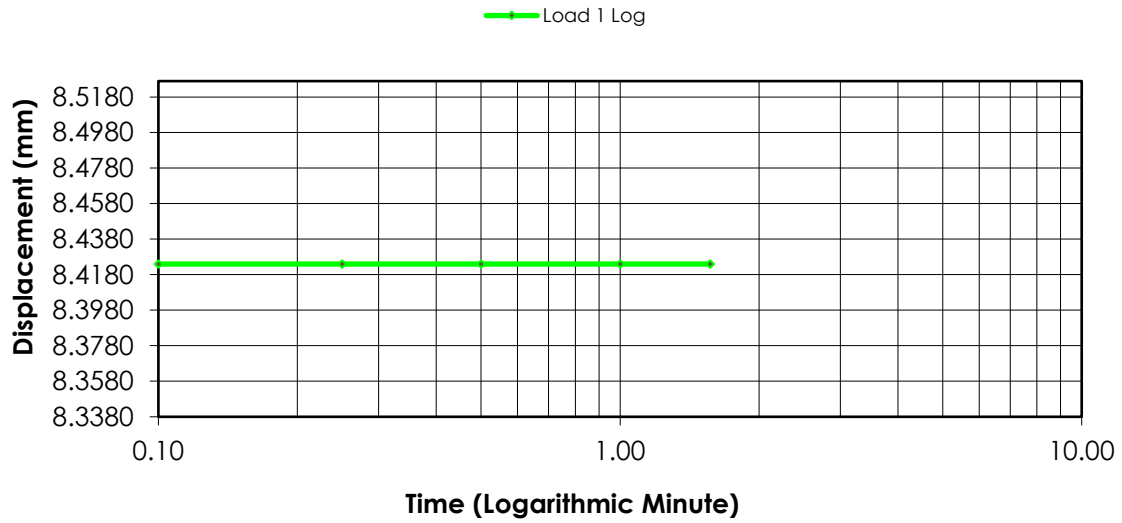
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.4240	0.0000	0.0000	0.5524
1	00:00:06	8.4240	0.0000	0.0000	0.5524
2	00:00:15	8.4240	0.0000	0.0000	0.5524
3	00:00:30	8.4240	0.0000	0.0000	0.5524
4	00:01:00	8.4240	0.0000	0.0000	0.5524
5	00:01:34	8.4240	0.0000	0.0000	0.5524

Consolidation Test Results (Sequence 1) Load 5.000 kPa

Consolidation Graph (Square root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 2) Load 10.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 29-Oct-18

Test Number:

Sample Number: GL1A ST12

Soil Description:

Boring Number:

Clay (Cl), Trace Sand, Trace Gravel

Depth: 5.4-5.85m

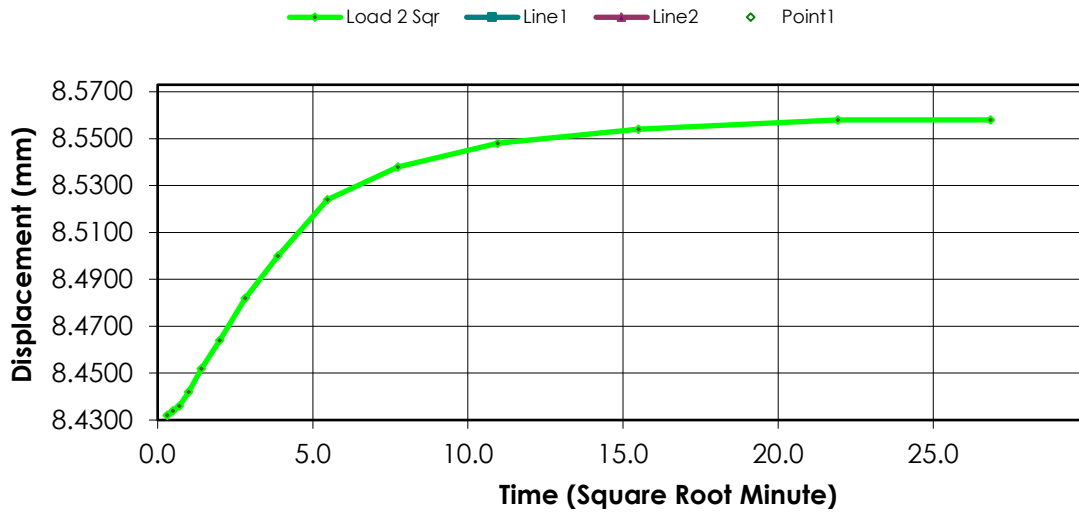
Remarks:

Sample Type: Undisturbed

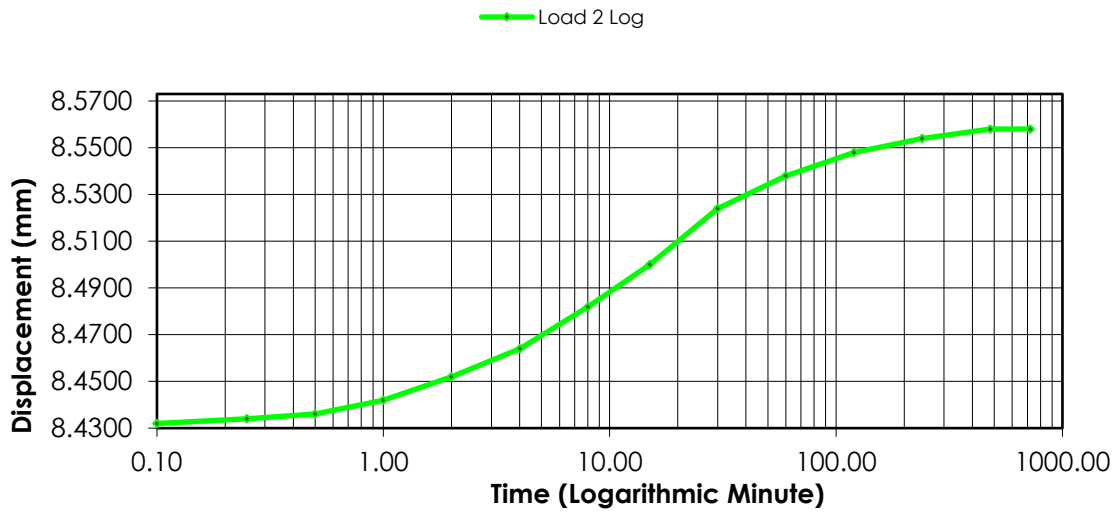
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.4240	0.0000	0.0000	0.5524
1	00:00:06	8.4320	-0.0120	-0.0808	0.5537
2	00:00:15	8.4340	-0.0140	-0.0942	0.5539
3	00:00:30	8.4360	-0.0160	-0.1077	0.5541
4	00:01:00	8.4420	-0.0220	-0.1480	0.5547
5	00:02:00	8.4520	-0.0320	-0.2153	0.5558
6	00:04:01	8.4640	-0.0440	-0.2961	0.5570
7	00:08:01	8.4820	-0.0620	-0.4172	0.5589
8	00:15:02	8.5000	-0.0800	-0.5384	0.5608
9	00:30:03	8.5240	-0.1040	-0.6999	0.5633
10	01:00:05	8.5380	-0.1180	-0.7941	0.5648
11	02:00:11	8.5480	-0.1280	-0.8614	0.5658
12	04:00:22	8.5540	-0.1340	-0.9018	0.5664
13	08:00:43	8.5580	-0.1380	-0.9287	0.5669
14	12:01:04	8.5580	-0.1380	-0.9287	0.5669

**Consolidation Test Results
(Sequence 2) Load 10.000 kPa**

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 3) Load 20.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 29-Oct-18

Test Number:

Sample Number: GL1A ST12

Soil Description:

Boring Number:

Clay (Cl), Trace Sand, Trace Gravel

Depth: 5.4-5.85m

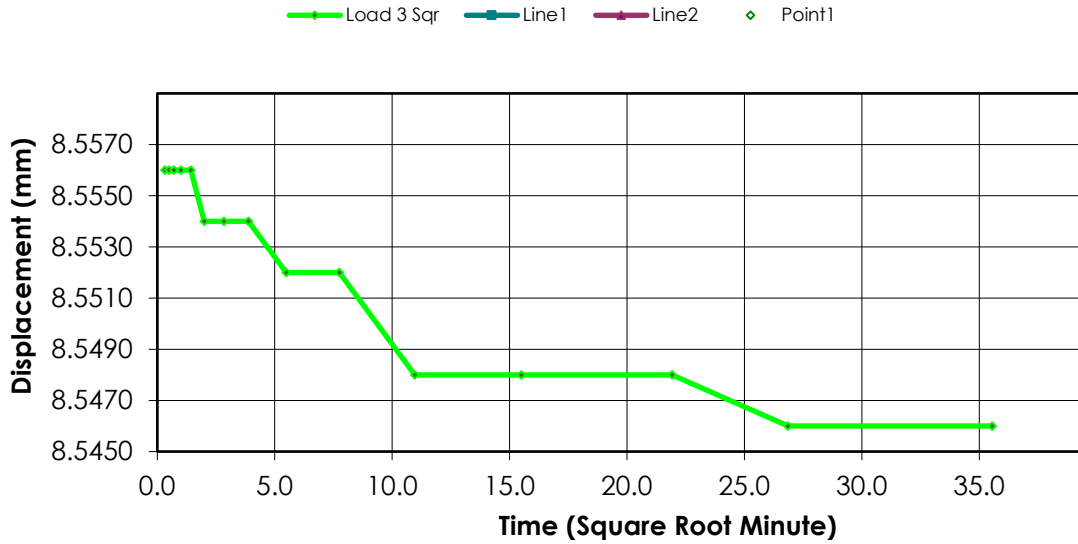
Remarks:

Sample Type: Undisturbed

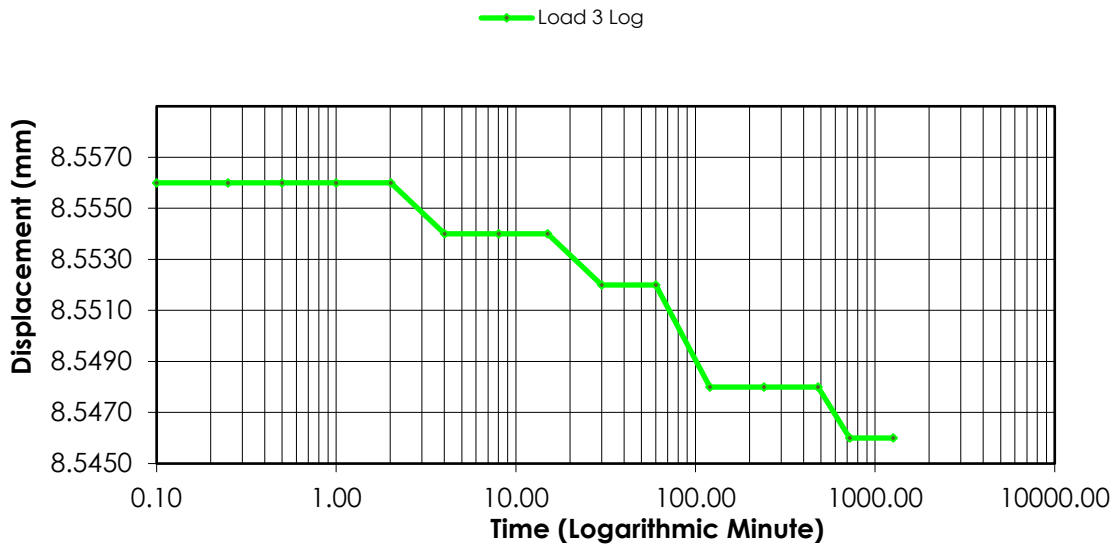
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.5580	-0.1380	-0.9287	0.5669
1	00:00:06	8.5560	-0.1520	-1.0229	0.5683
2	00:00:15	8.5560	-0.1520	-1.0229	0.5683
3	00:00:30	8.5560	-0.1520	-1.0229	0.5683
4	00:01:00	8.5560	-0.1520	-1.0229	0.5683
5	00:02:01	8.5560	-0.1520	-1.0229	0.5683
6	00:04:01	8.5540	-0.1500	-1.0094	0.5681
7	00:08:01	8.5540	-0.1500	-1.0094	0.5681
8	00:15:02	8.5540	-0.1500	-1.0094	0.5681
9	00:30:03	8.5520	-0.1480	-0.9960	0.5679
10	01:00:06	8.5520	-0.1480	-0.9960	0.5679
11	02:00:11	8.5480	-0.1440	-0.9690	0.5675
12	04:00:21	8.5480	-0.1440	-0.9690	0.5675
13	08:00:42	8.5480	-0.1440	-0.9690	0.5675
14	12:01:03	8.5460	-0.1420	-0.9556	0.5673
15	21:03:54	8.5460	-0.1420	-0.9556	0.5673

Consolidation Test Results (Sequence 3) Load 20.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 4) Load 40.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 29-Oct-18

Test Number:

Sample Number: GL1A ST12

Soil Description:

Boring Number:

Clay (Cl), Trace Sand, Trace Gravel

Depth: 5.4-5.85m

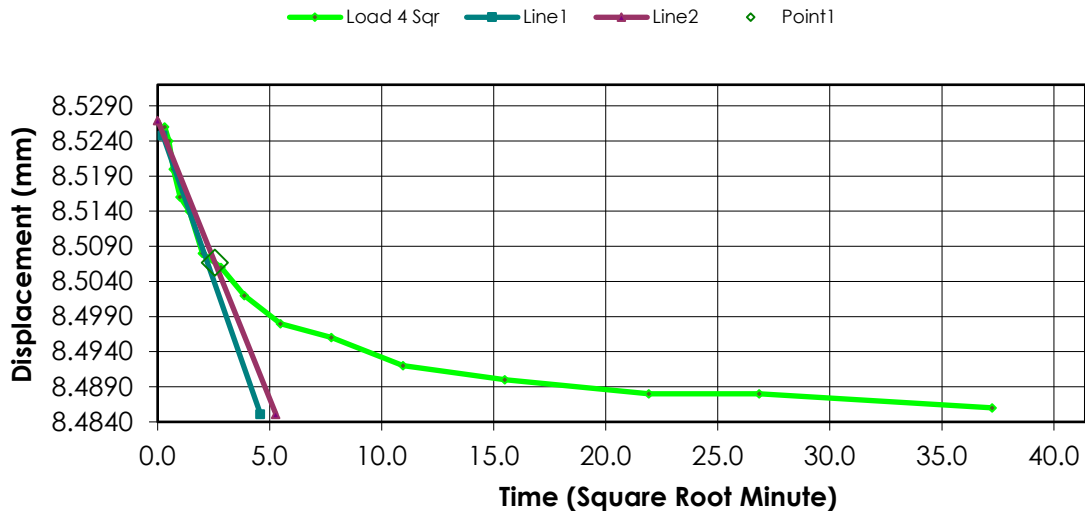
Remarks:

Sample Type: Undisturbed

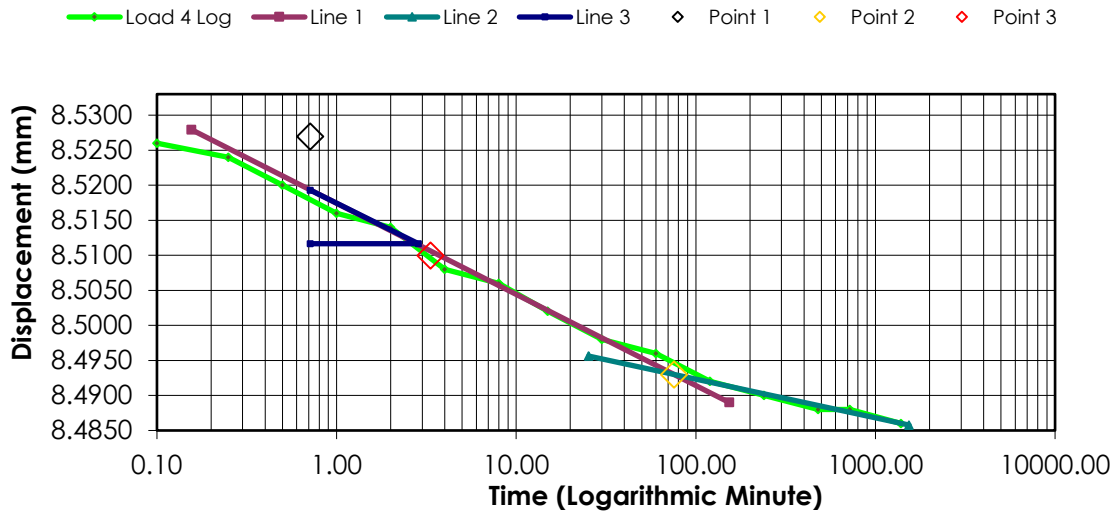
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.5460	-0.1420	-0.9556	0.5673
1	00:00:06	8.5260	-0.1280	-0.8614	0.5658
2	00:00:15	8.5240	-0.1260	-0.8479	0.5656
3	00:00:30	8.5200	-0.1220	-0.8210	0.5652
4	00:01:00	8.5160	-0.1180	-0.7941	0.5648
5	00:02:00	8.5140	-0.1160	-0.7806	0.5646
6	00:04:00	8.5080	-0.1100	-0.7402	0.5639
7	00:08:01	8.5060	-0.1080	-0.7268	0.5637
8	00:15:01	8.5020	-0.1040	-0.6999	0.5633
9	00:30:03	8.4980	-0.1000	-0.6729	0.5629
10	01:00:05	8.4960	-0.0980	-0.6595	0.5627
11	02:00:11	8.4920	-0.0940	-0.6326	0.5623
12	04:00:21	8.4900	-0.0920	-0.6191	0.5621
13	08:00:42	8.4880	-0.0900	-0.6057	0.5618
14	12:01:03	8.4880	-0.0900	-0.6057	0.5618
15	23:06:59	8.4860	-0.0880	-0.5922	0.5616

Consolidation Test Results (Sequence 4) Load 40.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 5) Load 80.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 29-Oct-18

Test Number:

Sample Number: GL1A ST12

Soil Description:

Boring Number:

Clay (Cl), Trace Sand, Trace Gravel

Depth: 5.4-5.85m

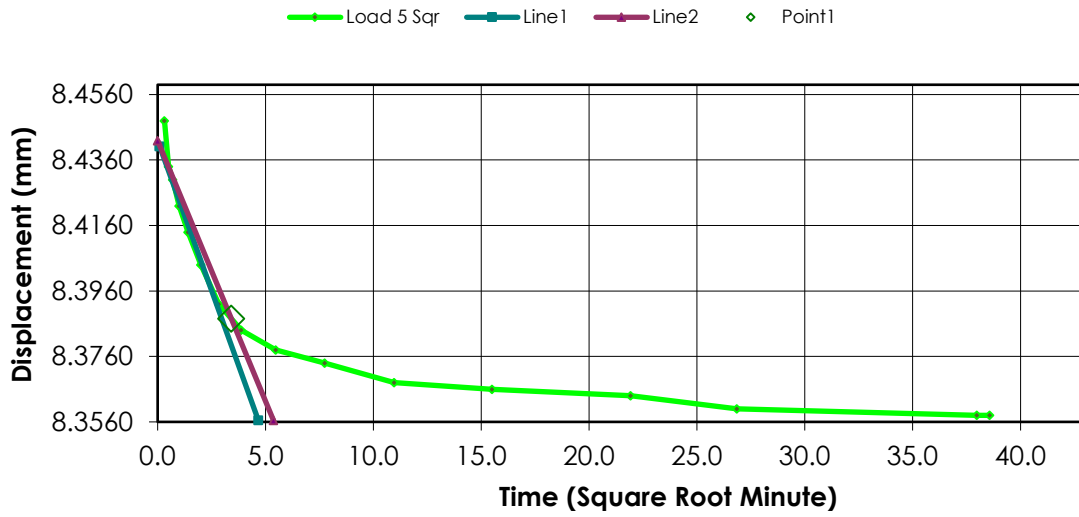
Remarks:

Sample Type: Undisturbed

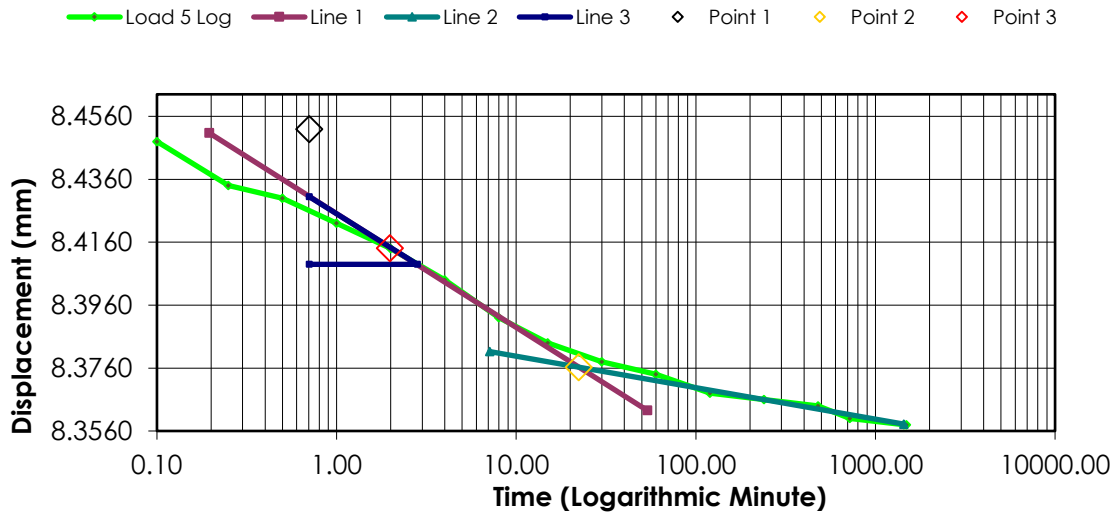
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.4860	-0.0880	-0.5922	0.5616
1	00:00:06	8.4480	-0.0640	-0.4307	0.5591
2	00:00:15	8.4340	-0.0500	-0.3365	0.5577
3	00:00:30	8.4300	-0.0460	-0.3096	0.5572
4	00:01:00	8.4220	-0.0380	-0.2557	0.5564
5	00:02:00	8.4140	-0.0300	-0.2019	0.5556
6	00:04:00	8.4040	-0.0200	-0.1346	0.5545
7	00:08:01	8.3920	-0.0080	-0.0538	0.5533
8	00:15:01	8.3840	0.0000	0.0000	0.5524
9	00:30:02	8.3780	0.0060	0.0404	0.5518
10	01:00:05	8.3740	0.0100	0.0673	0.5514
11	02:00:10	8.3680	0.0160	0.1077	0.5508
12	04:00:21	8.3660	0.0180	0.1211	0.5506
13	08:00:42	8.3640	0.0200	0.1346	0.5504
14	12:01:03	8.3600	0.0240	0.1615	0.5499
15	24:02:07	8.3580	0.0260	0.1750	0.5497
16	24:47:17	8.3580	0.0260	0.1750	0.5497

Consolidation Test Results (Sequence 5) Load 80.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 6) Load 160.000 kPa

Project: SR1 2018 Investigation
Location:
Job Number:

Project Number: 110773396

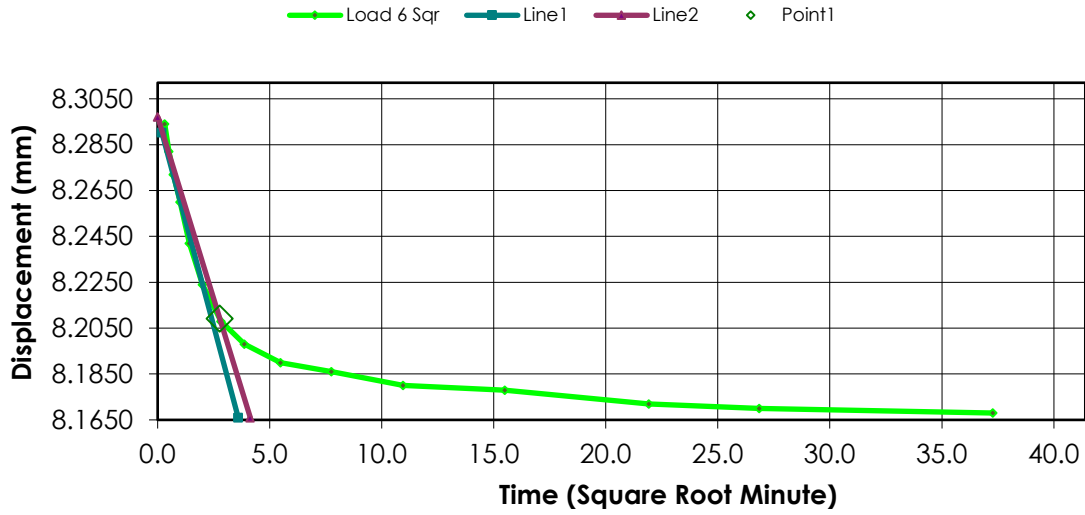
Test Date: 29-Oct-18
Test Number:

Sample Number: GL1A ST12 **Soil Description:**
Boring Number: Clay (Cl), Trace Sand, Trace Gravel
Depth: 5.4-5.85m **Remarks:**
Sample Type: Undisturbed

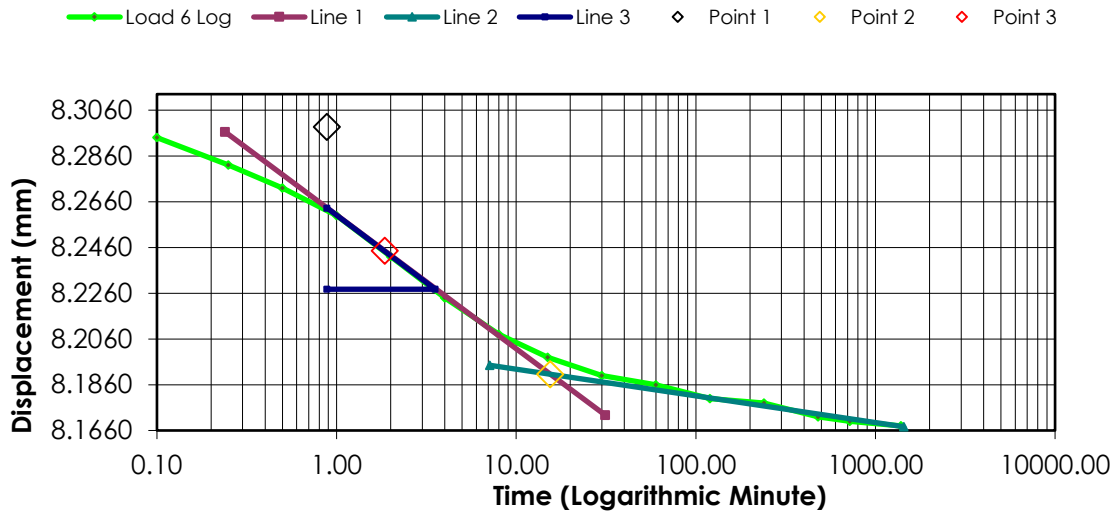
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.3580	0.0260	0.1750	0.5497
1	00:00:06	8.2940	0.0640	0.4307	0.5458
2	00:00:15	8.2820	0.0760	0.5114	0.5445
3	00:00:30	8.2720	0.0860	0.5787	0.5435
4	00:01:00	8.2600	0.0980	0.6595	0.5422
5	00:02:00	8.2420	0.1160	0.7806	0.5403
6	00:04:00	8.2240	0.1340	0.9017	0.5384
7	00:08:01	8.2080	0.1500	1.0094	0.5368
8	00:15:01	8.1980	0.1600	1.0767	0.5357
9	00:30:03	8.1900	0.1680	1.1305	0.5349
10	01:00:05	8.1860	0.1720	1.1575	0.5345
11	02:00:10	8.1800	0.1780	1.1978	0.5338
12	04:00:20	8.1780	0.1800	1.2113	0.5336
13	08:00:41	8.1720	0.1860	1.2517	0.5330
14	12:01:02	8.1700	0.1880	1.2651	0.5328
15	23:09:05	8.1680	0.1900	1.2786	0.5326

Consolidation Test Results (Sequence 6) Load 160.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 7) Load 320.000 kpa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 29-Oct-18

Test Number:

Sample Number: GL1A ST12

Soil Description:

Boring Number:

Clay (Cl), Trace Sand, Trace Gravel

Depth: 5.4-5.85m

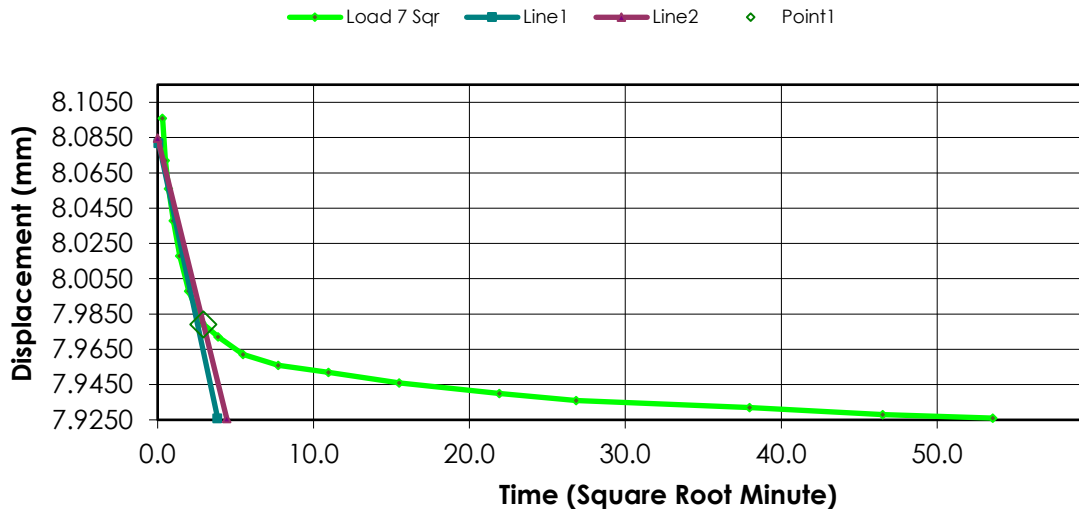
Remarks:

Sample Type: Undisturbed

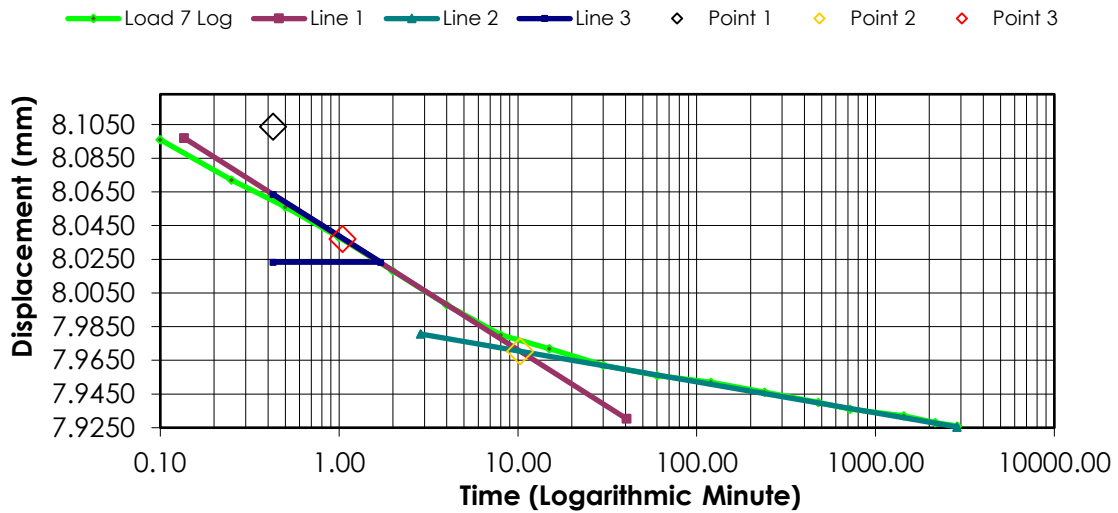
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.1680	0.1900	1.2786	0.5326
1	00:00:06	8.0960	0.2240	1.5074	0.5290
2	00:00:15	8.0720	0.2480	1.6689	0.5265
3	00:00:30	8.0560	0.2640	1.7766	0.5249
4	00:01:00	8.0380	0.2820	1.8977	0.5230
5	00:02:00	8.0180	0.3020	2.0323	0.5209
6	00:04:00	7.9980	0.3220	2.1669	0.5188
7	00:08:00	7.9800	0.3400	2.2880	0.5169
8	00:15:01	7.9720	0.3480	2.3419	0.5161
9	00:30:02	7.9620	0.3580	2.4091	0.5150
10	01:00:05	7.9560	0.3640	2.4495	0.5144
11	02:00:10	7.9520	0.3680	2.4764	0.5140
12	04:00:21	7.9460	0.3740	2.5168	0.5134
13	08:00:42	7.9400	0.3800	2.5572	0.5127
14	12:01:03	7.9360	0.3840	2.5841	0.5123
15	24:02:07	7.9320	0.3880	2.6110	0.5119
16	36:03:10	7.9280	0.3920	2.6380	0.5115
17	47:50:20	7.9260	0.3940	2.6514	0.5113

Consolidation Test Results (Sequence 7) Load 320.000 kpa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



**Consolidation Test Results
(Sequence 8) Load 640.000 kpa**

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 29-Oct-18

Test Number:

Sample Number: GL1A ST12

Soil Description:

Boring Number:

Clay (Cl), Trace Sand, Trace Gravel

Depth: 5.4-5.85m

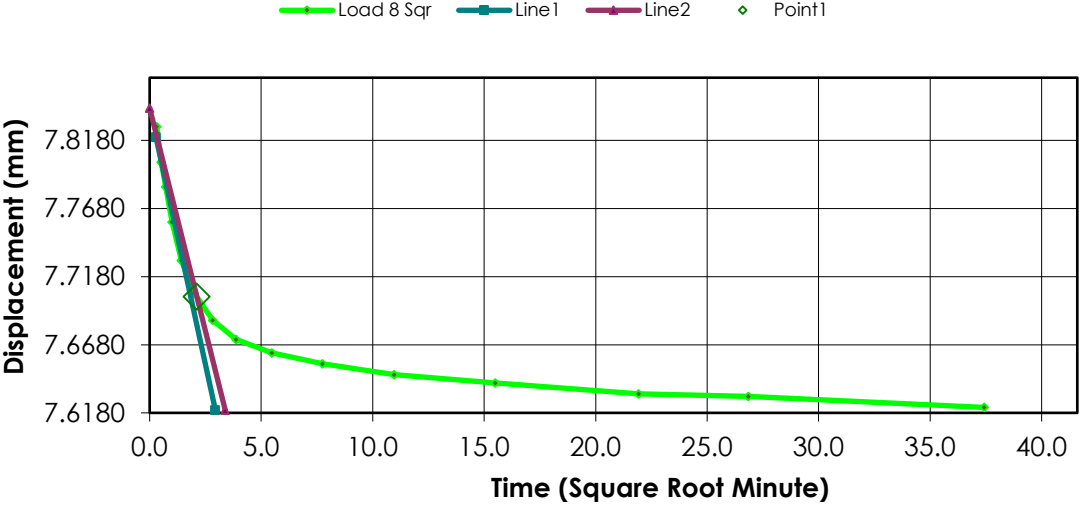
Remarks:

Sample Type: Undisturbed

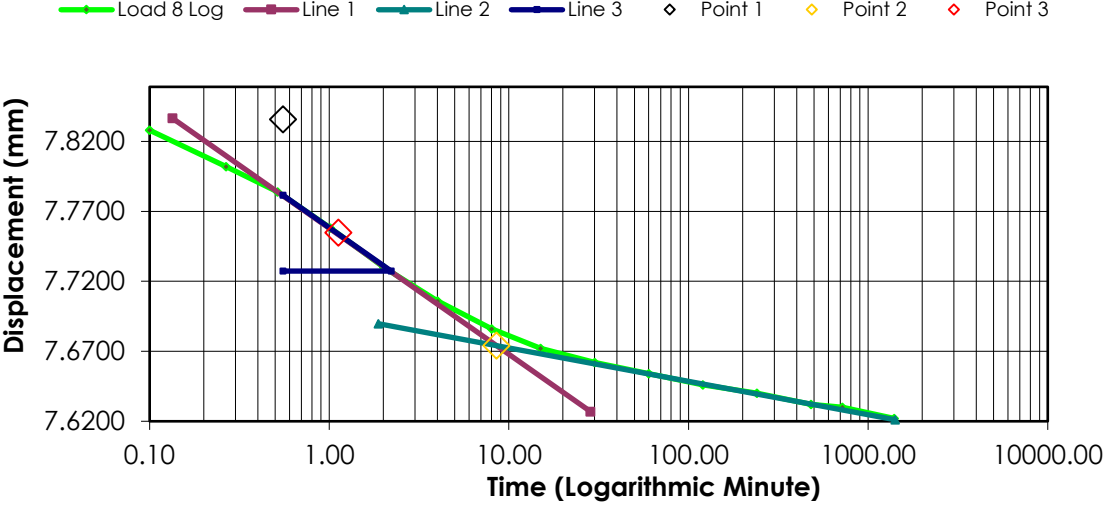
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	7.9260	0.3940	2.6514	0.5113
1	00:00:06	7.8280	0.4420	2.9744	0.5063
2	00:00:16	7.8020	0.4680	3.1494	0.5035
3	00:00:31	7.7840	0.4860	3.2705	0.5017
4	00:01:01	7.7580	0.5120	3.4455	0.4990
5	00:02:01	7.7300	0.5400	3.6339	0.4960
6	00:04:01	7.7060	0.5640	3.7954	0.4935
7	00:08:01	7.6860	0.5840	3.9300	0.4914
8	00:15:02	7.6720	0.5980	4.0242	0.4900
9	00:30:03	7.6620	0.6080	4.0915	0.4889
10	01:00:06	7.6540	0.6160	4.1454	0.4881
11	02:00:11	7.6460	0.6240	4.1992	0.4873
12	04:00:22	7.6400	0.6300	4.2396	0.4866
13	08:00:43	7.6320	0.6380	4.2934	0.4858
14	12:01:04	7.6300	0.6400	4.3069	0.4856
15	23:20:31	7.6220	0.6480	4.3607	0.4847

Consolidation Test Results (Sequence 8) Load 640.000 kpa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 9) Rebound 320.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 29-Oct-18

Test Number:

Sample Number: GL1A ST12

Soil Description:

Boring Number:

Clay (Cl), Trace Sand, Trace Gravel

Depth: 5.4-5.85m

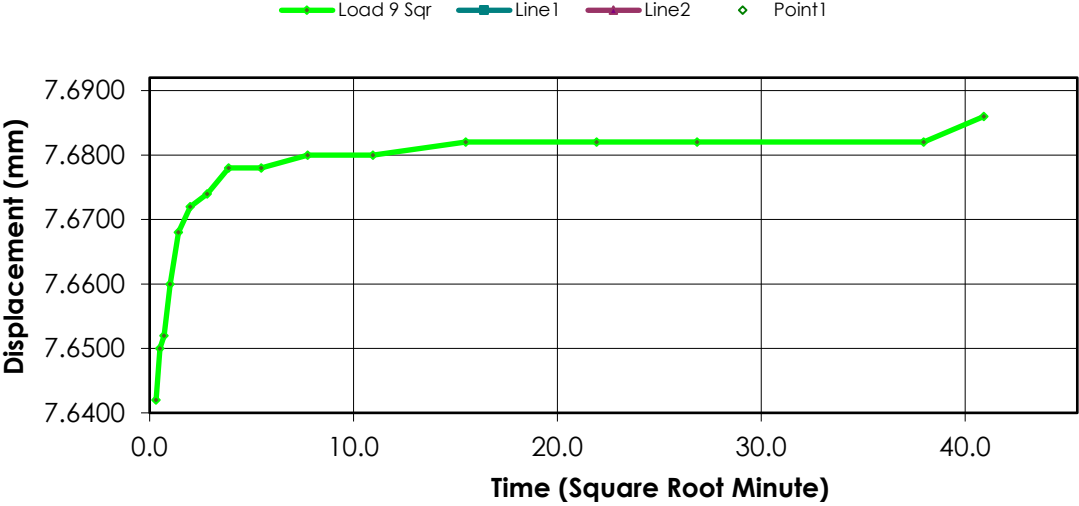
Remarks:

Sample Type: Undisturbed

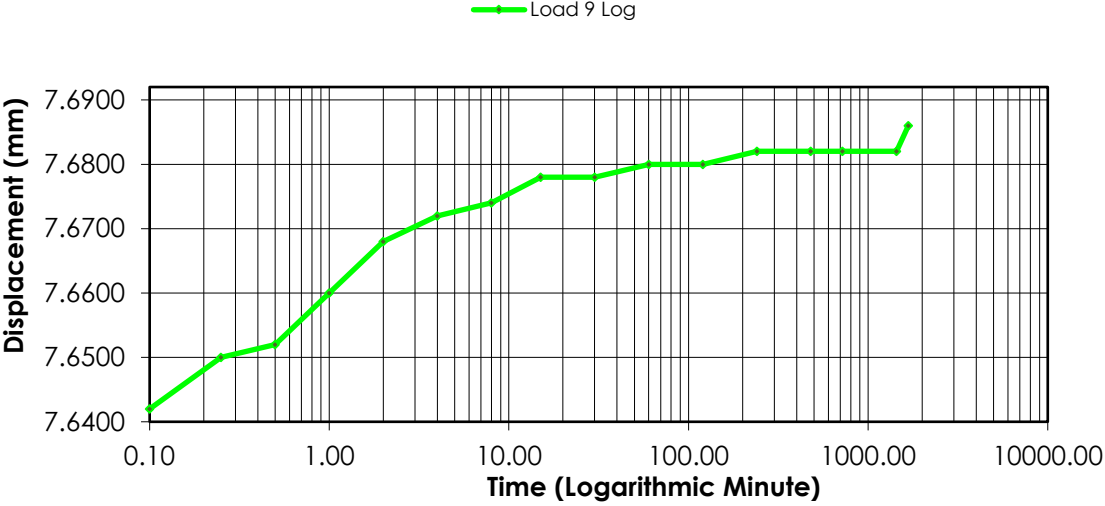
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	7.6220	0.6480	4.3607	0.4847
1	00:00:06	7.6420	0.6440	4.3338	0.4852
2	00:00:15	7.6500	0.6360	4.2799	0.4860
3	00:00:30	7.6520	0.6340	4.2665	0.4862
4	00:01:00	7.6600	0.6260	4.2127	0.4870
5	00:02:00	7.6680	0.6180	4.1588	0.4879
6	00:04:00	7.6720	0.6140	4.1319	0.4883
7	00:08:00	7.6740	0.6120	4.1184	0.4885
8	00:15:01	7.6780	0.6080	4.0915	0.4889
9	00:30:02	7.6780	0.6080	4.0915	0.4889
10	01:00:05	7.6800	0.6060	4.0781	0.4891
11	02:00:10	7.6800	0.6060	4.0781	0.4891
12	04:00:21	7.6820	0.6040	4.0646	0.4893
13	08:00:42	7.6820	0.6040	4.0646	0.4893
14	12:01:03	7.6820	0.6040	4.0646	0.4893
15	24:02:07	7.6820	0.6040	4.0646	0.4893
16	27:55:08	7.6860	0.6000	4.0377	0.4898

Consolidation Test Results (Sequence 9) Rebound 320.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 10) Rebound 160.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 29-Oct-18

Test Number:

Sample Number: GL1A ST12

Soil Description:

Boring Number:

Clay (Cl), Trace Sand, Trace Gravel

Depth: 5.4-5.85m

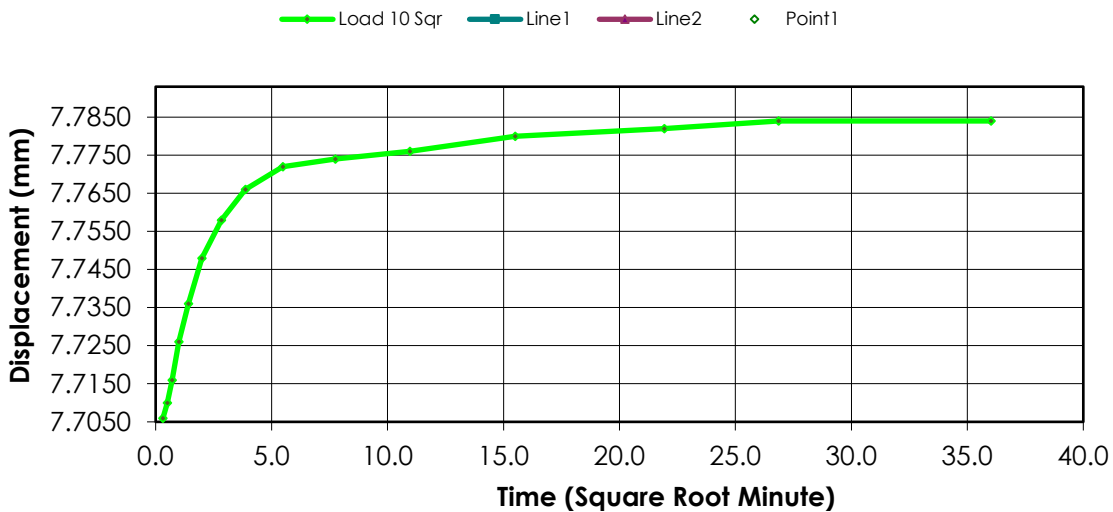
Remarks:

Sample Type: Undisturbed

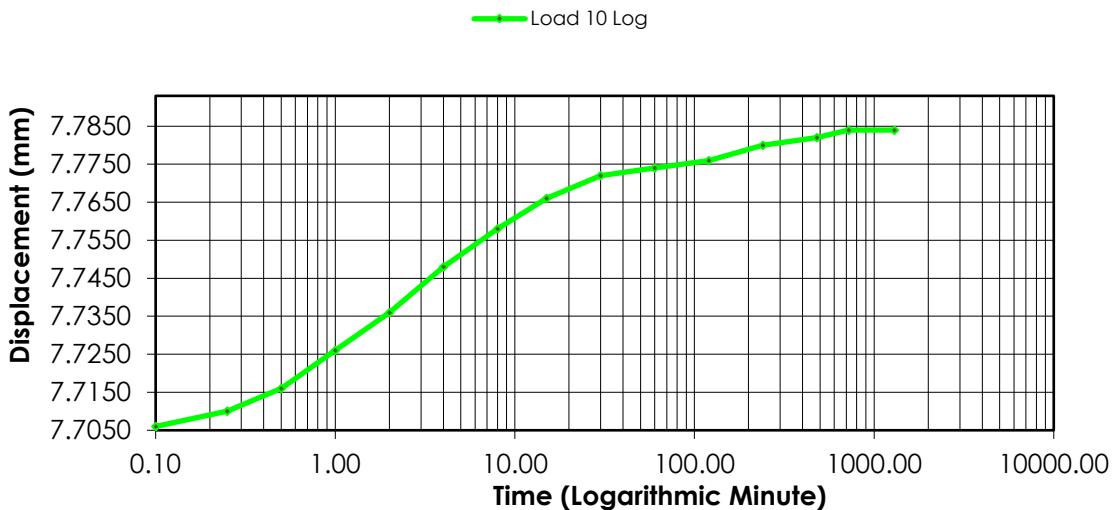
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	7.6860	0.6000	4.0377	0.4898
1	00:00:06	7.7060	0.5940	3.9973	0.4904
2	00:00:15	7.7100	0.5900	3.9704	0.4908
3	00:00:30	7.7160	0.5840	3.9300	0.4914
4	00:01:00	7.7260	0.5740	3.8627	0.4925
5	00:02:00	7.7360	0.5640	3.7954	0.4935
6	00:04:00	7.7480	0.5520	3.7147	0.4948
7	00:08:00	7.7580	0.5420	3.6474	0.4958
8	00:15:01	7.7660	0.5340	3.5935	0.4967
9	00:30:02	7.7720	0.5280	3.5532	0.4973
10	01:00:05	7.7740	0.5260	3.5397	0.4975
11	02:00:10	7.7760	0.5240	3.5262	0.4977
12	04:00:21	7.7800	0.5200	3.4993	0.4981
13	08:00:42	7.7820	0.5180	3.4859	0.4983
14	12:01:03	7.7840	0.5160	3.4724	0.4985
15	21:37:40	7.7840	0.5160	3.4724	0.4985

Consolidation Test Results (Sequence 10) Rebound 160.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 11) Load 320.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 29-Oct-18

Test Number:

Sample Number: GL1A ST12

Soil Description:

Boring Number:

Clay (Cl), Trace Sand, Trace Gravel

Depth: 5.4-5.85m

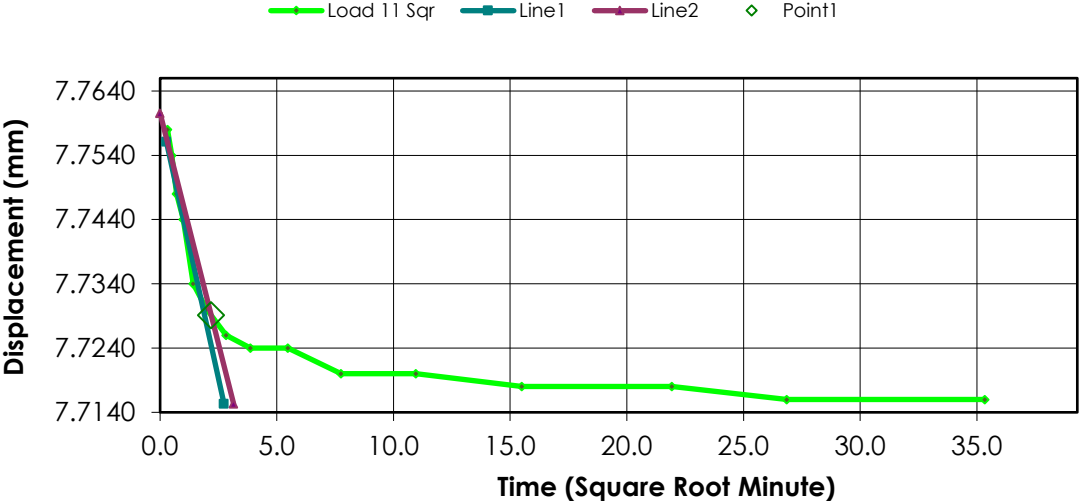
Remarks:

Sample Type: Undisturbed

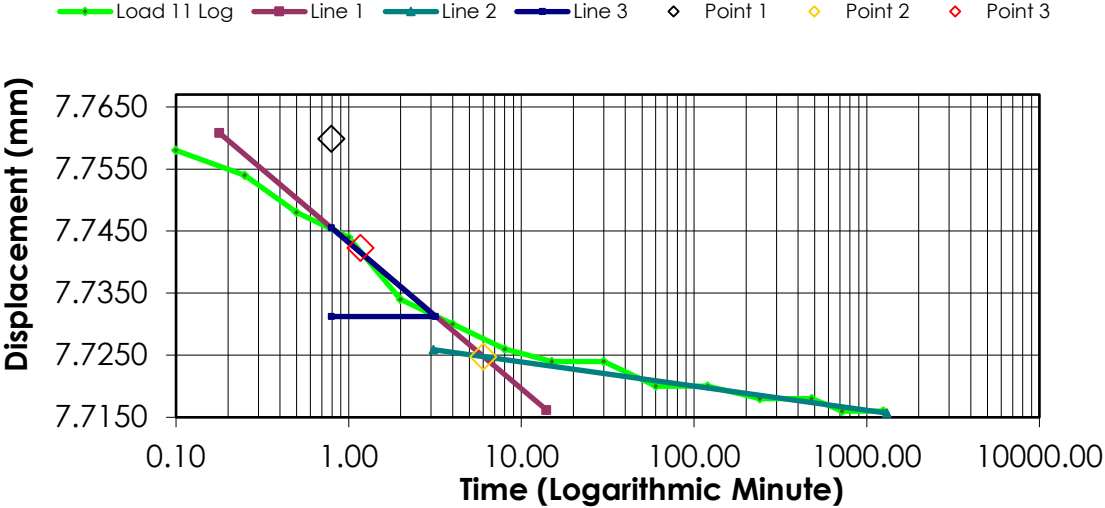
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	7.7840	0.5160	3.4724	0.4985
1	00:00:06	7.7580	0.5340	3.5935	0.4967
2	00:00:15	7.7540	0.5380	3.6205	0.4962
3	00:00:30	7.7480	0.5440	3.6608	0.4956
4	00:01:00	7.7440	0.5480	3.6877	0.4952
5	00:02:00	7.7340	0.5580	3.7550	0.4941
6	00:04:00	7.7300	0.5620	3.7820	0.4937
7	00:08:01	7.7260	0.5660	3.8089	0.4933
8	00:15:01	7.7240	0.5680	3.8223	0.4931
9	00:30:02	7.7240	0.5680	3.8223	0.4931
10	01:00:05	7.7200	0.5720	3.8493	0.4927
11	02:00:10	7.7200	0.5720	3.8493	0.4927
12	04:00:21	7.7180	0.5740	3.8627	0.4925
13	08:00:42	7.7180	0.5740	3.8627	0.4925
14	12:01:03	7.7160	0.5760	3.8762	0.4923
15	20:49:29	7.7160	0.5760	3.8762	0.4923

Consolidation Test Results (Sequence 11) Load 320.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 12) Load 640.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 29-Oct-18

Test Number:

Sample Number: GL1A ST12

Soil Description:

Boring Number:

Clay (Cl), Trace Sand, Trace Gravel

Depth: 5.4-5.85m

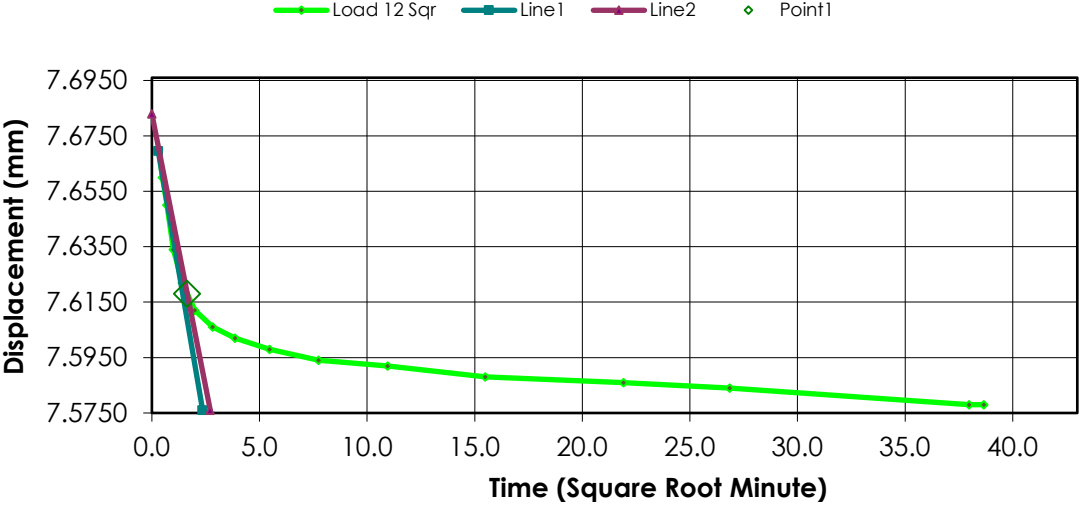
Remarks:

Sample Type: Undisturbed

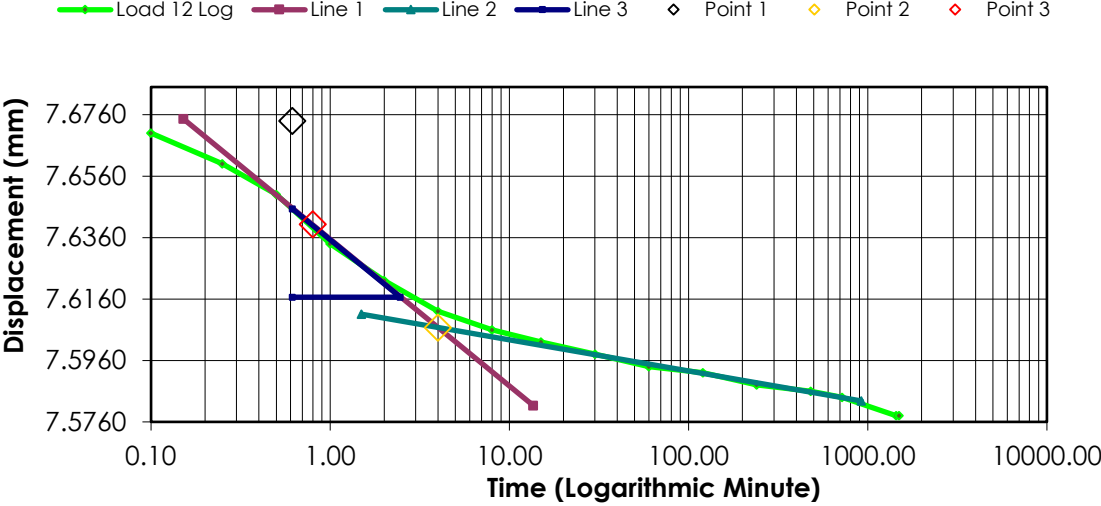
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	7.7160	0.5760	3.8762	0.4923
1	00:00:06	7.6700	0.6000	4.0377	0.4898
2	00:00:15	7.6600	0.6100	4.1050	0.4887
3	00:00:30	7.6500	0.6200	4.1723	0.4877
4	00:01:00	7.6340	0.6360	4.2799	0.4860
5	00:02:00	7.6220	0.6480	4.3607	0.4847
6	00:04:00	7.6120	0.6580	4.4280	0.4837
7	00:08:01	7.6060	0.6640	4.4684	0.4831
8	00:15:01	7.6020	0.6680	4.4953	0.4827
9	00:30:03	7.5980	0.6720	4.5222	0.4822
10	01:00:04	7.5940	0.6760	4.5491	0.4818
11	02:00:09	7.5920	0.6780	4.5626	0.4816
12	04:00:20	7.5880	0.6820	4.5895	0.4812
13	08:00:41	7.5860	0.6840	4.6030	0.4810
14	12:01:02	7.5840	0.6860	4.6164	0.4808
15	24:02:06	7.5780	0.6920	4.6568	0.4801
16	24:54:28	7.5780	0.6920	4.6568	0.4801

Consolidation Test Results (Sequence 12) Load 640.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 13) Load 1280.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 29-Oct-18

Test Number:

Sample Number: GL1A ST12

Soil Description:

Boring Number:

Clay (Cl), Trace Sand, Trace Gravel

Depth: 5.4-5.85m

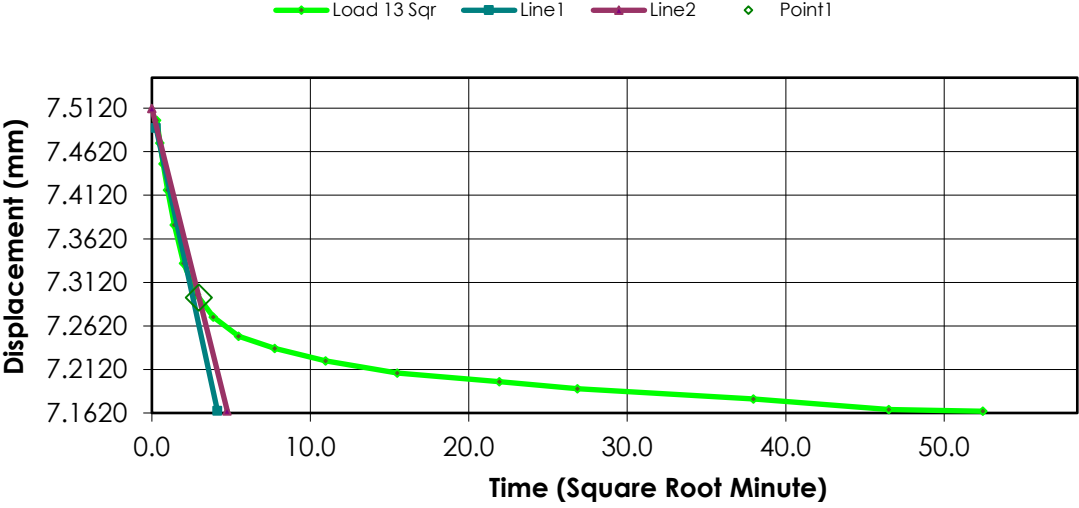
Remarks:

Sample Type: Undisturbed

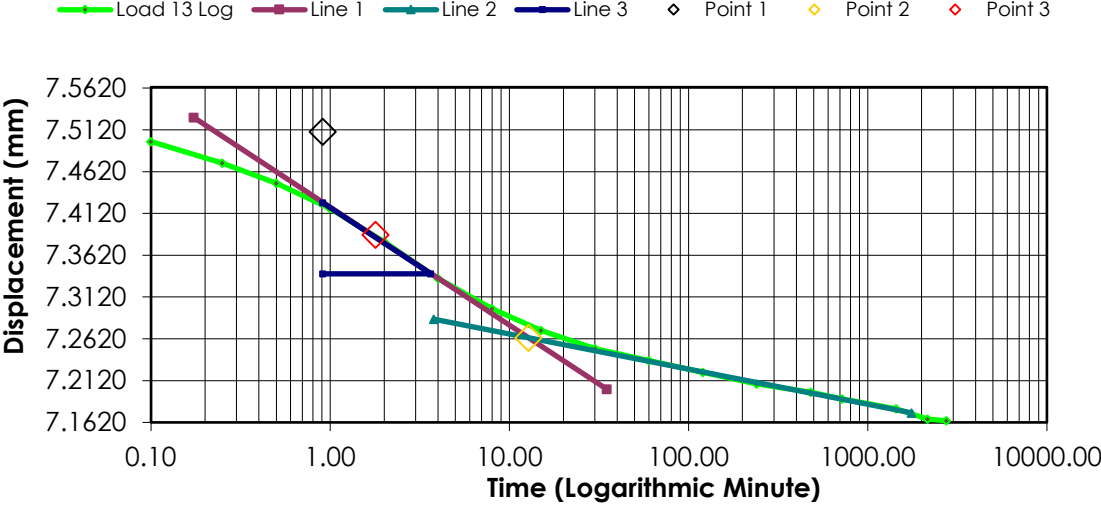
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	7.5780	0.6920	4.6568	0.4801
1	00:00:06	7.4980	0.7080	4.7645	0.4785
2	00:00:15	7.4720	0.7340	4.9394	0.4758
3	00:00:30	7.4480	0.7580	5.1009	0.4733
4	00:01:00	7.4180	0.7880	5.3028	0.4701
5	00:02:00	7.3780	0.8280	5.5720	0.4659
6	00:04:01	7.3340	0.8720	5.8681	0.4613
7	00:08:01	7.2980	0.9080	6.1104	0.4576
8	00:15:02	7.2720	0.9340	6.2853	0.4549
9	00:30:03	7.2500	0.9560	6.4334	0.4526
10	01:00:06	7.2360	0.9700	6.5276	0.4511
11	02:00:11	7.2220	0.9840	6.6218	0.4496
12	04:00:21	7.2080	0.9980	6.7160	0.4482
13	08:00:43	7.1980	1.0080	6.7833	0.4471
14	12:01:04	7.1900	1.0160	6.8371	0.4463
15	24:02:07	7.1780	1.0280	6.9179	0.4450
16	36:03:11	7.1660	1.0400	6.9987	0.4438
17	45:51:46	7.1640	1.0420	7.0121	0.4436

Consolidation Test Results (Sequence 13) Load 1280.000 kPa

Consolidation Graph (Square Root Time)



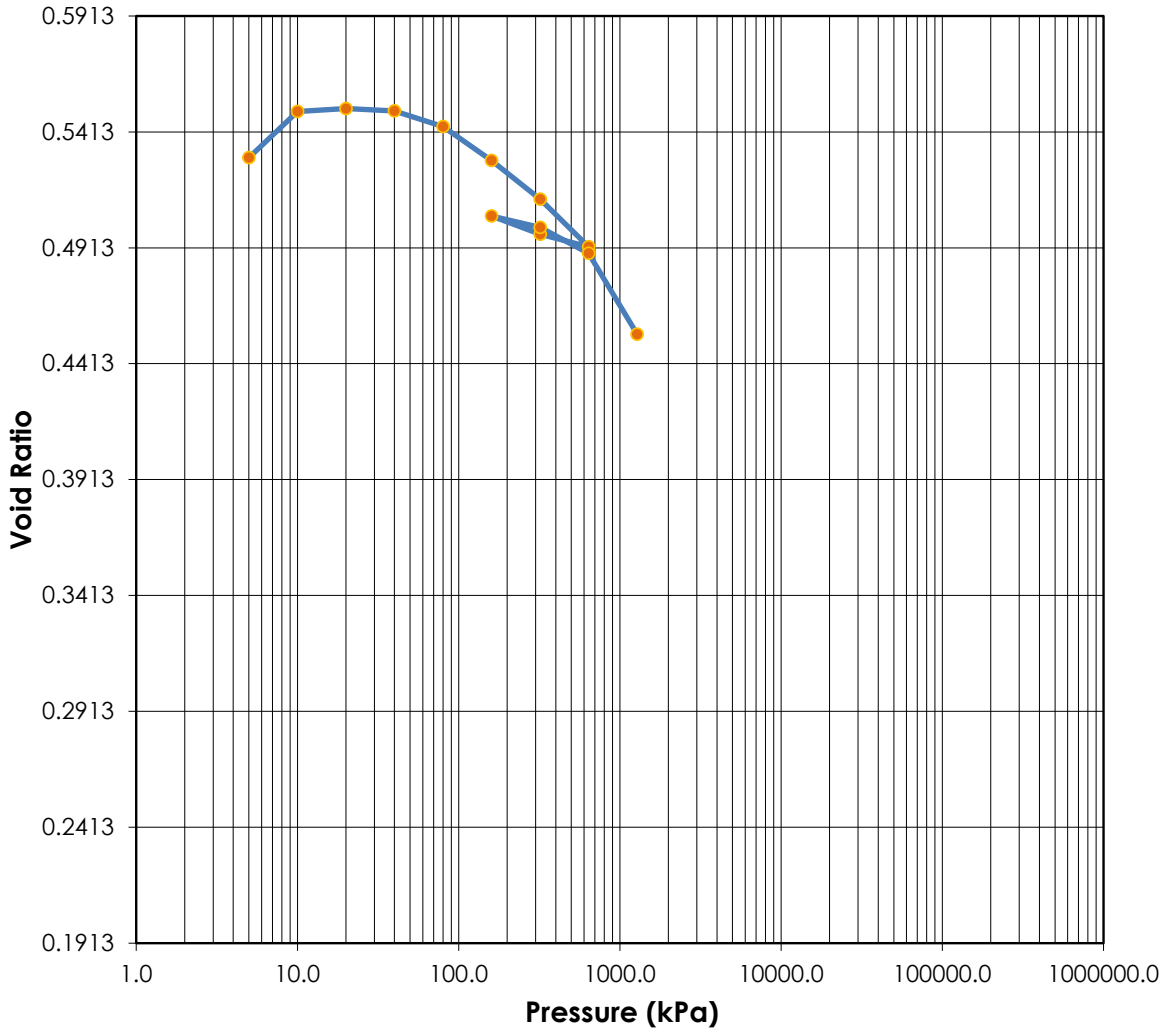
Consolidation Graph (Logarithmic Time)





Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876



	Before	After	Liquid Limits:	41	Test Date:	29-Oct-18
Moisture (%):	21.5	20.5	Plastic Limits:	16		
Dry Density (g/cm³):	1.729	1.818	Plasticity Index (%):	25		
Saturation (%):	100	100				
Void Ratio:	0.5317	0.4555	Specific Gravity:	2.65	Assumed	
Soil Description:	Clay (Cl), Trace Sand, Trace Gravel					
Project Number:	110773396	Depth:	7.2-7.65m			
Sample Number:	GL1A ST16	Boring Number:				
Project:	SRT 2018 Investigation					Remarks:
Client:	Alberta Transportation					
Location:						

Tested By: E. Wahl

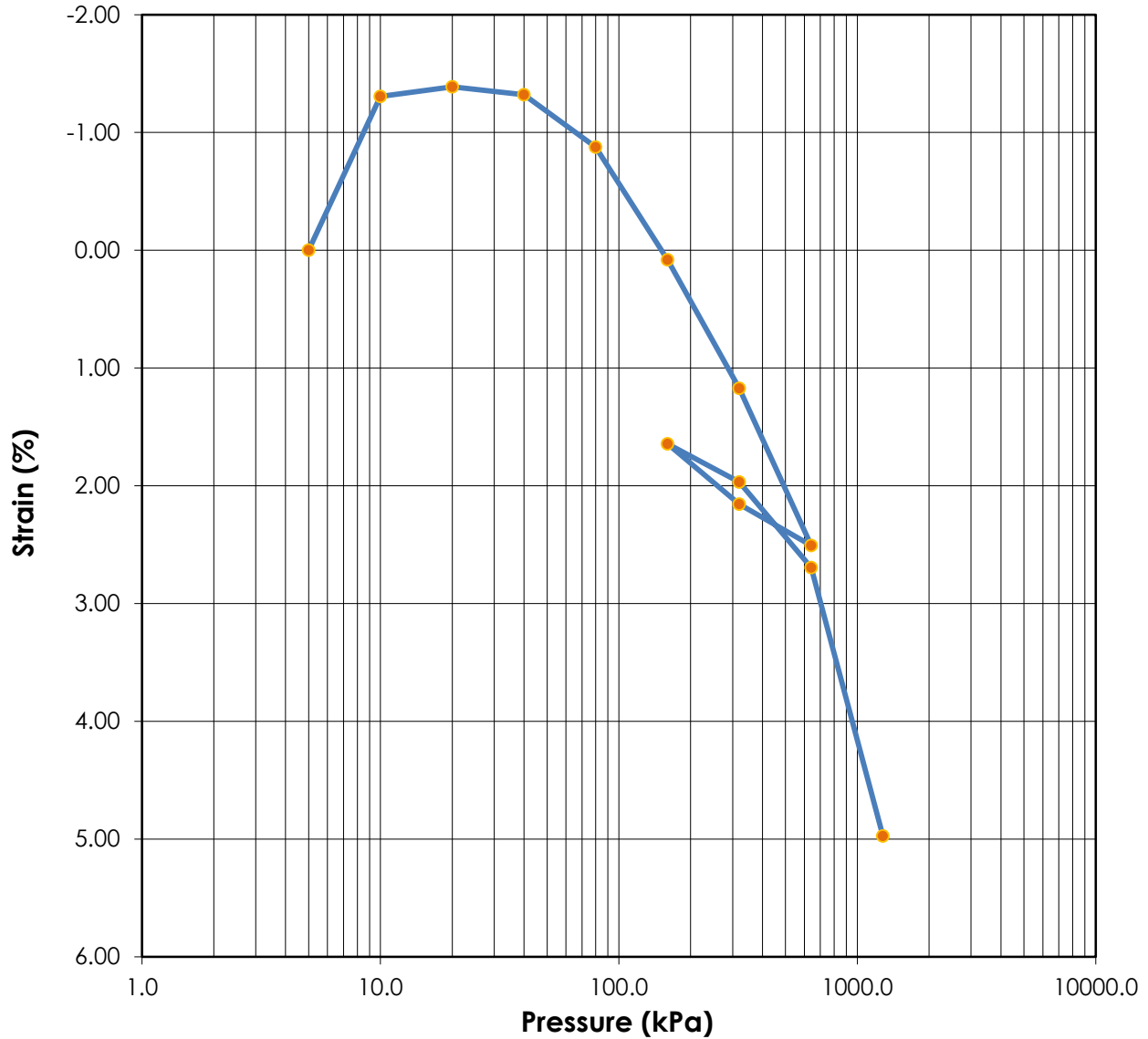
Reviewed By: C. Lamoureux

Reporting of these test results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request. The data presented above is for the sole use of the client stipulated above. Stantec is not responsible, nor can be held liable, for the use of this report by any other party, with or without the knowledge of Stantec.



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876

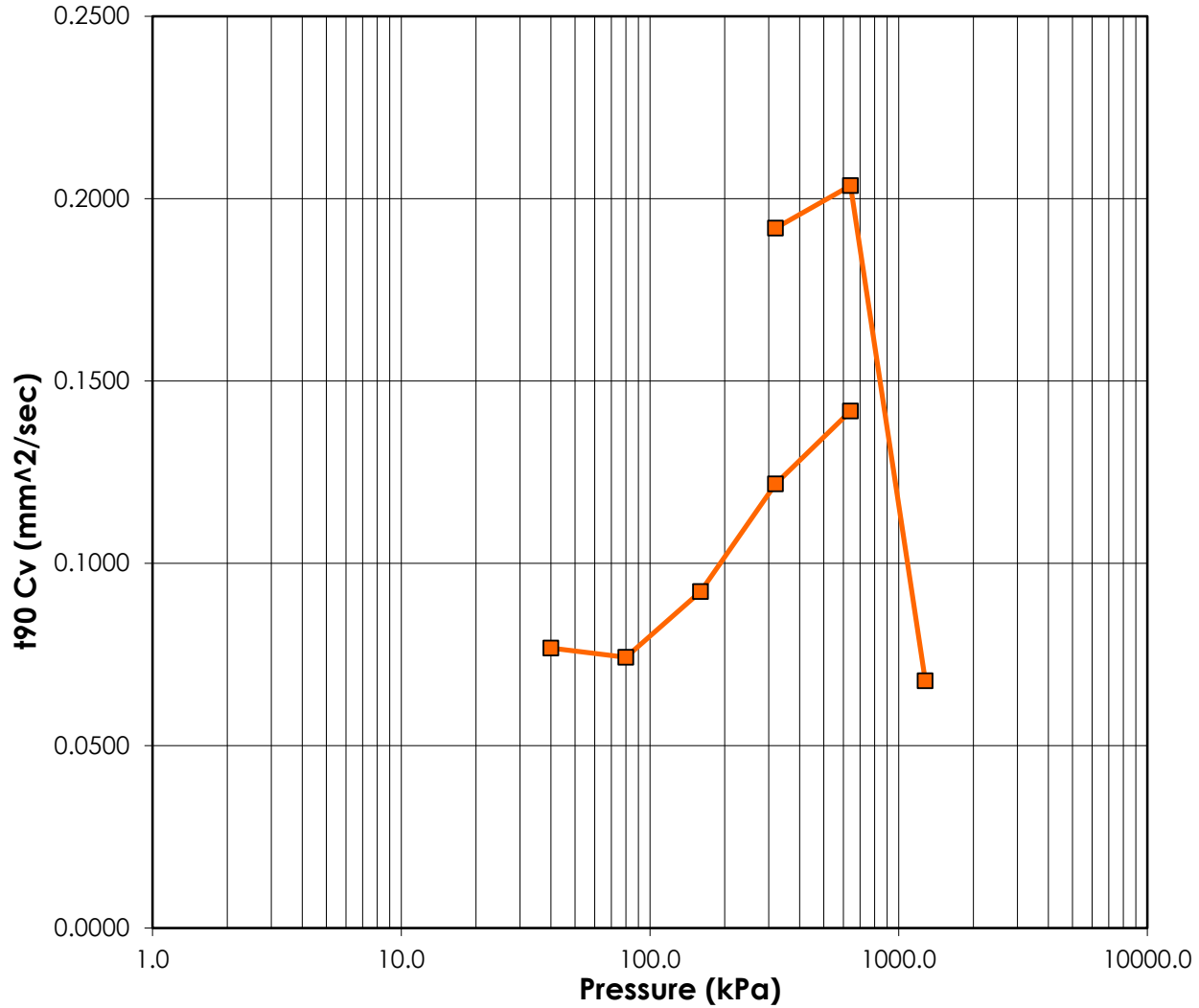


	Before	After	Liquid Limits:	41	Test Date:	29-Oct-18
Moisture (%):	21.5	20.5	Plastic Limits:	16		
Dry Density (g/cm3):	1.729	1.818	Plasticity Index (%):	25		
Saturation (%):	100	100	Specific Gravity:	2.65	Assumed	
Void Ratio:	0.5317	0.4555				
Sample Description:	Clay (Cl), Trace Sand, Trace Gravel					
Project Number:	110773396	Depth:	7.2-7.65m			
Sample Number:	GL1A ST16	Boring Number:				
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						
			Remarks:			



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876



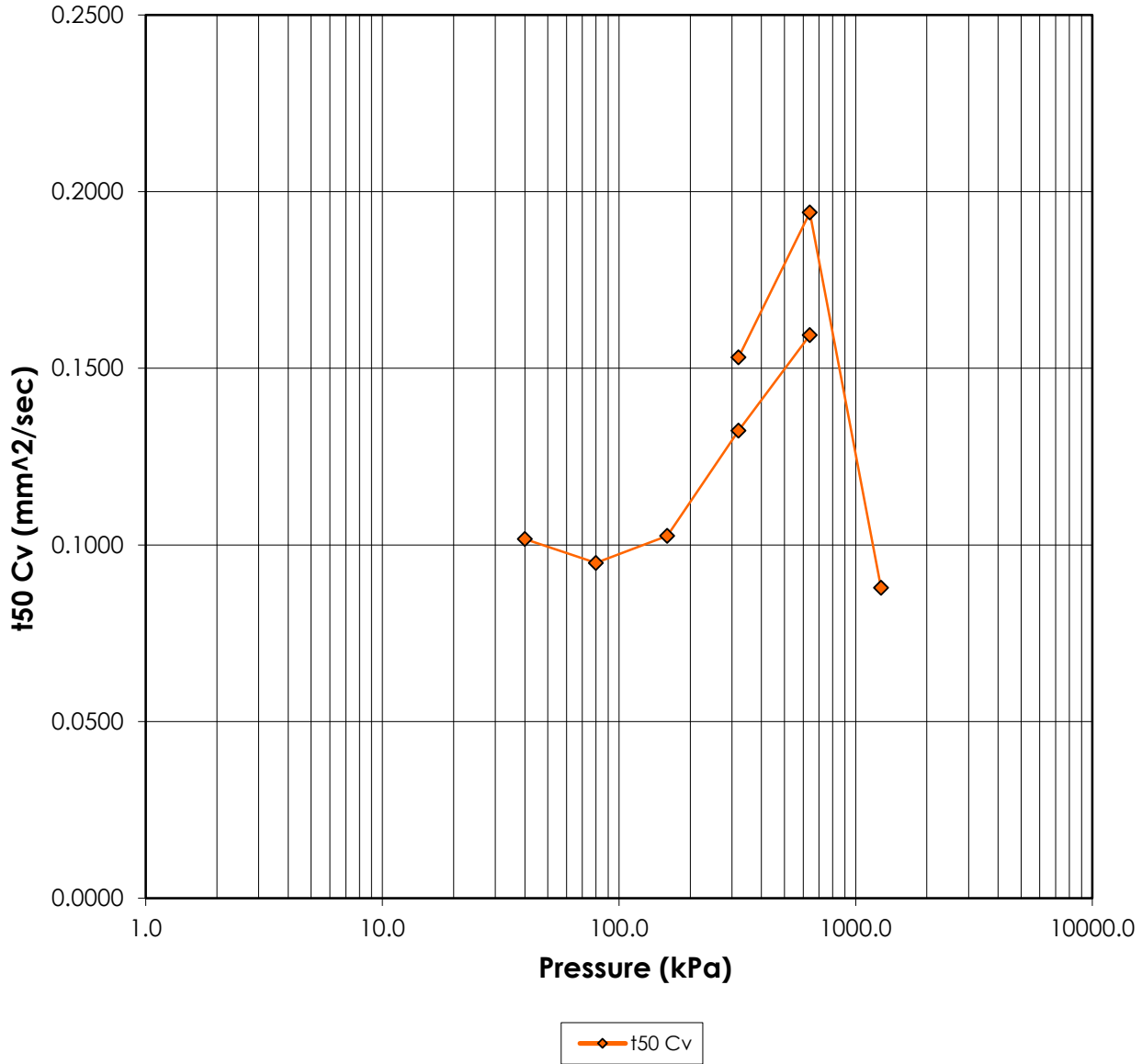
—■— $t_{90} C_v$

	Before	After	Liquid Limits:	41	Test Date:	29-Oct-18
Moisture (%):	21.5	20.5	Plastic Limits:	16		
Dry Density (g/cm³):	1.729	1.818	Plasticity Index (%):	25		
Saturation (%):	100	100				
Void Ratio:	0.5317	0.4555	Specific Gravity:	2.65	Assumed	
Soil Description:	Clay (Cl), Trace Sand, Trace Gravel					
Project Number:	110773396		Depth:	7.2-7.65m		
Sample Number:	GL1A ST16		Boring Number:			
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						
						Remarks:



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
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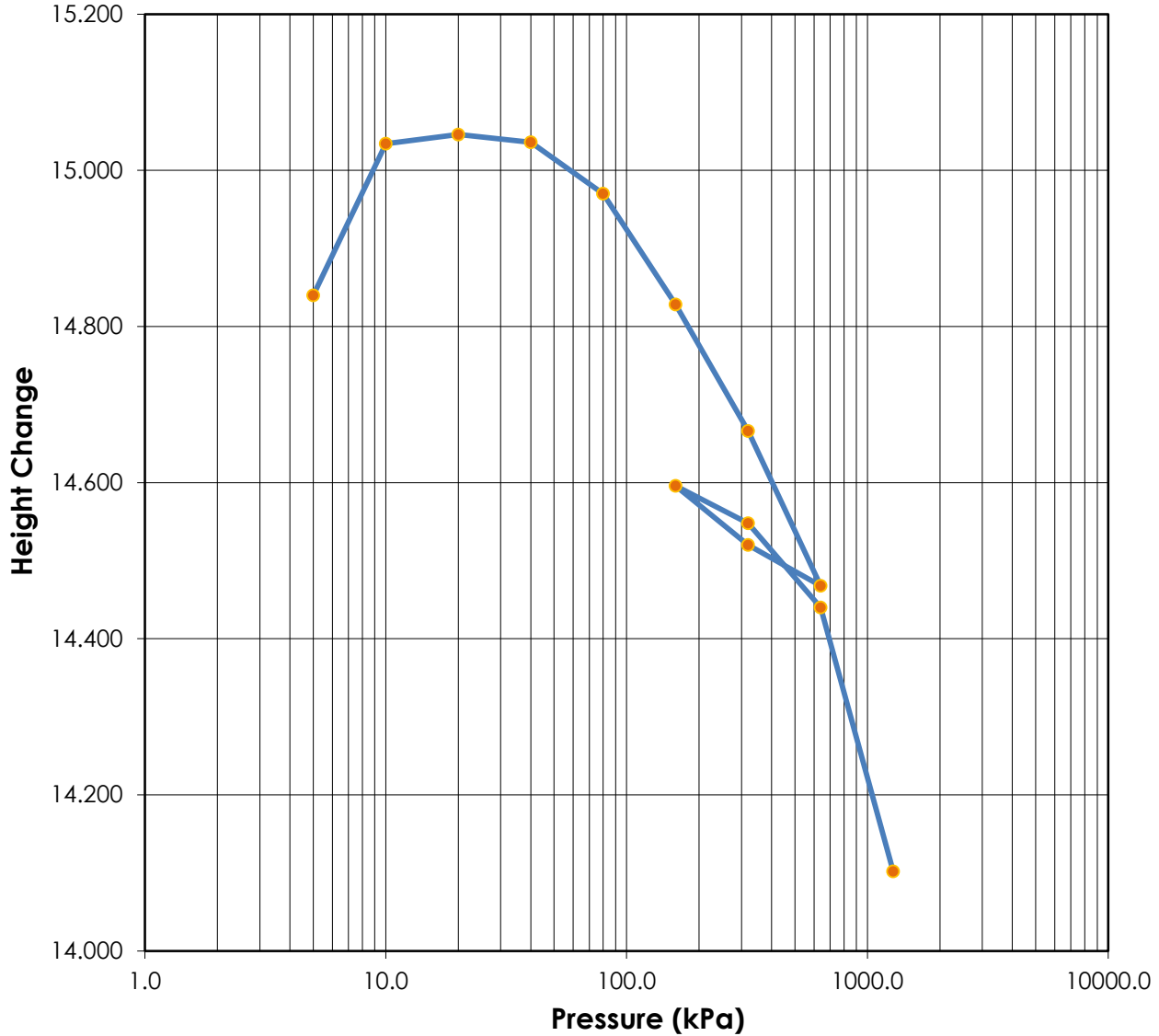


	Before	After	Liquid Limits:	41	Test Date:	29-Oct-18
Moisture (%):	21.5	20.5	Plastic Limits:	16		
Dry Density (g/cm³):	1.729	1.818	Plasticity Index (%):	25		
Saturation (%):	100	100				
Void Ratio:	0.5317	0.4555	Specific Gravity:	2.65	Assumed	
Soil Description:	Clay (Cl), Trace Sand, Trace Gravel					
Project Number:	110773396		Depth:	7.2-7.65m	Remarks:	
Sample Number:	GL1A ST16		Boring Number:			
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

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 10830 - 46th Street SE
 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876



	Before	After	Liquid Limits:	41	Test Date:	29-Oct-18
Moisture (%):	21.5	20.5	Plastic Limits:	16		
Dry Density (g/cm3):	1.729	1.818	Plasticity Index (%):	25		
Saturation (%):	100	100	Specific Gravity:	2.65	Assumed	
Void Ratio:	0.5317	0.4555				
Soil Description:	Clay (Cl), Trace Sand, Trace Gravel					
Project Number:	110773396	Depth:	7.2-7.65m			
Sample Number:	GL1A ST16	Boring Number:				
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						
						Remarks:

Consolidation Test Results Summary

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Sample Number: GL1A ST16

Sample Description:

Boring Number:

Clay (Cl), Trace Sand, Trace Gravel

Depth: 7.2-7.65m

Remarks:

Test Number:

Sample Type: Undisturbed

Test Date: 29-Oct-18

Index	Load Sequence (kPa)	Cumulative Change in Height (mm)	Specimen Height (mm)	Height of Void (mm)	Vertical Strain (%)	Void Ratio	t90 Fitting Time (min)	t50 Fitting Time (min)	t90 Cv (mm ² /sec)	t50 Cv (mm ² /sec)
0	0.000	0.0000	14.8400	5.1416	0.00	0.5302	0.000	0.000	0.000	0.000
1	5.000	0.0000	14.8400	5.1416	0.00	0.5302	0.000	0.000	0.000	0.000
2	10.000	-0.1940	15.0340	5.3356	-1.31	0.5502	0.000	0.000	0.000	0.000
3	20.000	-0.2060	15.0460	5.3476	-1.39	0.5514	0.000	0.000	0.000	0.000
4	40.000	-0.1960	15.0360	5.3376	-1.32	0.5504	10.408	1.826	0.077	0.102
5	80.000	-0.1300	14.9700	5.2716	-0.88	0.5436	10.666	1.938	0.074	0.095
6	160.000	0.0120	14.8280	5.1296	0.08	0.5289	8.418	1.760	0.092	0.103
7	320.000	0.1740	14.6660	4.9676	1.17	0.5122	6.243	1.334	0.122	0.132
8	640.000	0.3720	14.4680	4.7696	2.51	0.4918	5.219	1.078	0.142	0.159
9	320.000	0.3200	14.5200	4.8216	2.16	0.4972	0.000	0.000	0.000	0.000
10	160.000	0.2440	14.5960	4.8976	1.64	0.5050	0.000	0.000	0.000	0.000
11	320.000	0.2920	14.5480	4.8496	1.97	0.5000	3.896	1.135	0.192	0.153
12	640.000	0.4000	14.4400	4.7416	2.70	0.4889	3.619	0.882	0.204	0.194
13	1280.000	0.7380	14.1020	4.4036	4.97	0.4541	10.365	1.858	0.068	0.088

Predicted value indicated with *

Consolidation Test Consolidation Specimen Information

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 29-Oct-18

Sample Number: GL1A ST16

Sample Description:

Boring Number:

Clay (Cl), Trace Sand, Trace Gravel

Depth: 7.2-7.65m

Remarks:

Sample Type: Undisturbed

Test Number:

Liquid Limit: 41

Initial Void Ratio: 0.5317

Initial Height (mm): 14.84

Plastic Limit: 16

Plasticity Index (%): 25

Initial Diameter (mm): 50.04

Specific Gravity: 2.65

Weight of Ring (g): 61.13

Assumed

Parameters	Initial Specimen	Final Specimen
Moist Weight + Container (g)	109.02	64.61
Dry Soil + Container (g)	90.46	54.34
Weight of Container (g)	4.23	4.11
Moisture Content (%)	21.5	20.5
Void Ratio	0.5317	0.4555
Saturation (%)	100	100
Dry Density (g/cm ³)	1.729	1.818

Consolidation Test Results
(Sequence 1) Load 5.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 29-Oct-18

Test Number:

Sample Number: GL1A ST16

Soil Description:

Boring Number:

Clay (Cl), Trace Sand, Trace Gravel

Depth: 7.2-7.65m

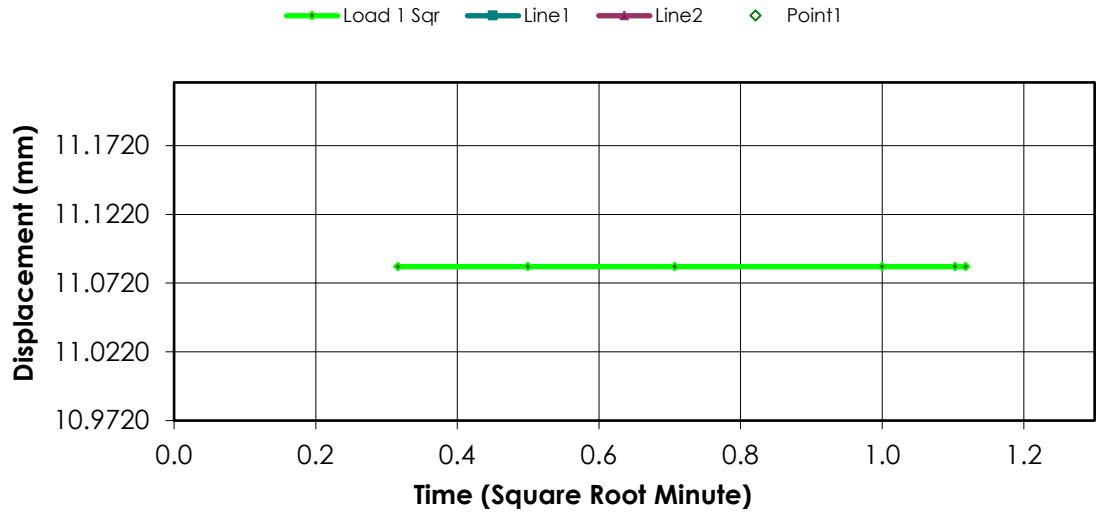
Remarks:

Sample Type: Undisturbed

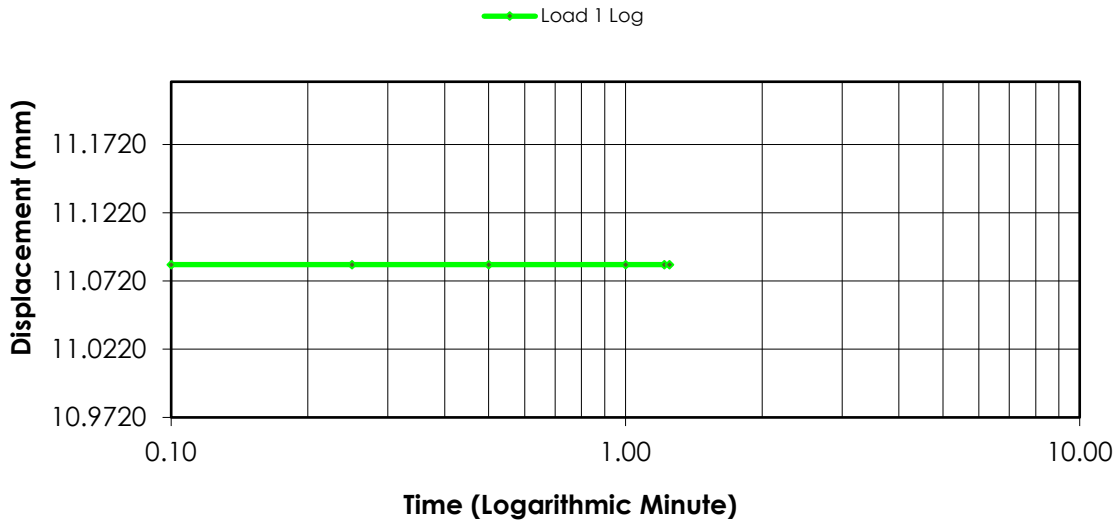
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	11.0840	0.0000	0.0000	0.5317
1	00:00:06	11.0840	0.0000	0.0000	0.5317
2	00:00:15	11.0840	0.0000	0.0000	0.5317
3	00:00:30	11.0840	0.0000	0.0000	0.5317
4	00:01:00	11.0840	0.0000	0.0000	0.5317
5	00:01:13	11.0840	0.0000	0.0000	0.5317
6	00:01:15	11.0840	0.0000	0.0000	0.5317

Consolidation Test Results (Sequence 1) Load 5.000 kPa

Consolidation Graph (Square-root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 2) Load 10.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 29-Oct-18

Test Number:

Sample Number: GL1A ST16

Soil Description:

Boring Number:

Clay (Cl), Trace Sand, Trace Gravel

Depth: 7.2-7.65m

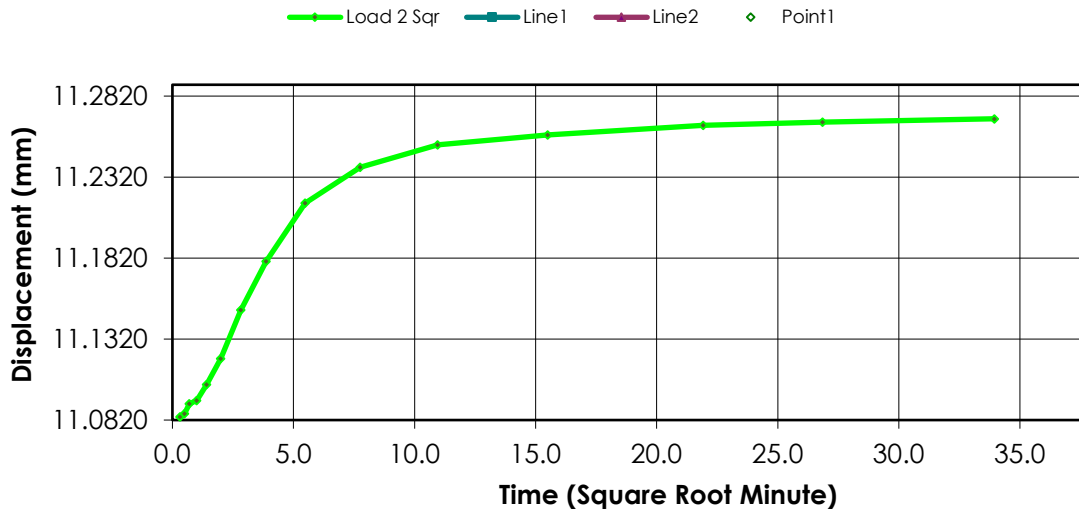
Remarks:

Sample Type: Undisturbed

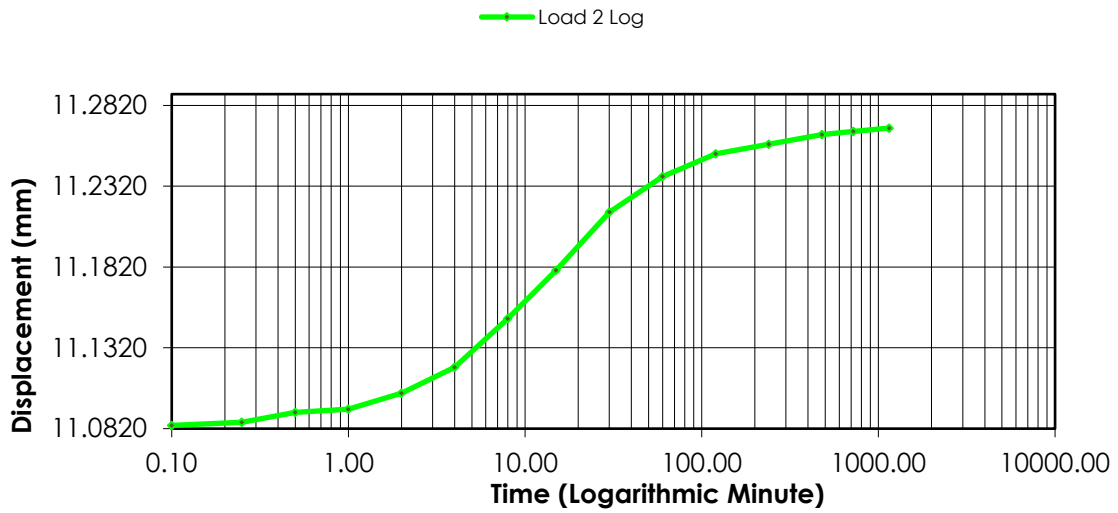
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	11.0840	0.0000	0.0000	0.5317
1	00:00:06	11.0840	-0.0100	-0.0674	0.5327
2	00:00:15	11.0860	-0.0120	-0.0809	0.5329
3	00:00:30	11.0920	-0.0180	-0.1213	0.5336
4	00:01:00	11.0940	-0.0200	-0.1348	0.5338
5	00:02:00	11.1040	-0.0300	-0.2022	0.5348
6	00:04:00	11.1200	-0.0460	-0.3100	0.5365
7	00:08:00	11.1500	-0.0760	-0.5121	0.5396
8	00:15:01	11.1800	-0.1060	-0.7143	0.5427
9	00:30:02	11.2160	-0.1420	-0.9569	0.5464
10	01:00:05	11.2380	-0.1640	-1.1051	0.5486
11	02:00:10	11.2520	-0.1780	-1.1995	0.5501
12	04:00:21	11.2580	-0.1840	-1.2399	0.5507
13	08:00:42	11.2640	-0.1900	-1.2803	0.5513
14	12:01:04	11.2660	-0.1920	-1.2938	0.5515
15	19:12:17	11.2680	-0.1940	-1.3073	0.5517

**Consolidation Test Results
(Sequence 2) Load 10.000 kPa**

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



**Consolidation Test Results
(Sequence 3) Load 20.000 kPa**

Project: SR1 2018 Investigation
Location:
Job Number:

Project Number: 110773396

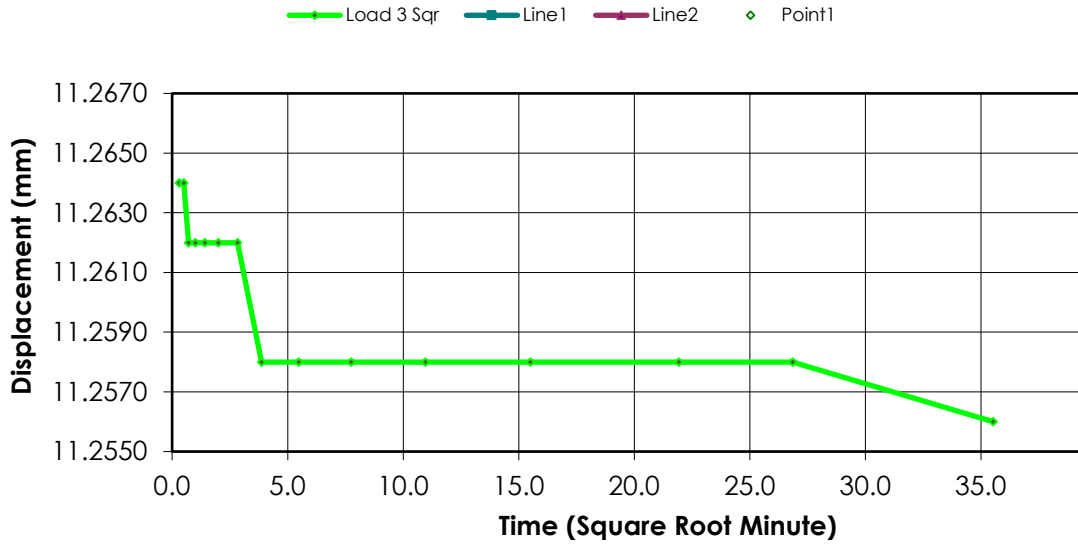
Test Date: 29-Oct-18
Test Number:

Sample Number: GL1A ST16 **Soil Description:**
Boring Number: Clay (Cl), Trace Sand, Trace Gravel
Depth: 7.2-7.65m **Remarks:**
Sample Type: Undisturbed

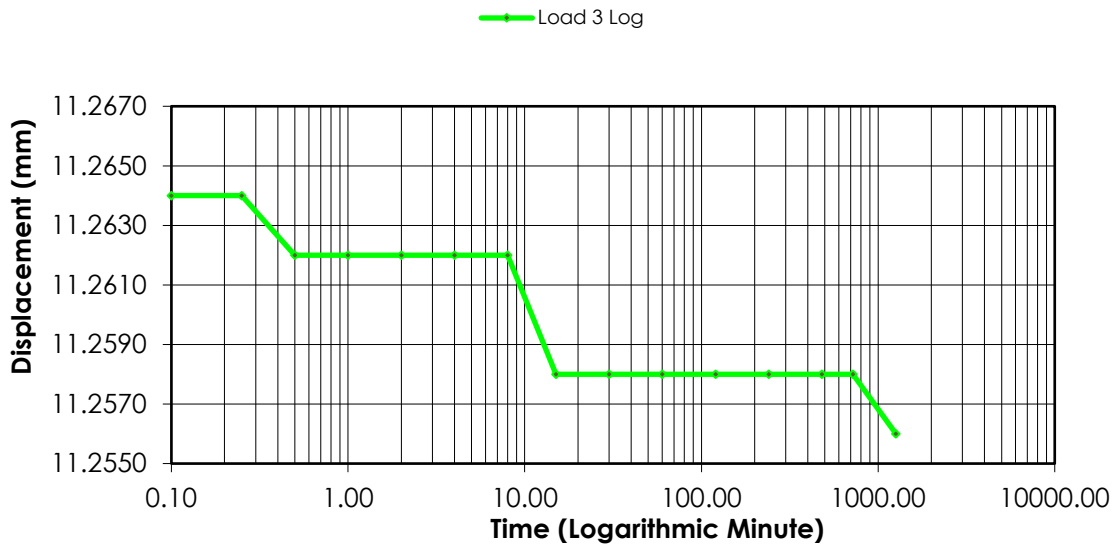
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	11.2680	-0.1940	-1.3073	0.5517
1	00:00:06	11.2640	-0.2140	-1.4420	0.5538
2	00:00:15	11.2640	-0.2140	-1.4420	0.5538
3	00:00:30	11.2620	-0.2120	-1.4286	0.5536
4	00:01:00	11.2620	-0.2120	-1.4286	0.5536
5	00:02:00	11.2620	-0.2120	-1.4286	0.5536
6	00:04:00	11.2620	-0.2120	-1.4286	0.5536
7	00:08:00	11.2620	-0.2120	-1.4286	0.5536
8	00:15:01	11.2580	-0.2080	-1.4016	0.5532
9	00:30:02	11.2580	-0.2080	-1.4016	0.5532
10	01:00:05	11.2580	-0.2080	-1.4016	0.5532
11	02:00:10	11.2580	-0.2080	-1.4016	0.5532
12	04:00:20	11.2580	-0.2080	-1.4016	0.5532
13	08:00:41	11.2580	-0.2080	-1.4016	0.5532
14	12:01:03	11.2580	-0.2080	-1.4016	0.5532
15	21:02:00	11.2560	-0.2060	-1.3881	0.5530

Consolidation Test Results (Sequence 3) Load 20.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 4) Load 40.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 29-Oct-18

Test Number:

Sample Number: GL1A ST16

Soil Description:

Boring Number:

Clay (Cl), Trace Sand, Trace Gravel

Depth: 7.2-7.65m

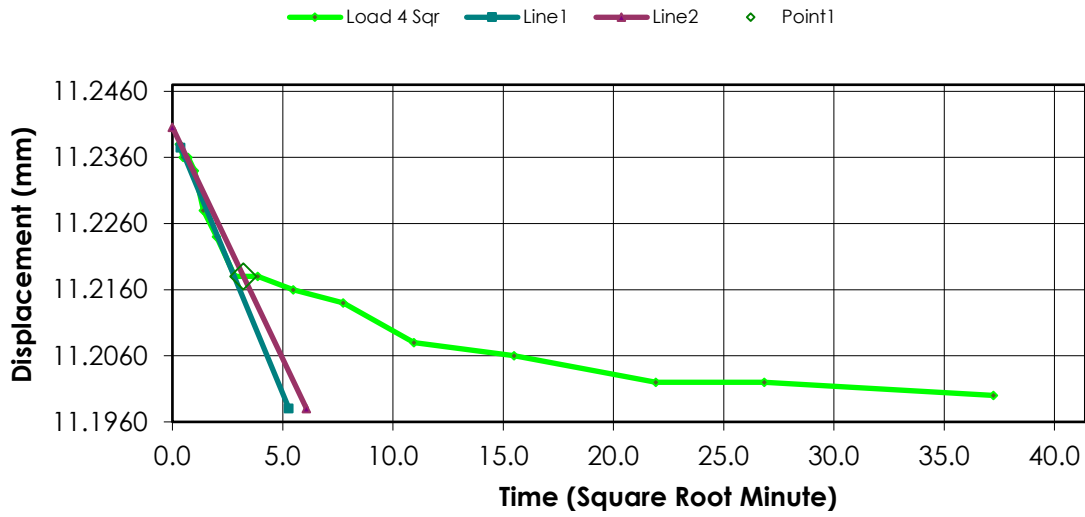
Remarks:

Sample Type: Undisturbed

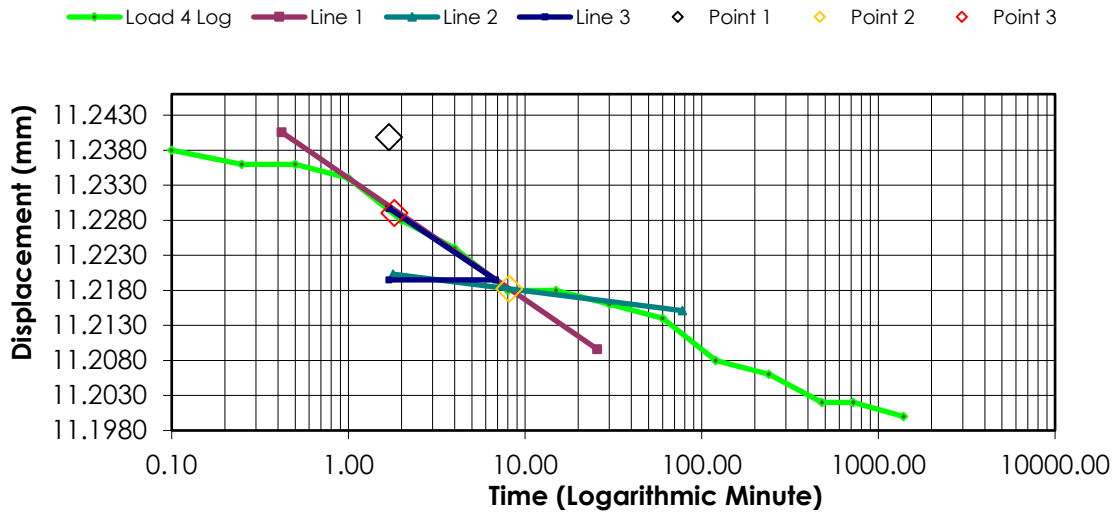
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	11.2560	-0.2060	-1.3881	0.5530
1	00:00:06	11.2380	-0.2340	-1.5768	0.5559
2	00:00:15	11.2360	-0.2320	-1.5633	0.5557
3	00:00:30	11.2360	-0.2320	-1.5633	0.5557
4	00:01:00	11.2340	-0.2300	-1.5499	0.5555
5	00:02:00	11.2280	-0.2240	-1.5094	0.5548
6	00:04:00	11.2240	-0.2200	-1.4825	0.5544
7	00:08:01	11.2180	-0.2140	-1.4420	0.5538
8	00:15:01	11.2180	-0.2140	-1.4420	0.5538
9	00:30:03	11.2160	-0.2120	-1.4286	0.5536
10	01:00:05	11.2140	-0.2100	-1.4151	0.5534
11	02:00:10	11.2080	-0.2040	-1.3747	0.5528
12	04:00:21	11.2060	-0.2020	-1.3612	0.5526
13	08:00:42	11.2020	-0.1980	-1.3342	0.5521
14	12:01:03	11.2020	-0.1980	-1.3342	0.5521
15	23:07:01	11.2000	-0.1960	-1.3208	0.5519

Consolidation Test Results (Sequence 4) Load 40.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 5) Load 80.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 29-Oct-18

Test Number:

Sample Number: GL1A ST16

Soil Description:

Boring Number:

Clay (Cl), Trace Sand, Trace Gravel

Depth: 7.2-7.65m

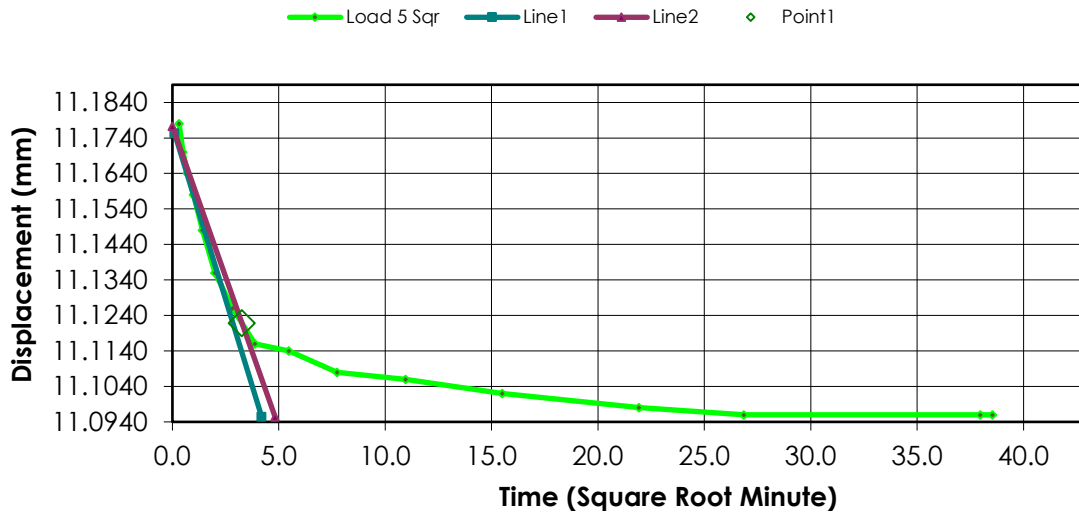
Remarks:

Sample Type: Undisturbed

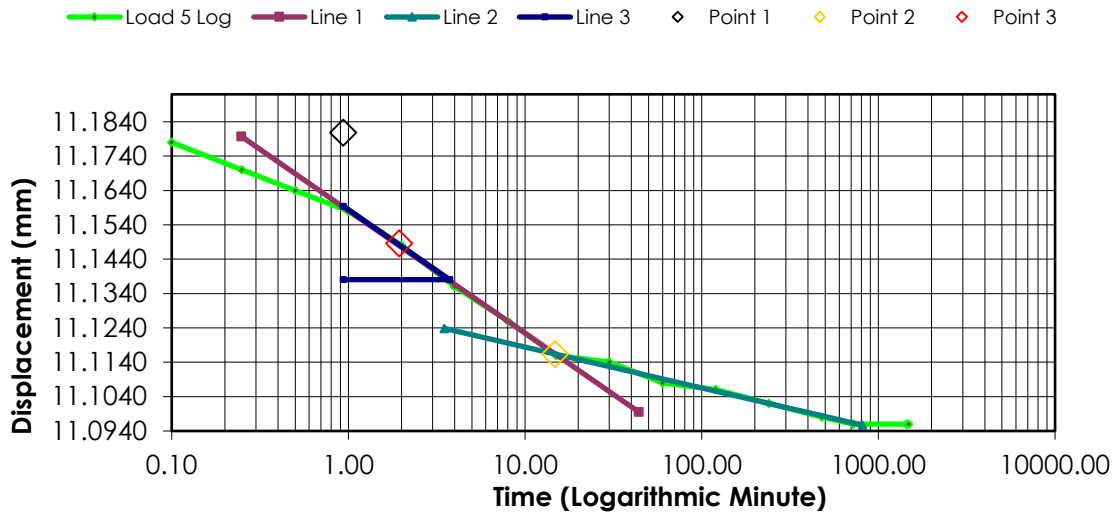
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	11.2000	-0.1960	-1.3208	0.5519
1	00:00:06	11.1780	-0.2120	-1.4286	0.5536
2	00:00:15	11.1700	-0.2040	-1.3747	0.5528
3	00:00:30	11.1640	-0.1980	-1.3342	0.5521
4	00:01:00	11.1580	-0.1920	-1.2938	0.5515
5	00:02:00	11.1480	-0.1820	-1.2264	0.5505
6	00:04:00	11.1360	-0.1700	-1.1456	0.5493
7	00:08:01	11.1260	-0.1600	-1.0782	0.5482
8	00:15:01	11.1160	-0.1500	-1.0108	0.5472
9	00:30:03	11.1140	-0.1480	-0.9973	0.5470
10	01:00:05	11.1080	-0.1420	-0.9569	0.5464
11	02:00:11	11.1060	-0.1400	-0.9434	0.5462
12	04:00:21	11.1020	-0.1360	-0.9164	0.5457
13	08:00:42	11.0980	-0.1320	-0.8895	0.5453
14	12:01:04	11.0960	-0.1300	-0.8760	0.5451
15	24:02:07	11.0960	-0.1300	-0.8760	0.5451
16	24:45:36	11.0960	-0.1300	-0.8760	0.5451

Consolidation Test Results (Sequence 5) Load 80.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 6) Load 160.000 kPa

Project: SR1 2018 Investigation
Location:
Job Number:

Project Number: 110773396

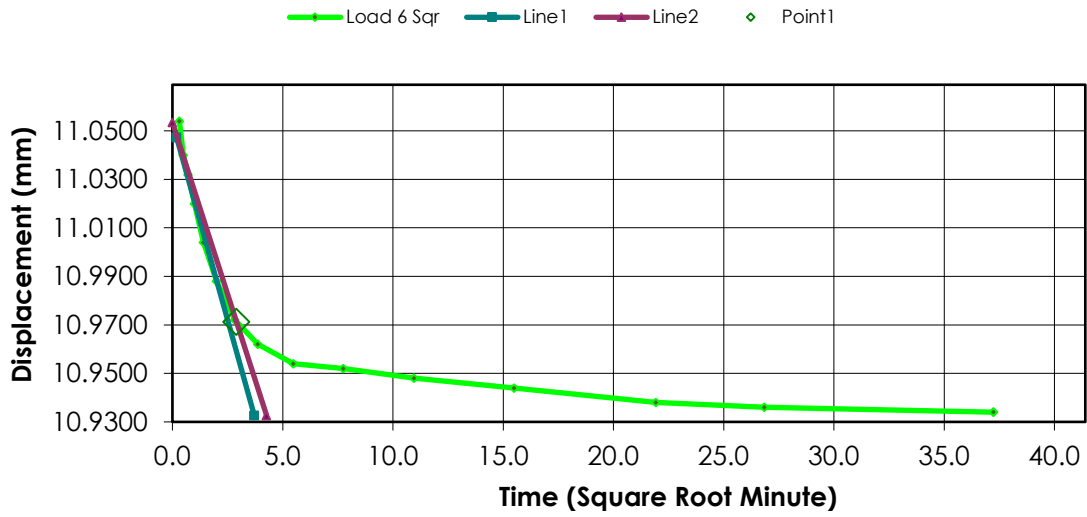
Test Date: 29-Oct-18
Test Number:

Sample Number: GL1A ST16 **Soil Description:**
Boring Number: Clay (Cl), Trace Sand, Trace Gravel
Depth: 7.2-7.65m **Remarks:**
Sample Type: Undisturbed

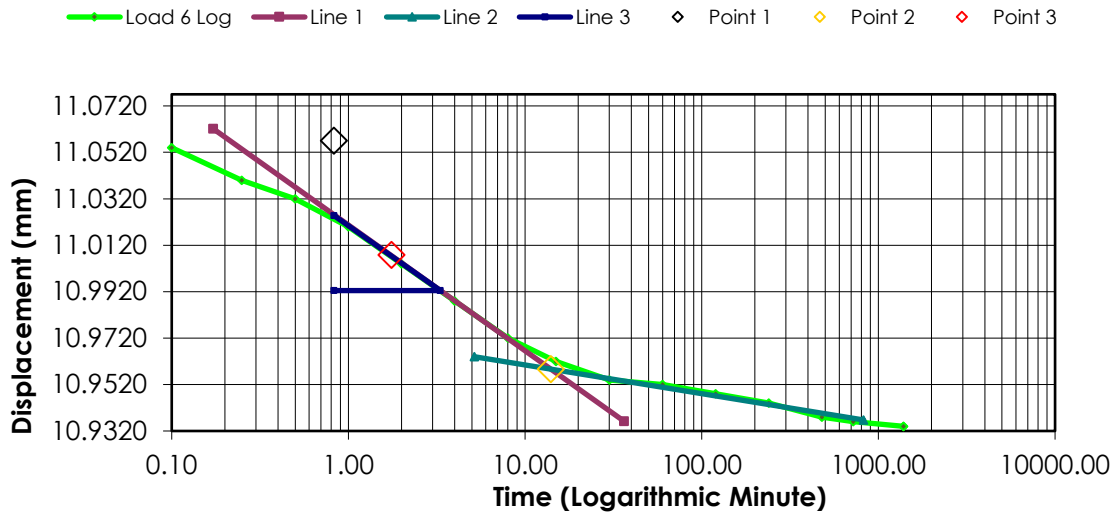
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	11.0960	-0.1300	-0.8760	0.5451
1	00:00:06	11.0540	-0.1080	-0.7278	0.5429
2	00:00:15	11.0400	-0.0940	-0.6334	0.5414
3	00:00:30	11.0320	-0.0860	-0.5795	0.5406
4	00:01:00	11.0200	-0.0740	-0.4987	0.5393
5	00:02:00	11.0040	-0.0580	-0.3908	0.5377
6	00:04:00	10.9880	-0.0420	-0.2830	0.5360
7	00:08:01	10.9720	-0.0260	-0.1752	0.5344
8	00:15:01	10.9620	-0.0160	-0.1078	0.5334
9	00:30:02	10.9540	-0.0080	-0.0539	0.5325
10	01:00:05	10.9520	-0.0060	-0.0404	0.5323
11	02:00:10	10.9480	-0.0020	-0.0135	0.5319
12	04:00:20	10.9440	0.0020	0.0135	0.5315
13	08:00:41	10.9380	0.0080	0.0539	0.5309
14	12:01:02	10.9360	0.0100	0.0674	0.5307
15	23:07:00	10.9340	0.0120	0.0809	0.5305
16	23:07:02	10.9340	0.0120	0.0809	0.5305

Consolidation Test Results (Sequence 6) Load 160.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 7) Load 320.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 29-Oct-18

Test Number:

Sample Number: GL1A ST16

Soil Description:

Boring Number:

Clay (Cl), Trace Sand, Trace Gravel

Depth: 7.2-7.65m

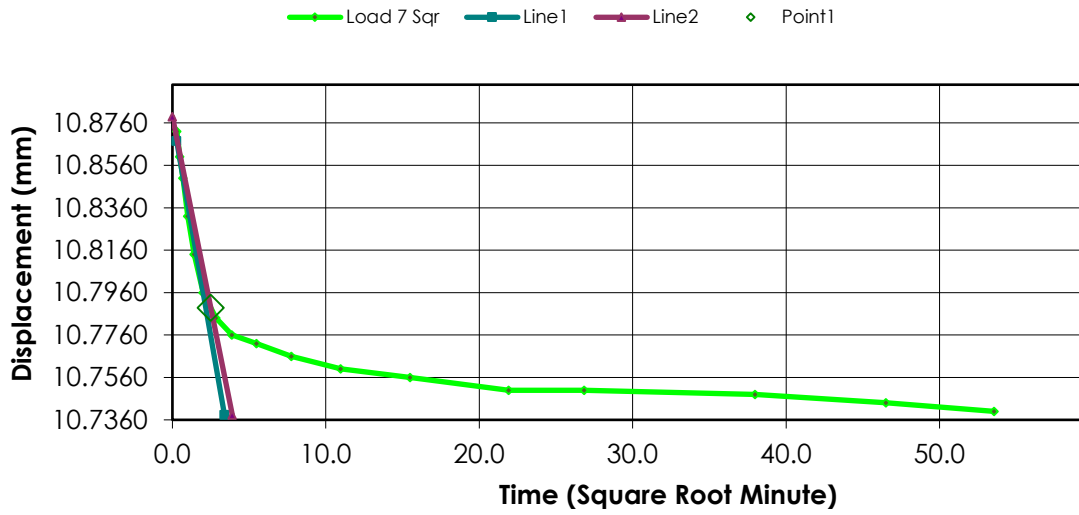
Remarks:

Sample Type: Undisturbed

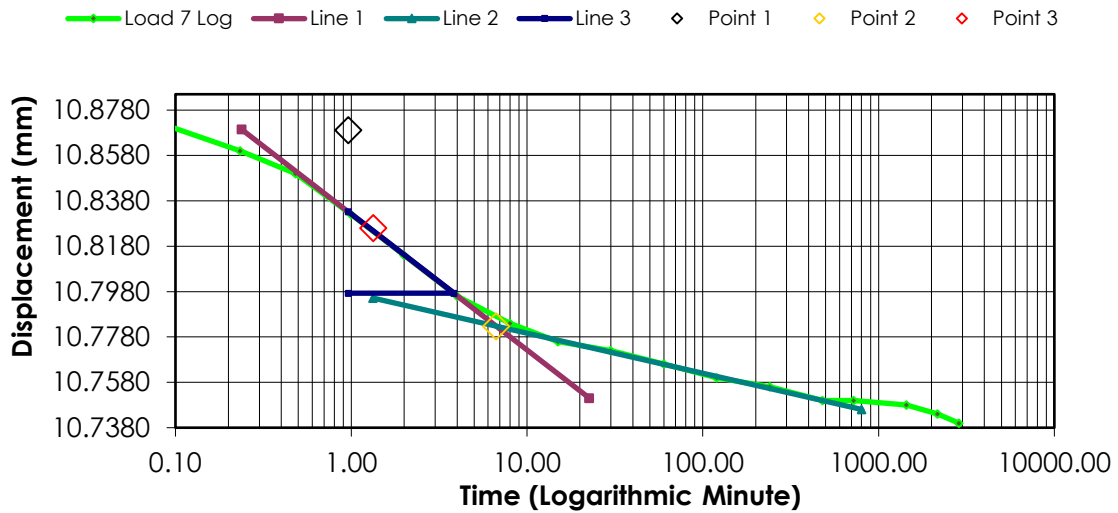
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	10.9340	0.0120	0.0809	0.5305
1	00:00:05	10.8720	0.0420	0.2830	0.5274
2	00:00:14	10.8600	0.0540	0.3639	0.5261
3	00:00:29	10.8500	0.0640	0.4313	0.5251
4	00:01:00	10.8320	0.0820	0.5526	0.5232
5	00:02:00	10.8140	0.1000	0.6739	0.5214
6	00:04:00	10.7960	0.1180	0.7951	0.5195
7	00:08:00	10.7840	0.1300	0.8760	0.5183
8	00:15:01	10.7760	0.1380	0.9299	0.5175
9	00:30:02	10.7720	0.1420	0.9569	0.5171
10	01:00:05	10.7660	0.1480	0.9973	0.5164
11	02:00:10	10.7600	0.1540	1.0377	0.5158
12	04:00:20	10.7560	0.1580	1.0647	0.5154
13	08:00:42	10.7500	0.1640	1.1051	0.5148
14	12:01:03	10.7500	0.1640	1.1051	0.5148
15	24:02:06	10.7480	0.1660	1.1186	0.5146
16	36:03:10	10.7440	0.1700	1.1456	0.5142
17	47:49:02	10.7400	0.1740	1.1725	0.5138

Consolidation Test Results (Sequence 7) Load 320.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 8) Load 640.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 29-Oct-18

Test Number:

Sample Number: GL1A ST16

Soil Description:

Boring Number:

Clay (Cl), Trace Sand, Trace Gravel

Depth: 7.2-7.65m

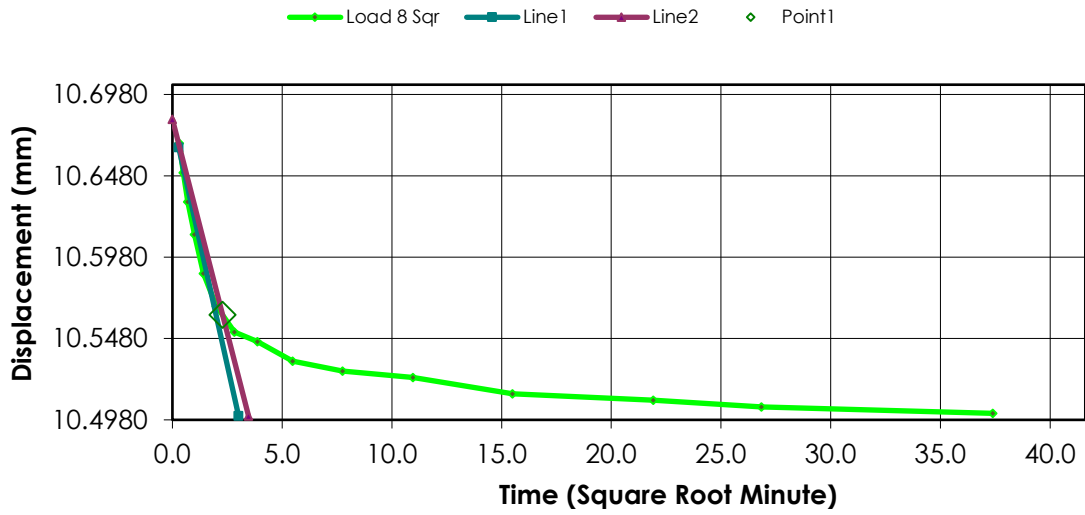
Remarks:

Sample Type: Undisturbed

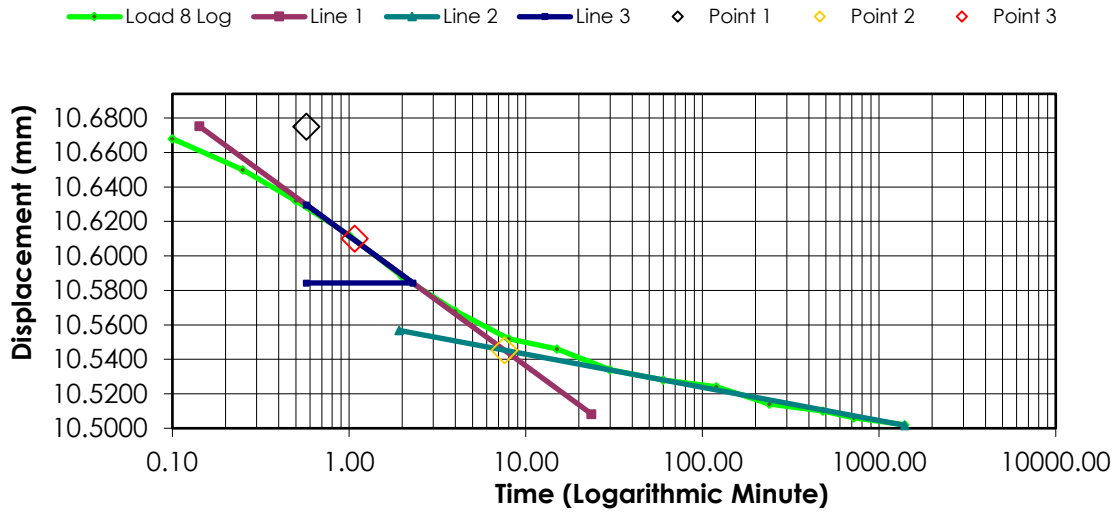
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	10.7400	0.1740	1.1725	0.5138
1	00:00:06	10.6680	0.2060	1.3881	0.5104
2	00:00:15	10.6500	0.2240	1.5094	0.5086
3	00:00:30	10.6320	0.2420	1.6307	0.5067
4	00:01:00	10.6120	0.2620	1.7655	0.5047
5	00:02:00	10.5880	0.2860	1.9272	0.5022
6	00:04:00	10.5680	0.3060	2.0620	0.5001
7	00:08:00	10.5520	0.3220	2.1698	0.4985
8	00:15:01	10.5460	0.3280	2.2102	0.4979
9	00:30:02	10.5340	0.3400	2.2911	0.4966
10	01:00:05	10.5280	0.3460	2.3315	0.4960
11	02:00:10	10.5240	0.3500	2.3585	0.4956
12	04:00:21	10.5140	0.3600	2.4259	0.4946
13	08:00:42	10.5100	0.3640	2.4528	0.4941
14	12:01:03	10.5060	0.3680	2.4798	0.4937
15	23:18:27	10.5020	0.3720	2.5067	0.4933

Consolidation Test Results (Sequence 8) Load 640.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 9) Rebound 320.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 29-Oct-18

Test Number:

Sample Number: GL1A ST16

Soil Description:

Boring Number:

Clay (Cl), Trace Sand, Trace Gravel

Depth: 7.2-7.65m

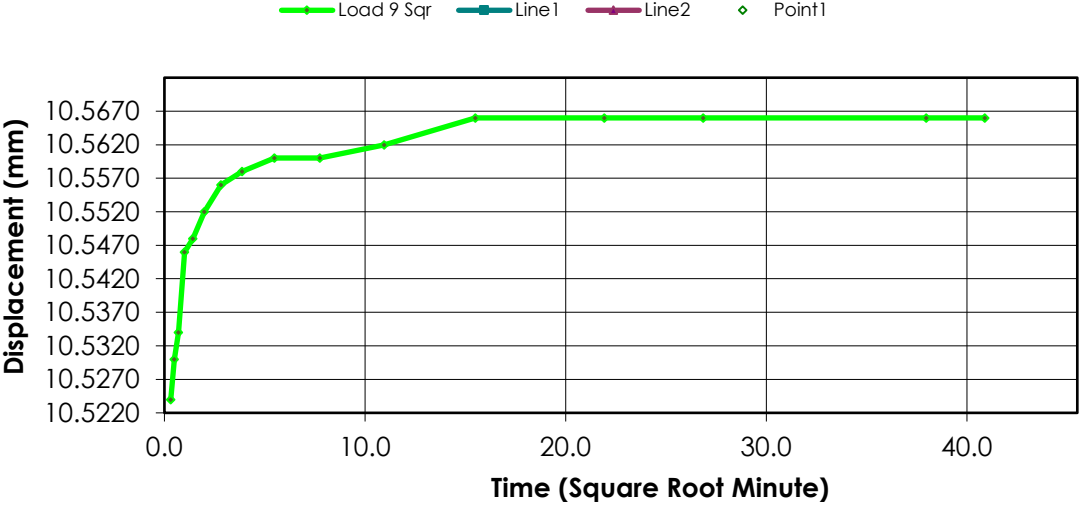
Remarks:

Sample Type: Undisturbed

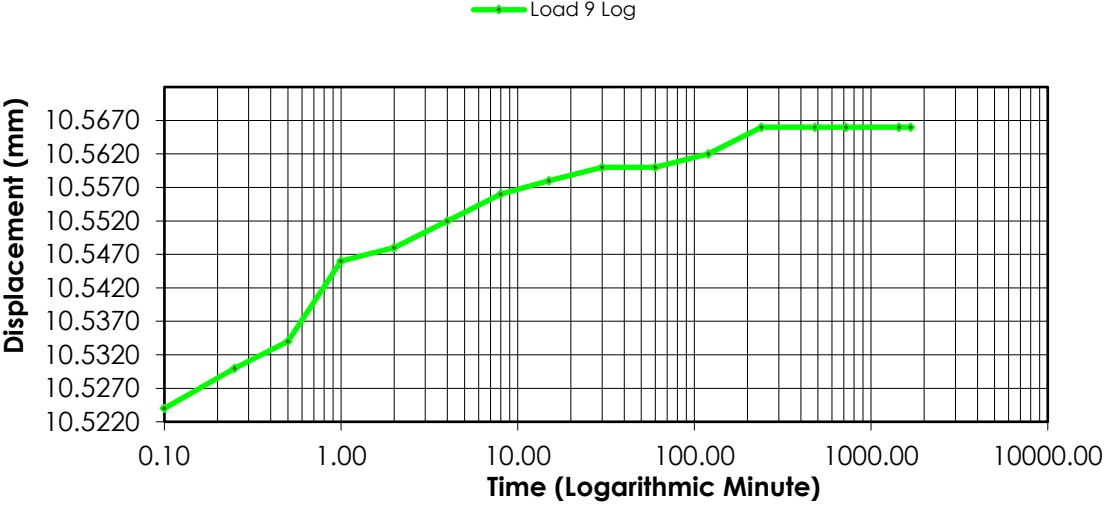
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	10.5020	0.3720	2.5067	0.4933
1	00:00:06	10.5240	0.3620	2.4394	0.4943
2	00:00:15	10.5300	0.3560	2.3989	0.4950
3	00:00:30	10.5340	0.3520	2.3720	0.4954
4	00:01:00	10.5460	0.3400	2.2911	0.4966
5	00:02:00	10.5480	0.3380	2.2776	0.4968
6	00:04:00	10.5520	0.3340	2.2507	0.4972
7	00:08:01	10.5560	0.3300	2.2237	0.4977
8	00:15:01	10.5580	0.3280	2.2102	0.4979
9	00:30:03	10.5600	0.3260	2.1968	0.4981
10	01:00:05	10.5600	0.3260	2.1968	0.4981
11	02:00:10	10.5620	0.3240	2.1833	0.4983
12	04:00:21	10.5660	0.3200	2.1563	0.4987
13	08:00:42	10.5660	0.3200	2.1563	0.4987
14	12:01:04	10.5660	0.3200	2.1563	0.4987
15	24:02:07	10.5660	0.3200	2.1563	0.4987
16	27:52:17	10.5660	0.3200	2.1563	0.4987

Consolidation Test Results (Sequence 9) Rebound 320.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 10) Rebound 160.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 29-Oct-18

Test Number:

Sample Number: GL1A ST16

Soil Description:

Boring Number:

Clay (Cl), Trace Sand, Trace Gravel

Depth: 7.2-7.65m

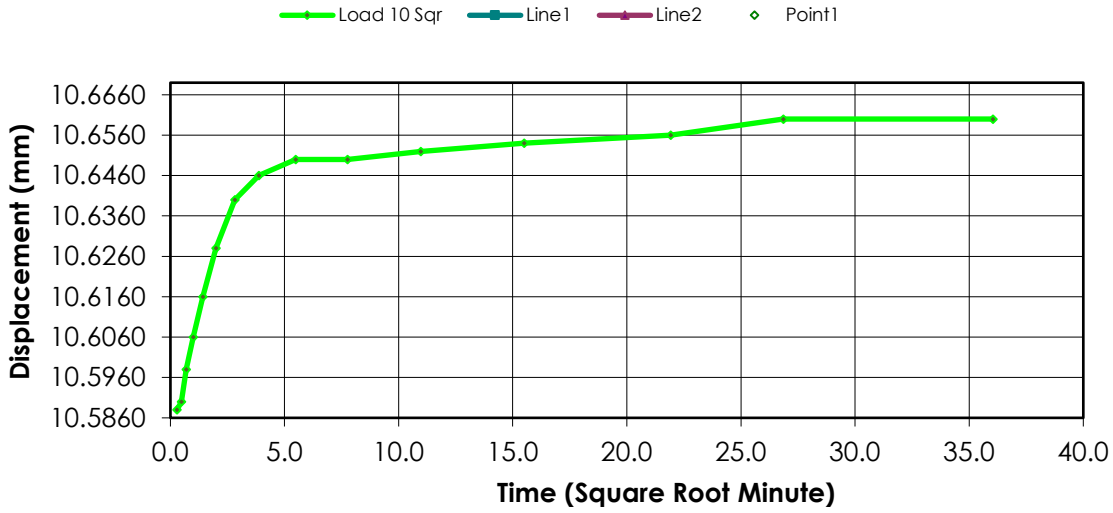
Remarks:

Sample Type: Undisturbed

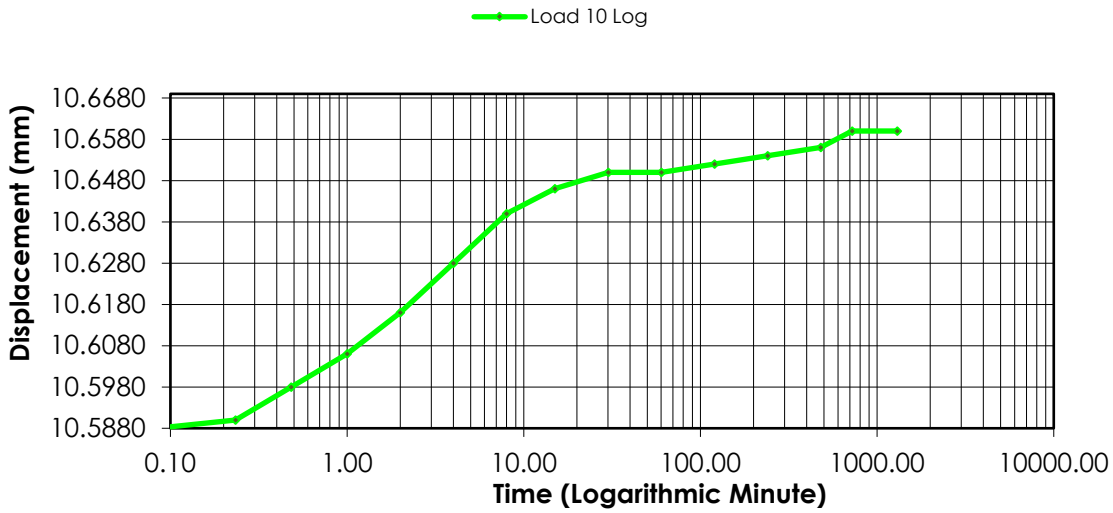
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	10.5660	0.3200	2.1563	0.4987
1	00:00:05	10.5880	0.3160	2.1294	0.4991
2	00:00:14	10.5900	0.3140	2.1159	0.4993
3	00:00:29	10.5980	0.3060	2.0620	0.5001
4	00:01:00	10.6060	0.2980	2.0081	0.5010
5	00:02:00	10.6160	0.2880	1.9407	0.5020
6	00:04:00	10.6280	0.2760	1.8598	0.5032
7	00:08:00	10.6400	0.2640	1.7790	0.5045
8	00:15:01	10.6460	0.2580	1.7385	0.5051
9	00:30:02	10.6500	0.2540	1.7116	0.5055
10	01:00:05	10.6500	0.2540	1.7116	0.5055
11	02:00:10	10.6520	0.2520	1.6981	0.5057
12	04:00:21	10.6540	0.2500	1.6846	0.5059
13	08:00:42	10.6560	0.2480	1.6712	0.5061
14	12:01:03	10.6600	0.2440	1.6442	0.5065
15	21:38:27	10.6600	0.2440	1.6442	0.5065

Consolidation Test Results
(Sequence 10) Rebound 160.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 11) Load 320.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 29-Oct-18

Test Number:

Sample Number: GL1A ST16

Soil Description:

Boring Number:

Clay (Cl), Trace Sand, Trace Gravel

Depth: 7.2-7.65m

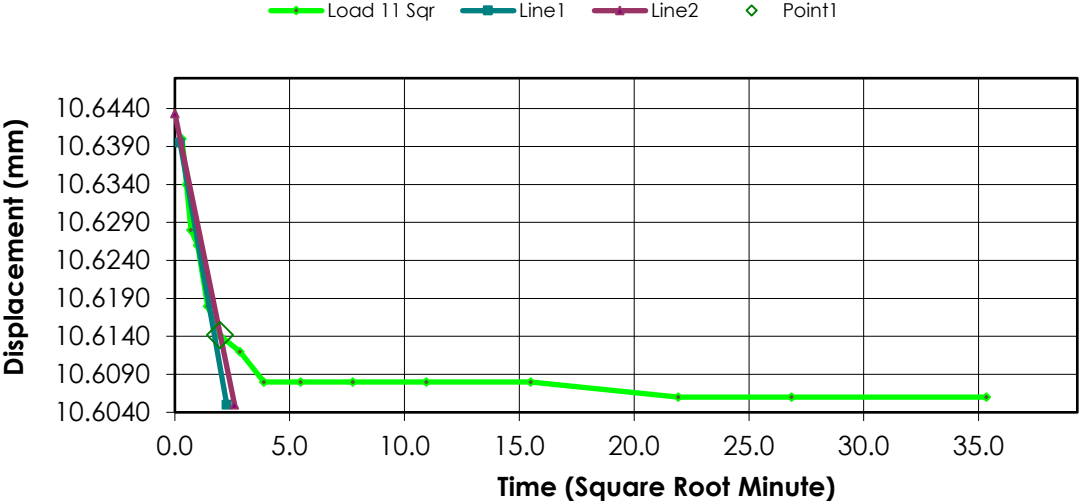
Remarks:

Sample Type: Undisturbed

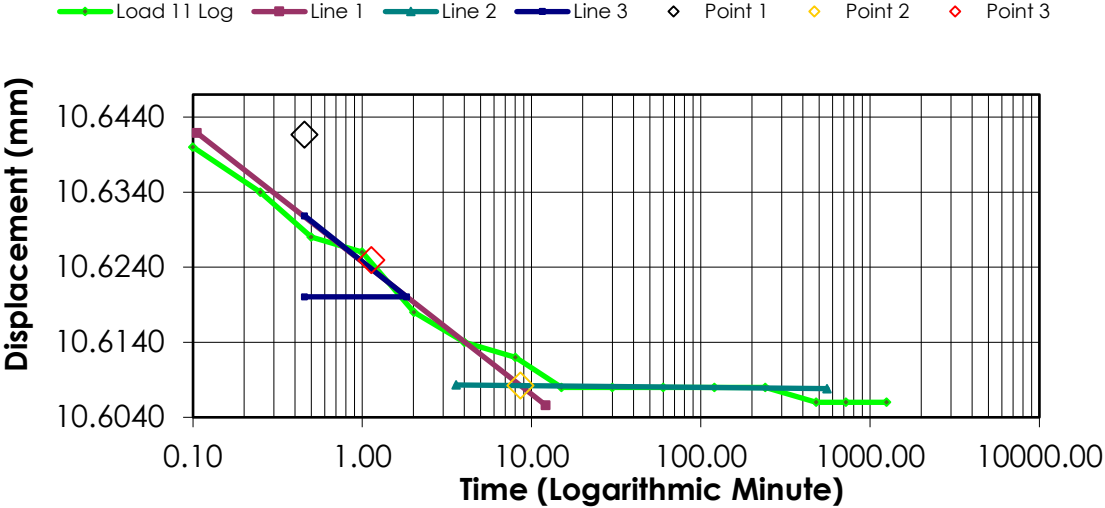
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	10.6600	0.2440	1.6442	0.5065
1	00:00:06	10.6400	0.2580	1.7385	0.5051
2	00:00:15	10.6340	0.2640	1.7790	0.5045
3	00:00:30	10.6280	0.2700	1.8194	0.5038
4	00:01:00	10.6260	0.2720	1.8329	0.5036
5	00:02:01	10.6180	0.2800	1.8868	0.5028
6	00:04:01	10.6140	0.2840	1.9138	0.5024
7	00:08:01	10.6120	0.2860	1.9272	0.5022
8	00:15:02	10.6080	0.2900	1.9542	0.5018
9	00:30:03	10.6080	0.2900	1.9542	0.5018
10	01:00:06	10.6080	0.2900	1.9542	0.5018
11	02:00:11	10.6080	0.2900	1.9542	0.5018
12	04:00:21	10.6080	0.2900	1.9542	0.5018
13	08:00:43	10.6060	0.2920	1.9677	0.5016
14	12:01:04	10.6060	0.2920	1.9677	0.5016
15	20:49:48	10.6060	0.2920	1.9677	0.5016

Consolidation Test Results (Sequence 11) Load 320.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 12) Load 640.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 29-Oct-18

Test Number:

Sample Number: GL1A ST16

Soil Description:

Boring Number:

Clay (Cl), Trace Sand, Trace Gravel

Depth: 7.2-7.65m

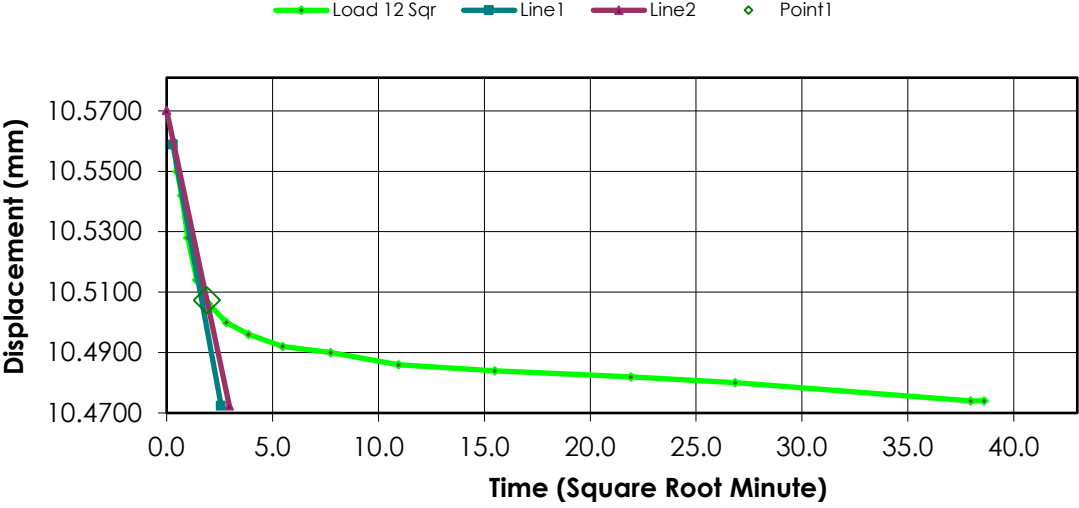
Remarks:

Sample Type: Undisturbed

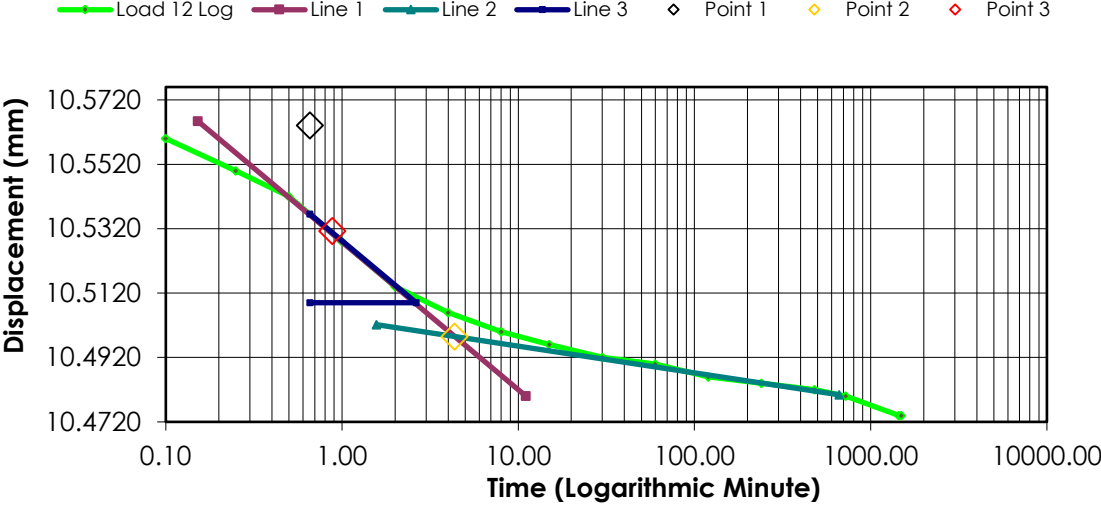
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	10.6060	0.2920	1.9677	0.5016
1	00:00:06	10.5600	0.3140	2.1159	0.4993
2	00:00:15	10.5500	0.3240	2.1833	0.4983
3	00:00:30	10.5420	0.3320	2.2372	0.4974
4	00:01:00	10.5280	0.3460	2.3315	0.4960
5	00:02:00	10.5140	0.3600	2.4259	0.4946
6	00:04:00	10.5060	0.3680	2.4798	0.4937
7	00:08:01	10.5000	0.3740	2.5202	0.4931
8	00:15:01	10.4960	0.3780	2.5472	0.4927
9	00:30:03	10.4920	0.3820	2.5741	0.4923
10	01:00:04	10.4900	0.3840	2.5876	0.4921
11	02:00:09	10.4860	0.3880	2.6146	0.4917
12	04:00:20	10.4840	0.3900	2.6280	0.4915
13	08:00:41	10.4820	0.3920	2.6415	0.4913
14	12:01:02	10.4800	0.3940	2.6550	0.4910
15	24:02:06	10.4740	0.4000	2.6954	0.4904
16	24:51:06	10.4740	0.4000	2.6954	0.4904

Consolidation Test Results (Sequence 12) Load 640.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 13) Load 1280.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 29-Oct-18

Test Number:

Sample Number: GL1A ST16

Soil Description:

Boring Number:

Clay (Cl), Trace Sand, Trace Gravel

Depth: 7.2-7.65m

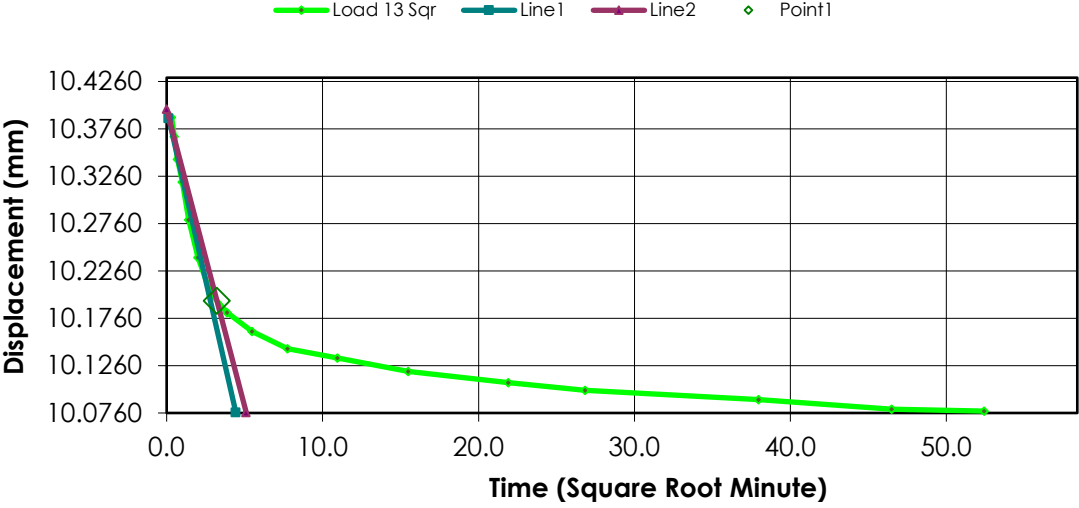
Remarks:

Sample Type: Undisturbed

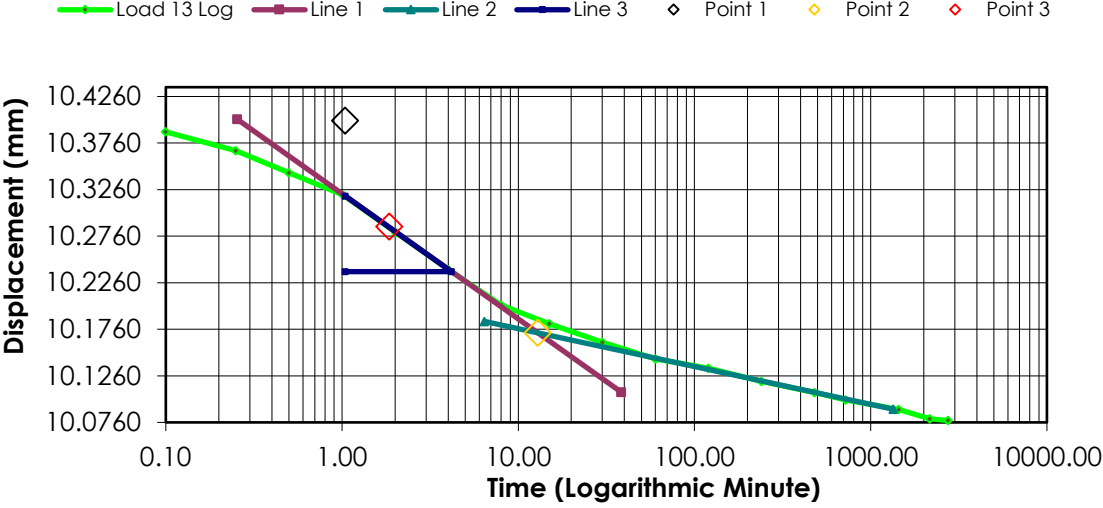
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	10.4740	0.4000	2.6954	0.4904
1	00:00:06	10.3880	0.4280	2.8841	0.4875
2	00:00:15	10.3680	0.4480	3.0189	0.4855
3	00:00:30	10.3440	0.4720	3.1806	0.4830
4	00:01:01	10.3200	0.4960	3.3423	0.4805
5	00:02:01	10.2800	0.5360	3.6119	0.4764
6	00:04:01	10.2400	0.5760	3.8814	0.4723
7	00:08:01	10.2020	0.6140	4.1375	0.4683
8	00:15:02	10.1820	0.6340	4.2722	0.4663
9	00:30:03	10.1620	0.6540	4.4070	0.4642
10	01:00:06	10.1440	0.6720	4.5283	0.4624
11	02:00:11	10.1340	0.6820	4.5957	0.4613
12	04:00:22	10.1200	0.6960	4.6900	0.4599
13	08:00:43	10.1080	0.7080	4.7709	0.4586
14	12:01:04	10.1000	0.7160	4.8248	0.4578
15	24:02:07	10.0900	0.7260	4.8922	0.4568
16	36:03:11	10.0800	0.7360	4.9596	0.4557
17	45:50:24	10.0780	0.7380	4.9730	0.4555

Consolidation Test Results (Sequence 13) Load 1280.000 kPa

Consolidation Graph (Squareroot Time)



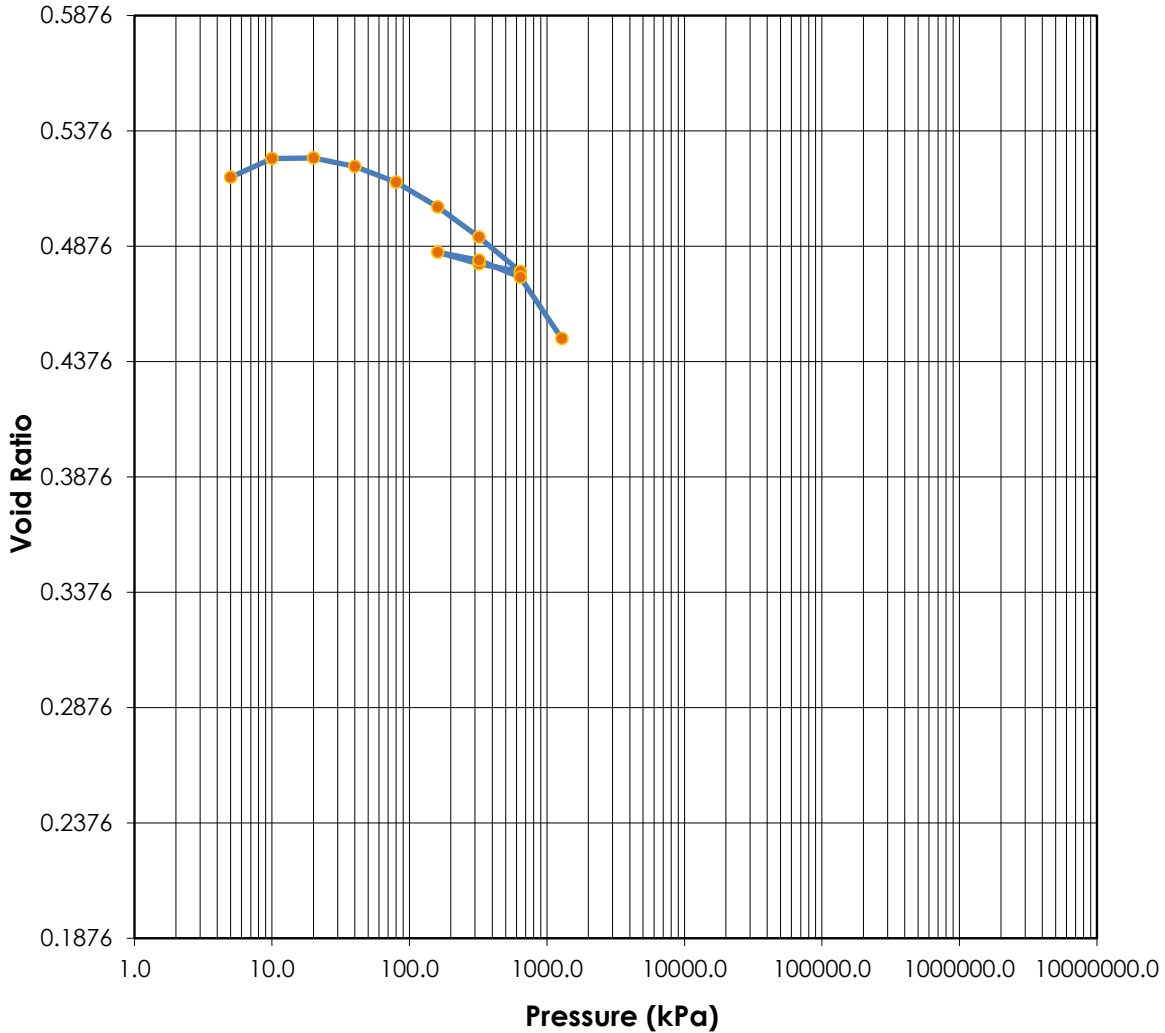
Consolidation Graph (Logarithmic Time)





Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876



	Before	After	Liquid Limits:	38	Test Date:	12-Nov-18
Moisture (%):	21.0	19.9	Plastic Limits:	17		
Dry Density (g/cm³):	1.743	1.832	Plasticity Index (%):	21		
Saturation (%):	100	100				
Void Ratio:	0.5164	0.4466	Specific Gravity:	2.65	Assumed	
Soil Description:	Clay (Cl), Trace Sand, Trace Gravel					
Project Number:	110773396	Depth:	10.9-11.35m			
Sample Number:	GL1A ST24	Boring Number:				
Project:	SRI 2018 Investigation					
Client:	Alberta Transportation					
Location:						
						Remarks:

Tested By: E. Wahl

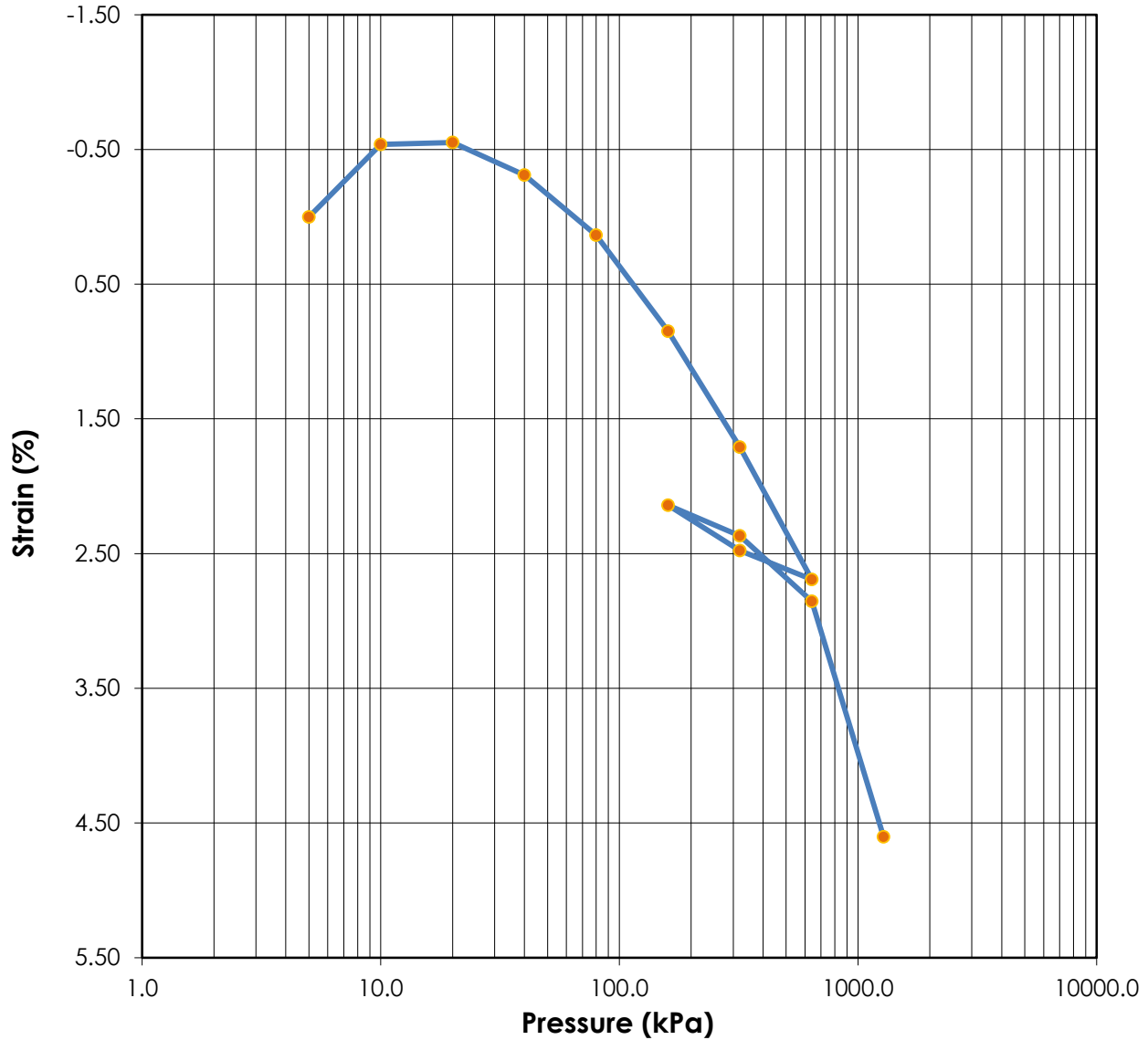
Reviewed By: C. Lamoureux

Reporting of these test results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request. The data presented above is for the sole use of the client stipulated above. Stantec is not responsible, nor can be held liable, for the use of this report by any other party, with or without the knowledge of Stantec.



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876

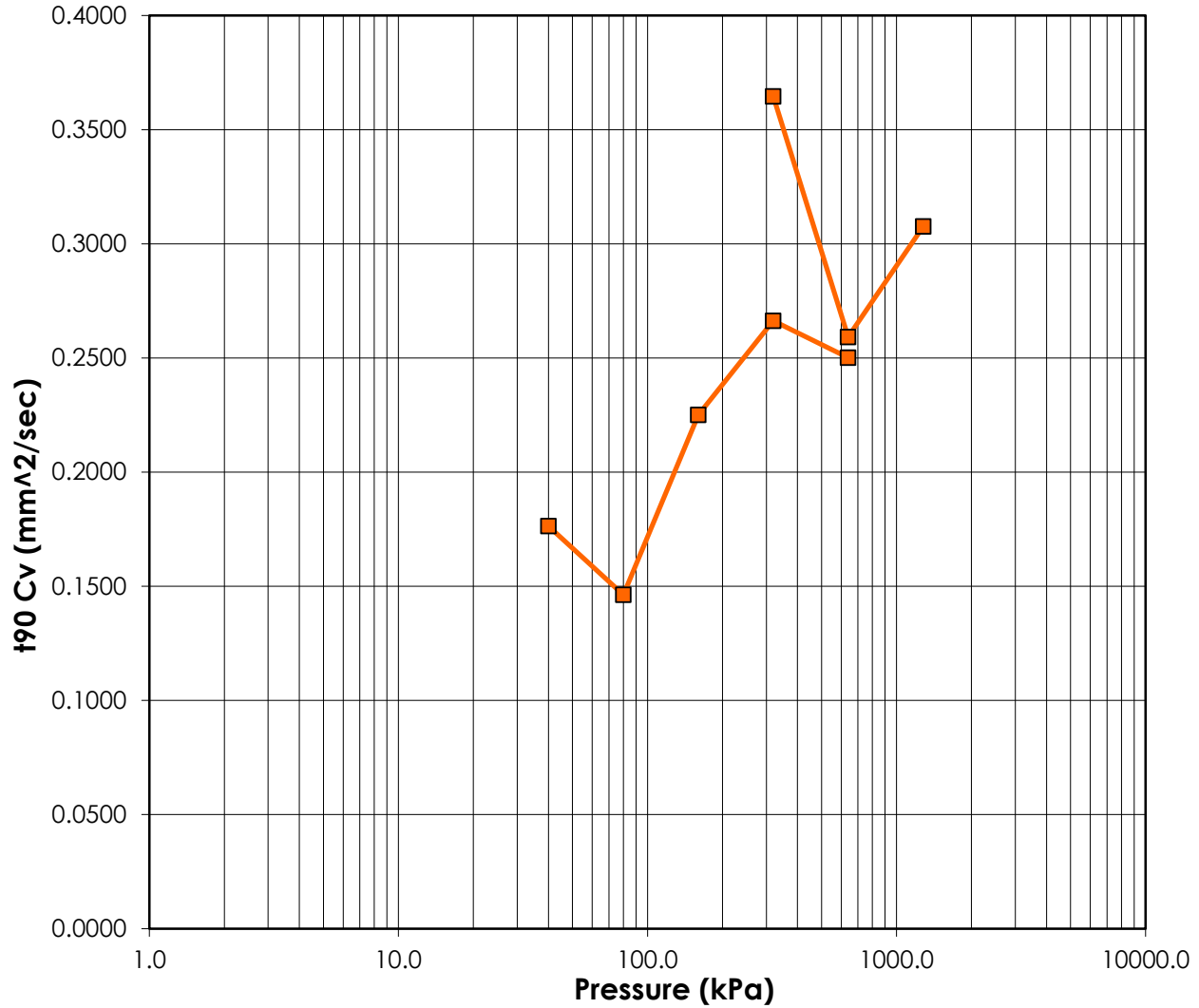


	Before	After	Liquid Limits:	38	Test Date:	12-Nov-18
Moisture (%):	21.0	19.9	Plastic Limits:	17		
Dry Density (g/cm3):	1.743	1.832	Plasticity Index (%):	21		
Saturation (%):	100	100	Specific Gravity:	2.65	Assumed	
Void Ratio:	0.5164	0.4466				
Sample Description:	Clay (Cl), Trace Sand, Trace Gravel					
Project Number:	110773396	Depth:	10.9-11.35m			
Sample Number:	GL1A ST24	Boring Number:				
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						
			Remarks:			



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
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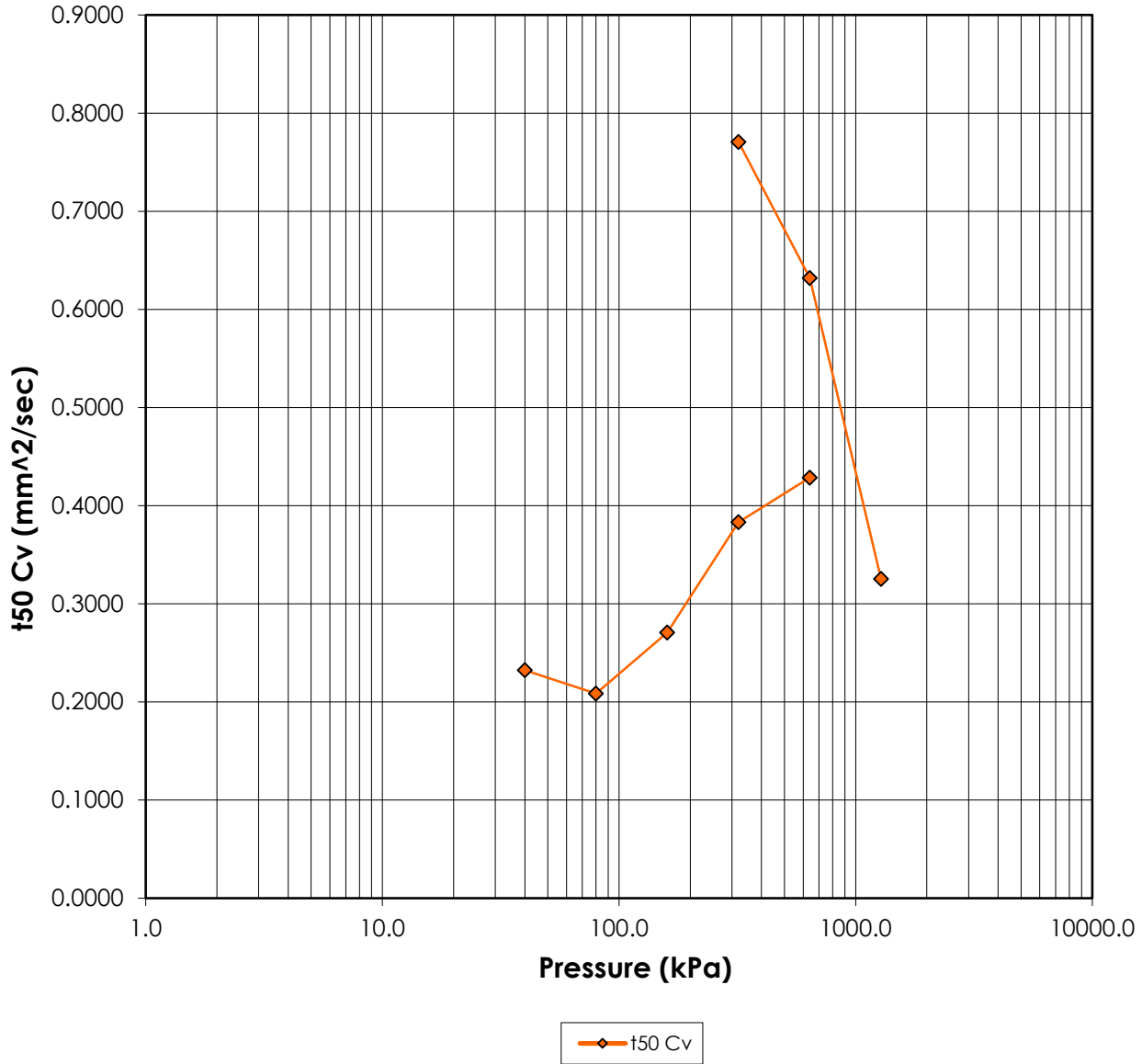
—■— t90 Cv

	Before	After	Liquid Limits:	38	Test Date:	12-Nov-18
Moisture (%):	21.0	19.9	Plastic Limits:	17		
Dry Density (g/cm³):	1.743	1.832	Plasticity Index (%):	21		
Saturation (%):	100	100				
Void Ratio:	0.5164	0.4466	Specific Gravity:	2.65	Assumed	
Soil Description:	Clay (Cl), Trace Sand, Trace Gravel					
Project Number:	110773396		Depth:	10.9-11.35m		
Sample Number:	GL1A ST24		Boring Number:			
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						
						Remarks:



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

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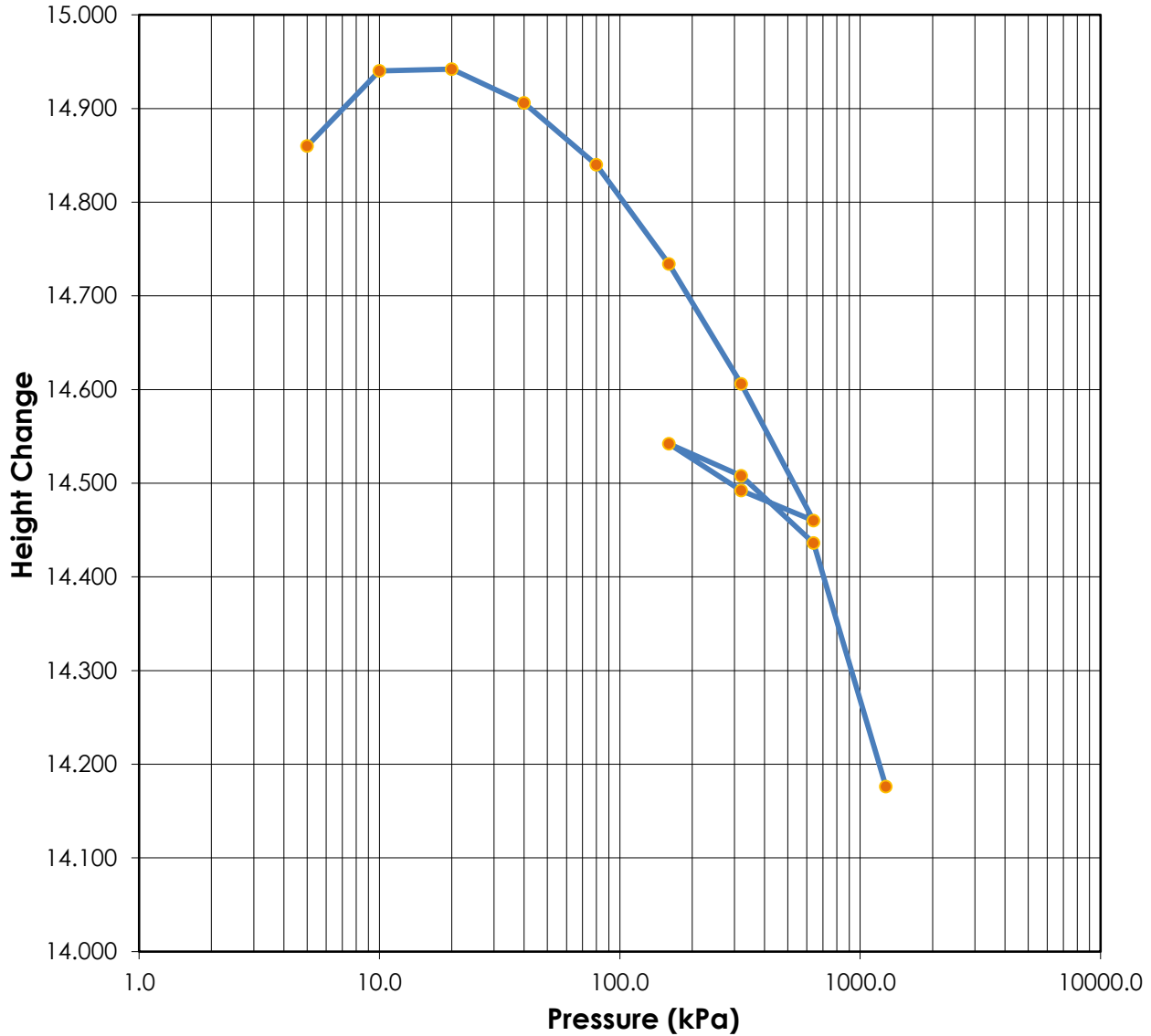


	Before	After	Liquid Limits:	38	Test Date:	12-Nov-18
Moisture (%):	21.0	19.9	Plastic Limits:	17		
Dry Density (g/cm³):	1.743	1.832	Plasticity Index (%):	21		
Saturation (%):	100	100	Specific Gravity:	2.65	Assumed	
Void Ratio:	0.5164	0.4466				
Soil Description:	Clay (Cl), Trace Sand, Trace Gravel					
Project Number:	110773396		Depth:	10.9-11.35m		
Sample Number:	GL1A ST24		Boring Number:			
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						
	Remarks:					



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One-Dimensional Consolidation Test
ASTM D2435
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	Before	After	Liquid Limits:	38	Test Date:	12-Nov-18
Moisture (%):	21.0	19.9	Plastic Limits:	17		
Dry Density (g/cm3):	1.743	1.832	Plasticity Index (%):	21		
Saturation (%):	100	100	Specific Gravity:	2.65	Assumed	
Void Ratio:	0.5164	0.4466				
Soil Description:	Clay (Cl), Trace Sand, Trace Gravel					
Project Number:	110773396	Depth:	10.9-11.35m			
Sample Number:	GL1A ST24	Boring Number:				
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						
			Remarks:			

Consolidation Test Results Summary

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Sample Number: GL1A ST24

Sample Description:

Boring Number:

Clay (Cl), Trace Sand, Trace Gravel

Depth: 10.9-11.35m

Remarks:

Test Number:

Sample Type: Undisturbed

Test Date: 12-Nov-18

Index	Load Sequence (kPa)	Cumulative Change in Height (mm)	Specimen Height (mm)	Height of Void (mm)	Vertical Strain (%)	Void Ratio	t90 Fitting Time (min)	t50 Fitting Time (min)	t90 Cv (mm ² /sec)	t50 Cv (mm ² /sec)
0	0.000	0.0000	14.8600	5.0672	0.00	0.5174	0.000	0.000	0.000	0.000
1	5.000	0.0000	14.8600	5.0672	0.00	0.5174	0.000	0.000	0.000	0.000
2	10.000	-0.0800	14.9400	5.1472	-0.54	0.5256	0.000	0.000	0.000	0.000
3	20.000	-0.0820	14.9420	5.1492	-0.55	0.5258	0.000	0.000	0.000	0.000
4	40.000	-0.0460	14.9060	5.1132	-0.31	0.5221	4.453	0.785	0.176	0.232
5	80.000	0.0200	14.8400	5.0472	0.13	0.5154	5.320	0.867	0.146	0.209
6	160.000	0.1260	14.7340	4.9412	0.85	0.5046	3.409	0.658	0.225	0.271
7	320.000	0.2540	14.6060	4.8132	1.71	0.4915	2.831	0.457	0.266	0.383
8	640.000	0.4000	14.4600	4.6672	2.69	0.4766	2.954	0.401	0.250	0.429
9	320.000	0.3680	14.4920	4.6992	2.48	0.4799	0.000	0.000	0.000	0.000
10	160.000	0.3180	14.5420	4.7492	2.14	0.4850	0.000	0.000	0.000	0.000
11	320.000	0.3520	14.5080	4.7152	2.37	0.4815	2.040	0.224	0.365	0.771
12	640.000	0.4240	14.4360	4.6432	2.85	0.4741	2.841	0.271	0.259	0.632
13	1280.000	0.6840	14.1760	4.3832	4.60	0.4476	2.308	0.507	0.308	0.325

Predicted value indicated with *

Consolidation Test
Consolidation Specimen Information

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 12-Nov-18

Sample Number: GL1A ST24

Sample Description:

Boring Number:

Clay (Cl), Trace Sand, Trace Gravel

Depth: 10.9-11.35m

Remarks:

Sample Type: Undisturbed

Test Number:

Liquid Limit: 38

Initial Void Ratio: 0.5164

Initial Height (mm): 14.86

Plastic Limit: 17

Plasticity Index (%): 21

Initial Diameter (mm): 50.00

Specific Gravity: 2.65

Weight of Ring (g): 60.80

Assumed

Parameters	Initial Specimen	Final Specimen
Moist Weight + Container (g)	65.50	64.49
Dry Soil + Container (g)	54.37	54.43
Weight of Container (g)	1.45	3.74
Moisture Content (%)	21.0	19.9
Void Ratio	0.5164	0.4466
Saturation (%)	100	100
Dry Density (g/cm ³)	1.743	1.832

**Consolidation Test Results
(Sequence 1) Load 5.000 kPa**

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 12-Nov-18

Test Number:

Sample Number: GL1A ST24

Soil Description:

Boring Number:

Clay (Cl), Trace Sand, Trace Gravel

Depth: 10.9-11.35m

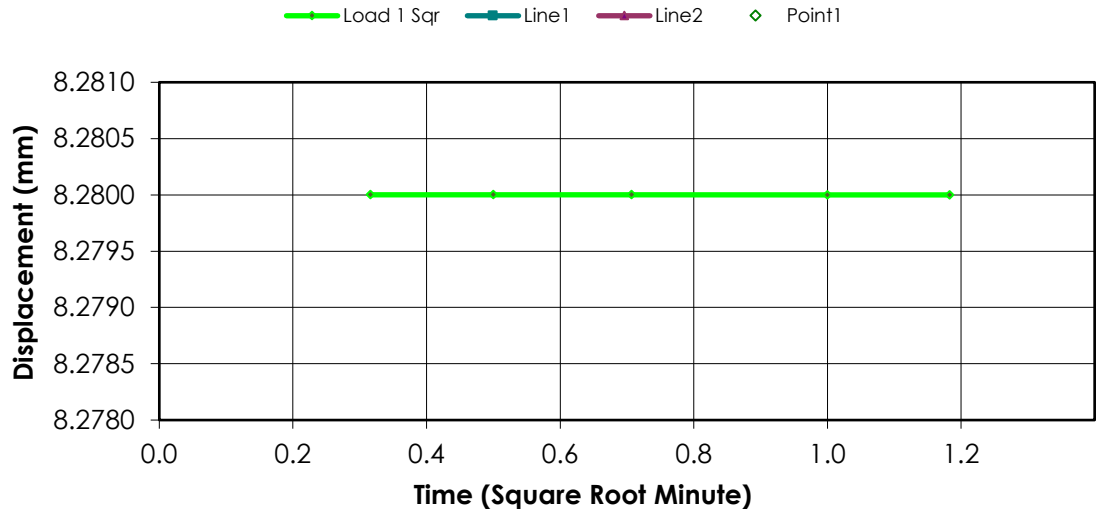
Remarks:

Sample Type: Undisturbed

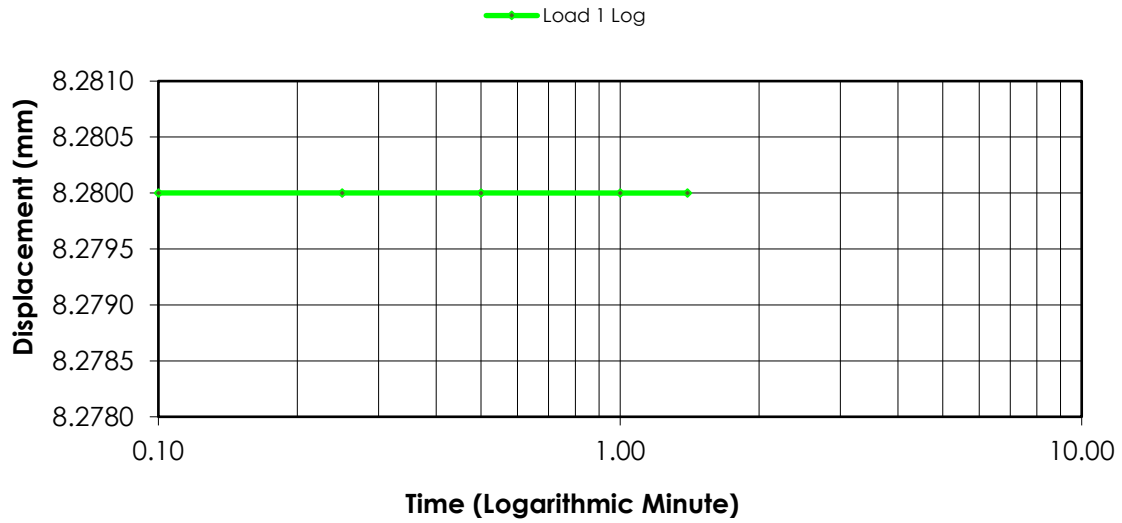
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.2800	0.0000	0.0000	0.5164
1	00:00:06	8.2800	0.0000	0.0000	0.5164
2	00:00:15	8.2800	0.0000	0.0000	0.5164
3	00:00:30	8.2800	0.0000	0.0000	0.5164
4	00:01:00	8.2800	0.0000	0.0000	0.5164
5	00:01:24	8.2800	0.0000	0.0000	0.5164

Consolidation Test Results (Sequence 1) Load 5.000 kPa

Consolidation Graph (Square-root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 2) Load 10.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 12-Nov-18

Test Number:

Sample Number: GL1A ST24

Soil Description:

Boring Number:

Clay (Cl), Trace Sand, Trace Gravel

Depth: 10.9-11.35m

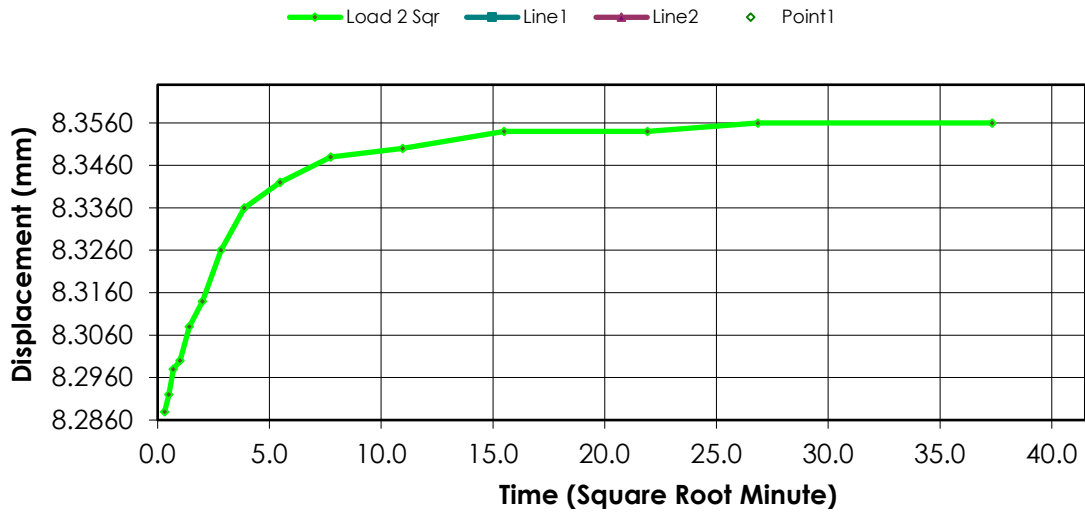
Remarks:

Sample Type: Undisturbed

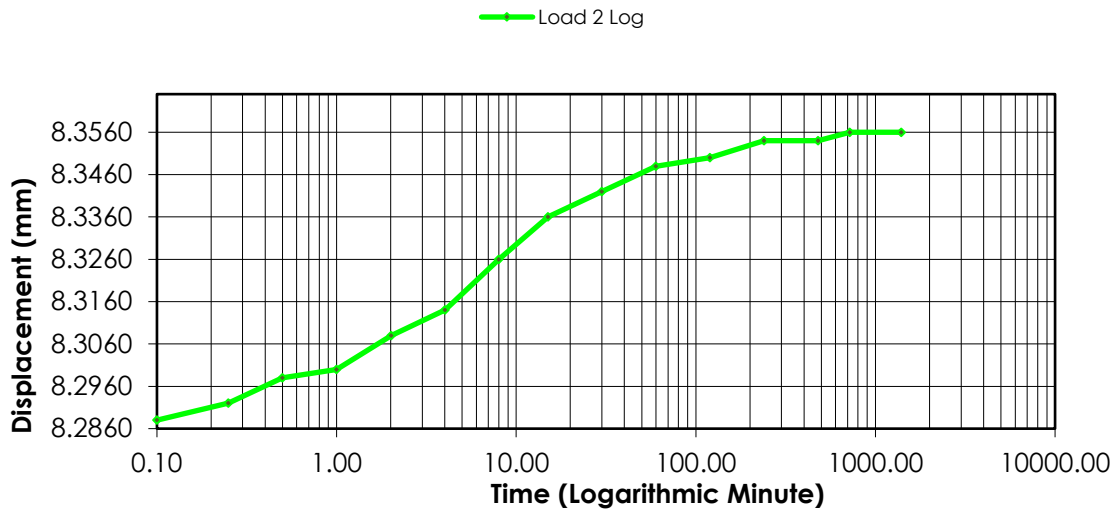
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.2800	0.0000	0.0000	0.5164
1	00:00:06	8.2880	-0.0120	-0.0808	0.5176
2	00:00:15	8.2920	-0.0160	-0.1077	0.5181
3	00:00:30	8.2980	-0.0220	-0.1480	0.5187
4	00:01:00	8.3000	-0.0240	-0.1615	0.5189
5	00:02:01	8.3080	-0.0320	-0.2153	0.5197
6	00:04:01	8.3140	-0.0380	-0.2557	0.5203
7	00:08:01	8.3260	-0.0500	-0.3365	0.5215
8	00:15:02	8.3360	-0.0600	-0.4038	0.5225
9	00:30:03	8.3420	-0.0660	-0.4441	0.5232
10	01:00:06	8.3480	-0.0720	-0.4845	0.5238
11	02:00:11	8.3500	-0.0740	-0.4980	0.5240
12	04:00:22	8.3540	-0.0780	-0.5249	0.5244
13	08:00:42	8.3540	-0.0780	-0.5249	0.5244
14	12:01:04	8.3560	-0.0800	-0.5384	0.5246
15	23:14:10	8.3560	-0.0800	-0.5384	0.5246

Consolidation Test Results (Sequence 2) Load 10.000 kPa

Consolidation Graph (Square Root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 3) Load 20.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 12-Nov-18

Test Number:

Sample Number: GL1A ST24

Soil Description:

Boring Number:

Clay (Cl), Trace Sand, Trace Gravel

Depth: 10.9-11.35m

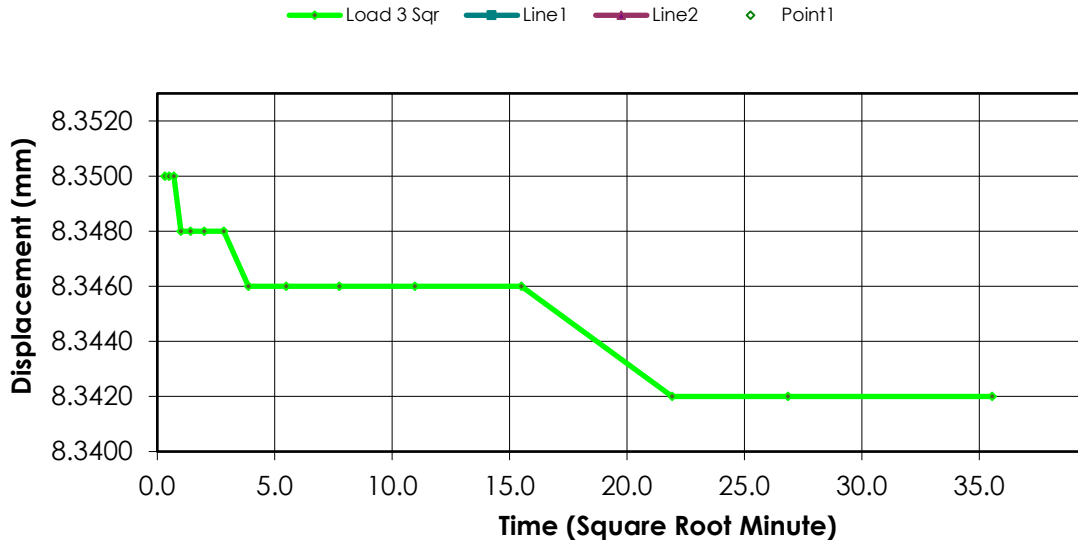
Remarks:

Sample Type: Undisturbed

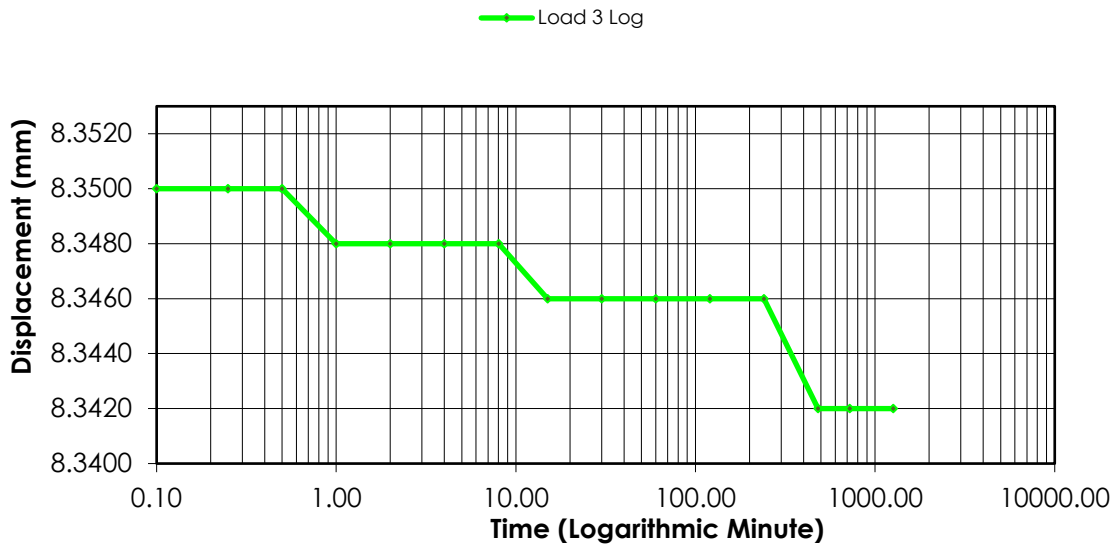
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.3560	-0.0800	-0.5384	0.5246
1	00:00:06	8.3500	-0.0900	-0.6056	0.5256
2	00:00:15	8.3500	-0.0900	-0.6056	0.5256
3	00:00:30	8.3500	-0.0900	-0.6056	0.5256
4	00:01:00	8.3480	-0.0880	-0.5922	0.5254
5	00:02:00	8.3480	-0.0880	-0.5922	0.5254
6	00:04:00	8.3480	-0.0880	-0.5922	0.5254
7	00:08:01	8.3480	-0.0880	-0.5922	0.5254
8	00:15:01	8.3460	-0.0860	-0.5787	0.5252
9	00:30:03	8.3460	-0.0860	-0.5787	0.5252
10	01:00:05	8.3460	-0.0860	-0.5787	0.5252
11	02:00:11	8.3460	-0.0860	-0.5787	0.5252
12	04:00:21	8.3460	-0.0860	-0.5787	0.5252
13	08:00:43	8.3420	-0.0820	-0.5518	0.5248
14	12:01:04	8.3420	-0.0820	-0.5518	0.5248
15	21:03:27	8.3420	-0.0820	-0.5518	0.5248

Consolidation Test Results (Sequence 3) Load 20.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



**Consolidation Test Results
(Sequence 4) Load 40.000 kPa**

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 12-Nov-18

Test Number:

Sample Number: GL1A ST24

Soil Description:

Boring Number:

Clay (Cl), Trace Sand, Trace Gravel

Depth: 10.9-11.35m

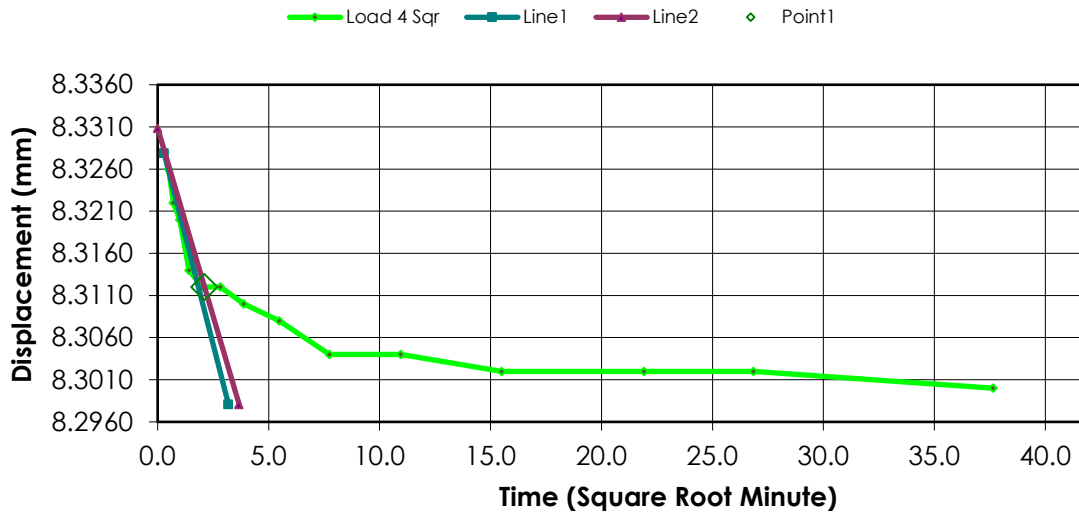
Remarks:

Sample Type: Undisturbed

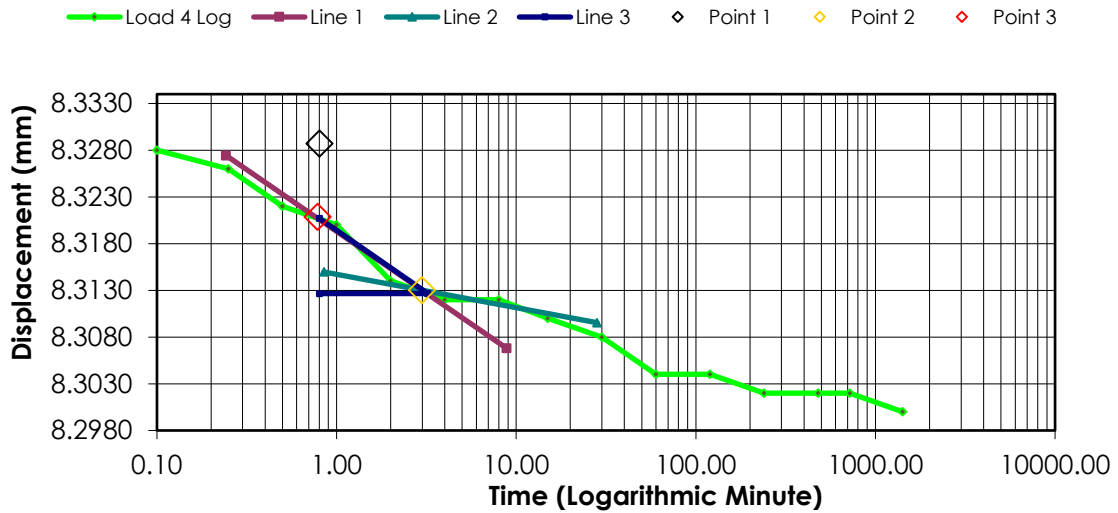
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.3420	-0.0820	-0.5518	0.5248
1	00:00:06	8.3280	-0.0740	-0.4980	0.5240
2	00:00:15	8.3260	-0.0720	-0.4845	0.5238
3	00:00:30	8.3220	-0.0680	-0.4576	0.5234
4	00:01:00	8.3200	-0.0660	-0.4441	0.5232
5	00:02:00	8.3140	-0.0600	-0.4038	0.5225
6	00:04:00	8.3120	-0.0580	-0.3903	0.5223
7	00:08:01	8.3120	-0.0580	-0.3903	0.5223
8	00:15:01	8.3100	-0.0560	-0.3768	0.5221
9	00:30:03	8.3080	-0.0540	-0.3634	0.5219
10	01:00:05	8.3040	-0.0500	-0.3365	0.5215
11	02:00:11	8.3040	-0.0500	-0.3365	0.5215
12	04:00:21	8.3020	-0.0480	-0.3230	0.5213
13	08:00:43	8.3020	-0.0480	-0.3230	0.5213
14	12:01:04	8.3020	-0.0480	-0.3230	0.5213
15	23:37:56	8.3000	-0.0460	-0.3096	0.5211

Consolidation Test Results (Sequence 4) Load 40.000 kPa

Consolidation Graph (Square Root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 5) Load 80.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 12-Nov-18

Test Number:

Sample Number: GL1A ST24

Soil Description:

Boring Number:

Clay (Cl), Trace Sand, Trace Gravel

Depth: 10.9-11.35m

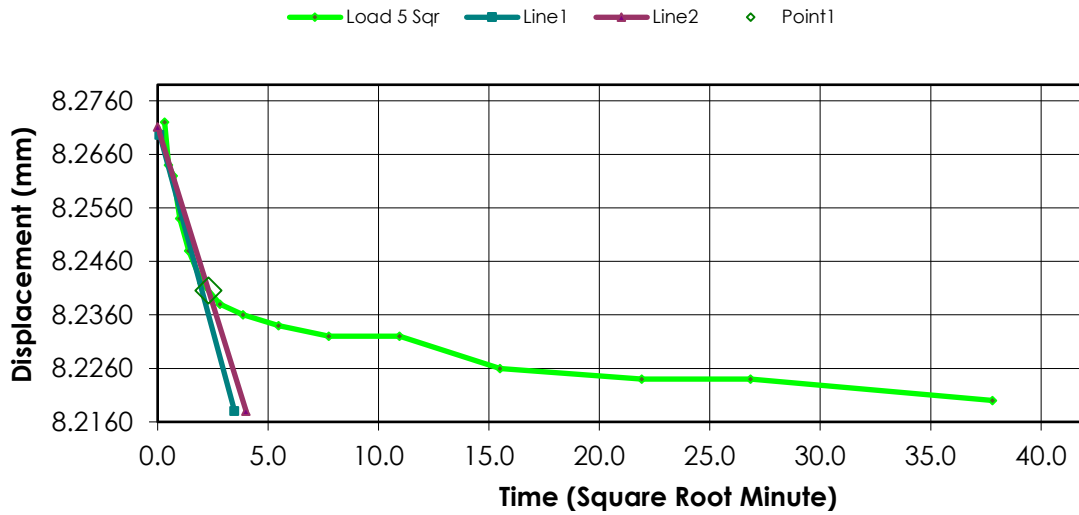
Remarks:

Sample Type: Undisturbed

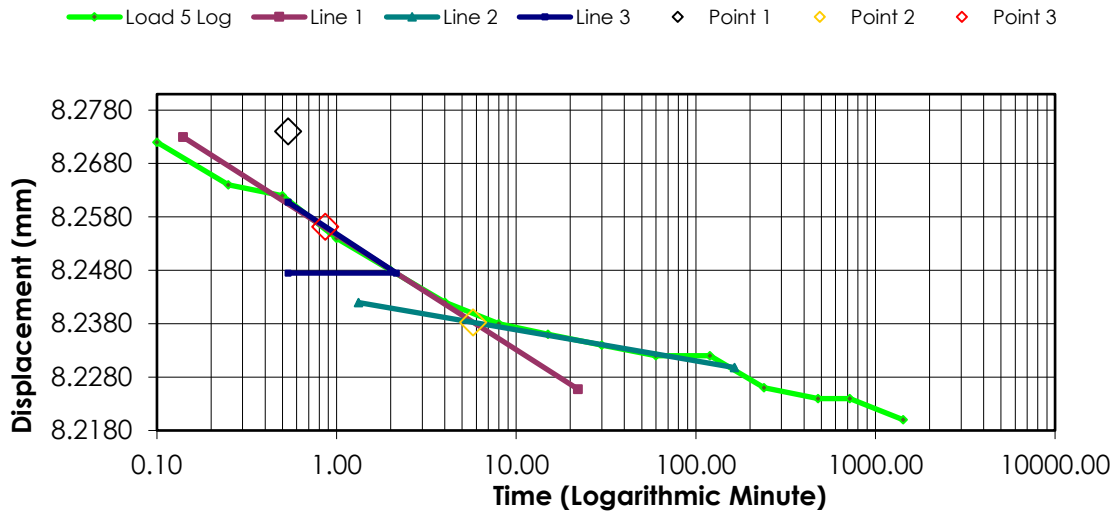
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.3000	-0.0460	-0.3096	0.5211
1	00:00:06	8.2720	-0.0320	-0.2153	0.5197
2	00:00:15	8.2640	-0.0240	-0.1615	0.5189
3	00:00:30	8.2620	-0.0220	-0.1480	0.5187
4	00:01:00	8.2540	-0.0140	-0.0942	0.5179
5	00:02:00	8.2480	-0.0080	-0.0538	0.5172
6	00:04:01	8.2420	-0.0020	-0.0135	0.5166
7	00:08:01	8.2380	0.0020	0.0135	0.5162
8	00:15:02	8.2360	0.0040	0.0269	0.5160
9	00:30:03	8.2340	0.0060	0.0404	0.5158
10	01:00:06	8.2320	0.0080	0.0538	0.5156
11	02:00:11	8.2320	0.0080	0.0538	0.5156
12	04:00:21	8.2260	0.0140	0.0942	0.5150
13	08:00:43	8.2240	0.0160	0.1077	0.5148
14	12:01:04	8.2240	0.0160	0.1077	0.5148
15	23:49:24	8.2200	0.0200	0.1346	0.5144

Consolidation Test Results (Sequence 5) Load 80.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 6) Load 160.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 12-Nov-18

Test Number:

Sample Number: GL1A ST24

Soil Description:

Boring Number:

Clay (Cl), Trace Sand, Trace Gravel

Depth: 10.9-11.35m

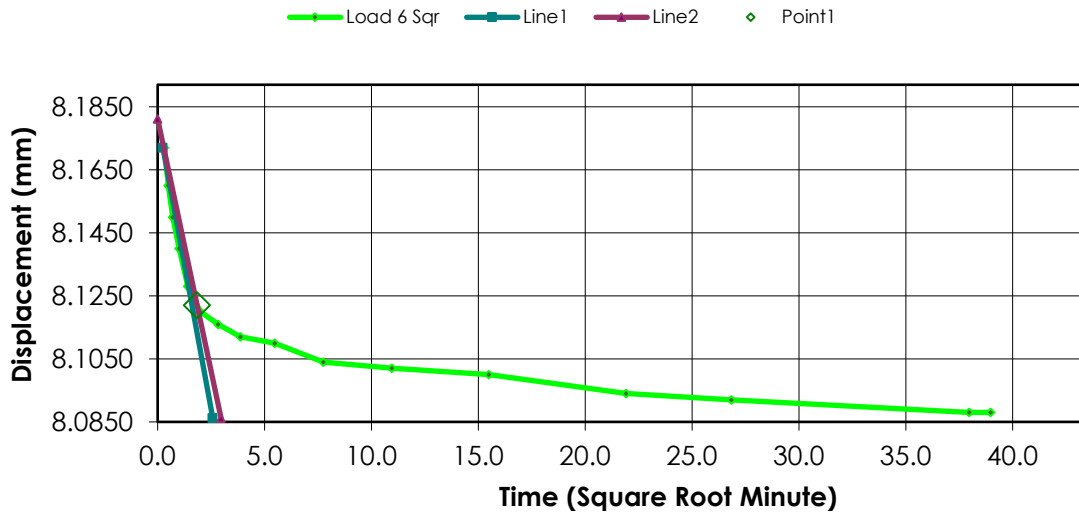
Remarks:

Sample Type: Undisturbed

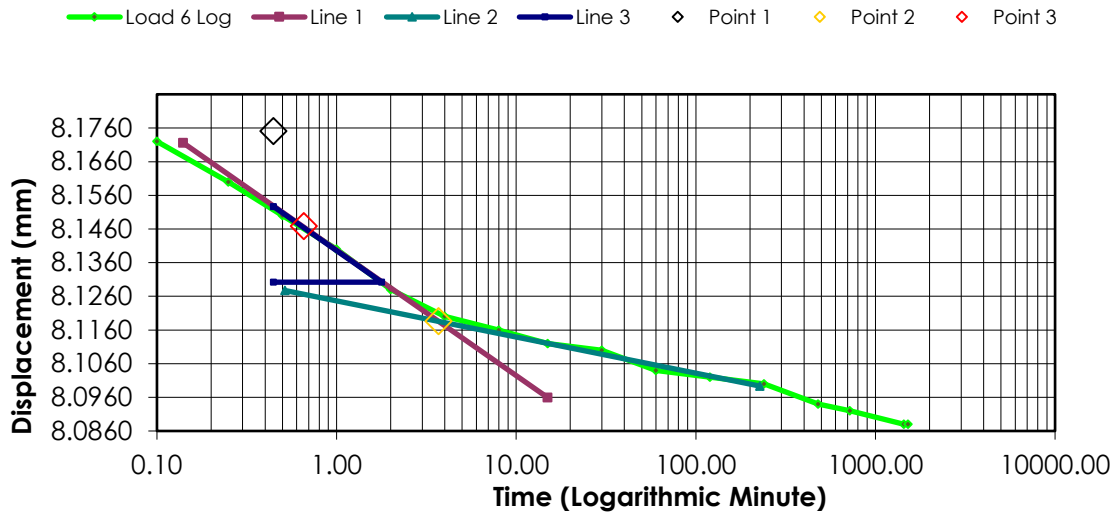
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.2200	0.0200	0.1346	0.5144
1	00:00:06	8.1720	0.0420	0.2826	0.5121
2	00:00:15	8.1600	0.0540	0.3634	0.5109
3	00:00:30	8.1500	0.0640	0.4307	0.5099
4	00:01:00	8.1400	0.0740	0.4980	0.5089
5	00:02:00	8.1280	0.0860	0.5787	0.5076
6	00:04:00	8.1200	0.0940	0.6326	0.5068
7	00:08:01	8.1160	0.0980	0.6595	0.5064
8	00:15:01	8.1120	0.1020	0.6864	0.5060
9	00:30:03	8.1100	0.1040	0.6999	0.5058
10	01:00:05	8.1040	0.1100	0.7402	0.5052
11	02:00:10	8.1020	0.1120	0.7537	0.5050
12	04:00:21	8.1000	0.1140	0.7672	0.5048
13	08:00:42	8.0940	0.1200	0.8075	0.5042
14	12:01:03	8.0920	0.1220	0.8210	0.5040
15	24:02:07	8.0880	0.1260	0.8479	0.5036
16	25:19:25	8.0880	0.1260	0.8479	0.5036

Consolidation Test Results (Sequence 6) Load 160.000 kPa

Consolidation Graph (Square Root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 7) Load 320.000 kPa

Project: SR1 2018 Investigation
Location:
Job Number:

Project Number: 110773396

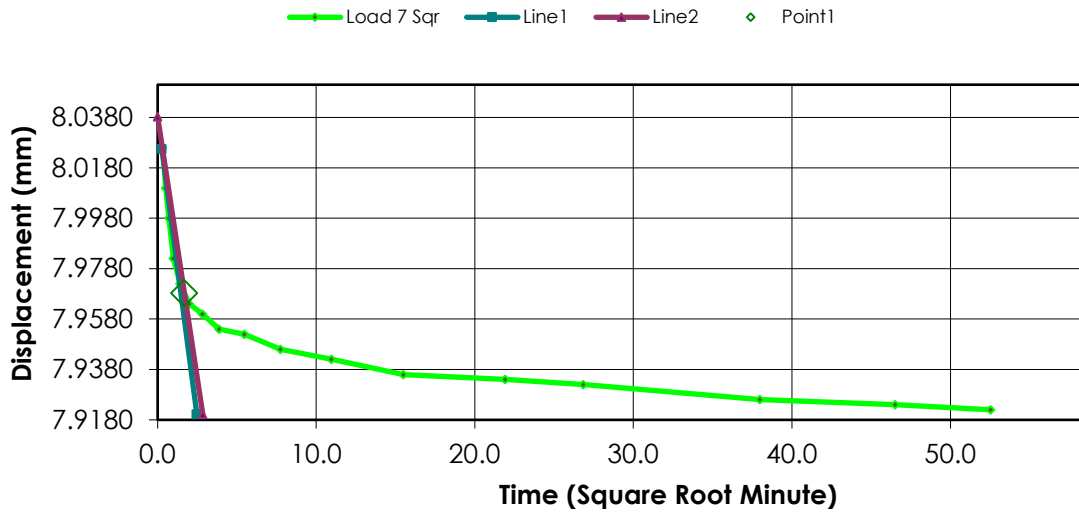
Test Date: 12-Nov-18
Test Number:

Sample Number: GL1A ST24 **Soil Description:**
Boring Number: Clay (Cl), Trace Sand, Trace Gravel
Depth: 10.9-11.35m **Remarks:**
Sample Type: Undisturbed

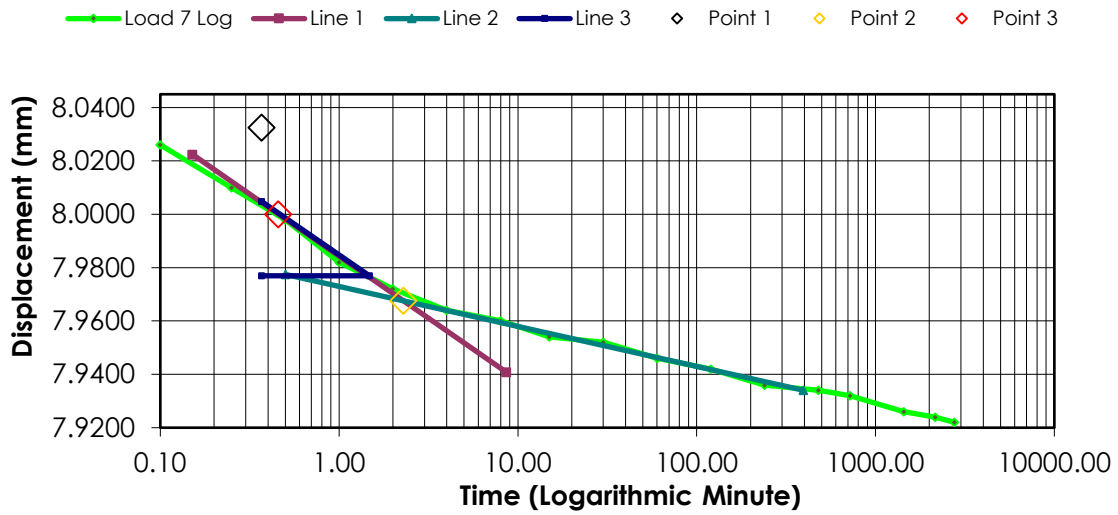
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.0880	0.1260	0.8479	0.5036
1	00:00:06	8.0260	0.1500	1.0094	0.5011
2	00:00:15	8.0100	0.1660	1.1171	0.4995
3	00:00:30	7.9980	0.1780	1.1978	0.4983
4	00:01:00	7.9820	0.1940	1.3055	0.4966
5	00:02:00	7.9720	0.2040	1.3728	0.4956
6	00:04:00	7.9640	0.2120	1.4266	0.4948
7	00:08:01	7.9600	0.2160	1.4536	0.4944
8	00:15:01	7.9540	0.2220	1.4939	0.4938
9	00:30:03	7.9520	0.2240	1.5074	0.4936
10	01:00:05	7.9460	0.2300	1.5478	0.4930
11	02:00:11	7.9420	0.2340	1.5747	0.4925
12	04:00:21	7.9360	0.2400	1.6151	0.4919
13	08:00:42	7.9340	0.2420	1.6285	0.4917
14	12:01:04	7.9320	0.2440	1.6420	0.4915
15	24:02:08	7.9260	0.2500	1.6824	0.4909
16	36:03:11	7.9240	0.2520	1.6958	0.4907
17	46:00:39	7.9220	0.2540	1.7093	0.4905

Consolidation Test Results (Sequence 7) Load 320.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 8) Load 640.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 12-Nov-18

Test Number:

Sample Number: GL1A ST24

Soil Description:

Boring Number:

Clay (Cl), Trace Sand, Trace Gravel

Depth: 10.9-11.35m

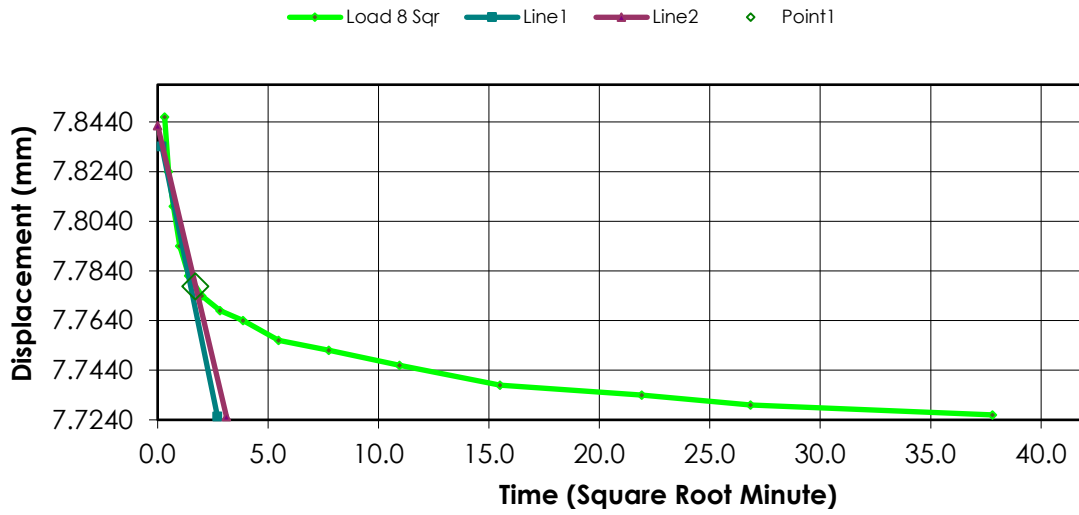
Remarks:

Sample Type: Undisturbed

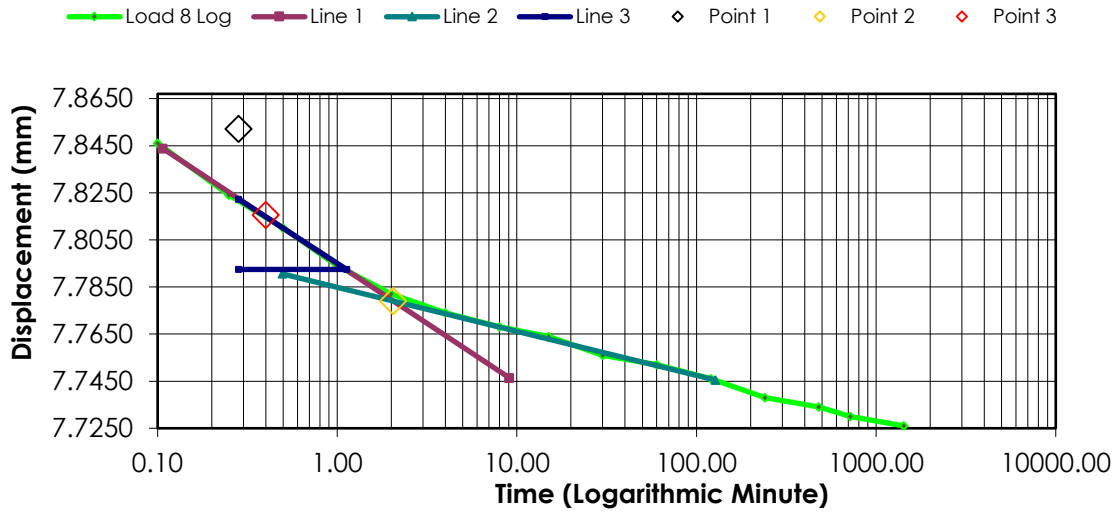
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	7.9220	0.2540	1.7093	0.4905
1	00:00:06	7.8460	0.2800	1.8843	0.4878
2	00:00:15	7.8240	0.3020	2.0323	0.4856
3	00:00:30	7.8100	0.3160	2.1265	0.4842
4	00:01:00	7.7940	0.3320	2.2342	0.4825
5	00:02:00	7.7820	0.3440	2.3149	0.4813
6	00:04:00	7.7740	0.3520	2.3688	0.4805
7	00:08:01	7.7680	0.3580	2.4092	0.4799
8	00:15:01	7.7640	0.3620	2.4361	0.4795
9	00:30:03	7.7560	0.3700	2.4899	0.4787
10	01:00:05	7.7520	0.3740	2.5168	0.4783
11	02:00:11	7.7460	0.3800	2.5572	0.4776
12	04:00:21	7.7380	0.3880	2.6110	0.4768
13	08:00:42	7.7340	0.3920	2.6380	0.4764
14	12:01:03	7.7300	0.3960	2.6649	0.4760
15	23:49:20	7.7260	0.4000	2.6918	0.4756

Consolidation Test Results (Sequence 8) Load 640.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 9) Rebound 320.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 12-Nov-18

Test Number:

Sample Number: GL1A ST24

Soil Description:

Boring Number:

Clay (Cl), Trace Sand, Trace Gravel

Depth: 10.9-11.35m

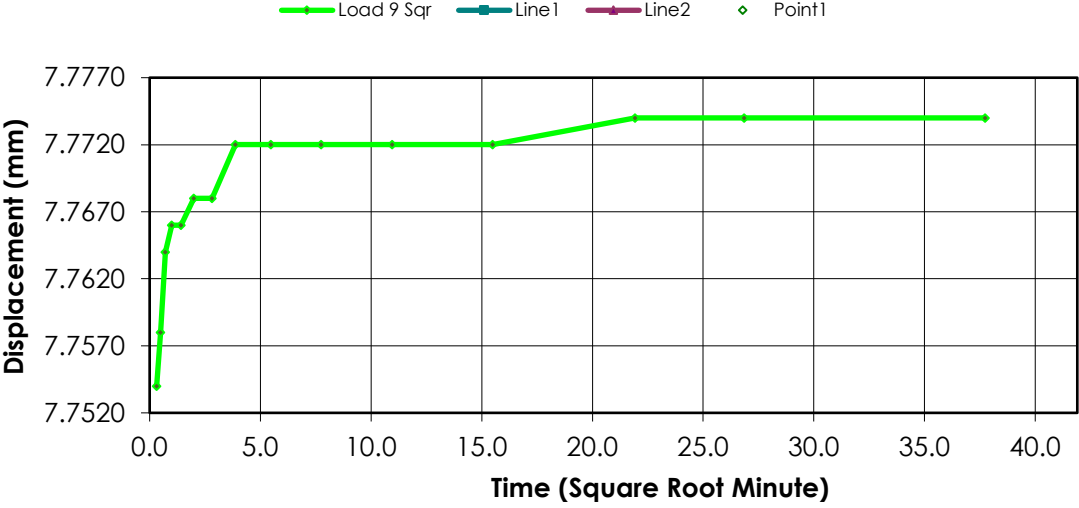
Remarks:

Sample Type: Undisturbed

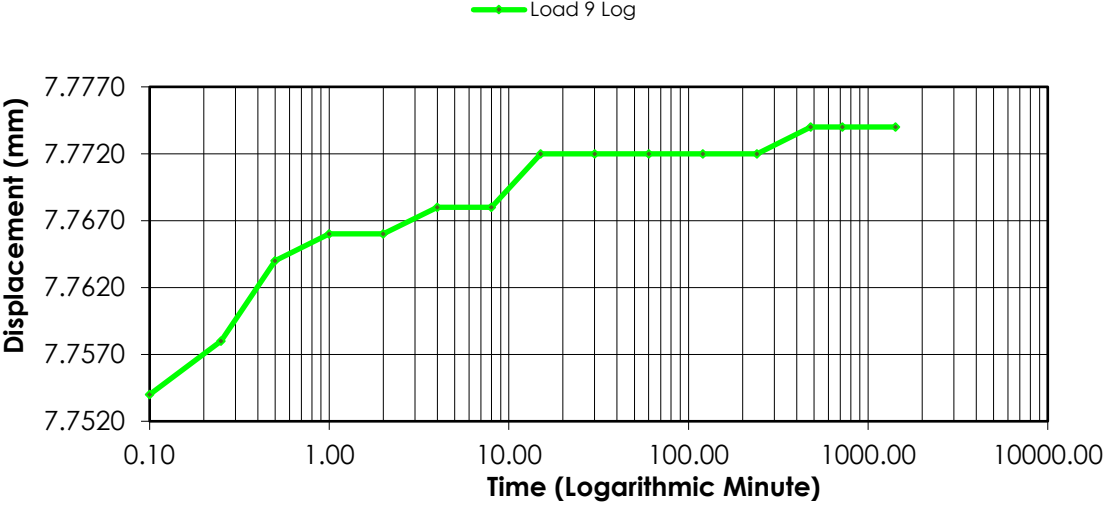
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	7.7260	0.4000	2.6918	0.4756
1	00:00:06	7.7540	0.3880	2.6110	0.4768
2	00:00:15	7.7580	0.3840	2.5841	0.4772
3	00:00:30	7.7640	0.3780	2.5437	0.4778
4	00:01:00	7.7660	0.3760	2.5303	0.4781
5	00:02:00	7.7660	0.3760	2.5303	0.4781
6	00:04:00	7.7680	0.3740	2.5168	0.4783
7	00:08:00	7.7680	0.3740	2.5168	0.4783
8	00:15:01	7.7720	0.3700	2.4899	0.4787
9	00:30:02	7.7720	0.3700	2.4899	0.4787
10	01:00:05	7.7720	0.3700	2.4899	0.4787
11	02:00:10	7.7720	0.3700	2.4899	0.4787
12	04:00:21	7.7720	0.3700	2.4899	0.4787
13	08:00:42	7.7740	0.3680	2.4764	0.4789
14	12:01:03	7.7740	0.3680	2.4764	0.4789
15	23:44:01	7.7740	0.3680	2.4764	0.4789

Consolidation Test Results (Sequence 9) Rebound 320.000 kPa

Consolidation Graph (Square-root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 10) Rebound 160.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 12-Nov-18

Test Number:

Sample Number: GL1A ST24

Soil Description:

Boring Number:

Clay (Cl), Trace Sand, Trace Gravel

Depth: 10.9-11.35m

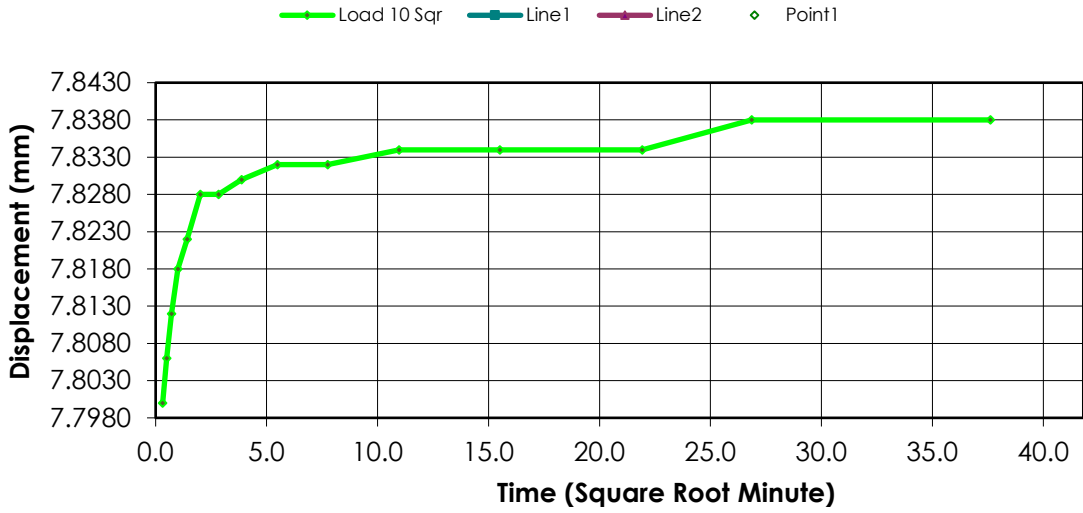
Remarks:

Sample Type: Undisturbed

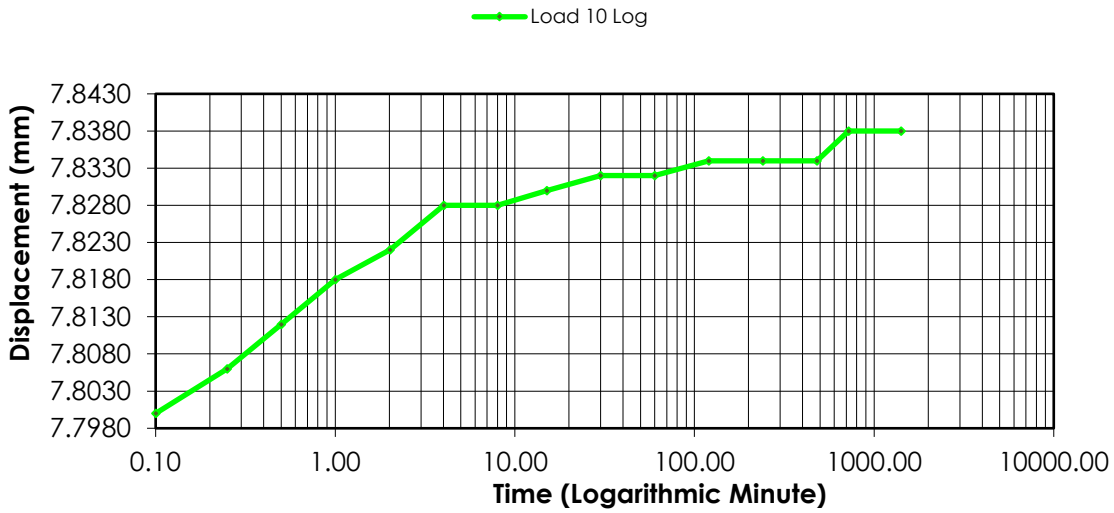
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	7.7740	0.3680	2.4764	0.4789
1	00:00:06	7.8000	0.3560	2.3957	0.4801
2	00:00:15	7.8060	0.3500	2.3553	0.4807
3	00:00:30	7.8120	0.3440	2.3149	0.4813
4	00:01:00	7.8180	0.3380	2.2746	0.4819
5	00:02:01	7.8220	0.3340	2.2476	0.4823
6	00:04:01	7.8280	0.3280	2.2073	0.4830
7	00:08:01	7.8280	0.3280	2.2073	0.4830
8	00:15:02	7.8300	0.3260	2.1938	0.4832
9	00:30:03	7.8320	0.3240	2.1804	0.4834
10	01:00:05	7.8320	0.3240	2.1804	0.4834
11	02:00:09	7.8340	0.3220	2.1669	0.4836
12	04:00:18	7.8340	0.3220	2.1669	0.4836
13	08:00:35	7.8340	0.3220	2.1669	0.4836
14	12:00:53	7.8380	0.3180	2.1400	0.4840
15	23:35:06	7.8380	0.3180	2.1400	0.4840

Consolidation Test Results
(Sequence 10) Rebound 160.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 11) Load 320.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 12-Nov-18

Test Number:

Sample Number: GL1A ST24

Soil Description:

Boring Number:

Clay (Cl), Trace Sand, Trace Gravel

Depth: 10.9-11.35m

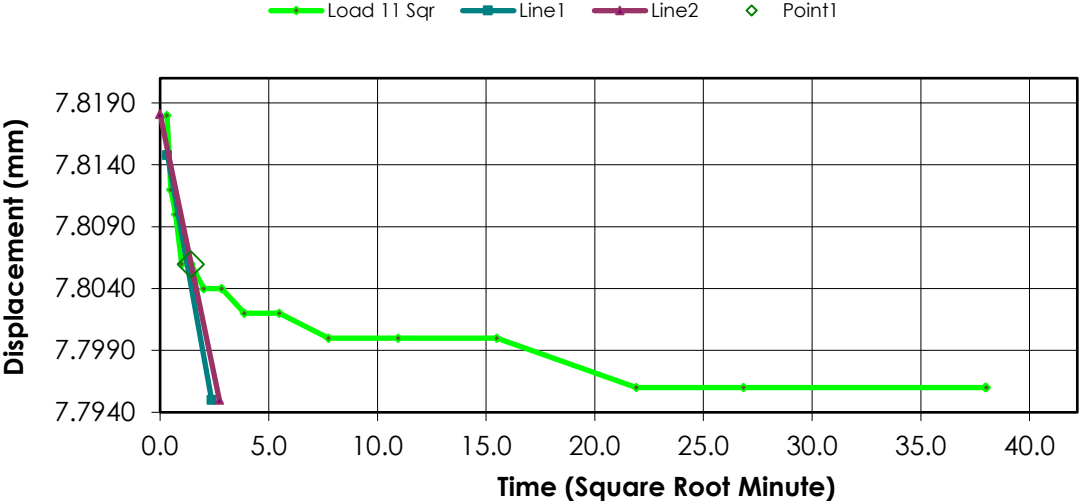
Remarks:

Sample Type: Undisturbed

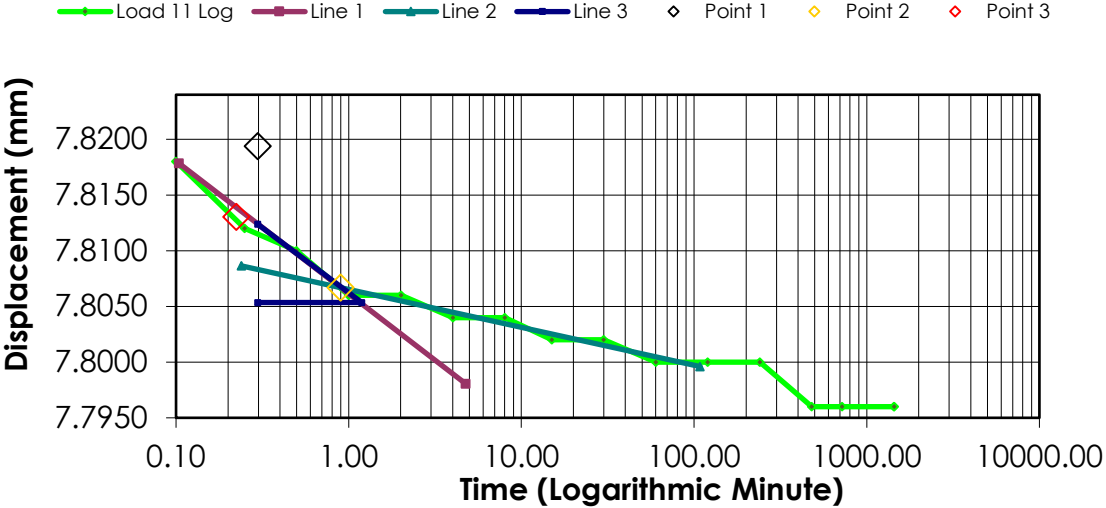
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	7.8380	0.3180	2.1400	0.4840
1	00:00:06	7.8180	0.3300	2.2207	0.4827
2	00:00:15	7.8120	0.3360	2.2611	0.4821
3	00:00:30	7.8100	0.3380	2.2746	0.4819
4	00:01:00	7.8060	0.3420	2.3015	0.4815
5	00:02:01	7.8060	0.3420	2.3015	0.4815
6	00:04:01	7.8040	0.3440	2.3149	0.4813
7	00:08:01	7.8040	0.3440	2.3149	0.4813
8	00:15:01	7.8020	0.3460	2.3284	0.4811
9	00:30:03	7.8020	0.3460	2.3284	0.4811
10	01:00:05	7.8000	0.3480	2.3419	0.4809
11	02:00:09	7.8000	0.3480	2.3419	0.4809
12	04:00:18	7.8000	0.3480	2.3419	0.4809
13	08:00:35	7.7960	0.3520	2.3688	0.4805
14	12:00:53	7.7960	0.3520	2.3688	0.4805
15	24:01:45	7.7960	0.3520	2.3688	0.4805
16	24:05:41	7.7960	0.3520	2.3688	0.4805

Consolidation Test Results (Sequence 11) Load 320.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 12) Load 640.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 12-Nov-18

Test Number:

Sample Number: GL1A ST24

Soil Description:

Boring Number:

Clay (Cl), Trace Sand, Trace Gravel

Depth: 10.9-11.35m

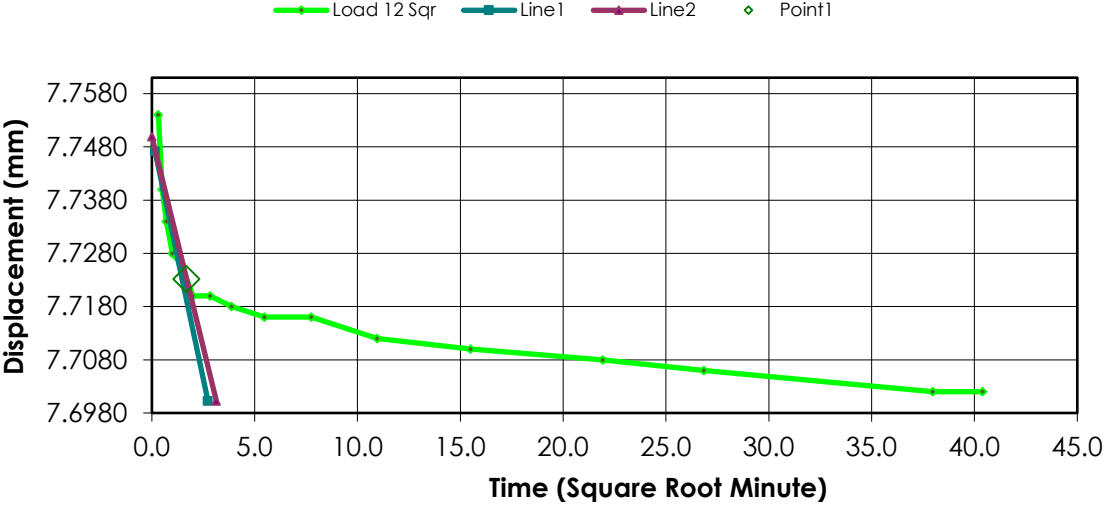
Remarks:

Sample Type: Undisturbed

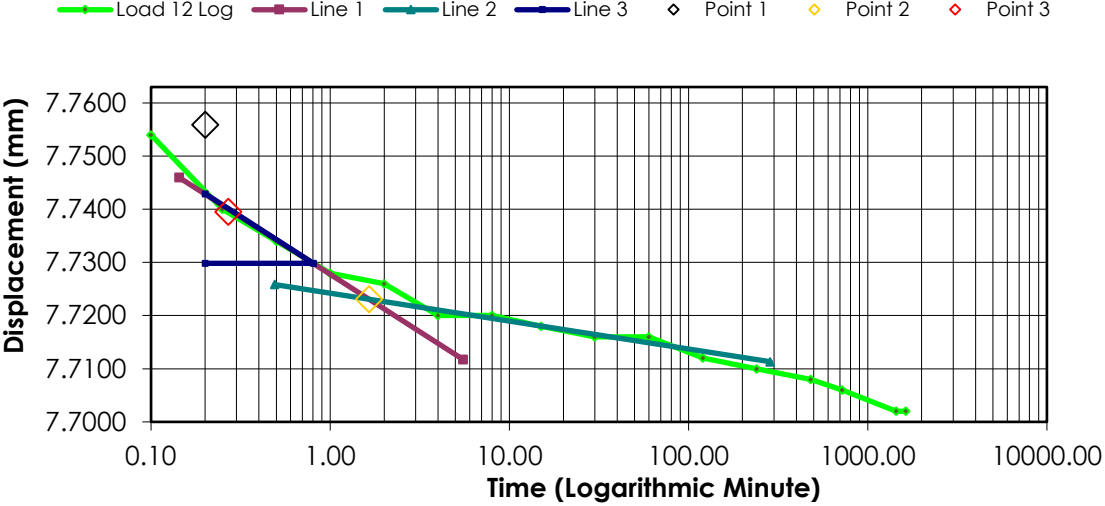
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	7.7960	0.3520	2.3688	0.4805
1	00:00:06	7.7540	0.3720	2.5034	0.4785
2	00:00:15	7.7400	0.3860	2.5976	0.4770
3	00:00:30	7.7340	0.3920	2.6380	0.4764
4	00:01:00	7.7280	0.3980	2.6783	0.4758
5	00:02:00	7.7260	0.4000	2.6918	0.4756
6	00:04:00	7.7200	0.4060	2.7322	0.4750
7	00:08:00	7.7200	0.4060	2.7322	0.4750
8	00:15:01	7.7180	0.4080	2.7456	0.4748
9	00:30:02	7.7160	0.4100	2.7591	0.4746
10	01:00:04	7.7160	0.4100	2.7591	0.4746
11	02:00:09	7.7120	0.4140	2.7860	0.4742
12	04:00:17	7.7100	0.4160	2.7995	0.4740
13	08:00:35	7.7080	0.4180	2.8129	0.4738
14	12:00:50	7.7060	0.4200	2.8264	0.4736
15	24:01:42	7.7020	0.4240	2.8533	0.4732
16	27:12:11	7.7020	0.4240	2.8533	0.4732

Consolidation Test Results (Sequence 12) Load 640.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 13) Load 1280.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 12-Nov-18

Test Number:

Sample Number: GL1A ST24

Soil Description:

Boring Number:

Clay (Cl), Trace Sand, Trace Gravel

Depth: 10.9-11.35m

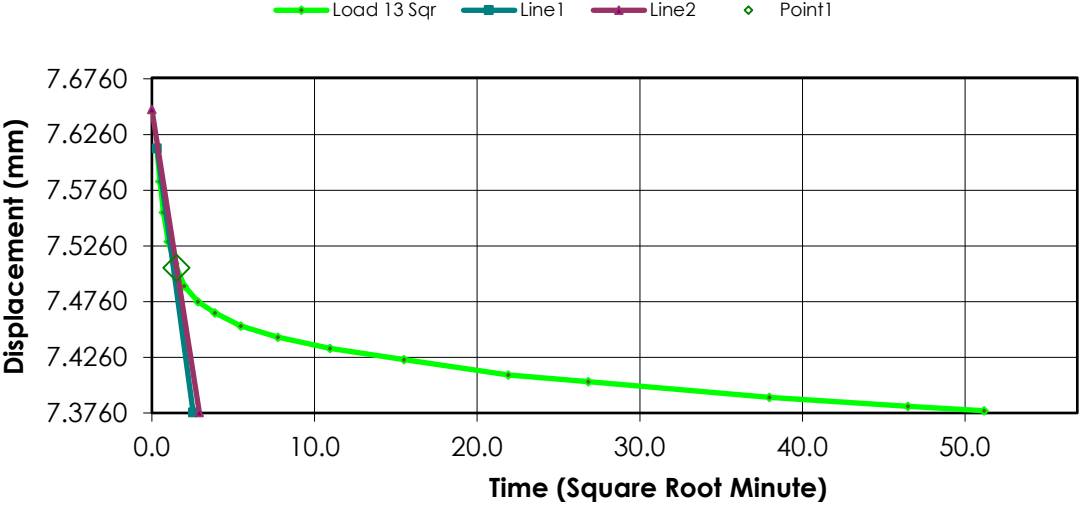
Remarks:

Sample Type: Undisturbed

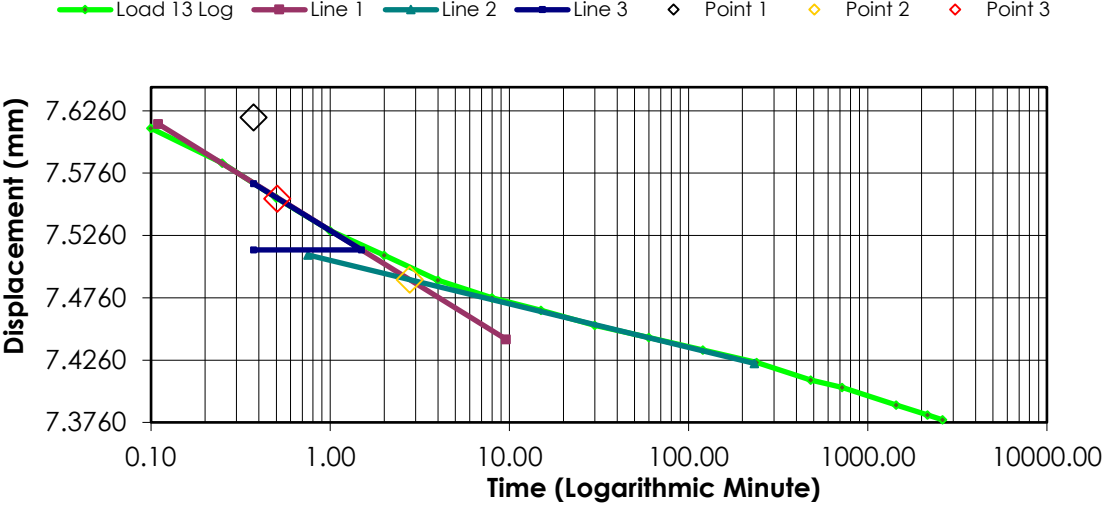
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	7.7020	0.4240	2.8533	0.4732
1	00:00:06	7.6120	0.4500	3.0283	0.4705
2	00:00:15	7.5840	0.4780	3.2167	0.4676
3	00:00:30	7.5560	0.5060	3.4051	0.4648
4	00:01:00	7.5300	0.5320	3.5801	0.4621
5	00:02:00	7.5100	0.5520	3.7147	0.4601
6	00:04:00	7.4900	0.5720	3.8493	0.4581
7	00:08:00	7.4760	0.5860	3.9435	0.4566
8	00:15:01	7.4660	0.5960	4.0108	0.4556
9	00:30:02	7.4540	0.6080	4.0915	0.4544
10	01:00:04	7.4440	0.6180	4.1588	0.4534
11	02:00:09	7.4340	0.6280	4.2261	0.4523
12	04:00:17	7.4240	0.6380	4.2934	0.4513
13	08:00:35	7.4100	0.6520	4.3876	0.4499
14	12:00:52	7.4040	0.6580	4.4280	0.4493
15	24:01:45	7.3900	0.6720	4.5222	0.4478
16	36:02:37	7.3820	0.6800	4.5760	0.4470
17	43:40:18	7.3780	0.6840	4.6030	0.4466

Consolidation Test Results (Sequence 13) Load 1280.000 kPa

Consolidation Graph (Square Root Time)



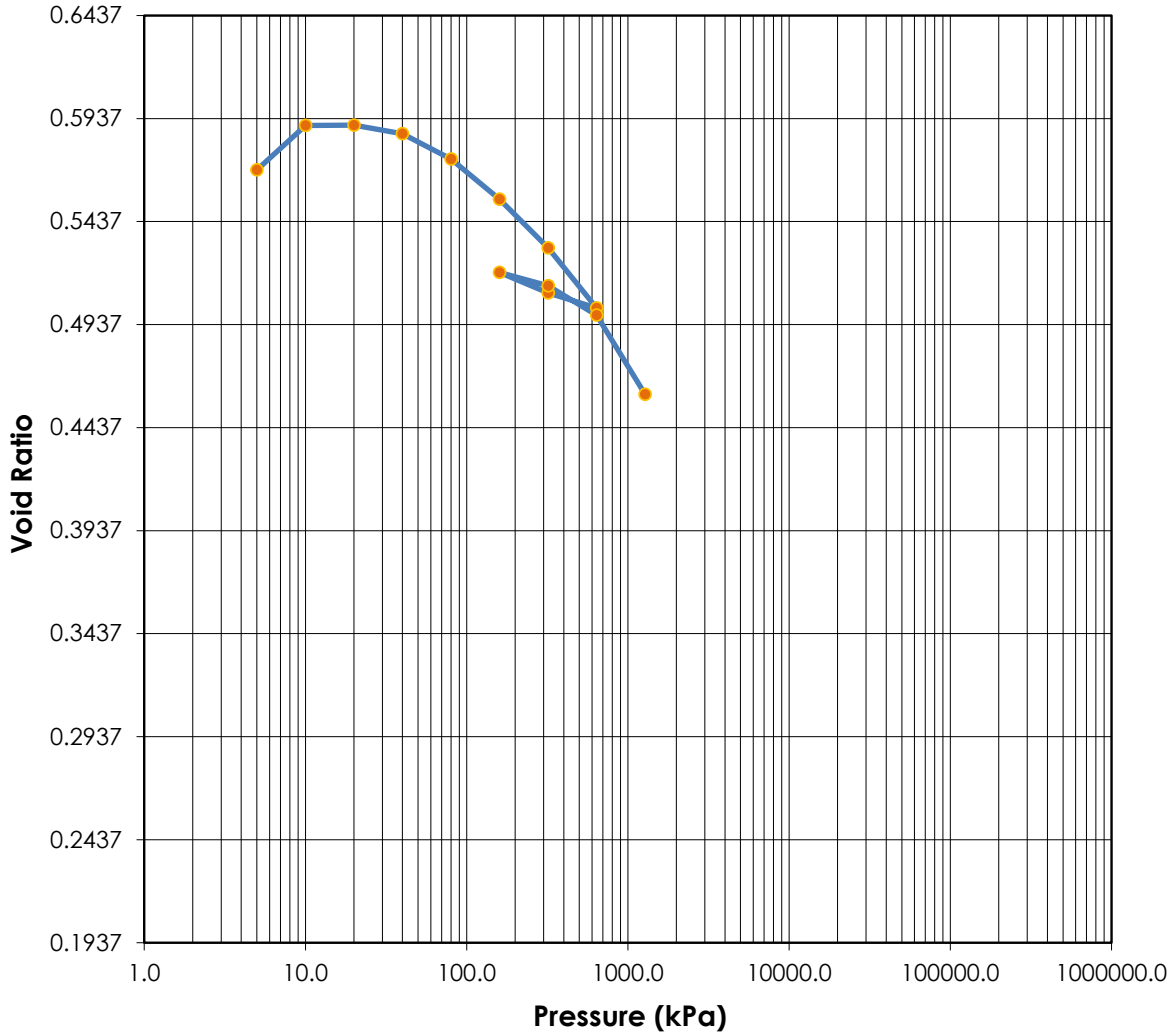
Consolidation Graph (Logarithmic Time)





Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876



	Before	After	Liquid Limits:	36	Test Date:	15-Oct-18
Moisture (%):	22.2	20.9	Plastic Limits:	16		
Dry Density (g/cm³):	1.686	1.803	Plasticity Index (%):	20		
Saturation (%):	100	100	Specific Gravity:	2.65	Assumed	
Void Ratio:	0.5703	0.4613				
Soil Description:	Clay (Cl), Some Sand, Trace Gravel					
Project Number:	110773396	Depth:	1.95-2.40m	Remarks:		
Sample Number:	GL2 ST4	Boring Number:				
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						

Tested By: E. Wahl

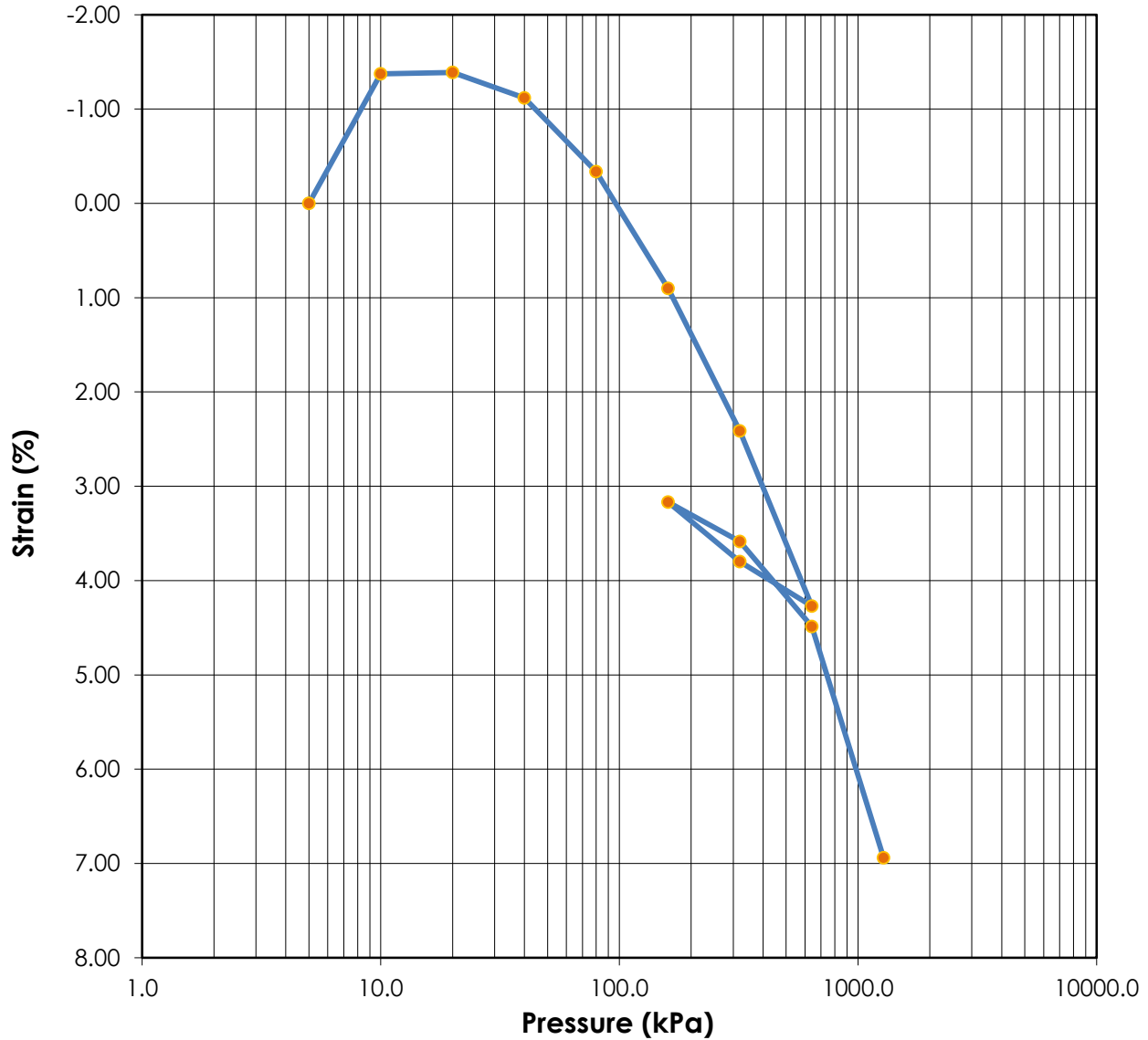
Reviewed By: C. Lamoureux

Reporting of these test results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request. The data presented above is for the sole use of the client stipulated above. Stantec is not responsible, nor can be held liable, for the use of this report by any other party, with or without the knowledge of Stantec.



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876

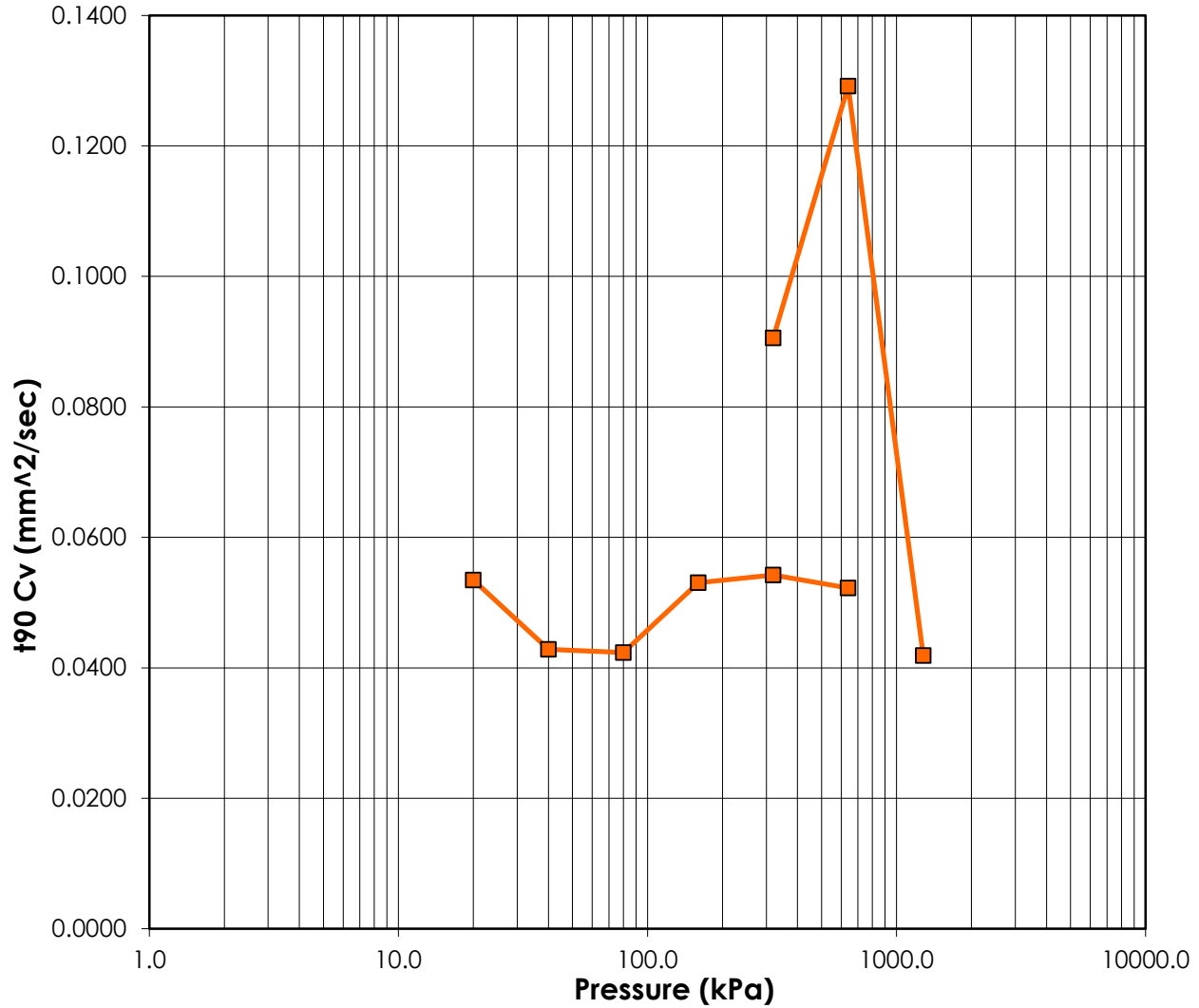


	Before	After	Liquid Limits:	36	Test Date:	15-Oct-18
Moisture (%):	22.2	20.9	Plastic Limits:	16		
Dry Density (g/cm3):	1.686	1.803	Plasticity Index (%):	20		
Saturation (%):	100	100	Specific Gravity:	2.65	Assumed	
Void Ratio:	0.5703	0.4613				
Sample Description:	Clay (Cl), Some Sand, Trace Gravel					
Project Number:	110773396	Depth:	1.95-2.40m			
Sample Number:	GL2 ST4	Boring Number:				
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						
			Remarks:			



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876



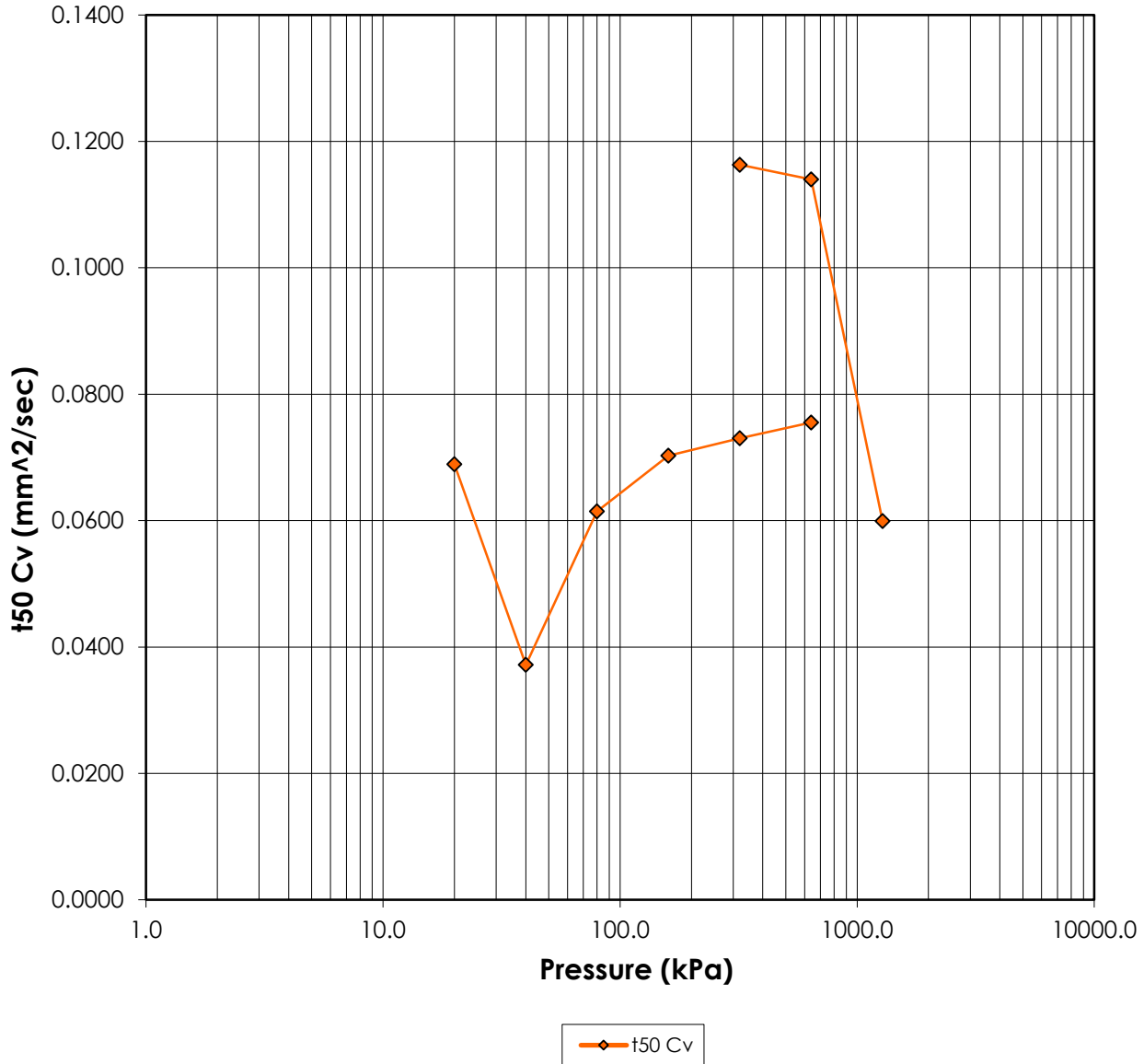
—■— t90 Cv

	Before	After	Liquid Limits:	36	Test Date:	15-Oct-18
Moisture (%):	22.2	20.9	Plastic Limits:	16		
Dry Density (g/cm3):	1.686	1.803	Plasticity Index (%):	20		
Saturation (%):	100	100	Specific Gravity:	2.65	Assumed	
Void Ratio:	0.5703	0.4613				
Soil Description:	Clay (Cl), Some Sand, Trace Gravel					
Project Number:	110773396	Depth:	1.95-2.40m			
Sample Number:	GL2 ST4	Boring Number:				
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						
			Remarks:			



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

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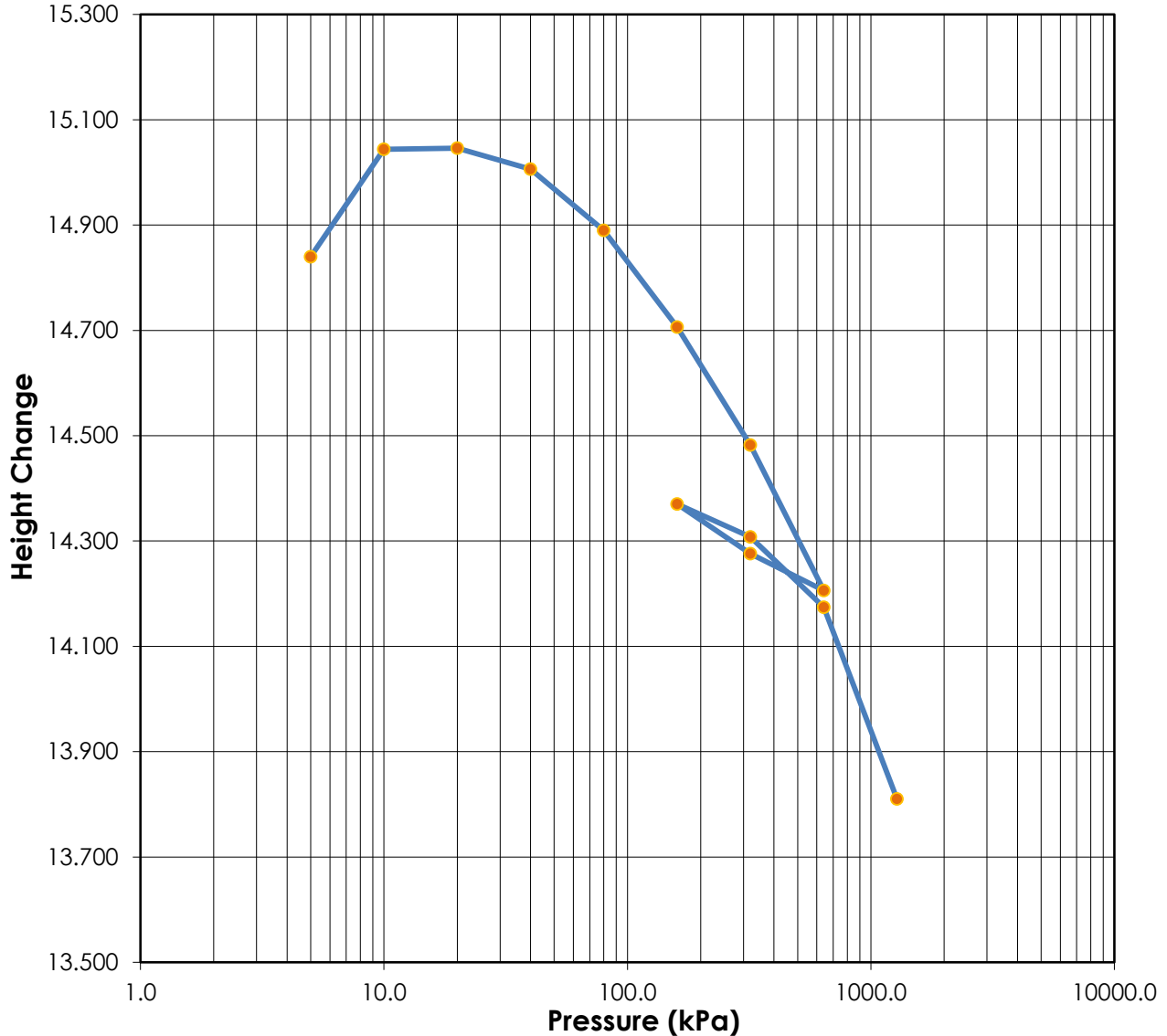


	Before	After	Liquid Limits:	36	Test Date:	15-Oct-18
Moisture (%):	22.2	20.9	Plastic Limits:	16		
Dry Density (g/cm³):	1.686	1.803	Plasticity Index (%):	20		
Saturation (%):	100	100	Specific Gravity:	2.65	Assumed	
Void Ratio:	0.5703	0.4613				
Soil Description:	Clay (Cl), Some Sand, Trace Gravel					
Project Number:	110773396	Depth:	1.95-2.40m			
Sample Number:	GL2 ST4	Boring Number:				
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						
						Remarks:



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Test Results

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	Before	After	Liquid Limits:	36	Test Date:	15-Oct-18
Moisture (%):	22.2	20.9	Plastic Limits:	16		
Dry Density (g/cm3):	1.686	1.803	Plasticity Index (%):	20		
Saturation (%):	100	100	Specific Gravity:	2.65	Assumed	
Void Ratio:	0.5703	0.4613				
Soil Description:	Clay (Cl), Some Sand, Trace Gravel					
Project Number:	110773396	Depth:	1.95-2.40m			
Sample Number:	GL2 ST4	Boring Number:				
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						
			Remarks:			

Consolidation Test Results Summary

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Sample Number: GL2 ST4

Sample Description:

Boring Number:

Clay (Cl), Some Sand, Trace Gravel

Depth: 1.95-2.40m

Remarks:

Test Number:

Sample Type: Undisturbed

Test Date: 15-Oct-18

Index	Load Sequence (kPa)	Cumulative Change in Height (mm)	Specimen Height (mm)	Height of Void (mm)	Vertical Strain (%)	Void Ratio	t90 Fitting Time (min)	t50 Fitting Time (min)	t90 Cv (mm ² /sec)	t50 Cv (mm ² /sec)
0	0.000	0.0000	14.8400	5.3804	0.00	0.5688	0.000	0.000	0.000	0.000
1	5.000	0.0000	14.8400	5.3804	0.00	0.5688	0.000	0.000	0.000	0.000
2	10.000	-0.2040	15.0440	5.5844	-1.37	0.5903	0.000	0.000	0.000	0.000
3	20.000	-0.2060	15.0460	5.5864	-1.39	0.5905	14.964	2.697	0.053	0.069
4	40.000	-0.1660	15.0060	5.5464	-1.12	0.5863	18.578	4.974	0.043	0.037
5	80.000	-0.0500	14.8900	5.4304	-0.34	0.5741	18.502	2.962	0.042	0.061
6	160.000	0.1340	14.7060	5.2464	0.90	0.5546	14.403	2.527	0.053	0.070
7	320.000	0.3580	14.4820	5.0224	2.41	0.5309	13.667	2.357	0.054	0.073
8	640.000	0.6340	14.2060	4.7464	4.27	0.5018	13.653	2.193	0.052	0.076
9	320.000	0.5640	14.2760	4.8164	3.80	0.5091	0.000	0.000	0.000	0.000
10	160.000	0.4700	14.3700	4.9104	3.17	0.5191	0.000	0.000	0.000	0.000
11	320.000	0.5320	14.3080	4.8484	3.58	0.5125	7.988	1.445	0.091	0.116
12	640.000	0.6660	14.1740	4.7144	4.49	0.4984	5.495	1.447	0.129	0.114
13	1280.000	1.0300	13.8100	4.3504	6.94	0.4599	16.086	2.613	0.042	0.060

Predicted value indicated with *

Consolidation Test Consolidation Specimen Information

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Sample Number: GL2 ST4

Sample Description:

Boring Number:

Clay (Cl), Some Sand, Trace Gravel

Depth: 1.95-2.40m

Remarks:

Sample Type: Undisturbed

Test Number:

Liquid Limit: 36

Initial Void Ratio: 0.5703

Initial Height (mm): 14.84

Plastic Limit: 16

Plasticity Index (%): 20

Initial Diameter (mm): 50.04

Specific Gravity: 2.65

Weight of Ring (g): 61.13

Assumed

Parameters	Initial Specimen	Final Specimen
Moist Weight + Container (g)	120.73	62.68
Dry Soil + Container (g)	99.50	52.49
Weight of Container (g)	4.01	3.76
Moisture Content (%)	22.2	20.9
Void Ratio	0.5703	0.4613
Saturation (%)	100	100
Dry Density (g/cm ³)	1.686	1.803

**Consolidation Test Results
(Sequence 1) Load 5.000 kPa**

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Test Number:

Sample Number: GL2 ST4

Soil Description:

Boring Number:

Clay (Cl), Some Sand, Trace Gravel

Depth: 1.95-2.40m

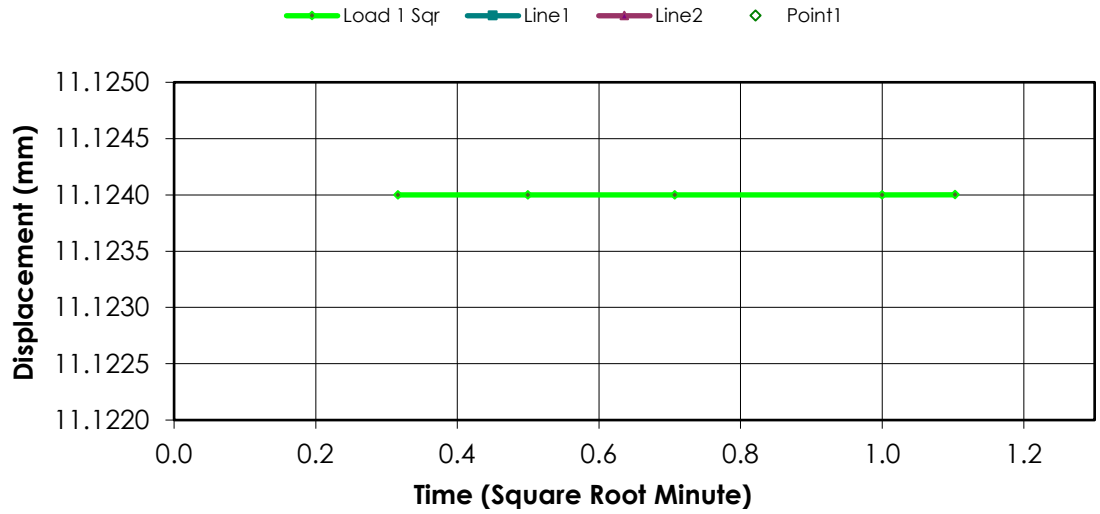
Remarks:

Sample Type: Undisturbed

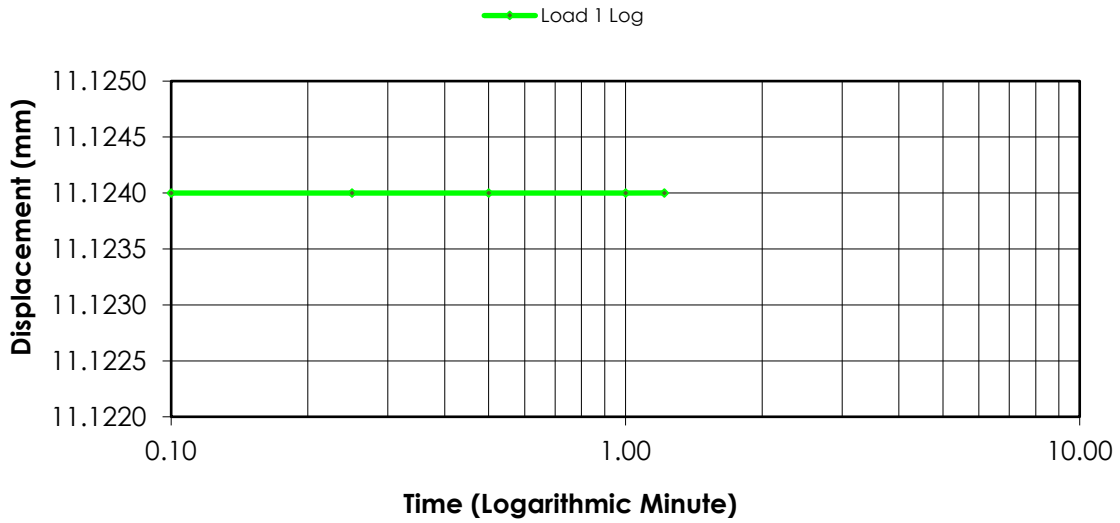
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	11.1240	0.0000	0.0000	0.5703
1	00:00:06	11.1240	0.0000	0.0000	0.5703
2	00:00:15	11.1240	0.0000	0.0000	0.5703
3	00:00:30	11.1240	0.0000	0.0000	0.5703
4	00:01:00	11.1240	0.0000	0.0000	0.5703
5	00:01:13	11.1240	0.0000	0.0000	0.5703

Consolidation Test Results (Sequence 1) Load 5.000 kPa

Consolidation Graph (Square-root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 2) Load 10.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Test Number:

Sample Number: GL2 ST4

Soil Description:

Boring Number:

Clay (Cl), Some Sand, Trace Gravel

Depth: 1.95-2.40m

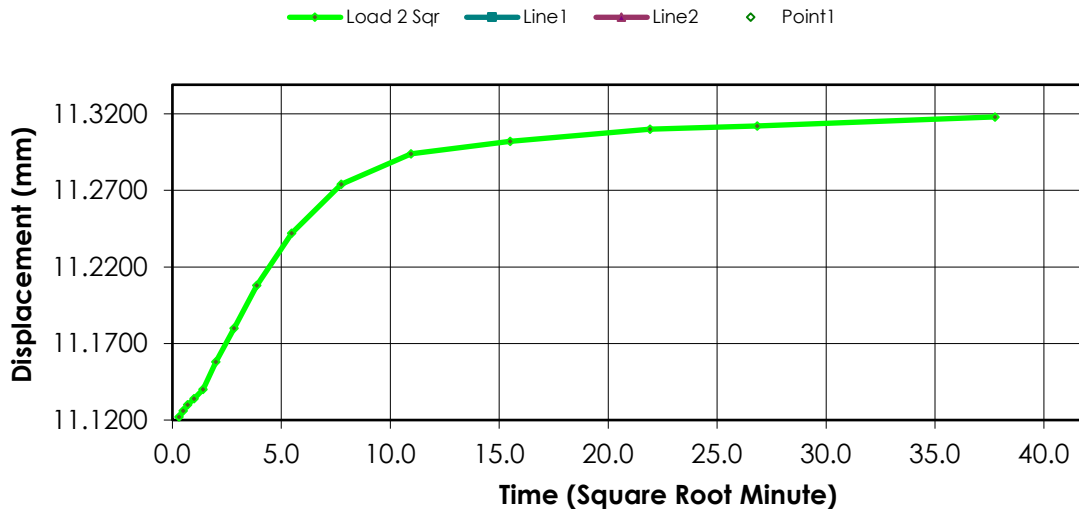
Remarks:

Sample Type: Undisturbed

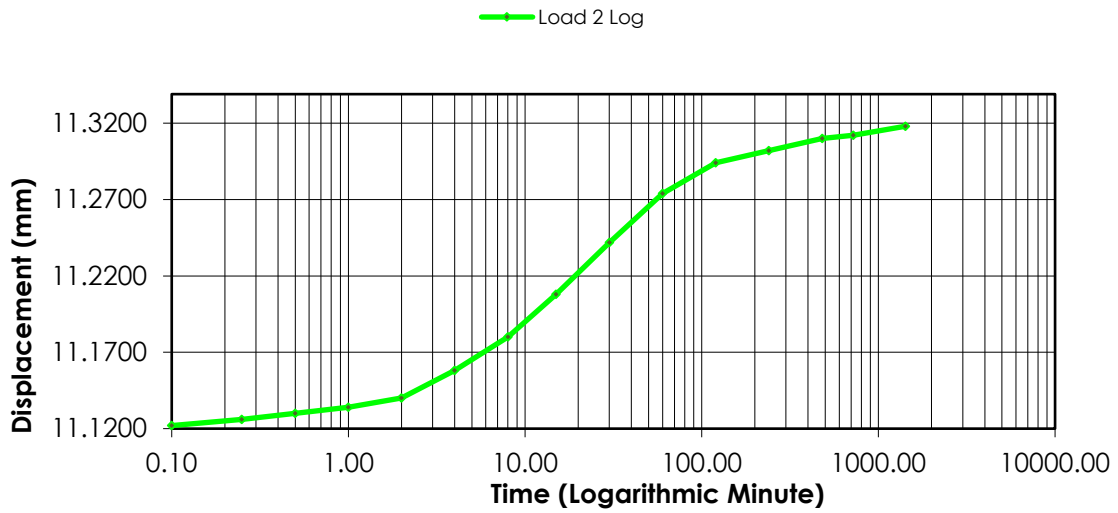
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	11.1240	0.0000	0.0000	0.5703
1	00:00:06	11.1220	-0.0080	-0.0539	0.5712
2	00:00:15	11.1260	-0.0120	-0.0809	0.5716
3	00:00:30	11.1300	-0.0160	-0.1078	0.5720
4	00:01:00	11.1340	-0.0200	-0.1348	0.5724
5	00:02:00	11.1400	-0.0260	-0.1752	0.5731
6	00:04:00	11.1580	-0.0440	-0.2965	0.5750
7	00:08:01	11.1800	-0.0660	-0.4447	0.5773
8	00:15:01	11.2080	-0.0940	-0.6334	0.5803
9	00:30:03	11.2420	-0.1280	-0.8625	0.5839
10	01:00:06	11.2740	-0.1600	-1.0782	0.5872
11	02:00:12	11.2940	-0.1800	-1.2129	0.5894
12	04:00:24	11.3020	-0.1880	-1.2669	0.5902
13	08:00:49	11.3100	-0.1960	-1.3208	0.5910
14	12:01:13	11.3120	-0.1980	-1.3342	0.5913
15	23:45:43	11.3180	-0.2040	-1.3747	0.5919

**Consolidation Test Results
(Sequence 2) Load 10.000 kPa**

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 3) Load 20.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Test Number:

Sample Number: GL2 ST4

Soil Description:

Boring Number:

Clay (Cl), Some Sand, Trace Gravel

Depth: 1.95-2.40m

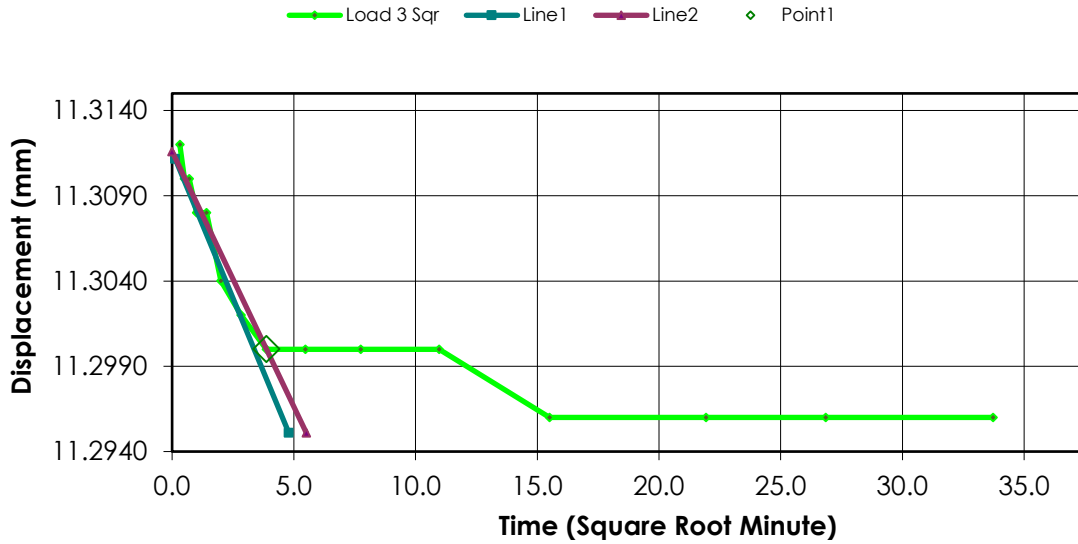
Remarks:

Sample Type: Undisturbed

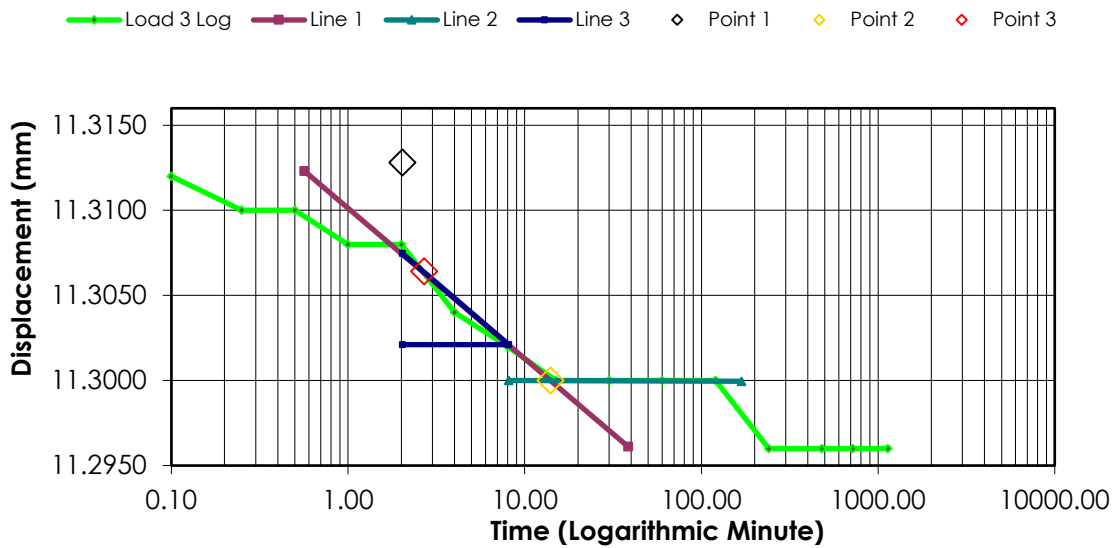
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	11.3180	-0.2040	-1.3747	0.5919
1	00:00:06	11.3120	-0.2220	-1.4960	0.5938
2	00:00:15	11.3100	-0.2200	-1.4825	0.5936
3	00:00:30	11.3100	-0.2200	-1.4825	0.5936
4	00:01:00	11.3080	-0.2180	-1.4690	0.5934
5	00:02:00	11.3080	-0.2180	-1.4690	0.5934
6	00:04:00	11.3040	-0.2140	-1.4421	0.5930
7	00:08:01	11.3020	-0.2120	-1.4286	0.5927
8	00:15:01	11.3000	-0.2100	-1.4151	0.5925
9	00:30:03	11.3000	-0.2100	-1.4151	0.5925
10	01:00:06	11.3000	-0.2100	-1.4151	0.5925
11	02:00:12	11.3000	-0.2100	-1.4151	0.5925
12	04:00:24	11.2960	-0.2060	-1.3881	0.5921
13	08:00:49	11.2960	-0.2060	-1.3881	0.5921
14	12:01:13	11.2960	-0.2060	-1.3881	0.5921
15	18:57:25	11.2960	-0.2060	-1.3881	0.5921

Consolidation Test Results (Sequence 3) Load 20.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 4) Load 40.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Test Number:

Sample Number: GL2 ST4

Soil Description:

Boring Number:

Clay (Cl), Some Sand, Trace Gravel

Depth: 1.95-2.40m

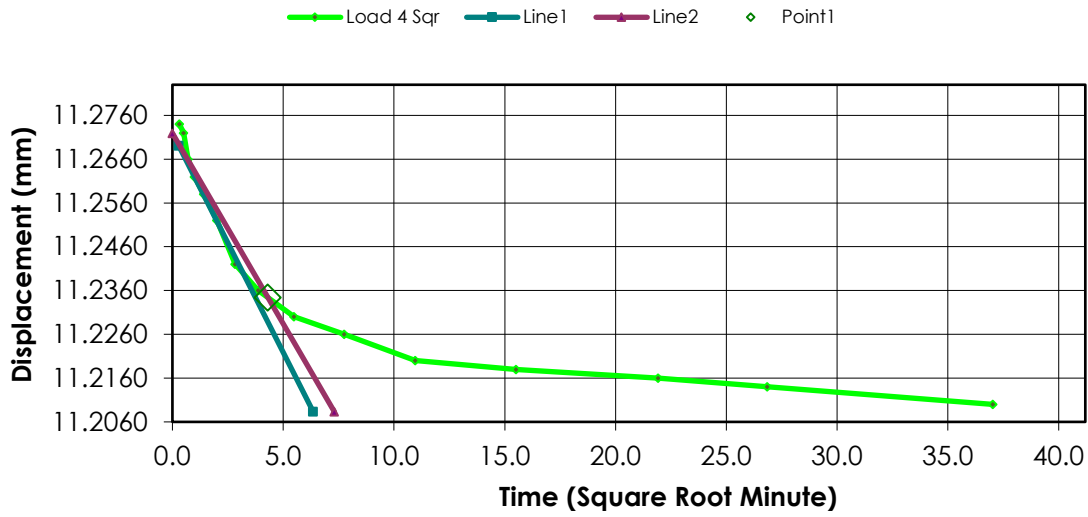
Remarks:

Sample Type: Undisturbed

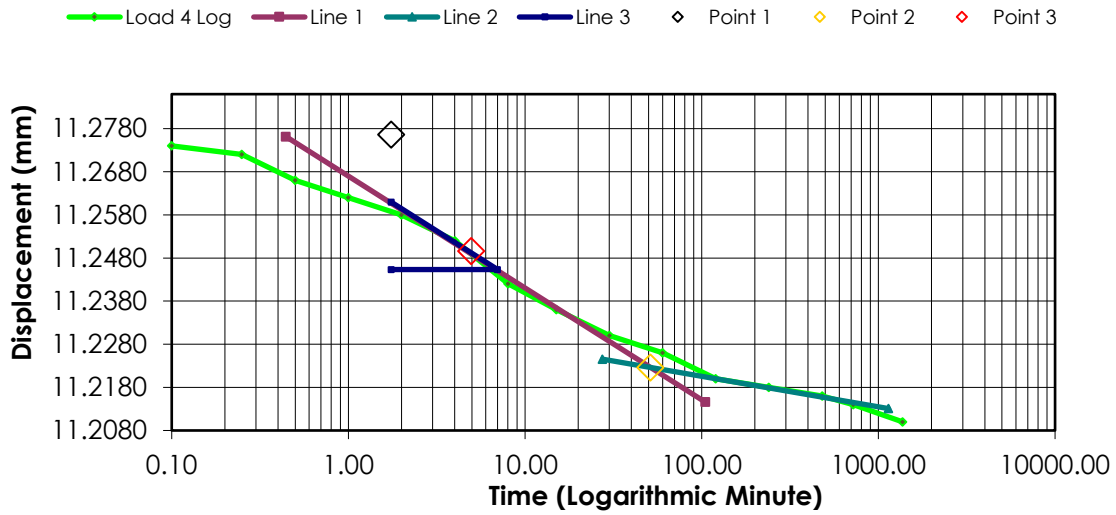
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	11.2960	-0.2060	-1.3881	0.5921
1	00:00:06	11.2740	-0.2300	-1.5499	0.5946
2	00:00:15	11.2720	-0.2280	-1.5364	0.5944
3	00:00:30	11.2660	-0.2220	-1.4960	0.5938
4	00:01:00	11.2620	-0.2180	-1.4690	0.5934
5	00:02:00	11.2580	-0.2140	-1.4421	0.5930
6	00:04:01	11.2520	-0.2080	-1.4016	0.5923
7	00:08:01	11.2420	-0.1980	-1.3342	0.5913
8	00:15:02	11.2360	-0.1920	-1.2938	0.5906
9	00:30:03	11.2300	-0.1860	-1.2534	0.5900
10	01:00:06	11.2260	-0.1820	-1.2264	0.5896
11	02:00:13	11.2200	-0.1760	-1.1860	0.5889
12	04:00:25	11.2180	-0.1740	-1.1725	0.5887
13	08:00:50	11.2160	-0.1720	-1.1590	0.5885
14	12:01:14	11.2140	-0.1700	-1.1456	0.5883
15	22:50:47	11.2100	-0.1660	-1.1186	0.5879

Consolidation Test Results (Sequence 4) Load 40.000 kPa

Consolidation Graph (Square Root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 5) Load 80.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Test Number:

Sample Number: GL2 ST4

Soil Description:

Boring Number:

Clay (Cl), Some Sand, Trace Gravel

Depth: 1.95-2.40m

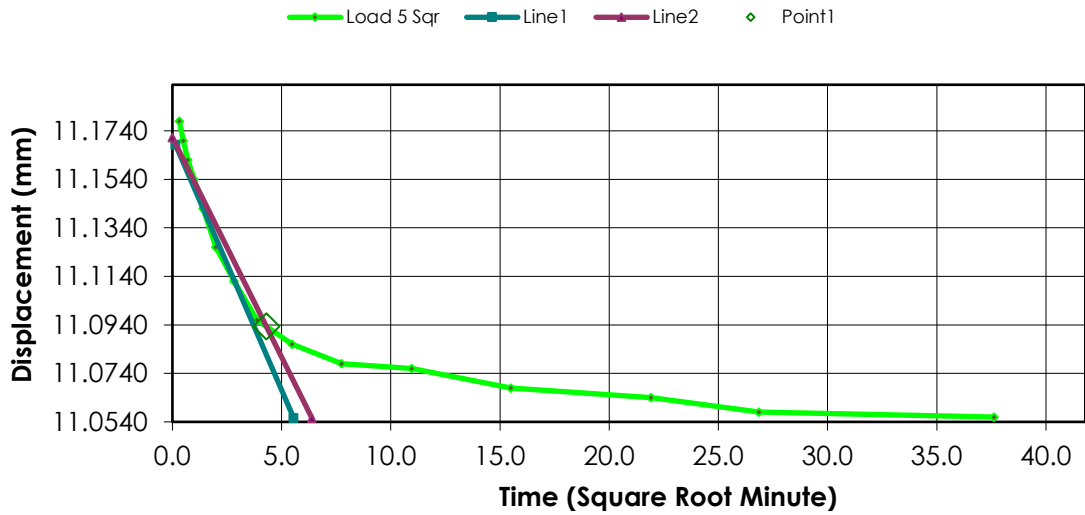
Remarks:

Sample Type: Undisturbed

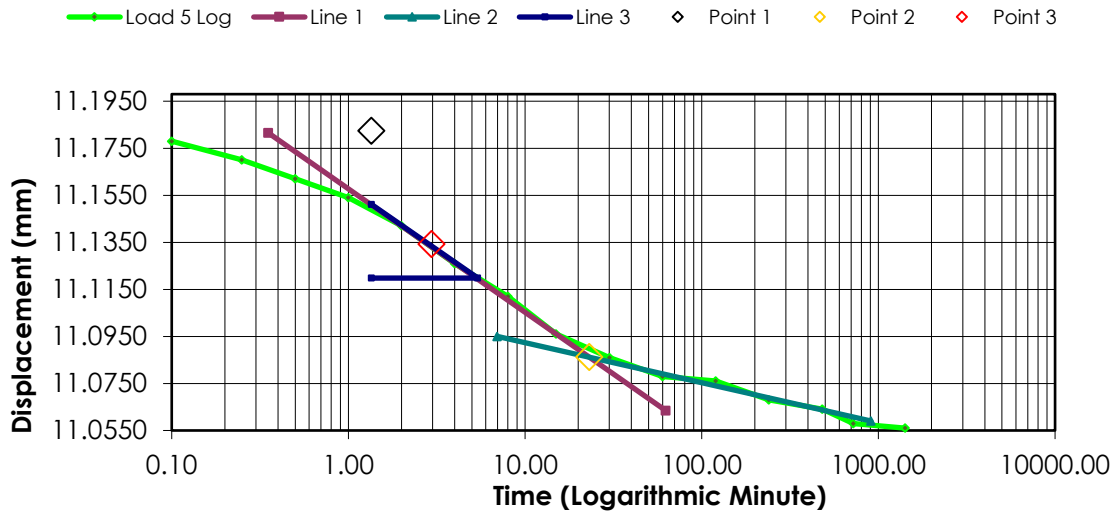
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	11.2100	-0.1660	-1.1186	0.5879
1	00:00:06	11.1780	-0.1720	-1.1590	0.5885
2	00:00:15	11.1700	-0.1640	-1.1051	0.5877
3	00:00:30	11.1620	-0.1560	-1.0512	0.5868
4	00:01:00	11.1540	-0.1480	-0.9973	0.5860
5	00:02:00	11.1420	-0.1360	-0.9164	0.5847
6	00:04:00	11.1260	-0.1200	-0.8086	0.5830
7	00:08:01	11.1120	-0.1060	-0.7143	0.5815
8	00:15:01	11.0960	-0.0900	-0.6065	0.5798
9	00:30:03	11.0860	-0.0800	-0.5391	0.5788
10	01:00:06	11.0780	-0.0720	-0.4852	0.5779
11	02:00:11	11.0760	-0.0700	-0.4717	0.5777
12	04:00:23	11.0680	-0.0620	-0.4178	0.5769
13	08:00:48	11.0640	-0.0580	-0.3908	0.5764
14	12:01:12	11.0580	-0.0520	-0.3504	0.5758
15	23:36:24	11.0560	-0.0500	-0.3369	0.5756

Consolidation Test Results (Sequence 5) Load 80.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 6) Load 160.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Test Number:

Sample Number: GL2 ST4

Soil Description:

Boring Number:

Clay (Cl), Some Sand, Trace Gravel

Depth: 1.95-2.40m

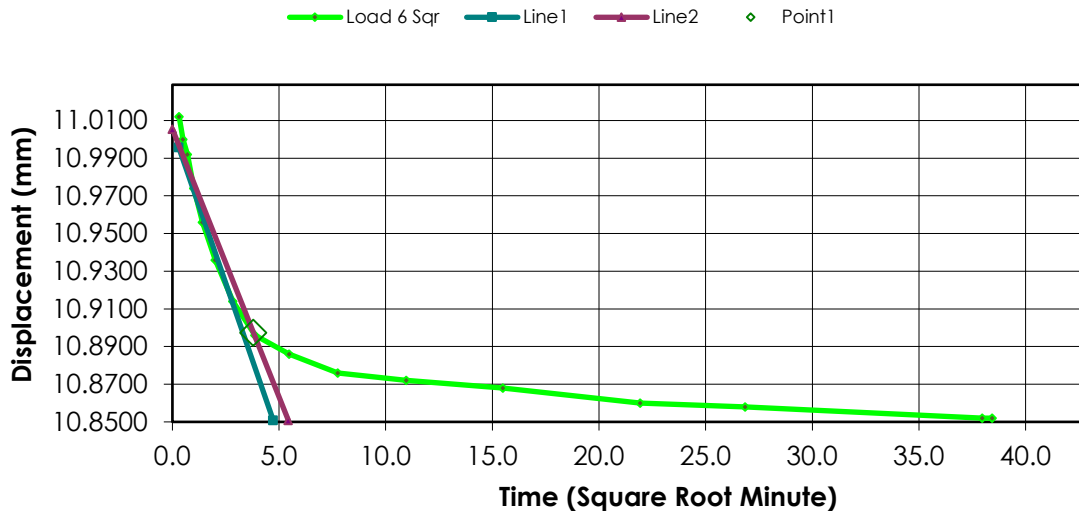
Remarks:

Sample Type: Undisturbed

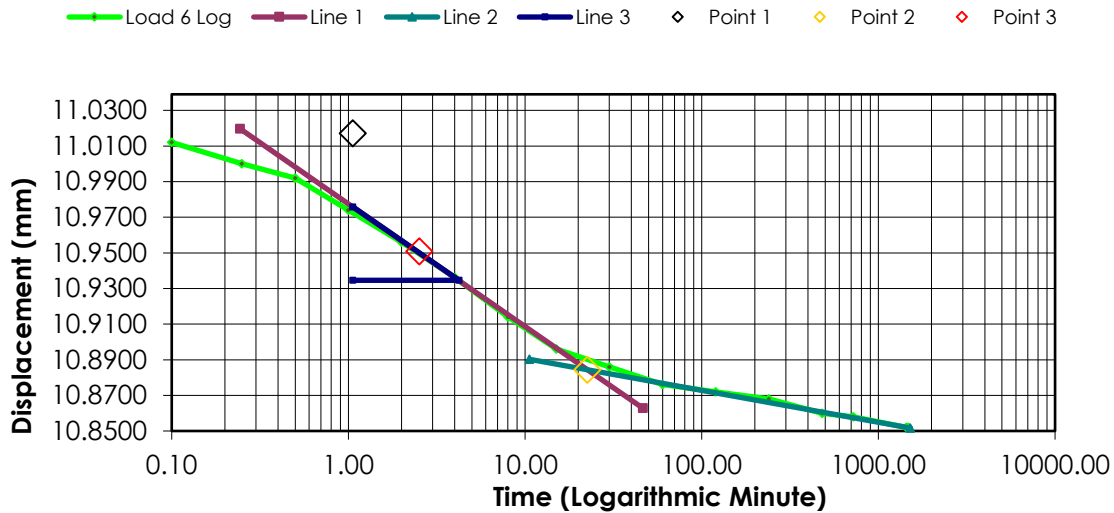
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	11.0560	-0.0500	-0.3369	0.5756
1	00:00:06	11.0120	-0.0260	-0.1752	0.5731
2	00:00:15	11.0000	-0.0140	-0.0943	0.5718
3	00:00:30	10.9920	-0.0060	-0.0404	0.5709
4	00:01:00	10.9740	0.0120	0.0809	0.5690
5	00:02:00	10.9560	0.0300	0.2022	0.5671
6	00:04:01	10.9360	0.0500	0.3369	0.5650
7	00:08:01	10.9140	0.0720	0.4852	0.5627
8	00:15:02	10.8960	0.0900	0.6065	0.5608
9	00:30:03	10.8860	0.1000	0.6738	0.5597
10	01:00:06	10.8760	0.1100	0.7412	0.5587
11	02:00:12	10.8720	0.1140	0.7682	0.5582
12	04:00:25	10.8680	0.1180	0.7951	0.5578
13	08:00:49	10.8600	0.1260	0.8491	0.5570
14	12:01:12	10.8580	0.1280	0.8625	0.5568
15	24:02:25	10.8520	0.1340	0.9030	0.5561
16	24:37:11	10.8520	0.1340	0.9030	0.5561

Consolidation Test Results (Sequence 6) Load 160.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 7) Load 320.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Test Number:

Sample Number: GL2 ST4

Soil Description:

Boring Number:

Clay (Cl), Some Sand, Trace Gravel

Depth: 1.95-2.40m

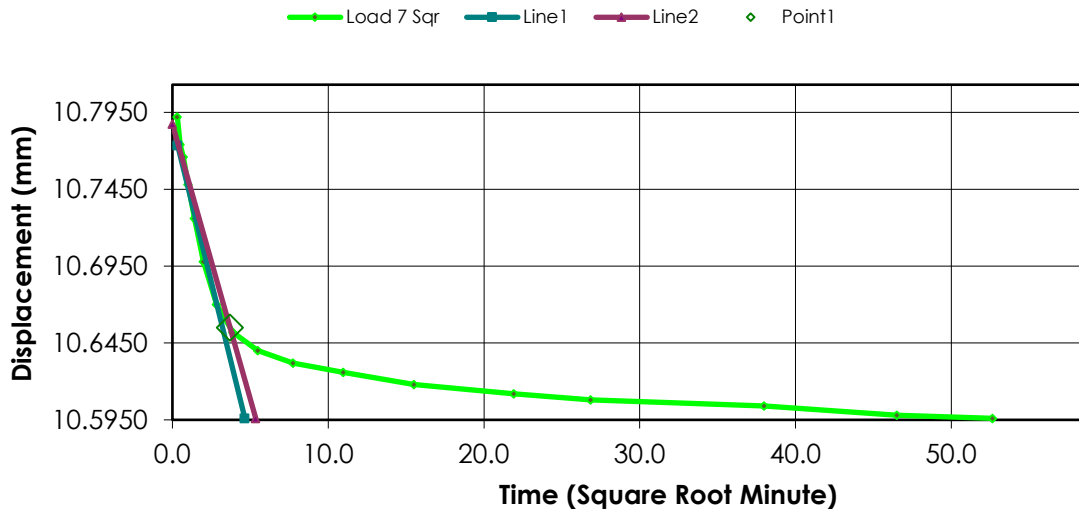
Remarks:

Sample Type: Undisturbed

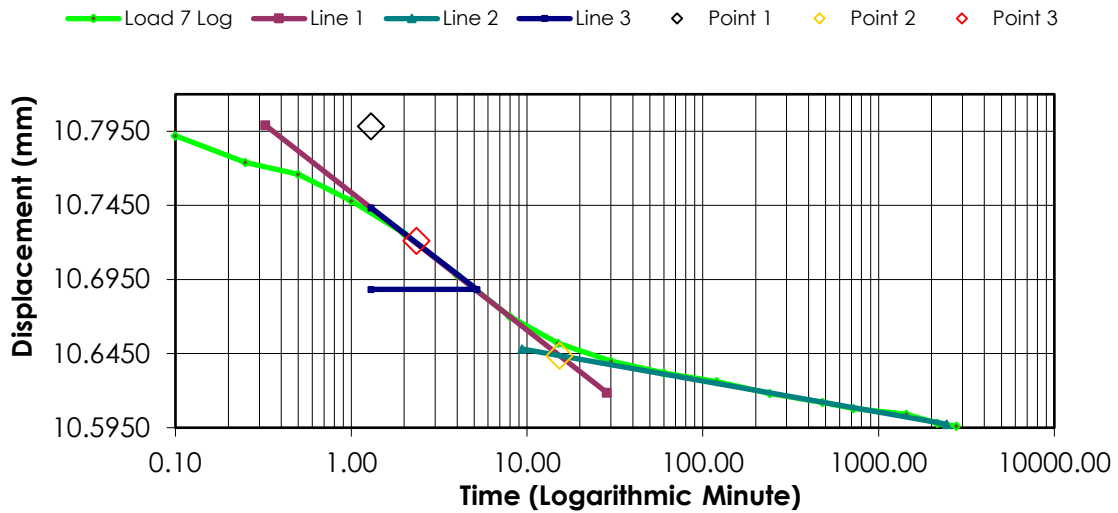
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	10.8520	0.1340	0.9030	0.5561
1	00:00:06	10.7920	0.1620	1.0916	0.5532
2	00:00:15	10.7740	0.1800	1.2129	0.5513
3	00:00:30	10.7660	0.1880	1.2668	0.5504
4	00:01:00	10.7480	0.2060	1.3881	0.5485
5	00:02:00	10.7260	0.2280	1.5364	0.5462
6	00:04:00	10.6980	0.2560	1.7251	0.5432
7	00:08:01	10.6700	0.2840	1.9137	0.5403
8	00:15:01	10.6520	0.3020	2.0350	0.5384
9	00:30:03	10.6400	0.3140	2.1159	0.5371
10	01:00:05	10.6320	0.3220	2.1698	0.5362
11	02:00:11	10.6260	0.3280	2.2102	0.5356
12	04:00:21	10.6180	0.3360	2.2641	0.5348
13	08:00:42	10.6120	0.3420	2.3046	0.5341
14	12:01:04	10.6080	0.3460	2.3315	0.5337
15	24:02:07	10.6040	0.3500	2.3585	0.5333
16	36:03:11	10.5980	0.3560	2.3989	0.5326
17	46:11:05	10.5960	0.3580	2.4124	0.5324

Consolidation Test Results (Sequence 7) Load 320.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 8) Load 640.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Test Number:

Sample Number: GL2 ST4

Soil Description:

Boring Number:

Clay (Cl), Some Sand, Trace Gravel

Depth: 1.95-2.40m

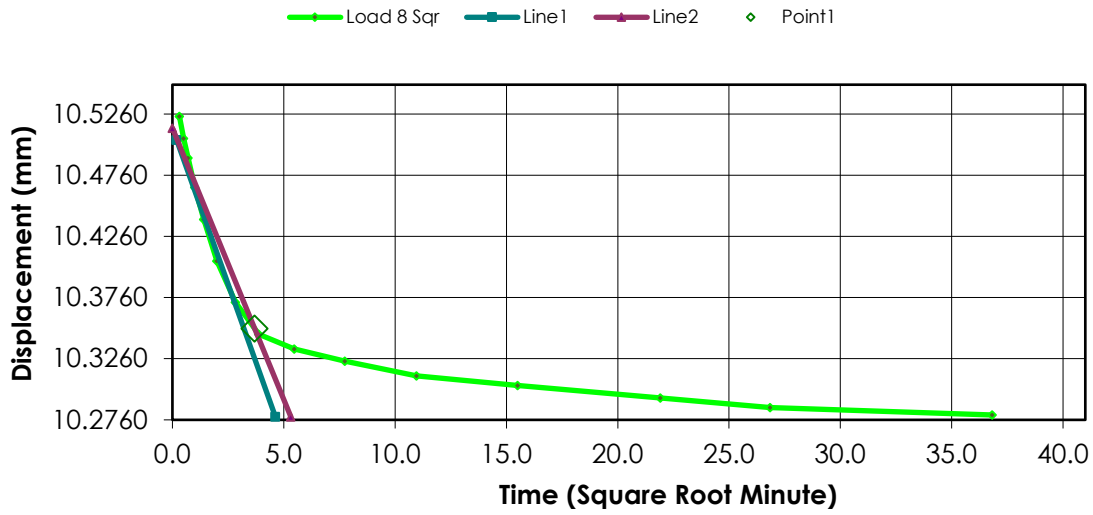
Remarks:

Sample Type: Undisturbed

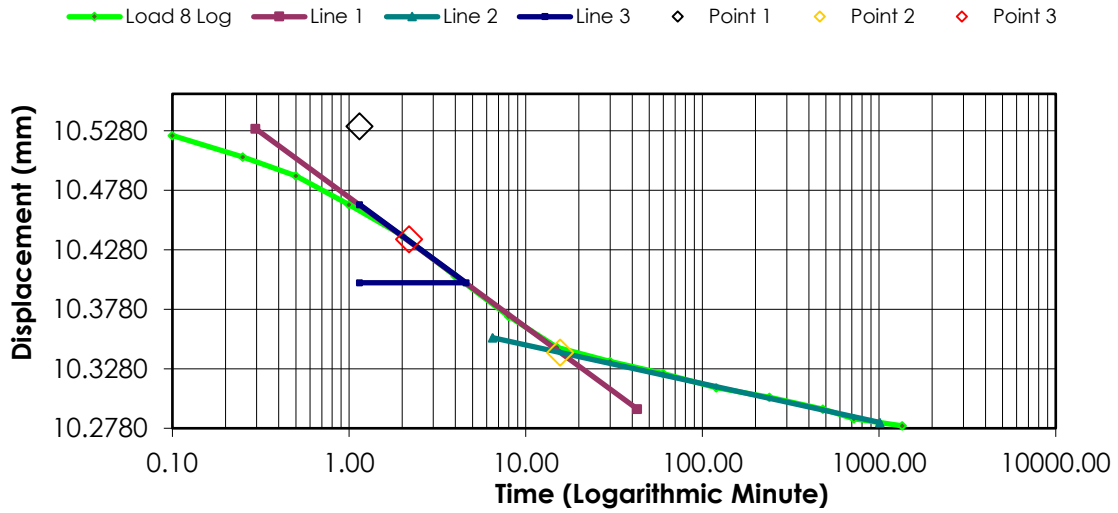
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	10.5960	0.3580	2.4124	0.5324
1	00:00:06	10.5240	0.3900	2.6280	0.5290
2	00:00:15	10.5060	0.4080	2.7493	0.5271
3	00:00:30	10.4900	0.4240	2.8571	0.5254
4	00:01:00	10.4660	0.4480	3.0189	0.5229
5	00:02:00	10.4400	0.4740	3.1941	0.5202
6	00:04:00	10.4060	0.5080	3.4232	0.5166
7	00:08:01	10.3720	0.5420	3.6523	0.5130
8	00:15:01	10.3460	0.5680	3.8275	0.5102
9	00:30:03	10.3340	0.5800	3.9083	0.5089
10	01:00:05	10.3240	0.5900	3.9757	0.5079
11	02:00:10	10.3120	0.6020	4.0566	0.5066
12	04:00:20	10.3040	0.6100	4.1105	0.5058
13	08:00:41	10.2940	0.6200	4.1779	0.5047
14	12:01:02	10.2860	0.6280	4.2318	0.5039
15	22:35:42	10.2800	0.6340	4.2722	0.5032

Consolidation Test Results (Sequence 8) Load 640.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 9) Rebound 320.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Test Number:

Sample Number: GL2 ST4

Soil Description:

Boring Number:

Clay (Cl), Some Sand, Trace Gravel

Depth: 1.95-2.40m

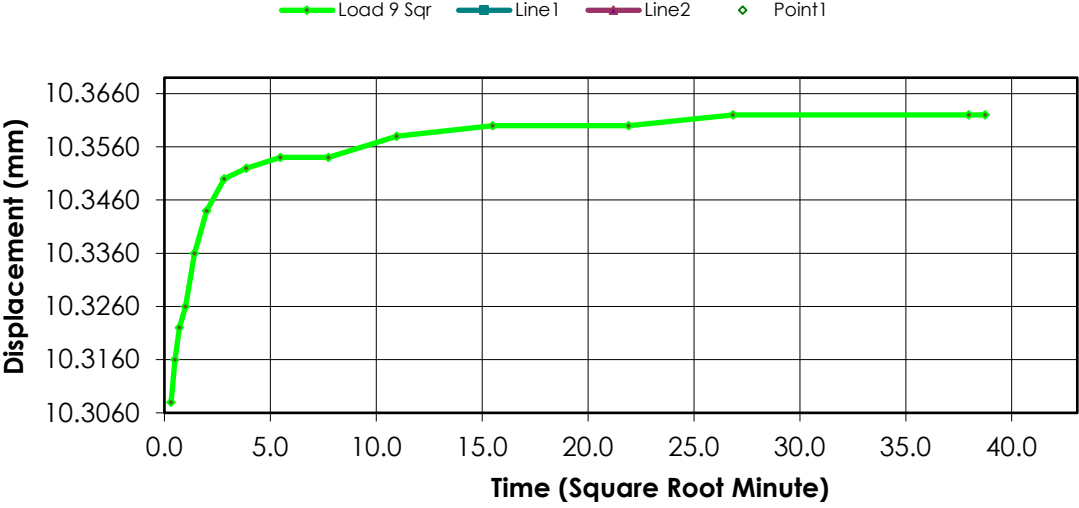
Remarks:

Sample Type: Undisturbed

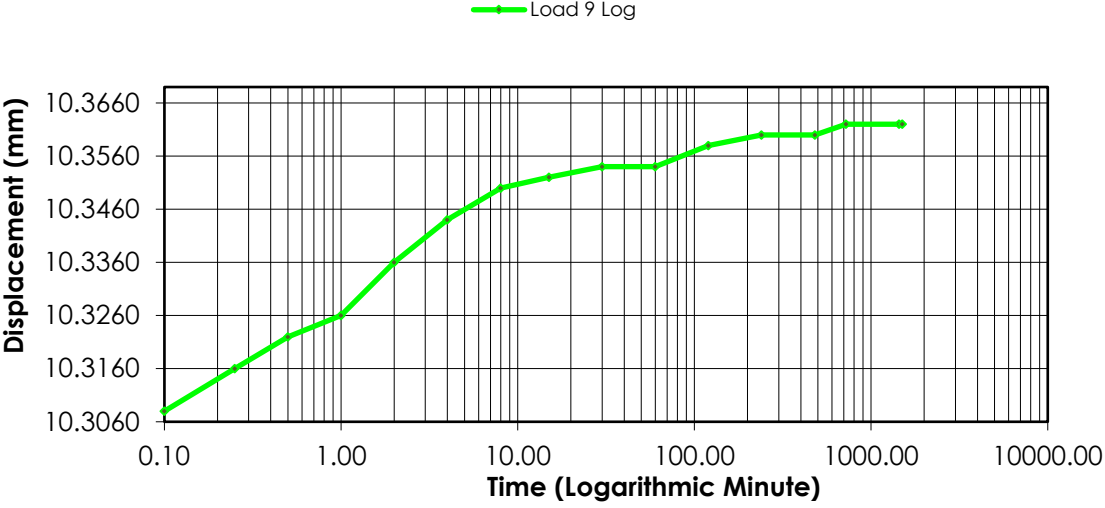
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	10.2800	0.6340	4.2722	0.5032
1	00:00:06	10.3080	0.6180	4.1644	0.5049
2	00:00:15	10.3160	0.6100	4.1105	0.5058
3	00:00:30	10.3220	0.6040	4.0701	0.5064
4	00:01:00	10.3260	0.6000	4.0431	0.5068
5	00:02:00	10.3360	0.5900	3.9757	0.5079
6	00:04:00	10.3440	0.5820	3.9218	0.5087
7	00:08:01	10.3500	0.5760	3.8814	0.5094
8	00:15:01	10.3520	0.5740	3.8679	0.5096
9	00:30:03	10.3540	0.5720	3.8544	0.5098
10	01:00:05	10.3540	0.5720	3.8544	0.5098
11	02:00:11	10.3580	0.5680	3.8275	0.5102
12	04:00:21	10.3600	0.5660	3.8140	0.5104
13	08:00:42	10.3600	0.5660	3.8140	0.5104
14	12:01:03	10.3620	0.5640	3.8005	0.5106
15	24:02:07	10.3620	0.5640	3.8005	0.5106
16	25:01:18	10.3620	0.5640	3.8005	0.5106

Consolidation Test Results (Sequence 9) Rebound 320.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 10) Rebound 160.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Test Number:

Sample Number: GL2 ST4

Soil Description:

Boring Number:

Clay (Cl), Some Sand, Trace Gravel

Depth: 1.95-2.40m

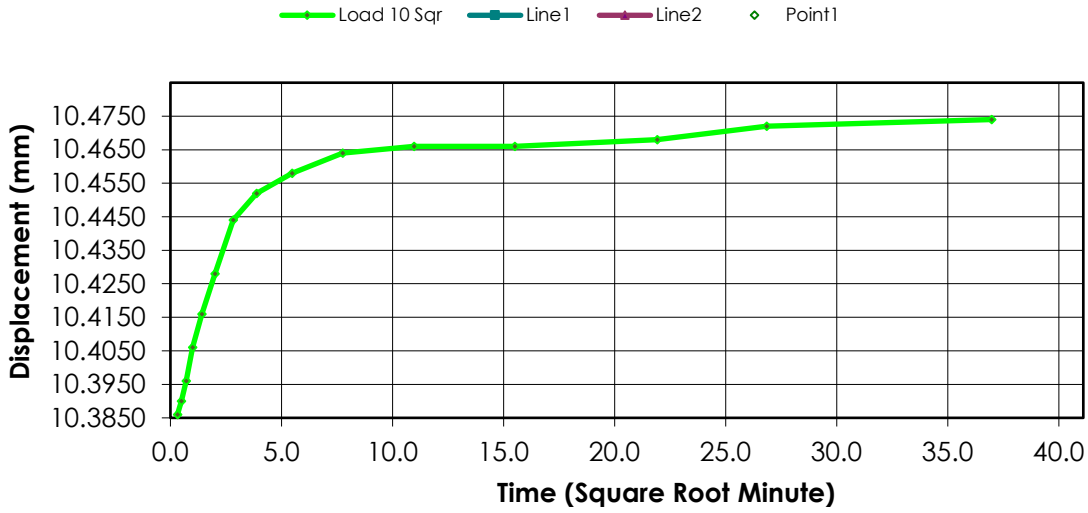
Remarks:

Sample Type: Undisturbed

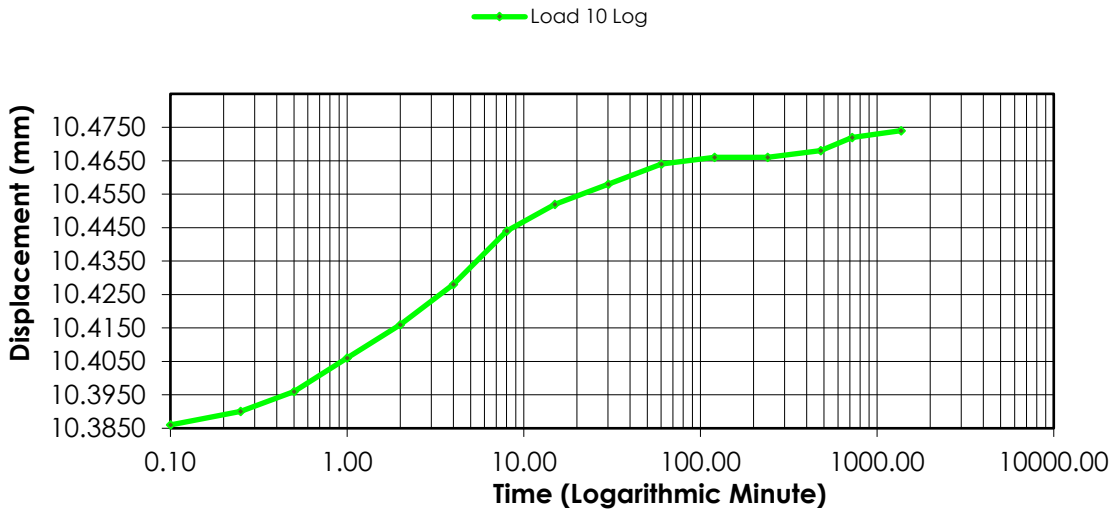
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	10.3620	0.5640	3.8005	0.5106
1	00:00:06	10.3860	0.5580	3.7601	0.5113
2	00:00:15	10.3900	0.5540	3.7331	0.5117
3	00:00:30	10.3960	0.5480	3.6927	0.5123
4	00:01:00	10.4060	0.5380	3.6253	0.5134
5	00:02:00	10.4160	0.5280	3.5579	0.5144
6	00:04:00	10.4280	0.5160	3.4771	0.5157
7	00:08:01	10.4440	0.5000	3.3693	0.5174
8	00:15:01	10.4520	0.4920	3.3154	0.5182
9	00:30:03	10.4580	0.4860	3.2749	0.5189
10	01:00:05	10.4640	0.4800	3.2345	0.5195
11	02:00:11	10.4660	0.4780	3.2210	0.5197
12	04:00:21	10.4660	0.4780	3.2210	0.5197
13	08:00:37	10.4680	0.4760	3.2075	0.5199
14	12:00:58	10.4720	0.4720	3.1806	0.5204
15	22:46:49	10.4740	0.4700	3.1671	0.5206

Consolidation Test Results
(Sequence 10) Rebound 160.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 11) Load 320.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Test Number:

Sample Number: GL2 ST4

Soil Description:

Boring Number:

Clay (Cl), Some Sand, Trace Gravel

Depth: 1.95-2.40m

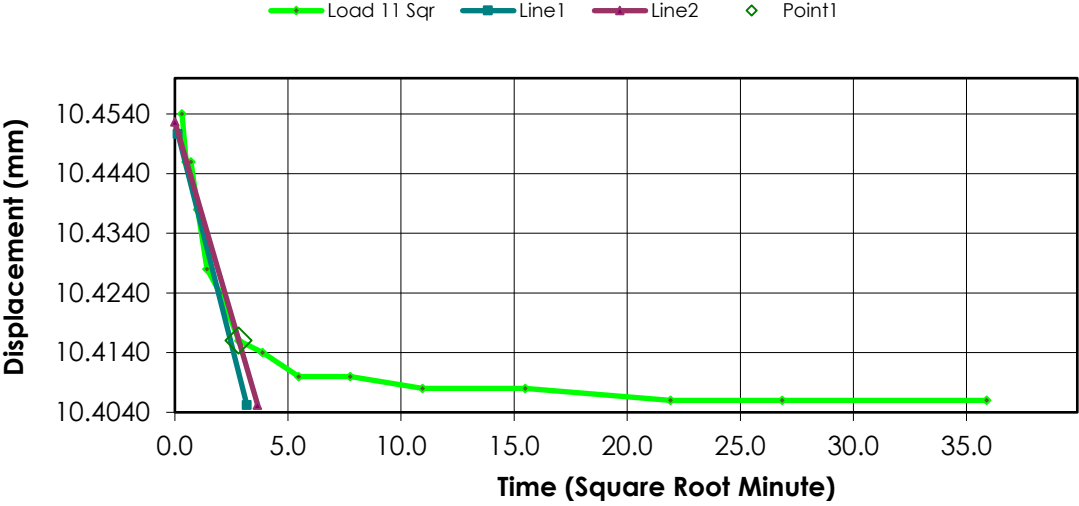
Remarks:

Sample Type: Undisturbed

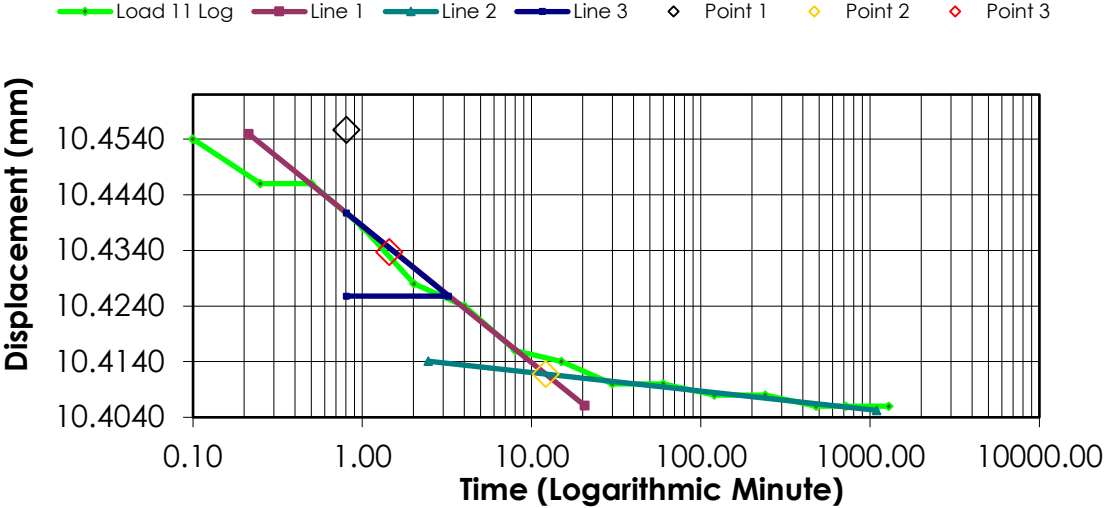
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	10.4740	0.4700	3.1671	0.5206
1	00:00:06	10.4540	0.4840	3.2614	0.5191
2	00:00:15	10.4460	0.4920	3.3154	0.5182
3	00:00:30	10.4460	0.4920	3.3154	0.5182
4	00:01:01	10.4380	0.5000	3.3693	0.5174
5	00:02:01	10.4280	0.5100	3.4367	0.5163
6	00:04:01	10.4240	0.5140	3.4636	0.5159
7	00:08:01	10.4160	0.5220	3.5175	0.5151
8	00:15:02	10.4140	0.5240	3.5310	0.5149
9	00:30:03	10.4100	0.5280	3.5579	0.5144
10	01:00:06	10.4100	0.5280	3.5579	0.5144
11	02:00:11	10.4080	0.5300	3.5714	0.5142
12	04:00:22	10.4080	0.5300	3.5714	0.5142
13	08:00:43	10.4060	0.5320	3.5849	0.5140
14	12:01:04	10.4060	0.5320	3.5849	0.5140
15	21:28:53	10.4060	0.5320	3.5849	0.5140

Consolidation Test Results (Sequence 11) Load 320.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 12) Load 640.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Test Number:

Sample Number: GL2 ST4

Soil Description:

Boring Number:

Clay (Cl), Some Sand, Trace Gravel

Depth: 1.95-2.40m

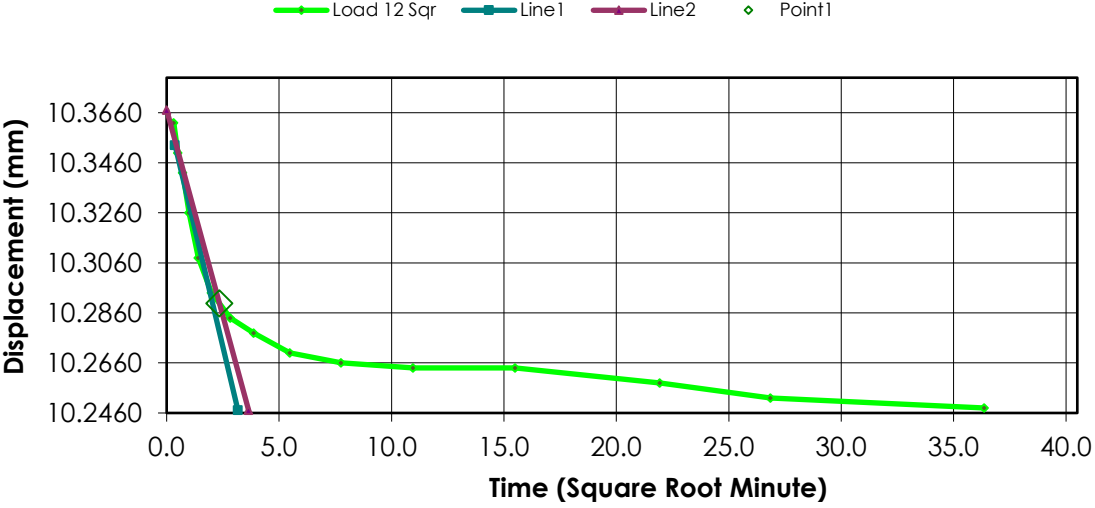
Remarks:

Sample Type: Undisturbed

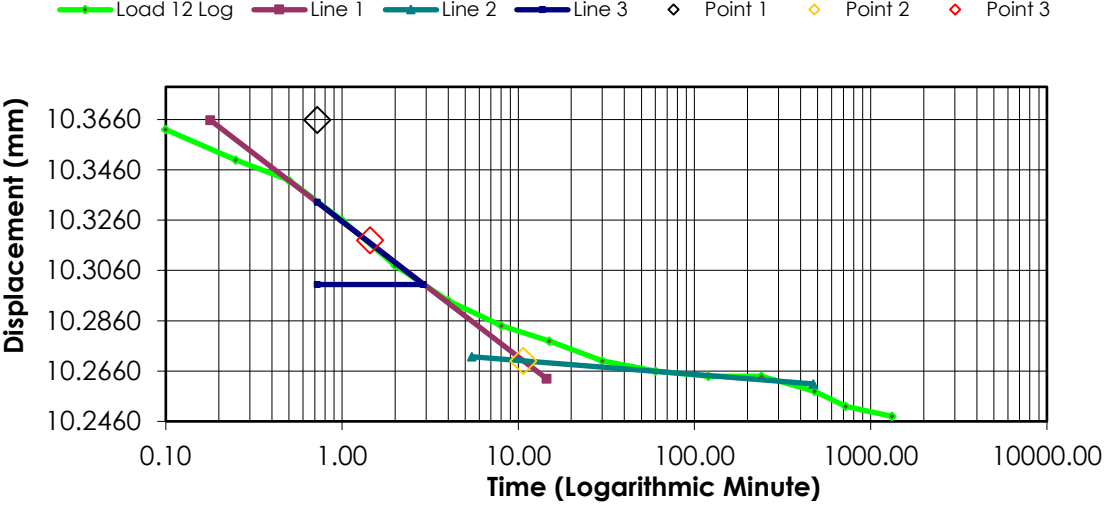
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	10.4060	0.5320	3.5849	0.5140
1	00:00:06	10.3620	0.5520	3.7197	0.5119
2	00:00:15	10.3500	0.5640	3.8005	0.5106
3	00:00:30	10.3420	0.5720	3.8544	0.5098
4	00:01:00	10.3260	0.5880	3.9623	0.5081
5	00:02:00	10.3080	0.6060	4.0836	0.5062
6	00:04:00	10.2940	0.6200	4.1779	0.5047
7	00:08:01	10.2840	0.6300	4.2453	0.5036
8	00:15:01	10.2780	0.6360	4.2857	0.5030
9	00:30:03	10.2700	0.6440	4.3396	0.5022
10	01:00:05	10.2660	0.6480	4.3666	0.5017
11	02:00:11	10.2640	0.6500	4.3800	0.5015
12	04:00:21	10.2640	0.6500	4.3800	0.5015
13	08:00:42	10.2580	0.6560	4.4205	0.5009
14	12:01:02	10.2520	0.6620	4.4609	0.5003
15	22:02:16	10.2480	0.6660	4.4879	0.4998

Consolidation Test Results (Sequence 12) Load 640.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 13) Load 1280.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Test Number:

Sample Number: GL2 ST4

Soil Description:

Boring Number:

Clay (Cl), Some Sand, Trace Gravel

Depth: 1.95-2.40m

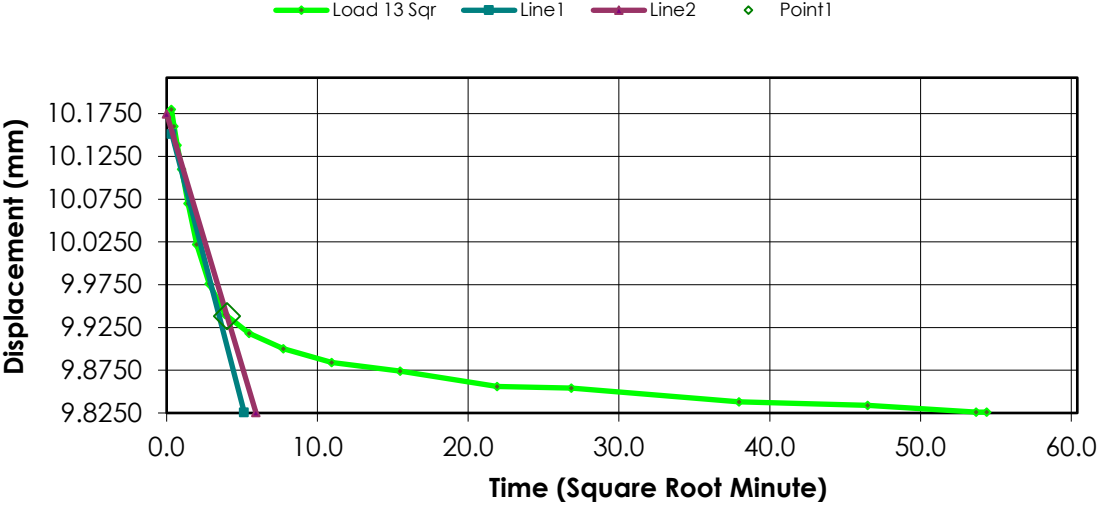
Remarks:

Sample Type: Undisturbed

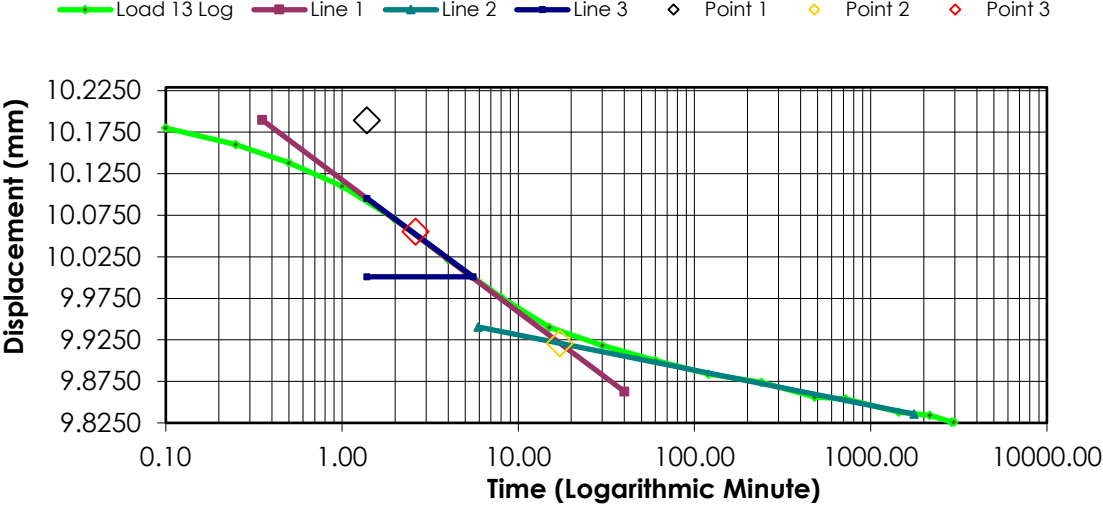
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	10.2480	0.6660	4.4879	0.4998
1	00:00:06	10.1800	0.6760	4.5552	0.4988
2	00:00:15	10.1600	0.6960	4.6900	0.4967
3	00:00:30	10.1380	0.7180	4.8383	0.4943
4	00:01:00	10.1100	0.7460	5.0269	0.4914
5	00:02:00	10.0700	0.7860	5.2965	0.4871
6	00:04:00	10.0220	0.8340	5.6199	0.4821
7	00:08:01	9.9760	0.8800	5.9299	0.4772
8	00:15:01	9.9400	0.9160	6.1725	0.4734
9	00:30:03	9.9180	0.9380	6.3207	0.4711
10	01:00:05	9.9000	0.9560	6.4420	0.4691
11	02:00:10	9.8840	0.9720	6.5499	0.4675
12	04:00:21	9.8740	0.9820	6.6172	0.4664
13	08:00:42	9.8560	1.0000	6.7385	0.4645
14	12:01:03	9.8540	1.0020	6.7520	0.4643
15	24:02:07	9.8380	1.0180	6.8598	0.4626
16	36:03:09	9.8340	1.0220	6.8868	0.4622
17	48:04:12	9.8260	1.0300	6.9407	0.4613
18	49:19:01	9.8260	1.0300	6.9407	0.4613

Consolidation Test Results (Sequence 13) Load 1280.000 kPa

Consolidation Graph (Squareroot Time)



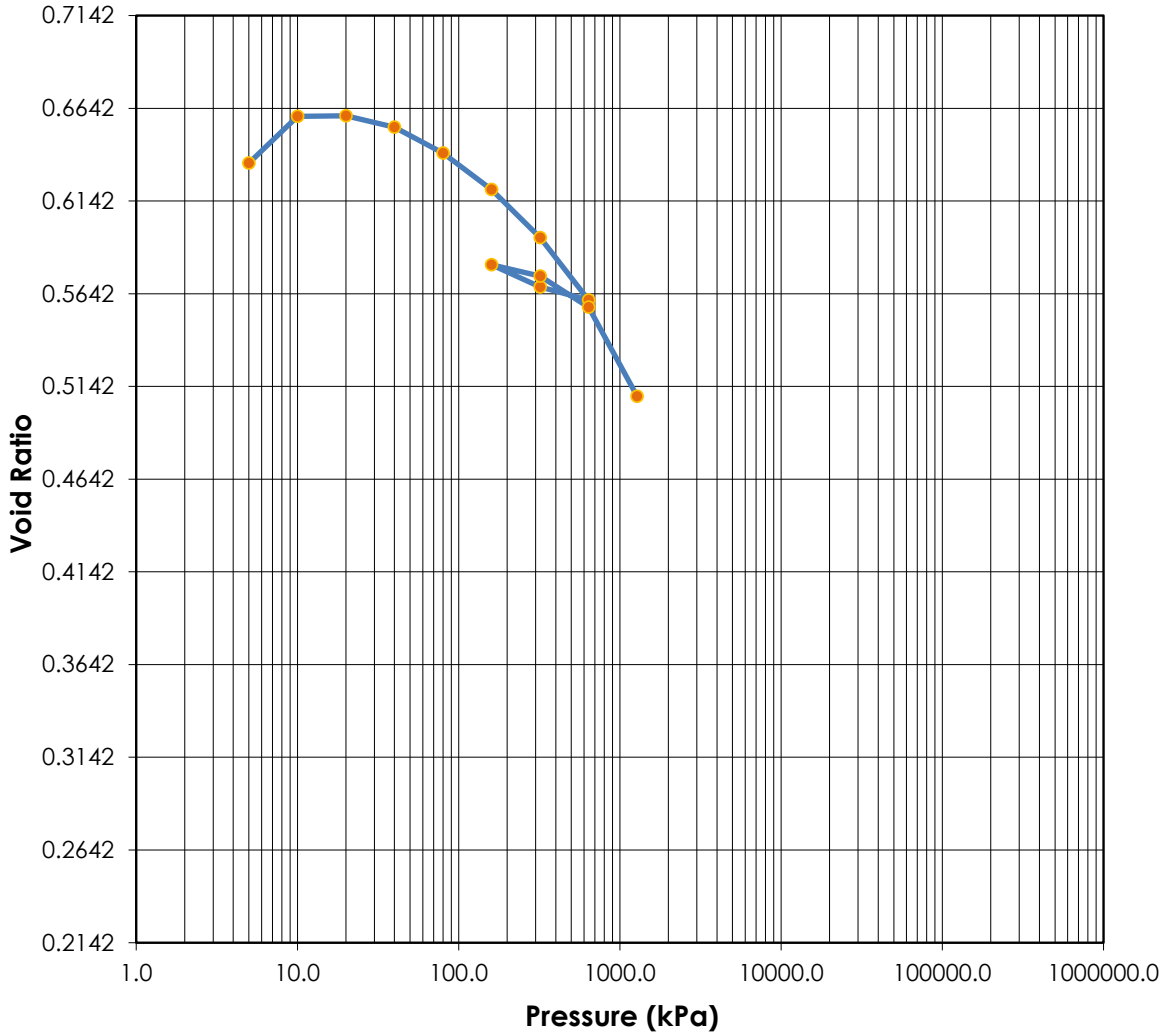
Consolidation Graph (Logarithmic Time)





Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876



	Before	After	Liquid Limits:	53	Test Date:	15-Oct-18	
Moisture (%):	25.6	23.1	Plastic Limits:	18			
Dry Density (g/cm³):	1.618	1.744	Plasticity Index (%):	35			
Saturation (%):	100	100					
Void Ratio:	0.6358	0.5099	Specific Gravity:	2.65	Assumed		
Soil Description:	Clay (CH), Some Sand, Trace Gravel						
Project Number:	110773396	Depth:	5.1-5.55m		Remarks:		
Sample Number:	GL2 ST11	Boring Number:					
Project:	SR1 2018 Investigation						
Client:	Alberta Transportation						
Location:							

Tested By: E. Wahl

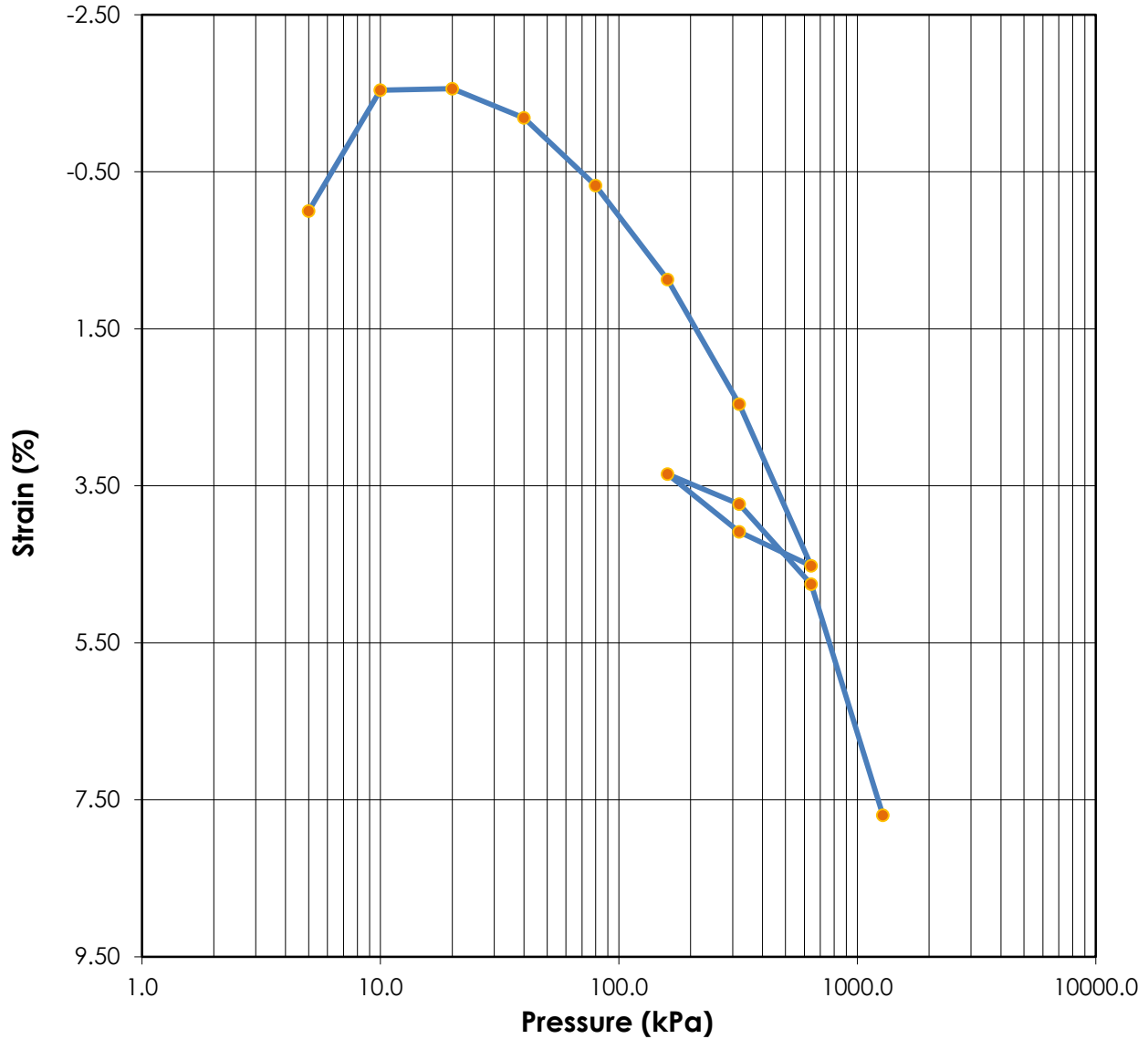
Reviewed By: C. Lamoureux

Reporting of these test results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request. The data presented above is for the sole use of the client stipulated above. Stantec is not responsible, nor can be held liable, for the use of this report by any other party, with or without the knowledge of Stantec.



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876

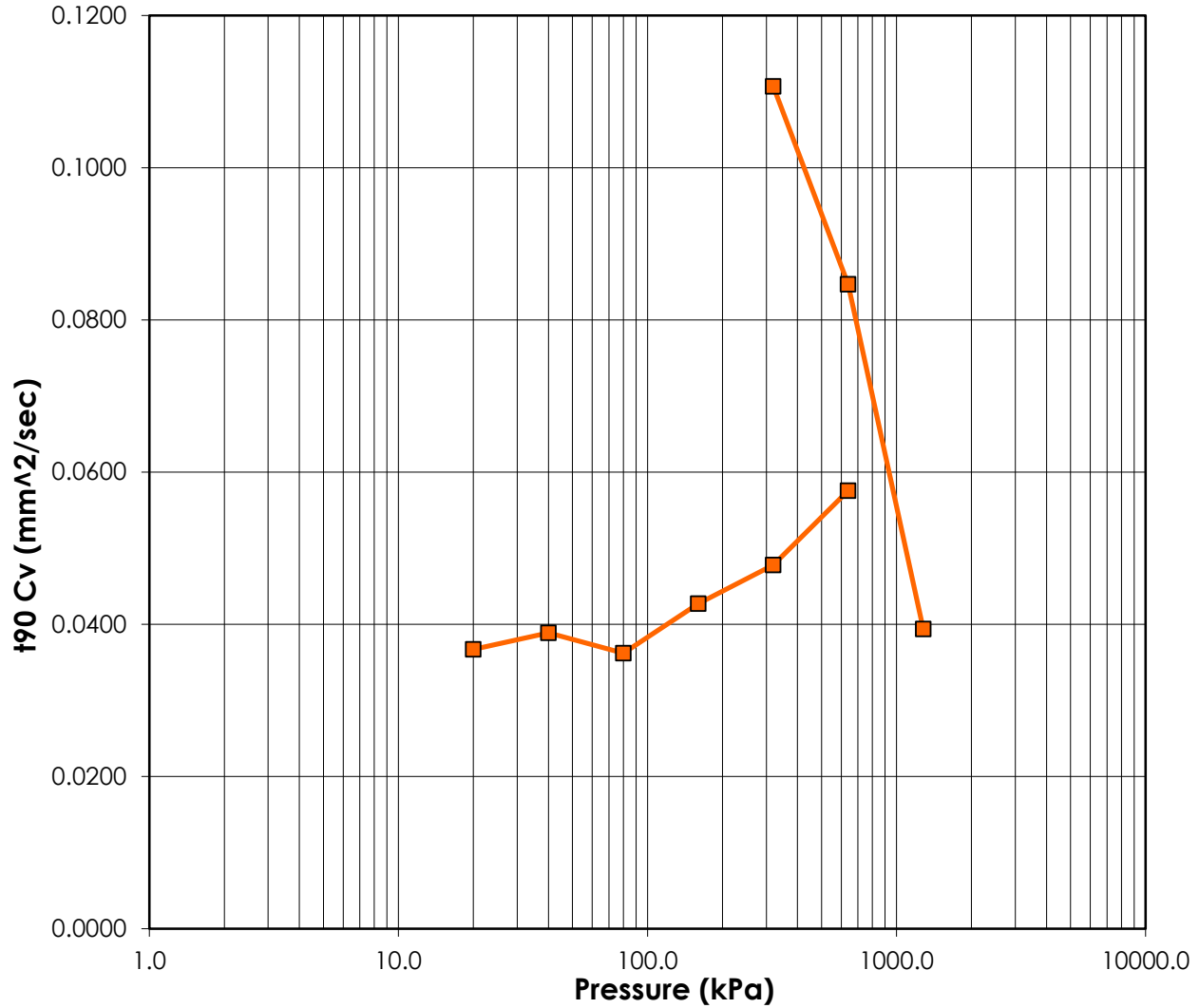


	Before	After	Liquid Limits:	53	Test Date:	15-Oct-18
Moisture (%):	25.6	23.1	Plastic Limits:	18		
Dry Density (g/cm3):	1.618	1.744	Plasticity Index (%):	35		
Saturation (%):	100	100	Specific Gravity:	2.65	Assumed	
Void Ratio:	0.6358	0.5099				
Sample Description:	Clay (CH), Some Sand, Trace Gravel					
Project Number:	110773396	Depth:	5.1-5.55m			
Sample Number:	GL2 ST11	Boring Number:				
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						
			Remarks:			



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

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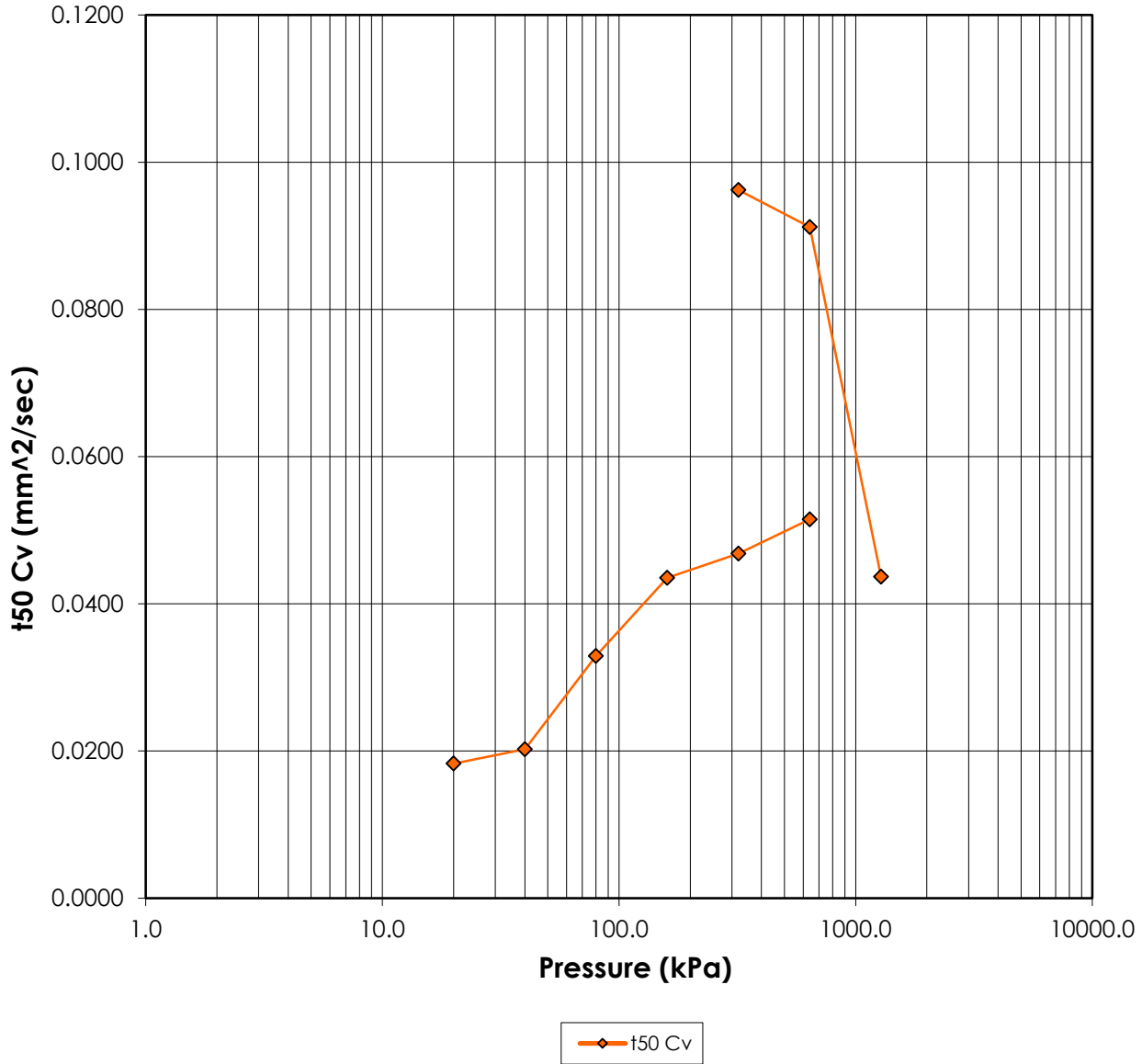
—■— t90 Cv

	Before	After	Liquid Limits:	53	Test Date:	15-Oct-18
Moisture (%):	25.6	23.1	Plastic Limits:	18		
Dry Density (g/cm3):	1.618	1.744	Plasticity Index (%):	35		
Saturation (%):	100	100				
Void Ratio:	0.6358	0.5099	Specific Gravity:	2.65	Assumed	
Soil Description:	Clay (CH), Some Sand, Trace Gravel					
Project Number:	110773396	Depth:	5.1-5.55m			
Sample Number:	GL2 ST11	Boring Number:				
Project:	SR1 2018 Investigation					Remarks:
Client:	Alberta Transportation					
Location:						



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Test Results

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 Tel: (403) 253-7876

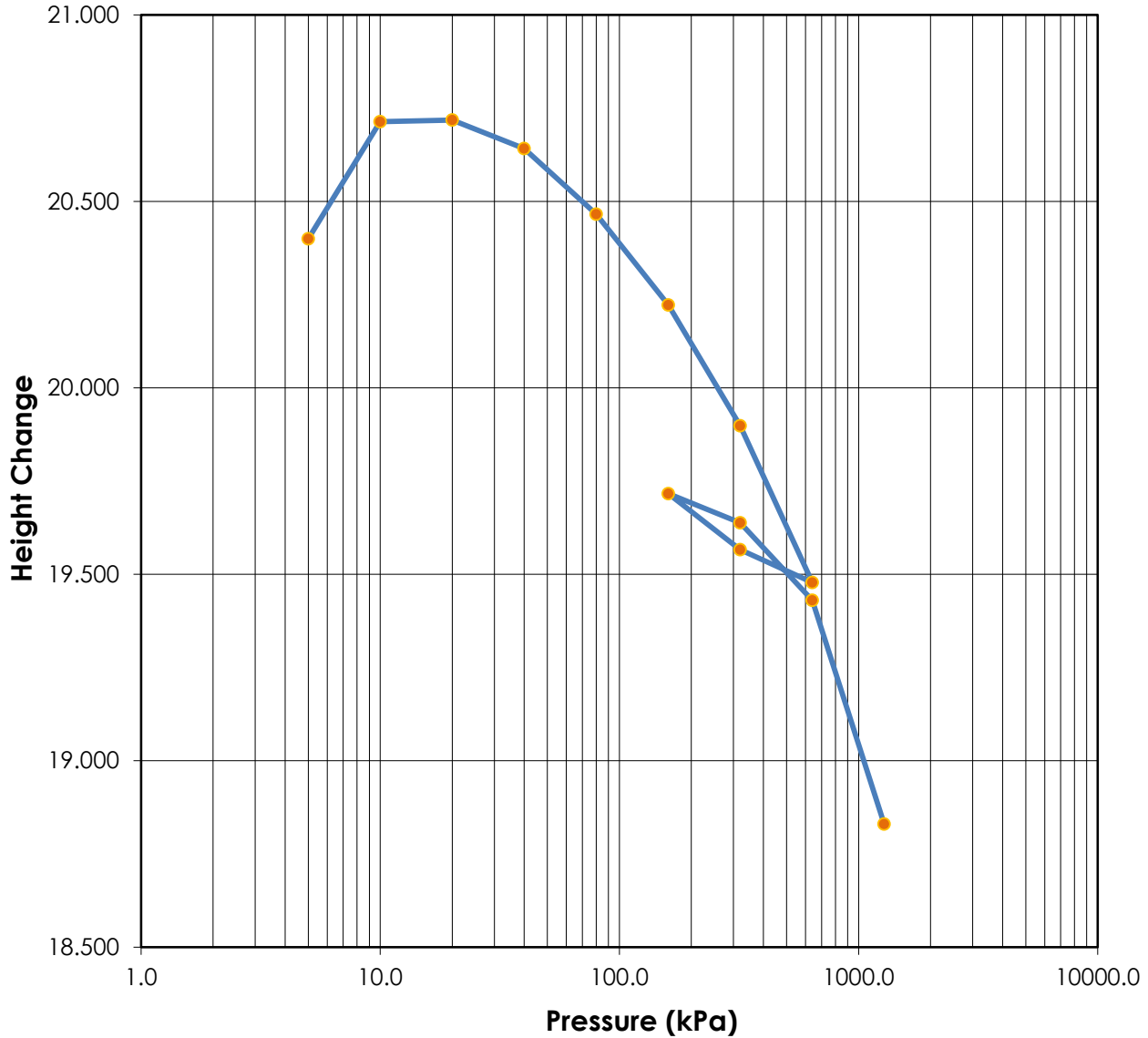


	Before	After	Liquid Limits:	53	Test Date:	15-Oct-18
Moisture (%):	25.6	23.1	Plastic Limits:	18		
Dry Density (g/cm³):	1.618	1.744	Plasticity Index (%):	35		
Saturation (%):	100	100				
Void Ratio:	0.6358	0.5099	Specific Gravity:	2.65	Assumed	
Soil Description:	Clay (CH), Some Sand, Trace Gravel					
Project Number:	110773396	Depth:	5.1-5.55m			
Sample Number:	GL2 ST11	Boring Number:				
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						
	Remarks:					



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

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 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876



	Before	After	Liquid Limits:	53	Test Date:	15-Oct-18
Moisture (%):	25.6	23.1	Plastic Limits:	18		
Dry Density (g/cm3):	1.618	1.744	Plasticity Index (%):	35		
Saturation (%):	100	100	Specific Gravity:	2.65	Assumed	
Void Ratio:	0.6358	0.5099				
Soil Description:	Clay (CH), Some Sand, Trace Gravel					
Project Number:	110773396	Depth:	5.1-5.55m			
Sample Number:	GL2 ST11	Boring Number:				
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						
			Remarks:			

Consolidation Test Results Summary

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Sample Number: GL2 ST11

Sample Description:

Boring Number:

Clay (CH), Some Sand, Trace Gravel

Depth: 5.1-5.55m

Remarks:

Test Number:

Sample Type: Undisturbed

Test Date: 15-Oct-18

Index	Load Sequence (kPa)	Cumulative Change in Height (mm)	Specimen Height (mm)	Height of Void (mm)	Vertical Strain (%)	Void Ratio	t90 Fitting Time (min)	t50 Fitting Time (min)	t90 Cv (mm ² /sec)	t50 Cv (mm ² /sec)
0	0.000	0.0000	20.4000	7.9200	0.00	0.6346	0.000	0.000	0.000	0.000
1	5.000	0.0000	20.4000	7.9200	0.00	0.6346	0.000	0.000	0.000	0.000
2	10.000	-0.3140	20.7140	8.2340	-1.54	0.6598	0.000	0.000	0.000	0.000
3	20.000	-0.3180	20.7180	8.2380	-1.56	0.6601	41.333	19.268	0.037	0.018
4	40.000	-0.2420	20.6420	8.1620	-1.19	0.6540	38.715	17.287	0.039	0.020
5	80.000	-0.0660	20.4660	7.9860	-0.32	0.6399	40.872	10.451	0.036	0.033
6	160.000	0.1780	20.2220	7.7420	0.87	0.6204	33.840	7.708	0.043	0.044
7	320.000	0.5020	19.8980	7.4180	2.46	0.5944	29.266	6.940	0.048	0.047
8	640.000	0.9220	19.4780	6.9980	4.52	0.5607	23.285	6.049	0.058	0.051
9	320.000	0.8340	19.5660	7.0860	4.09	0.5678	0.000	0.000	0.000	0.000
10	160.000	0.6840	19.7160	7.2360	3.35	0.5798	0.000	0.000	0.000	0.000
11	320.000	0.7620	19.6380	7.1580	3.74	0.5736	12.311	3.290	0.111	0.096
12	640.000	0.9700	19.4300	6.9500	4.75	0.5569	15.751	3.398	0.085	0.091
13	1280.000	1.5700	18.8300	6.3500	7.70	0.5088	31.802	6.664	0.039	0.044

Predicted value indicated with *

Consolidation Test
Consolidation Specimen Information

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Sample Number: GL2 ST11

Sample Description:

Boring Number:

Clay (CH), Some Sand, Trace Gravel

Depth: 5.1-5.55m

Remarks:

Sample Type: Undisturbed

Test Number:

Liquid Limit: 53

Initial Void Ratio: 0.6358

Initial Height (mm): 20.40

Plastic Limit: 18

Plasticity Index (%): 35

Initial Diameter (mm): 63.24

Specific Gravity: 2.65

Weight of Ring (g): 111.55

Assumed

Parameters	Initial Specimen	Final Specimen
Moist Weight + Container (g)	179.98	130.47
Dry Soil + Container (g)	144.01	106.72
Weight of Container (g)	3.77	3.75
Moisture Content (%)	25.6	23.1
Void Ratio	0.6358	0.5099
Saturation (%)	100	100
Dry Density (g/cm ³)	1.618	1.744

**Consolidation Test Results
(Sequence 1) Load 5.000 kPa**

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Test Number:

Sample Number: GL2 ST11

Soil Description:

Boring Number:

Clay (CH), Some Sand, Trace Gravel

Depth: 5.1-5.55m

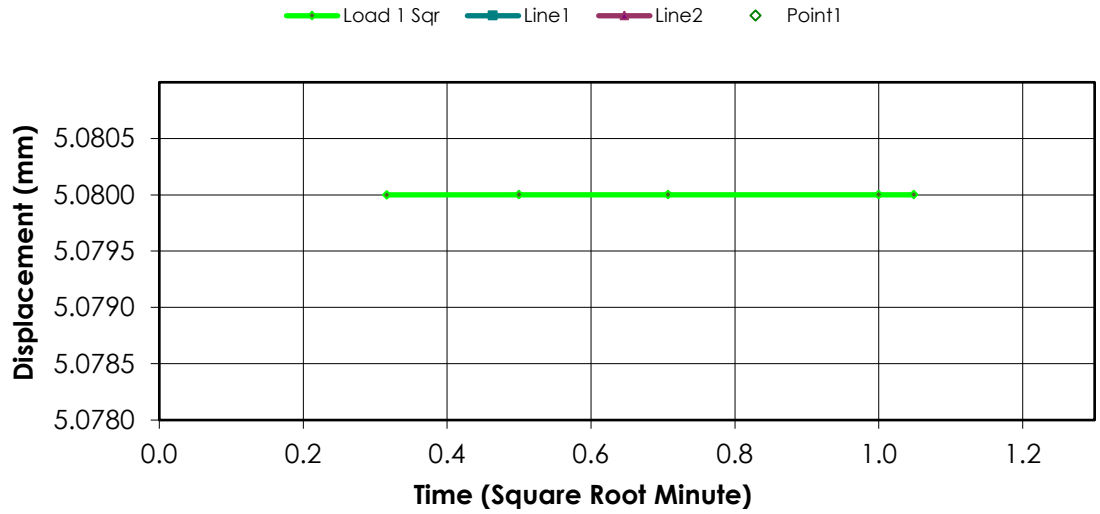
Remarks:

Sample Type: Undisturbed

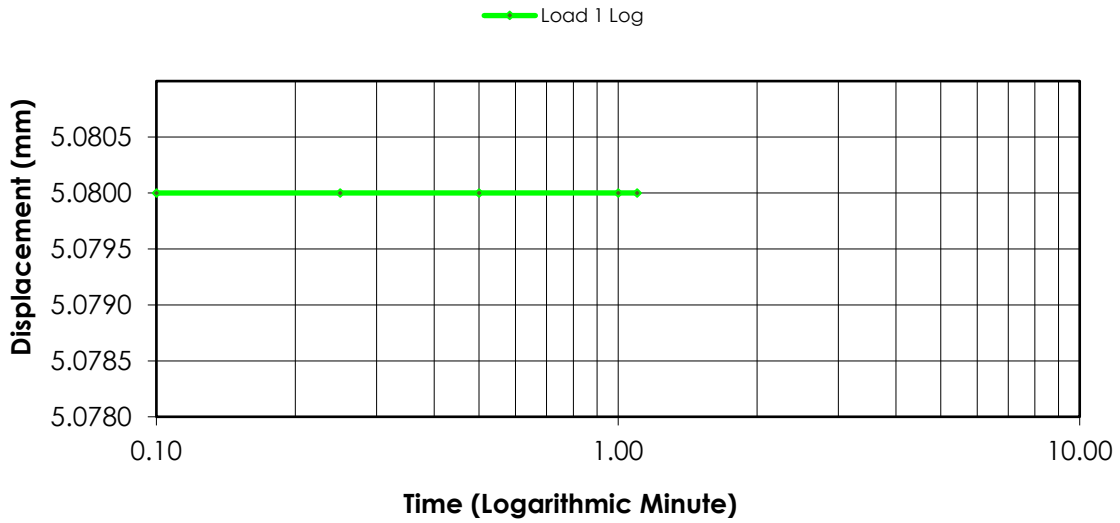
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	5.0800	0.0000	0.0000	0.6358
1	00:00:06	5.0800	0.0000	0.0000	0.6358
2	00:00:15	5.0800	0.0000	0.0000	0.6358
3	00:00:30	5.0800	0.0000	0.0000	0.6358
4	00:01:00	5.0800	0.0000	0.0000	0.6358
5	00:01:06	5.0800	0.0000	0.0000	0.6358

Consolidation Test Results (Sequence 1) Load 5.000 kPa

Consolidation Graph (Square-root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 2) Load 10.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Test Number:

Sample Number: GL2 ST11

Soil Description:

Boring Number:

Clay (CH), Some Sand, Trace Gravel

Depth: 5.1-5.55m

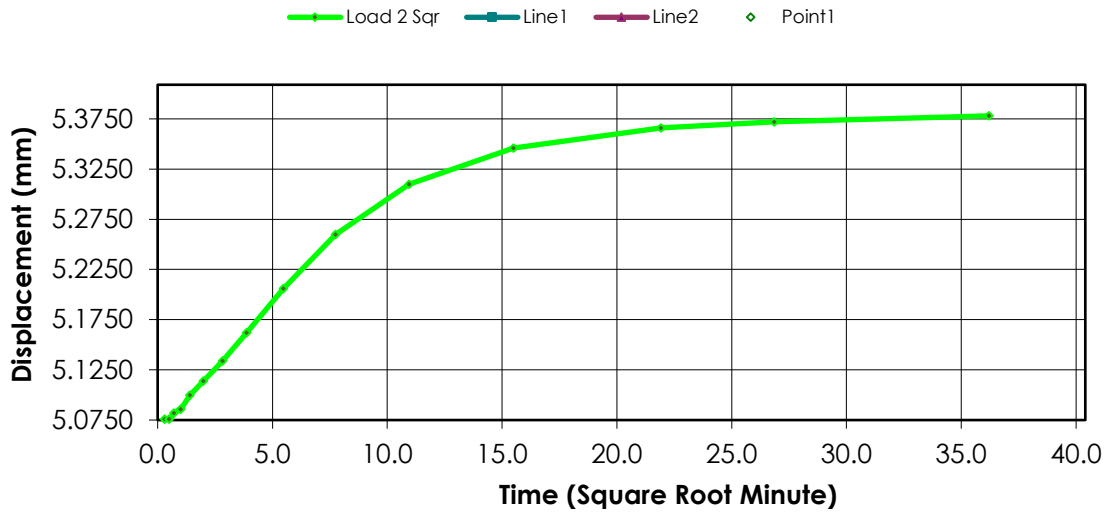
Remarks:

Sample Type: Undisturbed

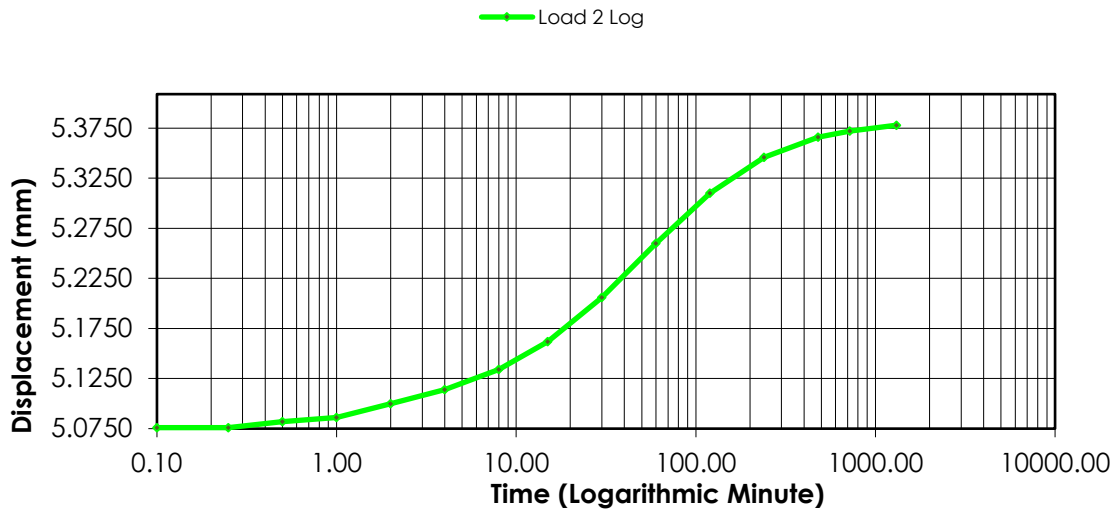
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	5.0800	0.0000	0.0000	0.6358
1	00:00:06	5.0760	-0.0120	-0.0588	0.6367
2	00:00:15	5.0760	-0.0120	-0.0588	0.6367
3	00:00:30	5.0820	-0.0180	-0.0882	0.6372
4	00:01:00	5.0860	-0.0220	-0.1078	0.6375
5	00:02:00	5.1000	-0.0360	-0.1765	0.6387
6	00:04:00	5.1140	-0.0500	-0.2451	0.6398
7	00:08:00	5.1340	-0.0700	-0.3431	0.6414
8	00:15:01	5.1620	-0.0980	-0.4804	0.6436
9	00:30:03	5.2060	-0.1420	-0.6961	0.6472
10	01:00:06	5.2600	-0.1960	-0.9608	0.6515
11	02:00:12	5.3100	-0.2460	-1.2059	0.6555
12	04:00:24	5.3460	-0.2820	-1.3824	0.6584
13	08:00:48	5.3660	-0.3020	-1.4804	0.6600
14	12:01:13	5.3720	-0.3080	-1.5098	0.6605
15	21:51:22	5.3780	-0.3140	-1.5392	0.6610

**Consolidation Test Results
(Sequence 2) Load 10.000 kPa**

Consolidation Graph (Square-root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 3) Load 20.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Test Number:

Sample Number: GL2 ST11

Soil Description:

Boring Number:

Clay (CH), Some Sand, Trace Gravel

Depth: 5.1-5.55m

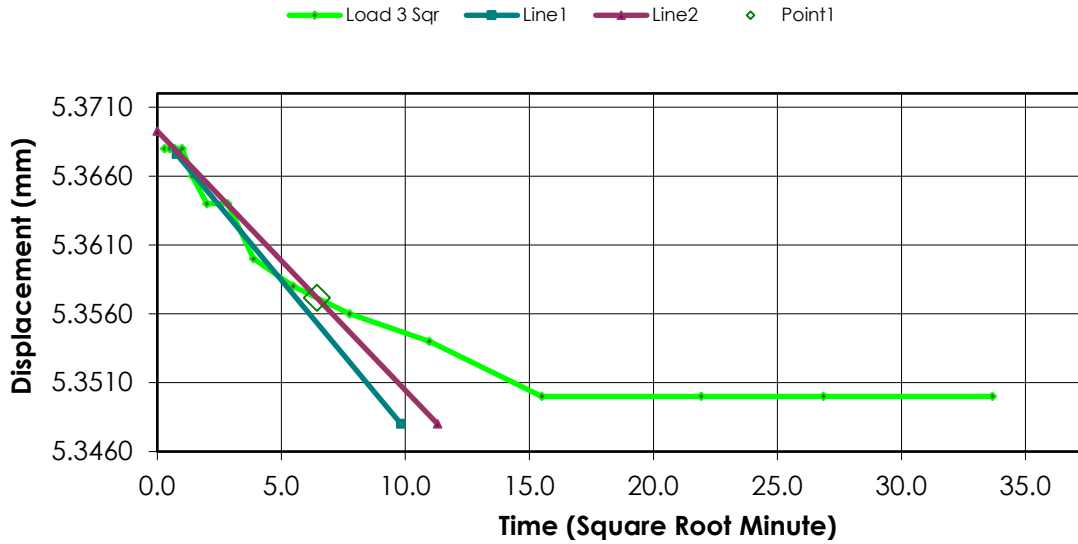
Remarks:

Sample Type: Undisturbed

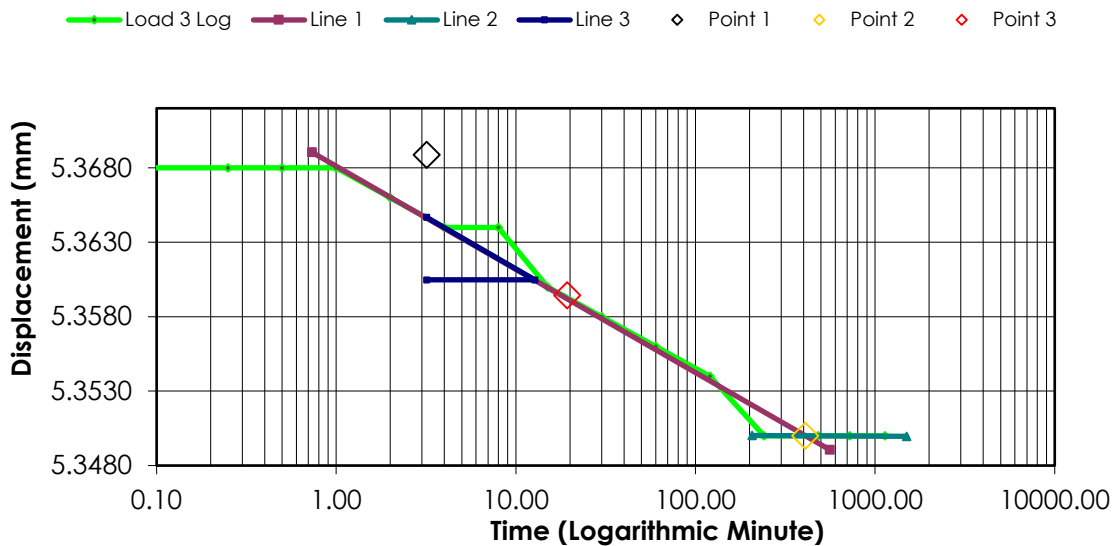
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	5.3780	-0.3140	-1.5392	0.6610
1	00:00:05	5.3680	-0.3360	-1.6471	0.6627
2	00:00:15	5.3680	-0.3360	-1.6471	0.6627
3	00:00:30	5.3680	-0.3360	-1.6471	0.6627
4	00:01:00	5.3680	-0.3360	-1.6471	0.6627
5	00:02:00	5.3660	-0.3340	-1.6373	0.6626
6	00:04:00	5.3640	-0.3320	-1.6275	0.6624
7	00:08:00	5.3640	-0.3320	-1.6275	0.6624
8	00:15:01	5.3600	-0.3280	-1.6078	0.6621
9	00:30:03	5.3580	-0.3260	-1.5980	0.6619
10	01:00:06	5.3560	-0.3240	-1.5882	0.6618
11	02:00:12	5.3540	-0.3220	-1.5784	0.6616
12	04:00:24	5.3500	-0.3180	-1.5588	0.6613
13	08:00:48	5.3500	-0.3180	-1.5588	0.6613
14	12:01:13	5.3500	-0.3180	-1.5588	0.6613
15	18:53:33	5.3500	-0.3180	-1.5588	0.6613

Consolidation Test Results (Sequence 3) Load 20.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



**Consolidation Test Results
(Sequence 4) Load 40.000 kPa**

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Test Number:

Sample Number: GL2 ST11

Soil Description:

Boring Number:

Clay (CH), Some Sand, Trace Gravel

Depth: 5.1-5.55m

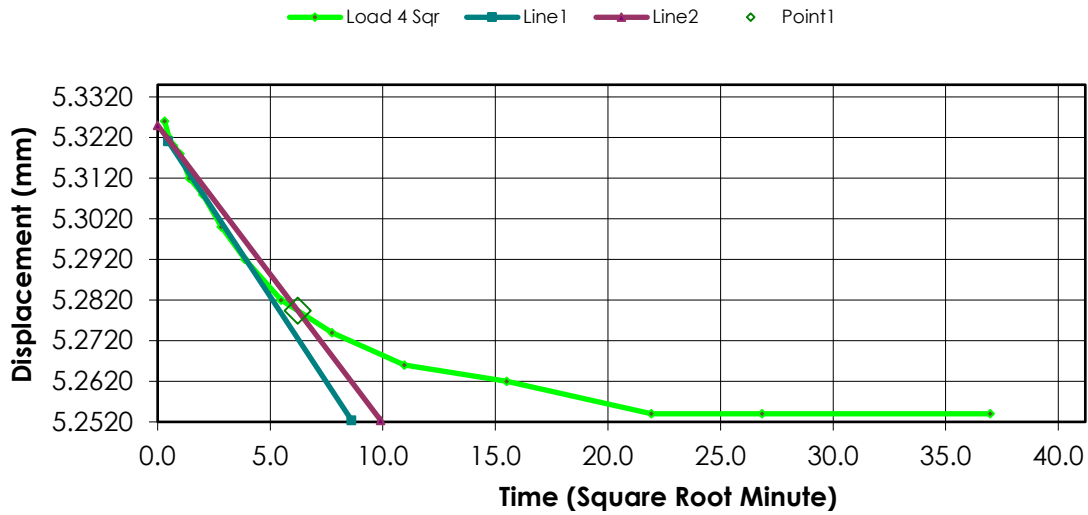
Remarks:

Sample Type: Undisturbed

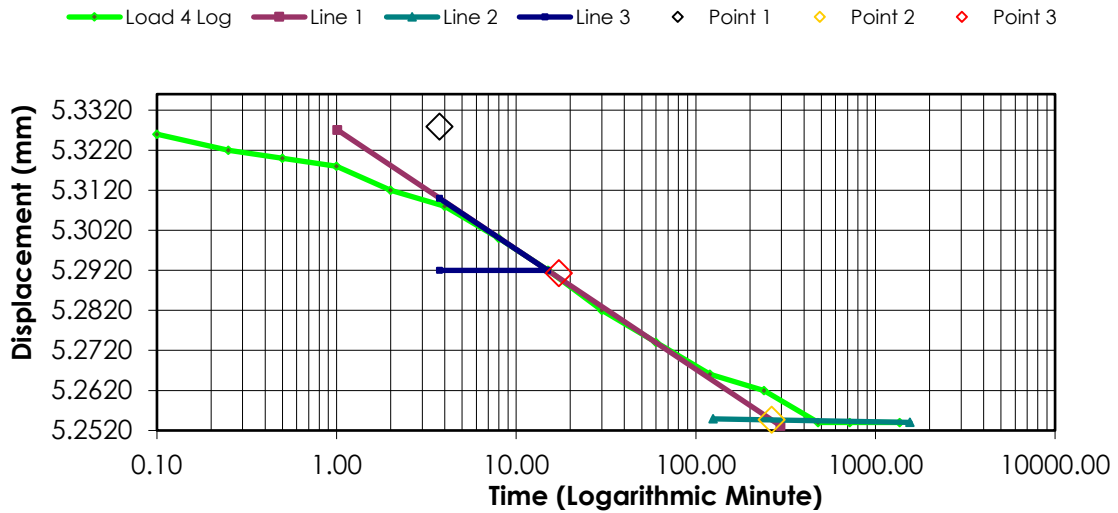
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	5.3500	-0.3180	-1.5588	0.6613
1	00:00:06	5.3260	-0.3140	-1.5392	0.6610
2	00:00:15	5.3220	-0.3100	-1.5196	0.6606
3	00:00:30	5.3200	-0.3080	-1.5098	0.6605
4	00:01:00	5.3180	-0.3060	-1.5000	0.6603
5	00:02:00	5.3120	-0.3000	-1.4706	0.6598
6	00:04:00	5.3080	-0.2960	-1.4510	0.6595
7	00:08:01	5.3000	-0.2880	-1.4118	0.6589
8	00:15:02	5.2920	-0.2800	-1.3725	0.6582
9	00:30:03	5.2820	-0.2700	-1.3235	0.6574
10	01:00:06	5.2740	-0.2620	-1.2843	0.6568
11	02:00:12	5.2660	-0.2540	-1.2451	0.6562
12	04:00:25	5.2620	-0.2500	-1.2255	0.6558
13	08:00:49	5.2540	-0.2420	-1.1863	0.6552
14	12:01:14	5.2540	-0.2420	-1.1863	0.6552
15	22:47:52	5.2540	-0.2420	-1.1863	0.6552

Consolidation Test Results (Sequence 4) Load 40.000 kPa

Consolidation Graph (Square Root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 5) Load 80.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Test Number:

Sample Number: GL2 ST11

Soil Description:

Boring Number:

Clay (CH), Some Sand, Trace Gravel

Depth: 5.1-5.55m

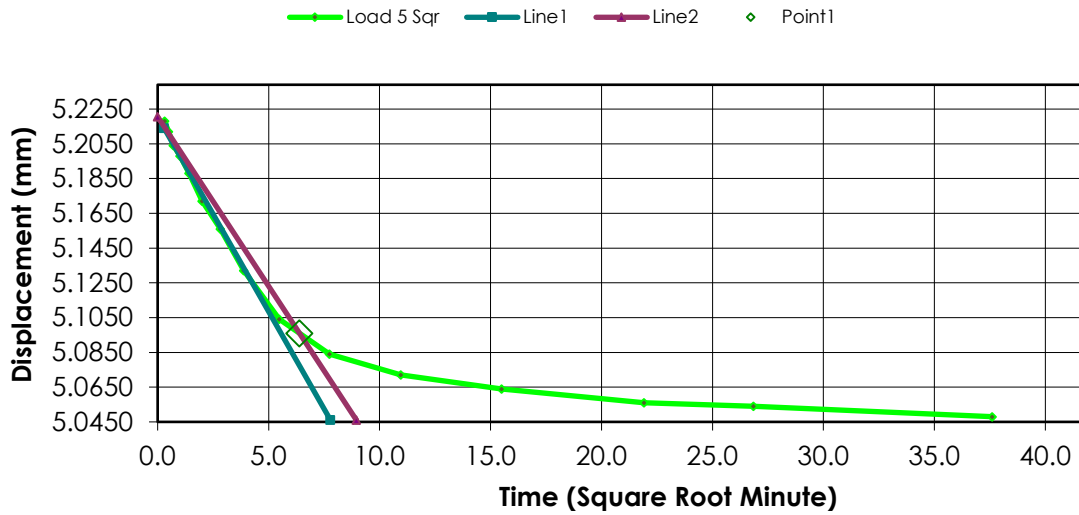
Remarks:

Sample Type: Undisturbed

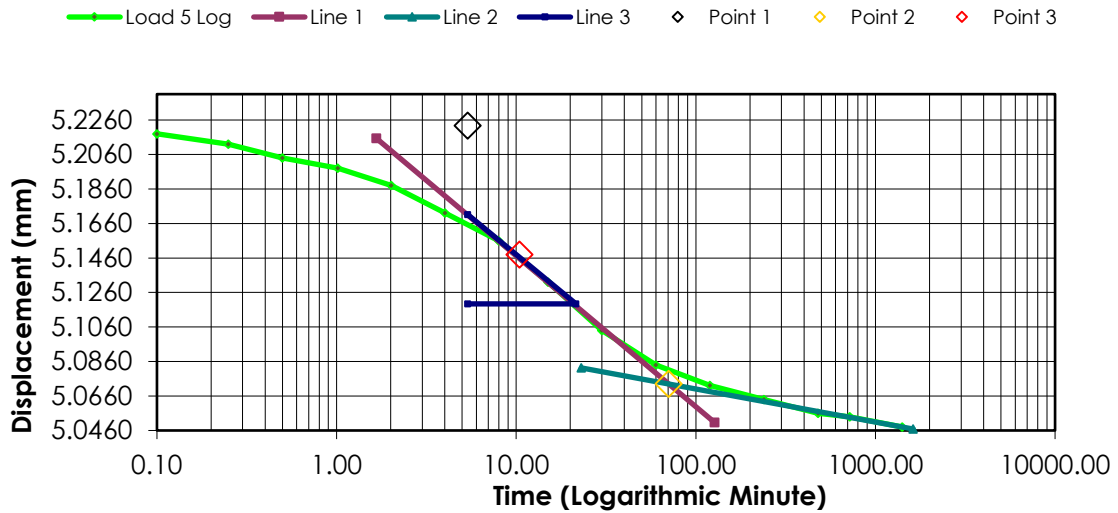
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	5.2540	-0.2420	-1.1863	0.6552
1	00:00:06	5.2180	-0.2360	-1.1569	0.6547
2	00:00:15	5.2120	-0.2300	-1.1275	0.6542
3	00:00:30	5.2040	-0.2220	-1.0882	0.6536
4	00:01:01	5.1980	-0.2160	-1.0588	0.6531
5	00:02:01	5.1880	-0.2060	-1.0098	0.6523
6	00:04:01	5.1720	-0.1900	-0.9314	0.6510
7	00:08:01	5.1560	-0.1740	-0.8529	0.6497
8	00:15:02	5.1320	-0.1500	-0.7353	0.6478
9	00:30:03	5.1040	-0.1220	-0.5980	0.6456
10	01:00:06	5.0840	-0.1020	-0.5000	0.6440
11	02:00:12	5.0720	-0.0900	-0.4412	0.6430
12	04:00:24	5.0640	-0.0820	-0.4020	0.6424
13	08:00:48	5.0560	-0.0740	-0.3627	0.6417
14	12:01:13	5.0540	-0.0720	-0.3529	0.6416
15	23:34:29	5.0480	-0.0660	-0.3235	0.6411

Consolidation Test Results (Sequence 5) Load 80.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 6) Load 160.000 kPa

Project: SR1 2018 Investigation
Location:
Job Number:

Project Number: 110773396

Test Date: 15-Oct-18
Test Number:

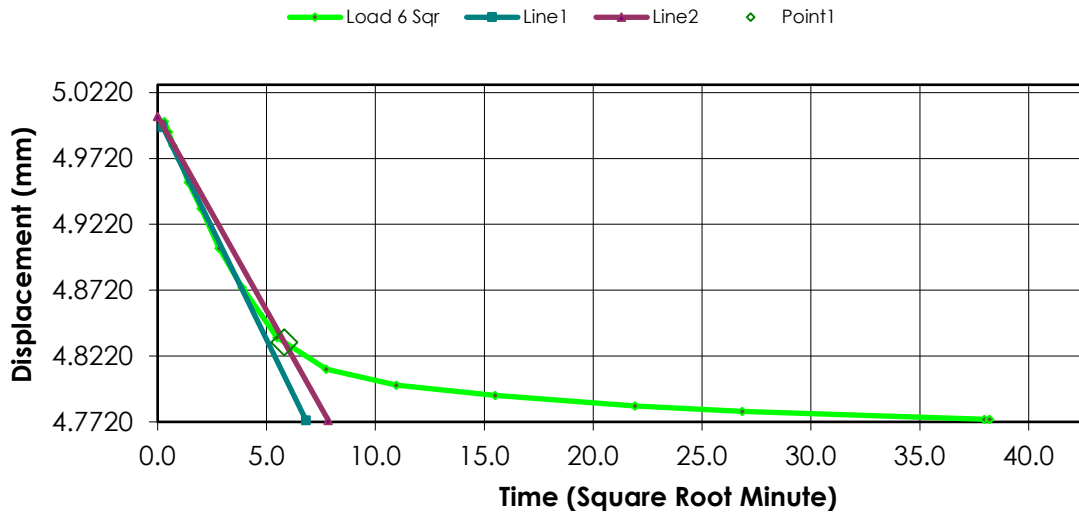
Sample Number: GL2 ST11
Boring Number:
Depth: 5.1-5.55m
Sample Type: Undisturbed

Soil Description:
Clay (CH), Some Sand, Trace Gravel
Remarks:

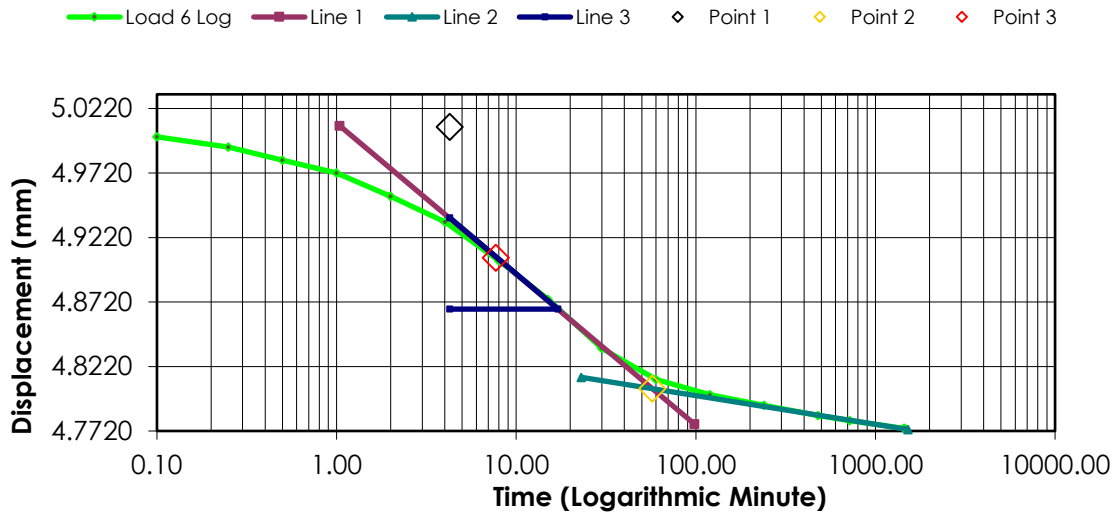
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	5.0480	-0.0660	-0.3235	0.6411
1	00:00:06	5.0000	-0.0480	-0.2353	0.6396
2	00:00:15	4.9920	-0.0400	-0.1961	0.6390
3	00:00:30	4.9820	-0.0300	-0.1471	0.6382
4	00:01:00	4.9720	-0.0200	-0.0980	0.6374
5	00:02:00	4.9540	-0.0020	-0.0098	0.6359
6	00:04:01	4.9340	0.0180	0.0882	0.6343
7	00:08:01	4.9040	0.0480	0.2353	0.6319
8	00:15:02	4.8740	0.0780	0.3824	0.6295
9	00:30:03	4.8360	0.1160	0.5686	0.6265
10	01:00:06	4.8120	0.1400	0.6863	0.6246
11	02:00:12	4.8000	0.1520	0.7451	0.6236
12	04:00:25	4.7920	0.1600	0.7843	0.6230
13	08:00:49	4.7840	0.1680	0.8235	0.6223
14	12:01:12	4.7800	0.1720	0.8431	0.6220
15	24:02:26	4.7740	0.1780	0.8725	0.6215
16	24:19:56	4.7740	0.1780	0.8725	0.6215

Consolidation Test Results (Sequence 6) Load 160.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 7) Load 320.000 kPa

Project: SR1 2018 Investigation
Location:
Job Number:

Project Number: 110773396

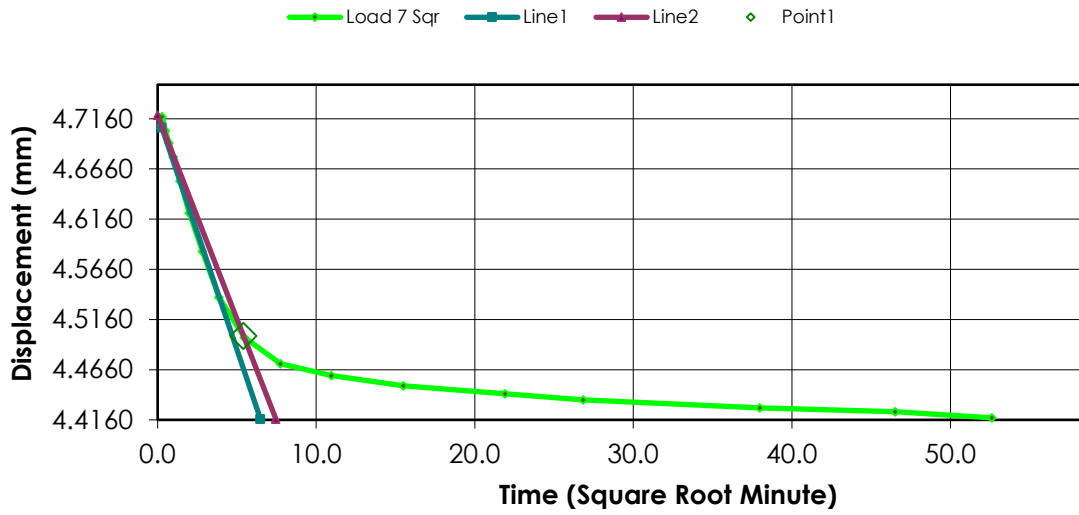
Test Date: 15-Oct-18
Test Number:

Sample Number: GL2 ST11 **Soil Description:**
Boring Number: Clay (CH), Some Sand, Trace Gravel
Depth: 5.1-5.55m **Remarks:**
Sample Type: Undisturbed

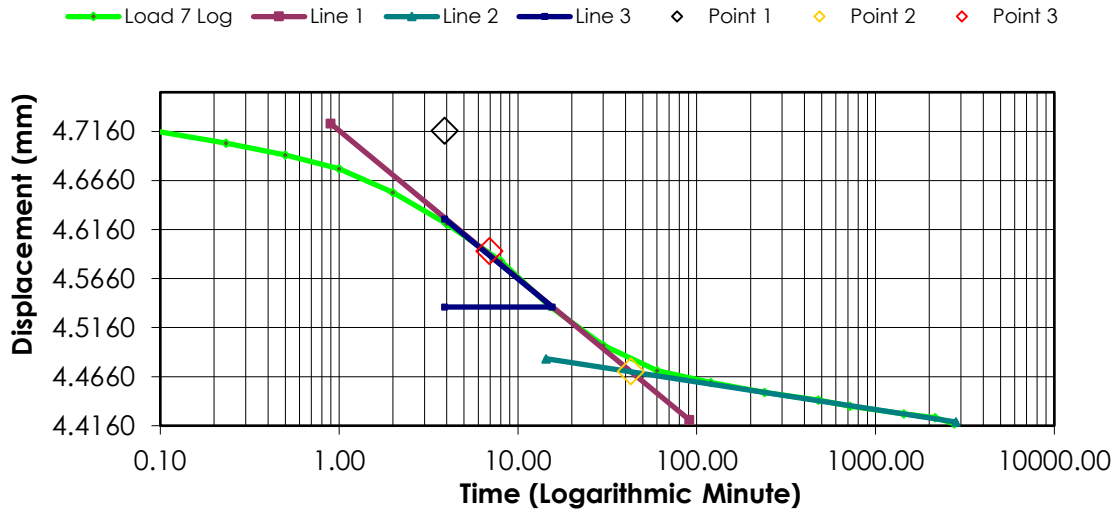
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	4.7740	0.1780	0.8725	0.6215
1	00:00:05	4.7180	0.2020	0.9902	0.6196
2	00:00:14	4.7040	0.2160	1.0588	0.6185
3	00:00:30	4.6920	0.2280	1.1176	0.6175
4	00:01:00	4.6780	0.2420	1.1863	0.6164
5	00:02:00	4.6540	0.2660	1.3039	0.6145
6	00:04:00	4.6220	0.2980	1.4608	0.6119
7	00:08:00	4.5840	0.3360	1.6471	0.6088
8	00:15:01	4.5380	0.3820	1.8725	0.6052
9	00:30:02	4.4980	0.4220	2.0686	0.6019
10	01:00:05	4.4720	0.4480	2.1961	0.5999
11	02:00:10	4.4600	0.4600	2.2549	0.5989
12	04:00:21	4.4500	0.4700	2.3039	0.5981
13	08:00:42	4.4420	0.4780	2.3431	0.5975
14	12:01:03	4.4360	0.4840	2.3725	0.5970
15	24:02:07	4.4280	0.4920	2.4118	0.5963
16	36:03:10	4.4240	0.4960	2.4314	0.5960
17	46:07:41	4.4180	0.5020	2.4608	0.5955

Consolidation Test Results (Sequence 7) Load 320.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 8) Load 640.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Test Number:

Sample Number: GL2 ST11

Soil Description:

Boring Number:

Clay (CH), Some Sand, Trace Gravel

Depth: 5.1-5.55m

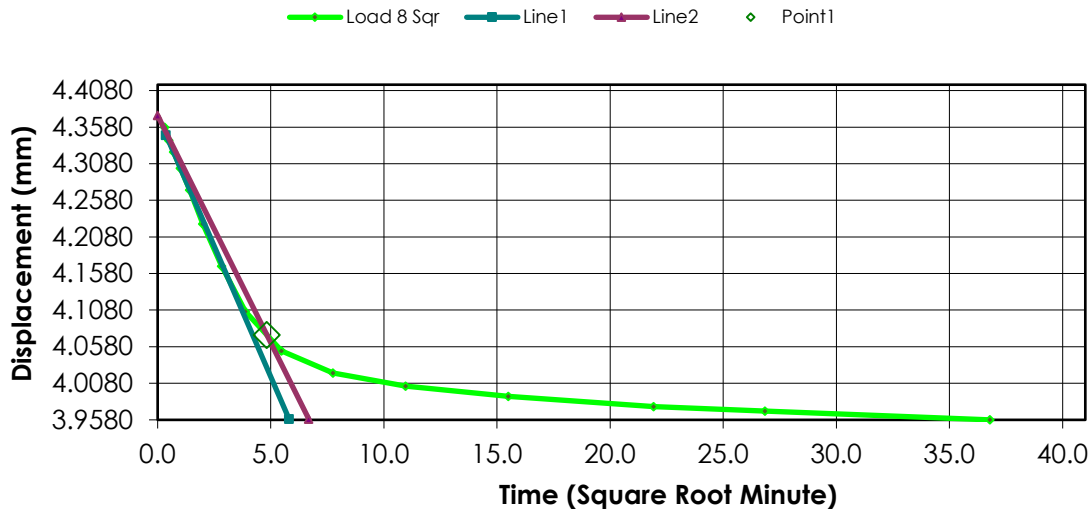
Remarks:

Sample Type: Undisturbed

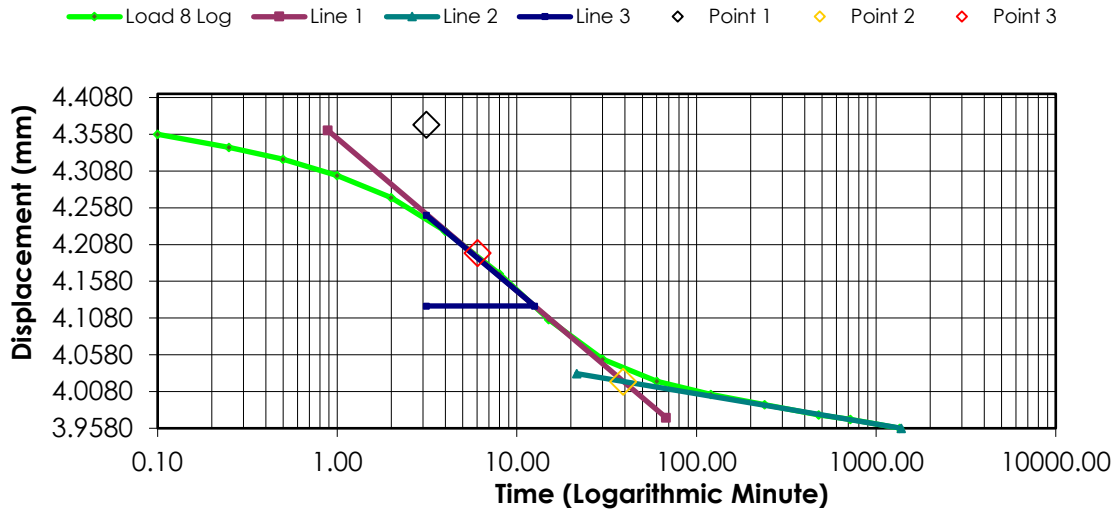
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	4.4180	0.5020	2.4608	0.5955
1	00:00:06	4.3580	0.5220	2.5588	0.5939
2	00:00:15	4.3400	0.5400	2.6471	0.5925
3	00:00:30	4.3240	0.5560	2.7255	0.5912
4	00:01:00	4.3020	0.5780	2.8333	0.5894
5	00:02:00	4.2720	0.6080	2.9804	0.5870
6	00:04:00	4.2260	0.6540	3.2059	0.5833
7	00:08:00	4.1680	0.7120	3.4902	0.5787
8	00:15:01	4.1060	0.7740	3.7941	0.5737
9	00:30:02	4.0520	0.8280	4.0588	0.5694
10	01:00:05	4.0220	0.8580	4.2059	0.5670
11	02:00:10	4.0040	0.8760	4.2941	0.5655
12	04:00:19	3.9900	0.8900	4.3627	0.5644
13	08:00:40	3.9760	0.9040	4.4314	0.5633
14	12:01:01	3.9700	0.9100	4.4608	0.5628
15	22:33:58	3.9580	0.9220	4.5196	0.5619

Consolidation Test Results (Sequence 8) Load 640.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 9) Rebound 320.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Test Number:

Sample Number: GL2 ST11

Soil Description:

Boring Number:

Clay (CH), Some Sand, Trace Gravel

Depth: 5.1-5.55m

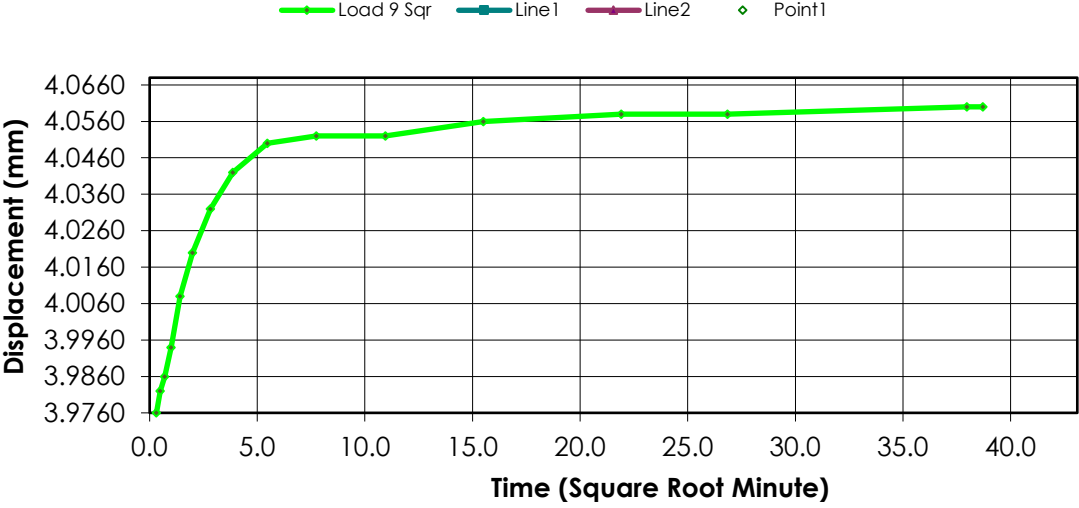
Remarks:

Sample Type: Undisturbed

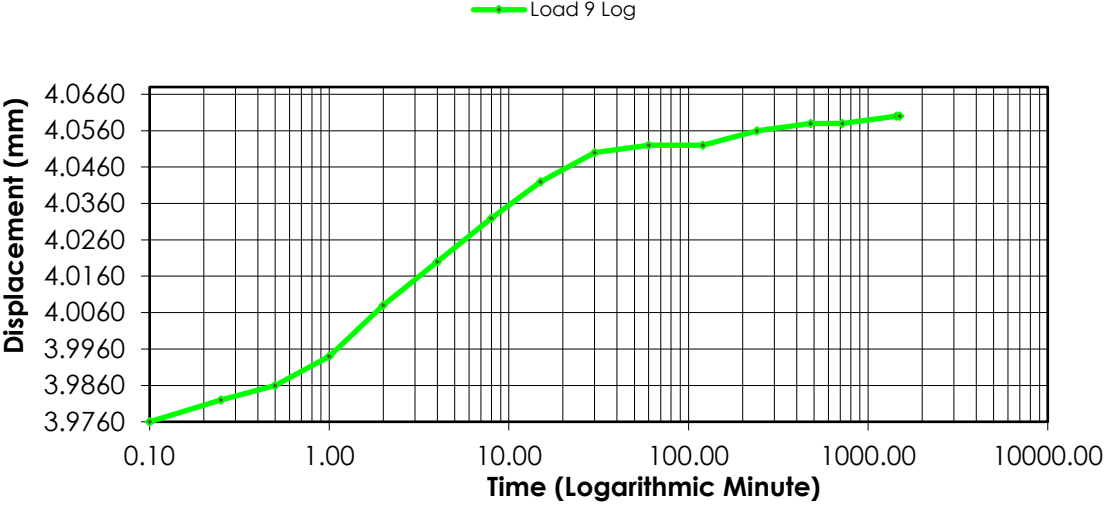
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	3.9580	0.9220	4.5196	0.5619
1	00:00:06	3.9760	0.9180	4.5000	0.5622
2	00:00:15	3.9820	0.9120	4.4706	0.5627
3	00:00:30	3.9860	0.9080	4.4510	0.5630
4	00:01:00	3.9940	0.9000	4.4118	0.5636
5	00:02:00	4.0080	0.8860	4.3431	0.5647
6	00:04:00	4.0200	0.8740	4.2843	0.5657
7	00:08:00	4.0320	0.8620	4.2255	0.5667
8	00:15:01	4.0420	0.8520	4.1765	0.5675
9	00:30:02	4.0500	0.8440	4.1373	0.5681
10	01:00:05	4.0520	0.8420	4.1275	0.5683
11	02:00:10	4.0520	0.8420	4.1275	0.5683
12	04:00:21	4.0560	0.8380	4.1078	0.5686
13	08:00:42	4.0580	0.8360	4.0980	0.5688
14	12:01:03	4.0580	0.8360	4.0980	0.5688
15	24:02:07	4.0600	0.8340	4.0882	0.5689
16	24:59:26	4.0600	0.8340	4.0882	0.5689

Consolidation Test Results (Sequence 9) Rebound 320.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 10) Rebound 160.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Test Number:

Sample Number: GL2 ST11

Soil Description:

Boring Number:

Clay (CH), Some Sand, Trace Gravel

Depth: 5.1-5.55m

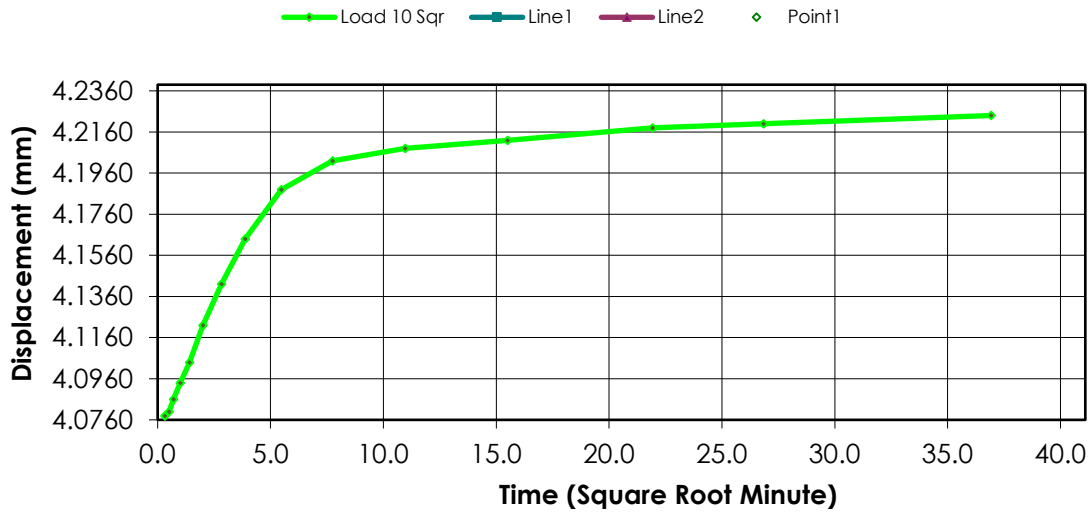
Remarks:

Sample Type: Undisturbed

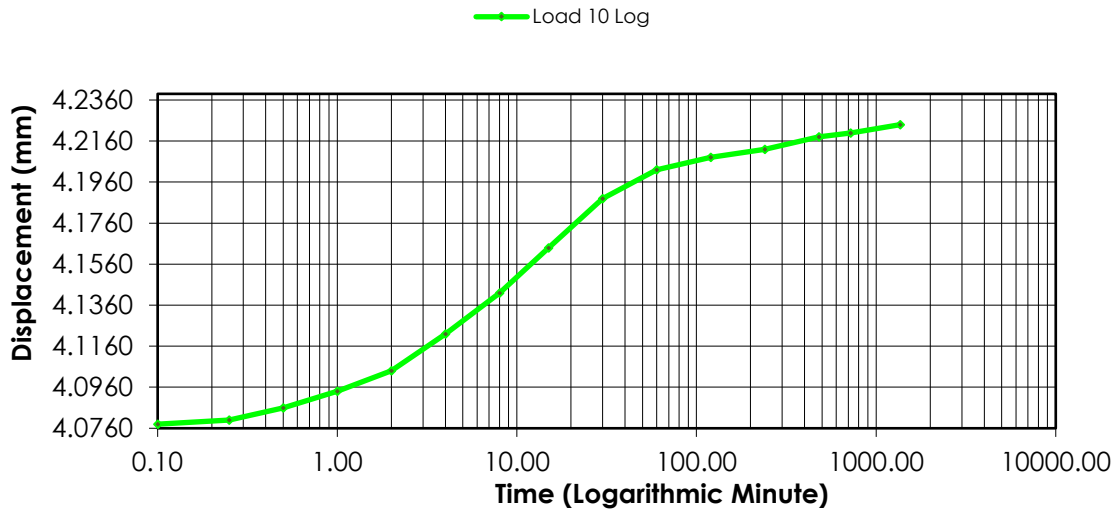
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	4.0600	0.8340	4.0882	0.5689
1	00:00:06	4.0780	0.8300	4.0686	0.5692
2	00:00:15	4.0800	0.8280	4.0588	0.5694
3	00:00:30	4.0860	0.8220	4.0294	0.5699
4	00:01:00	4.0940	0.8140	3.9902	0.5705
5	00:02:00	4.1040	0.8040	3.9412	0.5713
6	00:04:00	4.1220	0.7860	3.8529	0.5728
7	00:08:01	4.1420	0.7660	3.7549	0.5744
8	00:15:01	4.1640	0.7440	3.6471	0.5761
9	00:30:02	4.1880	0.7200	3.5294	0.5781
10	01:00:05	4.2020	0.7060	3.4608	0.5792
11	02:00:10	4.2080	0.7000	3.4314	0.5797
12	04:00:21	4.2120	0.6960	3.4118	0.5800
13	08:00:37	4.2180	0.6900	3.3824	0.5805
14	12:00:58	4.2200	0.6880	3.3725	0.5806
15	22:43:26	4.2240	0.6840	3.3529	0.5809

Consolidation Test Results
(Sequence 10) Rebound 160.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 11) Load 320.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Test Number:

Sample Number: GL2 ST11

Soil Description:

Boring Number:

Clay (CH), Some Sand, Trace Gravel

Depth: 5.1-5.55m

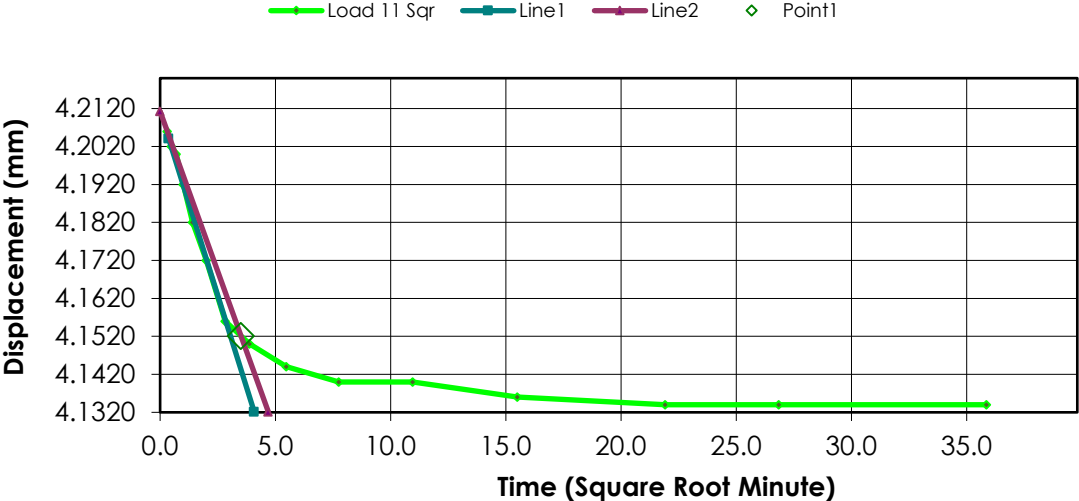
Remarks:

Sample Type: Undisturbed

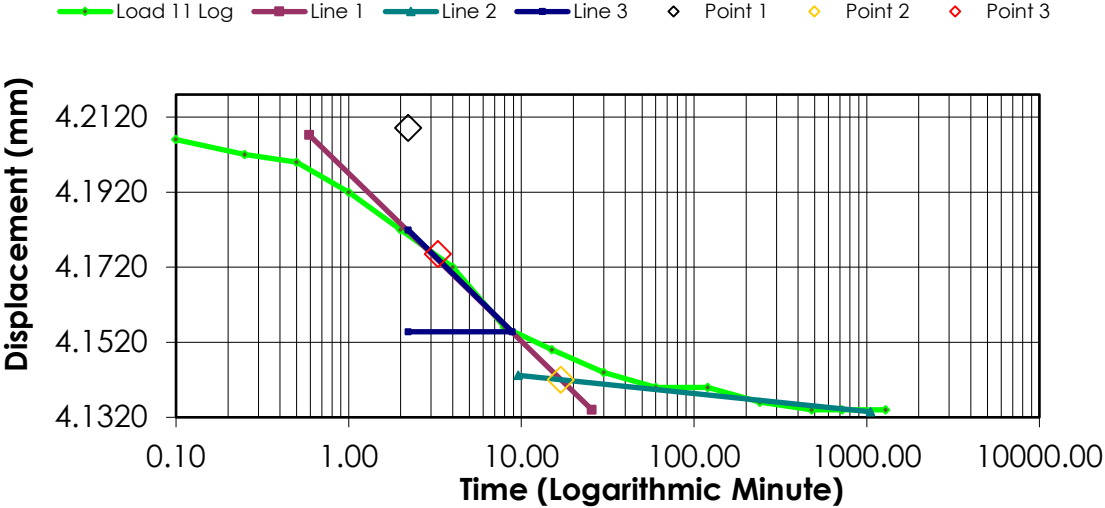
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	4.2240	0.6840	3.3529	0.5809
1	00:00:06	4.2060	0.6900	3.3824	0.5805
2	00:00:15	4.2020	0.6940	3.4020	0.5801
3	00:00:30	4.2000	0.6960	3.4118	0.5800
4	00:01:00	4.1920	0.7040	3.4510	0.5793
5	00:02:00	4.1820	0.7140	3.5000	0.5785
6	00:04:00	4.1720	0.7240	3.5490	0.5777
7	00:08:00	4.1560	0.7400	3.6275	0.5764
8	00:15:01	4.1500	0.7460	3.6569	0.5760
9	00:30:02	4.1440	0.7520	3.6863	0.5755
10	01:00:05	4.1400	0.7560	3.7059	0.5752
11	02:00:10	4.1400	0.7560	3.7059	0.5752
12	04:00:21	4.1360	0.7600	3.7255	0.5748
13	08:00:42	4.1340	0.7620	3.7353	0.5747
14	12:01:03	4.1340	0.7620	3.7353	0.5747
15	21:26:05	4.1340	0.7620	3.7353	0.5747

Consolidation Test Results (Sequence 11) Load 320.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 12) Load 640.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Test Number:

Sample Number: GL2 ST11

Soil Description:

Boring Number:

Clay (CH), Some Sand, Trace Gravel

Depth: 5.1-5.55m

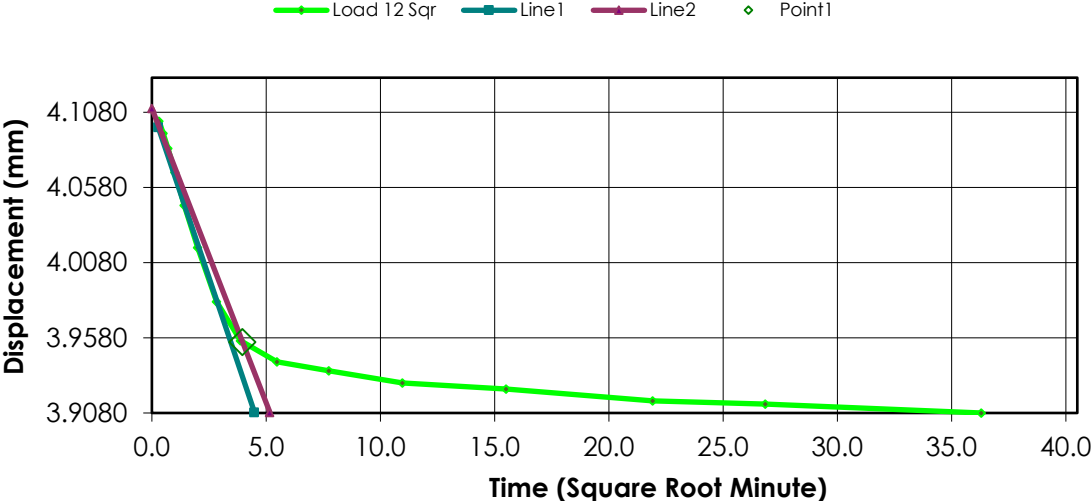
Remarks:

Sample Type: Undisturbed

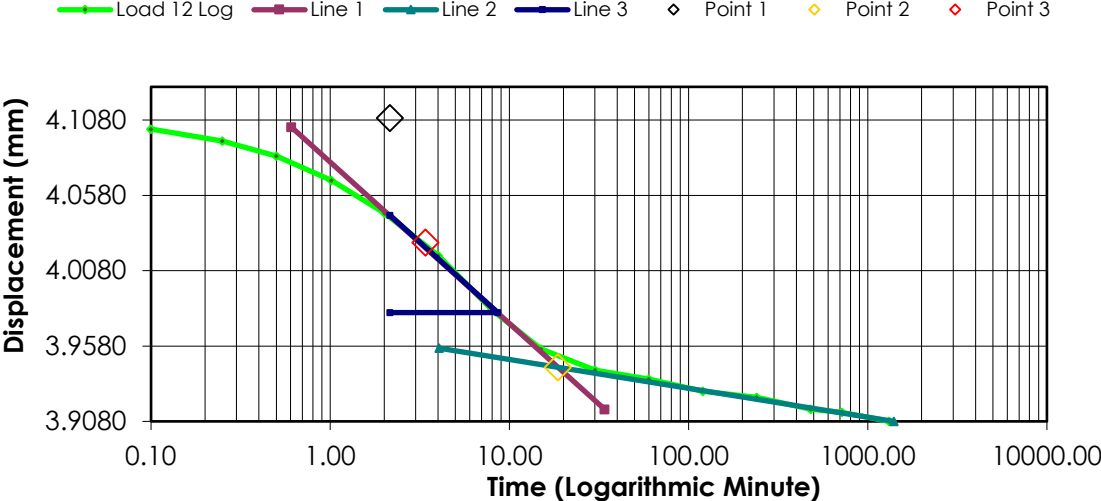
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	4.1340	0.7620	3.7353	0.5747
1	00:00:06	4.1020	0.7760	3.8039	0.5736
2	00:00:15	4.0940	0.7840	3.8431	0.5729
3	00:00:30	4.0840	0.7940	3.8922	0.5721
4	00:01:01	4.0680	0.8100	3.9706	0.5708
5	00:02:01	4.0460	0.8320	4.0784	0.5691
6	00:04:01	4.0180	0.8600	4.2157	0.5668
7	00:08:01	3.9820	0.8960	4.3922	0.5639
8	00:15:02	3.9560	0.9220	4.5196	0.5619
9	00:30:03	3.9420	0.9360	4.5882	0.5607
10	01:00:06	3.9360	0.9420	4.6176	0.5603
11	02:00:11	3.9280	0.9500	4.6569	0.5596
12	04:00:22	3.9240	0.9540	4.6765	0.5593
13	08:00:43	3.9160	0.9620	4.7157	0.5586
14	12:01:02	3.9140	0.9640	4.7255	0.5585
15	21:57:54	3.9080	0.9700	4.7549	0.5580

Consolidation Test Results (Sequence 12) Load 640.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 13) Load 1280.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Test Number:

Sample Number: GL2 ST11

Soil Description:

Boring Number:

Clay (CH), Some Sand, Trace Gravel

Depth: 5.1-5.55m

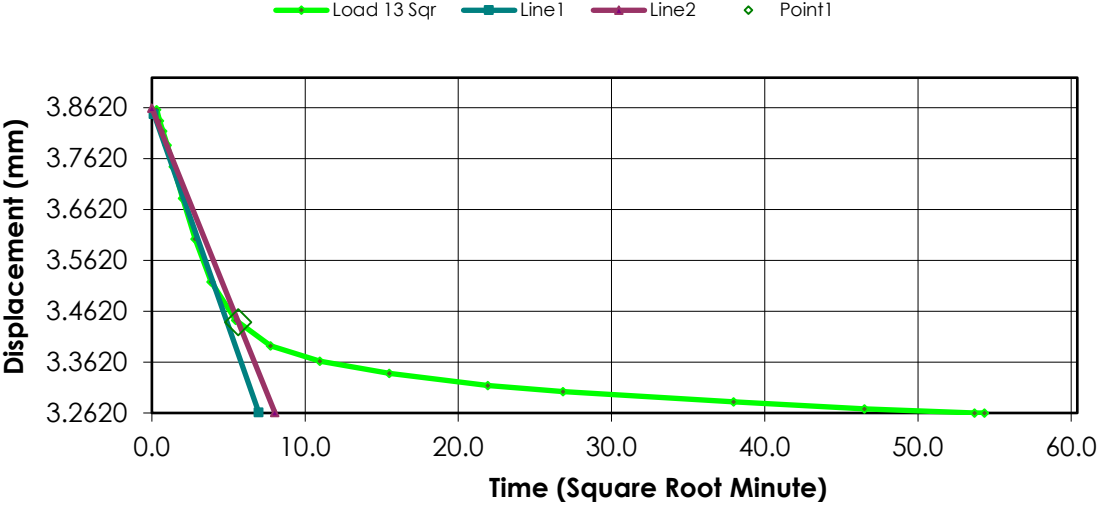
Remarks:

Sample Type: Undisturbed

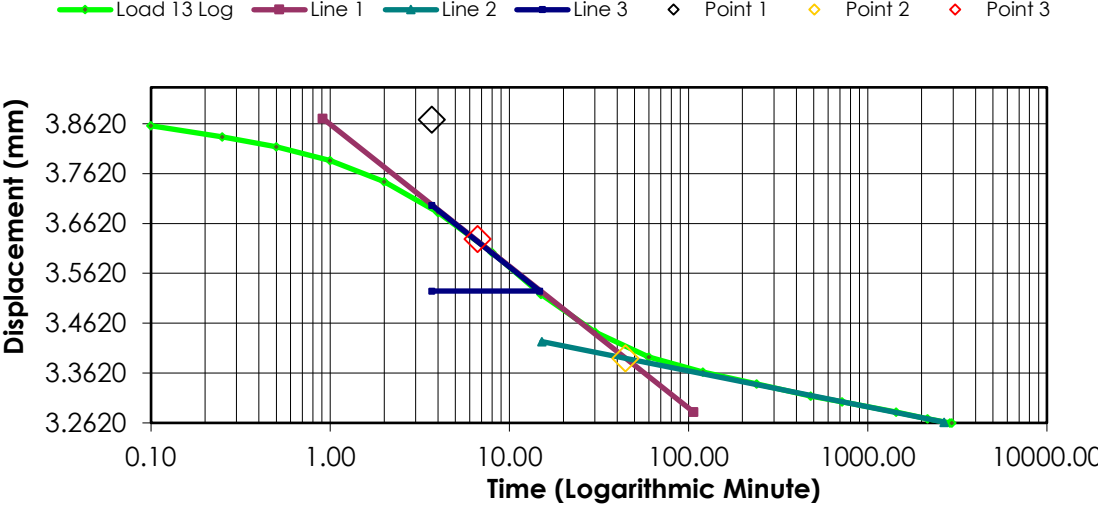
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	3.9080	0.9700	4.7549	0.5580
1	00:00:06	3.8580	0.9740	4.7745	0.5577
2	00:00:15	3.8360	0.9960	4.8824	0.5559
3	00:00:30	3.8160	1.0160	4.9804	0.5543
4	00:01:00	3.7880	1.0440	5.1176	0.5521
5	00:02:00	3.7460	1.0860	5.3235	0.5487
6	00:04:00	3.6840	1.1480	5.6275	0.5437
7	00:08:01	3.6040	1.2280	6.0196	0.5373
8	00:15:01	3.5200	1.3120	6.4314	0.5306
9	00:30:03	3.4440	1.3880	6.8039	0.5245
10	01:00:05	3.3940	1.4380	7.0490	0.5205
11	02:00:11	3.3640	1.4680	7.1961	0.5181
12	04:00:21	3.3400	1.4920	7.3137	0.5161
13	08:00:42	3.3160	1.5160	7.4314	0.5142
14	12:01:03	3.3040	1.5280	7.4902	0.5133
15	24:02:07	3.2840	1.5480	7.5882	0.5117
16	36:03:09	3.2700	1.5620	7.6569	0.5105
17	48:04:12	3.2620	1.5700	7.6961	0.5099
18	49:14:16	3.2620	1.5700	7.6961	0.5099

Consolidation Test Results (Sequence 13) Load 1280.000 kPa

Consolidation Graph (Square Root Time)



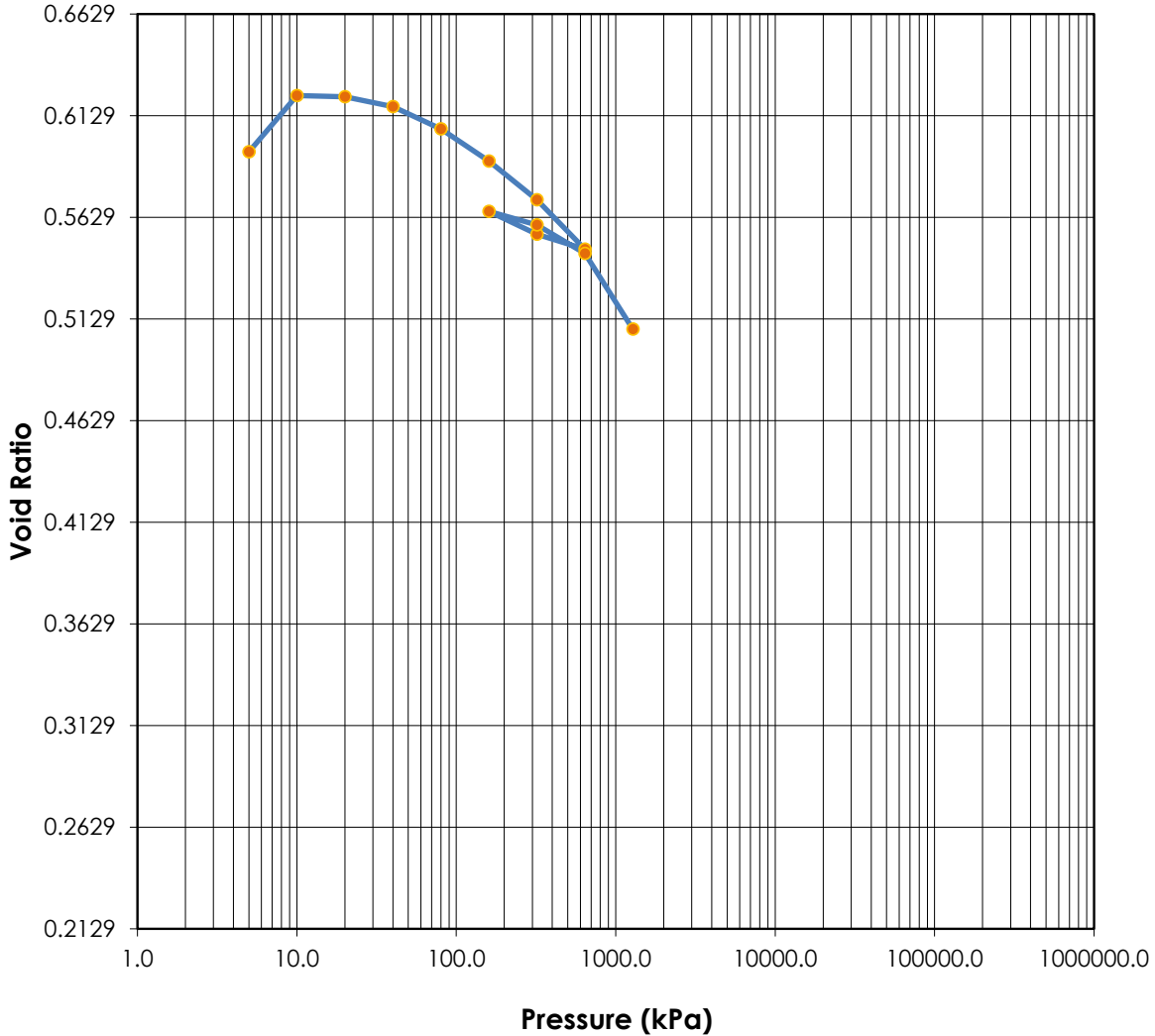
Consolidation Graph (Logarithmic Time)





Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876



	Before	After	Liquid Limits:	49	Test Date:	15-Oct-18	
Moisture (%):	22.7	22.0	Plastic Limits:	17			
Dry Density (g/cm³):	1.658	1.743	Plasticity Index (%):	32			
Saturation (%):	100	100					
Void Ratio:	0.5942	0.5070	Specific Gravity:	2.65	Assumed		
Soil Description:	Clay (CI-CH), Some Sand, Trace Gravel						
Project Number:	110773396	Depth:	7.35-7.8m		Remarks:		
Sample Number:	GL2 ST15	Boring Number:					
Project:	SRT 2018 Investigation						
Client:	Alberta Transportation						
Location:							

Tested By: E. Wahl

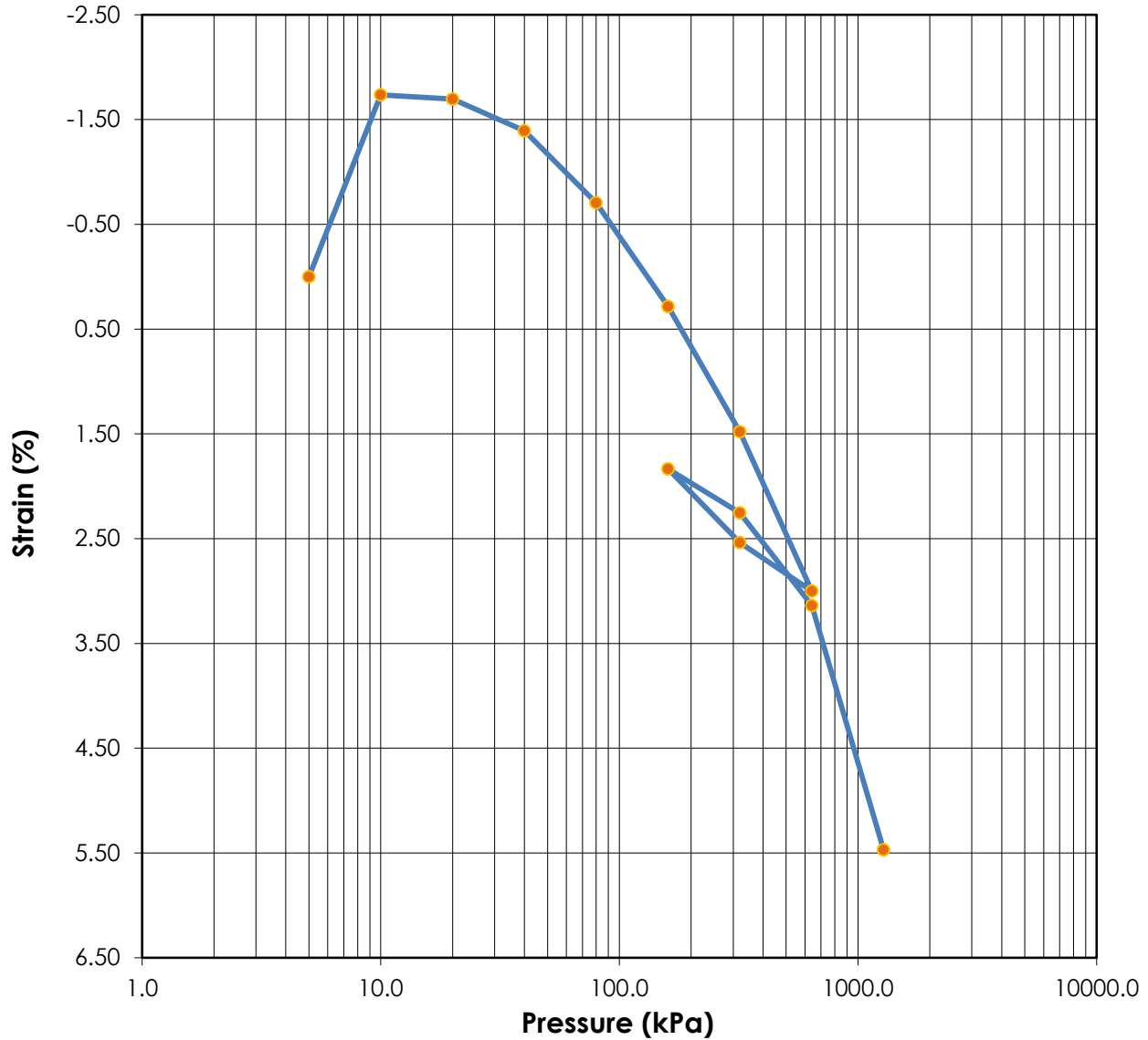
Reviewed By: C. Lamoureux

Reporting of these test results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request. The data presented above is for the sole use of the client stipulated above. Stantec is not responsible, nor can be held liable, for the use of this report by any other party, with or without the knowledge of Stantec.

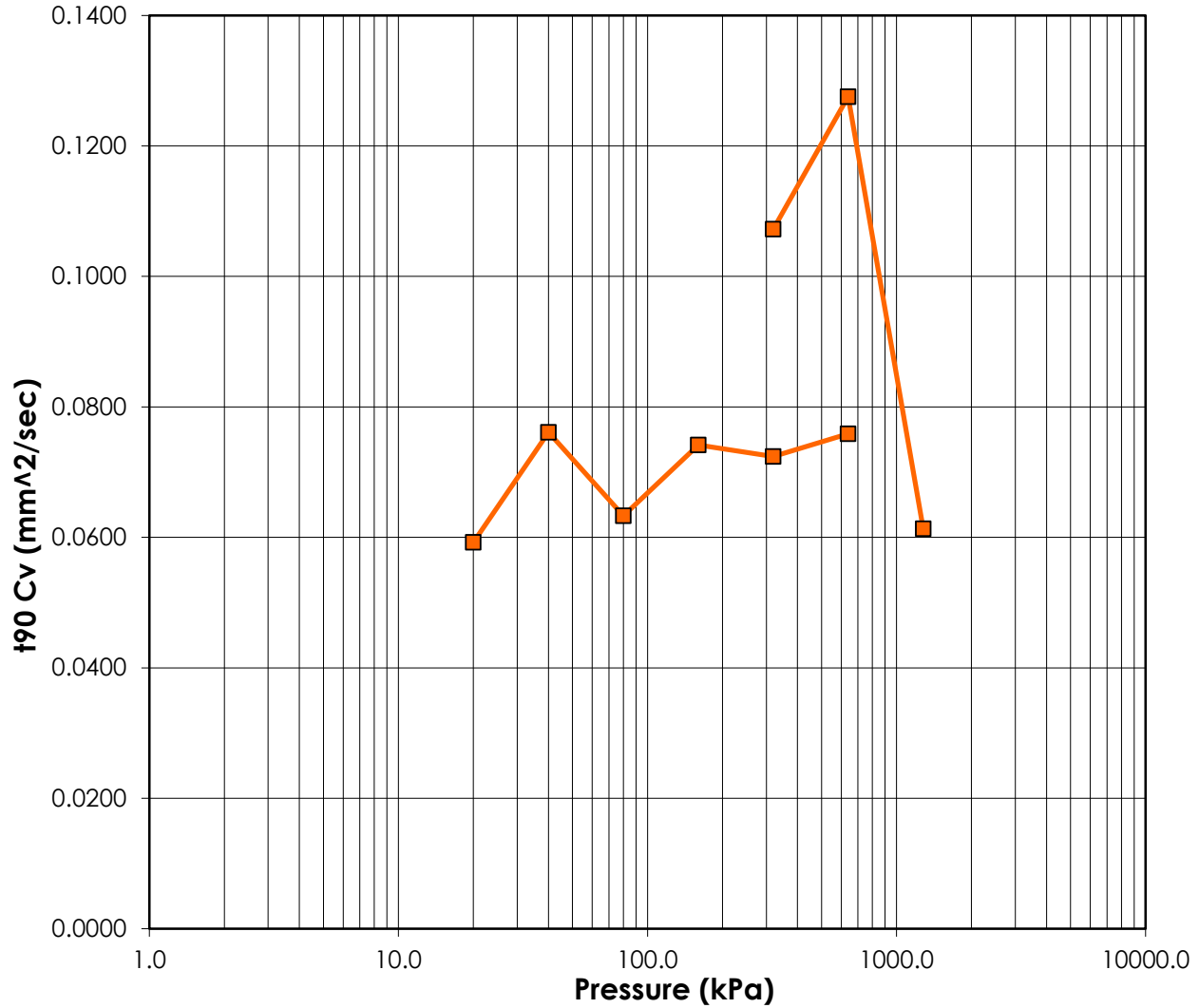


Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876



	Before	After	Liquid Limits:	49	Test Date:	15-Oct-18
Moisture (%):	22.7	22.0	Plastic Limits:	17		
Dry Density (g/cm3):	1.658	1.743	Plasticity Index (%):	32		
Saturation (%):	100	100	Specific Gravity:	2.65	Assumed	
Void Ratio:	0.5942	0.5070				
Sample Description:	Clay (Cl-CH), Some Sand, Trace Gravel					
Project Number:	110773396	Depth:	7.35-7.8m			
Sample Number:	GL2 ST15	Boring Number:				
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						
			Remarks:			



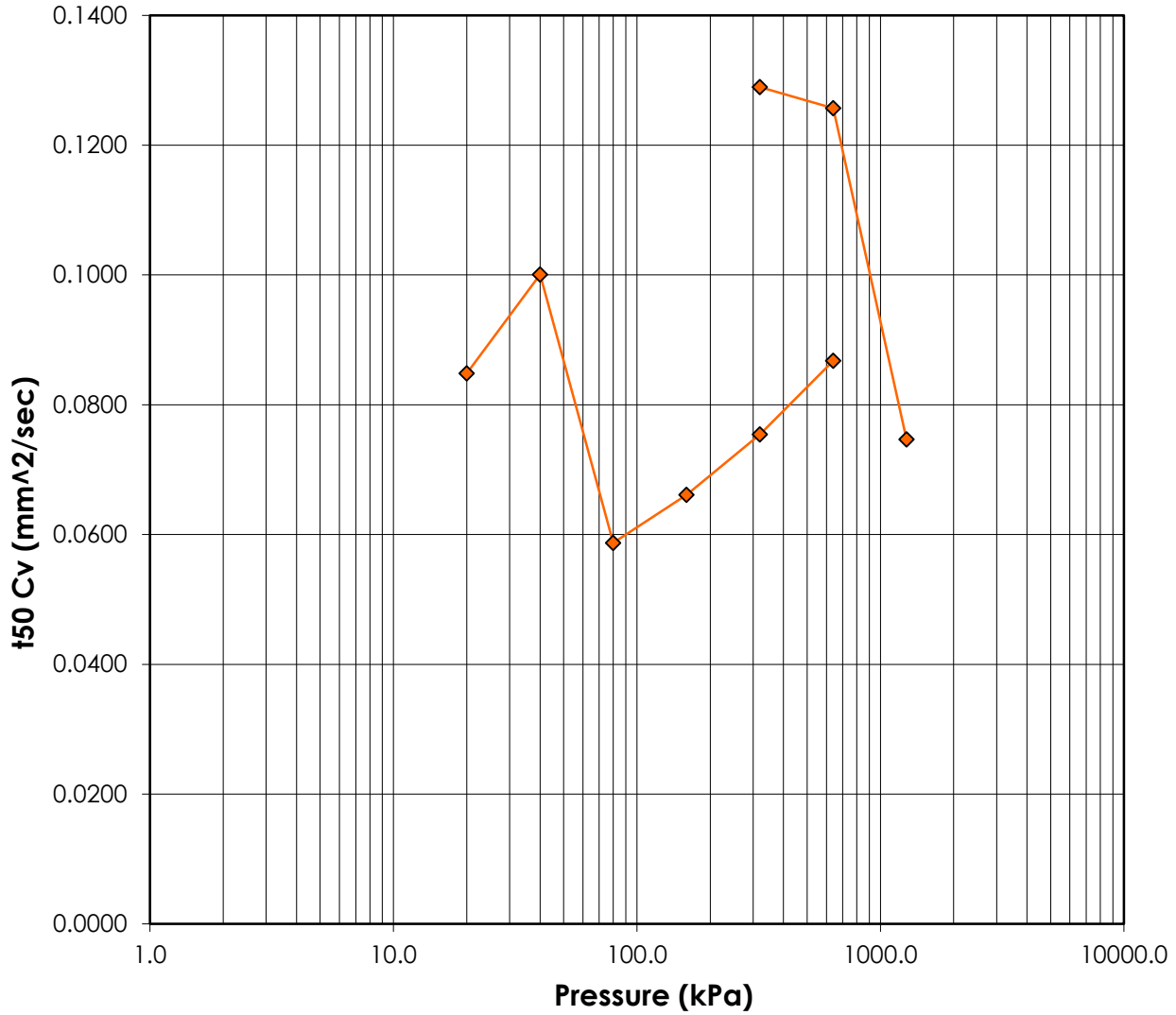

 t90 Cv

	Before	After	Liquid Limits:	49	Test Date:	15-Oct-18
Moisture (%):	22.7	22.0	Plastic Limits:	17		
Dry Density (g/cm3):	1.658	1.743	Plasticity Index (%):	32		
Saturation (%):	100	100				
Void Ratio:	0.5942	0.5070	Specific Gravity:	2.65	Assumed	
Soil Description:	Clay (CI-CH), Some Sand, Trace Gravel					
Project Number:	110773396		Depth:	7.35-7.8m	Remarks:	
Sample Number:	GL2 ST15		Boring Number:			
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876



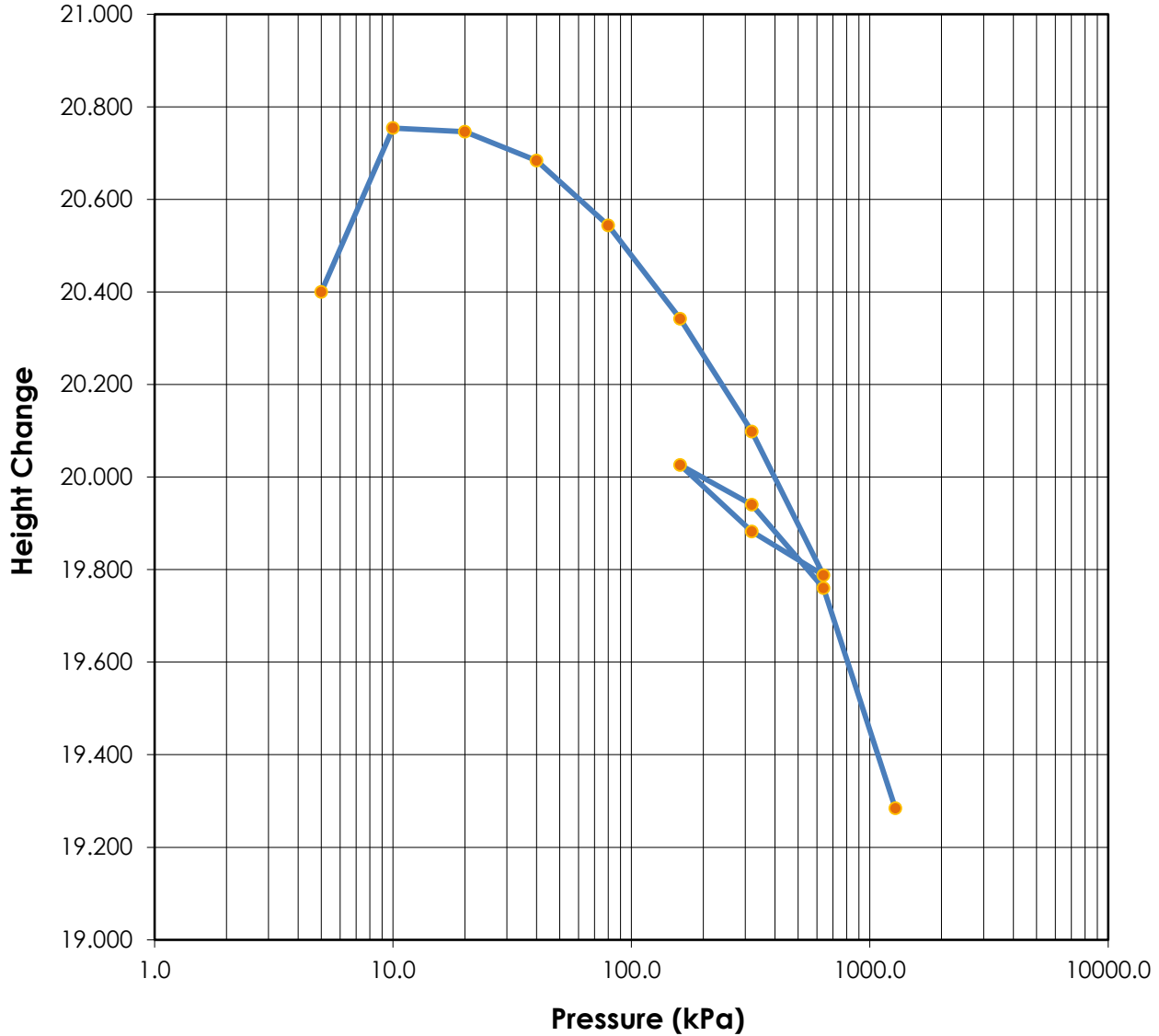
—◆— t50 Cv

	Before	After	Liquid Limits:	49	Test Date:	15-Oct-18
Moisture (%):	22.7	22.0	Plastic Limits:	17		
Dry Density (g/cm³):	1.658	1.743	Plasticity Index (%):	32		
Saturation (%):	100	100				
Void Ratio:	0.5942	0.5070	Specific Gravity:	2.65	Assumed	
Soil Description:	Clay (CI-CH), Some Sand, Trace Gravel					
Project Number:	110773396		Depth:	7.35-7.8m		
Sample Number:	GL2 ST15		Boring Number:			
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						
						Remarks:



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876



	Before	After	Liquid Limits:	49	Test Date:	15-Oct-18
Moisture (%):	22.7	22.0	Plastic Limits:	17		
Dry Density (g/cm3):	1.658	1.743	Plasticity Index (%):	32		
Saturation (%):	100	100	Specific Gravity:	2.65	Assumed	
Void Ratio:	0.5942	0.5070				
Soil Description:	Clay (CI-CH), Some Sand, Trace Gravel					
Project Number:	110773396	Depth:	7.35-7.8m			
Sample Number:	GL2 ST15	Boring Number:				
Project:	SR1 2018 Investigation					Remarks:
Client:	Alberta Transportation					
Location:						

Consolidation Test Results Summary

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Sample Number: GL2 ST15

Sample Description:

Boring Number:

Clay (Cl-CH), Some Sand, Trace Gravel

Depth: 7.35-7.8m

Remarks:

Test Number:

Sample Type: Undisturbed

Test Date: 15-Oct-18

Index	Load Sequence (kPa)	Cumulative Change in Height (mm)	Specimen Height (mm)	Height of Void (mm)	Vertical Strain (%)	Void Ratio	t90 Fitting Time (min)	t50 Fitting Time (min)	t90 Cv (mm ² /sec)	t50 Cv (mm ² /sec)
0	0.000	0.0000	20.4000	7.6113	0.00	0.5952	0.000	0.000	0.000	0.000
1	5.000	0.0000	20.4000	7.6113	0.00	0.5952	0.000	0.000	0.000	0.000
2	10.000	-0.3540	20.7540	7.9653	-1.74	0.6228	0.000	0.000	0.000	0.000
3	20.000	-0.3460	20.7460	7.9573	-1.70	0.6222	25.672	4.165	0.059	0.085
4	40.000	-0.2840	20.6840	7.8953	-1.39	0.6174	19.862	3.509	0.076	0.100
5	80.000	-0.1440	20.5440	7.7553	-0.71	0.6064	23.565	5.900	0.063	0.059
6	160.000	0.0580	20.3420	7.5533	0.28	0.5906	19.714	5.137	0.074	0.066
7	320.000	0.3020	20.0980	7.3093	1.48	0.5715	19.712	4.397	0.072	0.075
8	640.000	0.6120	19.7880	6.9993	3.00	0.5473	18.234	3.704	0.076	0.087
9	320.000	0.5180	19.8820	7.0933	2.54	0.5547	0.000	0.000	0.000	0.000
10	160.000	0.3740	20.0260	7.2373	1.83	0.5659	0.000	0.000	0.000	0.000
11	320.000	0.4600	19.9400	7.1513	2.25	0.5592	13.102	2.531	0.107	0.129
12	640.000	0.6400	19.7600	6.9713	3.14	0.5451	10.815	2.549	0.128	0.126
13	1280.000	1.1160	19.2840	6.4953	5.47	0.5079	21.434	4.089	0.061	0.075

Predicted value indicated with *

Consolidation Test
Consolidation Specimen Information

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Sample Number: GL2 ST15

Sample Description:

Boring Number:

Clay (CI-CH), Some Sand, Trace Gravel

Depth: 7.35-7.8m

Remarks:

Sample Type: Undisturbed

Test Number:

Liquid Limit: 49

Initial Void Ratio: 0.5942

Initial Height (mm): 20.40

Plastic Limit: 17

Plasticity Index (%): 32

Initial Diameter (mm): 63.54

Specific Gravity: 2.65

Weight of Ring (g): 207.75

Assumed

Parameters	Initial Specimen	Final Specimen
Moist Weight + Container (g)	132.65	133.61
Dry Soil + Container (g)	108.84	110.16
Weight of Container (g)	3.99	3.69
Moisture Content (%)	22.7	22.0
Void Ratio	0.5942	0.5070
Saturation (%)	100	100
Dry Density (g/cm ³)	1.658	1.743

Consolidation Test Results
(Sequence 1) Load 5.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Test Number:

Sample Number: GL2 ST15

Soil Description:

Boring Number:

Clay (CI-CH), Some Sand, Trace Gravel

Depth: 7.35-7.8m

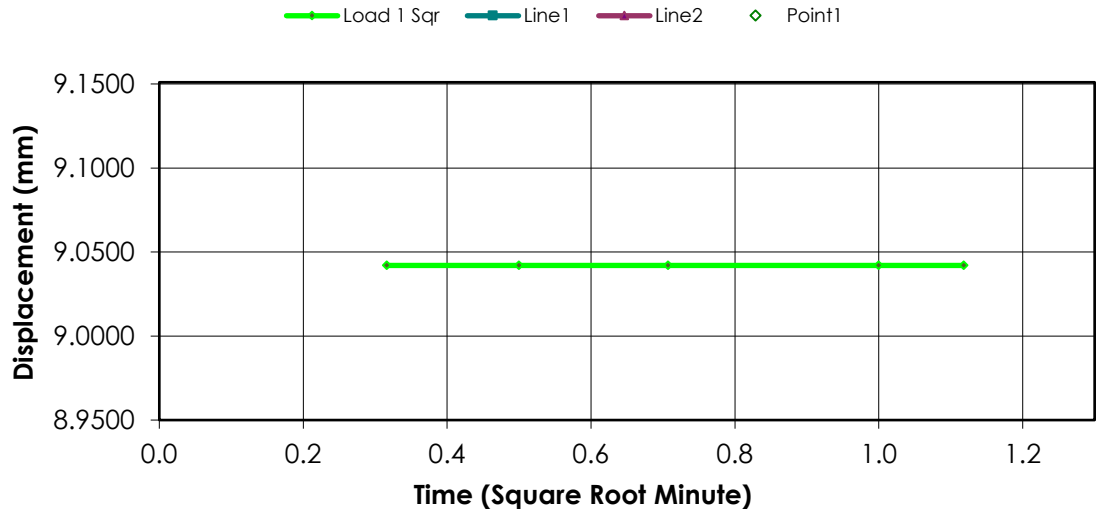
Remarks:

Sample Type: Undisturbed

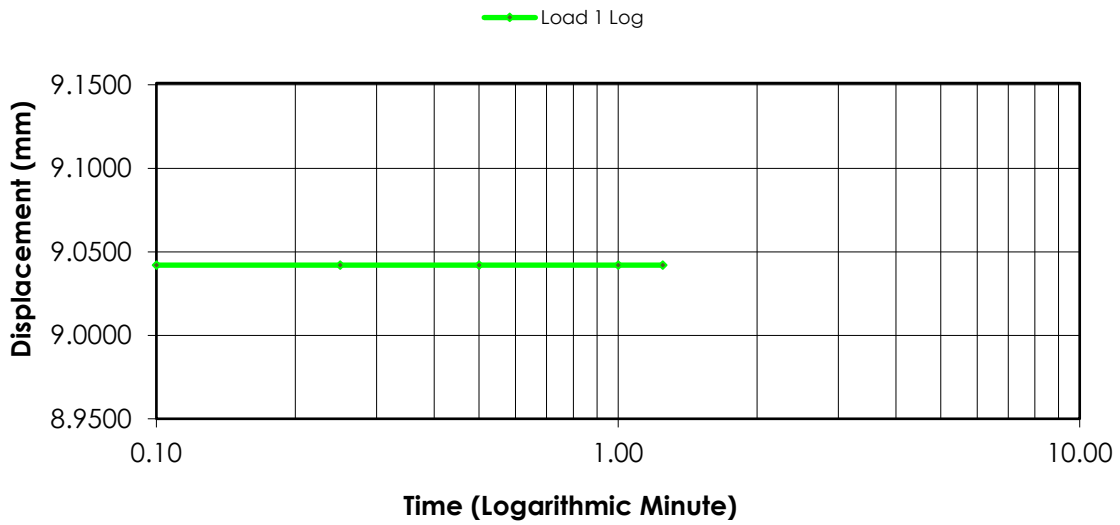
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	9.0420	0.0000	0.0000	0.5942
1	00:00:06	9.0420	0.0000	0.0000	0.5942
2	00:00:15	9.0420	0.0000	0.0000	0.5942
3	00:00:30	9.0420	0.0000	0.0000	0.5942
4	00:01:00	9.0420	0.0000	0.0000	0.5942
5	00:01:15	9.0420	0.0000	0.0000	0.5942

Consolidation Test Results (Sequence 1) Load 5.000 kPa

Consolidation Graph (Square-root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 2) Load 10.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Test Number:

Sample Number: GL2 ST15

Soil Description:

Boring Number:

Clay (Cl-CH), Some Sand, Trace Gravel

Depth: 7.35-7.8m

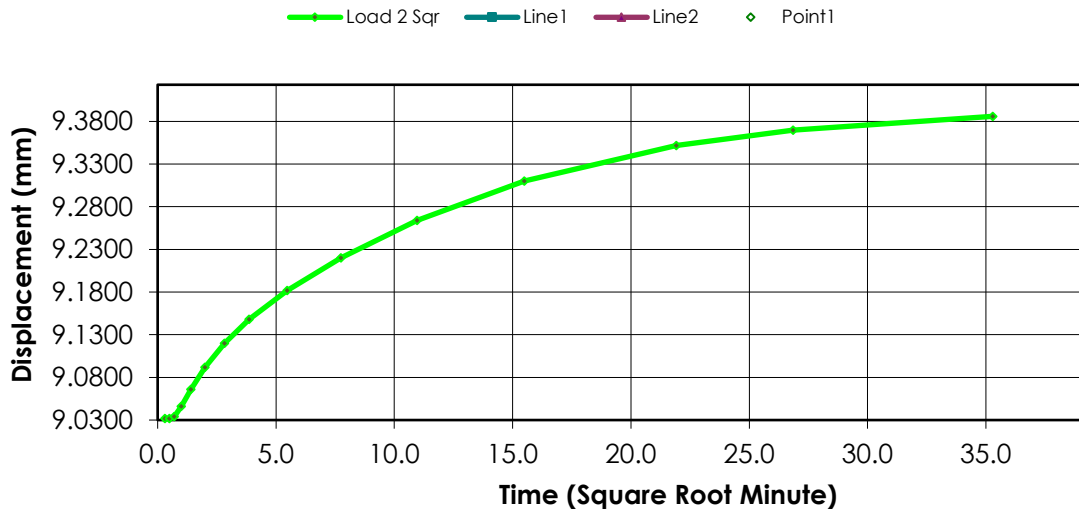
Remarks:

Sample Type: Undisturbed

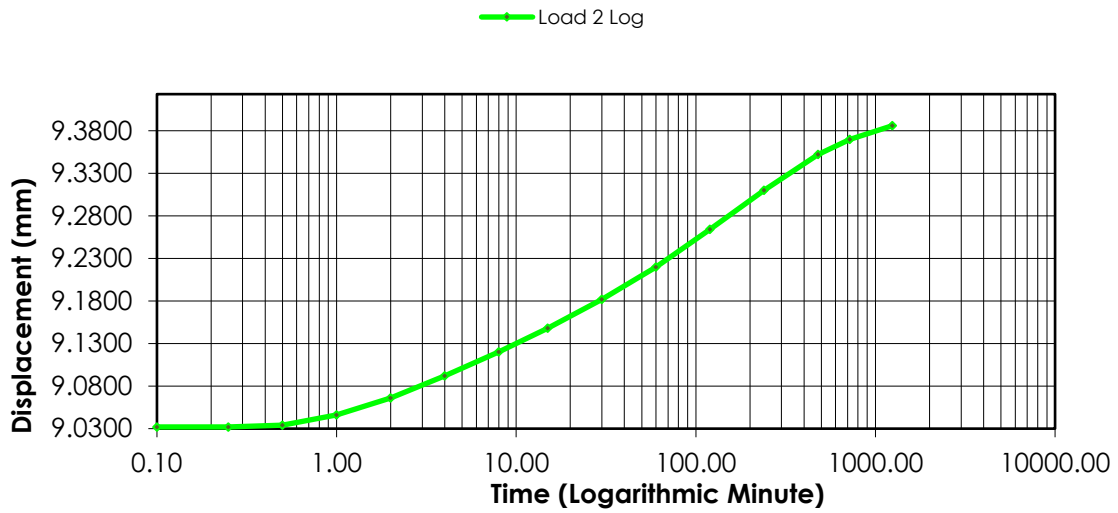
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	9.0420	0.0000	0.0000	0.5942
1	00:00:06	9.0320	0.0000	0.0000	0.5942
2	00:00:15	9.0320	0.0000	0.0000	0.5942
3	00:00:30	9.0340	-0.0020	-0.0098	0.5943
4	00:01:00	9.0460	-0.0140	-0.0686	0.5953
5	00:02:00	9.0660	-0.0340	-0.1667	0.5968
6	00:04:00	9.0920	-0.0600	-0.2941	0.5989
7	00:08:01	9.1200	-0.0880	-0.4314	0.6011
8	00:15:01	9.1480	-0.1160	-0.5686	0.6032
9	00:30:03	9.1820	-0.1500	-0.7353	0.6059
10	01:00:06	9.2200	-0.1880	-0.9216	0.6089
11	02:00:12	9.2640	-0.2320	-1.1373	0.6123
12	04:00:24	9.3100	-0.2780	-1.3627	0.6159
13	08:00:49	9.3520	-0.3200	-1.5686	0.6192
14	12:01:13	9.3700	-0.3380	-1.6569	0.6206
15	20:45:20	9.3860	-0.3540	-1.7353	0.6218

Consolidation Test Results (Sequence 2) Load 10.000 kPa

Consolidation Graph (Square root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 3) Load 20.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Test Number:

Sample Number: GL2 ST15

Soil Description:

Boring Number:

Clay (Cl-CH), Some Sand, Trace Gravel

Depth: 7.35-7.8m

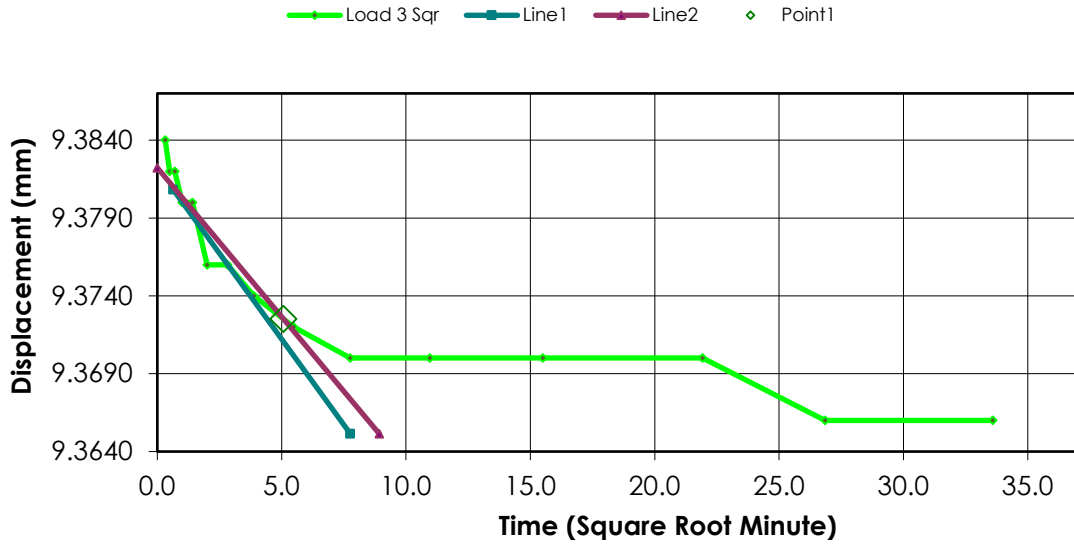
Remarks:

Sample Type: Undisturbed

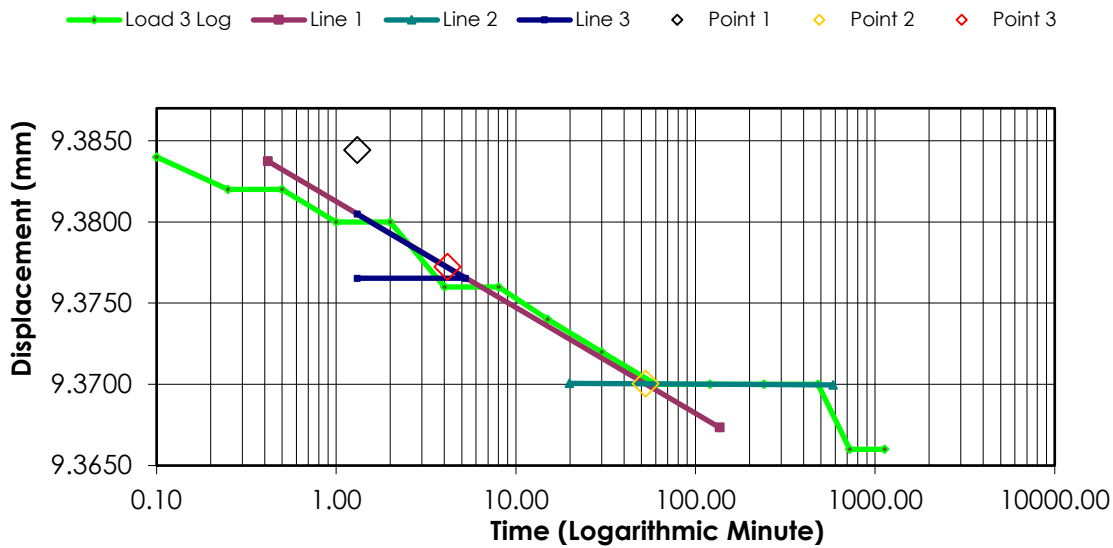
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	9.3860	-0.3540	-1.7353	0.6218
1	00:00:06	9.3840	-0.3640	-1.7843	0.6226
2	00:00:15	9.3820	-0.3620	-1.7745	0.6225
3	00:00:30	9.3820	-0.3620	-1.7745	0.6225
4	00:01:00	9.3800	-0.3600	-1.7647	0.6223
5	00:02:00	9.3800	-0.3600	-1.7647	0.6223
6	00:04:01	9.3760	-0.3560	-1.7451	0.6220
7	00:08:01	9.3760	-0.3560	-1.7451	0.6220
8	00:15:02	9.3740	-0.3540	-1.7353	0.6218
9	00:30:03	9.3720	-0.3520	-1.7255	0.6217
10	01:00:06	9.3700	-0.3500	-1.7157	0.6215
11	02:00:12	9.3700	-0.3500	-1.7157	0.6215
12	04:00:25	9.3700	-0.3500	-1.7157	0.6215
13	08:00:49	9.3700	-0.3500	-1.7157	0.6215
14	12:01:13	9.3660	-0.3460	-1.6961	0.6212
15	18:48:37	9.3660	-0.3460	-1.6961	0.6212

Consolidation Test Results (Sequence 3) Load 20.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 4) Load 40.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Test Number:

Sample Number: GL2 ST15

Soil Description:

Boring Number:

Clay (Cl-CH), Some Sand, Trace Gravel

Depth: 7.35-7.8m

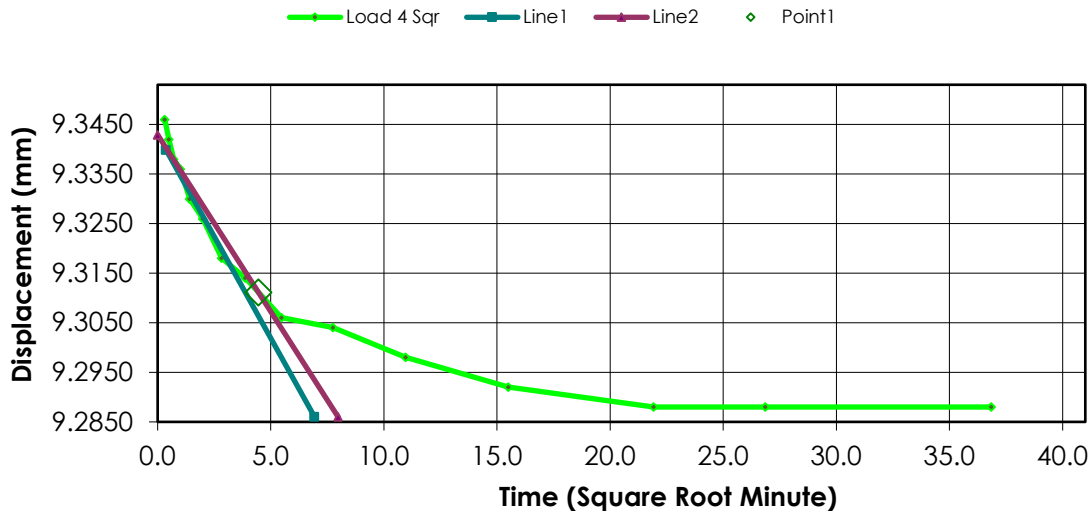
Remarks:

Sample Type: Undisturbed

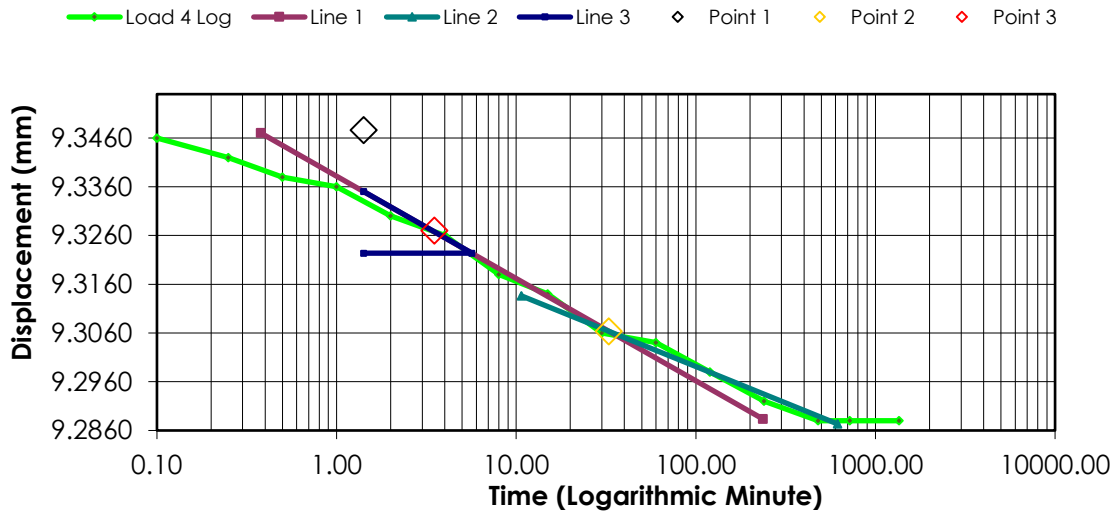
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	9.3660	-0.3460	-1.6961	0.6212
1	00:00:06	9.3460	-0.3420	-1.6765	0.6209
2	00:00:15	9.3420	-0.3380	-1.6569	0.6206
3	00:00:30	9.3380	-0.3340	-1.6373	0.6203
4	00:01:00	9.3360	-0.3320	-1.6275	0.6201
5	00:02:00	9.3300	-0.3260	-1.5980	0.6197
6	00:04:00	9.3260	-0.3220	-1.5784	0.6193
7	00:08:01	9.3180	-0.3140	-1.5392	0.6187
8	00:15:01	9.3140	-0.3100	-1.5196	0.6184
9	00:30:03	9.3060	-0.3020	-1.4804	0.6178
10	01:00:06	9.3040	-0.3000	-1.4706	0.6176
11	02:00:12	9.2980	-0.2940	-1.4412	0.6172
12	04:00:24	9.2920	-0.2880	-1.4118	0.6167
13	08:00:49	9.2880	-0.2840	-1.3922	0.6164
14	12:01:13	9.2880	-0.2840	-1.3922	0.6164
15	22:38:05	9.2880	-0.2840	-1.3922	0.6164

Consolidation Test Results (Sequence 4) Load 40.000 kPa

Consolidation Graph (Square Root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 5) Load 80.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Test Number:

Sample Number: GL2 ST15

Soil Description:

Boring Number:

Clay (Cl-CH), Some Sand, Trace Gravel

Depth: 7.35-7.8m

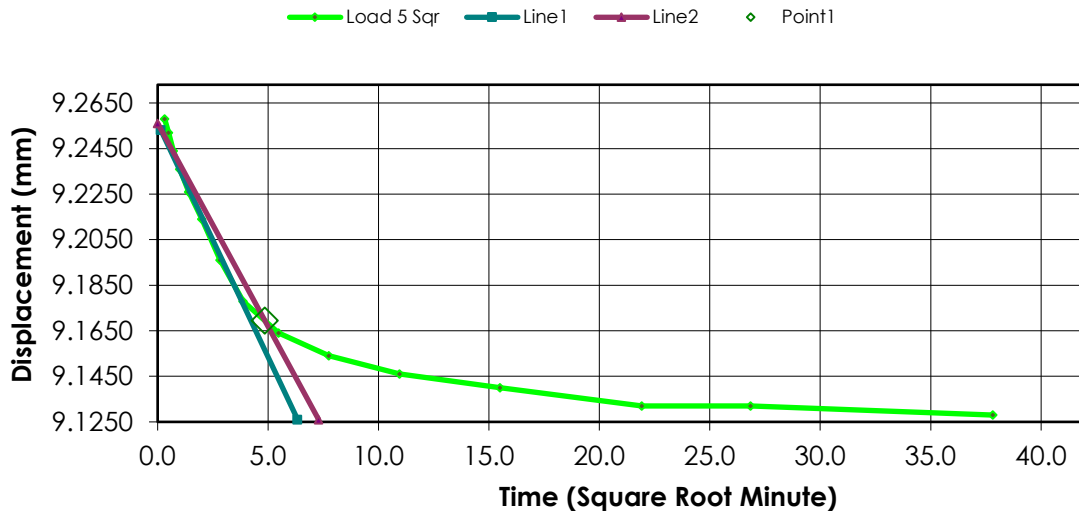
Remarks:

Sample Type: Undisturbed

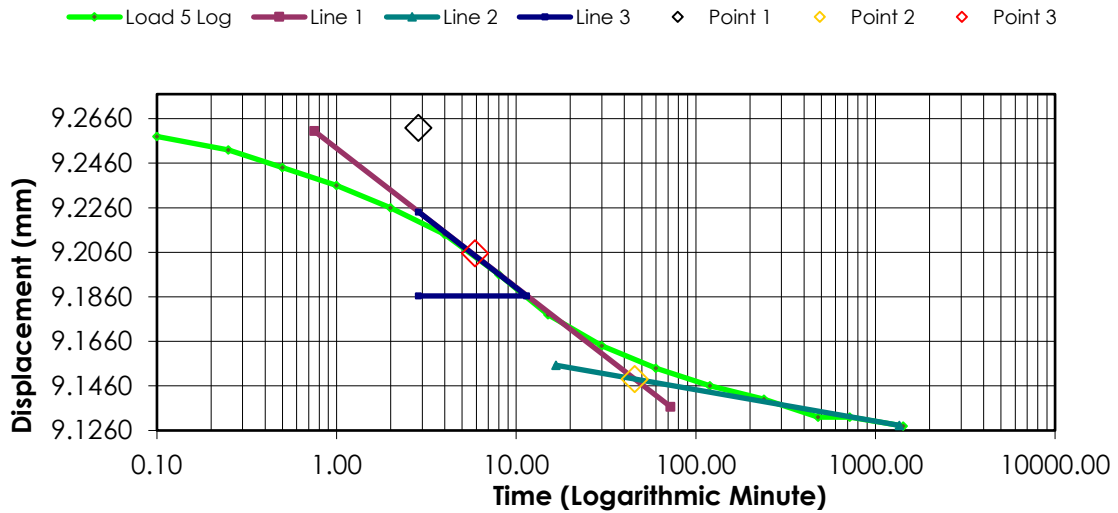
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	9.2880	-0.2840	-1.3922	0.6164
1	00:00:06	9.2580	-0.2740	-1.3431	0.6156
2	00:00:15	9.2520	-0.2680	-1.3137	0.6151
3	00:00:30	9.2440	-0.2600	-1.2745	0.6145
4	00:01:00	9.2360	-0.2520	-1.2353	0.6139
5	00:02:00	9.2260	-0.2420	-1.1863	0.6131
6	00:04:00	9.2140	-0.2300	-1.1275	0.6122
7	00:08:01	9.1960	-0.2120	-1.0392	0.6107
8	00:15:02	9.1780	-0.1940	-0.9510	0.6093
9	00:30:03	9.1640	-0.1800	-0.8824	0.6082
10	01:00:06	9.1540	-0.1700	-0.8333	0.6075
11	02:00:11	9.1460	-0.1620	-0.7941	0.6068
12	04:00:23	9.1400	-0.1560	-0.7647	0.6064
13	08:00:48	9.1320	-0.1480	-0.7255	0.6057
14	12:01:12	9.1320	-0.1480	-0.7255	0.6057
15	23:50:15	9.1280	-0.1440	-0.7059	0.6054

Consolidation Test Results (Sequence 5) Load 80.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 6) Load 160.000 kPa

Project: SR1 2018 Investigation
Location:
Job Number:

Project Number: 110773396

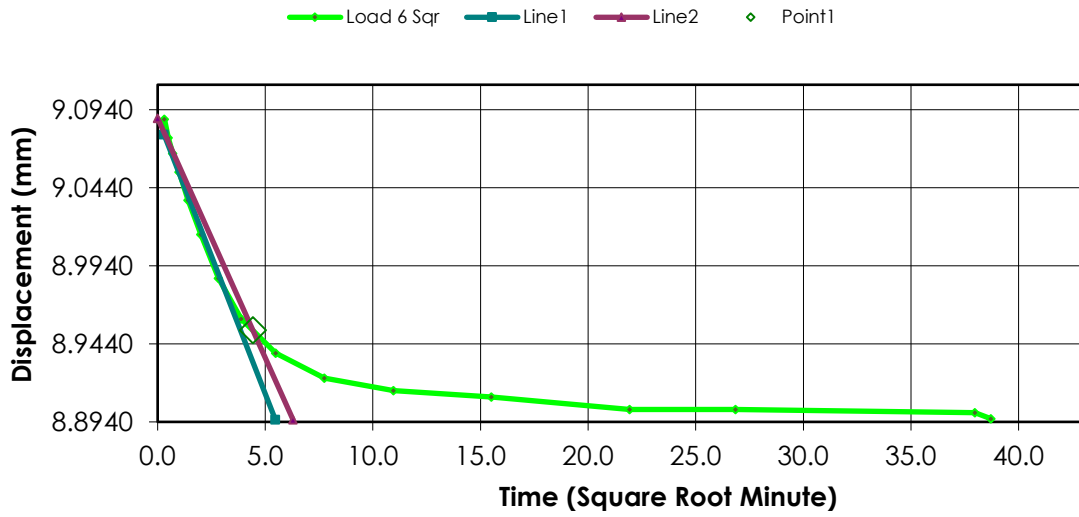
Test Date: 15-Oct-18
Test Number:

Sample Number: GL2 ST15 **Soil Description:**
Boring Number: Clay (Cl-CH), Some Sand, Trace Gravel
Depth: 7.35-7.8m **Remarks:**
Sample Type: Undisturbed

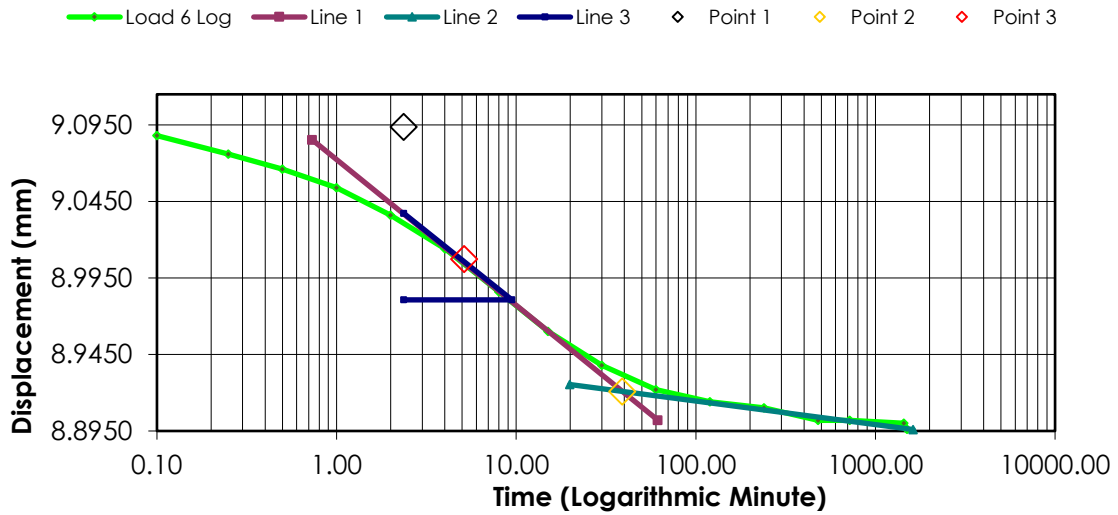
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	9.1280	-0.1440	-0.7059	0.6054
1	00:00:06	9.0880	-0.1340	-0.6569	0.6047
2	00:00:15	9.0760	-0.1220	-0.5980	0.6037
3	00:00:30	9.0660	-0.1120	-0.5490	0.6029
4	00:01:00	9.0540	-0.1000	-0.4902	0.6020
5	00:02:00	9.0360	-0.0820	-0.4020	0.6006
6	00:04:01	9.0140	-0.0600	-0.2941	0.5989
7	00:08:01	8.9860	-0.0320	-0.1569	0.5967
8	00:15:02	8.9600	-0.0060	-0.0294	0.5946
9	00:30:03	8.9380	0.0160	0.0784	0.5929
10	01:00:06	8.9220	0.0320	0.1569	0.5917
11	02:00:12	8.9140	0.0400	0.1961	0.5911
12	04:00:25	8.9100	0.0440	0.2157	0.5907
13	08:00:49	8.9020	0.0520	0.2549	0.5901
14	12:01:12	8.9020	0.0520	0.2549	0.5901
15	24:02:25	8.9000	0.0540	0.2647	0.5900
16	24:59:21	8.8960	0.0580	0.2843	0.5896

Consolidation Test Results (Sequence 6) Load 160.000 kPa

Consolidation Graph (Square-root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 7) Load 320.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Test Number:

Sample Number: GL2 ST15

Soil Description:

Boring Number:

Clay (CI-CH), Some Sand, Trace Gravel

Depth: 7.35-7.8m

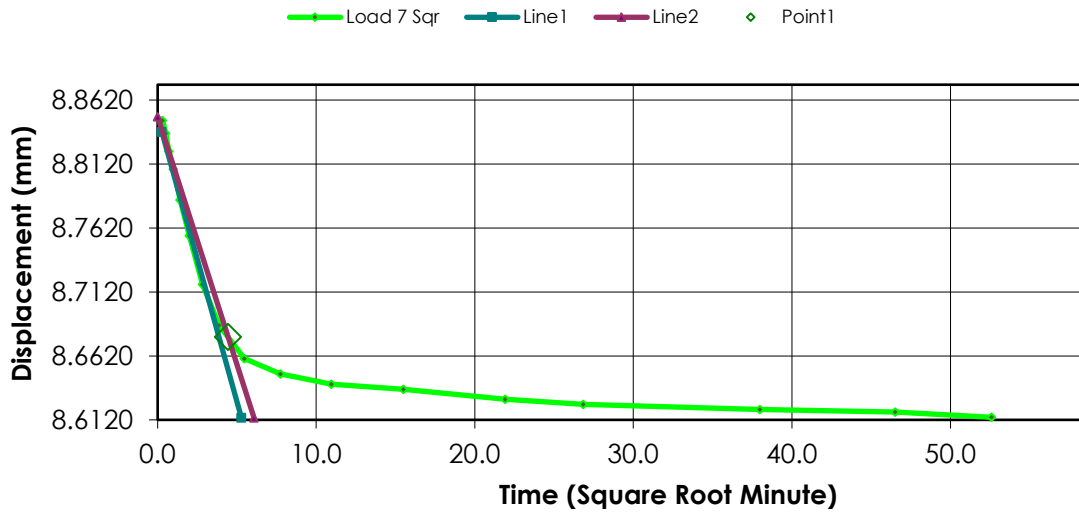
Remarks:

Sample Type: Undisturbed

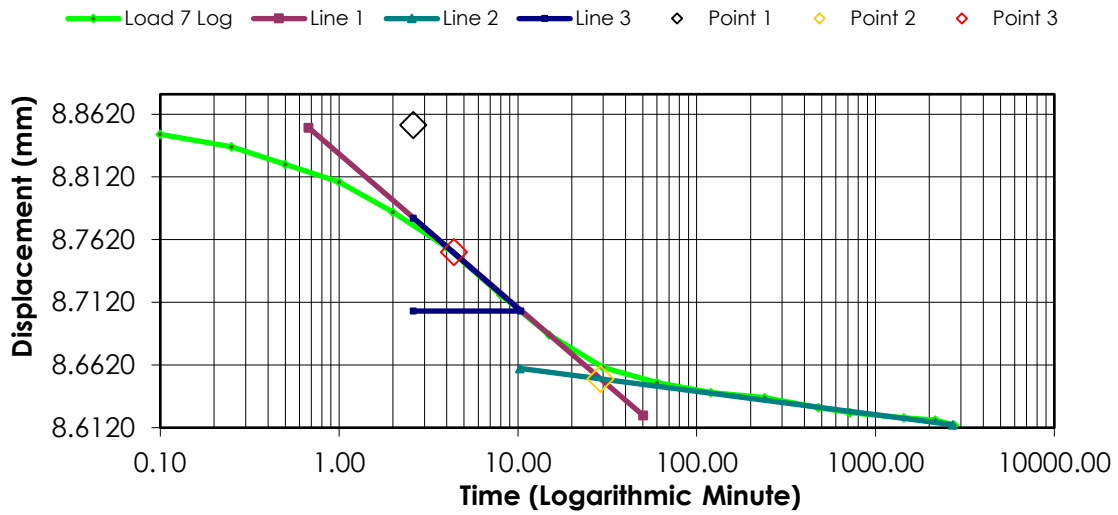
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.8960	0.0580	0.2843	0.5896
1	00:00:06	8.8460	0.0700	0.3431	0.5887
2	00:00:15	8.8360	0.0800	0.3922	0.5879
3	00:00:30	8.8220	0.0940	0.4608	0.5868
4	00:01:00	8.8080	0.1080	0.5294	0.5857
5	00:02:00	8.7840	0.1320	0.6471	0.5839
6	00:04:00	8.7560	0.1600	0.7843	0.5817
7	00:08:01	8.7180	0.1980	0.9706	0.5787
8	00:15:01	8.6860	0.2300	1.1275	0.5762
9	00:30:03	8.6600	0.2560	1.2549	0.5742
10	01:00:05	8.6480	0.2680	1.3137	0.5732
11	02:00:10	8.6400	0.2760	1.3529	0.5726
12	04:00:21	8.6360	0.2800	1.3726	0.5723
13	08:00:42	8.6280	0.2880	1.4118	0.5717
14	12:01:04	8.6240	0.2920	1.4314	0.5714
15	24:02:07	8.6200	0.2960	1.4510	0.5710
16	36:03:11	8.6180	0.2980	1.4608	0.5709
17	46:05:08	8.6140	0.3020	1.4804	0.5706

Consolidation Test Results (Sequence 7) Load 320.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 8) Load 640.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Test Number:

Sample Number: GL2 ST15

Soil Description:

Boring Number:

Clay (CI-CH), Some Sand, Trace Gravel

Depth: 7.35-7.8m

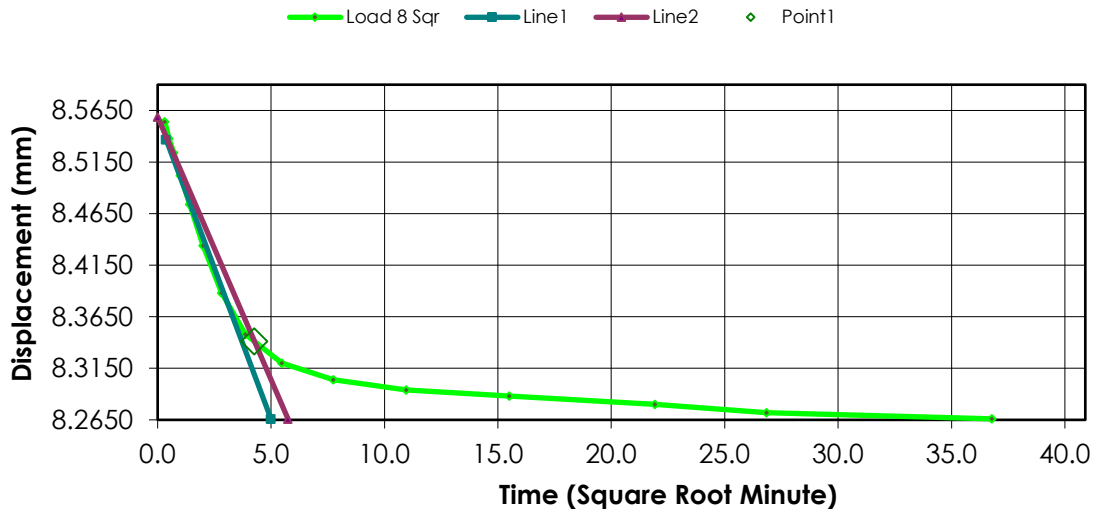
Remarks:

Sample Type: Undisturbed

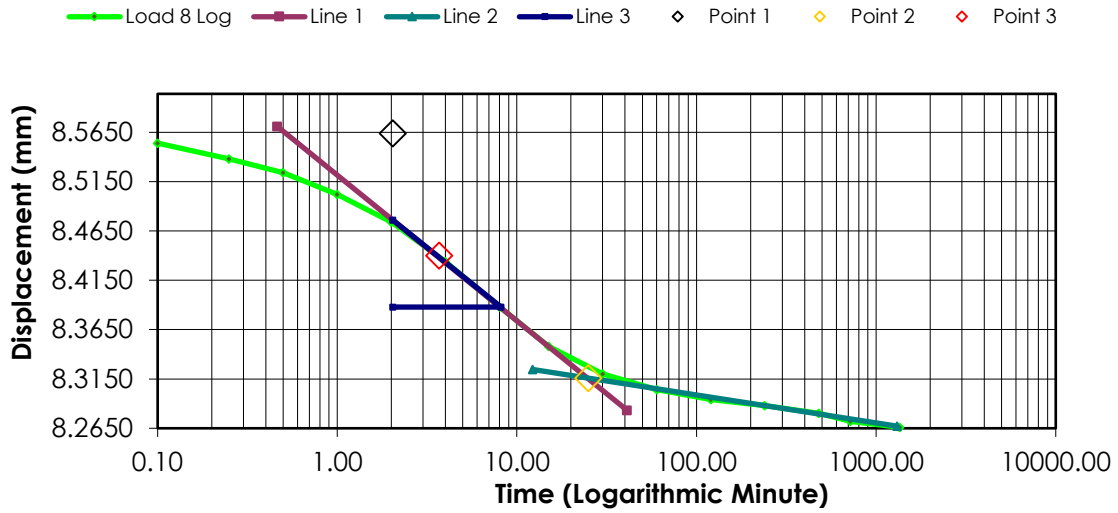
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.6140	0.3020	1.4804	0.5706
1	00:00:06	8.5540	0.3240	1.5882	0.5689
2	00:00:15	8.5380	0.3400	1.6667	0.5676
3	00:00:30	8.5240	0.3540	1.7353	0.5665
4	00:01:00	8.5020	0.3760	1.8431	0.5648
5	00:02:00	8.4740	0.4040	1.9804	0.5626
6	00:04:00	8.4340	0.4440	2.1765	0.5595
7	00:08:01	8.3880	0.4900	2.4020	0.5559
8	00:15:01	8.3480	0.5300	2.5980	0.5528
9	00:30:03	8.3200	0.5580	2.7353	0.5506
10	01:00:05	8.3040	0.5740	2.8137	0.5493
11	02:00:10	8.2940	0.5840	2.8627	0.5485
12	04:00:19	8.2880	0.5900	2.8922	0.5481
13	08:00:41	8.2800	0.5980	2.9314	0.5474
14	12:01:02	8.2720	0.6060	2.9706	0.5468
15	22:32:40	8.2660	0.6120	3.0000	0.5464

Consolidation Test Results (Sequence 8) Load 640.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 9) Rebound 320.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Test Number:

Sample Number: GL2 ST15

Soil Description:

Boring Number:

Clay (CI-CH), Some Sand, Trace Gravel

Depth: 7.35-7.8m

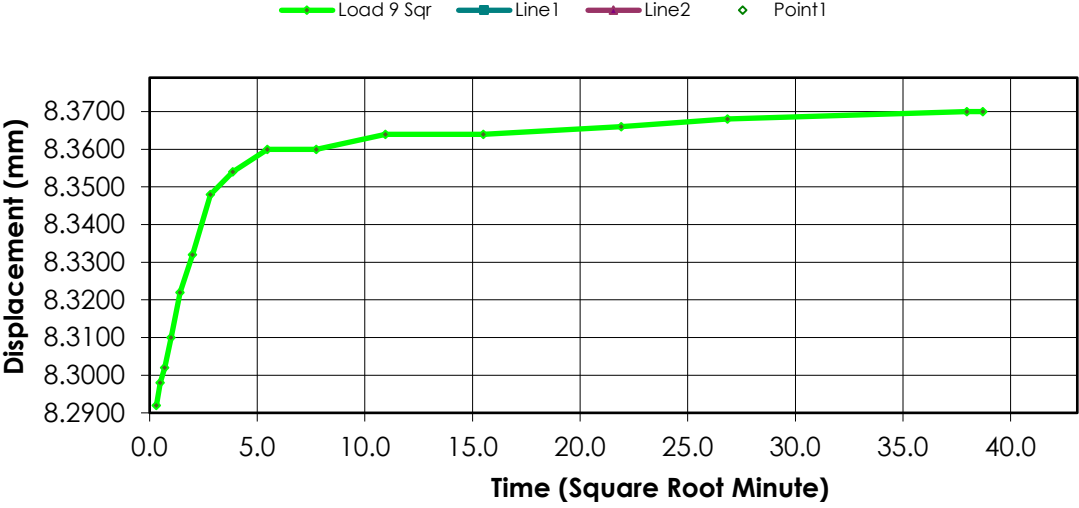
Remarks:

Sample Type: Undisturbed

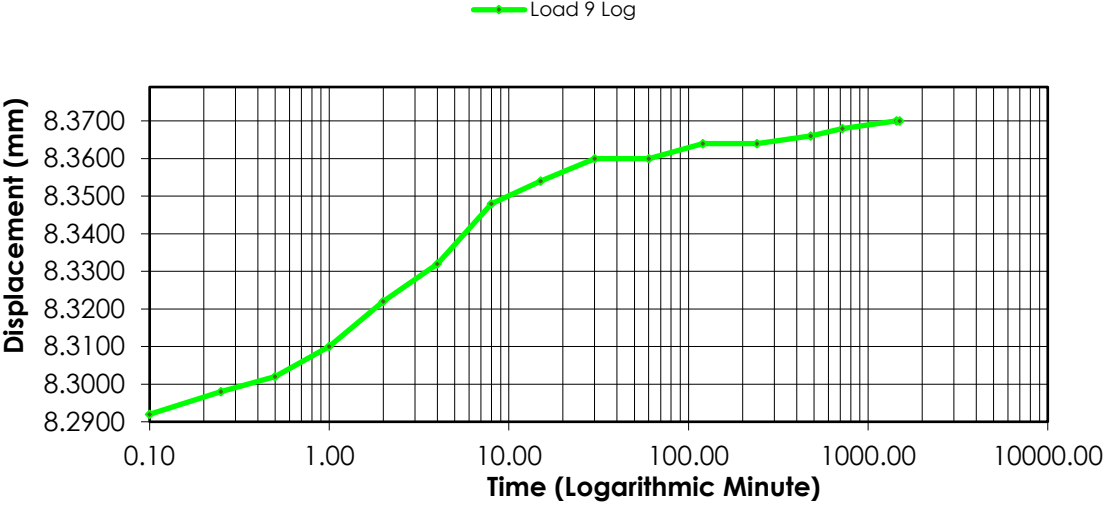
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.2660	0.6120	3.0000	0.5464
1	00:00:06	8.2920	0.5960	2.9216	0.5476
2	00:00:15	8.2980	0.5900	2.8922	0.5481
3	00:00:30	8.3020	0.5860	2.8726	0.5484
4	00:01:00	8.3100	0.5780	2.8333	0.5490
5	00:02:00	8.3220	0.5660	2.7745	0.5500
6	00:04:00	8.3320	0.5560	2.7255	0.5507
7	00:08:00	8.3480	0.5400	2.6471	0.5520
8	00:15:01	8.3540	0.5340	2.6176	0.5525
9	00:30:02	8.3600	0.5280	2.5882	0.5529
10	01:00:05	8.3600	0.5280	2.5882	0.5529
11	02:00:10	8.3640	0.5240	2.5686	0.5532
12	04:00:21	8.3640	0.5240	2.5686	0.5532
13	08:00:42	8.3660	0.5220	2.5588	0.5534
14	12:01:03	8.3680	0.5200	2.5490	0.5535
15	24:02:07	8.3700	0.5180	2.5392	0.5537
16	24:58:47	8.3700	0.5180	2.5392	0.5537

Consolidation Test Results (Sequence 9) Rebound 320.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 10) Rebound 160.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Test Number:

Sample Number: GL2 ST15

Soil Description:

Boring Number:

Clay (CI-CH), Some Sand, Trace Gravel

Depth: 7.35-7.8m

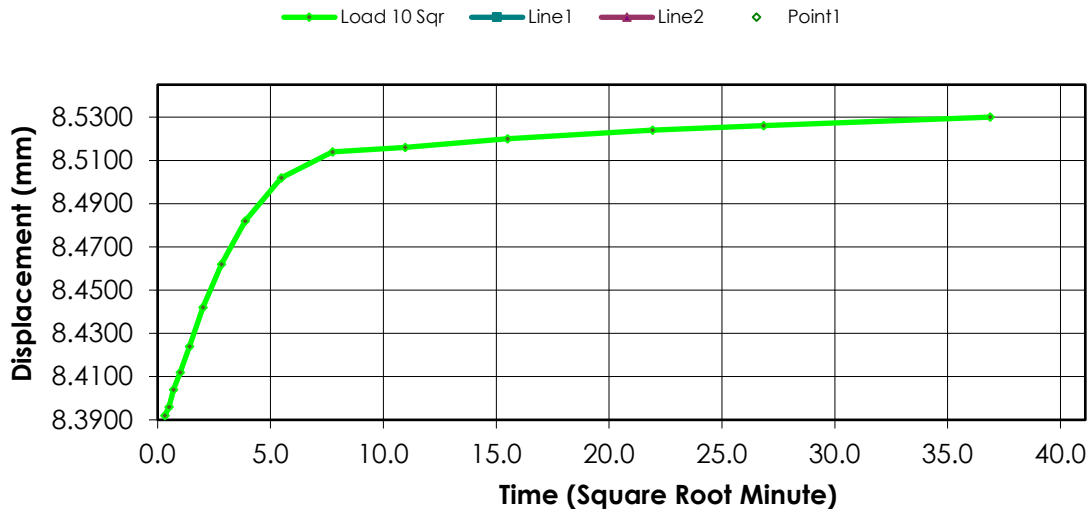
Remarks:

Sample Type: Undisturbed

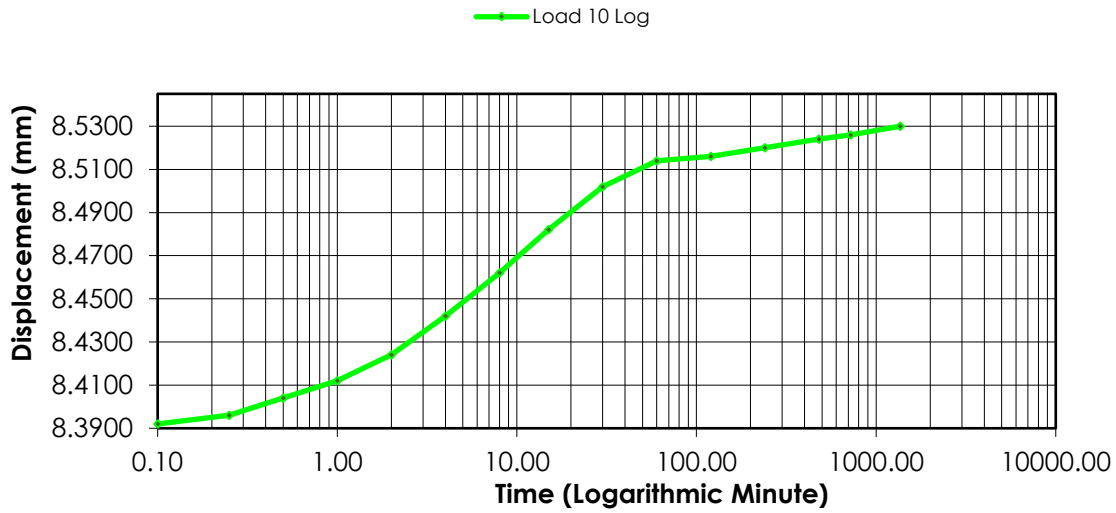
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.3700	0.5180	2.5392	0.5537
1	00:00:06	8.3920	0.5120	2.5098	0.5542
2	00:00:15	8.3960	0.5080	2.4902	0.5545
3	00:00:30	8.4040	0.5000	2.4510	0.5551
4	00:01:00	8.4120	0.4920	2.4118	0.5557
5	00:02:00	8.4240	0.4800	2.3529	0.5567
6	00:04:00	8.4420	0.4620	2.2647	0.5581
7	00:08:00	8.4620	0.4420	2.1667	0.5596
8	00:15:01	8.4820	0.4220	2.0686	0.5612
9	00:30:02	8.5020	0.4020	1.9706	0.5628
10	01:00:05	8.5140	0.3900	1.9118	0.5637
11	02:00:10	8.5160	0.3880	1.9020	0.5639
12	04:00:21	8.5200	0.3840	1.8824	0.5642
13	08:00:37	8.5240	0.3800	1.8627	0.5645
14	12:00:58	8.5260	0.3780	1.8529	0.5646
15	22:40:41	8.5300	0.3740	1.8333	0.5650

Consolidation Test Results (Sequence 10) Rebound 160.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 11) Load 320.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Test Number:

Sample Number: GL2 ST15

Soil Description:

Boring Number:

Clay (CI-CH), Some Sand, Trace Gravel

Depth: 7.35-7.8m

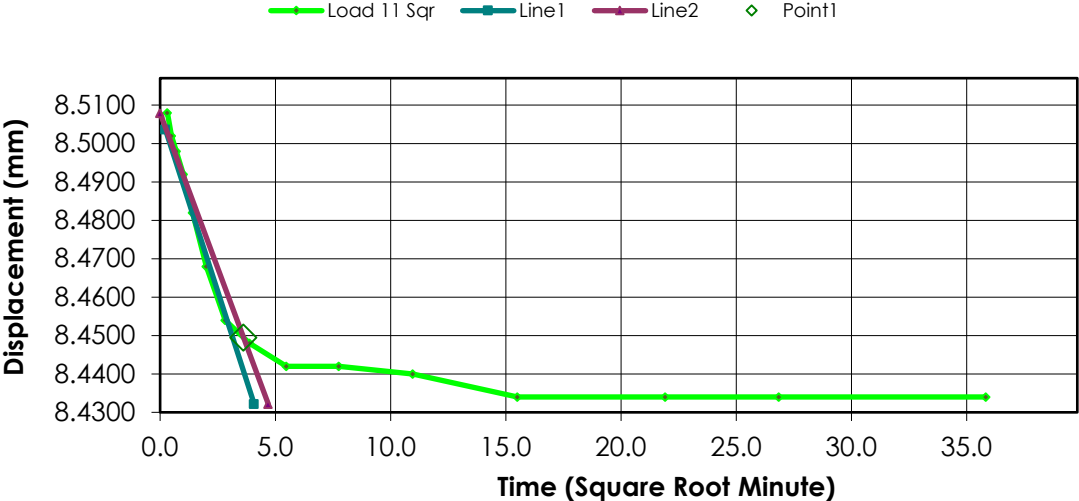
Remarks:

Sample Type: Undisturbed

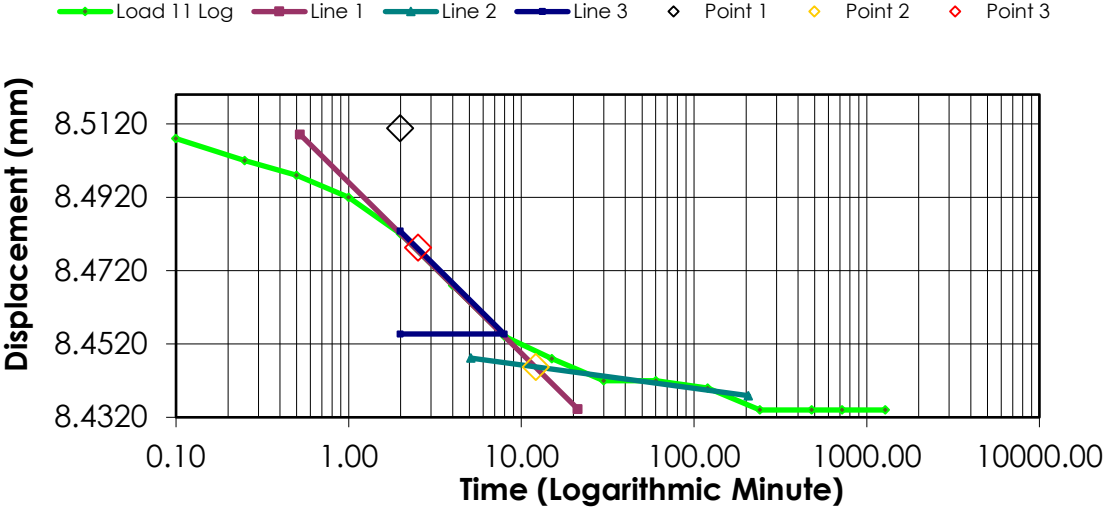
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.5300	0.3740	1.8333	0.5650
1	00:00:06	8.5080	0.3860	1.8922	0.5640
2	00:00:15	8.5020	0.3920	1.9216	0.5635
3	00:00:30	8.4980	0.3960	1.9412	0.5632
4	00:01:00	8.4920	0.4020	1.9706	0.5628
5	00:02:00	8.4820	0.4120	2.0196	0.5620
6	00:04:00	8.4680	0.4260	2.0882	0.5609
7	00:08:01	8.4540	0.4400	2.1569	0.5598
8	00:15:01	8.4480	0.4460	2.1863	0.5593
9	00:30:03	8.4420	0.4520	2.2157	0.5589
10	01:00:05	8.4420	0.4520	2.2157	0.5589
11	02:00:11	8.4400	0.4540	2.2255	0.5587
12	04:00:21	8.4340	0.4600	2.2549	0.5582
13	08:00:42	8.4340	0.4600	2.2549	0.5582
14	12:01:04	8.4340	0.4600	2.2549	0.5582
15	21:23:44	8.4340	0.4600	2.2549	0.5582

Consolidation Test Results (Sequence 11) Load 320.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 12) Load 640.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Test Number:

Sample Number: GL2 ST15

Soil Description:

Boring Number:

Clay (CI-CH), Some Sand, Trace Gravel

Depth: 7.35-7.8m

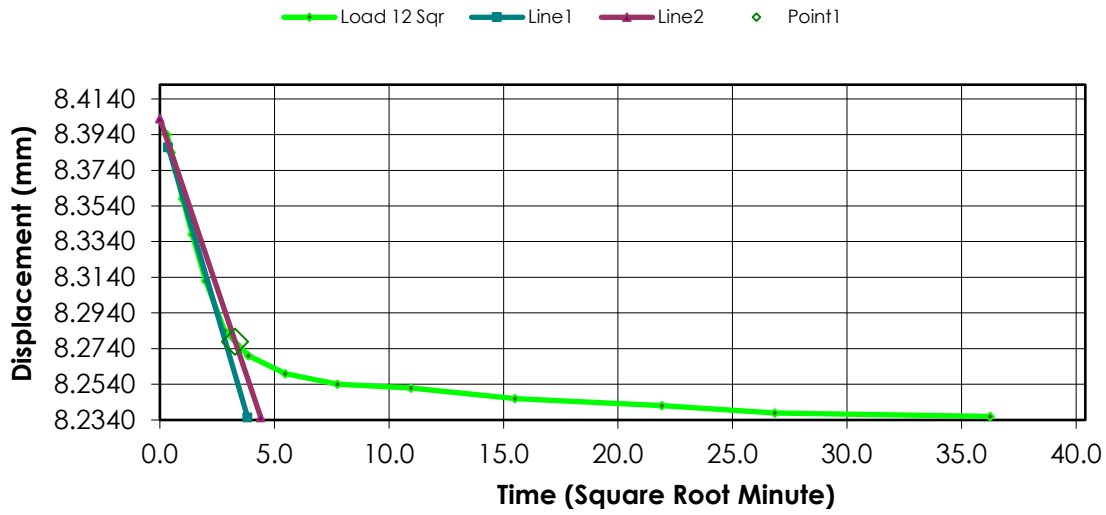
Remarks:

Sample Type: Undisturbed

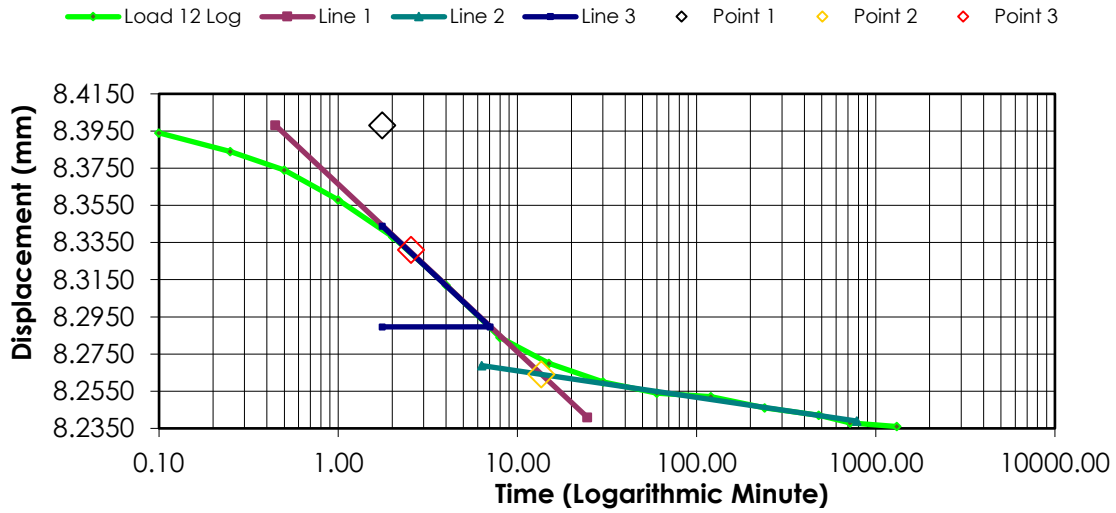
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.4340	0.4600	2.2549	0.5582
1	00:00:06	8.3940	0.4820	2.3627	0.5565
2	00:00:15	8.3840	0.4920	2.4118	0.5557
3	00:00:30	8.3740	0.5020	2.4608	0.5550
4	00:01:00	8.3580	0.5180	2.5392	0.5537
5	00:02:01	8.3380	0.5380	2.6373	0.5521
6	00:04:01	8.3120	0.5640	2.7647	0.5501
7	00:08:01	8.2840	0.5920	2.9020	0.5479
8	00:15:02	8.2700	0.6060	2.9706	0.5468
9	00:30:03	8.2600	0.6160	3.0196	0.5460
10	01:00:06	8.2540	0.6220	3.0490	0.5456
11	02:00:11	8.2520	0.6240	3.0588	0.5454
12	04:00:21	8.2460	0.6300	3.0882	0.5449
13	08:00:43	8.2420	0.6340	3.1078	0.5446
14	12:01:02	8.2380	0.6380	3.1275	0.5443
15	21:54:01	8.2360	0.6400	3.1373	0.5442

Consolidation Test Results (Sequence 12) Load 640.000 kPa

Consolidation Graph (Square root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 13) Load 1280.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Test Number:

Sample Number: GL2 ST15

Soil Description:

Boring Number:

Clay (CI-CH), Some Sand, Trace Gravel

Depth: 7.35-7.8m

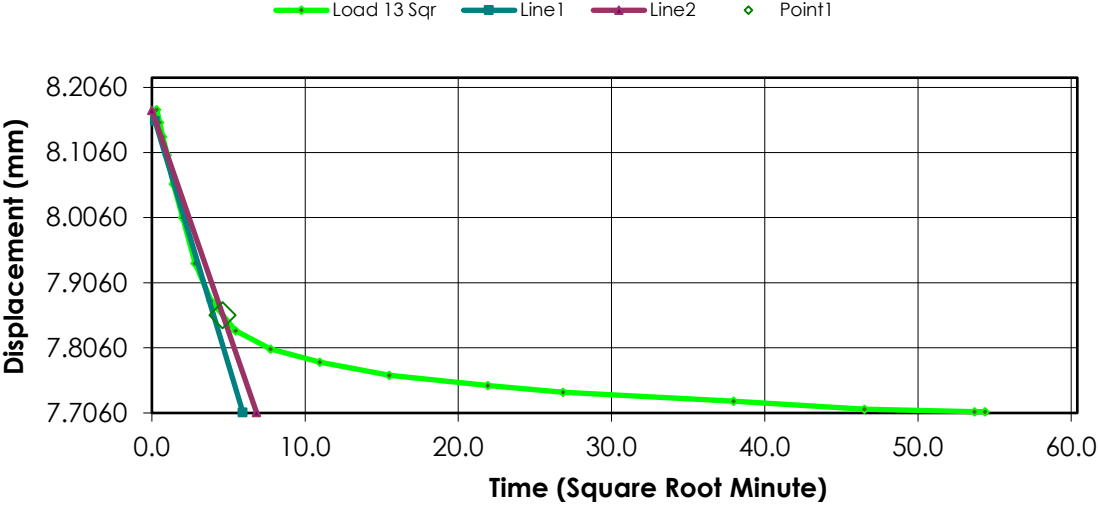
Remarks:

Sample Type: Undisturbed

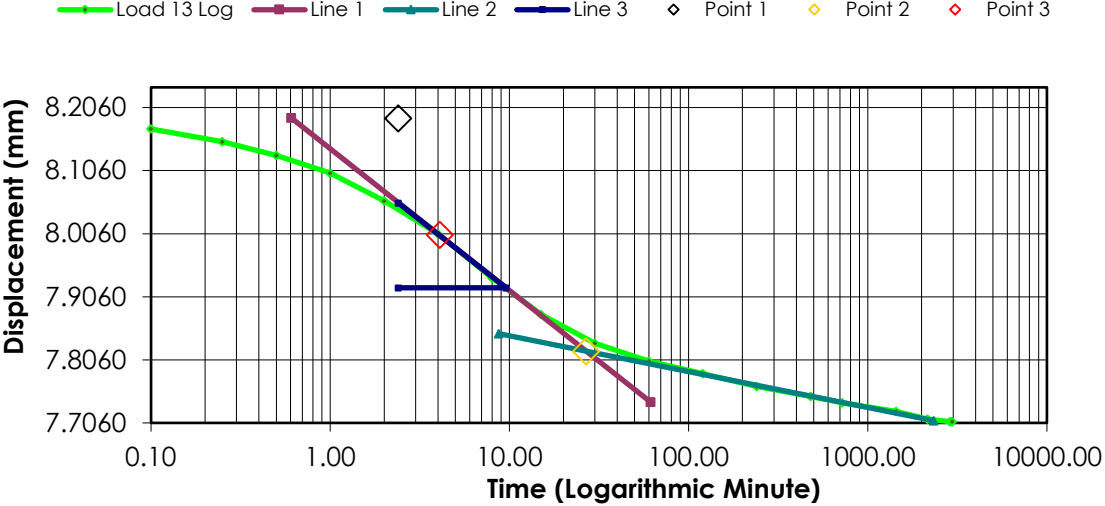
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.2360	0.6400	3.1373	0.5442
1	00:00:06	8.1720	0.6520	3.1961	0.5432
2	00:00:15	8.1520	0.6720	3.2941	0.5417
3	00:00:30	8.1300	0.6940	3.4020	0.5399
4	00:01:00	8.1020	0.7220	3.5392	0.5378
5	00:02:00	8.0580	0.7660	3.7549	0.5343
6	00:04:00	8.0060	0.8180	4.0098	0.5303
7	00:08:00	7.9360	0.8880	4.3529	0.5248
8	00:15:01	7.8780	0.9460	4.6373	0.5203
9	00:30:02	7.8320	0.9920	4.8627	0.5167
10	01:00:05	7.8040	1.0200	5.0000	0.5145
11	02:00:10	7.7840	1.0400	5.0980	0.5129
12	04:00:21	7.7640	1.0600	5.1961	0.5113
13	08:00:42	7.7480	1.0760	5.2745	0.5101
14	12:01:03	7.7380	1.0860	5.3235	0.5093
15	24:02:06	7.7240	1.1000	5.3922	0.5082
16	36:03:08	7.7120	1.1120	5.4510	0.5073
17	48:04:12	7.7080	1.1160	5.4706	0.5070
18	49:17:28	7.7080	1.1160	5.4706	0.5070

Consolidation Test Results (Sequence 13) Load 1280.000 kPa

Consolidation Graph (Squareroot Time)



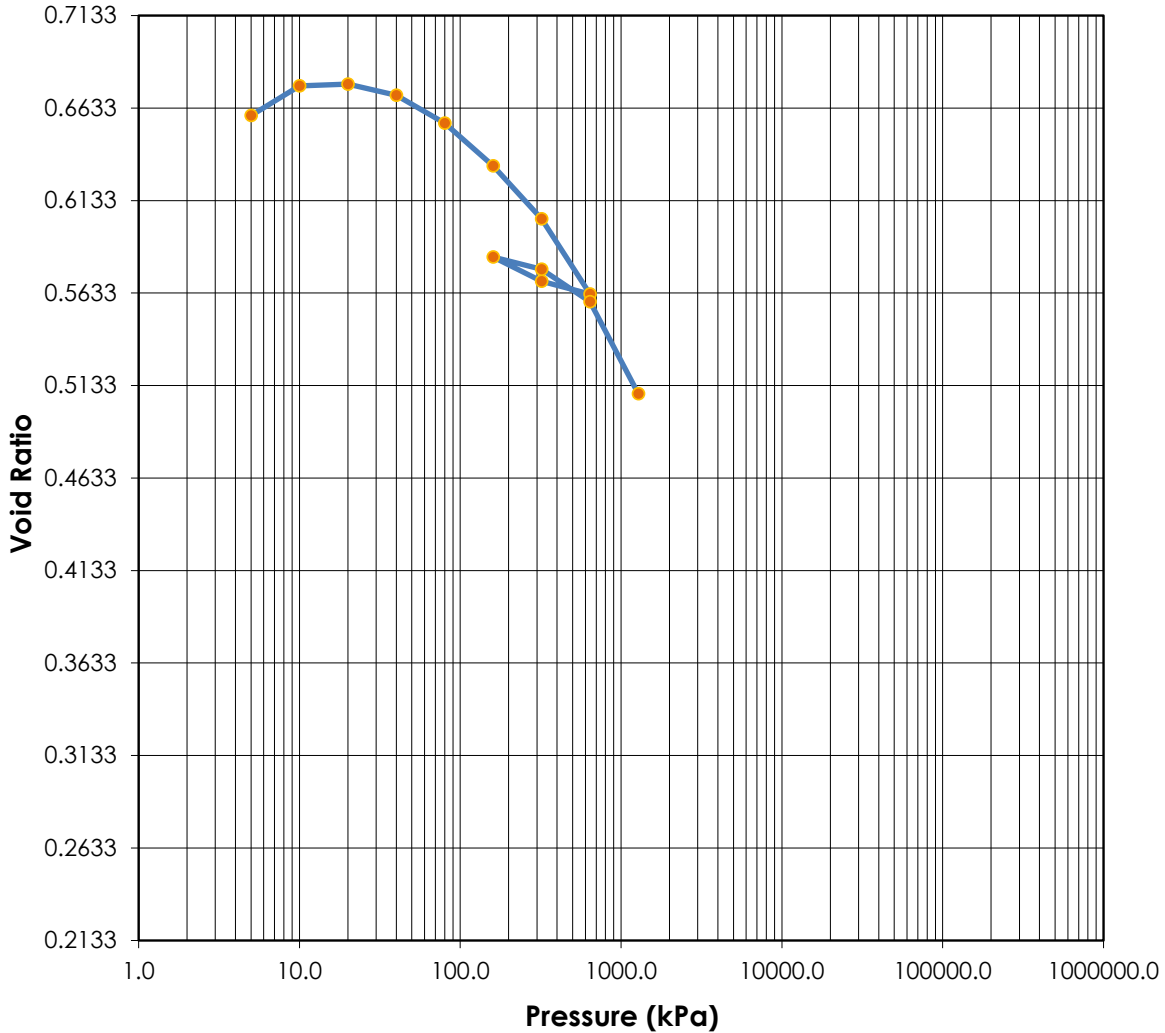
Consolidation Graph (Logarithmic Time)





Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876



	Before	After	Liquid Limits:	47	Test Date:	30-Oct-18
Moisture (%):	26.4	21.4	Plastic Limits:	17		
Dry Density (g/cm³):	1.594	1.762	Plasticity Index (%):	30		
Saturation (%):	100	100				
Void Ratio:	0.6583	0.5079	Specific Gravity:	2.65	Assumed	
Soil Description:	Clay (Cl), Trace Sand, Trace Gravel					
Project Number:	110773396	Depth:	8.25-8.7m			
Sample Number:	GL2 ST17	Boring Number:				
Project:	SRT 2018 Investigation					
Client:	Alberta Transportation					
Location:						
						Remarks:

Tested By: E. Wahl

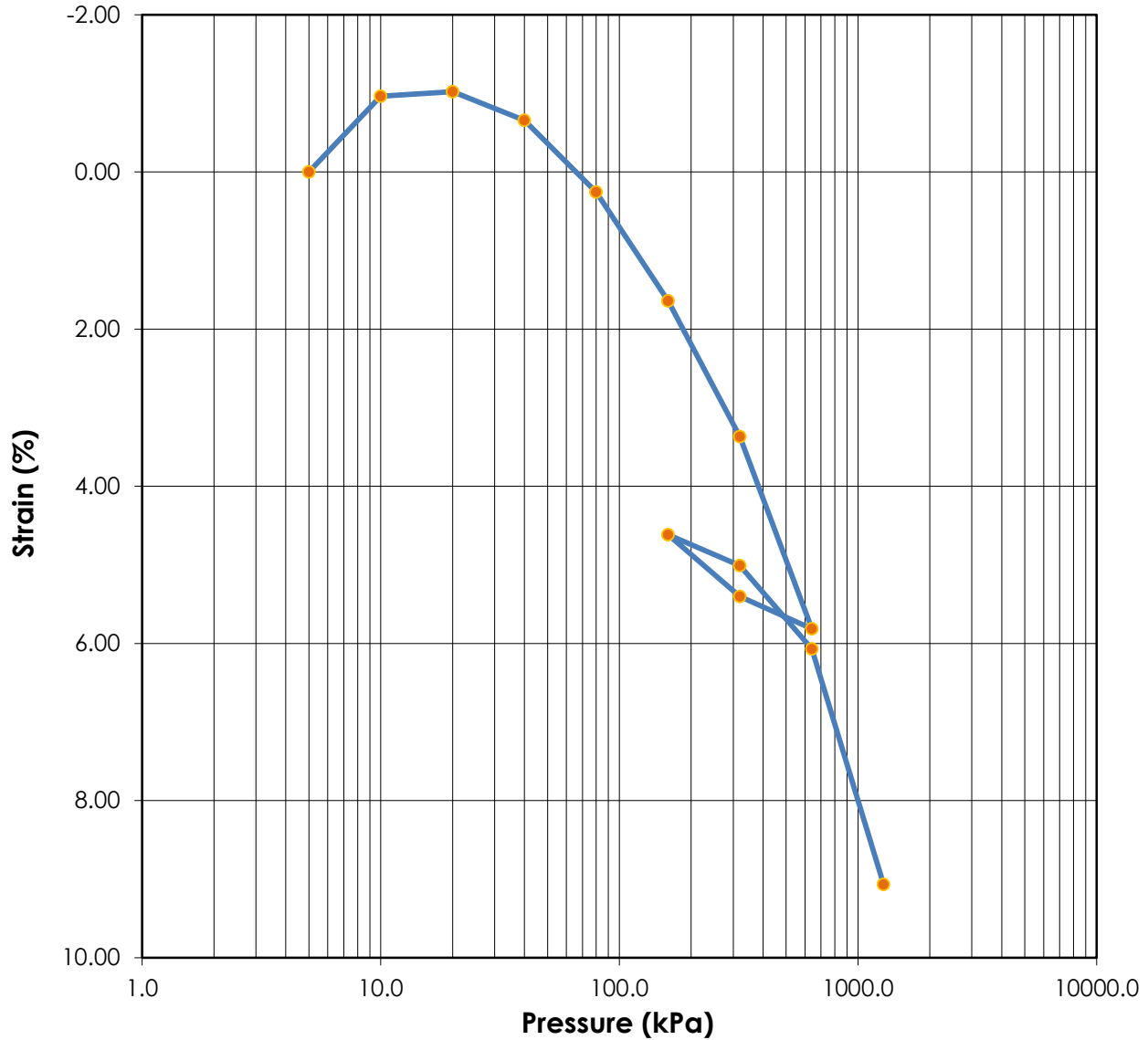
Reviewed By: C. Lamoureux

Reporting of these test results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request. The data presented above is for the sole use of the client stipulated above. Stantec is not responsible, nor can be held liable, for the use of this report by any other party, with or without the knowledge of Stantec.



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One-Dimensional Consolidation Test
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Test Results

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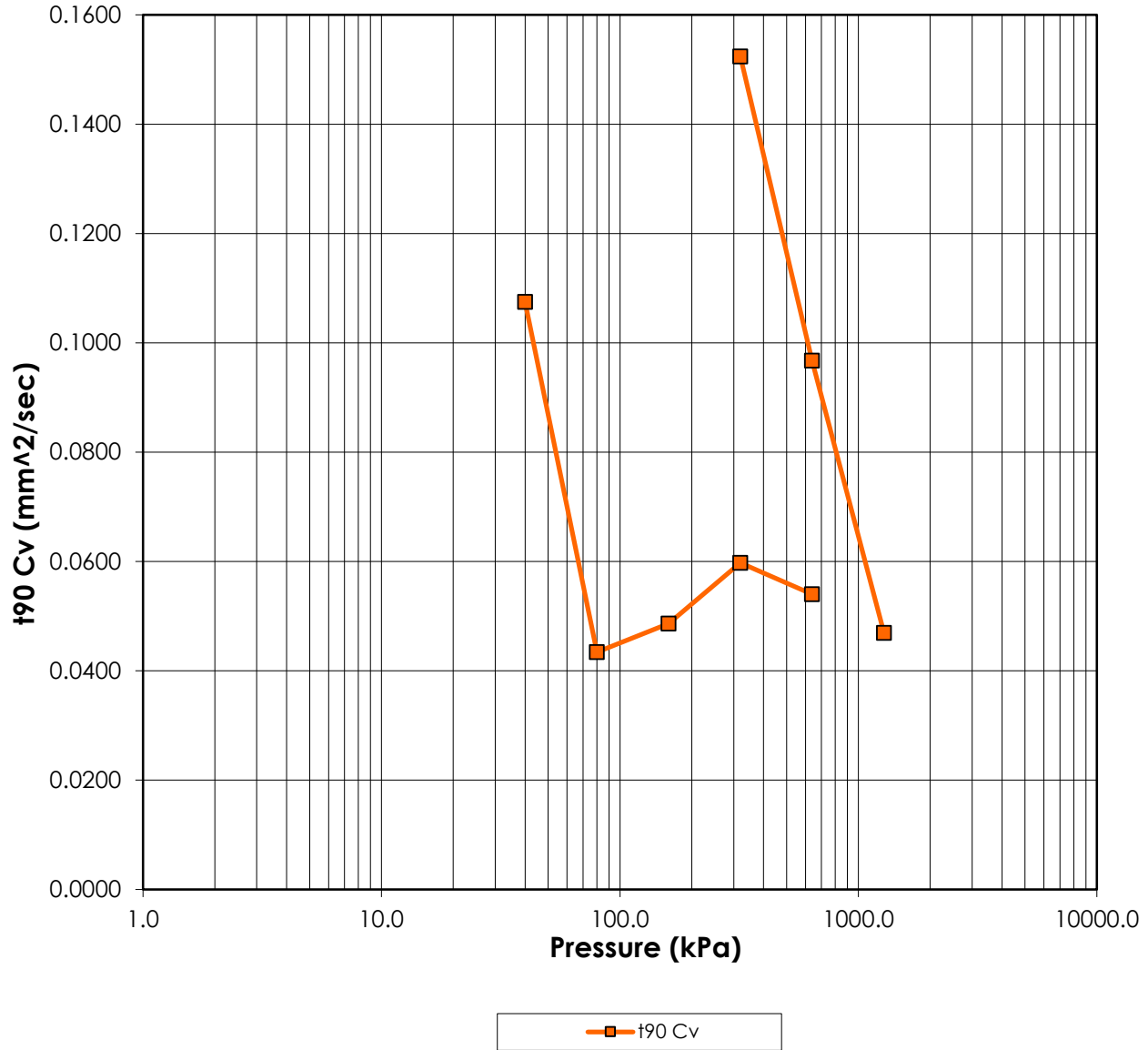


	Before	After	Liquid Limits:	47	Test Date:	30-Oct-18
Moisture (%):	26.4	21.4	Plastic Limits:	17		
Dry Density (g/cm3):	1.594	1.762	Plasticity Index (%):	30		
Saturation (%):	100	100	Specific Gravity:	2.65	Assumed	
Void Ratio:	0.6583	0.5079				
Sample Description:	Clay (Cl), Trace Sand, Trace Gravel					
Project Number:	110773396	Depth:	8.25-8.7m			
Sample Number:	GL2 ST17	Boring Number:				
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						
						Remarks:



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

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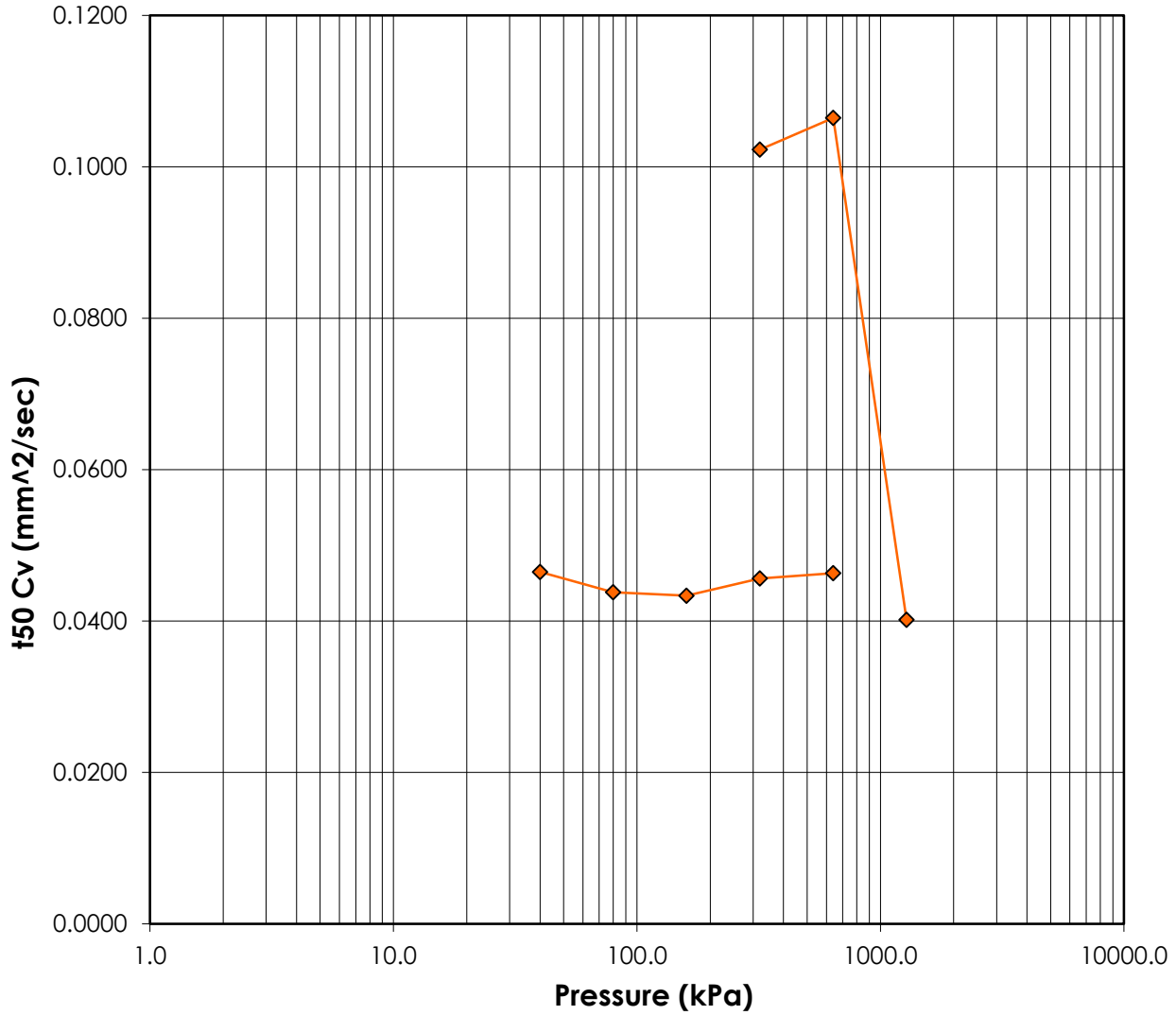


	Before	After	Liquid Limits:	47	Test Date:	30-Oct-18
Moisture (%):	26.4	21.4	Plastic Limits:	17		
Dry Density (g/cm3):	1.594	1.762	Plasticity Index (%):	30		
Saturation (%):	100	100				
Void Ratio:	0.6583	0.5079	Specific Gravity:	2.65	Assumed	
Soil Description:	Clay (Cl), Trace Sand, Trace Gravel					
Project Number:	110773396		Depth:	8.25-8.7m		
Sample Number:	GL2 ST17		Boring Number:			
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						
						Remarks:



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
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 Tel: (403) 253-7876



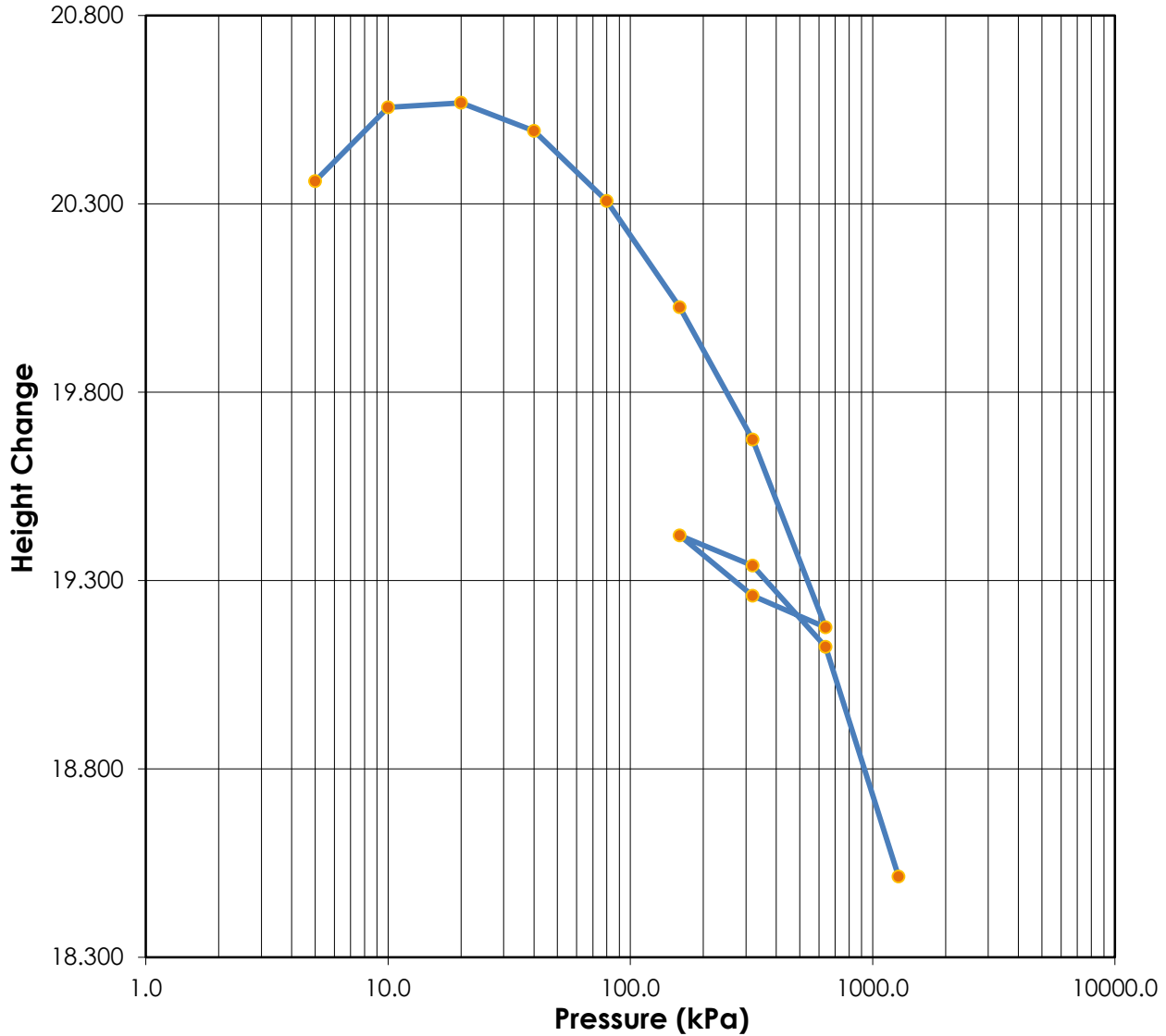
—◆— t50 Cv

	Before	After	Liquid Limits:	47	Test Date:	30-Oct-18
Moisture (%):	26.4	21.4	Plastic Limits:	17		
Dry Density (g/cm³):	1.594	1.762	Plasticity Index (%):	30		
Saturation (%):	100	100				
Void Ratio:	0.6583	0.5079	Specific Gravity:	2.65	Assumed	
Soil Description:	Clay (Cl), Trace Sand, Trace Gravel					
Project Number:	110773396	Depth:	8.25-8.7m			
Sample Number:	GL2 ST17	Boring Number:				
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						
			Remarks:			



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

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	Before	After	Liquid Limits:	47	Test Date:	30-Oct-18
Moisture (%):	26.4	21.4	Plastic Limits:	17		
Dry Density (g/cm3):	1.594	1.762	Plasticity Index (%):	30		
Saturation (%):	100	100	Specific Gravity:	2.65	Assumed	
Void Ratio:	0.6583	0.5079				
Soil Description:	Clay (Cl), Trace Sand, Trace Gravel					
Project Number:	110773396	Depth:	8.25-8.7m			
Sample Number:	GL2 ST17	Boring Number:				
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						
						Remarks:

Consolidation Test Results Summary

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Sample Number: GL2 ST17

Sample Description:

Boring Number:

Clay (Cl), Trace Sand, Trace Gravel

Depth: 8.25-8.7m

Remarks:

Test Number:

Sample Type: Undisturbed

Test Date: 30-Oct-18

Index	Load Sequence (kPa)	Cumulative Change in Height (mm)	Specimen Height (mm)	Height of Void (mm)	Vertical Strain (%)	Void Ratio	t90 Fitting Time (min)	t50 Fitting Time (min)	t90 Cv (mm ² /sec)	t50 Cv (mm ² /sec)
0	0.000	0.0000	20.3600	8.0898	0.00	0.6593	0.000	0.000	0.000	0.000
1	5.000	0.0000	20.3600	8.0898	0.00	0.6593	0.000	0.000	0.000	0.000
2	10.000	-0.1960	20.5560	8.2858	-0.96	0.6753	0.000	0.000	0.000	0.000
3	20.000	-0.2080	20.5680	8.2978	-1.02	0.6763	0.000	0.000	0.000	0.000
4	40.000	-0.1340	20.4940	8.2238	-0.66	0.6702	13.805	7.416	0.108	0.046
5	80.000	0.0520	20.3080	8.0378	0.26	0.6551	33.567	7.728	0.043	0.044
6	160.000	0.3340	20.0260	7.7558	1.64	0.6321	29.150	7.593	0.049	0.043
7	320.000	0.6860	19.6740	7.4038	3.37	0.6034	22.883	6.965	0.060	0.046
8	640.000	1.1840	19.1760	6.9058	5.82	0.5628	24.068	6.515	0.054	0.046
9	320.000	1.1000	19.2600	6.9898	5.40	0.5697	0.000	0.000	0.000	0.000
10	160.000	0.9400	19.4200	7.1498	4.62	0.5827	0.000	0.000	0.000	0.000
11	320.000	1.0200	19.3400	7.0698	5.01	0.5762	8.674	3.002	0.152	0.102
12	640.000	1.2360	19.1240	6.8538	6.07	0.5586	13.362	2.820	0.097	0.106
13	1280.000	1.8460	18.5140	6.2438	9.07	0.5089	25.795	7.005	0.047	0.040

Predicted value indicated with *

Consolidation Test Consolidation Specimen Information

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 30-Oct-18

Sample Number: GL2 ST17

Sample Description:

Boring Number:

Clay (Cl), Trace Sand, Trace Gravel

Depth: 8.25-8.7m

Remarks:

Sample Type: Undisturbed

Test Number:

Liquid Limit: 47

Initial Void Ratio: 0.6583

Initial Height (mm): 20.36

Plastic Limit: 17

Plasticity Index (%): 30

Initial Diameter (mm): 63.54

Specific Gravity: 2.65

Weight of Ring (g): 111.55

Assumed

Parameters	Initial Specimen	Final Specimen
Moist Weight + Container (g)	71.55	129.06
Dry Soil + Container (g)	57.46	107.00
Weight of Container (g)	3.98	3.90
Moisture Content (%)	26.4	21.4
Void Ratio	0.6583	0.5079
Saturation (%)	100	100
Dry Density (g/cm ³)	1.594	1.762

**Consolidation Test Results
(Sequence 1) Load 5.000 kPa**

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 30-Oct-18

Test Number:

Sample Number: GL2 ST17

Soil Description:

Boring Number:

Clay (Cl), Trace Sand, Trace Gravel

Depth: 8.25-8.7m

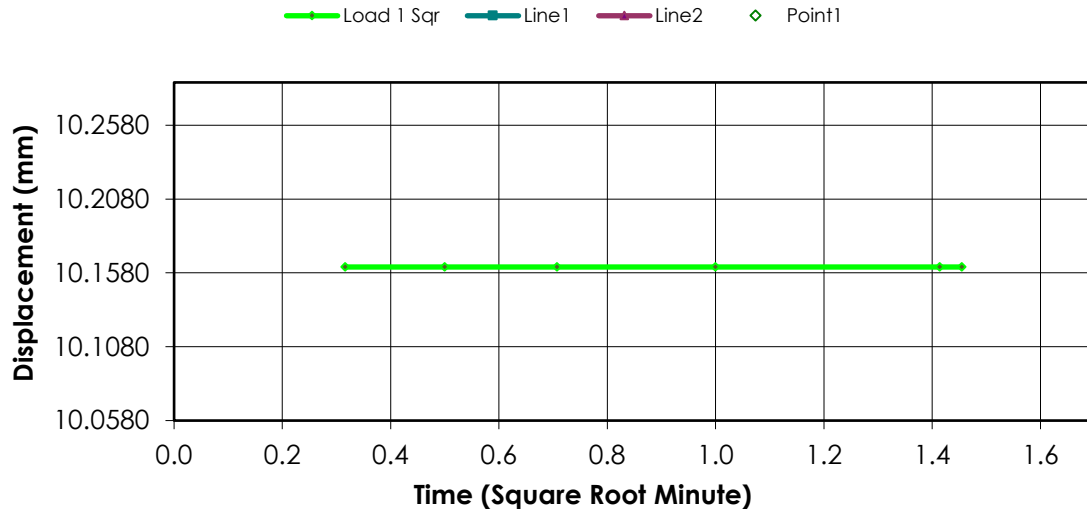
Remarks:

Sample Type: Undisturbed

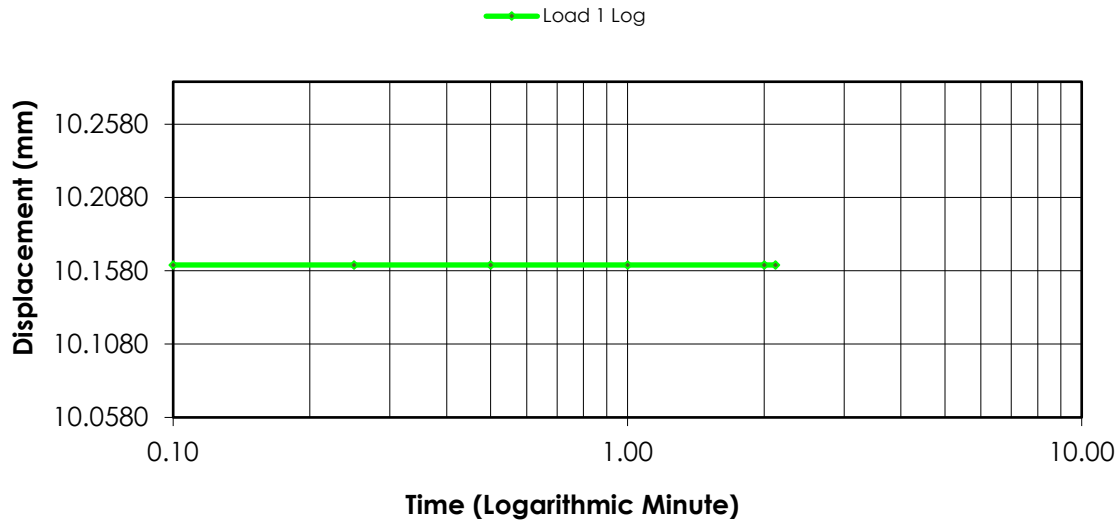
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	10.1620	0.0000	0.0000	0.6583
1	00:00:06	10.1620	0.0000	0.0000	0.6583
2	00:00:15	10.1620	0.0000	0.0000	0.6583
3	00:00:30	10.1620	0.0000	0.0000	0.6583
4	00:01:00	10.1620	0.0000	0.0000	0.6583
5	00:02:00	10.1620	0.0000	0.0000	0.6583
6	00:02:07	10.1620	0.0000	0.0000	0.6583

Consolidation Test Results (Sequence 1) Load 5.000 kPa

Consolidation Graph (Square root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 2) Load 10.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 30-Oct-18

Test Number:

Sample Number: GL2 ST17

Soil Description:

Boring Number:

Clay (Cl), Trace Sand, Trace Gravel

Depth: 8.25-8.7m

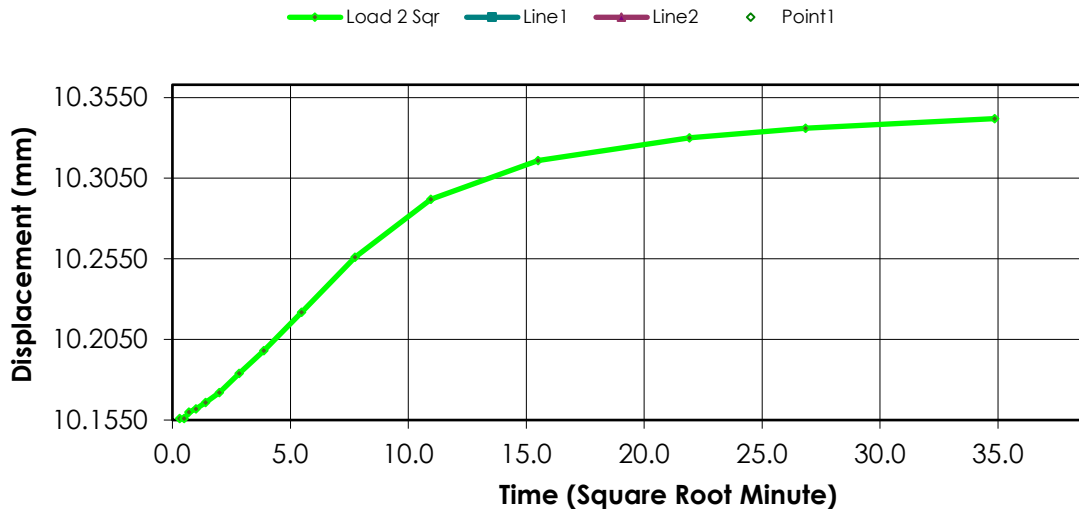
Remarks:

Sample Type: Undisturbed

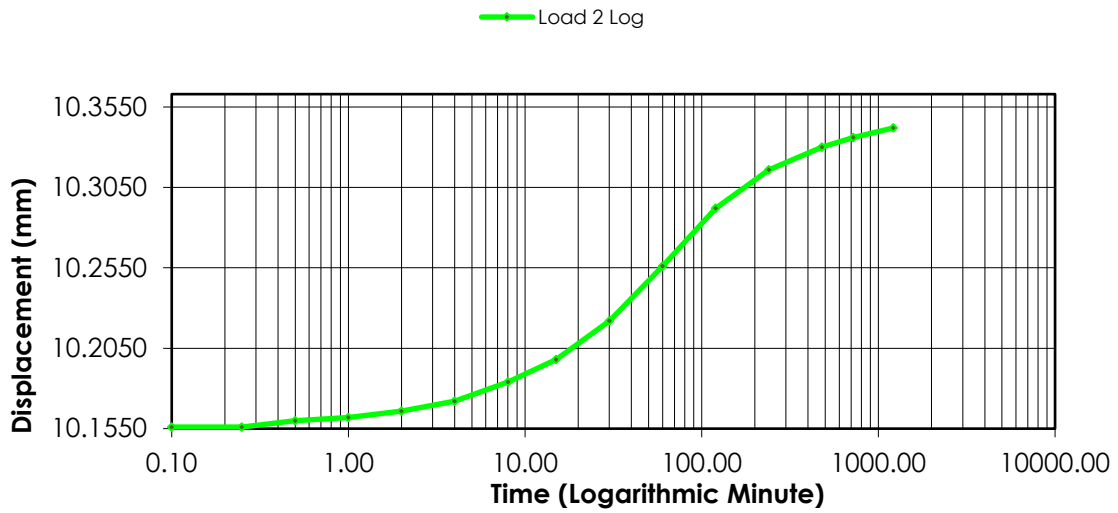
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	10.1620	0.0000	0.0000	0.6583
1	00:00:06	10.1560	-0.0100	-0.0491	0.6591
2	00:00:15	10.1560	-0.0100	-0.0491	0.6591
3	00:00:30	10.1600	-0.0140	-0.0688	0.6594
4	00:01:00	10.1620	-0.0160	-0.0786	0.6596
5	00:02:00	10.1660	-0.0200	-0.0982	0.6599
6	00:04:00	10.1720	-0.0260	-0.1277	0.6604
7	00:08:01	10.1840	-0.0380	-0.1866	0.6614
8	00:15:01	10.1980	-0.0520	-0.2554	0.6625
9	00:30:03	10.2220	-0.0760	-0.3733	0.6645
10	01:00:05	10.2560	-0.1100	-0.5403	0.6673
11	02:00:10	10.2920	-0.1460	-0.7171	0.6702
12	04:00:21	10.3160	-0.1700	-0.8350	0.6721
13	08:00:42	10.3300	-0.1840	-0.9037	0.6733
14	12:01:03	10.3360	-0.1900	-0.9332	0.6738
15	20:15:35	10.3420	-0.1960	-0.9627	0.6743

**Consolidation Test Results
(Sequence 2) Load 10.000 kPa**

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 3) Load 20.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 30-Oct-18

Test Number:

Sample Number: GL2 ST17

Soil Description:

Boring Number:

Clay (Cl), Trace Sand, Trace Gravel

Depth: 8.25-8.7m

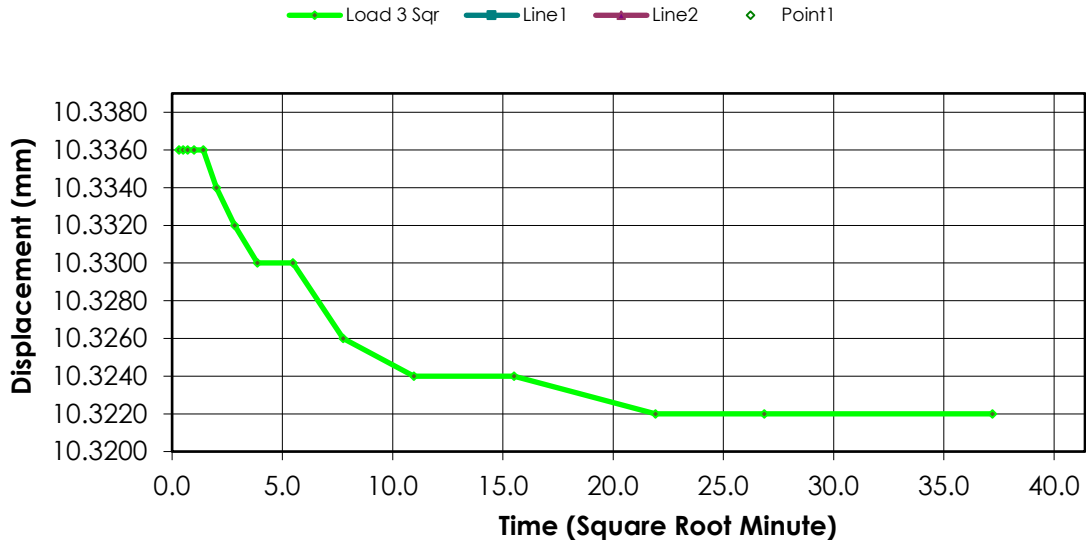
Remarks:

Sample Type: Undisturbed

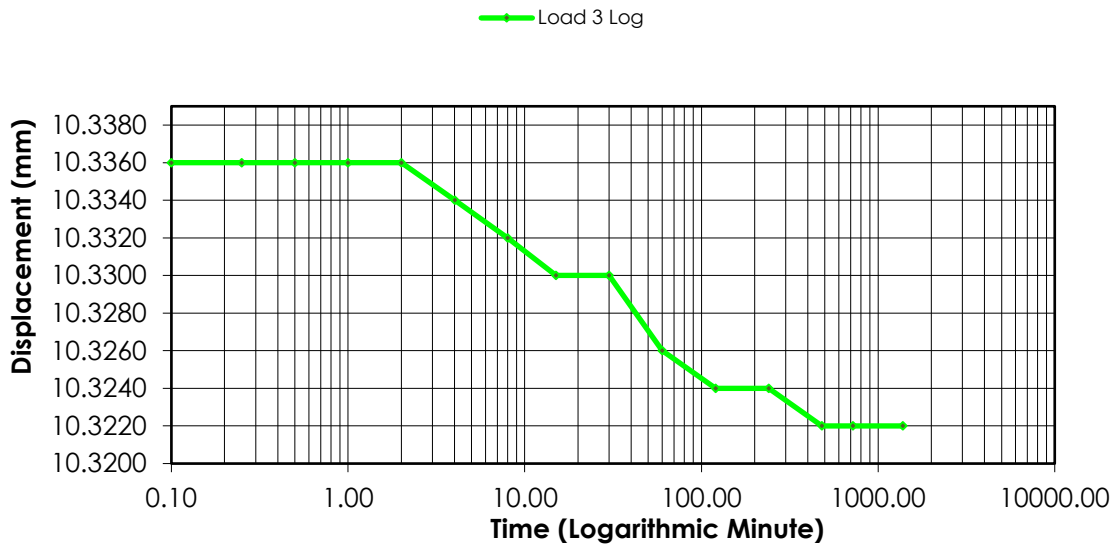
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	10.3420	-0.1960	-0.9627	0.6743
1	00:00:06	10.3360	-0.2220	-1.0904	0.6764
2	00:00:15	10.3360	-0.2220	-1.0904	0.6764
3	00:00:30	10.3360	-0.2220	-1.0904	0.6764
4	00:01:00	10.3360	-0.2220	-1.0904	0.6764
5	00:02:00	10.3360	-0.2220	-1.0904	0.6764
6	00:04:01	10.3340	-0.2200	-1.0806	0.6762
7	00:08:01	10.3320	-0.2180	-1.0707	0.6761
8	00:15:01	10.3300	-0.2160	-1.0609	0.6759
9	00:30:03	10.3300	-0.2160	-1.0609	0.6759
10	01:00:05	10.3260	-0.2120	-1.0413	0.6756
11	02:00:11	10.3240	-0.2100	-1.0314	0.6754
12	04:00:21	10.3240	-0.2100	-1.0314	0.6754
13	08:00:42	10.3220	-0.2080	-1.0216	0.6752
14	12:01:04	10.3220	-0.2080	-1.0216	0.6752
15	23:03:48	10.3220	-0.2080	-1.0216	0.6752

Consolidation Test Results (Sequence 3) Load 20.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 4) Load 40.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 30-Oct-18

Test Number:

Sample Number: GL2 ST17

Soil Description:

Boring Number:

Clay (Cl), Trace Sand, Trace Gravel

Depth: 8.25-8.7m

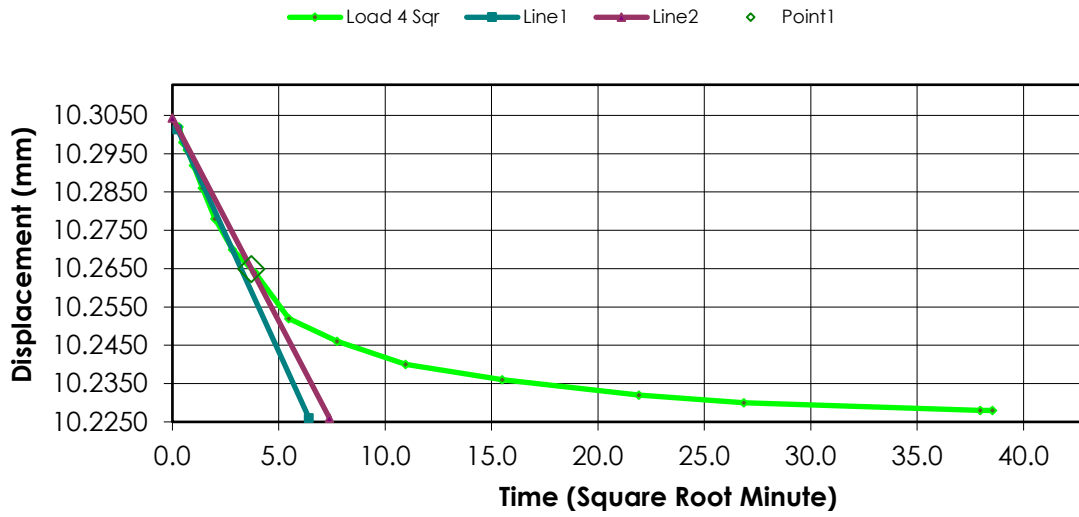
Remarks:

Sample Type: Undisturbed

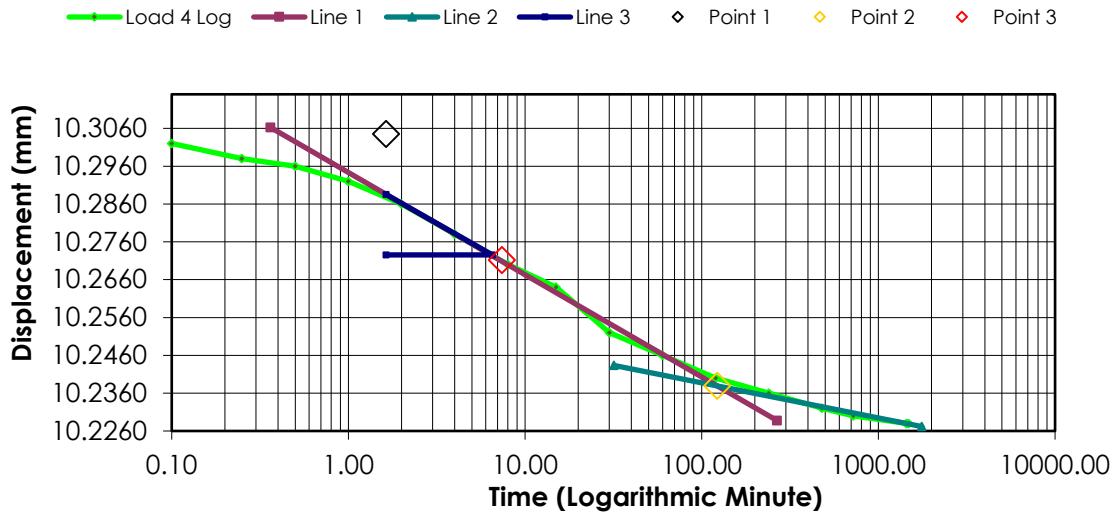
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	10.3220	-0.2080	-1.0216	0.6752
1	00:00:06	10.3020	-0.2080	-1.0216	0.6752
2	00:00:15	10.2980	-0.2040	-1.0020	0.6749
3	00:00:30	10.2960	-0.2020	-0.9921	0.6748
4	00:01:00	10.2920	-0.1980	-0.9725	0.6744
5	00:02:00	10.2860	-0.1920	-0.9430	0.6739
6	00:04:00	10.2780	-0.1840	-0.9037	0.6733
7	00:08:01	10.2700	-0.1760	-0.8644	0.6726
8	00:15:01	10.2640	-0.1700	-0.8350	0.6721
9	00:30:02	10.2520	-0.1580	-0.7760	0.6712
10	01:00:05	10.2460	-0.1520	-0.7466	0.6707
11	02:00:10	10.2400	-0.1460	-0.7171	0.6702
12	04:00:21	10.2360	-0.1420	-0.6974	0.6699
13	08:00:42	10.2320	-0.1380	-0.6778	0.6695
14	12:01:03	10.2300	-0.1360	-0.6680	0.6694
15	24:02:07	10.2280	-0.1340	-0.6582	0.6692
16	24:46:08	10.2280	-0.1340	-0.6582	0.6692

Consolidation Test Results (Sequence 4) Load 40.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 5) Load 80.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 30-Oct-18

Test Number:

Sample Number: GL2 ST17

Soil Description:

Boring Number:

Clay (Cl), Trace Sand, Trace Gravel

Depth: 8.25-8.7m

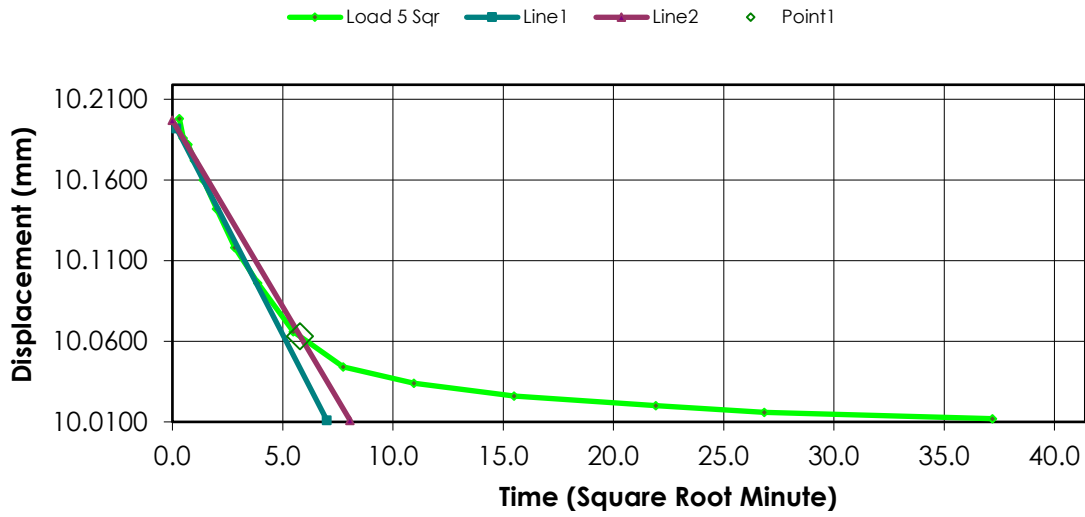
Remarks:

Sample Type: Undisturbed

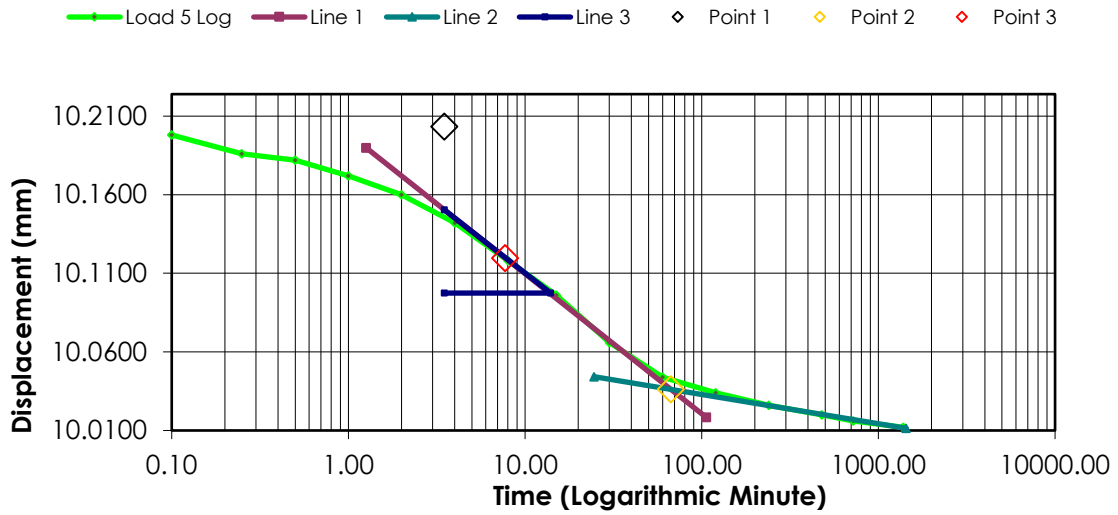
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	10.2280	-0.1340	-0.6582	0.6692
1	00:00:06	10.1980	-0.1340	-0.6582	0.6692
2	00:00:15	10.1860	-0.1220	-0.5992	0.6682
3	00:00:30	10.1820	-0.1180	-0.5796	0.6679
4	00:01:00	10.1720	-0.1080	-0.5305	0.6671
5	00:02:00	10.1600	-0.0960	-0.4715	0.6661
6	00:04:01	10.1420	-0.0780	-0.3831	0.6647
7	00:08:01	10.1180	-0.0540	-0.2652	0.6627
8	00:15:02	10.0960	-0.0320	-0.1572	0.6609
9	00:30:03	10.0660	-0.0020	-0.0098	0.6585
10	01:00:06	10.0440	0.0200	0.0982	0.6567
11	02:00:11	10.0340	0.0300	0.1473	0.6559
12	04:00:20	10.0260	0.0380	0.1866	0.6552
13	08:00:41	10.0200	0.0440	0.2161	0.6547
14	12:01:02	10.0160	0.0480	0.2358	0.6544
15	23:03:24	10.0120	0.0520	0.2554	0.6541

Consolidation Test Results (Sequence 5) Load 80.000 kPa

Consolidation Graph (Square root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 6) Load 160.000 kPa

Project: SR1 2018 Investigation
Location:
Job Number:

Project Number: 110773396

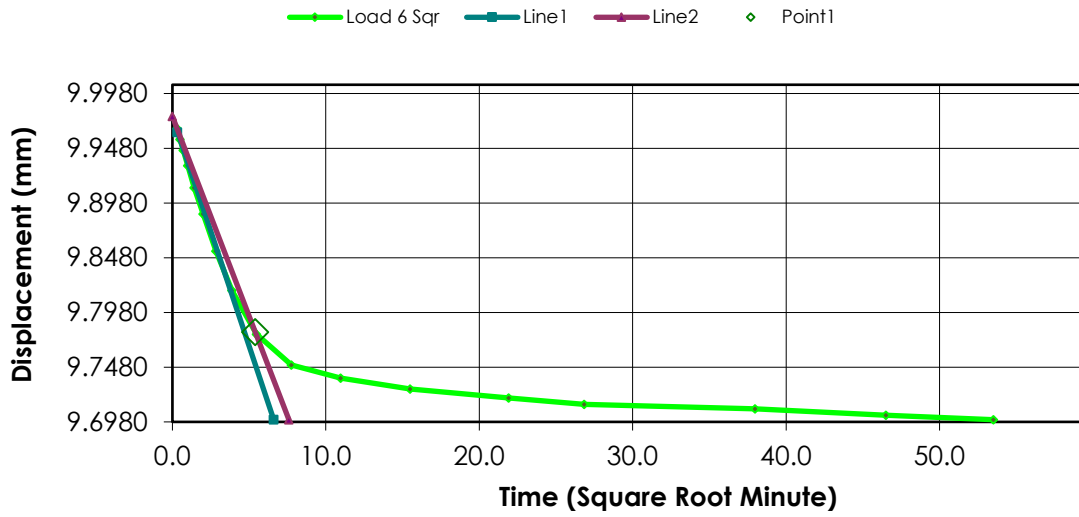
Test Date: 30-Oct-18
Test Number:

Sample Number: GL2 ST17 **Soil Description:**
Boring Number: Clay (Cl), Trace Sand, Trace Gravel
Depth: 8.25-8.7m **Remarks:**
Sample Type: Undisturbed

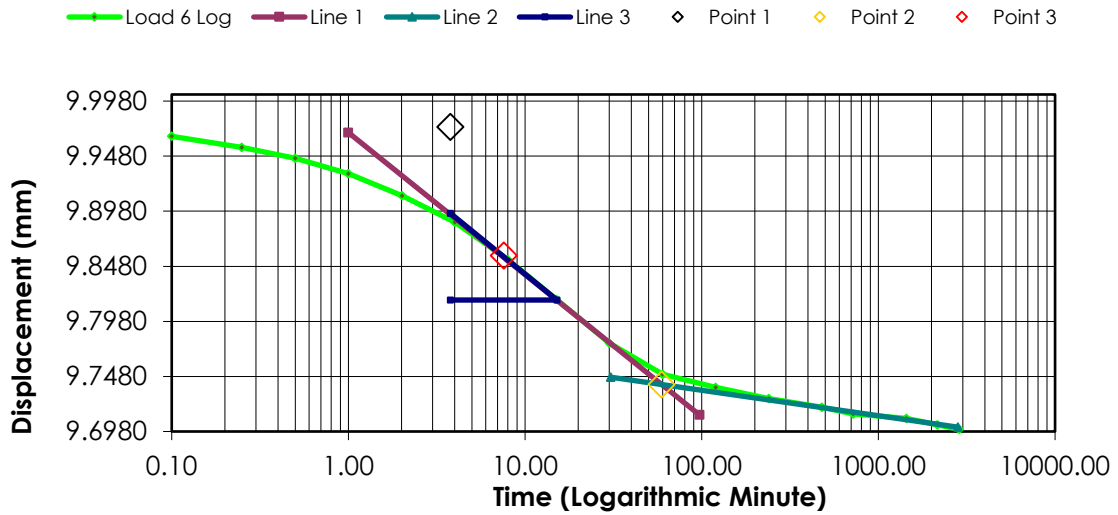
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	10.0120	0.0520	0.2554	0.6541
1	00:00:06	9.9660	0.0680	0.3340	0.6528
2	00:00:15	9.9560	0.0780	0.3831	0.6519
3	00:00:30	9.9460	0.0880	0.4322	0.6511
4	00:01:00	9.9320	0.1020	0.5010	0.6500
5	00:02:01	9.9120	0.1220	0.5992	0.6484
6	00:04:01	9.8880	0.1460	0.7171	0.6464
7	00:08:01	9.8540	0.1800	0.8841	0.6436
8	00:15:02	9.8180	0.2160	1.0609	0.6407
9	00:30:03	9.7780	0.2560	1.2574	0.6375
10	01:00:06	9.7500	0.2840	1.3949	0.6352
11	02:00:11	9.7380	0.2960	1.4538	0.6342
12	04:00:21	9.7280	0.3060	1.5029	0.6334
13	08:00:43	9.7200	0.3140	1.5422	0.6327
14	12:01:04	9.7140	0.3200	1.5717	0.6322
15	24:02:07	9.7100	0.3240	1.5914	0.6319
16	36:03:11	9.7040	0.3300	1.6208	0.6314
17	47:45:12	9.7000	0.3340	1.6405	0.6311

Consolidation Test Results (Sequence 6) Load 160.000 kPa

Consolidation Graph (Square-root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 7) Load 320.000 kPa

Project: SR1 2018 Investigation
Location:
Job Number:

Project Number: 110773396

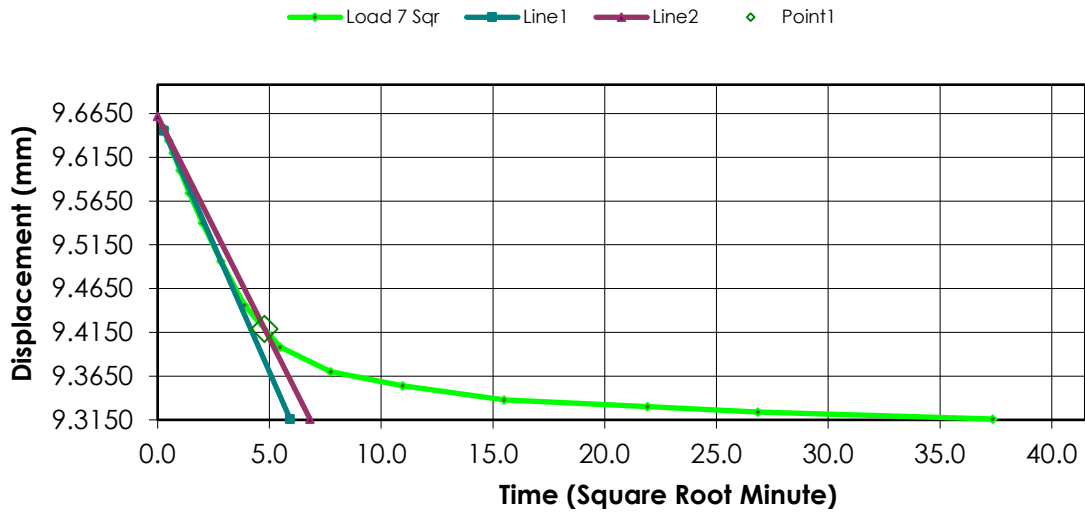
Test Date: 30-Oct-18
Test Number:

Sample Number: GL2 ST17 **Soil Description:**
Boring Number: Clay (Cl), Trace Sand, Trace Gravel
Depth: 8.25-8.7m **Remarks:**
Sample Type: Undisturbed

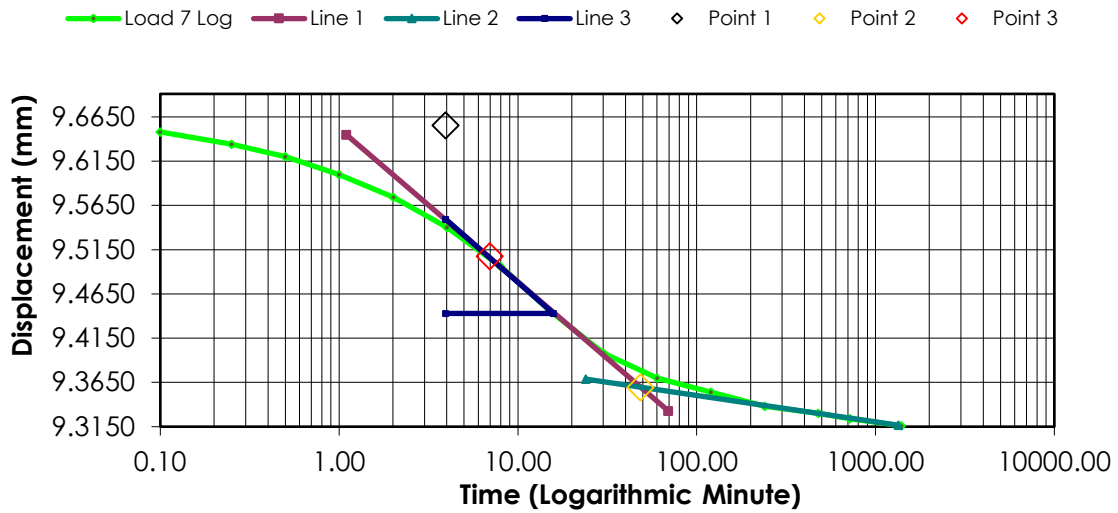
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	9.7000	0.3340	1.6405	0.6311
1	00:00:06	9.6480	0.3540	1.7387	0.6295
2	00:00:15	9.6340	0.3680	1.8075	0.6283
3	00:00:30	9.6200	0.3820	1.8762	0.6272
4	00:01:00	9.6000	0.4020	1.9745	0.6256
5	00:02:01	9.5740	0.4280	2.1022	0.6234
6	00:04:01	9.5400	0.4620	2.2692	0.6207
7	00:08:01	9.4960	0.5060	2.4853	0.6171
8	00:15:02	9.4460	0.5560	2.7308	0.6130
9	00:30:03	9.3980	0.6040	2.9666	0.6091
10	01:00:06	9.3700	0.6320	3.1041	0.6068
11	02:00:11	9.3540	0.6480	3.1827	0.6055
12	04:00:22	9.3380	0.6640	3.2613	0.6042
13	08:00:43	9.3300	0.6720	3.3006	0.6036
14	12:01:04	9.3240	0.6780	3.3301	0.6031
15	23:16:42	9.3160	0.6860	3.3694	0.6024

Consolidation Test Results (Sequence 7) Load 320.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 8) Load 640.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 30-Oct-18

Test Number:

Sample Number: GL2 ST17

Soil Description:

Boring Number:

Clay (Cl), Trace Sand, Trace Gravel

Depth: 8.25-8.7m

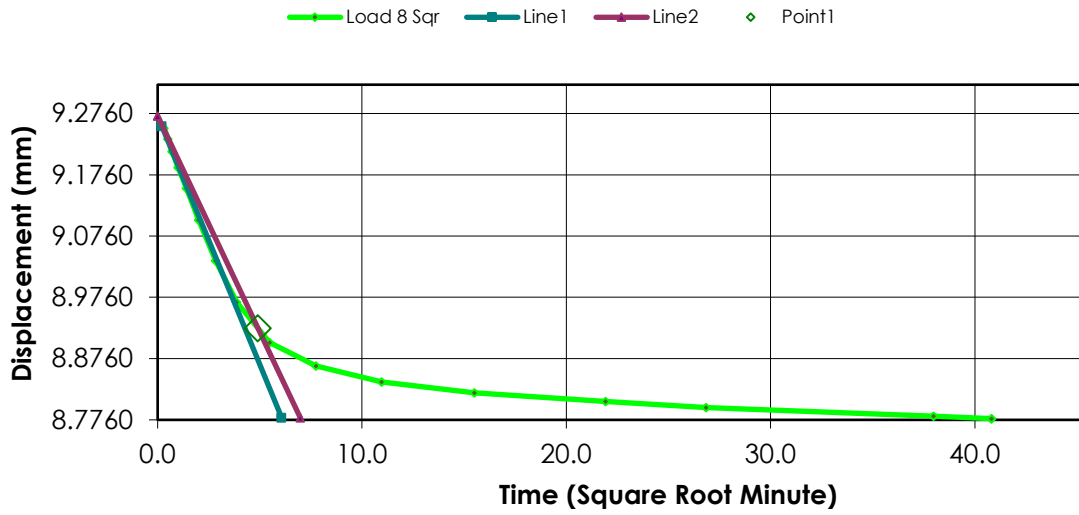
Remarks:

Sample Type: Undisturbed

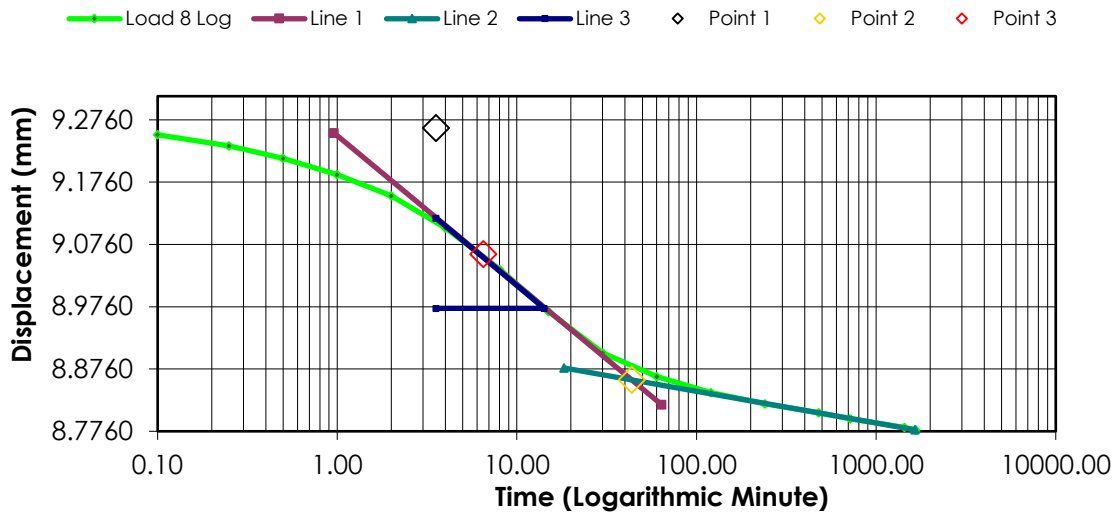
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	9.3160	0.6860	3.3694	0.6024
1	00:00:06	9.2520	0.7100	3.4872	0.6005
2	00:00:15	9.2340	0.7280	3.5756	0.5990
3	00:00:30	9.2140	0.7480	3.6739	0.5974
4	00:01:00	9.1880	0.7740	3.8016	0.5953
5	00:02:00	9.1540	0.8080	3.9686	0.5925
6	00:04:01	9.1020	0.8600	4.2240	0.5883
7	00:08:01	9.0360	0.9260	4.5481	0.5829
8	00:15:01	8.9680	0.9940	4.8821	0.5773
9	00:30:03	8.9020	1.0600	5.2063	0.5720
10	01:00:05	8.8640	1.0980	5.3929	0.5689
11	02:00:10	8.8380	1.1240	5.5206	0.5668
12	04:00:21	8.8200	1.1420	5.6090	0.5653
13	08:00:42	8.8060	1.1560	5.6778	0.5641
14	12:01:04	8.7960	1.1660	5.7269	0.5633
15	24:02:07	8.7820	1.1800	5.7957	0.5622
16	27:45:28	8.7780	1.1840	5.8153	0.5619
17	27:45:40	8.7780	1.1840	5.8153	0.5619

Consolidation Test Results (Sequence 8) Load 640.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 9) Rebound 320.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 30-Oct-18

Test Number:

Sample Number: GL2 ST17

Soil Description:

Boring Number:

Clay (Cl), Trace Sand, Trace Gravel

Depth: 8.25-8.7m

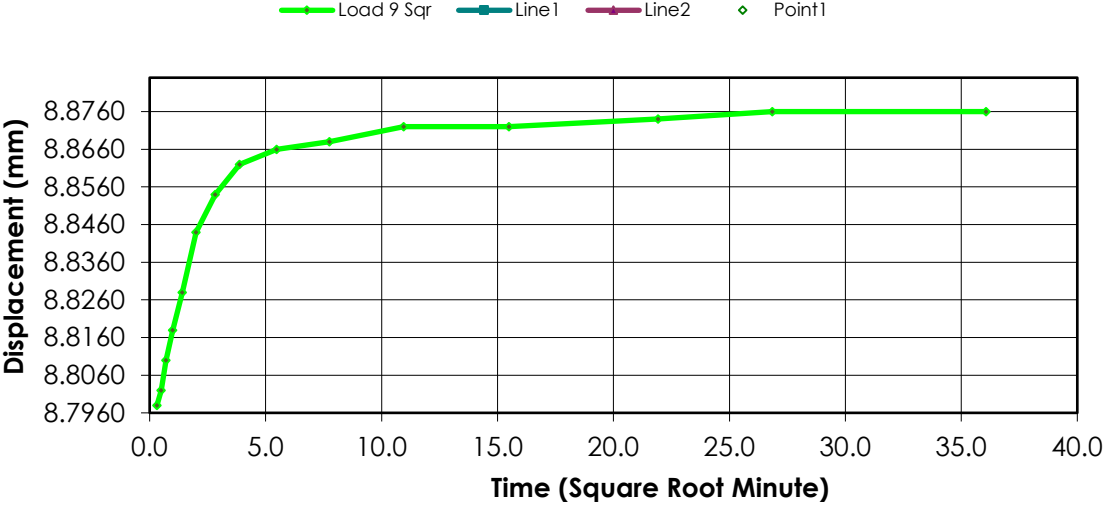
Remarks:

Sample Type: Undisturbed

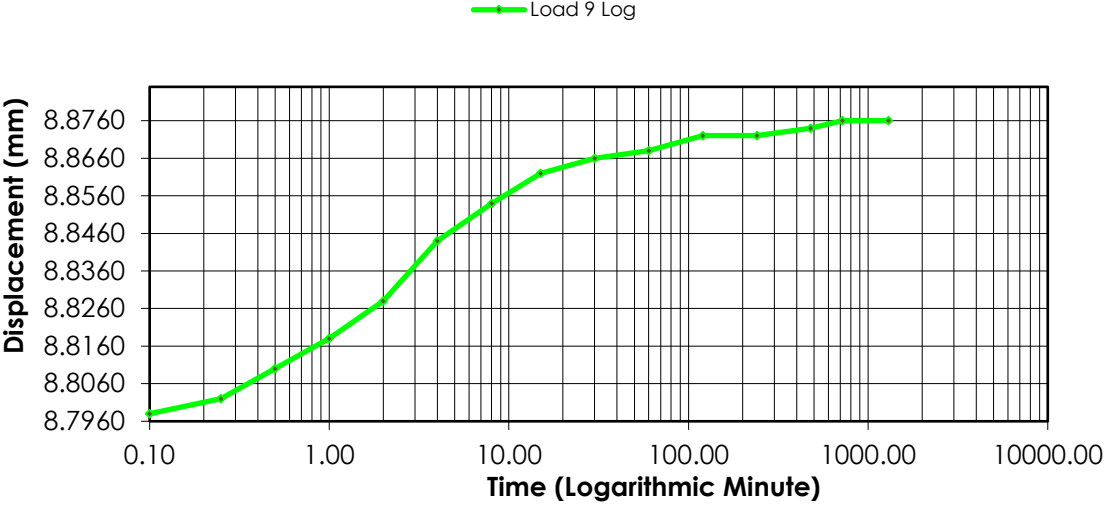
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.7780	1.1840	5.8153	0.5619
1	00:00:06	8.7980	1.1780	5.7859	0.5624
2	00:00:15	8.8020	1.1740	5.7662	0.5627
3	00:00:30	8.8100	1.1660	5.7269	0.5633
4	00:01:00	8.8180	1.1580	5.6876	0.5640
5	00:02:00	8.8280	1.1480	5.6385	0.5648
6	00:04:00	8.8440	1.1320	5.5599	0.5661
7	00:08:01	8.8540	1.1220	5.5108	0.5669
8	00:15:01	8.8620	1.1140	5.4715	0.5676
9	00:30:02	8.8660	1.1100	5.4519	0.5679
10	01:00:05	8.8680	1.1080	5.4420	0.5681
11	02:00:10	8.8720	1.1040	5.4224	0.5684
12	04:00:21	8.8720	1.1040	5.4224	0.5684
13	08:00:42	8.8740	1.1020	5.4126	0.5685
14	12:01:03	8.8760	1.1000	5.4028	0.5687
15	21:40:56	8.8760	1.1000	5.4028	0.5687

Consolidation Test Results (Sequence 9) Rebound 320.000 kPa

Consolidation Graph (Square-root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 10) Rebound 160.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 30-Oct-18

Test Number:

Sample Number: GL2 ST17

Soil Description:

Boring Number:

Clay (Cl), Trace Sand, Trace Gravel

Depth: 8.25-8.7m

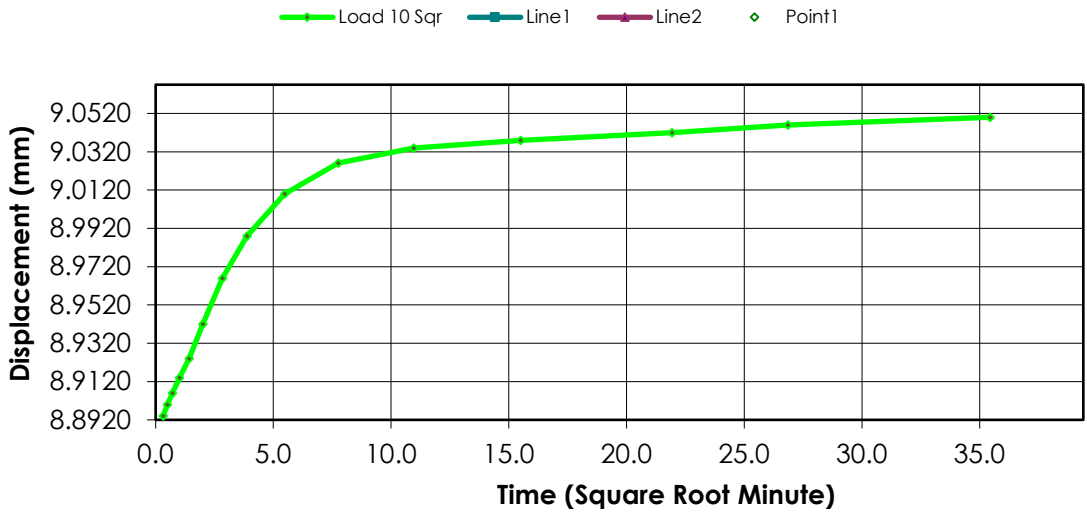
Remarks:

Sample Type: Undisturbed

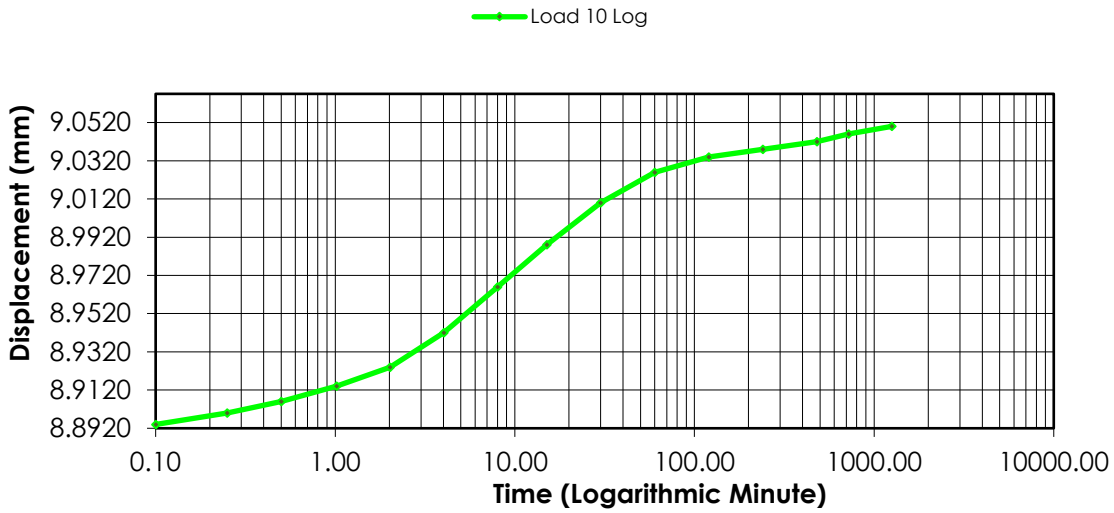
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.8760	1.1000	5.4028	0.5687
1	00:00:06	8.8940	1.0960	5.3831	0.5690
2	00:00:15	8.9000	1.0900	5.3536	0.5695
3	00:00:30	8.9060	1.0840	5.3242	0.5700
4	00:01:01	8.9140	1.0760	5.2849	0.5707
5	00:02:01	8.9240	1.0660	5.2358	0.5715
6	00:04:01	8.9420	1.0480	5.1473	0.5729
7	00:08:01	8.9660	1.0240	5.0295	0.5749
8	00:15:02	8.9880	1.0020	4.9214	0.5767
9	00:30:03	9.0100	0.9800	4.8134	0.5785
10	01:00:06	9.0260	0.9640	4.7348	0.5798
11	02:00:11	9.0340	0.9560	4.6955	0.5804
12	04:00:21	9.0380	0.9520	4.6758	0.5808
13	08:00:43	9.0420	0.9480	4.6562	0.5811
14	12:01:04	9.0460	0.9440	4.6365	0.5814
15	20:56:10	9.0500	0.9400	4.6169	0.5817

Consolidation Test Results
(Sequence 10) Rebound 160.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 11) Load 320.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 30-Oct-18

Test Number:

Sample Number: GL2 ST17

Soil Description:

Boring Number:

Clay (Cl), Trace Sand, Trace Gravel

Depth: 8.25-8.7m

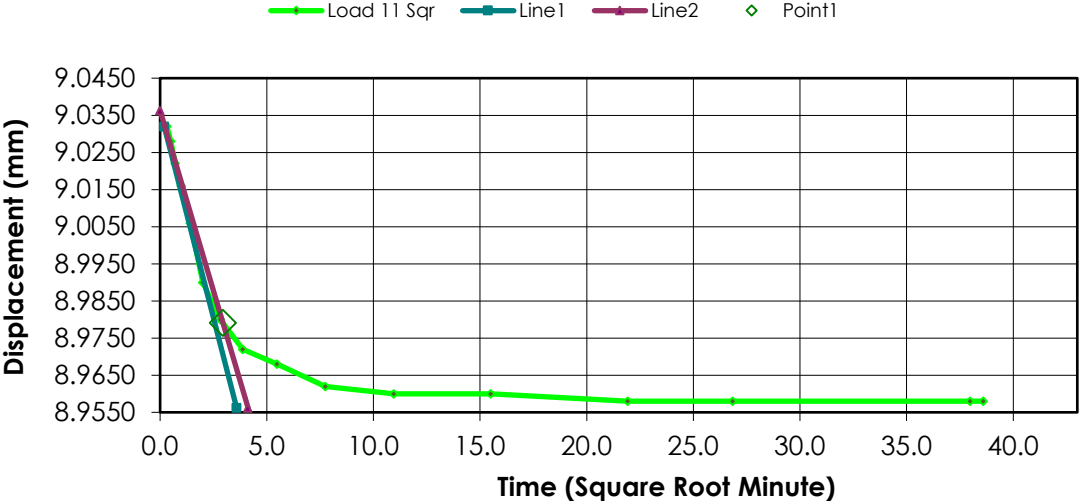
Remarks:

Sample Type: Undisturbed

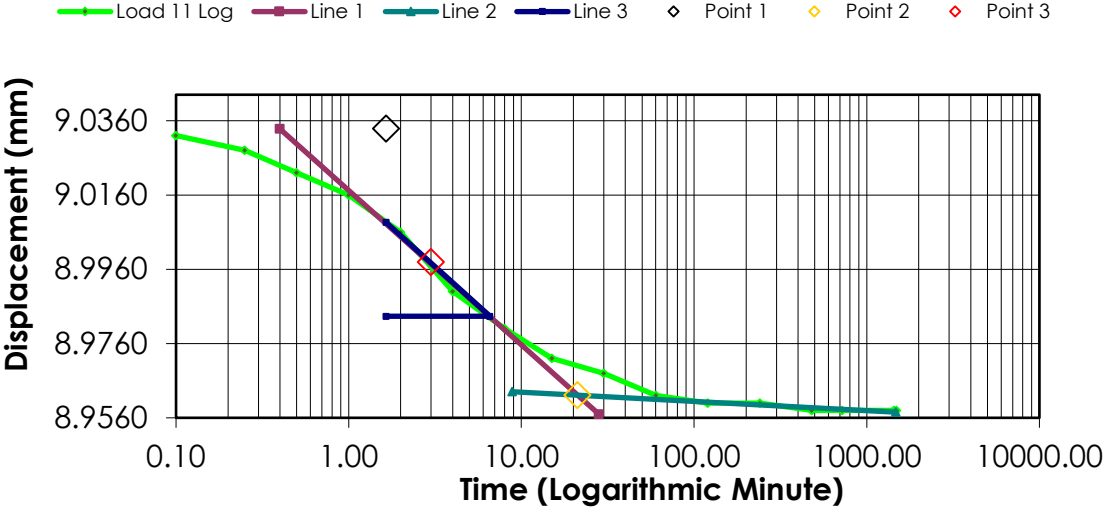
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	9.0500	0.9400	4.6169	0.5817
1	00:00:06	9.0320	0.9460	4.6464	0.5813
2	00:00:15	9.0280	0.9500	4.6660	0.5809
3	00:00:30	9.0220	0.9560	4.6955	0.5804
4	00:01:00	9.0160	0.9620	4.7250	0.5799
5	00:02:00	9.0060	0.9720	4.7741	0.5791
6	00:04:00	8.9900	0.9880	4.8527	0.5778
7	00:08:00	8.9800	0.9980	4.9018	0.5770
8	00:15:01	8.9720	1.0060	4.9411	0.5764
9	00:30:02	8.9680	1.0100	4.9607	0.5760
10	01:00:04	8.9620	1.0160	4.9902	0.5756
11	02:00:09	8.9600	1.0180	5.0000	0.5754
12	04:00:20	8.9600	1.0180	5.0000	0.5754
13	08:00:41	8.9580	1.0200	5.0098	0.5752
14	12:01:02	8.9580	1.0200	5.0098	0.5752
15	24:02:06	8.9580	1.0200	5.0098	0.5752
16	24:49:21	8.9580	1.0200	5.0098	0.5752

Consolidation Test Results (Sequence 11) Load 320.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 12) Load 640.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 30-Oct-18

Test Number:

Sample Number: GL2 ST17

Soil Description:

Boring Number:

Clay (Cl), Trace Sand, Trace Gravel

Depth: 8.25-8.7m

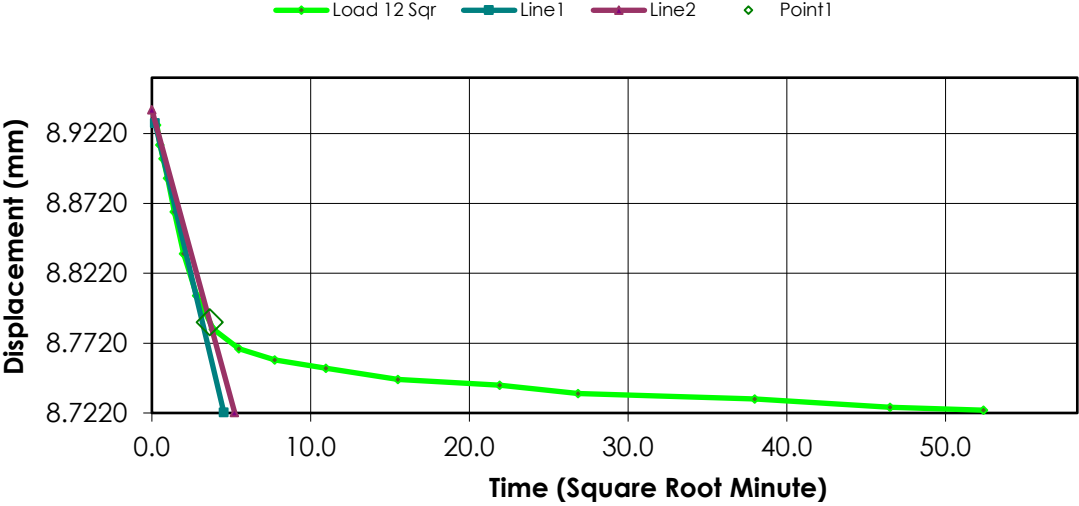
Remarks:

Sample Type: Undisturbed

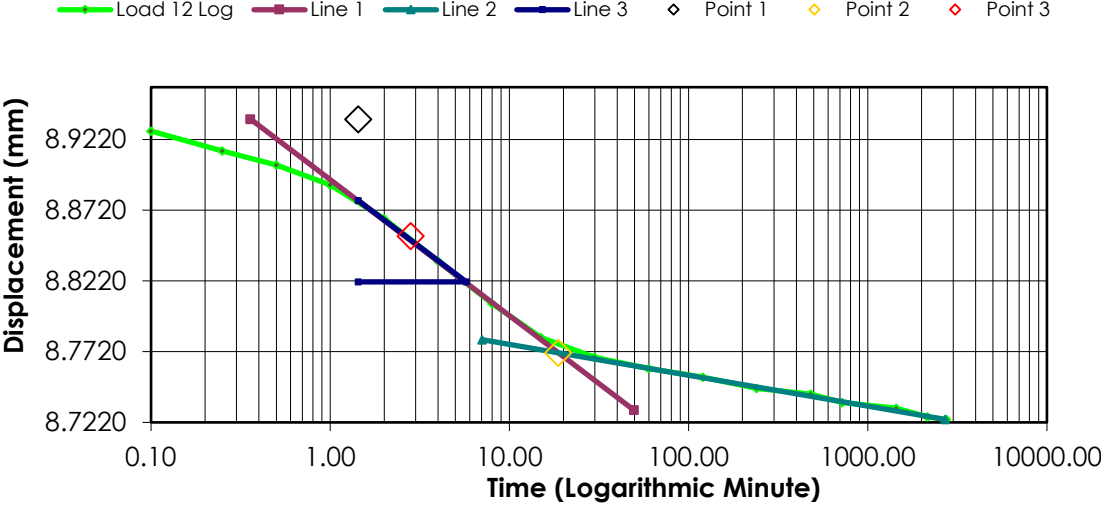
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.9580	1.0200	5.0098	0.5752
1	00:00:06	8.9280	1.0320	5.0688	0.5742
2	00:00:15	8.9140	1.0460	5.1375	0.5731
3	00:00:30	8.9040	1.0560	5.1866	0.5723
4	00:01:00	8.8900	1.0700	5.2554	0.5712
5	00:02:00	8.8660	1.0940	5.3733	0.5692
6	00:04:00	8.8360	1.1240	5.5206	0.5668
7	00:08:00	8.8060	1.1540	5.6680	0.5643
8	00:15:01	8.7820	1.1780	5.7859	0.5624
9	00:30:02	8.7680	1.1920	5.8546	0.5612
10	01:00:05	8.7600	1.2000	5.8939	0.5606
11	02:00:10	8.7540	1.2060	5.9234	0.5601
12	04:00:21	8.7460	1.2140	5.9627	0.5594
13	08:00:42	8.7420	1.2180	5.9823	0.5591
14	12:01:03	8.7360	1.2240	6.0118	0.5586
15	24:02:07	8.7320	1.2280	6.0314	0.5583
16	36:03:10	8.7260	1.2340	6.0609	0.5578
17	45:46:30	8.7240	1.2360	6.0707	0.5576

Consolidation Test Results (Sequence 12) Load 640.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 13) Load 1280.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 30-Oct-18

Test Number:

Sample Number: GL2 ST17

Soil Description:

Boring Number:

Clay (Cl), Trace Sand, Trace Gravel

Depth: 8.25-8.7m

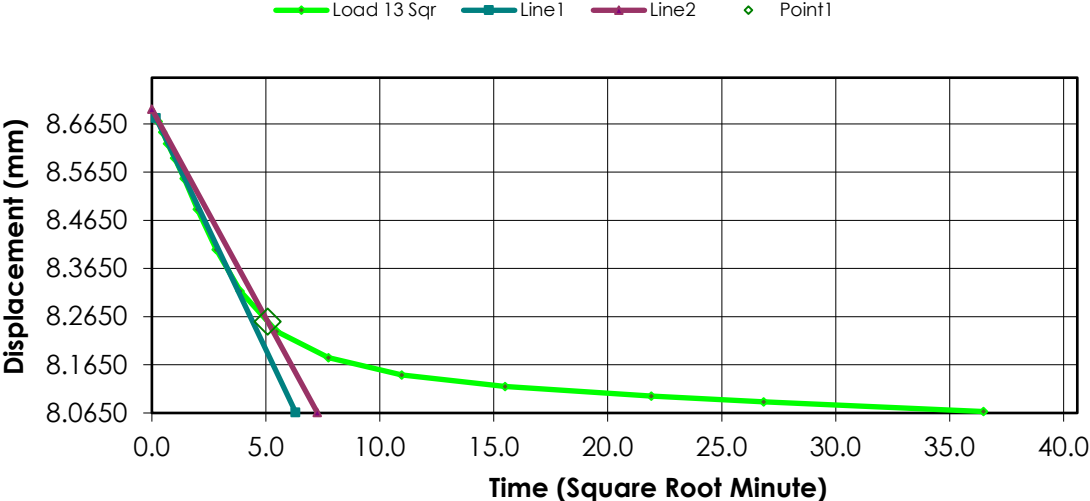
Remarks:

Sample Type: Undisturbed

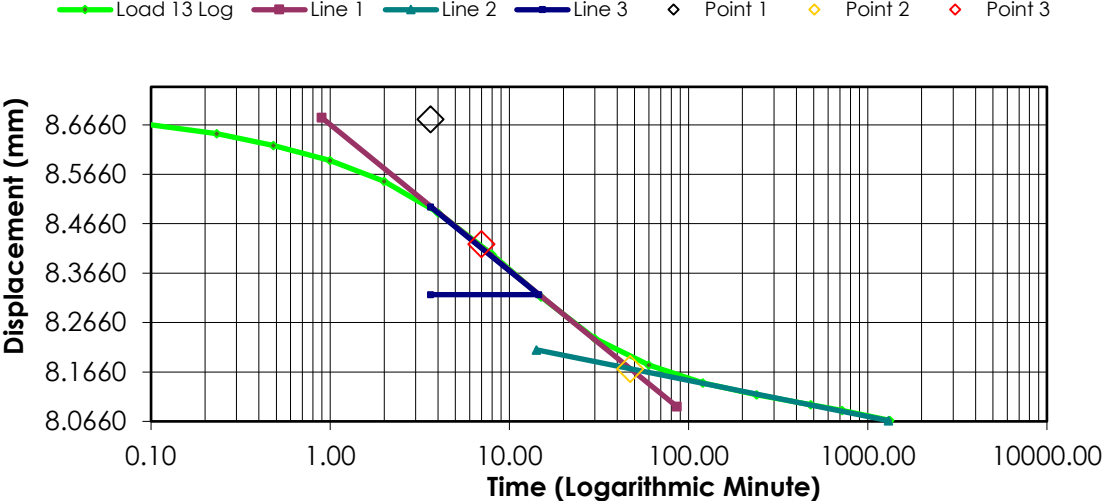
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.7240	1.2360	6.0707	0.5576
1	00:00:05	8.6700	1.2440	6.1100	0.5570
2	00:00:14	8.6480	1.2660	6.2181	0.5552
3	00:00:29	8.6240	1.2900	6.3360	0.5532
4	00:01:00	8.5940	1.3200	6.4833	0.5508
5	00:02:00	8.5520	1.3620	6.6896	0.5474
6	00:04:00	8.4880	1.4260	7.0039	0.5422
7	00:08:00	8.4040	1.5100	7.4165	0.5353
8	00:15:01	8.3180	1.5960	7.8389	0.5283
9	00:30:02	8.2340	1.6800	8.2515	0.5215
10	01:00:05	8.1800	1.7340	8.5167	0.5171
11	02:00:10	8.1440	1.7700	8.6935	0.5141
12	04:00:20	8.1200	1.7940	8.8114	0.5122
13	08:00:41	8.1000	1.8140	8.9096	0.5106
14	12:01:03	8.0880	1.8260	8.9686	0.5096
15	22:11:04	8.0680	1.8460	9.0668	0.5079

Consolidation Test Results (Sequence 13) Load 1280.000 kPa

Consolidation Graph (Square Root Time)



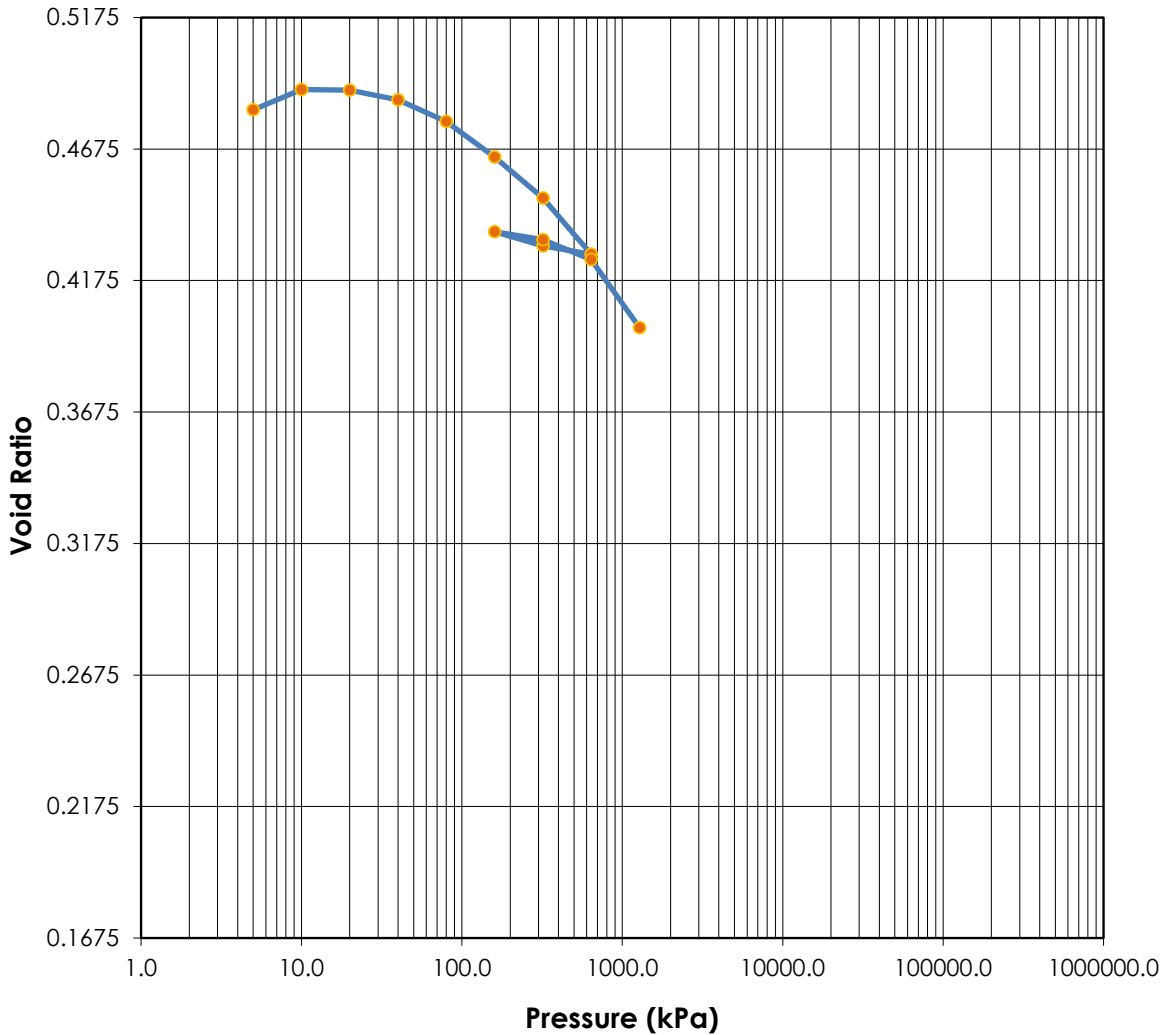
Consolidation Graph (Logarithmic Time)





Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876



	Before	After	Liquid Limits:	31	Test Date:	30-Oct-18
Moisture (%):	18.6	16.4	Plastic Limits:	15		
Dry Density (g/cm³):	1.784	1.900	Plasticity Index (%):	16		
Saturation (%):	100	100				
Void Ratio:	0.4815	0.3987	Specific Gravity:	2.65	Assumed	
Soil Description:	Clay (CI-CL), Some Sand, Trace Gravel					
Project Number:	110773396	Depth:	10.5-10.95m	Remarks:		
Sample Number:	GL2 ST22	Boring Number:				
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						

Tested By: E. Wahl

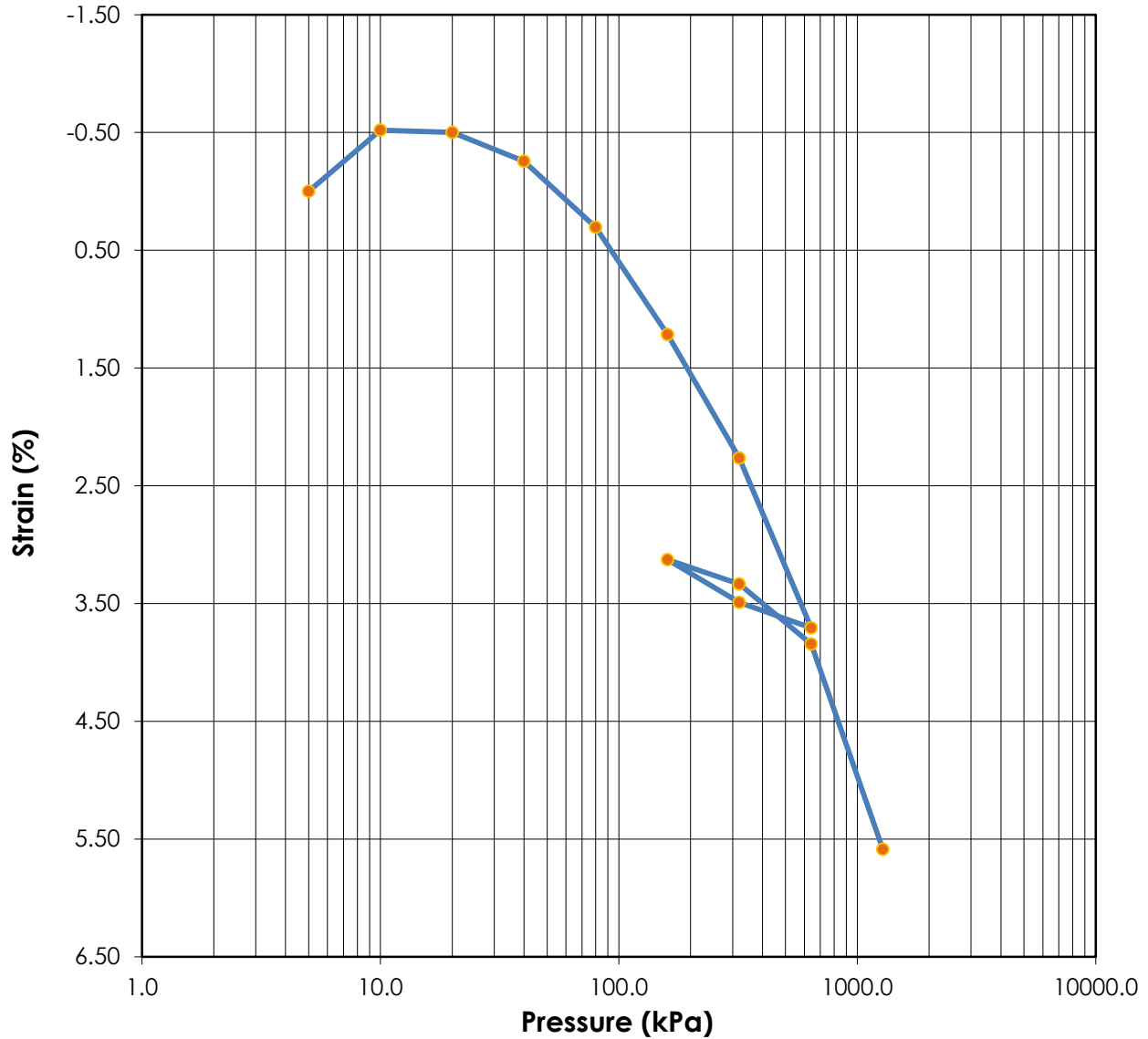
Reviewed By: C. Lamoureux

Reporting of these test results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request. The data presented above is for the sole use of the client stipulated above. Stantec is not responsible, nor can be held liable, for the use of this report by any other party, with or without the knowledge of Stantec.



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876

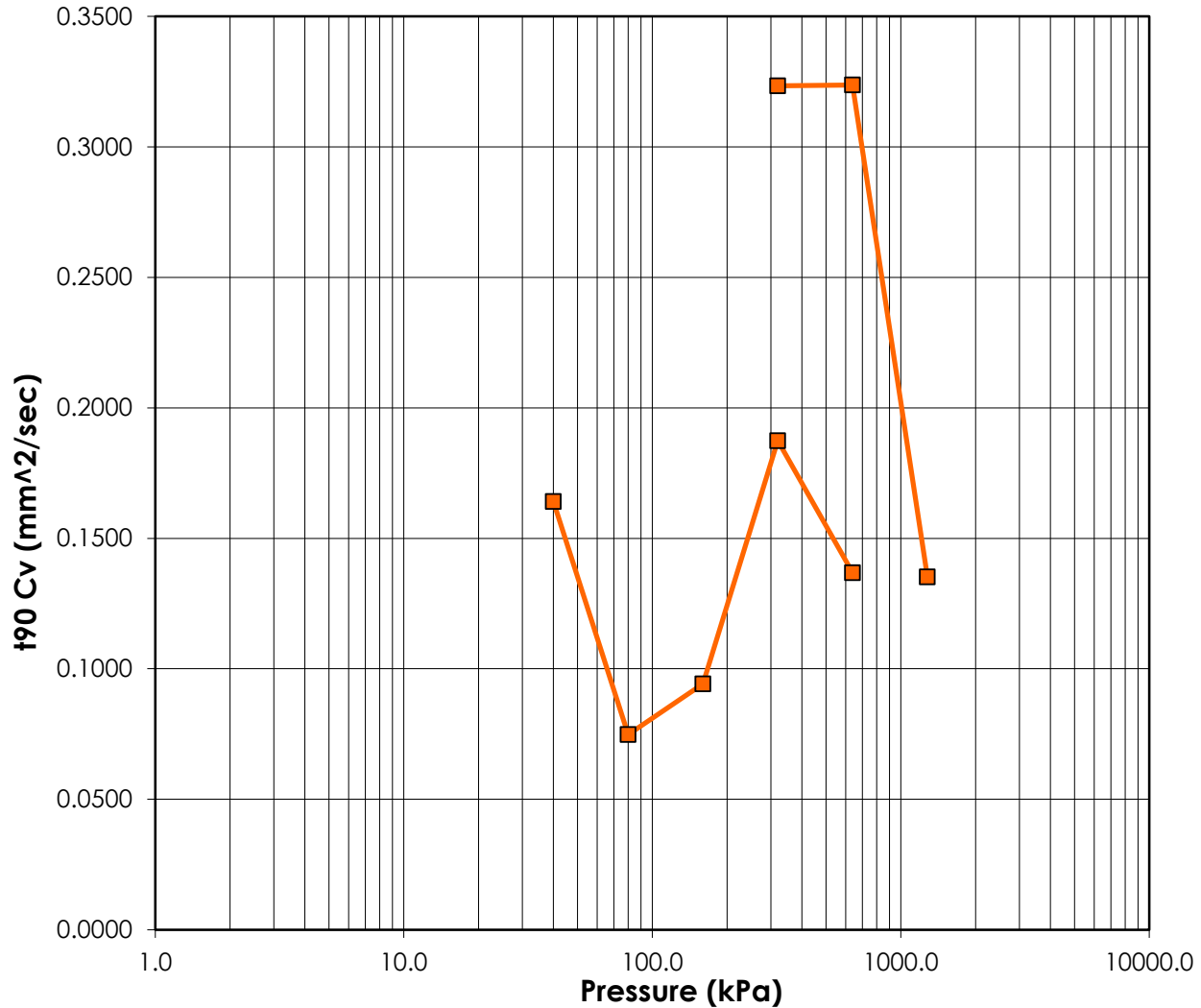


	Before	After	Liquid Limits:	31	Test Date:	30-Oct-18
Moisture (%):	18.6	16.4	Plastic Limits:	15		
Dry Density (g/cm3):	1.784	1.900	Plasticity Index (%):	16		
Saturation (%):	100	100	Specific Gravity:	2.65	Assumed	
Void Ratio:	0.4815	0.3987				
Sample Description:	Clay (Cl-CL), Some Sand, Trace Gravel					
Project Number:	110773396	Depth:	10.5-10.95m			
Sample Number:	GL2 ST22	Boring Number:				
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						
						Remarks:



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

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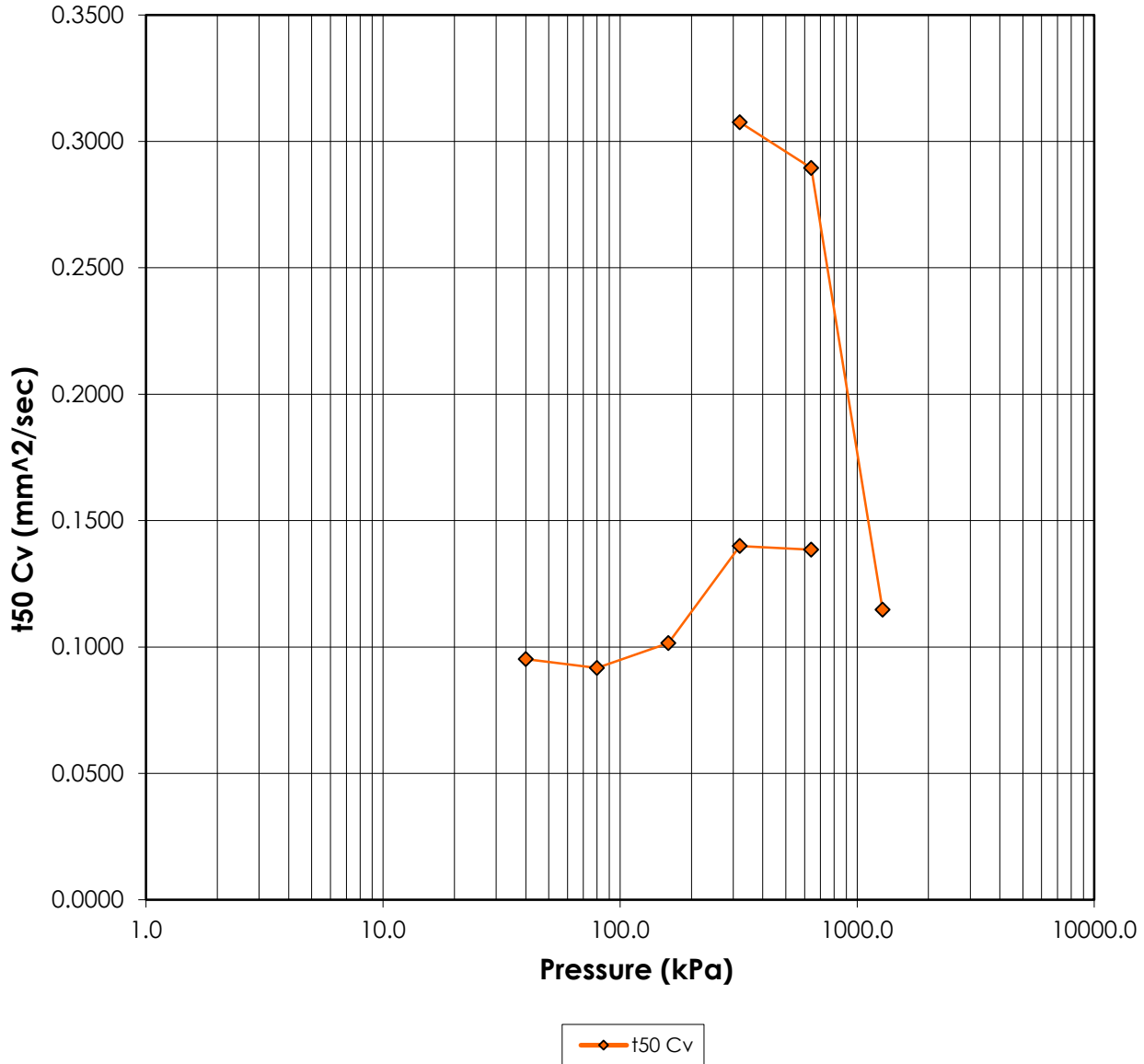
—■— $t_{90} C_v$

	Before	After	Liquid Limits:	31	Test Date:	30-Oct-18
Moisture (%):	18.6	16.4	Plastic Limits:	15		
Dry Density (g/cm³):	1.784	1.900	Plasticity Index (%):	16		
Saturation (%):	100	100				
Void Ratio:	0.4815	0.3987	Specific Gravity:	2.65	Assumed	
Soil Description:	Clay (CI-CL), Some Sand, Trace Gravel					
Project Number:	110773396		Depth:	10.5-10.95m	Remarks:	
Sample Number:	GL2 ST22		Boring Number:			
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

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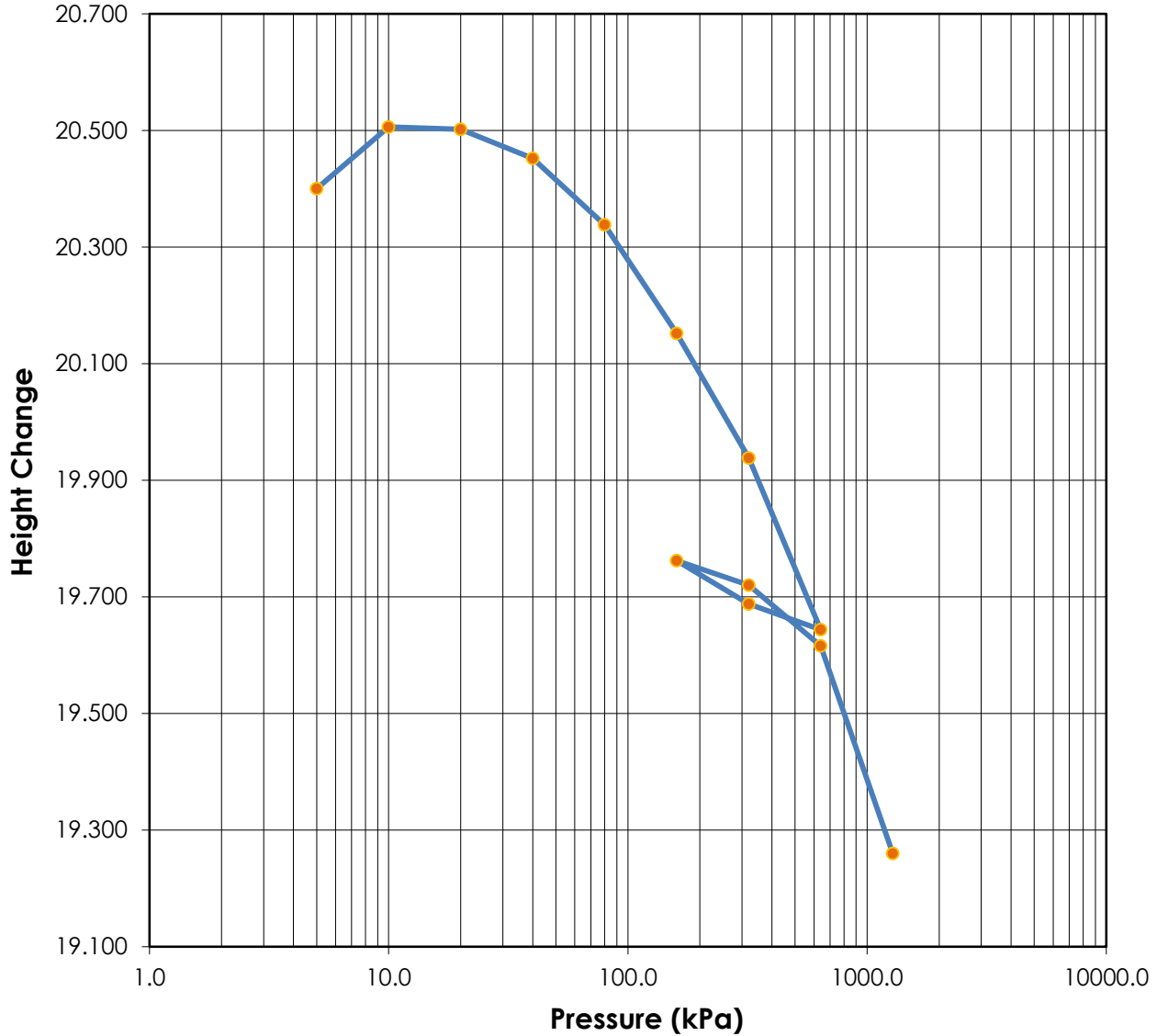


	Before	After	Liquid Limits:	31	Test Date:	30-Oct-18
Moisture (%):	18.6	16.4	Plastic Limits:	15		
Dry Density (g/cm3):	1.784	1.900	Plasticity Index (%):	16		
Saturation (%):	100	100				
Void Ratio:	0.4815	0.3987	Specific Gravity:	2.65	Assumed	
Soil Description:	Clay (CI-CL), Some Sand, Trace Gravel					
Project Number:	110773396	Depth:	10.5-10.95m			
Sample Number:	GL2 ST22	Boring Number:				
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						
						Remarks:



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876



	Before	After	Liquid Limits:	31	Test Date:	30-Oct-18
Moisture (%):	18.6	16.4	Plastic Limits:	15		
Dry Density (g/cm3):	1.784	1.900	Plasticity Index (%):	16		
Saturation (%):	100	100	Specific Gravity:	2.65	Assumed	
Void Ratio:	0.4815	0.3987				
Soil Description:	Clay (Cl-CL), Some Sand, Trace Gravel					
Project Number:	110773396	Depth:	10.5-10.95m			
Sample Number:	GL2 ST22	Boring Number:				
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						
			Remarks:			

Consolidation Test Results Summary

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Sample Number: GL2 ST22

Sample Description:

Boring Number:

Clay (CI-CL), Some Sand, Trace Gravel

Depth: 10.5-10.95m

Remarks:

Test Number:

Sample Type: Undisturbed

Test Date: 30-Oct-18

Index	Load Sequence (kPa)	Change in Height (mm)	Specimen Height (mm)	Height of Void (mm)	Vertical Strain (%)	Void Ratio	t90 Fitting Time (min)	t50 Fitting Time (min)	t90 Cv (mm ² /sec)	t50 Cv (mm ² /sec)
0	0.000	0.0000	20.4000	6.6384	0.00	0.4824	0.000	0.000	0.000	0.000
1	5.000	0.0000	20.4000	6.6384	0.00	0.4824	0.000	0.000	0.000	0.000
2	10.000	-0.1060	20.5060	6.7444	-0.52	0.4901	0.000	0.000	0.000	0.000
3	20.000	-0.1020	20.5020	6.7404	-0.50	0.4898	0.000	0.000	0.000	0.000
4	40.000	-0.0520	20.4520	6.6904	-0.25	0.4862	9.007	3.606	0.164	0.095
5	80.000	0.0620	20.3380	6.5764	0.30	0.4779	19.540	3.703	0.075	0.092
6	160.000	0.2480	20.1520	6.3904	1.22	0.4644	15.228	3.285	0.094	0.101
7	320.000	0.4620	19.9380	6.1764	2.26	0.4488	7.493	2.332	0.187	0.140
8	640.000	0.7560	19.6440	5.8824	3.71	0.4275	9.969	2.288	0.137	0.138
9	320.000	0.7120	19.6880	5.9264	3.49	0.4306	0.000	0.000	0.000	0.000
10	160.000	0.6380	19.7620	6.0004	3.13	0.4360	0.000	0.000	0.000	0.000
11	320.000	0.6800	19.7200	5.9584	3.33	0.4330	4.249	1.038	0.323	0.308
12	640.000	0.7840	19.6160	5.8544	3.84	0.4254	4.200	1.091	0.324	0.289
13	1280.000	1.1400	19.2600	5.4984	5.59	0.3995	9.694	2.653	0.135	0.115

Predicted value indicated with *

Consolidation Test Consolidation Specimen Information

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 30-Oct-18

Sample Number: GL2 ST22

Sample Description:

Boring Number:

Clay (CI-CL), Some Sand, Trace Gravel

Depth: 10.5-10.95m

Remarks:

Sample Type: Undisturbed

Test Number:

Liquid Limit: 31

Initial Void Ratio: 0.4815

Initial Height (mm): 20.40

Plastic Limit: 15

Plasticity Index (%): 16

Initial Diameter (mm): 63.54

Specific Gravity: 2.65

Weight of Ring (g): 207.72

Assumed

Parameters	Initial Specimen	Final Specimen
Moist Weight + Container (g)	102.75	138.91
Dry Soil + Container (g)	87.22	119.98
Weight of Container (g)	3.72	4.29
Moisture Content (%)	18.6	16.4
Void Ratio	0.4815	0.3987
Saturation (%)	100	100
Dry Density (g/cm ³)	1.784	1.900

Consolidation Test Results
(Sequence 1) Load 5.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 30-Oct-18

Test Number:

Sample Number: GL2 ST22

Soil Description:

Boring Number:

Clay (CI-CL), Some Sand, Trace Gravel

Depth: 10.5-10.95m

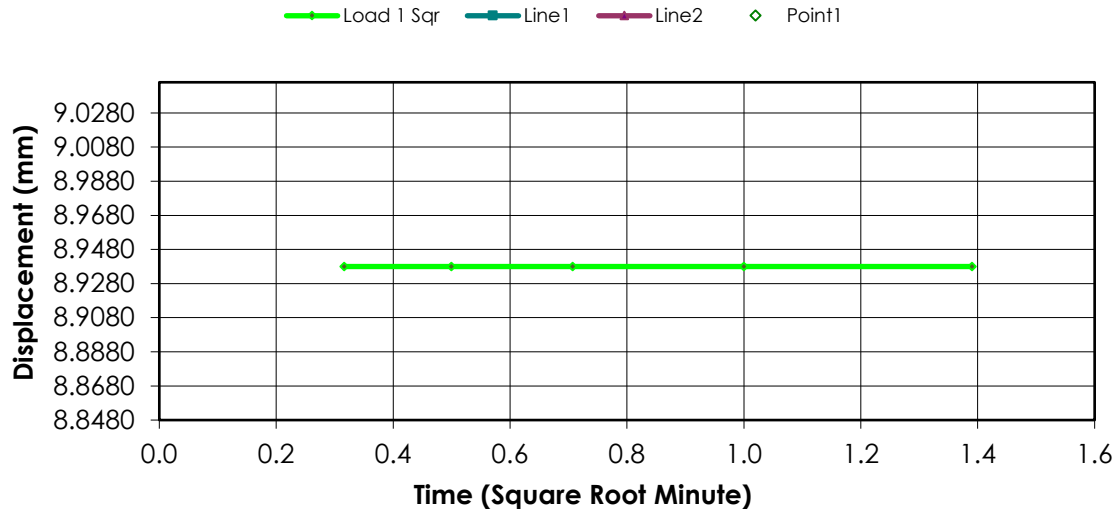
Remarks:

Sample Type: Undisturbed

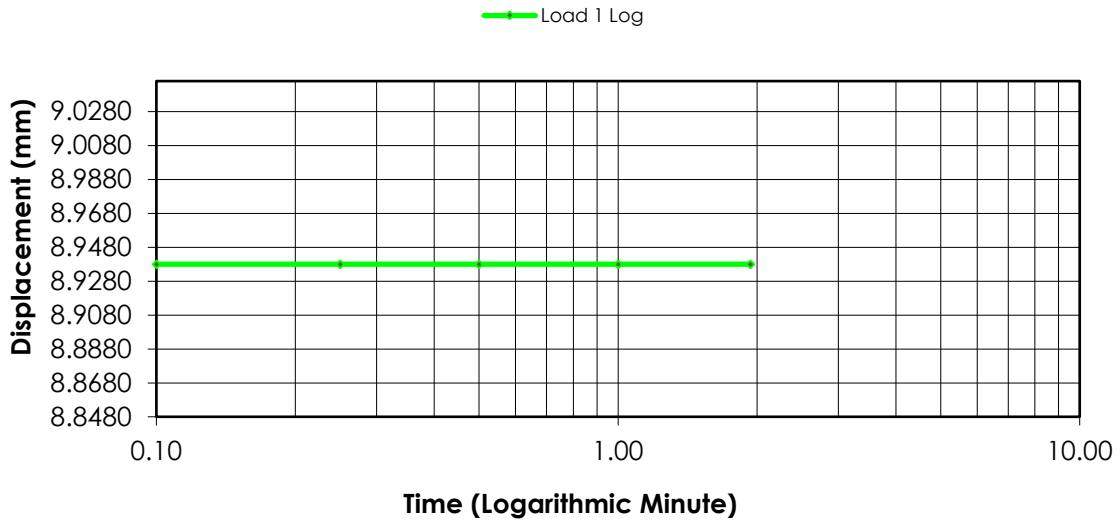
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.9380	0.0000	0.0000	0.4815
1	00:00:06	8.9380	0.0000	0.0000	0.4815
2	00:00:15	8.9380	0.0000	0.0000	0.4815
3	00:00:30	8.9380	0.0000	0.0000	0.4815
4	00:01:00	8.9380	0.0000	0.0000	0.4815
5	00:01:56	8.9380	0.0000	0.0000	0.4815

Consolidation Test Results (Sequence 1) Load 5.000 kPa

Consolidation Graph (Square root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 2) Load 10.000 kpa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 30-Oct-18

Test Number:

Sample Number: GL2 ST22

Soil Description:

Boring Number:

Clay (Cl-CL), Some Sand, Trace Gravel

Depth: 10.5-10.95m

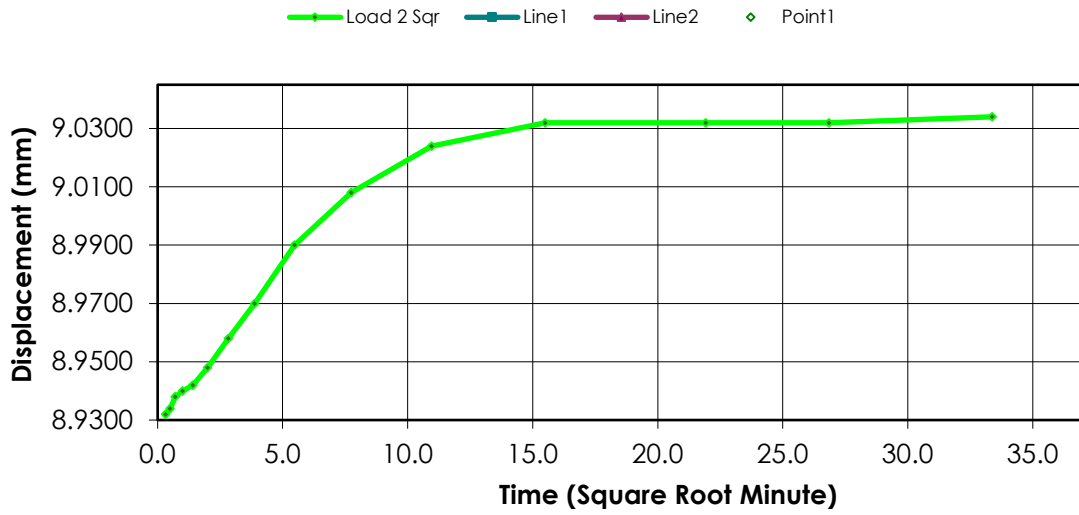
Remarks:

Sample Type: Undisturbed

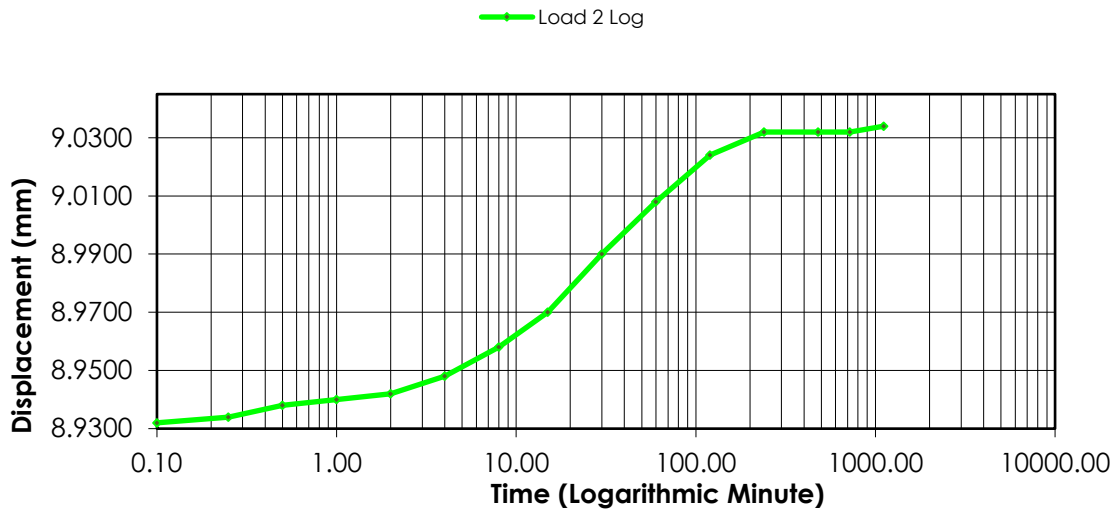
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.9380	0.0000	0.0000	0.4815
1	00:00:06	8.9320	-0.0040	-0.0196	0.4818
2	00:00:15	8.9340	-0.0060	-0.0294	0.4819
3	00:00:30	8.9380	-0.0100	-0.0490	0.4822
4	00:01:00	8.9400	-0.0120	-0.0588	0.4824
5	00:02:00	8.9420	-0.0140	-0.0686	0.4825
6	00:04:00	8.9480	-0.0200	-0.0980	0.4829
7	00:08:01	8.9580	-0.0300	-0.1471	0.4837
8	00:15:01	8.9700	-0.0420	-0.2059	0.4845
9	00:30:03	8.9900	-0.0620	-0.3039	0.4860
10	01:00:05	9.0080	-0.0800	-0.3922	0.4873
11	02:00:11	9.0240	-0.0960	-0.4706	0.4885
12	04:00:21	9.0320	-0.1040	-0.5098	0.4890
13	08:00:42	9.0320	-0.1040	-0.5098	0.4890
14	12:01:03	9.0320	-0.1040	-0.5098	0.4890
15	18:33:47	9.0340	-0.1060	-0.5196	0.4892

**Consolidation Test Results
(Sequence 2) Load 10.000 kpa**

Consolidation Graph (Square root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 3) Load 20.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 30-Oct-18

Test Number:

Sample Number: GL2 ST22

Soil Description:

Boring Number:

Clay (CI-CL), Some Sand, Trace Gravel

Depth: 10.5-10.95m

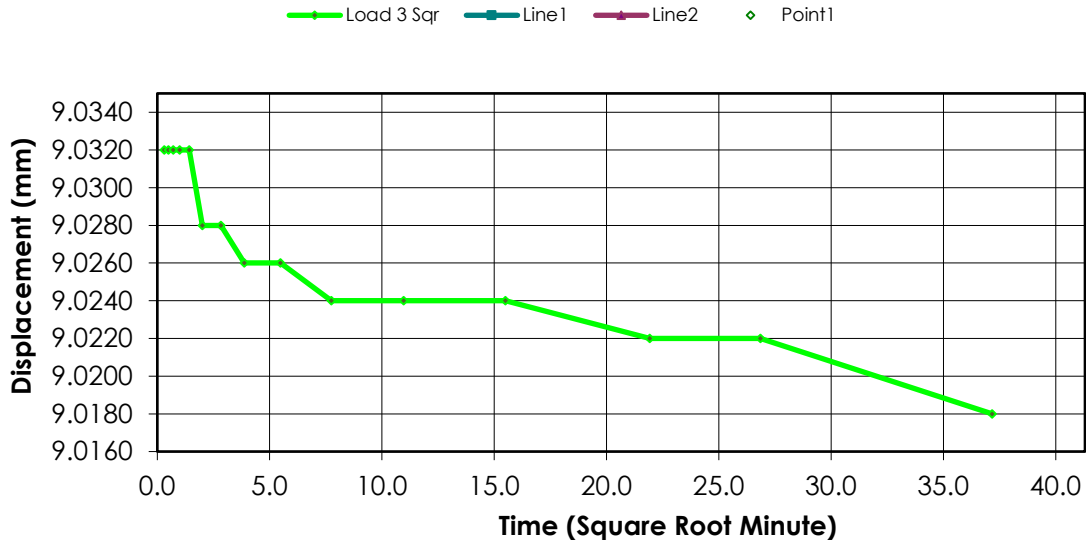
Remarks:

Sample Type: Undisturbed

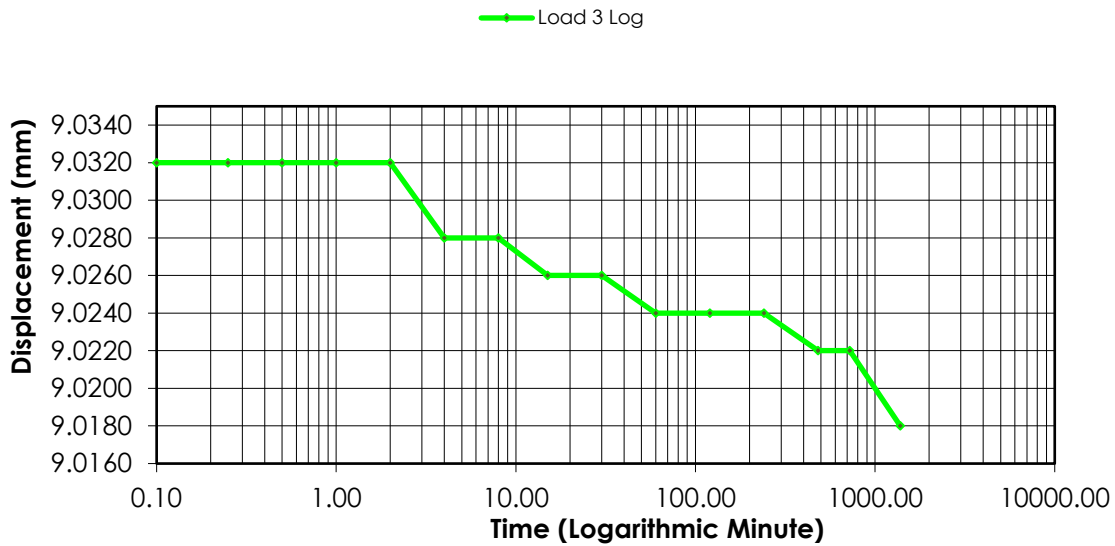
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	9.0340	-0.1060	-0.5196	0.4892
1	00:00:06	9.0320	-0.1160	-0.5686	0.4899
2	00:00:15	9.0320	-0.1160	-0.5686	0.4899
3	00:00:30	9.0320	-0.1160	-0.5686	0.4899
4	00:01:00	9.0320	-0.1160	-0.5686	0.4899
5	00:02:00	9.0320	-0.1160	-0.5686	0.4899
6	00:04:00	9.0280	-0.1120	-0.5490	0.4896
7	00:08:00	9.0280	-0.1120	-0.5490	0.4896
8	00:15:01	9.0260	-0.1100	-0.5392	0.4895
9	00:30:02	9.0260	-0.1100	-0.5392	0.4895
10	01:00:05	9.0240	-0.1080	-0.5294	0.4893
11	02:00:10	9.0240	-0.1080	-0.5294	0.4893
12	04:00:21	9.0240	-0.1080	-0.5294	0.4893
13	08:00:42	9.0220	-0.1060	-0.5196	0.4892
14	12:01:03	9.0220	-0.1060	-0.5196	0.4892
15	23:01:16	9.0180	-0.1020	-0.5000	0.4889

Consolidation Test Results (Sequence 3) Load 20.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 4) Load 40.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 30-Oct-18

Test Number:

Sample Number: GL2 ST22

Soil Description:

Boring Number:

Clay (Cl-CL), Some Sand, Trace Gravel

Depth: 10.5-10.95m

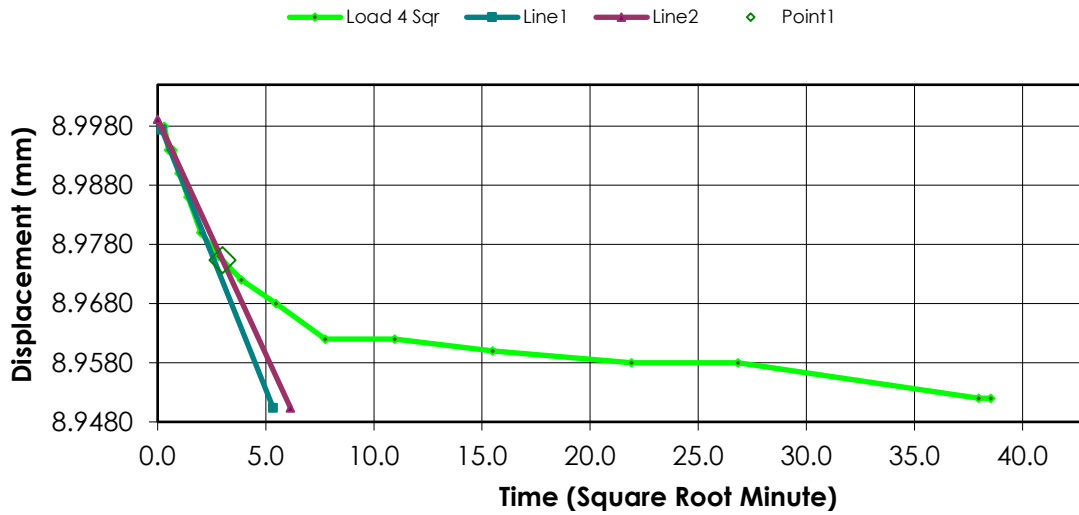
Remarks:

Sample Type: Undisturbed

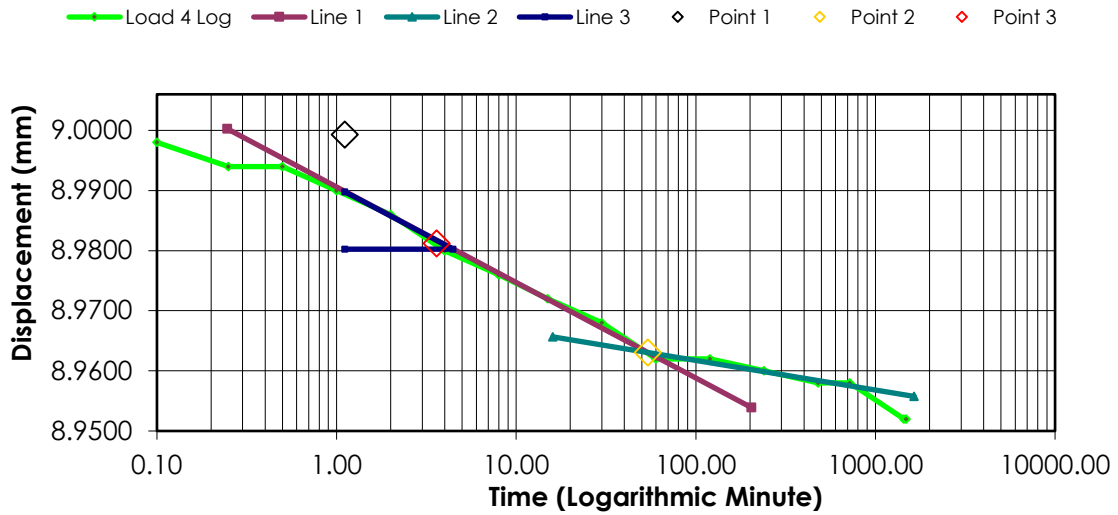
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	9.0180	-0.1020	-0.5000	0.4889
1	00:00:06	8.9980	-0.0980	-0.4804	0.4886
2	00:00:15	8.9940	-0.0940	-0.4608	0.4883
3	00:00:30	8.9940	-0.0940	-0.4608	0.4883
4	00:01:00	8.9900	-0.0900	-0.4412	0.4880
5	00:02:00	8.9860	-0.0860	-0.4216	0.4877
6	00:04:00	8.9800	-0.0800	-0.3922	0.4873
7	00:08:00	8.9760	-0.0760	-0.3726	0.4870
8	00:15:01	8.9720	-0.0720	-0.3529	0.4867
9	00:30:02	8.9680	-0.0680	-0.3333	0.4864
10	01:00:05	8.9620	-0.0620	-0.3039	0.4860
11	02:00:10	8.9620	-0.0620	-0.3039	0.4860
12	04:00:21	8.9600	-0.0600	-0.2941	0.4858
13	08:00:42	8.9580	-0.0580	-0.2843	0.4857
14	12:01:03	8.9580	-0.0580	-0.2843	0.4857
15	24:02:07	8.9520	-0.0520	-0.2549	0.4853
16	24:45:25	8.9520	-0.0520	-0.2549	0.4853

Consolidation Test Results (Sequence 4) Load 40.000 kPa

Consolidation Graph (Square-root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 5) Load 80.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 30-Oct-18

Test Number:

Sample Number: GL2 ST22

Soil Description:

Boring Number:

Clay (Cl-CL), Some Sand, Trace Gravel

Depth: 10.5-10.95m

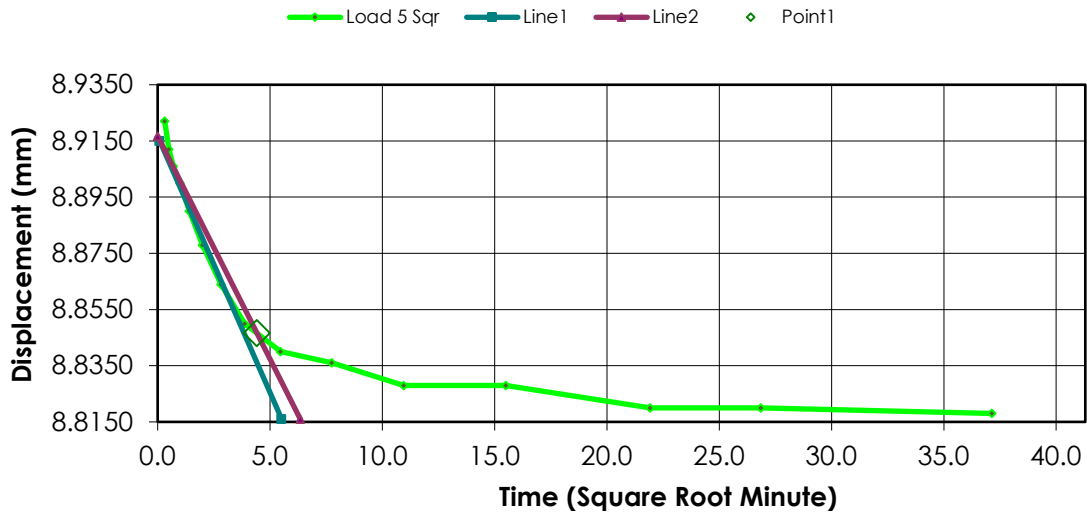
Remarks:

Sample Type: Undisturbed

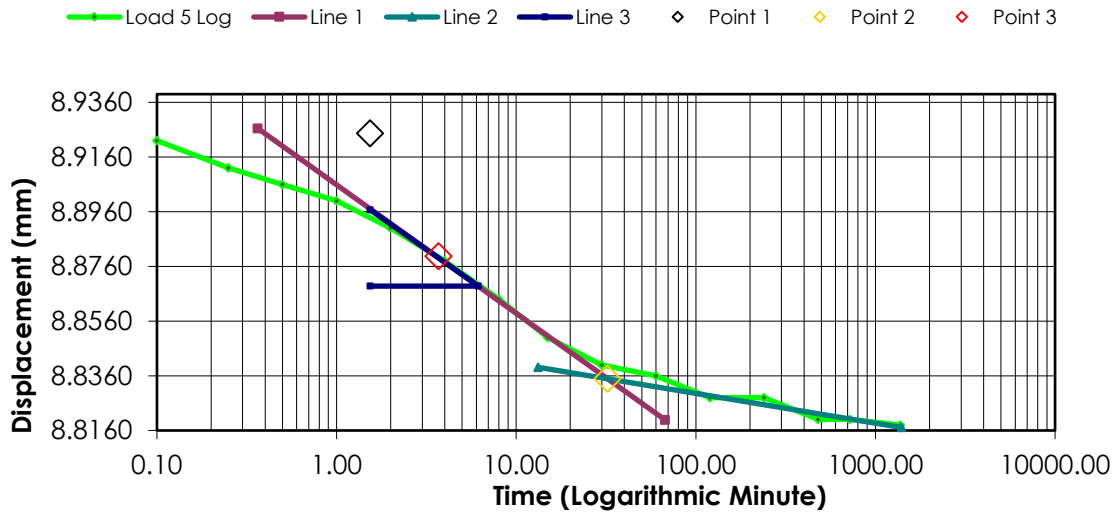
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.9520	-0.0520	-0.2549	0.4853
1	00:00:06	8.9220	-0.0420	-0.2059	0.4845
2	00:00:15	8.9120	-0.0320	-0.1569	0.4838
3	00:00:30	8.9060	-0.0260	-0.1275	0.4834
4	00:01:00	8.9000	-0.0200	-0.0980	0.4829
5	00:02:00	8.8900	-0.0100	-0.0490	0.4822
6	00:04:00	8.8780	0.0020	0.0098	0.4813
7	00:08:00	8.8640	0.0160	0.0784	0.4803
8	00:15:01	8.8500	0.0300	0.1471	0.4793
9	00:30:02	8.8400	0.0400	0.1961	0.4786
10	01:00:05	8.8360	0.0440	0.2157	0.4783
11	02:00:10	8.8280	0.0520	0.2549	0.4777
12	04:00:20	8.8280	0.0520	0.2549	0.4777
13	08:00:40	8.8200	0.0600	0.2941	0.4771
14	12:01:02	8.8200	0.0600	0.2941	0.4771
15	22:59:42	8.8180	0.0620	0.3039	0.4770

Consolidation Test Results (Sequence 5) Load 80.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 6) Load 160.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 30-Oct-18

Test Number:

Sample Number: GL2 ST22

Soil Description:

Boring Number:

Clay (Cl-CL), Some Sand, Trace Gravel

Depth: 10.5-10.95m

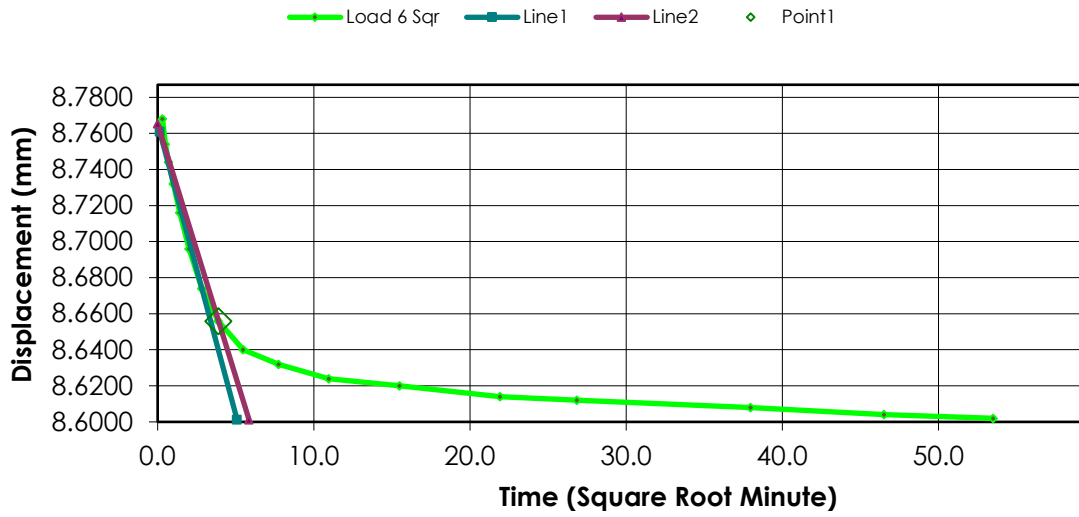
Remarks:

Sample Type: Undisturbed

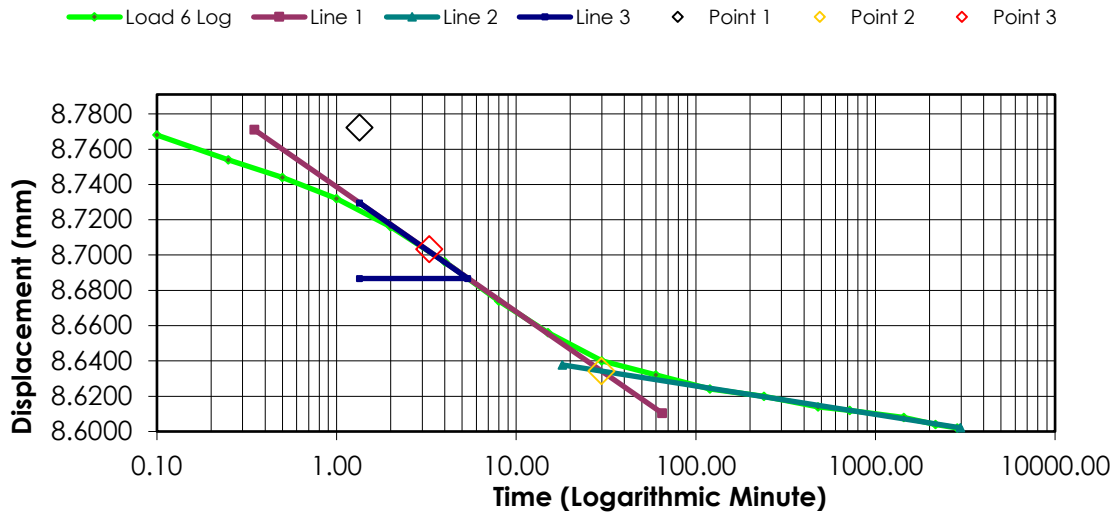
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.8180	0.0620	0.3039	0.4770
1	00:00:06	8.7680	0.0820	0.4020	0.4755
2	00:00:15	8.7540	0.0960	0.4706	0.4745
3	00:00:30	8.7440	0.1060	0.5196	0.4738
4	00:01:00	8.7320	0.1180	0.5784	0.4729
5	00:02:00	8.7160	0.1340	0.6569	0.4718
6	00:04:01	8.6960	0.1540	0.7549	0.4703
7	00:08:01	8.6740	0.1760	0.8627	0.4687
8	00:15:02	8.6560	0.1940	0.9510	0.4674
9	00:30:03	8.6400	0.2100	1.0294	0.4662
10	01:00:06	8.6320	0.2180	1.0686	0.4657
11	02:00:11	8.6240	0.2260	1.1078	0.4651
12	04:00:21	8.6200	0.2300	1.1275	0.4648
13	08:00:43	8.6140	0.2360	1.1569	0.4643
14	12:01:04	8.6120	0.2380	1.1667	0.4642
15	24:02:07	8.6080	0.2420	1.1863	0.4639
16	36:03:11	8.6040	0.2460	1.2059	0.4636
17	47:43:00	8.6020	0.2480	1.2157	0.4635

Consolidation Test Results (Sequence 6) Load 160.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 7) Load 320.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 30-Oct-18

Test Number:

Sample Number: GL2 ST22

Soil Description:

Boring Number:

Clay (CI-CL), Some Sand, Trace Gravel

Depth: 10.5-10.95m

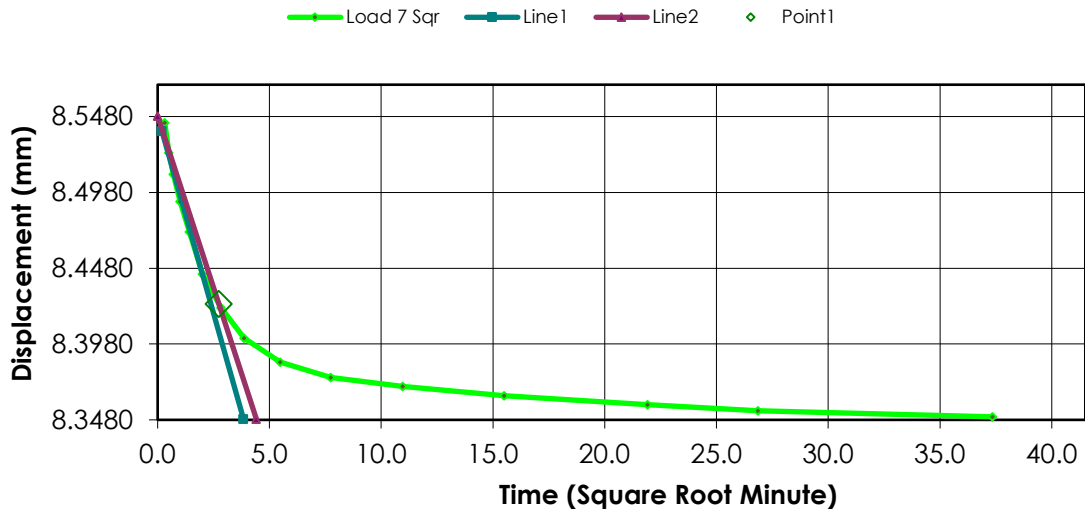
Remarks:

Sample Type: Undisturbed

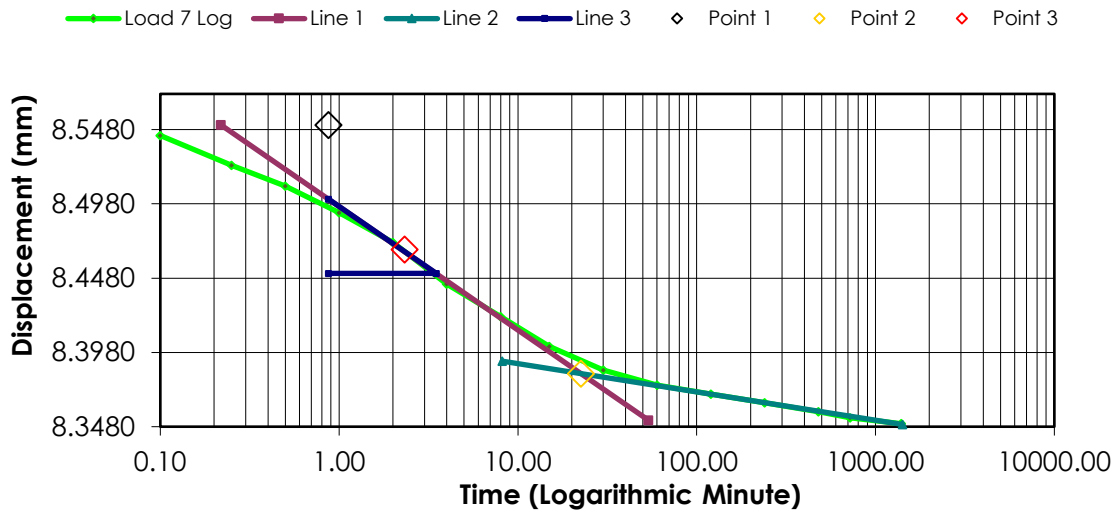
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.6020	0.2480	1.2157	0.4635
1	00:00:06	8.5440	0.2680	1.3137	0.4620
2	00:00:15	8.5240	0.2880	1.4118	0.4606
3	00:00:30	8.5100	0.3020	1.4804	0.4596
4	00:01:00	8.4920	0.3200	1.5686	0.4582
5	00:02:00	8.4720	0.3400	1.6667	0.4568
6	00:04:00	8.4440	0.3680	1.8039	0.4548
7	00:08:01	8.4220	0.3900	1.9118	0.4532
8	00:15:01	8.4020	0.4100	2.0098	0.4517
9	00:30:03	8.3860	0.4260	2.0882	0.4505
10	01:00:05	8.3760	0.4360	2.1373	0.4498
11	02:00:11	8.3700	0.4420	2.1667	0.4494
12	04:00:21	8.3640	0.4480	2.1961	0.4490
13	08:00:42	8.3580	0.4540	2.2255	0.4485
14	12:01:04	8.3540	0.4580	2.2451	0.4482
15	23:15:06	8.3500	0.4620	2.2647	0.4479

Consolidation Test Results (Sequence 7) Load 320.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 8) Load 640.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 30-Oct-18

Test Number:

Sample Number: GL2 ST22

Soil Description:

Boring Number:

Clay (CI-CL), Some Sand, Trace Gravel

Depth: 10.5-10.95m

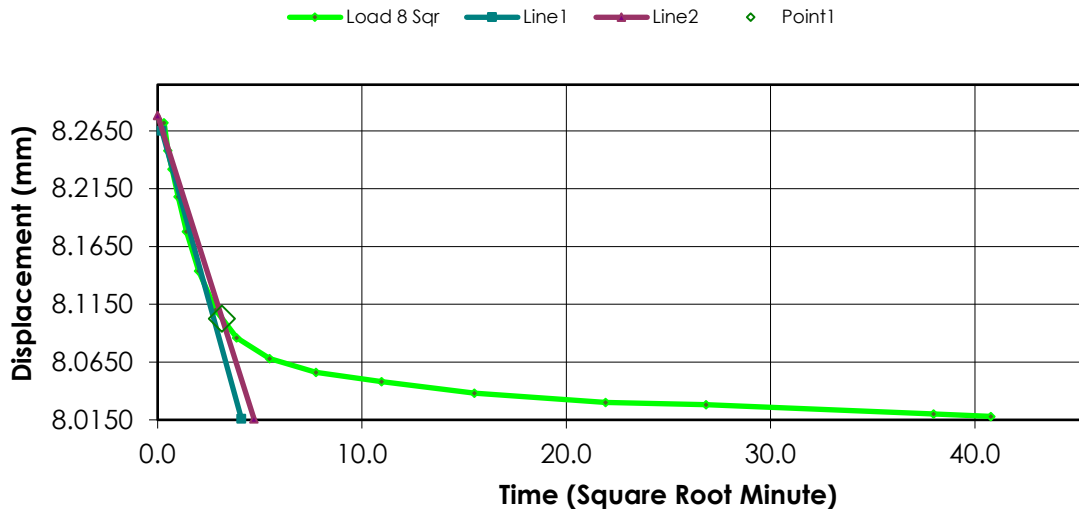
Remarks:

Sample Type: Undisturbed

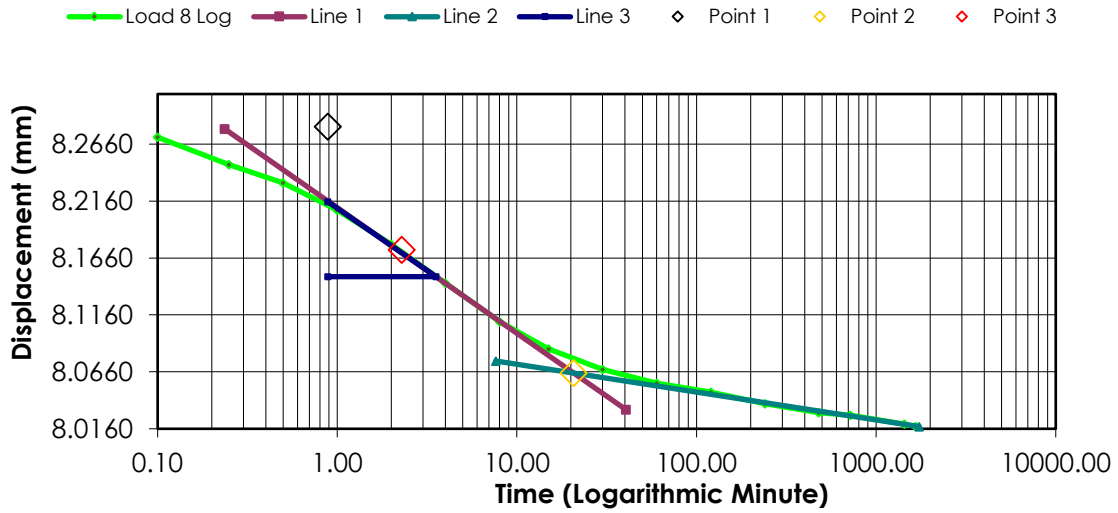
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.3500	0.4620	2.2647	0.4479
1	00:00:06	8.2720	0.5020	2.4608	0.4450
2	00:00:15	8.2480	0.5260	2.5784	0.4433
3	00:00:30	8.2320	0.5420	2.6569	0.4421
4	00:01:00	8.2080	0.5660	2.7745	0.4404
5	00:02:00	8.1780	0.5960	2.9216	0.4382
6	00:04:00	8.1440	0.6300	3.0882	0.4357
7	00:08:01	8.1100	0.6640	3.2549	0.4333
8	00:15:01	8.0860	0.6880	3.3725	0.4315
9	00:30:03	8.0680	0.7060	3.4608	0.4302
10	01:00:05	8.0560	0.7180	3.5196	0.4293
11	02:00:10	8.0480	0.7260	3.5588	0.4288
12	04:00:21	8.0380	0.7360	3.6078	0.4280
13	08:00:42	8.0300	0.7440	3.6471	0.4275
14	12:01:03	8.0280	0.7460	3.6569	0.4273
15	24:02:07	8.0200	0.7540	3.6961	0.4267
16	27:43:35	8.0180	0.7560	3.7059	0.4266

Consolidation Test Results (Sequence 8) Load 640.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 9) Rebound 320.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 30-Oct-18

Test Number:

Sample Number: GL2 ST22

Soil Description:

Boring Number:

Clay (Cl-CL), Some Sand, Trace Gravel

Depth: 10.5-10.95m

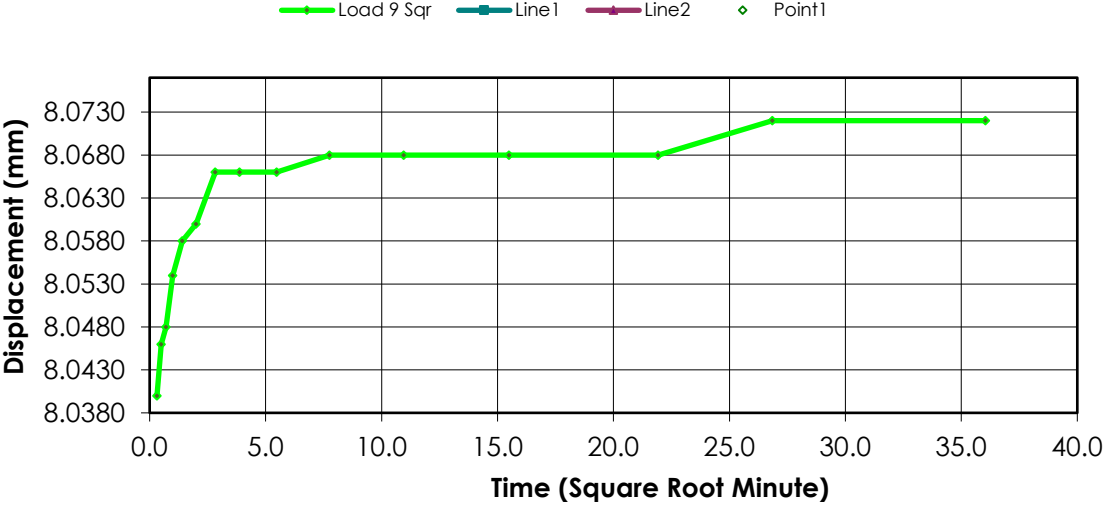
Remarks:

Sample Type: Undisturbed

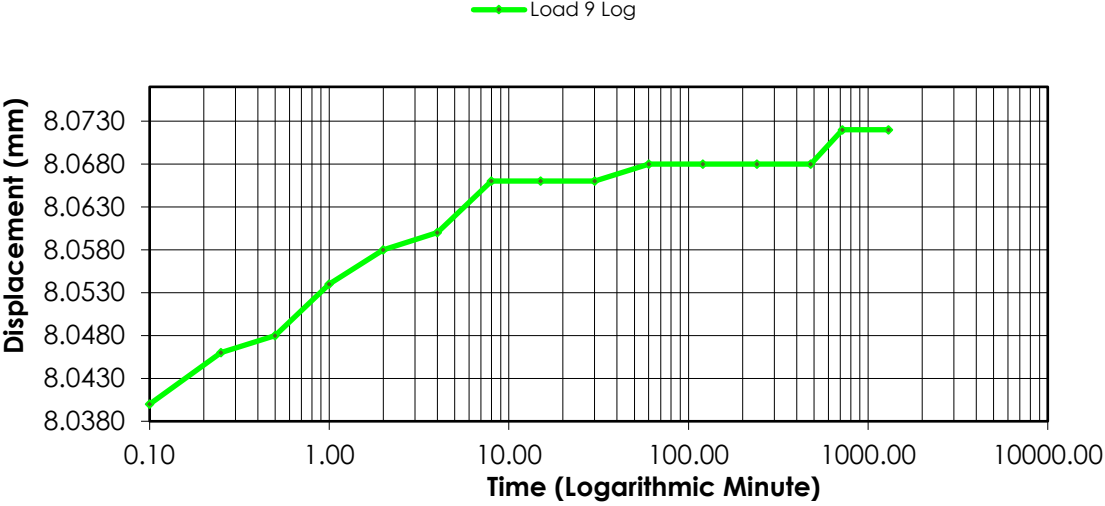
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.0180	0.7560	3.7059	0.4266
1	00:00:06	8.0400	0.7440	3.6471	0.4275
2	00:00:15	8.0460	0.7380	3.6176	0.4279
3	00:00:30	8.0480	0.7360	3.6078	0.4280
4	00:01:00	8.0540	0.7300	3.5784	0.4285
5	00:02:00	8.0580	0.7260	3.5588	0.4288
6	00:04:00	8.0600	0.7240	3.5490	0.4289
7	00:08:00	8.0660	0.7180	3.5196	0.4293
8	00:15:01	8.0660	0.7180	3.5196	0.4293
9	00:30:02	8.0660	0.7180	3.5196	0.4293
10	01:00:05	8.0680	0.7160	3.5098	0.4295
11	02:00:10	8.0680	0.7160	3.5098	0.4295
12	04:00:21	8.0680	0.7160	3.5098	0.4295
13	08:00:42	8.0680	0.7160	3.5098	0.4295
14	12:01:03	8.0720	0.7120	3.4902	0.4298
15	21:38:41	8.0720	0.7120	3.4902	0.4298

Consolidation Test Results (Sequence 9) Rebound 320.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 10) Rebound 160.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 30-Oct-18

Test Number:

Sample Number: GL2 ST22

Soil Description:

Boring Number:

Clay (CI-CL), Some Sand, Trace Gravel

Depth: 10.5-10.95m

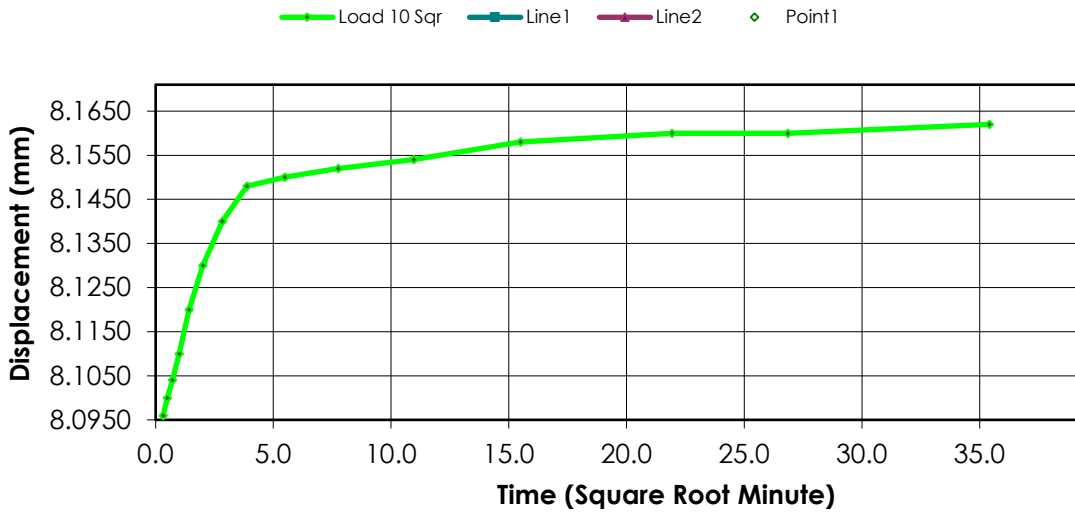
Remarks:

Sample Type: Undisturbed

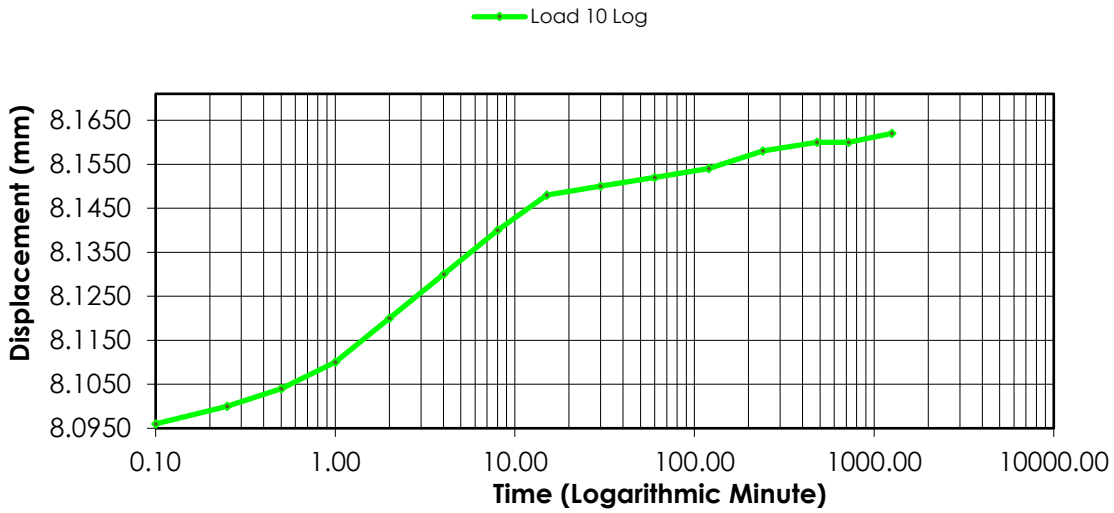
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.0720	0.7120	3.4902	0.4298
1	00:00:06	8.0960	0.7040	3.4510	0.4304
2	00:00:15	8.1000	0.7000	3.4314	0.4306
3	00:00:30	8.1040	0.6960	3.4118	0.4309
4	00:01:00	8.1100	0.6900	3.3824	0.4314
5	00:02:00	8.1200	0.6800	3.3333	0.4321
6	00:04:01	8.1300	0.6700	3.2843	0.4328
7	00:08:01	8.1400	0.6600	3.2353	0.4336
8	00:15:02	8.1480	0.6520	3.1961	0.4341
9	00:30:03	8.1500	0.6500	3.1863	0.4343
10	01:00:06	8.1520	0.6480	3.1765	0.4344
11	02:00:11	8.1540	0.6460	3.1667	0.4346
12	04:00:21	8.1580	0.6420	3.1471	0.4349
13	08:00:43	8.1600	0.6400	3.1373	0.4350
14	12:01:04	8.1600	0.6400	3.1373	0.4350
15	20:53:43	8.1620	0.6380	3.1274	0.4352

Consolidation Test Results
(Sequence 10) Rebound 160.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 11) Load 320.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 30-Oct-18

Test Number:

Sample Number: GL2 ST22

Soil Description:

Boring Number:

Clay (Cl-CL), Some Sand, Trace Gravel

Depth: 10.5-10.95m

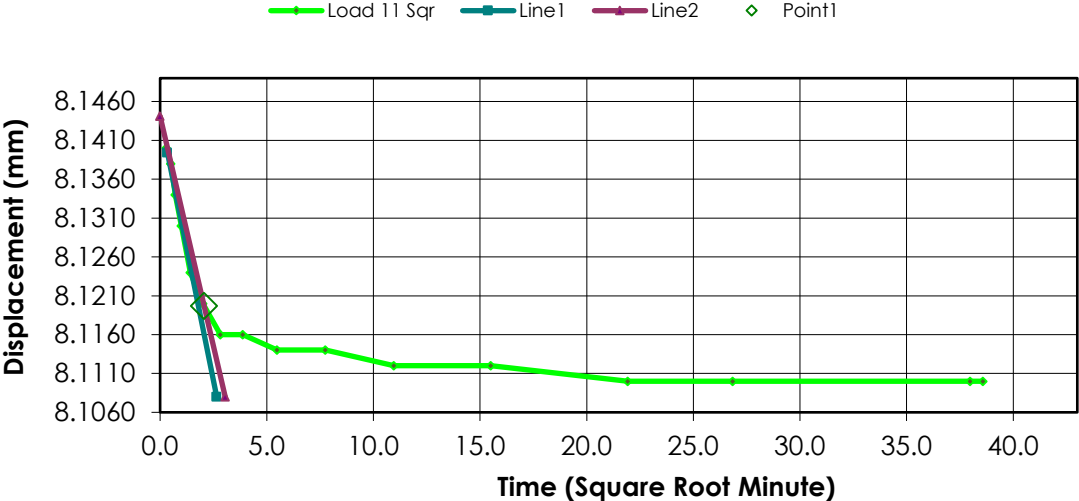
Remarks:

Sample Type: Undisturbed

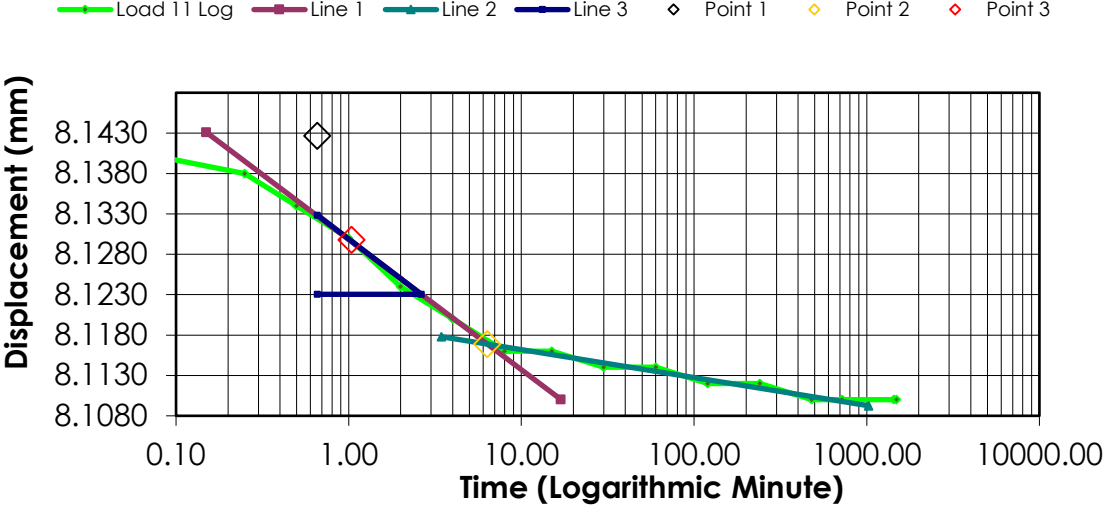
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.1620	0.6380	3.1274	0.4352
1	00:00:05	8.1400	0.6500	3.1863	0.4343
2	00:00:15	8.1380	0.6520	3.1961	0.4341
3	00:00:30	8.1340	0.6560	3.2157	0.4338
4	00:01:00	8.1300	0.6600	3.2353	0.4336
5	00:02:00	8.1240	0.6660	3.2647	0.4331
6	00:04:00	8.1200	0.6700	3.2843	0.4328
7	00:08:00	8.1160	0.6740	3.3039	0.4325
8	00:15:01	8.1160	0.6740	3.3039	0.4325
9	00:30:01	8.1140	0.6760	3.3137	0.4324
10	01:00:04	8.1140	0.6760	3.3137	0.4324
11	02:00:09	8.1120	0.6780	3.3235	0.4322
12	04:00:19	8.1120	0.6780	3.3235	0.4322
13	08:00:41	8.1100	0.6800	3.3333	0.4321
14	12:01:02	8.1100	0.6800	3.3333	0.4321
15	24:02:05	8.1100	0.6800	3.3333	0.4321
16	24:48:34	8.1100	0.6800	3.3333	0.4321

Consolidation Test Results (Sequence 11) Load 320.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 12) Load 640.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 30-Oct-18

Test Number:

Sample Number: GL2 ST22

Soil Description:

Boring Number:

Clay (CI-CL), Some Sand, Trace Gravel

Depth: 10.5-10.95m

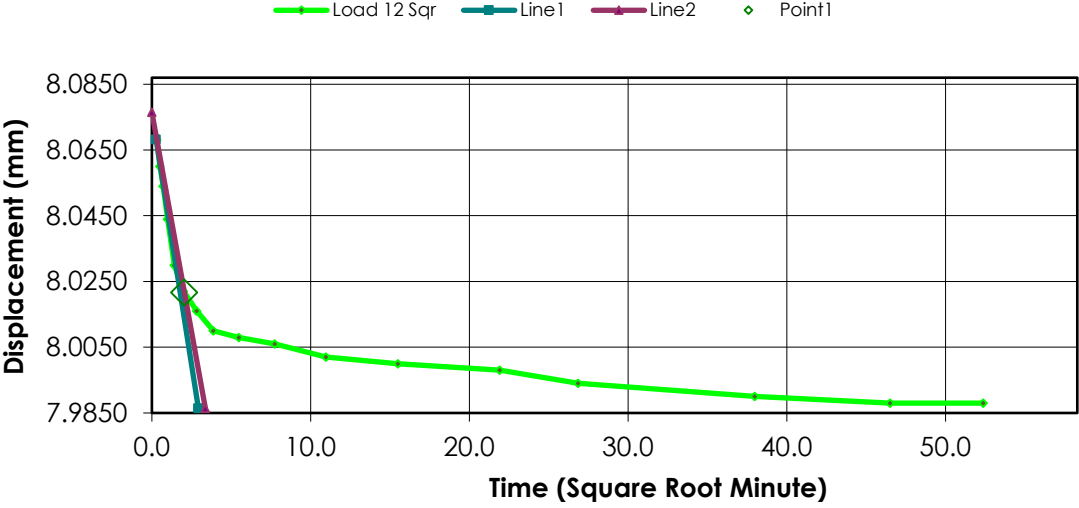
Remarks:

Sample Type: Undisturbed

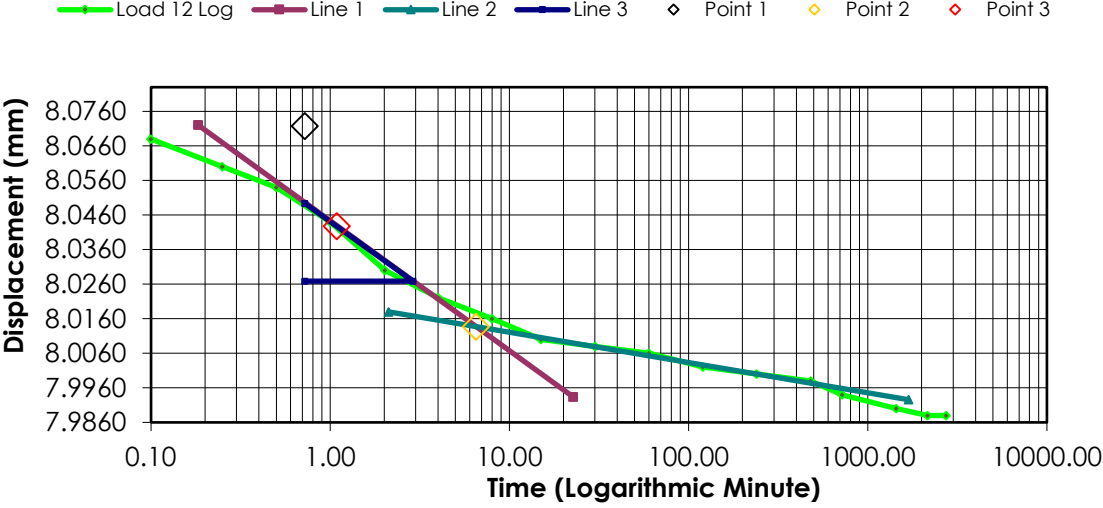
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.1100	0.6800	3.3333	0.4321
1	00:00:06	8.0680	0.7040	3.4510	0.4304
2	00:00:15	8.0600	0.7120	3.4902	0.4298
3	00:00:30	8.0540	0.7180	3.5196	0.4293
4	00:01:00	8.0440	0.7280	3.5686	0.4286
5	00:02:01	8.0300	0.7420	3.6373	0.4276
6	00:04:01	8.0220	0.7500	3.6765	0.4270
7	00:08:01	8.0160	0.7560	3.7059	0.4266
8	00:15:02	8.0100	0.7620	3.7353	0.4261
9	00:30:03	8.0080	0.7640	3.7451	0.4260
10	01:00:06	8.0060	0.7660	3.7549	0.4259
11	02:00:11	8.0020	0.7700	3.7745	0.4256
12	04:00:21	8.0000	0.7720	3.7843	0.4254
13	08:00:43	7.9980	0.7740	3.7941	0.4253
14	12:01:04	7.9940	0.7780	3.8137	0.4250
15	24:02:07	7.9900	0.7820	3.8333	0.4247
16	36:03:11	7.9880	0.7840	3.8431	0.4245
17	45:44:13	7.9880	0.7840	3.8431	0.4245

Consolidation Test Results (Sequence 12) Load 640.000 kPa

Consolidation Graph (Square Root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 13) Load 1280.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 30-Oct-18

Test Number:

Sample Number: GL2 ST22

Soil Description:

Boring Number:

Clay (CI-CL), Some Sand, Trace Gravel

Depth: 10.5-10.95m

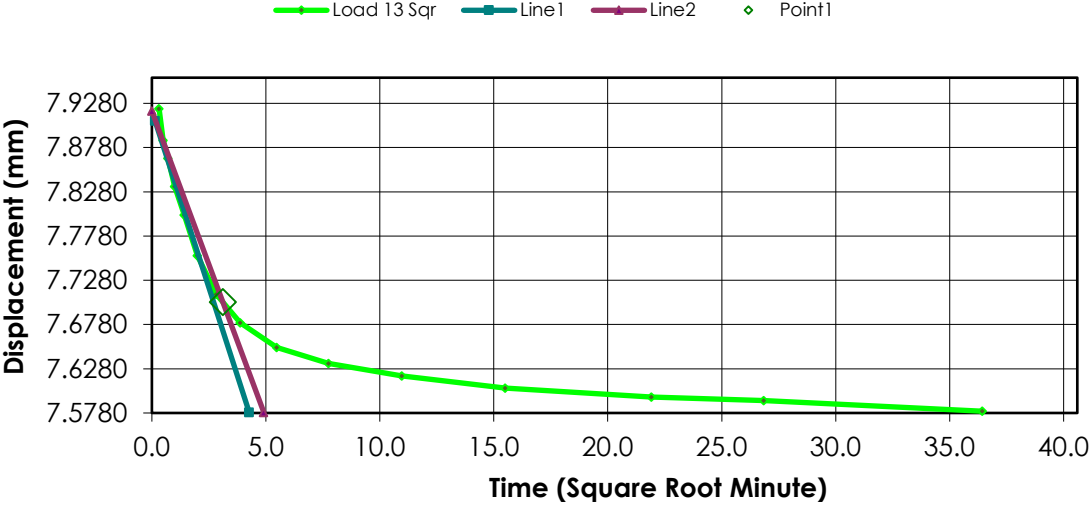
Remarks:

Sample Type: Undisturbed

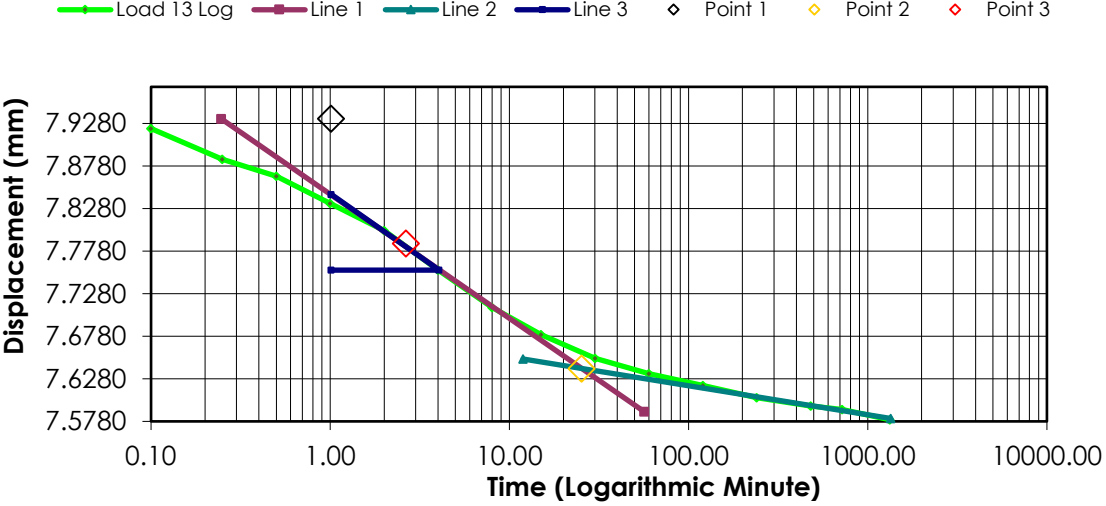
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	7.9880	0.7840	3.8431	0.4245
1	00:00:06	7.9220	0.7980	3.9118	0.4235
2	00:00:15	7.8860	0.8340	4.0882	0.4209
3	00:00:30	7.8660	0.8540	4.1863	0.4195
4	00:01:00	7.8340	0.8860	4.3431	0.4171
5	00:02:00	7.8020	0.9180	4.5000	0.4148
6	00:04:00	7.7560	0.9640	4.7255	0.4115
7	00:08:01	7.7120	1.0080	4.9412	0.4083
8	00:15:01	7.6800	1.0400	5.0980	0.4060
9	00:30:03	7.6520	1.0680	5.2353	0.4039
10	01:00:05	7.6340	1.0860	5.3235	0.4026
11	02:00:10	7.6200	1.1000	5.3922	0.4016
12	04:00:21	7.6060	1.1140	5.4608	0.4006
13	08:00:42	7.5960	1.1240	5.5098	0.3999
14	12:01:03	7.5920	1.1280	5.5294	0.3996
15	22:07:21	7.5800	1.1400	5.5882	0.3987

Consolidation Test Results (Sequence 13) Load 1280.000 kPa

Consolidation Graph (Squareroot Time)



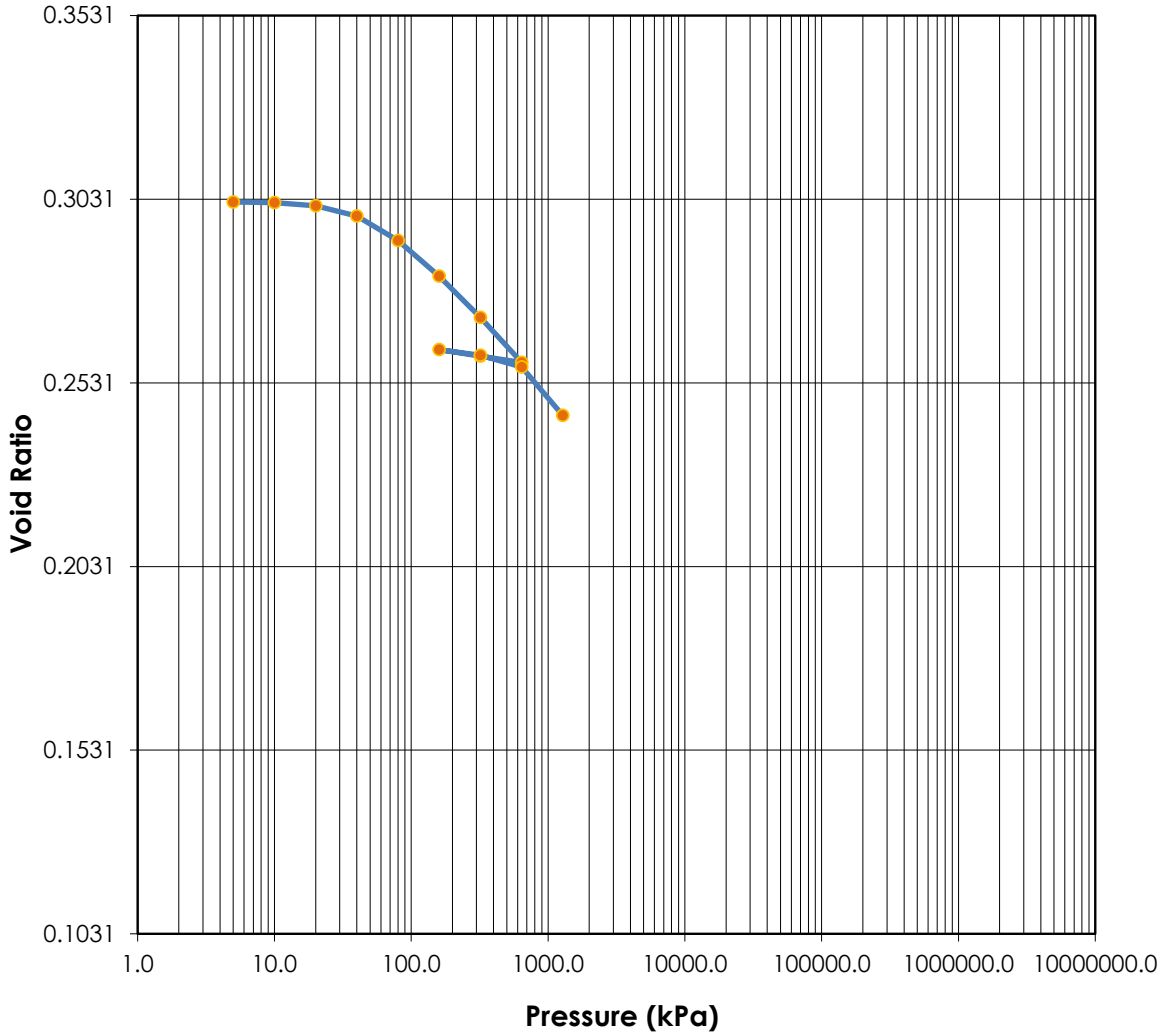
Consolidation Graph (Logarithmic Time)





Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876



	Before	After	Liquid Limits:	-	Test Date:	12-Nov-18
Moisture (%):	13.2	10.8	Plastic Limits:	-		
Dry Density (g/cm³):	2.031	2.142	Plasticity Index (%):	-		
Saturation (%):	100	100	Specific Gravity:	2.65	Assumed	
Void Ratio:	0.3036	0.2454				
Soil Description:	Clay, Some Sand, Trace Gravel					
Project Number:	110773396	Depth:	11.55-12.0m	Remarks:		
Sample Number:	GL2 ST24	Boring Number:				
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						

Tested By: E. Wahl

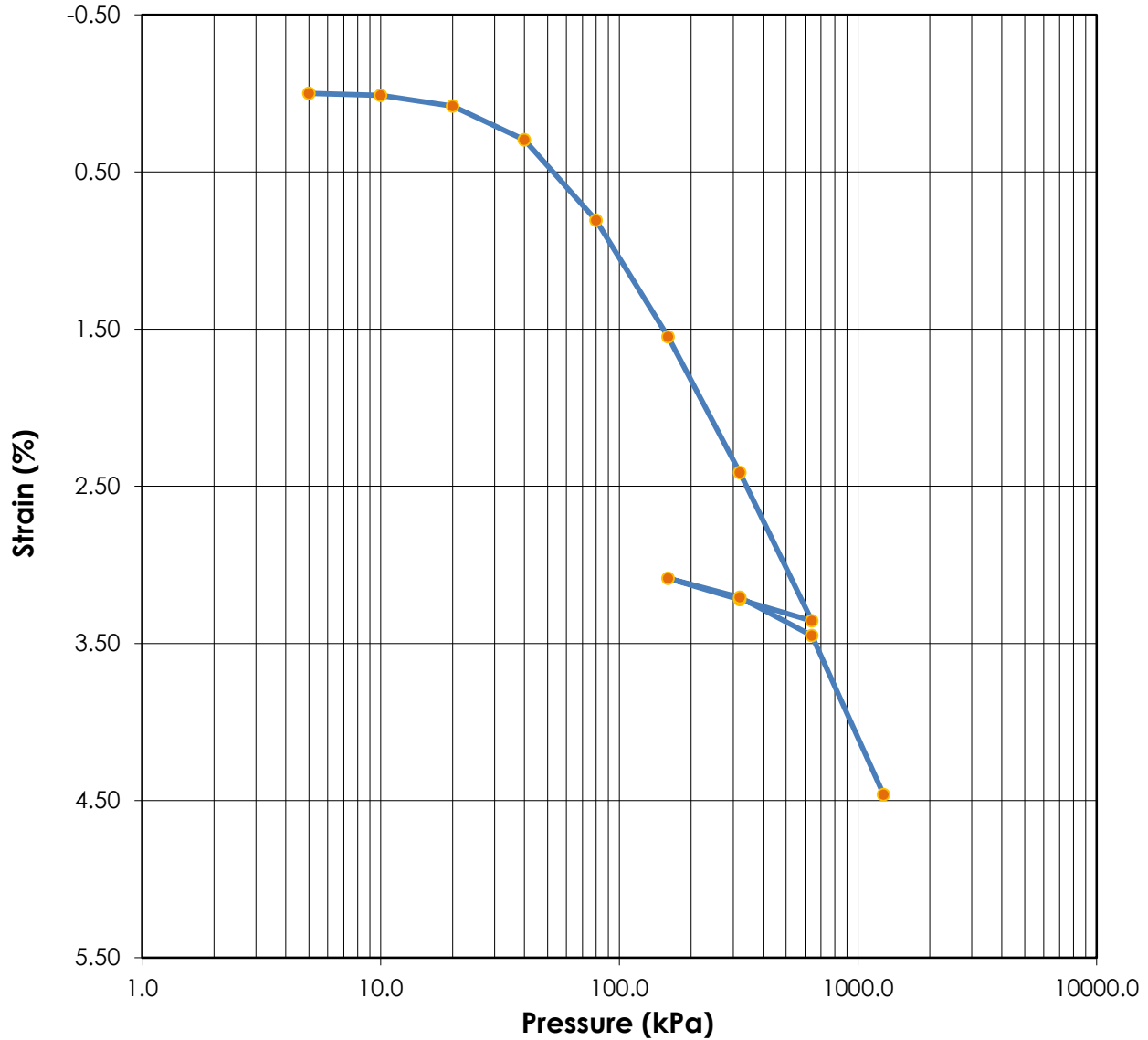
Reviewed By: C. Lamoureux

Reporting of these test results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request. The data presented above is for the sole use of the client stipulated above. Stantec is not responsible, nor can be held liable, for the use of this report by any other party, with or without the knowledge of Stantec.



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876

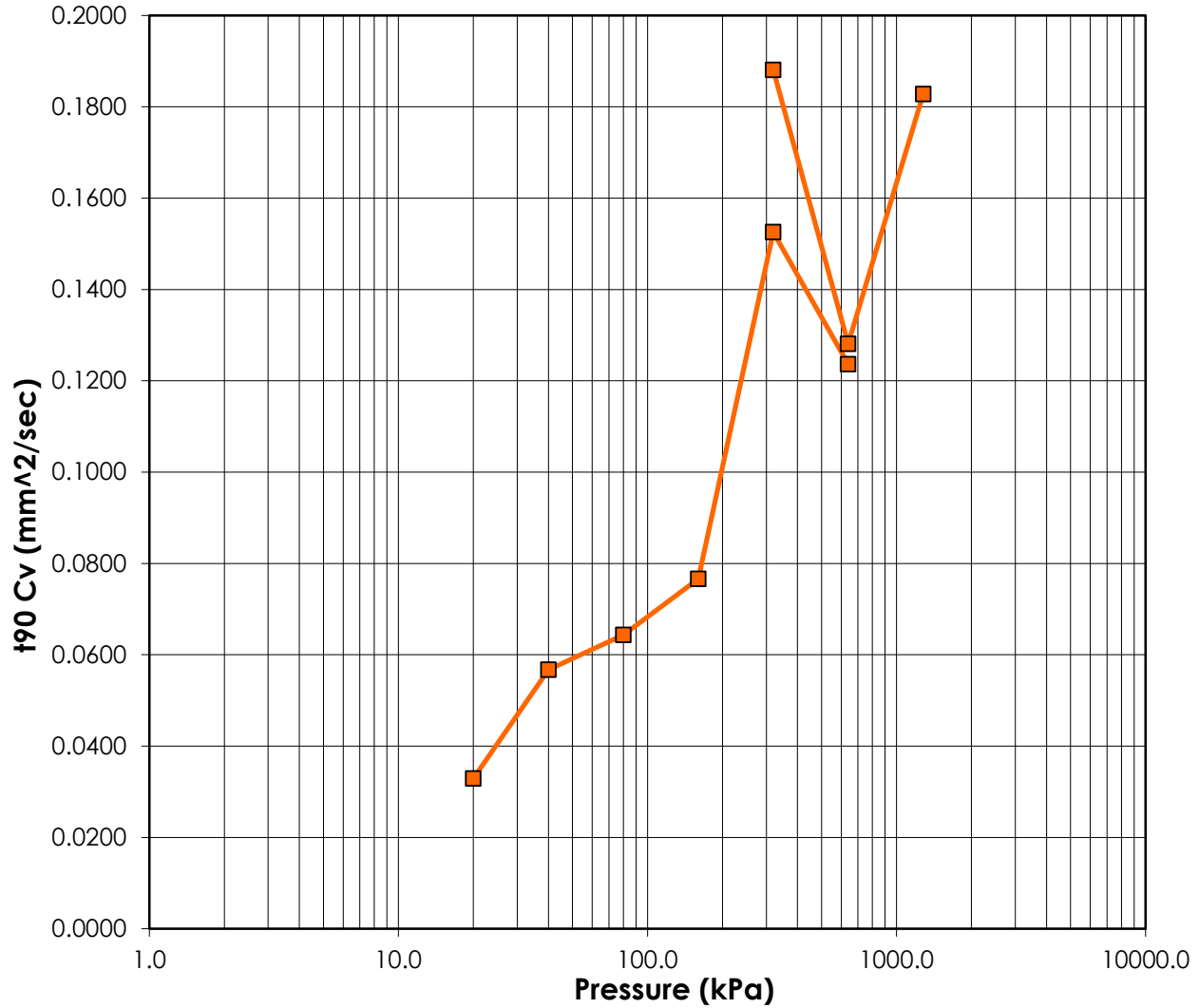


	Before	After	Liquid Limits:	-	Test Date:	12-Nov-18
Moisture (%):	13.2	10.8	Plastic Limits:	-		
Dry Density (g/cm3):	2.031	2.142	Plasticity Index (%):	-		
Saturation (%):	100	100	Specific Gravity:	2.65	Assumed	
Void Ratio:	0.3036	0.2454				
Sample Description:	Clay, Some Sand, Trace Gravel					
Project Number:	110773396	Depth:	11.55-12.0m			
Sample Number:	GL2 ST24	Boring Number:				
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						
						Remarks:



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
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 Calgary, Alberta T2C 1G4
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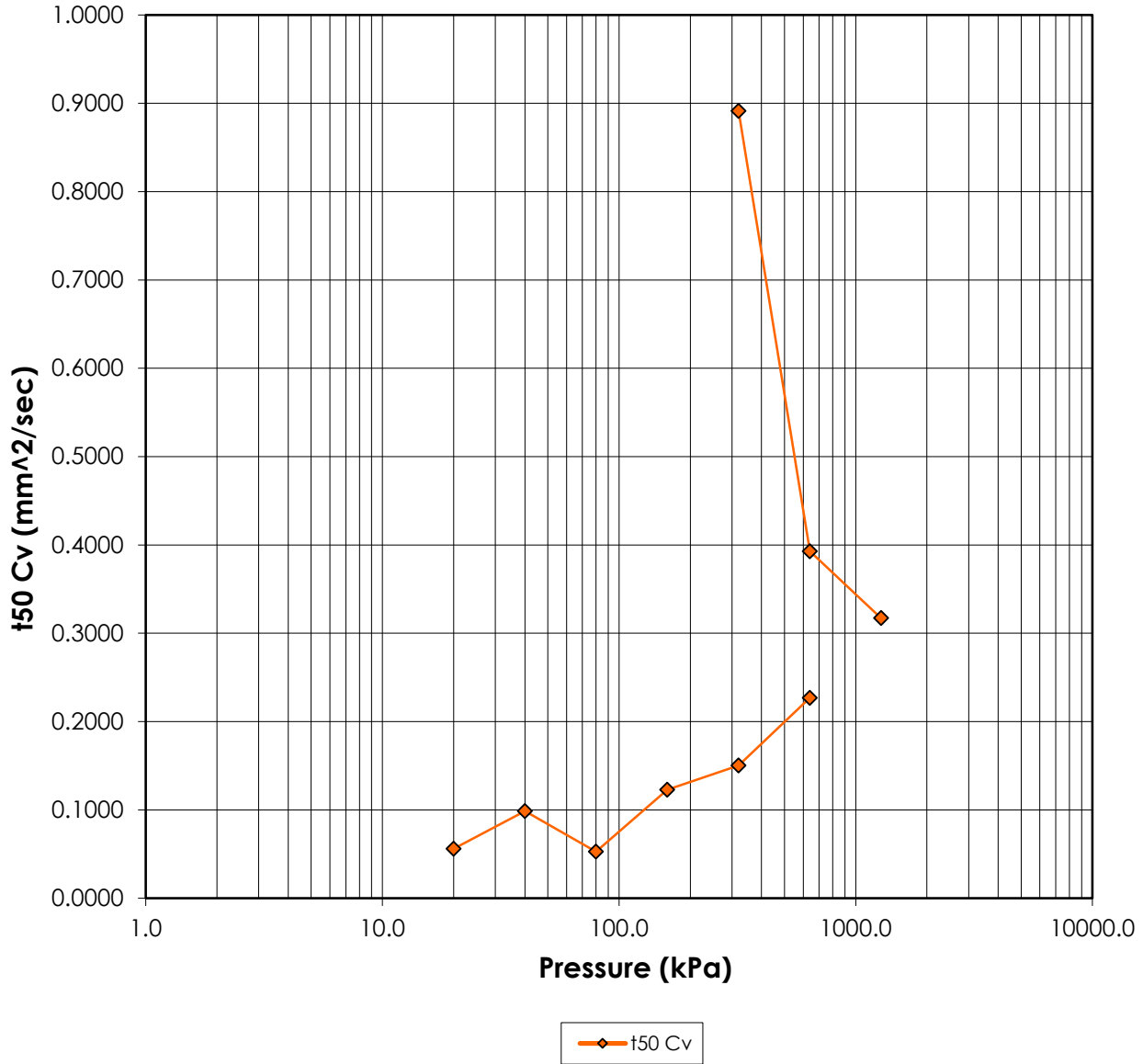
—■— $t_{90} C_v$

	Before	After	Liquid Limits:	-	Test Date:	12-Nov-18
Moisture (%):	13.2	10.8	Plastic Limits:	-		
Dry Density (g/cm³):	2.031	2.142	Plasticity Index (%):	-		
Saturation (%):	100	100	Specific Gravity:	2.65	Assumed	
Void Ratio:	0.3036	0.2454				
Soil Description:	Clay, Some Sand, Trace Gravel					
Project Number:	110773396	Depth:	11.55-12.0m			
Sample Number:	GL2 ST24	Boring Number:				
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						
			Remarks:			



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
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 Tel: (403) 253-7876

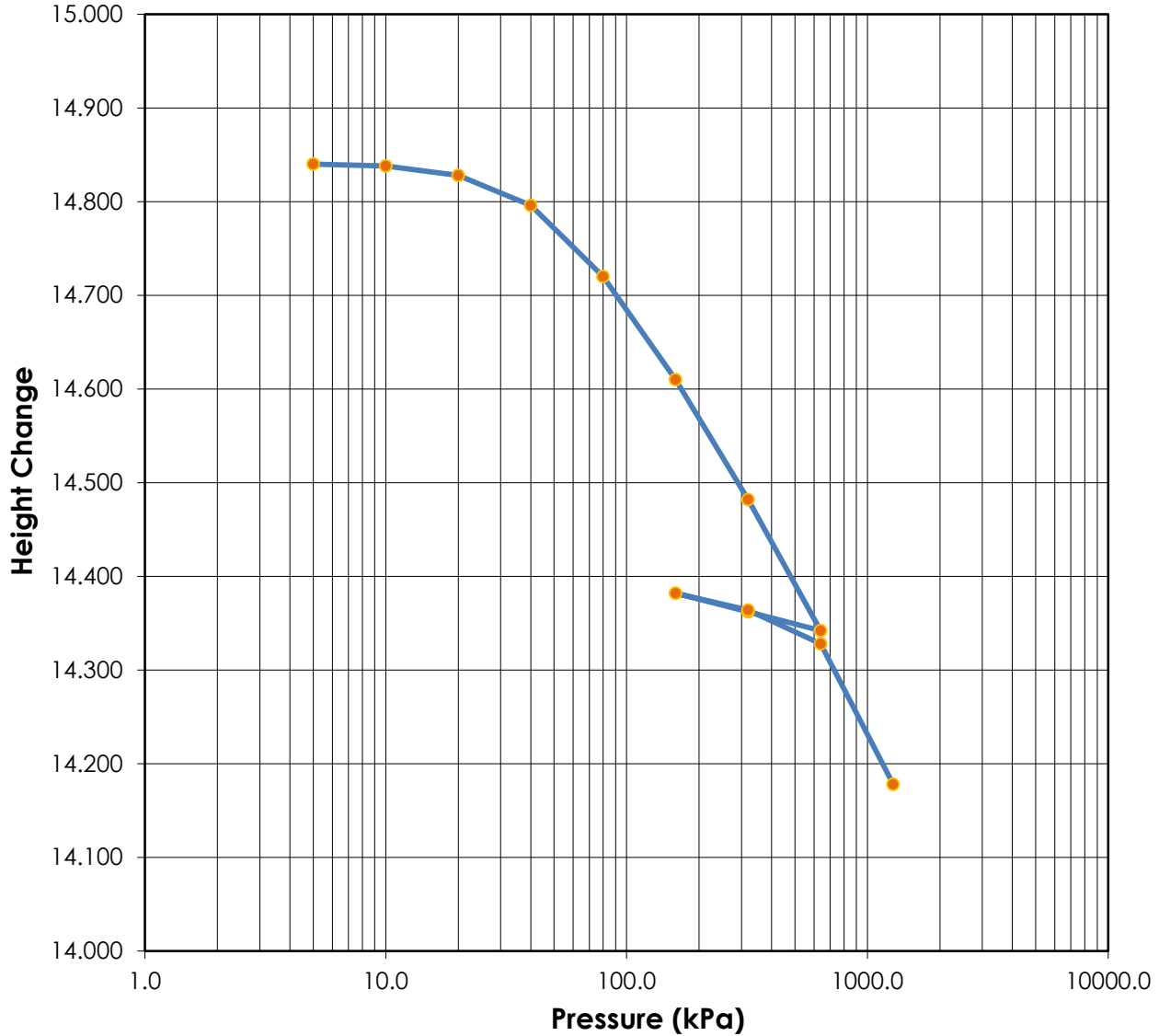


	Before	After	Liquid Limits:	-	Test Date:	12-Nov-18
Moisture (%):	13.2	10.8	Plastic Limits:	-		
Dry Density (g/cm3):	2.031	2.142	Plasticity Index (%):	-		
Saturation (%):	100	100	Specific Gravity:	2.65	Assumed	
Void Ratio:	0.3036	0.2454				
Soil Description:	Clay, Some Sand, Trace Gravel					
Project Number:	110773396	Depth:	11.55-12.0m			
Sample Number:	GL2 ST24	Boring Number:				
Project:	SR1 2018 Investigation					Remarks:
Client:	Alberta Transportation					
Location:						



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

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 Tel: (403) 253-7876



	Before	After	Liquid Limits:	-	Test Date:	12-Nov-18
Moisture (%):	13.2	10.8	Plastic Limits:	-		
Dry Density (g/cm3):	2.031	2.142	Plasticity Index (%):	-		
Saturation (%):	100	100	Specific Gravity:	2.65	Assumed	
Void Ratio:	0.3036	0.2454				
Soil Description:	Clay, Some Sand, Trace Gravel					
Project Number:	110773396	Depth:	11.55-12.0m			
Sample Number:	GL2 ST24	Boring Number:				
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						
			Remarks:			

Consolidation Test Results Summary

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Sample Number: GL2 ST24

Sample Description:

Boring Number:

Clay, Some Sand, Trace Gravel

Depth: 11.55-12.0m

Remarks:

Test Number:

Sample Type: Undisturbed

Test Date: 12-Nov-18

Index	Load Sequence (kPa)	Cumulative Change in Height (mm)	Specimen Height (mm)	Height of Void (mm)	Vertical Strain (%)	Void Ratio	t90 Fitting Time (min)	t50 Fitting Time (min)	t90 Cv (mm ² /sec)	t50 Cv (mm ² /sec)
0	0.000	0.0000	14.8400	3.4449	0.00	0.3023	0.000	0.000	0.000	0.000
1	5.000	0.0000	14.8400	3.4449	0.00	0.3023	0.000	0.000	0.000	0.000
2	10.000	0.0020	14.8380	3.4429	0.01	0.3021	0.000	0.000	0.000	0.000
3	20.000	0.0120	14.8280	3.4329	0.08	0.3013	23.599	3.217	0.033	0.056
4	40.000	0.0440	14.7960	3.4009	0.30	0.2985	13.642	1.825	0.057	0.098
5	80.000	0.1200	14.7200	3.3249	0.81	0.2918	11.893	3.376	0.064	0.053
6	160.000	0.2300	14.6100	3.2149	1.55	0.2821	9.842	1.427	0.077	0.123
7	320.000	0.3580	14.4820	3.0869	2.41	0.2709	4.858	1.145	0.153	0.150
8	640.000	0.4980	14.3420	2.9469	3.36	0.2586	5.878	0.744	0.124	0.227
9	320.000	0.4780	14.3620	2.9669	3.22	0.2604	0.000	0.000	0.000	0.000
10	160.000	0.4580	14.3820	2.9869	3.09	0.2621	0.000	0.000	0.000	0.000
11	320.000	0.4760	14.3640	2.9689	3.21	0.2605	3.876	0.190	0.188	0.891
12	640.000	0.5120	14.3280	2.9329	3.45	0.2574	5.662	0.429	0.128	0.393
13	1280.000	0.6620	14.1780	2.7829	4.46	0.2442	3.885	0.520	0.183	0.317

Predicted value indicated with *

Consolidation Test
Consolidation Specimen Information

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 12-Nov-18

Sample Number: GL2 ST24

Sample Description:

Boring Number:

Clay, Some Sand, Trace Gravel

Depth: 11.55-12.0m

Remarks:

Sample Type: Undisturbed

Test Number:

Liquid Limit: -

Initial Void Ratio: 0.3036

Initial Height (mm): 14.84

Plastic Limit: -

Plasticity Index (%): -

Initial Diameter (mm): 50.04

Specific Gravity: 2.65
Assumed

Weight of Ring (g): 61.13

Parameters	Initial Specimen	Final Specimen
Moist Weight + Container (g)	86.08	69.57
Dry Soil + Container (g)	76.18	63.15
Weight of Container (g)	1.21	3.75
Moisture Content (%)	13.2	10.8
Void Ratio	0.3036	0.2454
Saturation (%)	100	100
Dry Density (g/cm ³)	2.031	2.142

Consolidation Test Results
(Sequence 1) Load 5.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 12-Nov-18

Test Number:

Sample Number: GL2 ST24

Soil Description:

Boring Number:

Clay, Some Sand, Trace Gravel

Depth: 11.55-12.0m

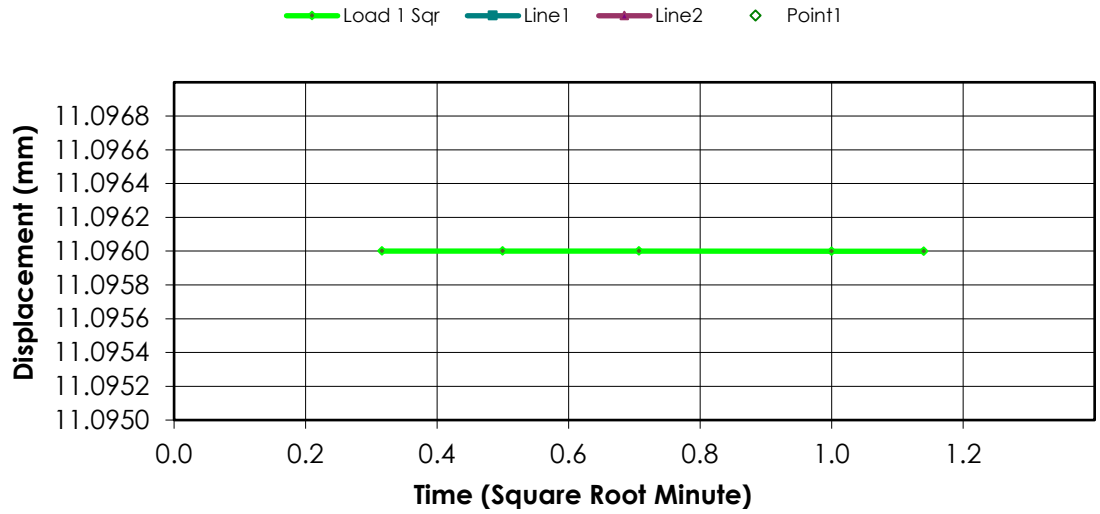
Remarks:

Sample Type: Undisturbed

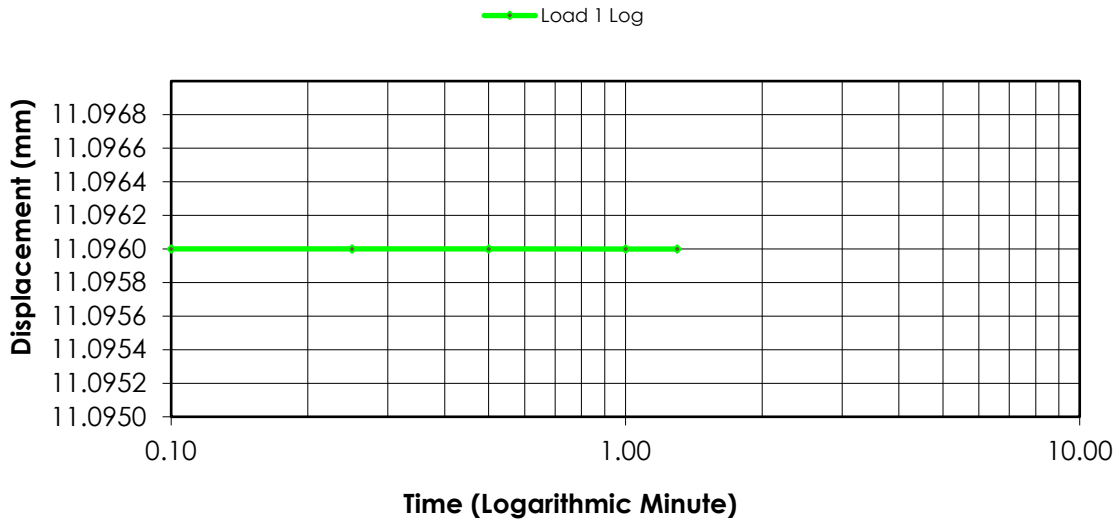
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	11.0960	0.0000	0.0000	0.3036
1	00:00:06	11.0960	0.0000	0.0000	0.3036
2	00:00:15	11.0960	0.0000	0.0000	0.3036
3	00:00:30	11.0960	0.0000	0.0000	0.3036
4	00:01:00	11.0960	0.0000	0.0000	0.3036
5	00:01:18	11.0960	0.0000	0.0000	0.3036

Consolidation Test Results (Sequence 1) Load 5.000 kPa

Consolidation Graph (Square root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 2) Load 10.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 12-Nov-18

Test Number:

Sample Number: GL2 ST24

Soil Description:

Boring Number:

Clay, Some Sand, Trace Gravel

Depth: 11.55-12.0m

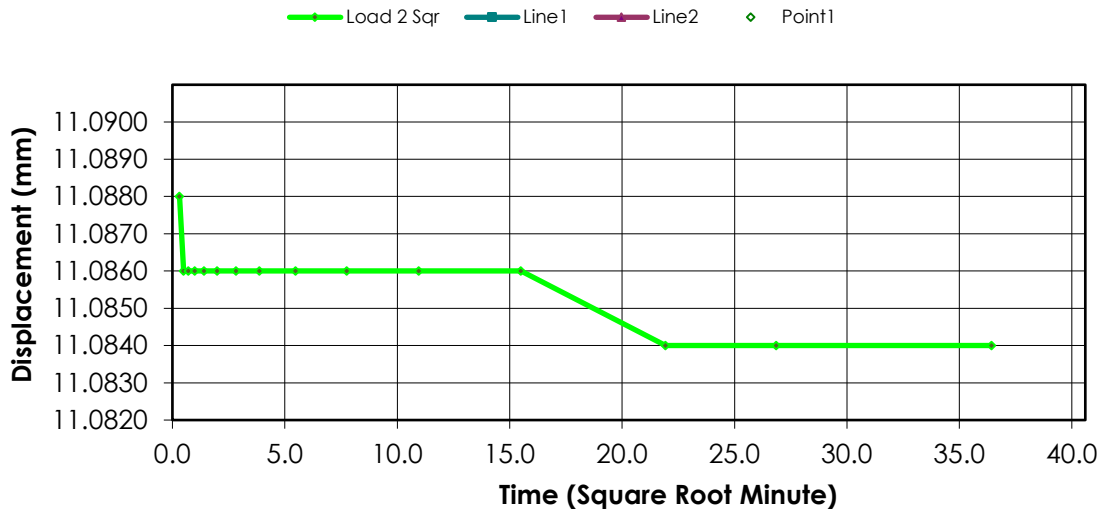
Remarks:

Sample Type: Undisturbed

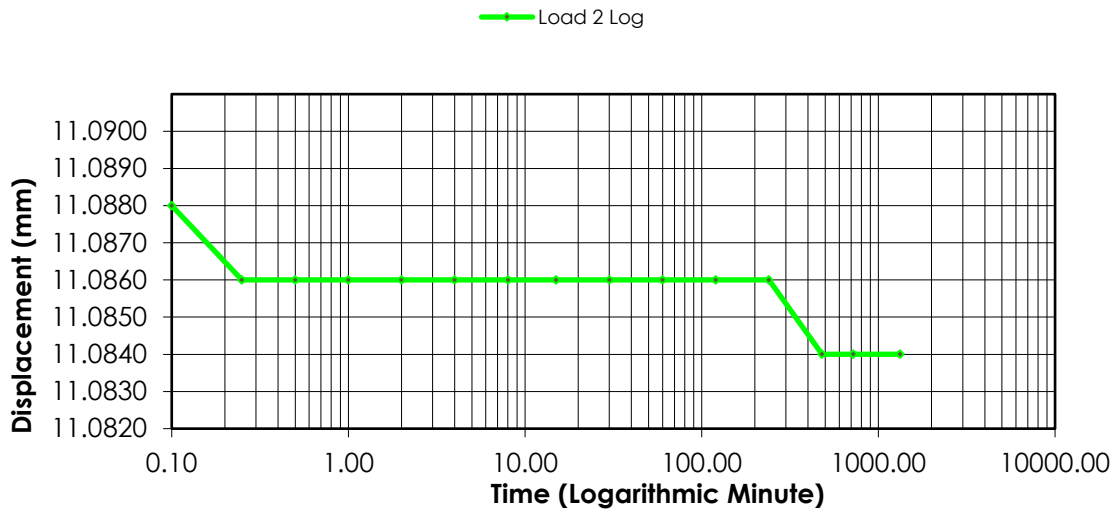
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	11.0960	0.0000	0.0000	0.3036
1	00:00:06	11.0880	-0.0020	-0.0135	0.3037
2	00:00:15	11.0860	0.0000	0.0000	0.3036
3	00:00:30	11.0860	0.0000	0.0000	0.3036
4	00:01:00	11.0860	0.0000	0.0000	0.3036
5	00:02:00	11.0860	0.0000	0.0000	0.3036
6	00:04:00	11.0860	0.0000	0.0000	0.3036
7	00:08:01	11.0860	0.0000	0.0000	0.3036
8	00:15:01	11.0860	0.0000	0.0000	0.3036
9	00:30:03	11.0860	0.0000	0.0000	0.3036
10	01:00:05	11.0860	0.0000	0.0000	0.3036
11	02:00:11	11.0860	0.0000	0.0000	0.3036
12	04:00:21	11.0860	0.0000	0.0000	0.3036
13	08:00:42	11.0840	0.0020	0.0135	0.3034
14	12:01:03	11.0840	0.0020	0.0135	0.3034
15	22:07:36	11.0840	0.0020	0.0135	0.3034

Consolidation Test Results (Sequence 2) Load 10.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 3) Load 20.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 12-Nov-18

Test Number:

Sample Number: GL2 ST24

Soil Description:

Boring Number:

Clay, Some Sand, Trace Gravel

Depth: 11.55-12.0m

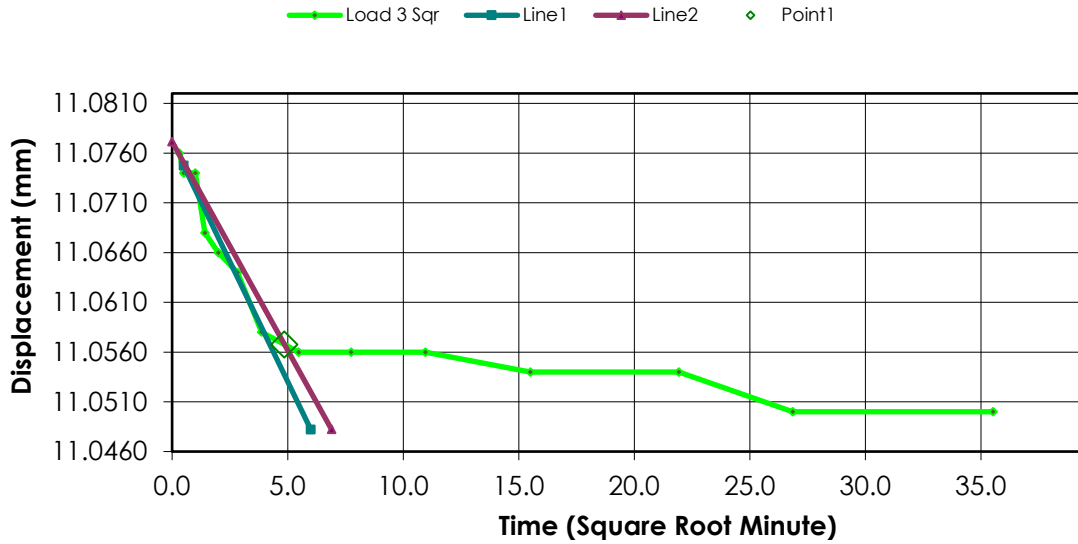
Remarks:

Sample Type: Undisturbed

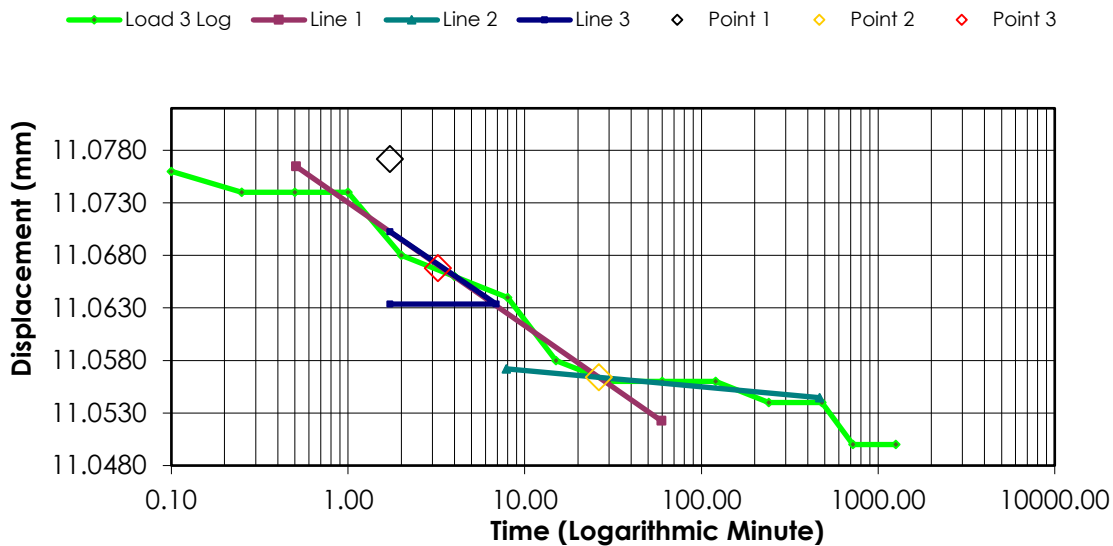
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	11.0840	0.0020	0.0135	0.3034
1	00:00:06	11.0760	-0.0140	-0.0943	0.3048
2	00:00:15	11.0740	-0.0120	-0.0809	0.3046
3	00:00:30	11.0740	-0.0120	-0.0809	0.3046
4	00:01:00	11.0740	-0.0120	-0.0809	0.3046
5	00:02:00	11.0680	-0.0060	-0.0404	0.3041
6	00:04:00	11.0660	-0.0040	-0.0270	0.3039
7	00:08:00	11.0640	-0.0020	-0.0135	0.3037
8	00:15:01	11.0580	0.0040	0.0270	0.3032
9	00:30:02	11.0560	0.0060	0.0404	0.3030
10	01:00:05	11.0560	0.0060	0.0404	0.3030
11	02:00:10	11.0560	0.0060	0.0404	0.3030
12	04:00:21	11.0540	0.0080	0.0539	0.3029
13	08:00:42	11.0540	0.0080	0.0539	0.3029
14	12:01:30	11.0500	0.0120	0.0809	0.3025
15	21:02:03	11.0500	0.0120	0.0809	0.3025

Consolidation Test Results (Sequence 3) Load 20.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 4) Load 40.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 12-Nov-18

Test Number:

Sample Number: GL2 ST24

Soil Description:

Boring Number:

Clay, Some Sand, Trace Gravel

Depth: 11.55-12.0m

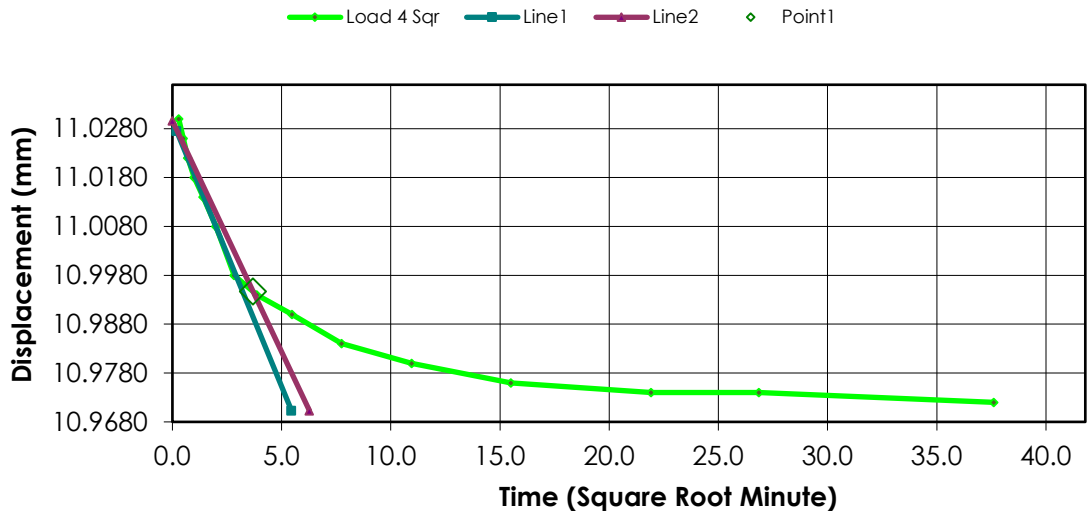
Remarks:

Sample Type: Undisturbed

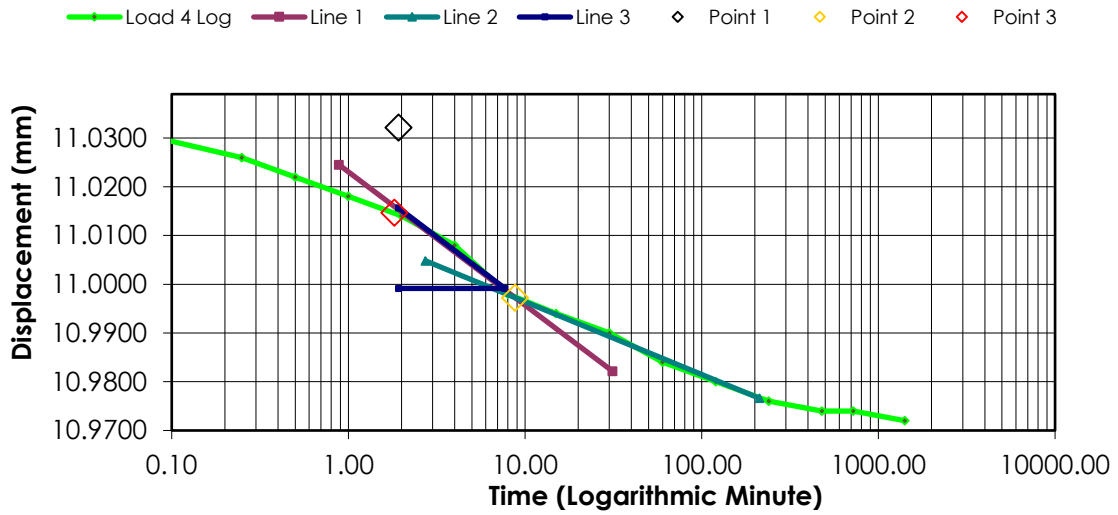
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	11.0500	0.0120	0.0809	0.3025
1	00:00:05	11.0300	-0.0140	-0.0943	0.3048
2	00:00:15	11.0260	-0.0100	-0.0674	0.3044
3	00:00:30	11.0220	-0.0060	-0.0404	0.3041
4	00:01:00	11.0180	-0.0020	-0.0135	0.3037
5	00:02:00	11.0140	0.0020	0.0135	0.3034
6	00:04:00	11.0080	0.0080	0.0539	0.3029
7	00:08:00	10.9980	0.0180	0.1213	0.3020
8	00:15:01	10.9940	0.0220	0.1482	0.3016
9	00:30:02	10.9900	0.0260	0.1752	0.3013
10	01:00:05	10.9840	0.0320	0.2156	0.3007
11	02:00:10	10.9800	0.0360	0.2426	0.3004
12	04:00:21	10.9760	0.0400	0.2695	0.3000
13	08:00:42	10.9740	0.0420	0.2830	0.2999
14	12:01:03	10.9740	0.0420	0.2830	0.2999
15	23:35:03	10.9720	0.0440	0.2965	0.2997

Consolidation Test Results (Sequence 4) Load 40.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 5) Load 80.000 kPa

Project: SR1 2018 Investigation
Location:
Job Number:

Project Number: 110773396

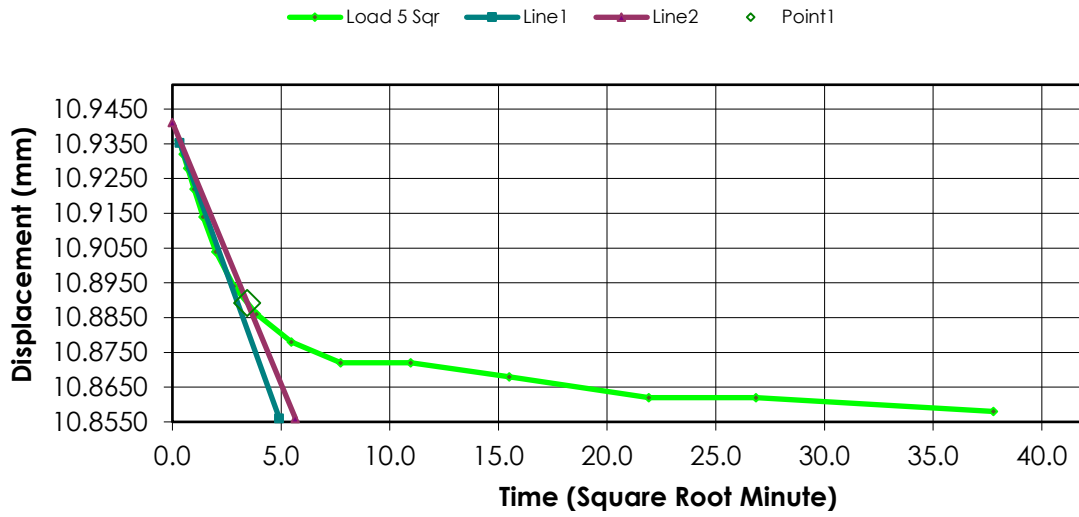
Test Date: 12-Nov-18
Test Number:

Sample Number: GL2 ST24 **Soil Description:**
Boring Number: Clay, Some Sand, Trace Gravel
Depth: 11.55-12.0m **Remarks:**
Sample Type: Undisturbed

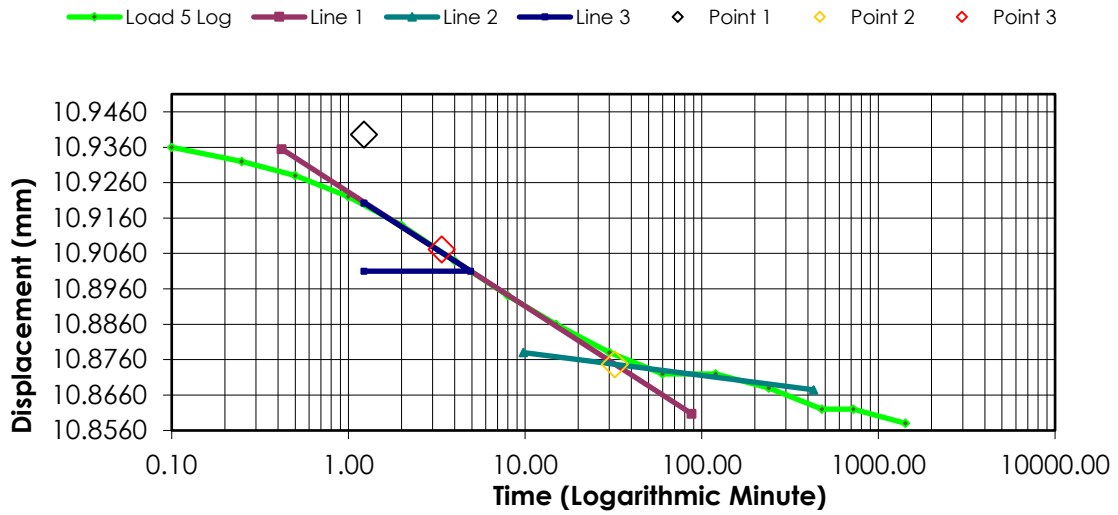
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	10.9720	0.0440	0.2965	0.2997
1	00:00:06	10.9360	0.0420	0.2830	0.2999
2	00:00:15	10.9320	0.0460	0.3100	0.2995
3	00:00:30	10.9280	0.0500	0.3369	0.2992
4	00:01:00	10.9220	0.0560	0.3774	0.2986
5	00:02:00	10.9140	0.0640	0.4313	0.2979
6	00:04:00	10.9040	0.0740	0.4987	0.2971
7	00:08:01	10.8940	0.0840	0.5660	0.2962
8	00:15:01	10.8860	0.0920	0.6199	0.2955
9	00:30:03	10.8780	0.1000	0.6739	0.2948
10	01:00:05	10.8720	0.1060	0.7143	0.2942
11	02:00:11	10.8720	0.1060	0.7143	0.2942
12	04:00:21	10.8680	0.1100	0.7412	0.2939
13	08:00:42	10.8620	0.1160	0.7817	0.2934
14	12:01:04	10.8620	0.1160	0.7817	0.2934
15	23:47:08	10.8580	0.1200	0.8086	0.2930

Consolidation Test Results (Sequence 5) Load 80.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 6) Load 160.000 kPa

Project: SR1 2018 Investigation
Location:
Job Number:

Project Number: 110773396

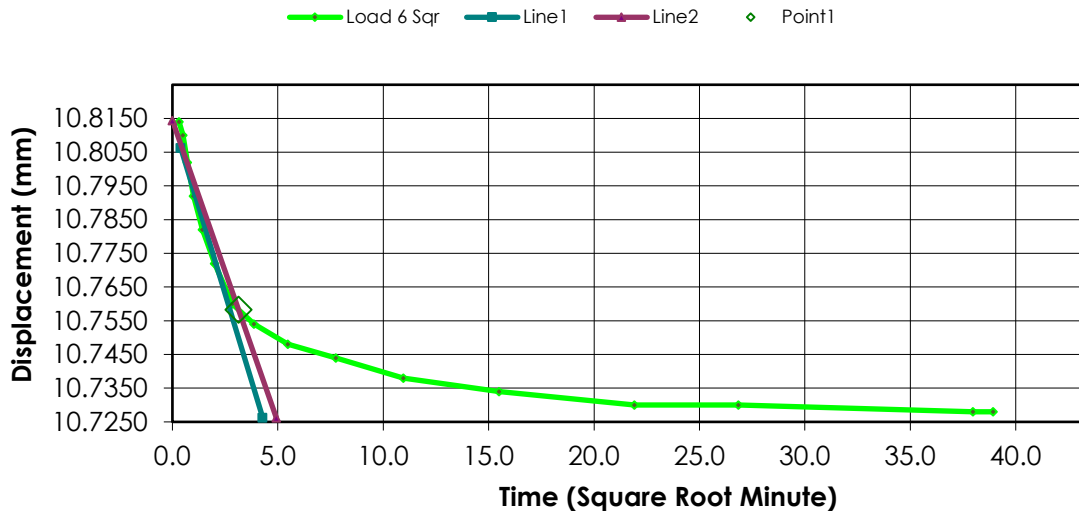
Test Date: 12-Nov-18
Test Number:

Sample Number: GL2 ST24 **Soil Description:**
Boring Number: Clay, Some Sand, Trace Gravel
Depth: 11.55-12.0m **Remarks:**
Sample Type: Undisturbed

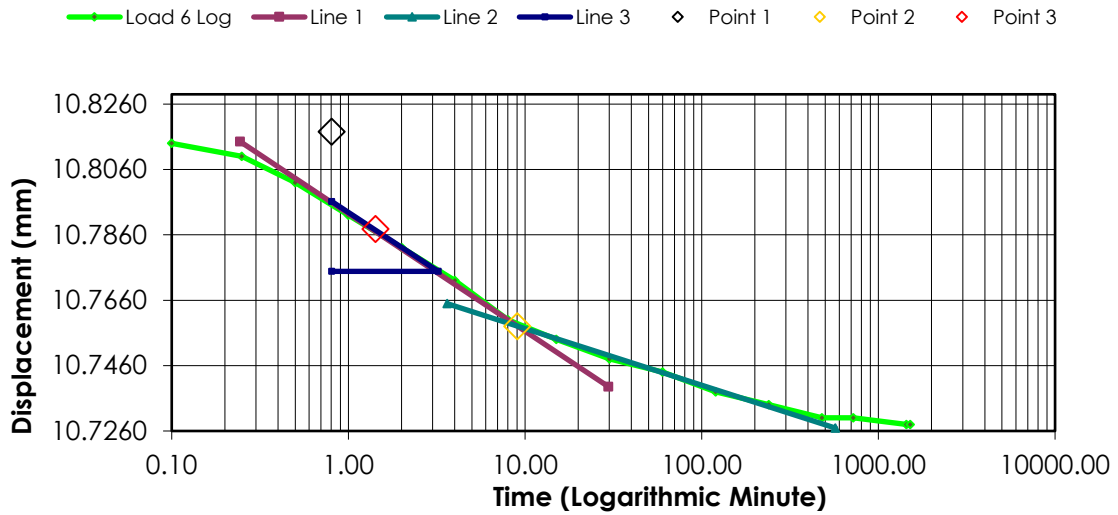
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	10.8580	0.1200	0.8086	0.2930
1	00:00:06	10.8140	0.1440	0.9703	0.2909
2	00:00:15	10.8100	0.1480	0.9973	0.2906
3	00:00:30	10.8020	0.1560	1.0512	0.2899
4	00:01:00	10.7920	0.1660	1.1186	0.2890
5	00:02:01	10.7820	0.1760	1.1860	0.2881
6	00:04:01	10.7720	0.1860	1.2534	0.2872
7	00:08:01	10.7600	0.1980	1.3342	0.2862
8	00:15:02	10.7540	0.2040	1.3747	0.2856
9	00:30:03	10.7480	0.2100	1.4151	0.2851
10	01:00:06	10.7440	0.2140	1.4420	0.2848
11	02:00:10	10.7380	0.2200	1.4825	0.2842
12	04:00:21	10.7340	0.2240	1.5094	0.2839
13	08:00:42	10.7300	0.2280	1.5364	0.2835
14	12:01:04	10.7300	0.2280	1.5364	0.2835
15	24:02:07	10.7280	0.2300	1.5499	0.2834
16	25:15:57	10.7280	0.2300	1.5499	0.2834

Consolidation Test Results (Sequence 6) Load 160.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 7) Load 320.000 kPa

Project: SR1 2018 Investigation
Location:
Job Number:

Project Number: 110773396

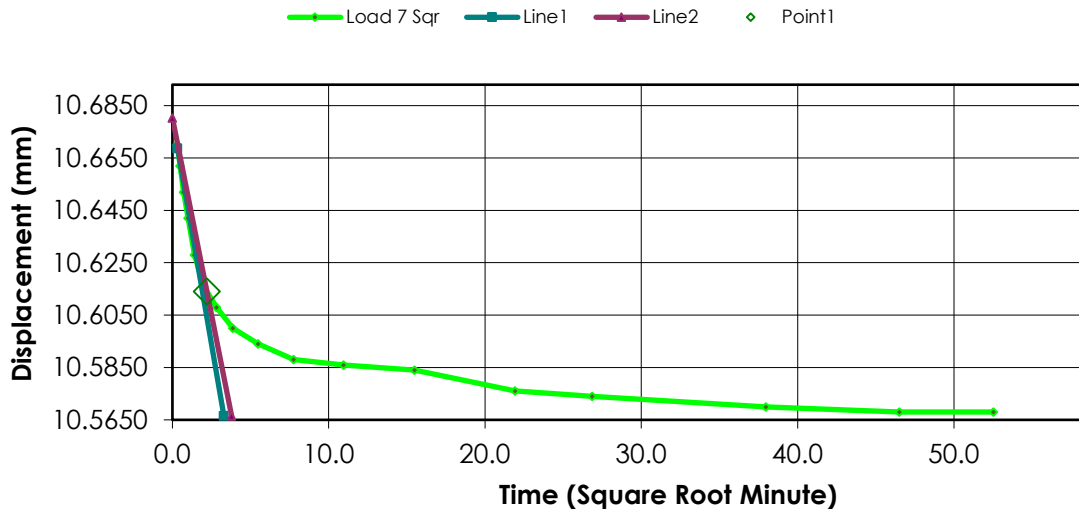
Test Date: 12-Nov-18
Test Number:

Sample Number: GL2 ST24 **Soil Description:**
Boring Number: Clay, Some Sand, Trace Gravel
Depth: 11.55-12.0m **Remarks:**
Sample Type: Undisturbed

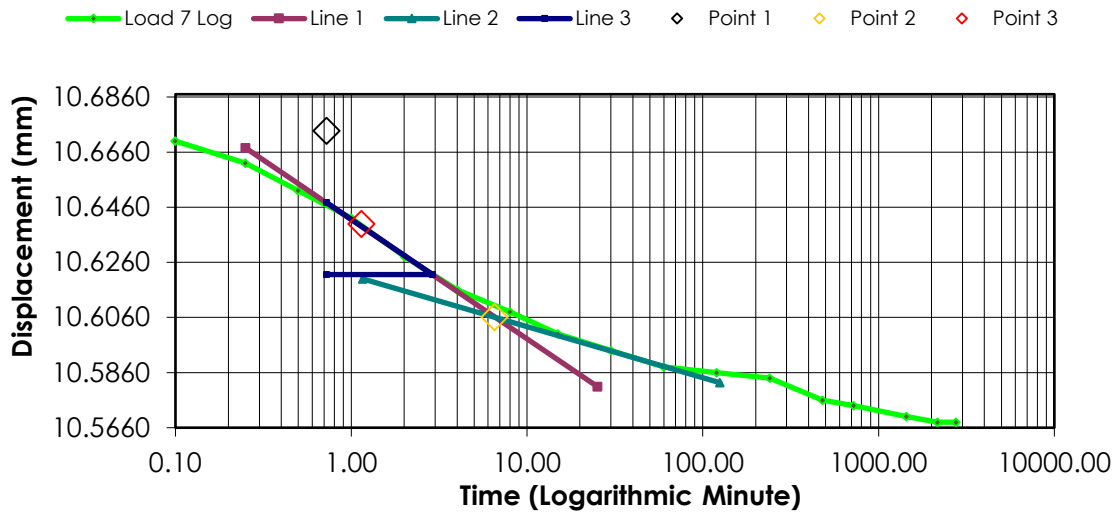
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	10.7280	0.2300	1.5499	0.2834
1	00:00:06	10.6700	0.2560	1.7251	0.2811
2	00:00:15	10.6620	0.2640	1.7790	0.2804
3	00:00:30	10.6520	0.2740	1.8464	0.2795
4	00:01:00	10.6420	0.2840	1.9137	0.2786
5	00:02:01	10.6280	0.2980	2.0081	0.2774
6	00:04:01	10.6160	0.3100	2.0889	0.2763
7	00:08:01	10.6080	0.3180	2.1429	0.2756
8	00:15:02	10.6000	0.3260	2.1968	0.2749
9	00:30:03	10.5940	0.3320	2.2372	0.2744
10	01:00:06	10.5880	0.3380	2.2776	0.2739
11	02:00:11	10.5860	0.3400	2.2911	0.2737
12	04:00:22	10.5840	0.3420	2.3046	0.2735
13	08:00:43	10.5760	0.3500	2.3585	0.2728
14	12:01:04	10.5740	0.3520	2.3720	0.2726
15	24:02:08	10.5700	0.3560	2.3989	0.2723
16	36:03:12	10.5680	0.3580	2.4124	0.2721
17	45:58:46	10.5680	0.3580	2.4124	0.2721

Consolidation Test Results (Sequence 7) Load 320.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 8) Load 640.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 12-Nov-18

Test Number:

Sample Number: GL2 ST24

Soil Description:

Boring Number:

Clay, Some Sand, Trace Gravel

Depth: 11.55-12.0m

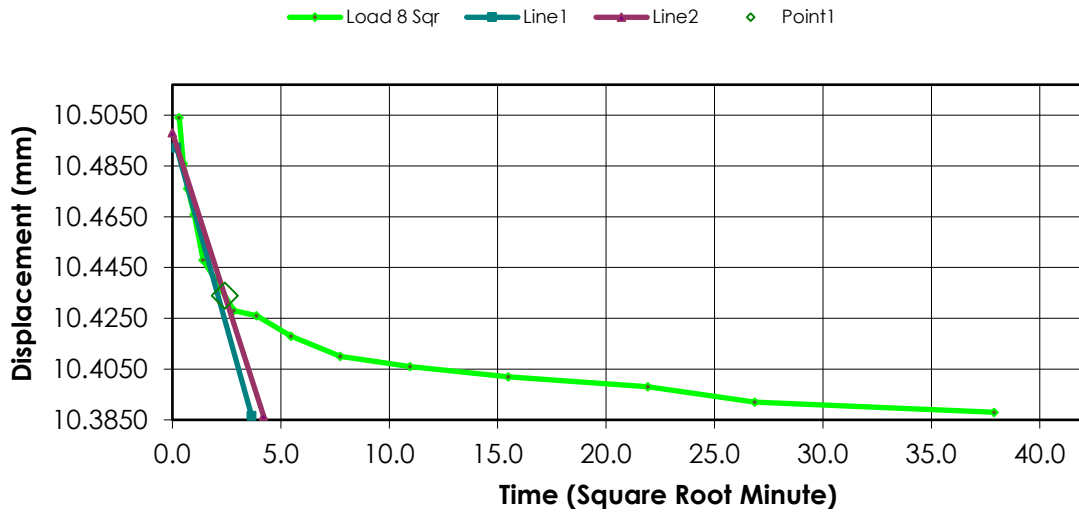
Remarks:

Sample Type: Undisturbed

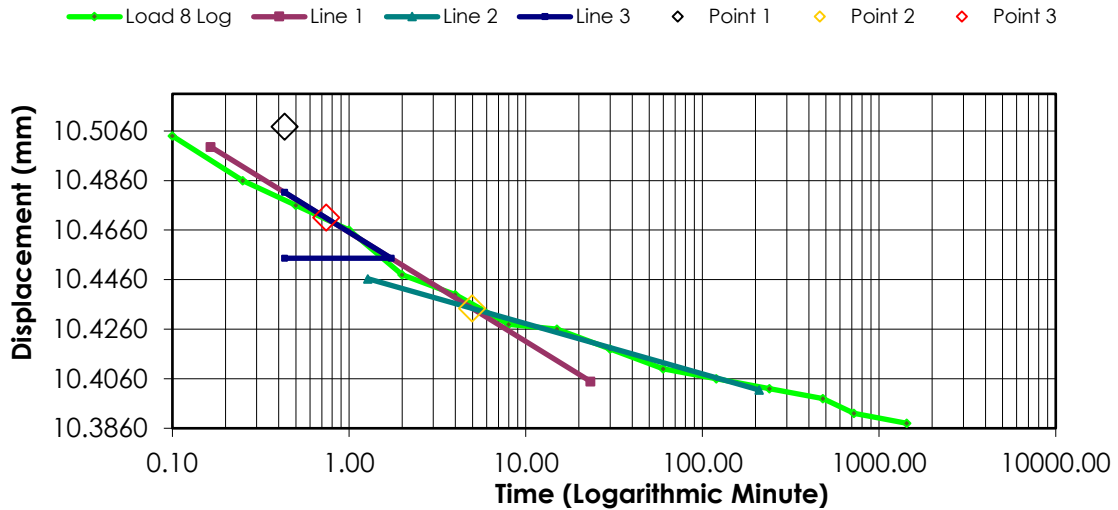
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	10.5680	0.3580	2.4124	0.2721
1	00:00:06	10.5040	0.3820	2.5741	0.2700
2	00:00:15	10.4860	0.4000	2.6954	0.2684
3	00:00:30	10.4760	0.4100	2.7628	0.2675
4	00:01:00	10.4660	0.4200	2.8302	0.2667
5	00:02:00	10.4480	0.4380	2.9515	0.2651
6	00:04:00	10.4400	0.4460	3.0054	0.2644
7	00:08:01	10.4280	0.4580	3.0863	0.2633
8	00:15:01	10.4260	0.4600	3.0997	0.2631
9	00:30:03	10.4180	0.4680	3.1536	0.2624
10	01:00:05	10.4100	0.4760	3.2075	0.2617
11	02:00:11	10.4060	0.4800	3.2345	0.2614
12	04:00:21	10.4020	0.4840	3.2615	0.2610
13	08:00:42	10.3980	0.4880	3.2884	0.2607
14	12:01:03	10.3920	0.4940	3.3288	0.2602
15	23:56:18	10.3880	0.4980	3.3558	0.2598

Consolidation Test Results (Sequence 8) Load 640.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 9) Rebound 320.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 12-Nov-18

Test Number:

Sample Number: GL2 ST24

Soil Description:

Boring Number:

Clay, Some Sand, Trace Gravel

Depth: 11.55-12.0m

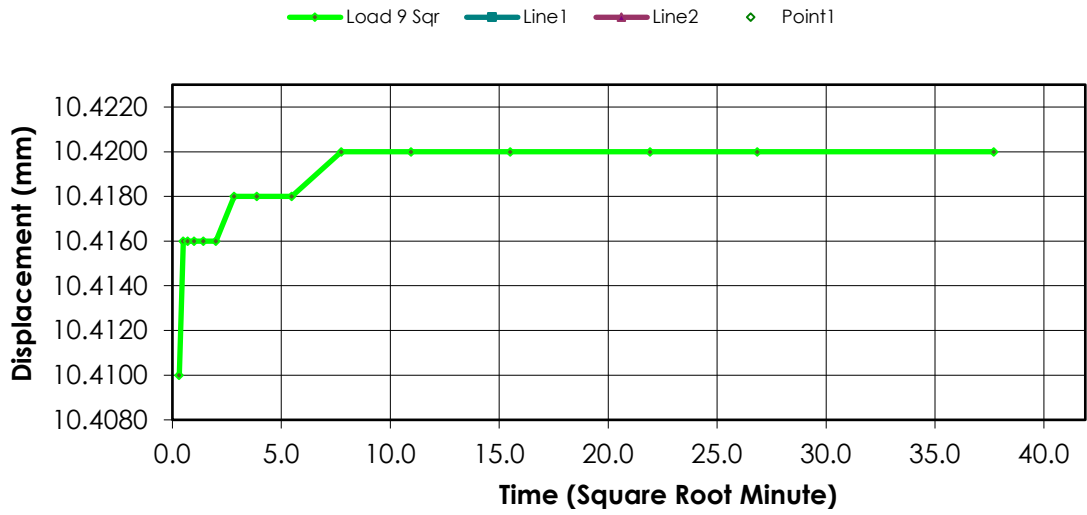
Remarks:

Sample Type: Undisturbed

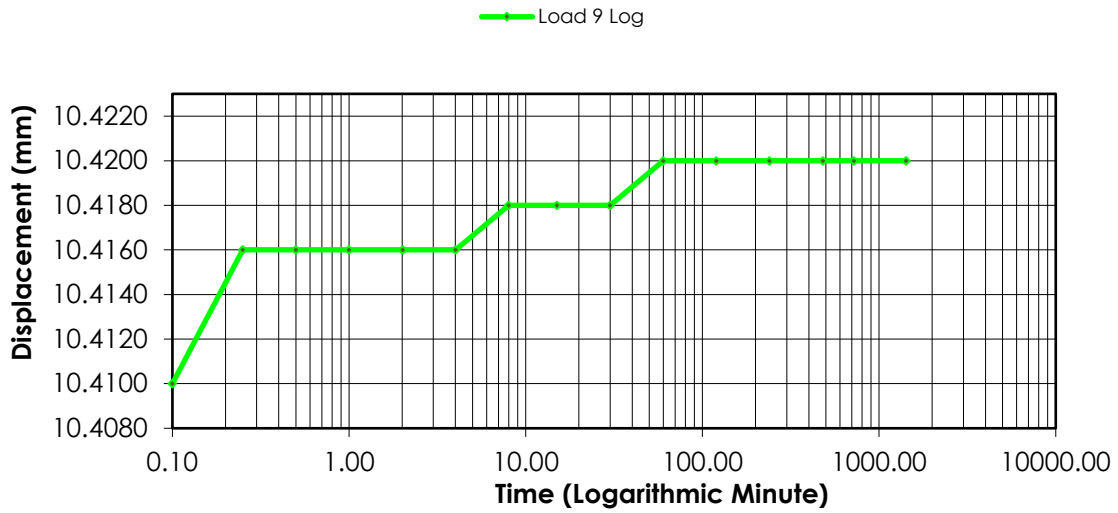
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	10.3880	0.4980	3.3558	0.2598
1	00:00:06	10.4100	0.4880	3.2884	0.2607
2	00:00:15	10.4160	0.4820	3.2480	0.2612
3	00:00:30	10.4160	0.4820	3.2480	0.2612
4	00:01:00	10.4160	0.4820	3.2480	0.2612
5	00:02:01	10.4160	0.4820	3.2480	0.2612
6	00:04:01	10.4160	0.4820	3.2480	0.2612
7	00:08:01	10.4180	0.4800	3.2345	0.2614
8	00:15:02	10.4180	0.4800	3.2345	0.2614
9	00:30:03	10.4180	0.4800	3.2345	0.2614
10	01:00:06	10.4200	0.4780	3.2210	0.2616
11	02:00:11	10.4200	0.4780	3.2210	0.2616
12	04:00:22	10.4200	0.4780	3.2210	0.2616
13	08:00:43	10.4200	0.4780	3.2210	0.2616
14	12:01:04	10.4200	0.4780	3.2210	0.2616
15	23:42:04	10.4200	0.4780	3.2210	0.2616

Consolidation Test Results (Sequence 9) Rebound 320.000 kPa

Consolidation Graph (Square-root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 10) Rebound 160.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 12-Nov-18

Test Number:

Sample Number: GL2 ST24

Soil Description:

Boring Number:

Clay, Some Sand, Trace Gravel

Depth: 11.55-12.0m

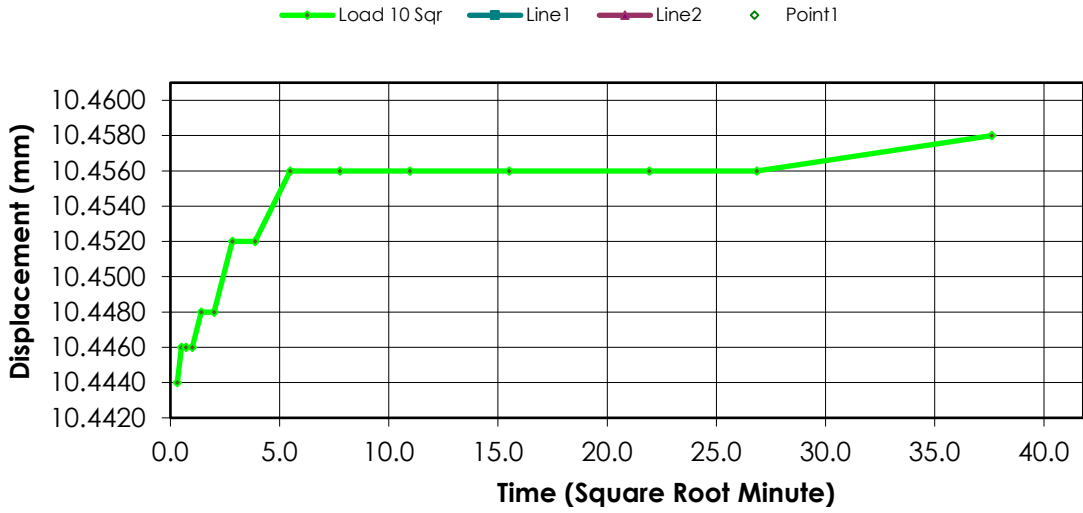
Remarks:

Sample Type: Undisturbed

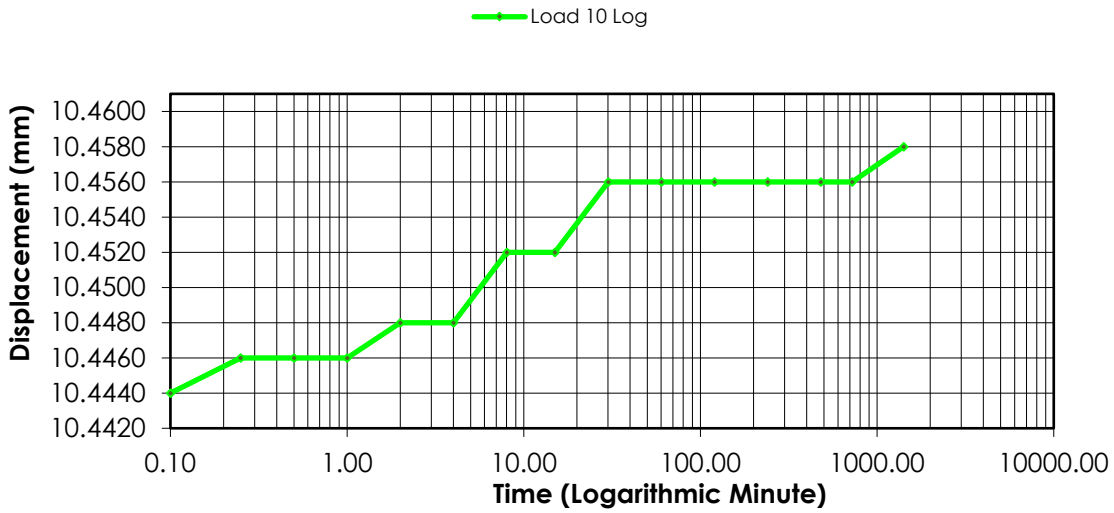
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	10.4200	0.4780	3.2210	0.2616
1	00:00:06	10.4440	0.4720	3.1806	0.2621
2	00:00:15	10.4460	0.4700	3.1671	0.2623
3	00:00:30	10.4460	0.4700	3.1671	0.2623
4	00:01:00	10.4460	0.4700	3.1671	0.2623
5	00:02:00	10.4480	0.4680	3.1536	0.2624
6	00:04:00	10.4480	0.4680	3.1536	0.2624
7	00:08:01	10.4520	0.4640	3.1267	0.2628
8	00:15:01	10.4520	0.4640	3.1267	0.2628
9	00:30:02	10.4560	0.4600	3.0997	0.2631
10	01:00:05	10.4560	0.4600	3.0997	0.2631
11	02:00:09	10.4560	0.4600	3.0997	0.2631
12	04:00:18	10.4560	0.4600	3.0997	0.2631
13	08:00:35	10.4560	0.4600	3.0997	0.2631
14	12:00:52	10.4560	0.4600	3.0997	0.2631
15	23:33:33	10.4580	0.4580	3.0863	0.2633

Consolidation Test Results (Sequence 10) Rebound 160.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 11) Load 320.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 12-Nov-18

Test Number:

Sample Number: GL2 ST24

Soil Description:

Boring Number:

Clay, Some Sand, Trace Gravel

Depth: 11.55-12.0m

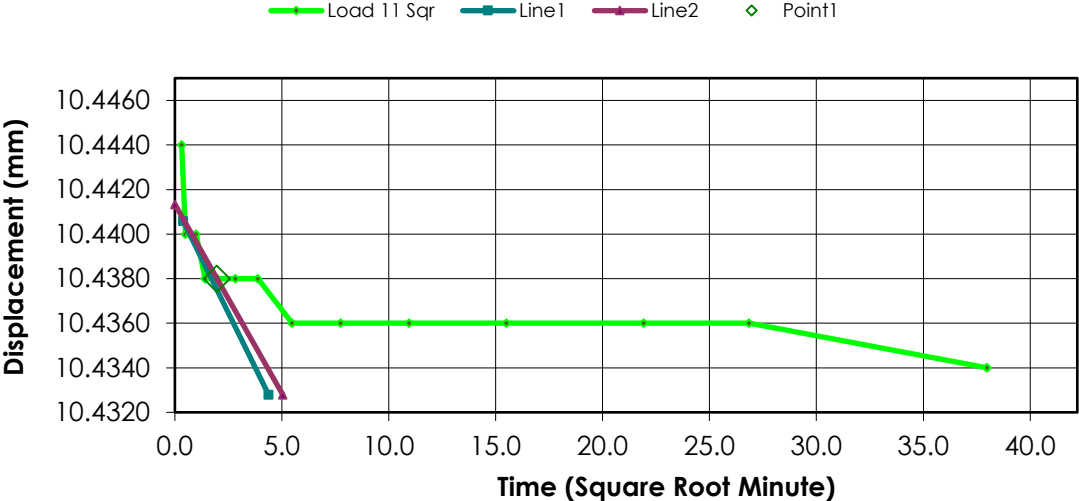
Remarks:

Sample Type: Undisturbed

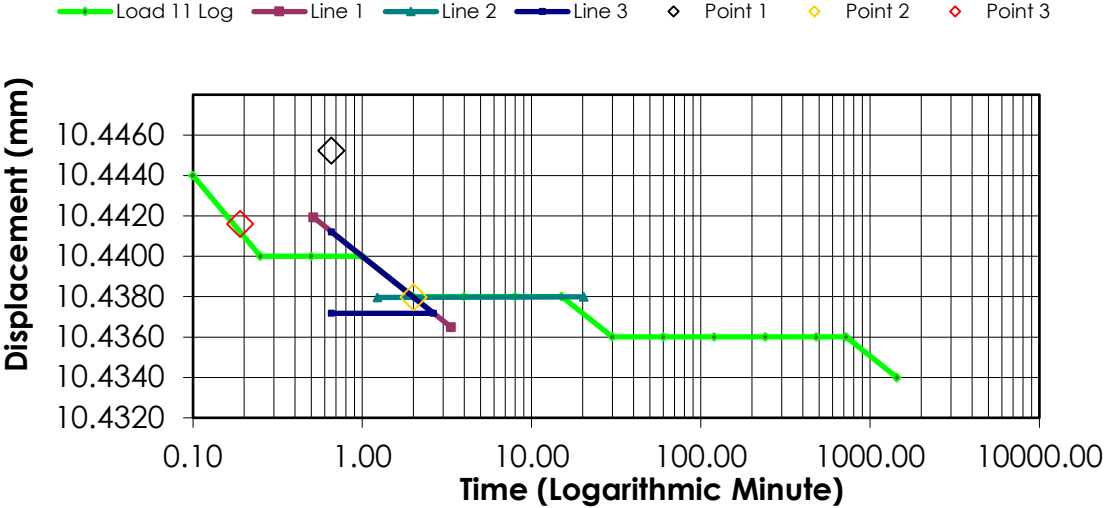
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	10.4580	0.4580	3.0863	0.2633
1	00:00:06	10.4440	0.4660	3.1402	0.2626
2	00:00:15	10.4400	0.4700	3.1671	0.2623
3	00:00:30	10.4400	0.4700	3.1671	0.2623
4	00:01:00	10.4400	0.4700	3.1671	0.2623
5	00:02:00	10.4380	0.4720	3.1806	0.2621
6	00:04:00	10.4380	0.4720	3.1806	0.2621
7	00:08:00	10.4380	0.4720	3.1806	0.2621
8	00:15:01	10.4380	0.4720	3.1806	0.2621
9	00:30:02	10.4360	0.4740	3.1941	0.2619
10	01:00:04	10.4360	0.4740	3.1941	0.2619
11	02:00:08	10.4360	0.4740	3.1941	0.2619
12	04:00:17	10.4360	0.4740	3.1941	0.2619
13	08:00:34	10.4360	0.4740	3.1941	0.2619
14	12:00:52	10.4360	0.4740	3.1941	0.2619
15	24:01:44	10.4340	0.4760	3.2075	0.2617
16	24:02:33	10.4340	0.4760	3.2075	0.2617

Consolidation Test Results (Sequence 11) Load 320.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 12) Load 640.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 12-Nov-18

Test Number:

Sample Number: GL2 ST24

Soil Description:

Boring Number:

Clay, Some Sand, Trace Gravel

Depth: 11.55-12.0m

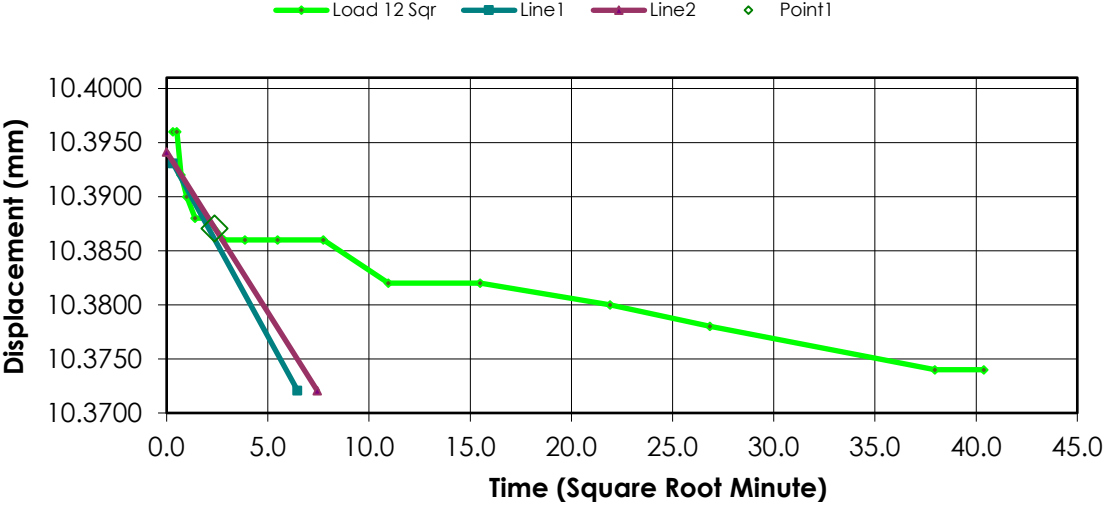
Remarks:

Sample Type: Undisturbed

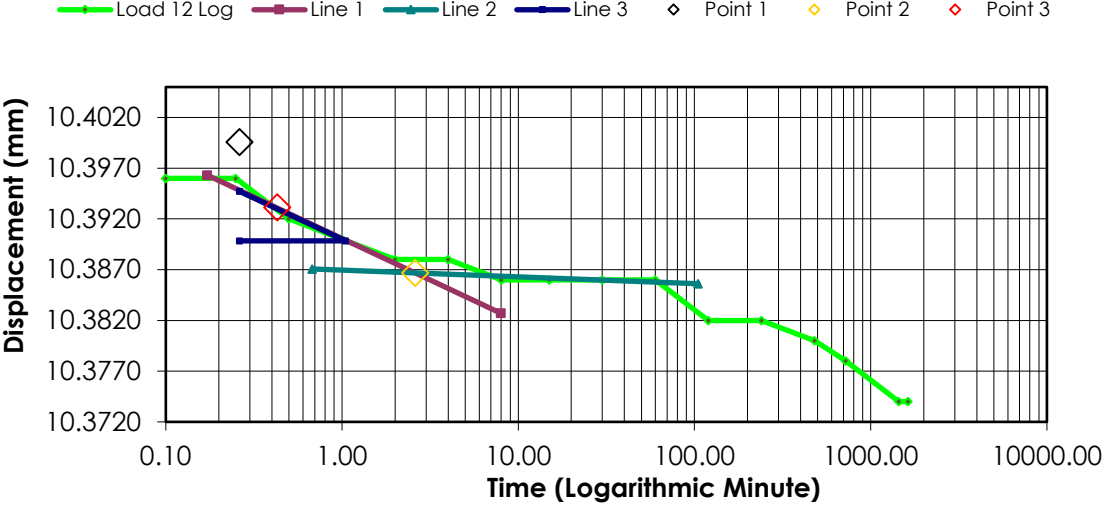
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	10.4340	0.4760	3.2075	0.2617
1	00:00:06	10.3960	0.4900	3.3019	0.2605
2	00:00:15	10.3960	0.4900	3.3019	0.2605
3	00:00:30	10.3920	0.4940	3.3288	0.2602
4	00:01:00	10.3900	0.4960	3.3423	0.2600
5	00:02:00	10.3880	0.4980	3.3558	0.2598
6	00:04:00	10.3880	0.4980	3.3558	0.2598
7	00:08:01	10.3860	0.5000	3.3693	0.2596
8	00:15:01	10.3860	0.5000	3.3693	0.2596
9	00:30:02	10.3860	0.5000	3.3693	0.2596
10	01:00:04	10.3860	0.5000	3.3693	0.2596
11	02:00:09	10.3820	0.5040	3.3962	0.2593
12	04:00:18	10.3820	0.5040	3.3962	0.2593
13	08:00:35	10.3800	0.5060	3.4097	0.2591
14	12:00:50	10.3780	0.5080	3.4232	0.2589
15	24:01:43	10.3740	0.5120	3.4501	0.2586
16	27:10:32	10.3740	0.5120	3.4501	0.2586

Consolidation Test Results (Sequence 12) Load 640.000 kPa

Consolidation Graph (Square-root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 13) Load 1280.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 12-Nov-18

Test Number:

Sample Number: GL2 ST24

Soil Description:

Boring Number:

Clay, Some Sand, Trace Gravel

Depth: 11.55-12.0m

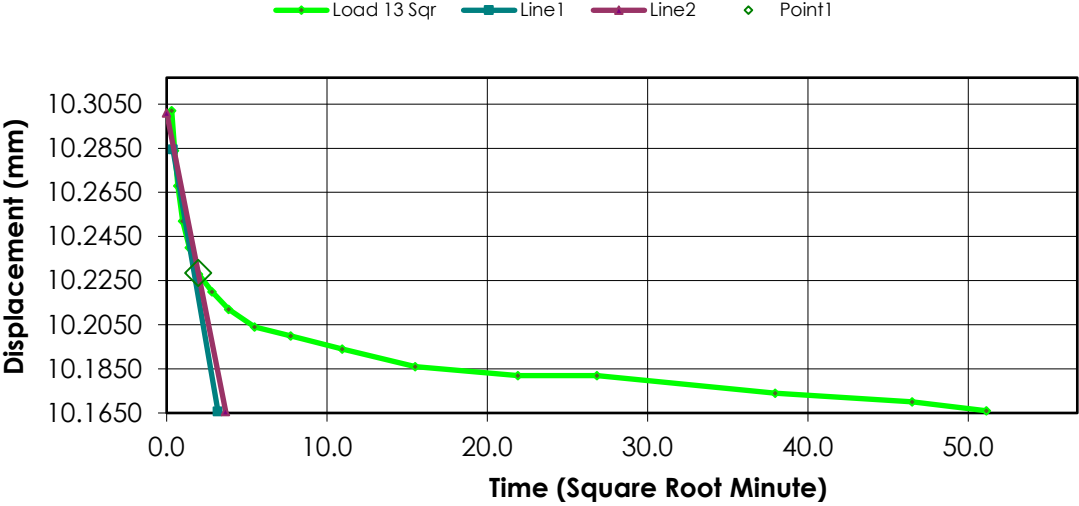
Remarks:

Sample Type: Undisturbed

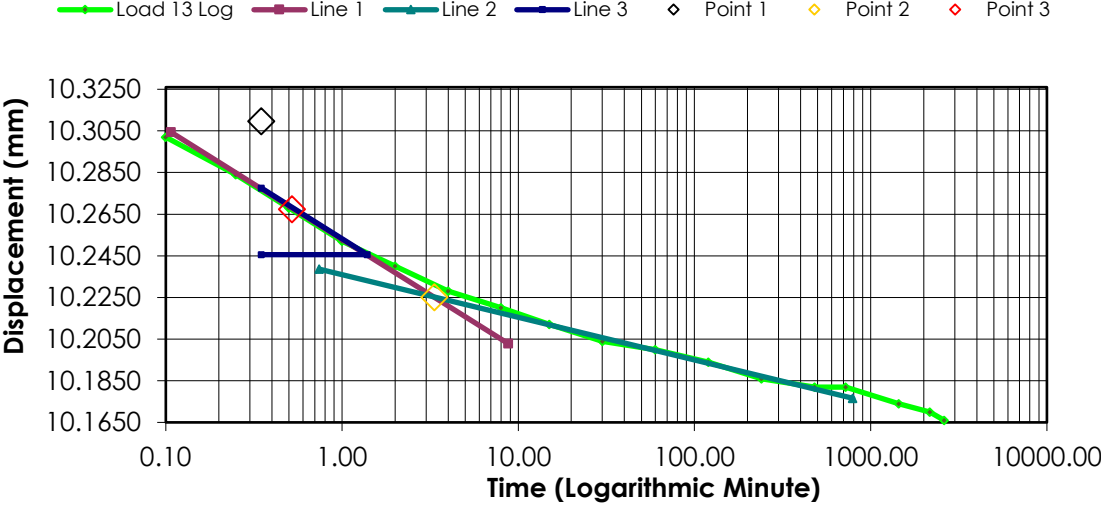
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	10.3740	0.5120	3.4501	0.2586
1	00:00:06	10.3020	0.5260	3.5445	0.2574
2	00:00:15	10.2840	0.5440	3.6658	0.2558
3	00:00:30	10.2680	0.5600	3.7736	0.2544
4	00:01:00	10.2520	0.5760	3.8814	0.2530
5	00:02:00	10.2400	0.5880	3.9623	0.2519
6	00:04:00	10.2280	0.6000	4.0431	0.2509
7	00:08:00	10.2200	0.6080	4.0970	0.2501
8	00:15:01	10.2120	0.6160	4.1509	0.2494
9	00:30:02	10.2040	0.6240	4.2049	0.2487
10	01:00:04	10.2000	0.6280	4.2318	0.2484
11	02:00:08	10.1940	0.6340	4.2722	0.2479
12	04:00:17	10.1860	0.6420	4.3261	0.2472
13	08:00:35	10.1820	0.6460	4.3531	0.2468
14	12:00:52	10.1820	0.6460	4.3531	0.2468
15	24:01:44	10.1740	0.6540	4.4070	0.2461
16	36:02:37	10.1700	0.6580	4.4340	0.2458
17	43:34:40	10.1660	0.6620	4.4609	0.2454

Consolidation Test Results (Sequence 13) Load 1280.000 kPa

Consolidation Graph (Square Root Time)



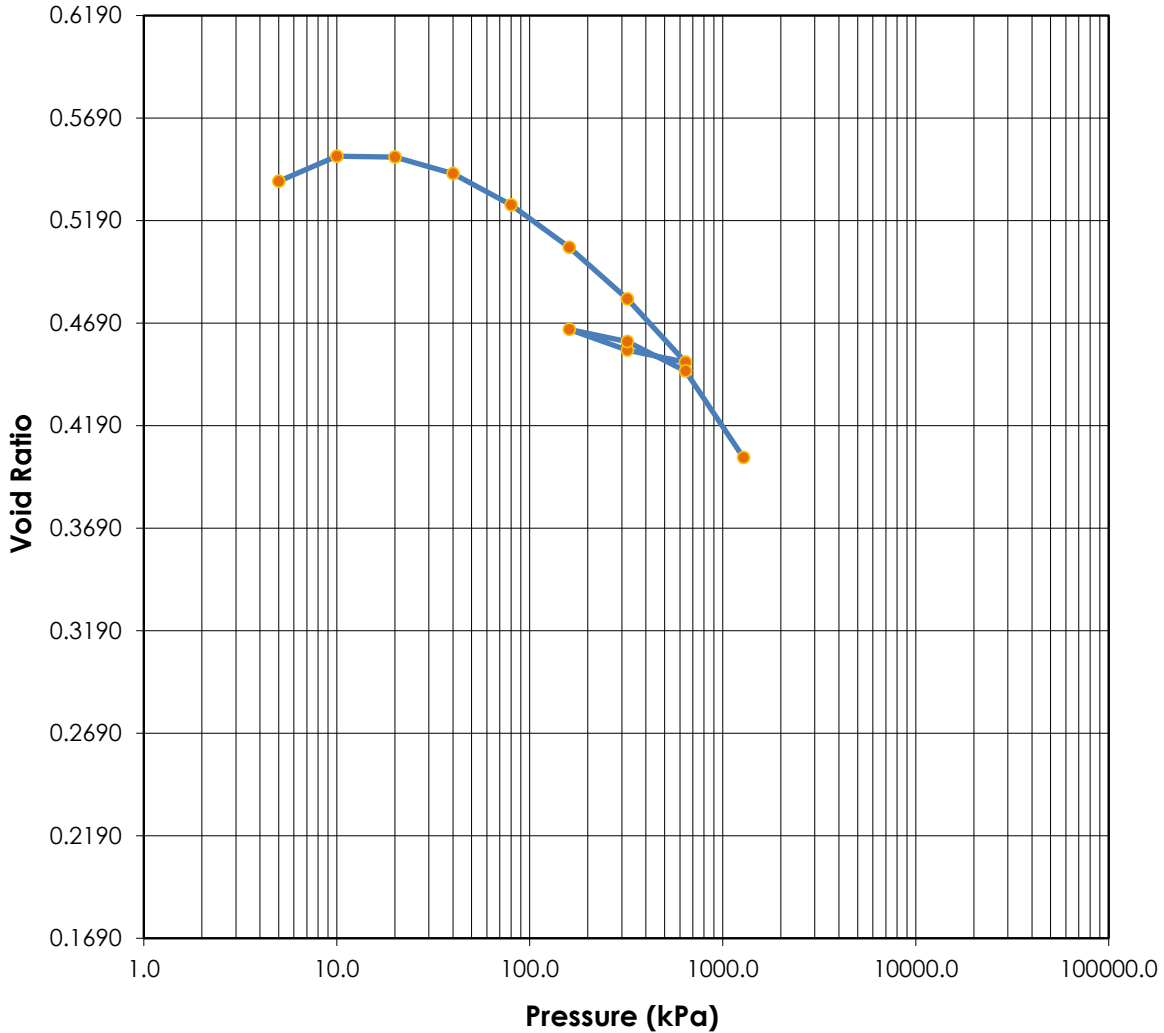
Consolidation Graph (Logarithmic Time)





Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876



	Before	After	Liquid Limits:	46	Test Date:	15-Oct-18
Moisture (%):	20.5	19.9	Plastic Limits:	17		
Dry Density (g/cm³):	1.720	1.855	Plasticity Index (%):	29		
Saturation (%):	100	100				
Void Ratio:	0.5370	0.4023	Specific Gravity:	2.65	Assumed	
Soil Description:	Clay (Cl), Some Sand, Trace Gravel					
Project Number:	110773396	Depth:	3.75-3.70m			
Sample Number:	GL3A ST6	Boring Number:				
Project:	SRT 2018 Investigation					
Client:	Alberta Transportation					
Location:						
			Remarks:			

Tested By: E. Wahl

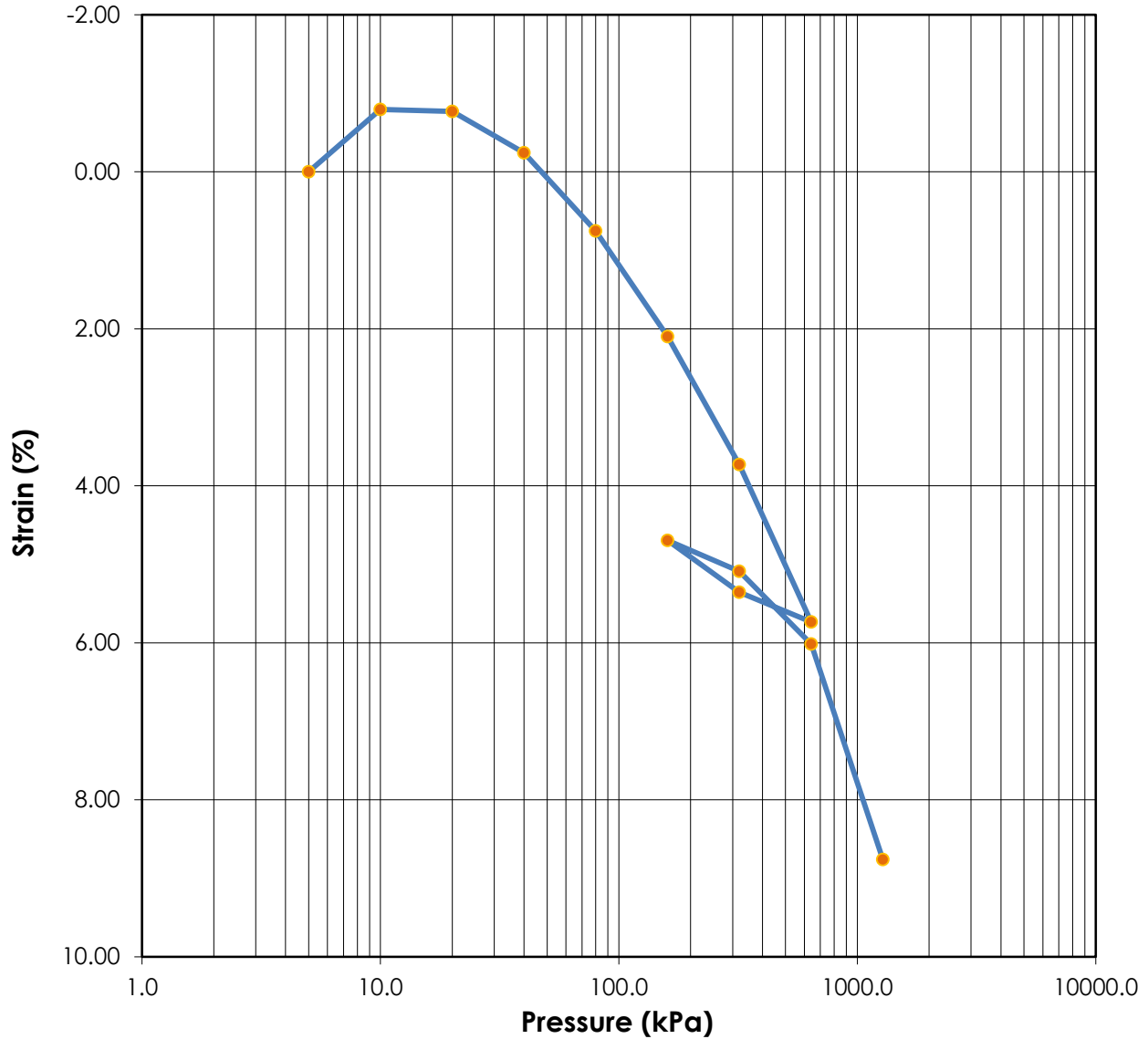
Reviewed By: C. Lamoureux

Reporting of these test results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request. The data presented above is for the sole use of the client stipulated above. Stantec is not responsible, nor can be held liable, for the use of this report by any other party, with or without the knowledge of Stantec.



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876

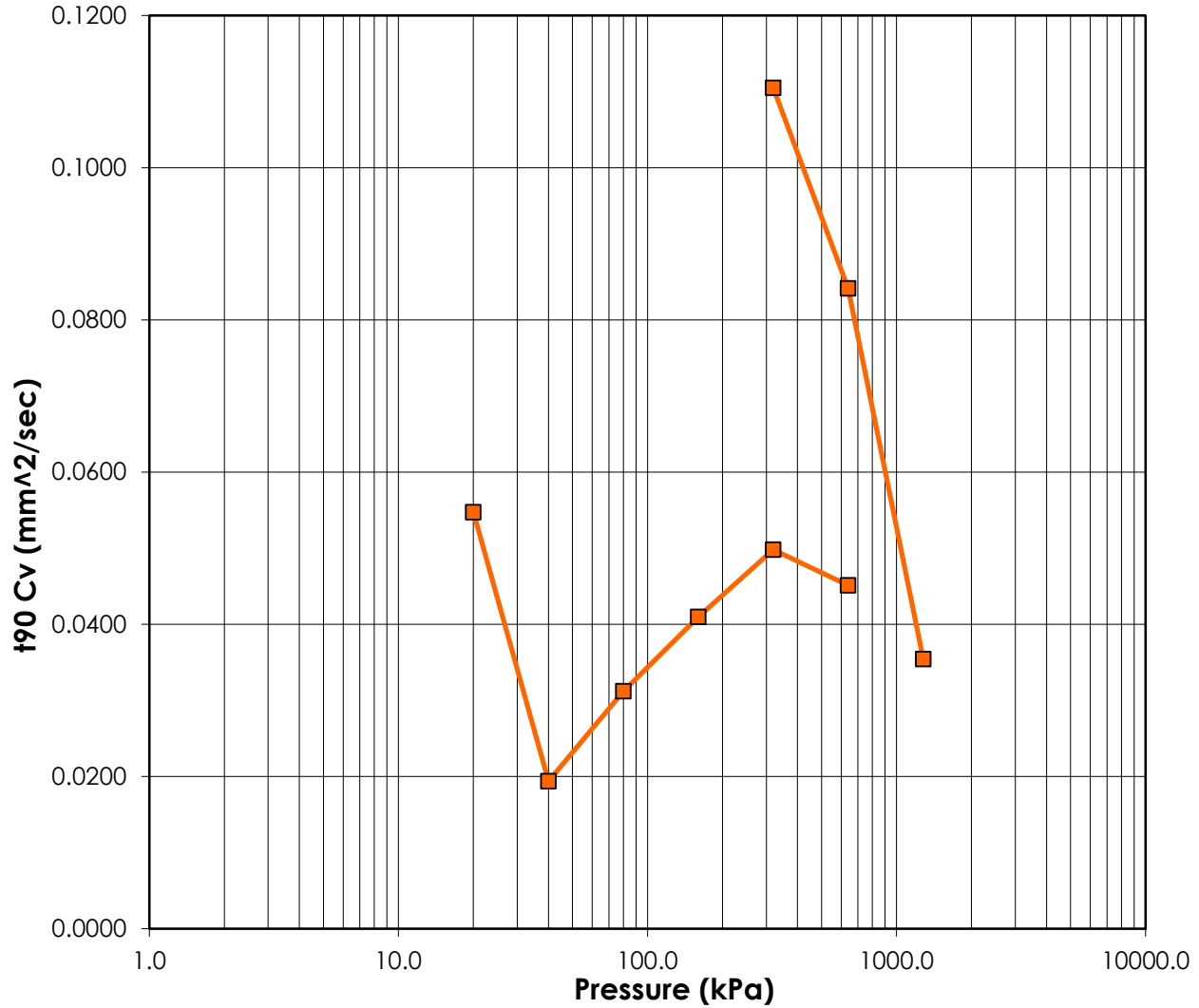


	Before	After	Liquid Limits:	46	Test Date:	15-Oct-18
Moisture (%):	20.5	19.9	Plastic Limits:	17		
Dry Density (g/cm3):	1.720	1.855	Plasticity Index (%):	29		
Saturation (%):	100	100	Specific Gravity:	2.65	Assumed	
Void Ratio:	0.5370	0.4023				
Sample Description:	Clay (Cl), Some Sand, Trace Gravel					
Project Number:	110773396	Depth:	3.75-3.70m			
Sample Number:	GL3A ST6	Boring Number:				
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						
			Remarks:			



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876



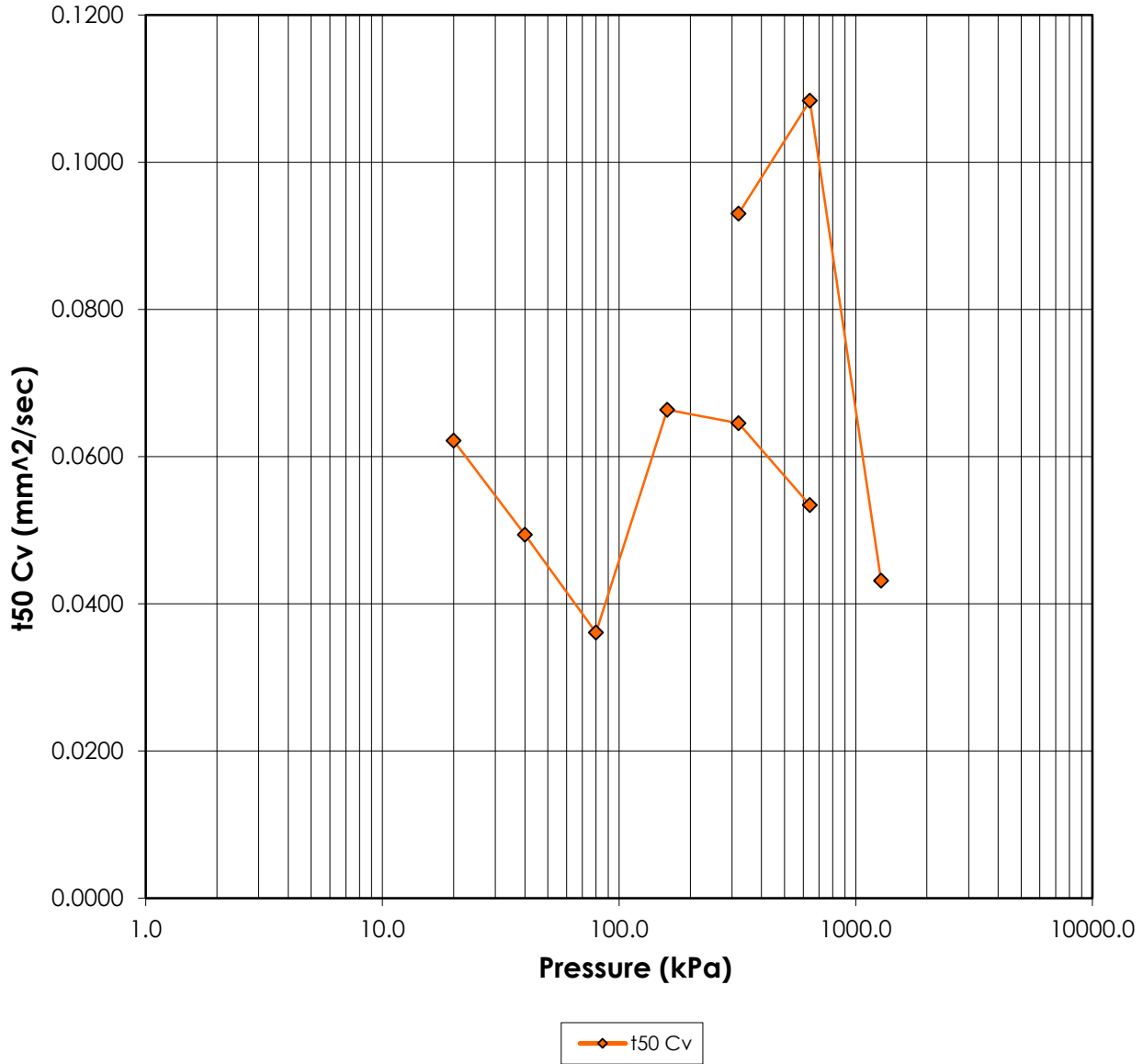
—■— $t_{90} C_v$

	Before	After	Liquid Limits:	46	Test Date:	15-Oct-18
Moisture (%):	20.5	19.9	Plastic Limits:	17		
Dry Density (g/cm³):	1.720	1.855	Plasticity Index (%):	29		
Saturation (%):	100	100				
Void Ratio:	0.5370	0.4023	Specific Gravity:	2.65	Assumed	
Soil Description:	Clay (Cl), Some Sand, Trace Gravel					
Project Number:	110773396	Depth:	3.75-3.70m			
Sample Number:	GL3A ST6	Boring Number:				
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						
			Remarks:			



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
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 Tel: (403) 253-7876

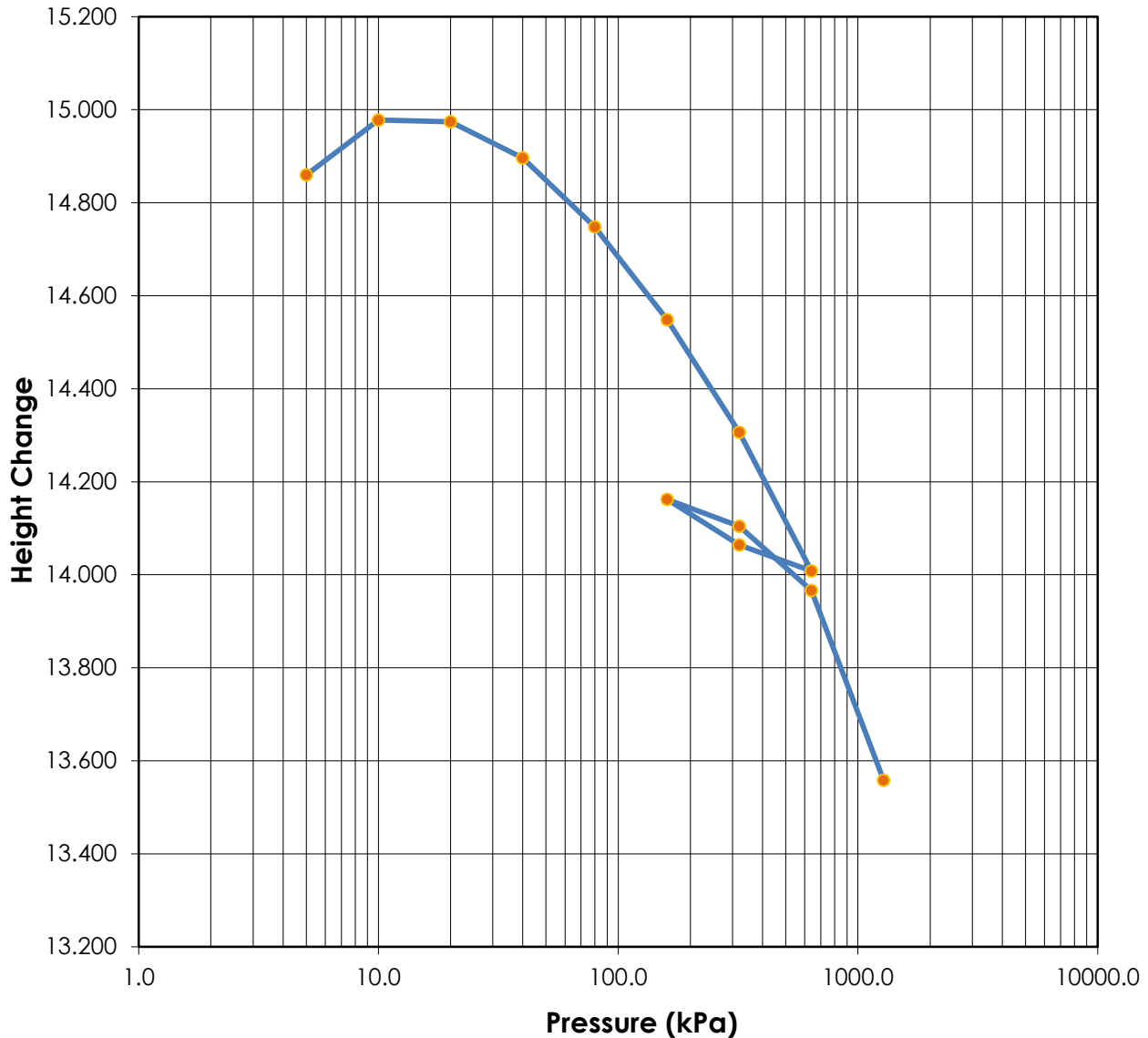


	Before	After	Liquid Limits:	46	Test Date:	15-Oct-18
Moisture (%):	20.5	19.9	Plastic Limits:	17		
Dry Density (g/cm³):	1.720	1.855	Plasticity Index (%):	29		
Saturation (%):	100	100				
Void Ratio:	0.5370	0.4023	Specific Gravity:	2.65	Assumed	
Soil Description:	Clay (Cl), Some Sand, Trace Gravel					
Project Number:	110773396	Depth:	3.75-3.70m			
Sample Number:	GL3A ST6	Boring Number:				
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						
			Remarks:			



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

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 Tel: (403) 253-7876



	Before	After	Liquid Limits:	46	Test Date:	15-Oct-18
Moisture (%):	20.5	19.9	Plastic Limits:	17		
Dry Density (g/cm3):	1.720	1.855	Plasticity Index (%):	29		
Saturation (%):	100	100				
Void Ratio:	0.5370	0.4023	Specific Gravity:	2.65	Assumed	
Soil Description:	Clay (Cl), Some Sand, Trace Gravel					
Project Number:	110773396	Depth:	3.75-3.70m			
Sample Number:	GL3A ST6	Boring Number:				
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						
						Remarks:

Consolidation Test Results Summary

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Sample Number: GL3A ST6

Sample Description:

Boring Number:

Clay (Cl), Some Sand, Trace Gravel

Depth: 3.75-3.70m

Remarks:

Test Number:

Sample Type: Undisturbed

Test Date: 15-Oct-18

Index	Load Sequence (kPa)	Cumulative Change in Height (mm)	Specimen Height (mm)	Height of Void (mm)	Vertical Strain (%)	Void Ratio	t90 Fitting Time (min)	t50 Fitting Time (min)	t90 Cv (mm ² /sec)	t50 Cv (mm ² /sec)
0	0.000	0.0000	14.8600	5.1991	0.00	0.5382	0.000	0.000	0.000	0.000
1	5.000	0.0000	14.8600	5.1991	0.00	0.5382	0.000	0.000	0.000	0.000
2	10.000	-0.1180	14.9780	5.3171	-0.79	0.5504	0.000	0.000	0.000	0.000
3	20.000	-0.1140	14.9740	5.3131	-0.77	0.5500	14.472	2.960	0.055	0.062
4	40.000	-0.0360	14.8960	5.2351	-0.24	0.5419	40.445	3.688	0.019	0.049
5	80.000	0.1120	14.7480	5.0871	0.75	0.5266	24.627	4.947	0.031	0.036
6	160.000	0.3120	14.5480	4.8871	2.10	0.5059	18.259	2.618	0.041	0.066
7	320.000	0.5540	14.3060	4.6451	3.73	0.4808	14.522	2.603	0.050	0.065
8	640.000	0.8520	14.0080	4.3471	5.73	0.4500	15.366	3.015	0.045	0.053
9	320.000	0.7960	14.0640	4.4031	5.36	0.4558	0.000	0.000	0.000	0.000
10	160.000	0.6980	14.1620	4.5011	4.70	0.4659	0.000	0.000	0.000	0.000
11	320.000	0.7560	14.1040	4.4431	5.09	0.4599	6.362	1.755	0.110	0.093
12	640.000	0.8940	13.9660	4.3051	6.02	0.4456	8.191	1.478	0.084	0.108
13	1280.000	1.3020	13.5580	3.8971	8.76	0.4034	18.329	3.498	0.035	0.043

Predicted value indicated with *

Consolidation Test Consolidation Specimen Information

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Sample Number: GL3A ST6

Sample Description:

Boring Number:

Clay (Cl), Some Sand, Trace Gravel

Depth: 3.75-3.70m

Remarks:

Sample Type: Undisturbed

Test Number:

Liquid Limit: 46

Initial Void Ratio: 0.5370

Initial Height (mm): 14.86

Plastic Limit: 17

Plasticity Index (%): 29

Initial Diameter (mm): 50.00

Specific Gravity: 2.65

Weight of Ring (g): 60.81

Assumed

Parameters	Initial Specimen	Final Specimen
Moist Weight + Container (g)	92.18	63.24
Dry Soil + Container (g)	77.22	53.44
Weight of Container (g)	4.20	4.12
Moisture Content (%)	20.5	19.9
Void Ratio	0.5370	0.4023
Saturation (%)	100	100
Dry Density (g/cm ³)	1.720	1.855

Consolidation Test Results
(Sequence 1) Load 5.000 kPa

Project: SR1 2018 Investigation
Location:
Job Number:

Project Number: 110773396

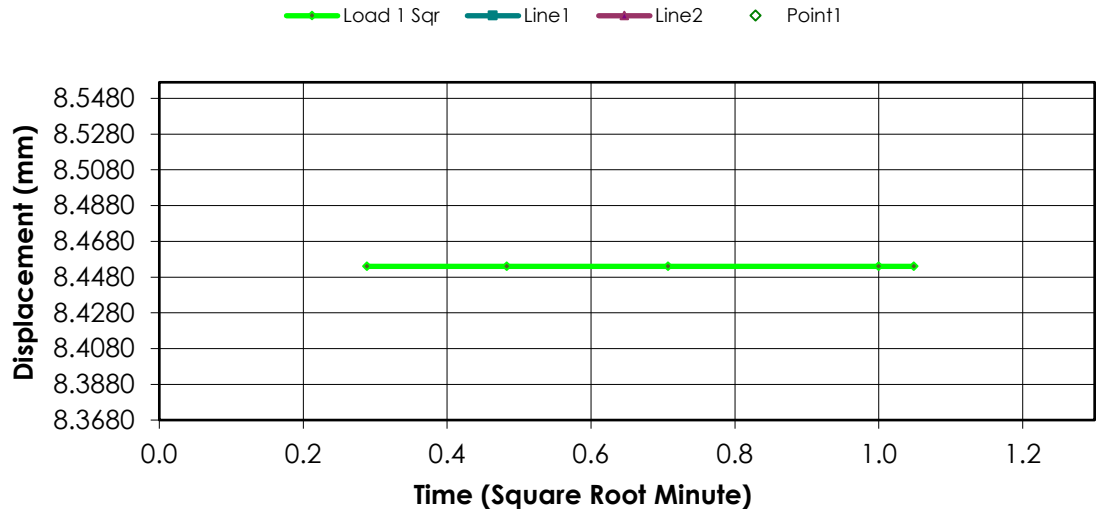
Test Date: 15-Oct-18
Test Number:

Sample Number: GL3A ST6 **Soil Description:**
Boring Number: Clay (Cl), Some Sand, Trace Gravel
Depth: 3.75-3.70m **Remarks:**
Sample Type: Undisturbed

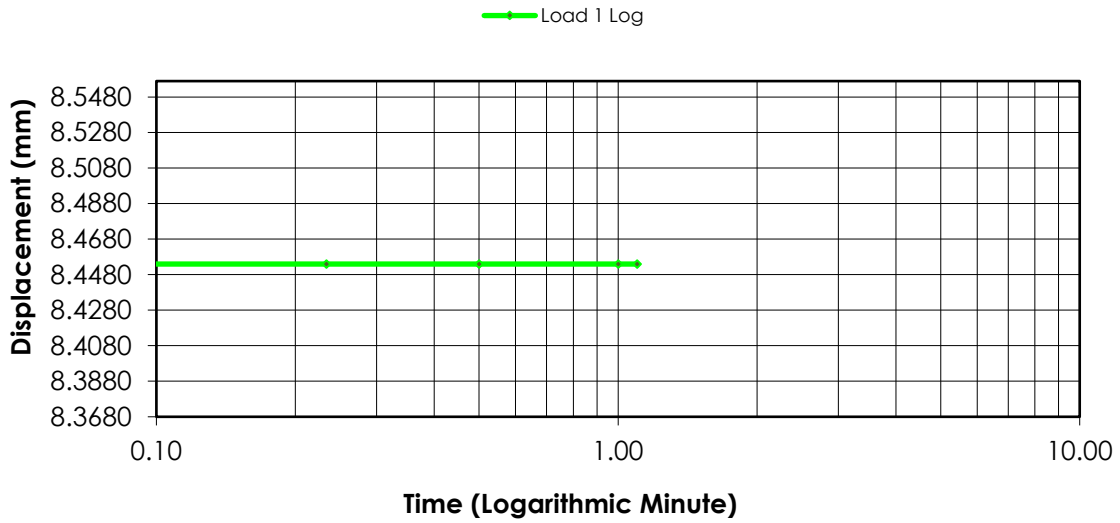
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.4540	0.0000	0.0000	0.5370
1	00:00:05	8.4540	0.0000	0.0000	0.5370
2	00:00:14	8.4540	0.0000	0.0000	0.5370
3	00:00:30	8.4540	0.0000	0.0000	0.5370
4	00:01:00	8.4540	0.0000	0.0000	0.5370
5	00:01:06	8.4540	0.0000	0.0000	0.5370

Consolidation Test Results (Sequence 1) Load 5.000 kPa

Consolidation Graph (Square-root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 2) Load 10.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Test Number:

Sample Number: GL3A ST6

Soil Description:

Boring Number:

Clay (Cl), Some Sand, Trace Gravel

Depth: 3.75-3.70m

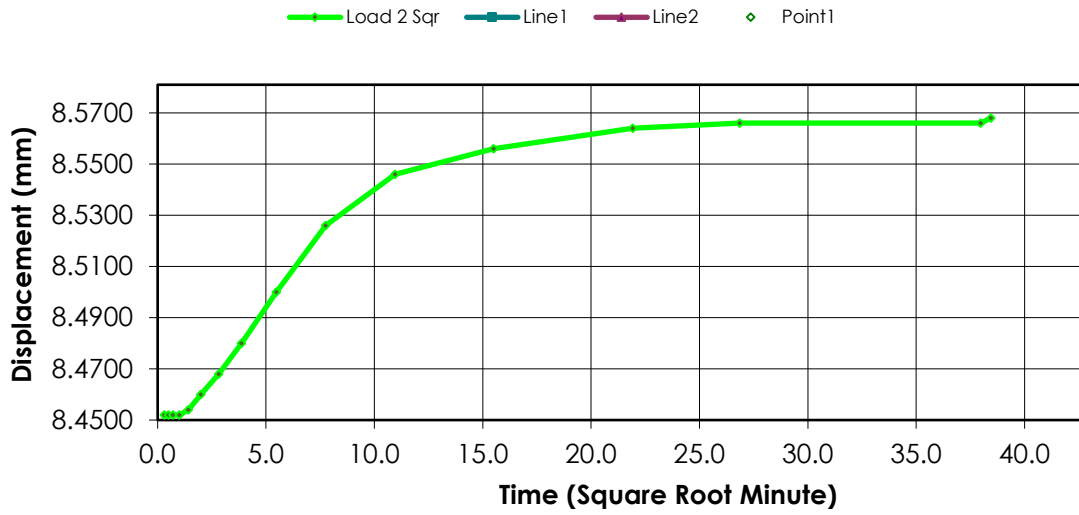
Remarks:

Sample Type: Undisturbed

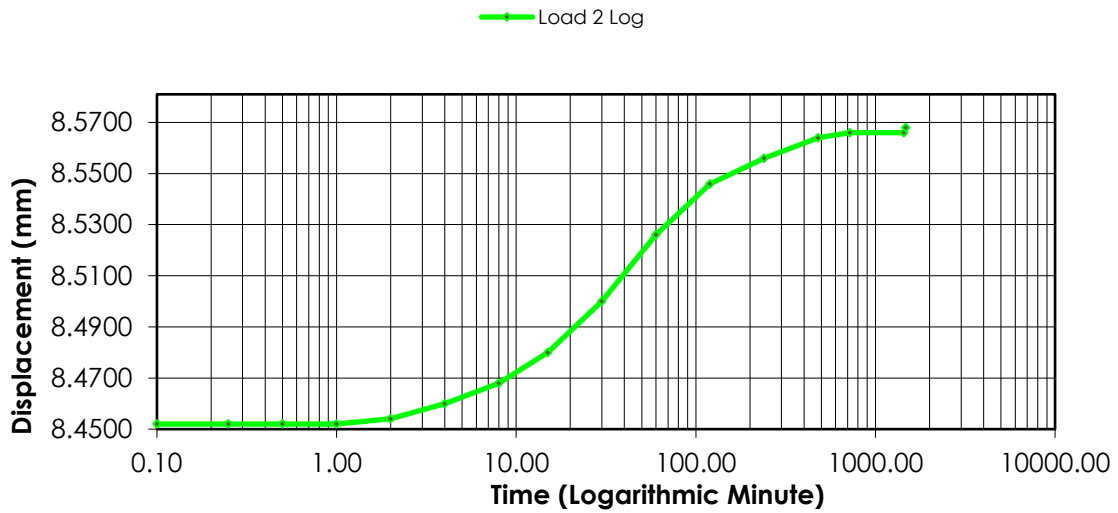
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.4540	0.0000	0.0000	0.5370
1	00:00:06	8.4520	-0.0020	-0.0135	0.5372
2	00:00:15	8.4520	-0.0020	-0.0135	0.5372
3	00:00:30	8.4520	-0.0020	-0.0135	0.5372
4	00:01:00	8.4520	-0.0020	-0.0135	0.5372
5	00:02:00	8.4540	-0.0040	-0.0269	0.5374
6	00:04:00	8.4600	-0.0100	-0.0673	0.5380
7	00:08:00	8.4680	-0.0180	-0.1211	0.5388
8	00:15:01	8.4800	-0.0300	-0.2019	0.5401
9	00:30:03	8.5000	-0.0500	-0.3365	0.5421
10	01:00:06	8.5260	-0.0760	-0.5114	0.5448
11	02:00:12	8.5460	-0.0960	-0.6460	0.5469
12	04:00:24	8.5560	-0.1060	-0.7133	0.5479
13	08:00:49	8.5640	-0.1140	-0.7672	0.5488
14	12:01:13	8.5660	-0.1160	-0.7806	0.5490
15	24:02:26	8.5660	-0.1160	-0.7806	0.5490
16	24:38:03	8.5680	-0.1180	-0.7941	0.5492

Consolidation Test Results (Sequence 2) Load 10.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 3) Load 20.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Test Number:

Sample Number: GL3A ST6

Soil Description:

Boring Number:

Clay (Cl), Some Sand, Trace Gravel

Depth: 3.75-3.70m

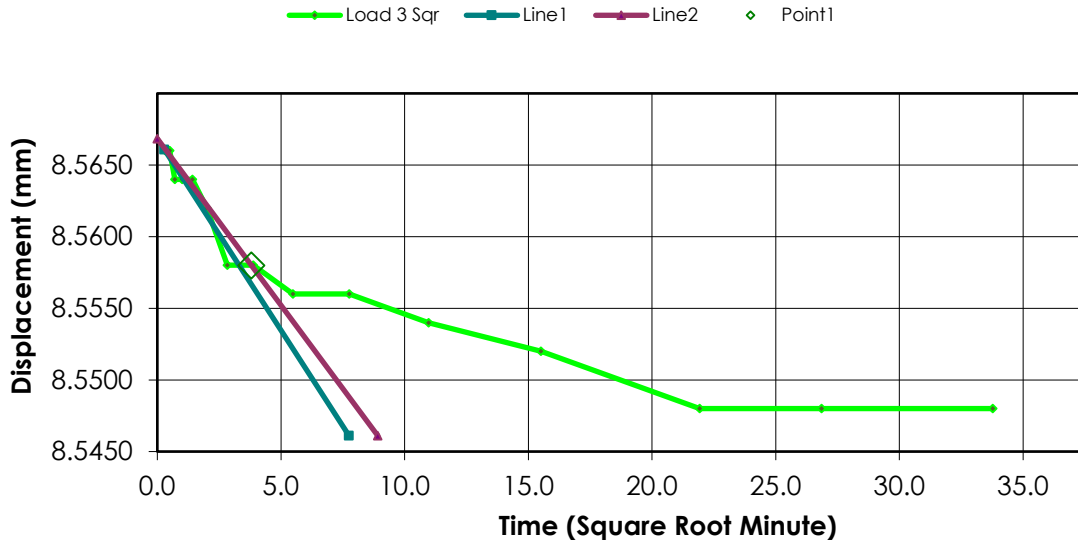
Remarks:

Sample Type: Undisturbed

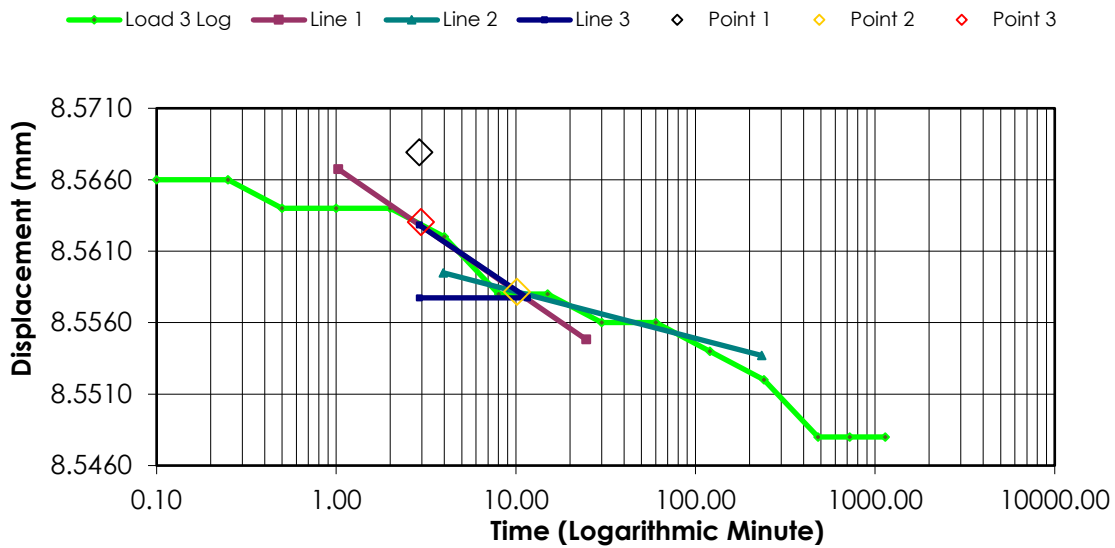
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.5680	-0.1180	-0.7941	0.5492
1	00:00:06	8.5660	-0.1320	-0.8883	0.5506
2	00:00:15	8.5660	-0.1320	-0.8883	0.5506
3	00:00:30	8.5640	-0.1300	-0.8748	0.5504
4	00:01:00	8.5640	-0.1300	-0.8748	0.5504
5	00:02:00	8.5640	-0.1300	-0.8748	0.5504
6	00:04:00	8.5620	-0.1280	-0.8614	0.5502
7	00:08:01	8.5580	-0.1240	-0.8345	0.5498
8	00:15:01	8.5580	-0.1240	-0.8345	0.5498
9	00:30:03	8.5560	-0.1220	-0.8210	0.5496
10	01:00:06	8.5560	-0.1220	-0.8210	0.5496
11	02:00:12	8.5540	-0.1200	-0.8075	0.5494
12	04:00:24	8.5520	-0.1180	-0.7941	0.5492
13	08:00:49	8.5480	-0.1140	-0.7672	0.5488
14	12:01:13	8.5480	-0.1140	-0.7672	0.5488
15	19:00:38	8.5480	-0.1140	-0.7672	0.5488

Consolidation Test Results (Sequence 3) Load 20.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 4) Load 40.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Test Number:

Sample Number: GL3A ST6

Soil Description:

Boring Number:

Clay (Cl), Some Sand, Trace Gravel

Depth: 3.75-3.70m

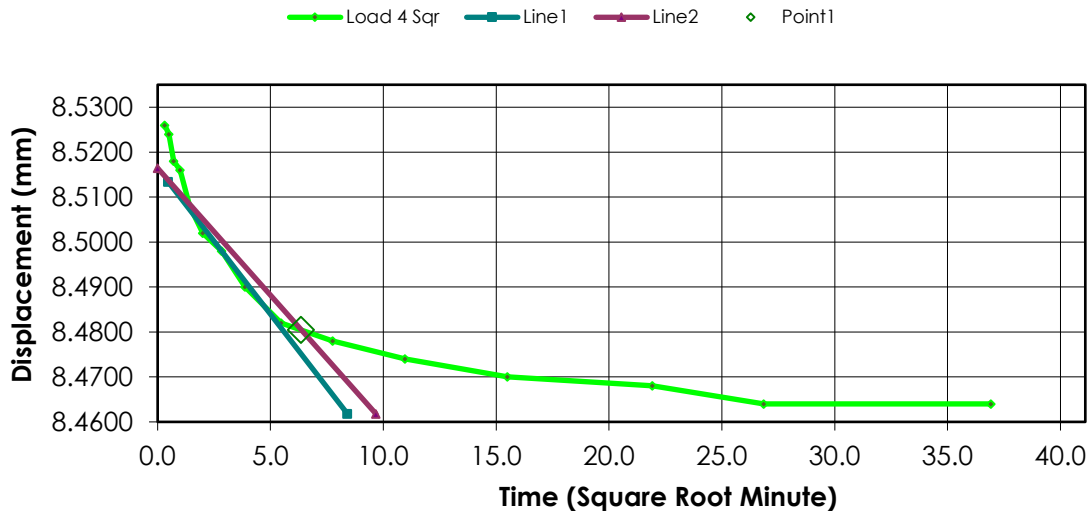
Remarks:

Sample Type: Undisturbed

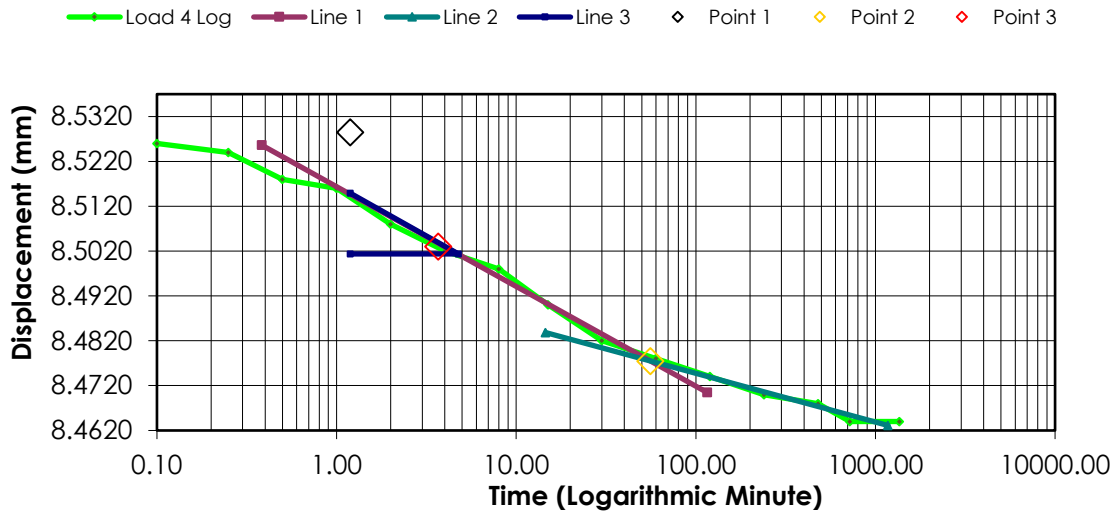
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.5480	-0.1140	-0.7672	0.5488
1	00:00:06	8.5260	-0.0980	-0.6595	0.5471
2	00:00:15	8.5240	-0.0960	-0.6460	0.5469
3	00:00:30	8.5180	-0.0900	-0.6056	0.5463
4	00:01:00	8.5160	-0.0880	-0.5922	0.5461
5	00:02:00	8.5080	-0.0800	-0.5384	0.5452
6	00:04:01	8.5020	-0.0740	-0.4980	0.5446
7	00:08:01	8.4980	-0.0700	-0.4711	0.5442
8	00:15:02	8.4900	-0.0620	-0.4172	0.5434
9	00:30:03	8.4820	-0.0540	-0.3634	0.5426
10	01:00:06	8.4780	-0.0500	-0.3365	0.5421
11	02:00:12	8.4740	-0.0460	-0.3096	0.5417
12	04:00:25	8.4700	-0.0420	-0.2826	0.5413
13	08:00:49	8.4680	-0.0400	-0.2692	0.5411
14	12:01:14	8.4640	-0.0360	-0.2423	0.5407
15	22:43:10	8.4640	-0.0360	-0.2423	0.5407

Consolidation Test Results (Sequence 4) Load 40.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 5) Load 80.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Test Number:

Sample Number: GL3A ST6

Soil Description:

Boring Number:

Clay (Cl), Some Sand, Trace Gravel

Depth: 3.75-3.70m

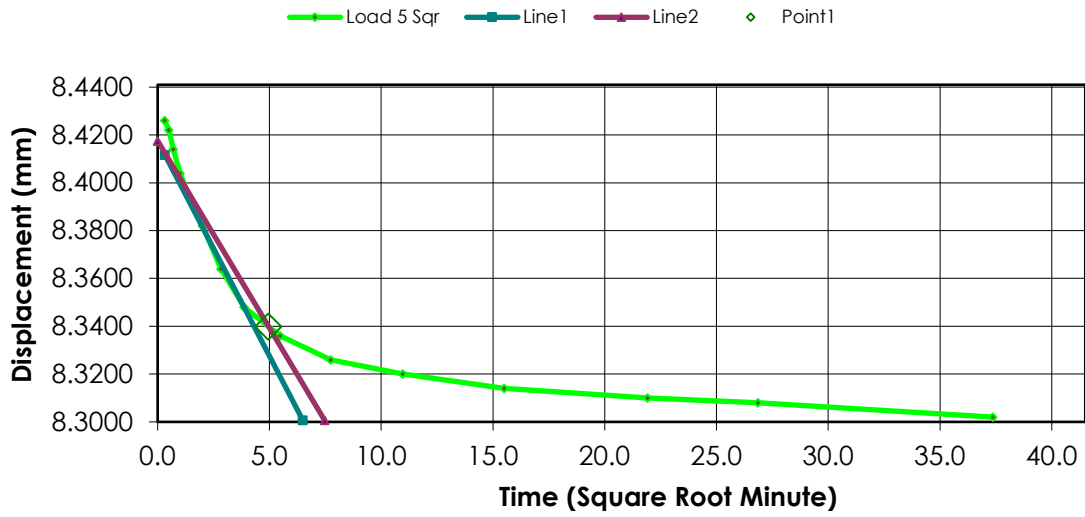
Remarks:

Sample Type: Undisturbed

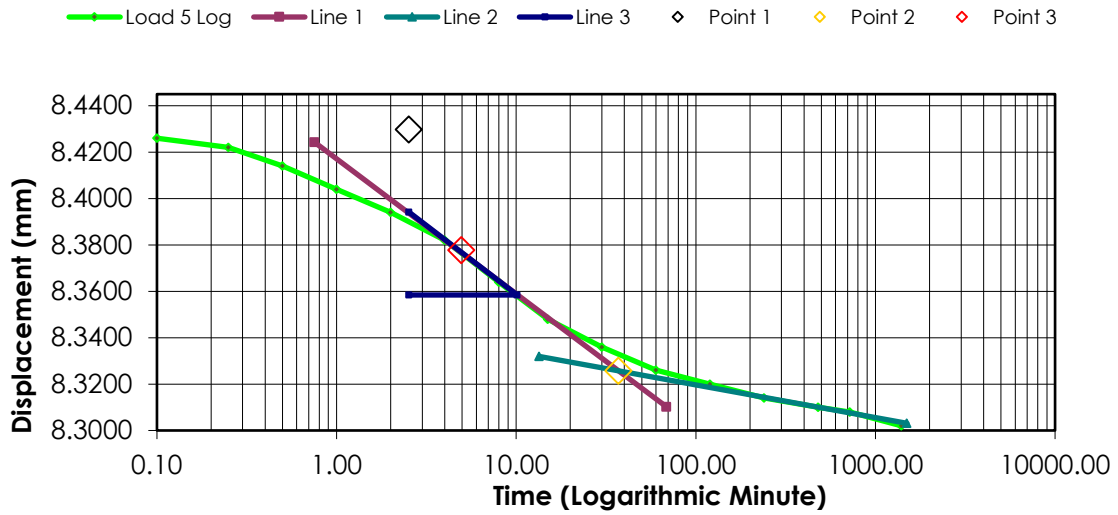
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.4640	-0.0360	-0.2423	0.5407
1	00:00:06	8.4260	-0.0120	-0.0808	0.5382
2	00:00:15	8.4220	-0.0080	-0.0538	0.5378
3	00:00:30	8.4140	0.0000	0.0000	0.5370
4	00:01:00	8.4040	0.0100	0.0673	0.5359
5	00:02:00	8.3940	0.0200	0.1346	0.5349
6	00:04:00	8.3820	0.0320	0.2153	0.5337
7	00:08:01	8.3640	0.0500	0.3365	0.5318
8	00:15:01	8.3480	0.0660	0.4441	0.5301
9	00:30:03	8.3360	0.0780	0.5249	0.5289
10	01:00:06	8.3260	0.0880	0.5922	0.5279
11	02:00:11	8.3200	0.0940	0.6326	0.5272
12	04:00:23	8.3140	0.1000	0.6729	0.5266
13	08:00:48	8.3100	0.1040	0.6999	0.5262
14	12:01:12	8.3080	0.1060	0.7133	0.5260
15	23:16:03	8.3020	0.1120	0.7537	0.5254

Consolidation Test Results (Sequence 5) Load 80.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 6) Load 160.000 kPa

Project: SR1 2018 Investigation
Location:
Job Number:

Project Number: 110773396

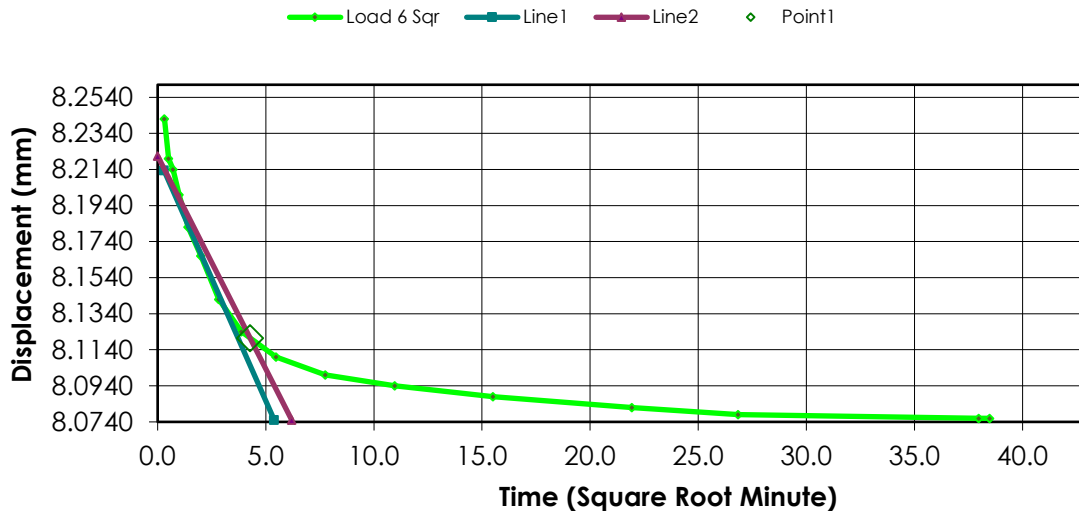
Test Date: 15-Oct-18
Test Number:

Sample Number: GL3A ST6 **Soil Description:**
Boring Number: Clay (Cl), Some Sand, Trace Gravel
Depth: 3.75-3.70m **Remarks:**
Sample Type: Undisturbed

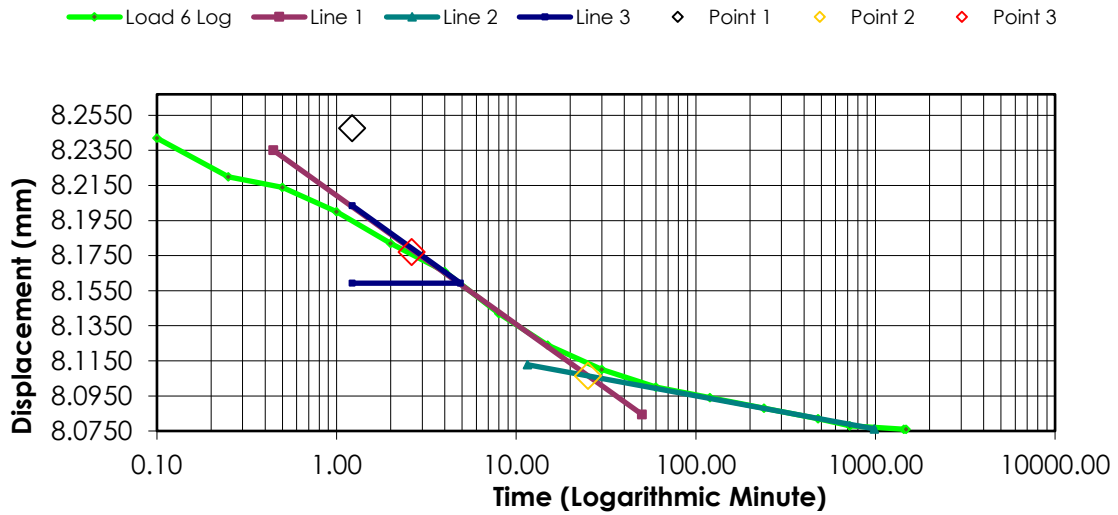
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.3020	0.1120	0.7537	0.5254
1	00:00:06	8.2420	0.1460	0.9825	0.5219
2	00:00:15	8.2200	0.1680	1.1306	0.5196
3	00:00:30	8.2140	0.1740	1.1709	0.5190
4	00:01:00	8.2000	0.1880	1.2651	0.5175
5	00:02:00	8.1820	0.2060	1.3863	0.5157
6	00:04:00	8.1660	0.2220	1.4939	0.5140
7	00:08:01	8.1420	0.2460	1.6555	0.5115
8	00:15:01	8.1240	0.2640	1.7766	0.5097
9	00:30:03	8.1100	0.2780	1.8708	0.5082
10	01:00:06	8.1000	0.2880	1.9381	0.5072
11	02:00:12	8.0940	0.2940	1.9785	0.5066
12	04:00:24	8.0880	0.3000	2.0188	0.5059
13	08:00:49	8.0820	0.3060	2.0592	0.5053
14	12:01:11	8.0780	0.3100	2.0861	0.5049
15	24:02:25	8.0760	0.3120	2.0996	0.5047
16	24:40:59	8.0760	0.3120	2.0996	0.5047

Consolidation Test Results (Sequence 6) Load 160.000 kPa

Consolidation Graph (Square Root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 7) Load 320.000 kPa

Project: SR1 2018 Investigation
Location:
Job Number:

Project Number: 110773396

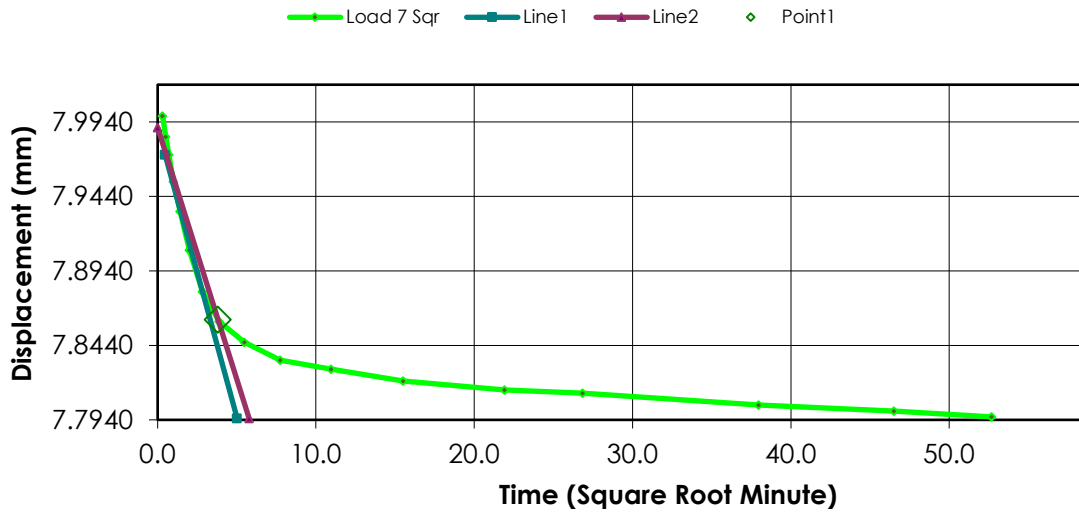
Test Date: 15-Oct-18
Test Number:

Sample Number: GL3A ST6 **Soil Description:**
Boring Number: Clay (Cl), Some Sand, Trace Gravel
Depth: 3.75-3.70m **Remarks:**
Sample Type: Undisturbed

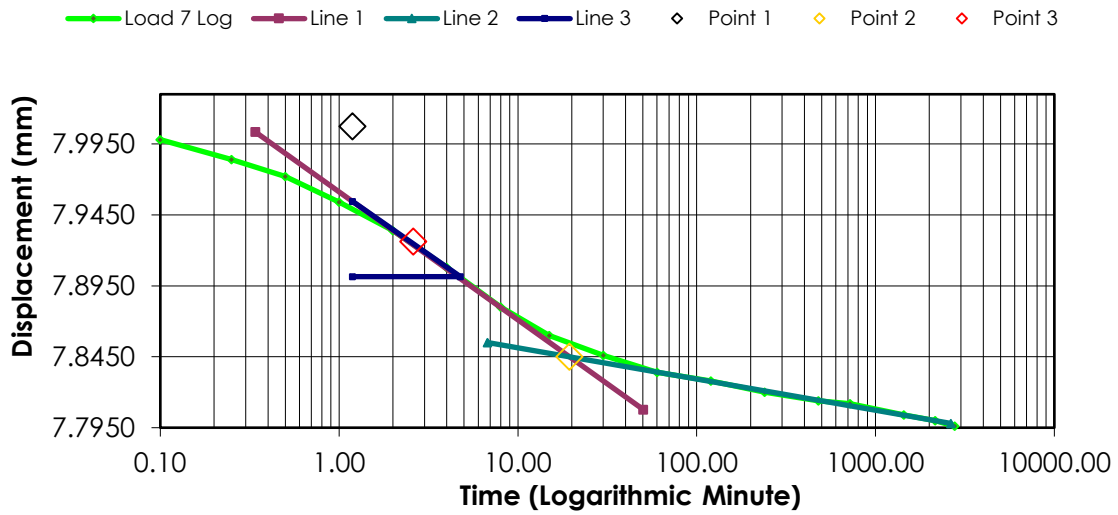
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.0760	0.3120	2.0996	0.5047
1	00:00:06	7.9980	0.3520	2.3688	0.5006
2	00:00:15	7.9840	0.3660	2.4630	0.4991
3	00:00:30	7.9720	0.3780	2.5437	0.4979
4	00:01:00	7.9540	0.3960	2.6649	0.4960
5	00:02:00	7.9340	0.4160	2.7995	0.4939
6	00:04:00	7.9080	0.4420	2.9744	0.4913
7	00:08:00	7.8800	0.4700	3.1629	0.4884
8	00:15:01	7.8600	0.4900	3.2974	0.4863
9	00:30:02	7.8460	0.5040	3.3917	0.4848
10	01:00:05	7.8340	0.5160	3.4724	0.4836
11	02:00:10	7.8280	0.5220	3.5128	0.4830
12	04:00:21	7.8200	0.5300	3.5666	0.4822
13	08:00:42	7.8140	0.5360	3.6070	0.4815
14	12:01:03	7.8120	0.5380	3.6205	0.4813
15	24:02:07	7.8040	0.5460	3.6743	0.4805
16	36:03:10	7.8000	0.5500	3.7012	0.4801
17	46:14:56	7.7960	0.5540	3.7281	0.4797

Consolidation Test Results (Sequence 7) Load 320.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 8) Load 640.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Test Number:

Sample Number: GL3A ST6

Soil Description:

Boring Number:

Clay (Cl), Some Sand, Trace Gravel

Depth: 3.75-3.70m

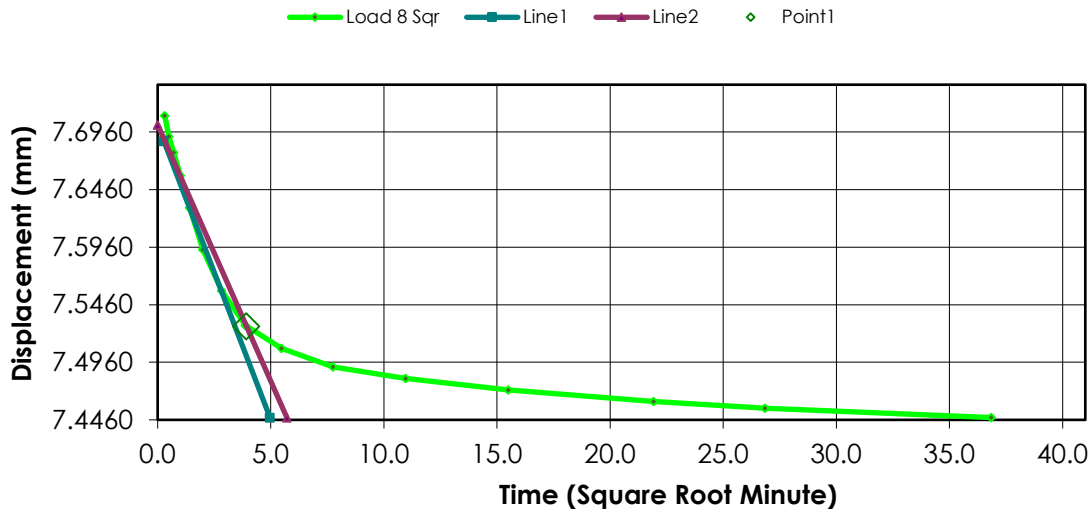
Remarks:

Sample Type: Undisturbed

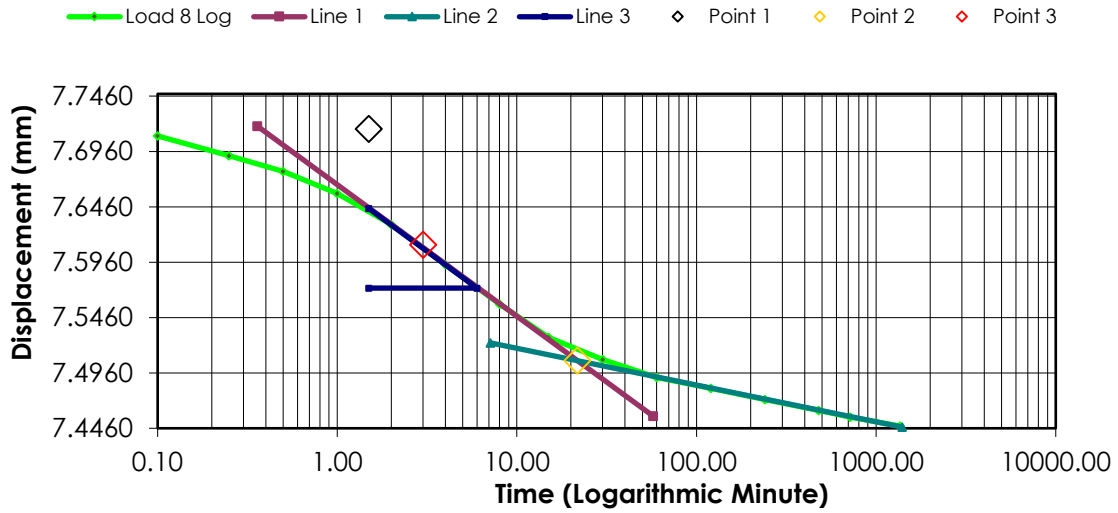
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	7.7960	0.5540	3.7281	0.4797
1	00:00:06	7.7100	0.5900	3.9704	0.4759
2	00:00:15	7.6920	0.6080	4.0915	0.4741
3	00:00:30	7.6780	0.6220	4.1857	0.4726
4	00:01:00	7.6580	0.6420	4.3203	0.4706
5	00:02:00	7.6300	0.6700	4.5088	0.4677
6	00:04:00	7.5940	0.7060	4.7510	0.4640
7	00:08:01	7.5580	0.7420	4.9933	0.4602
8	00:15:01	7.5280	0.7720	5.1952	0.4571
9	00:30:03	7.5080	0.7920	5.3297	0.4551
10	01:00:05	7.4920	0.8080	5.4374	0.4534
11	02:00:11	7.4820	0.8180	5.5047	0.4524
12	04:00:20	7.4720	0.8280	5.5720	0.4513
13	08:00:41	7.4620	0.8380	5.6393	0.4503
14	12:01:02	7.4560	0.8440	5.6797	0.4497
15	22:37:30	7.4480	0.8520	5.7335	0.4488

Consolidation Test Results (Sequence 8) Load 640.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 9) Rebound 320.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Test Number:

Sample Number: GL3A ST6

Soil Description:

Boring Number:

Clay (Cl), Some Sand, Trace Gravel

Depth: 3.75-3.70m

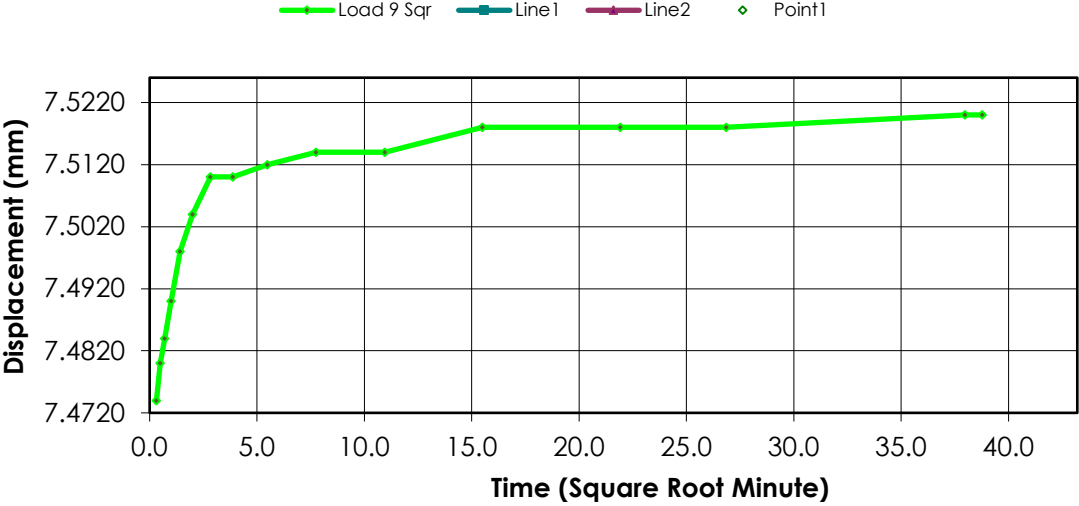
Remarks:

Sample Type: Undisturbed

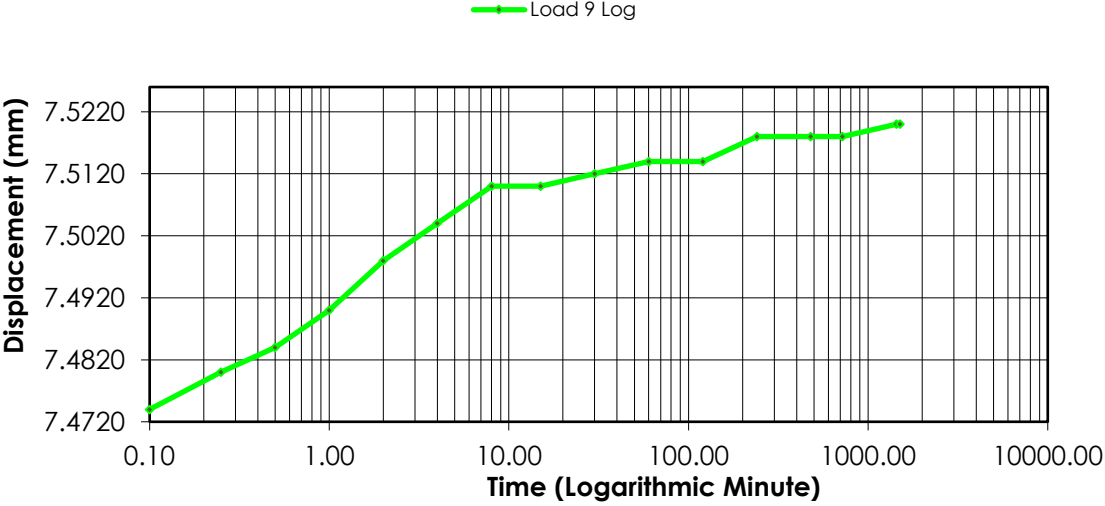
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	7.4480	0.8520	5.7335	0.4488
1	00:00:06	7.4740	0.8420	5.6662	0.4499
2	00:00:15	7.4800	0.8360	5.6258	0.4505
3	00:00:30	7.4840	0.8320	5.5989	0.4509
4	00:01:00	7.4900	0.8260	5.5586	0.4515
5	00:02:00	7.4980	0.8180	5.5047	0.4524
6	00:04:00	7.5040	0.8120	5.4643	0.4530
7	00:08:01	7.5100	0.8060	5.4240	0.4536
8	00:15:01	7.5100	0.8060	5.4240	0.4536
9	00:30:03	7.5120	0.8040	5.4105	0.4538
10	01:00:05	7.5140	0.8020	5.3970	0.4540
11	02:00:11	7.5140	0.8020	5.3970	0.4540
12	04:00:21	7.5180	0.7980	5.3701	0.4544
13	08:00:42	7.5180	0.7980	5.3701	0.4544
14	12:01:03	7.5180	0.7980	5.3701	0.4544
15	24:02:07	7.5200	0.7960	5.3567	0.4546
16	25:04:04	7.5200	0.7960	5.3567	0.4546

Consolidation Test Results (Sequence 9) Rebound 320.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 10) Rebound 160.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Test Number:

Sample Number: GL3A ST6

Soil Description:

Boring Number:

Clay (Cl), Some Sand, Trace Gravel

Depth: 3.75-3.70m

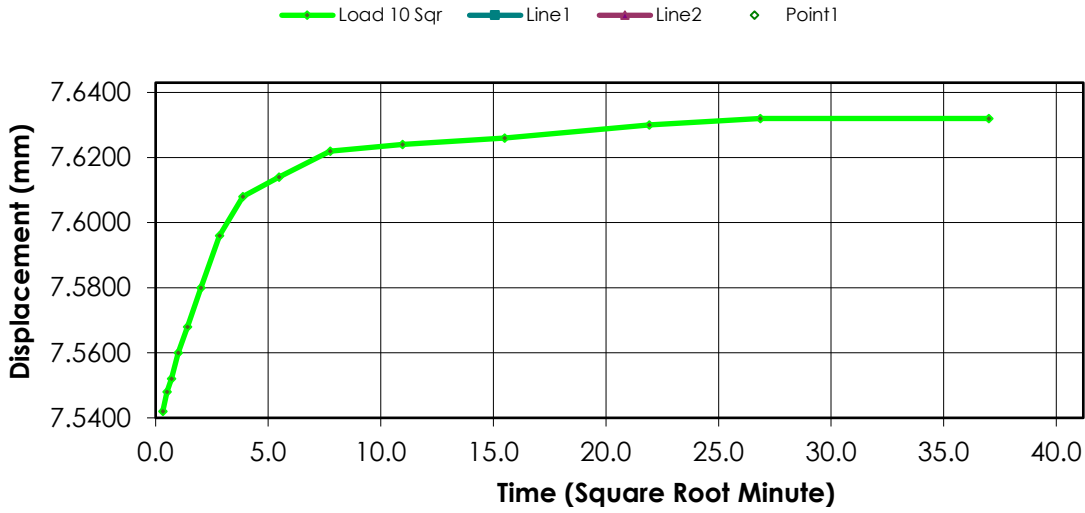
Remarks:

Sample Type: Undisturbed

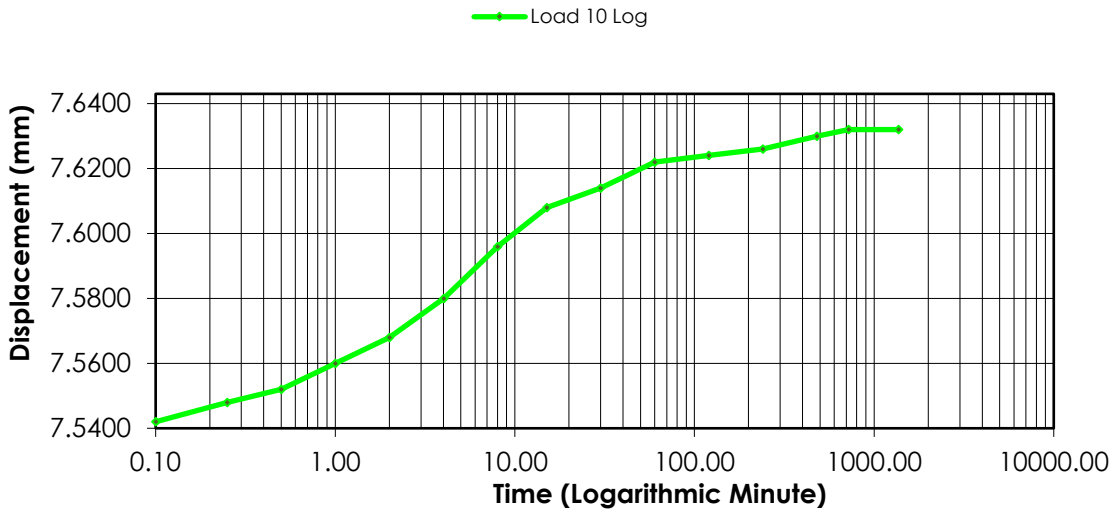
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	7.5200	0.7960	5.3567	0.4546
1	00:00:06	7.5420	0.7880	5.3028	0.4555
2	00:00:15	7.5480	0.7820	5.2625	0.4561
3	00:00:30	7.5520	0.7780	5.2355	0.4565
4	00:01:00	7.5600	0.7700	5.1817	0.4573
5	00:02:00	7.5680	0.7620	5.1279	0.4582
6	00:04:01	7.5800	0.7500	5.0471	0.4594
7	00:08:01	7.5960	0.7340	4.9394	0.4611
8	00:15:02	7.6080	0.7220	4.8587	0.4623
9	00:30:03	7.6140	0.7160	4.8183	0.4629
10	01:00:06	7.6220	0.7080	4.7645	0.4637
11	02:00:11	7.6240	0.7060	4.7510	0.4640
12	04:00:22	7.6260	0.7040	4.7376	0.4642
13	08:00:37	7.6300	0.7000	4.7106	0.4646
14	12:00:58	7.6320	0.6980	4.6972	0.4648
15	22:49:34	7.6320	0.6980	4.6972	0.4648

Consolidation Test Results
(Sequence 10) Rebound 160.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 11) Load 320.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Test Number:

Sample Number: GL3A ST6

Soil Description:

Boring Number:

Clay (Cl), Some Sand, Trace Gravel

Depth: 3.75-3.70m

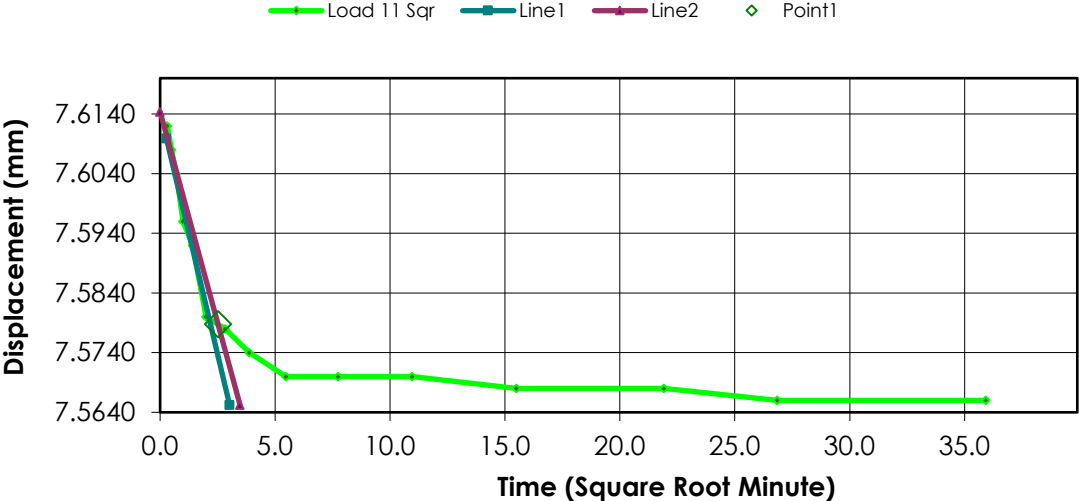
Remarks:

Sample Type: Undisturbed

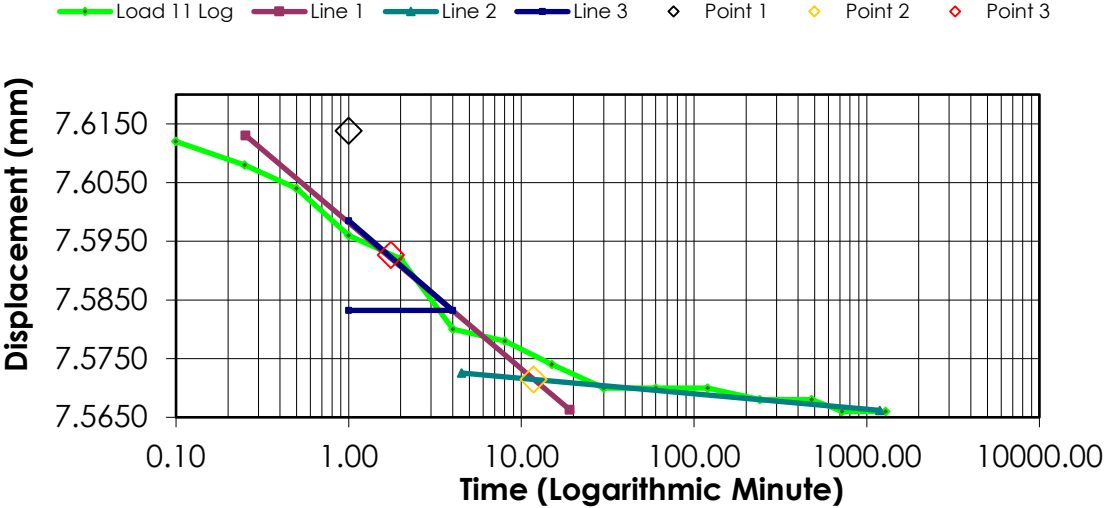
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	7.6320	0.6980	4.6972	0.4648
1	00:00:06	7.6120	0.7100	4.7779	0.4635
2	00:00:15	7.6080	0.7140	4.8048	0.4631
3	00:00:30	7.6040	0.7180	4.8318	0.4627
4	00:01:00	7.5960	0.7260	4.8856	0.4619
5	00:02:00	7.5920	0.7300	4.9125	0.4615
6	00:04:01	7.5800	0.7420	4.9933	0.4602
7	00:08:01	7.5780	0.7440	5.0067	0.4600
8	00:15:02	7.5740	0.7480	5.0336	0.4596
9	00:30:03	7.5700	0.7520	5.0606	0.4592
10	01:00:06	7.5700	0.7520	5.0606	0.4592
11	02:00:11	7.5700	0.7520	5.0606	0.4592
12	04:00:21	7.5680	0.7540	5.0740	0.4590
13	08:00:43	7.5680	0.7540	5.0740	0.4590
14	12:01:04	7.5660	0.7560	5.0875	0.4588
15	21:29:59	7.5660	0.7560	5.0875	0.4588

Consolidation Test Results (Sequence 11) Load 320.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 12) Load 640.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Test Number:

Sample Number: GL3A ST6

Soil Description:

Boring Number:

Clay (Cl), Some Sand, Trace Gravel

Depth: 3.75-3.70m

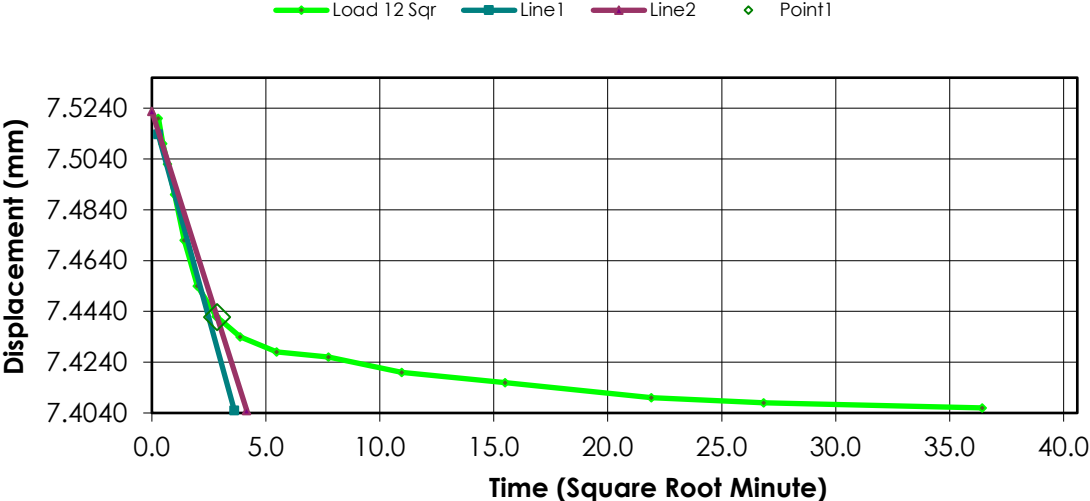
Remarks:

Sample Type: Undisturbed

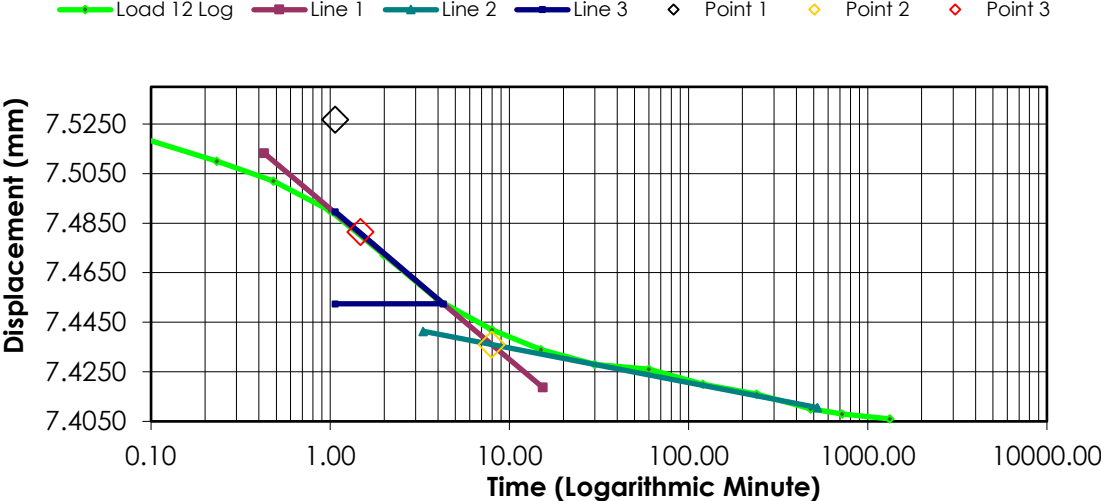
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	7.5660	0.7560	5.0875	0.4588
1	00:00:05	7.5200	0.7800	5.2490	0.4563
2	00:00:14	7.5100	0.7900	5.3163	0.4553
3	00:00:29	7.5020	0.7980	5.3701	0.4544
4	00:01:00	7.4900	0.8100	5.4509	0.4532
5	00:02:00	7.4720	0.8280	5.5720	0.4513
6	00:04:00	7.4540	0.8460	5.6931	0.4495
7	00:08:00	7.4420	0.8580	5.7739	0.4482
8	00:15:01	7.4340	0.8660	5.8277	0.4474
9	00:30:02	7.4280	0.8720	5.8681	0.4468
10	01:00:05	7.4260	0.8740	5.8816	0.4466
11	02:00:10	7.4200	0.8800	5.9219	0.4460
12	04:00:21	7.4160	0.8840	5.9489	0.4455
13	08:00:42	7.4100	0.8900	5.9892	0.4449
14	12:01:01	7.4080	0.8920	6.0027	0.4447
15	22:07:33	7.4060	0.8940	6.0162	0.4445

Consolidation Test Results (Sequence 12) Load 640.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 13) Load 1280.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 15-Oct-18

Test Number:

Sample Number: GL3A ST6

Soil Description:

Boring Number:

Clay (Cl), Some Sand, Trace Gravel

Depth: 3.75-3.70m

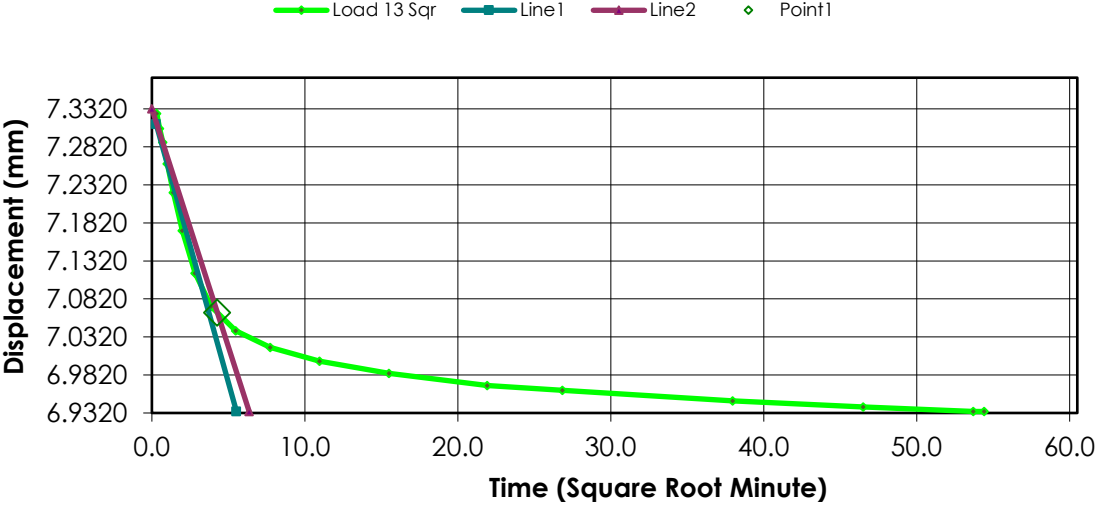
Remarks:

Sample Type: Undisturbed

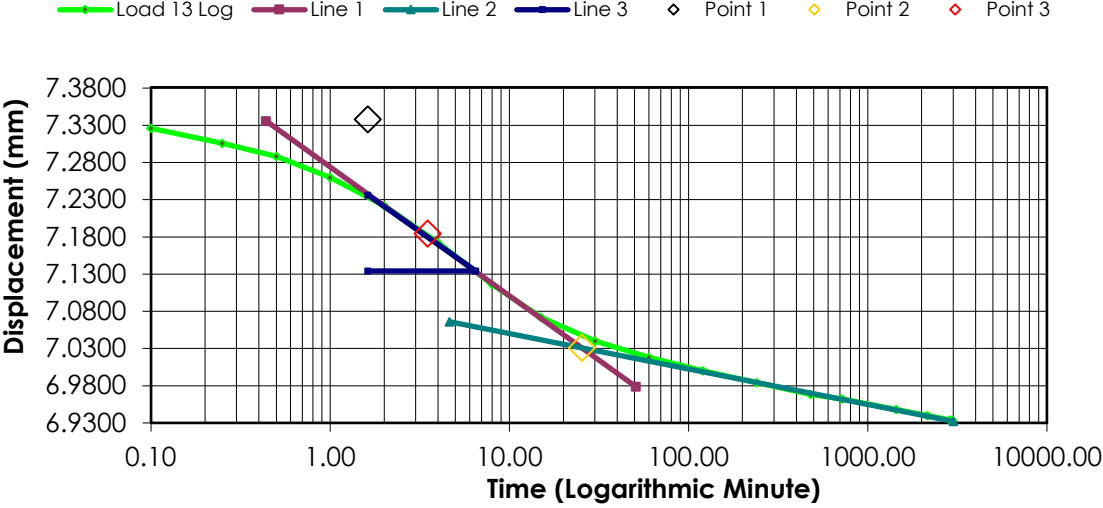
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	7.4060	0.8940	6.0162	0.4445
1	00:00:06	7.3260	0.9100	6.1238	0.4429
2	00:00:15	7.3060	0.9300	6.2584	0.4408
3	00:00:30	7.2880	0.9480	6.3795	0.4389
4	00:01:00	7.2600	0.9760	6.5680	0.4360
5	00:02:00	7.2220	1.0140	6.8237	0.4321
6	00:04:00	7.1720	1.0640	7.1602	0.4269
7	00:08:01	7.1160	1.1200	7.5370	0.4211
8	00:15:01	7.0720	1.1640	7.8331	0.4166
9	00:30:03	7.0400	1.1960	8.0485	0.4133
10	01:00:05	7.0180	1.2180	8.1965	0.4110
11	02:00:11	7.0000	1.2360	8.3176	0.4091
12	04:00:21	6.9840	1.2520	8.4253	0.4075
13	08:00:42	6.9680	1.2680	8.5330	0.4058
14	12:01:03	6.9620	1.2740	8.5734	0.4052
15	24:02:07	6.9480	1.2880	8.6676	0.4038
16	36:03:09	6.9400	1.2960	8.7214	0.4029
17	48:04:12	6.9340	1.3020	8.7618	0.4023
18	49:21:31	6.9340	1.3020	8.7618	0.4023

Consolidation Test Results (Sequence 13) Load 1280.000 kPa

Consolidation Graph (Squareroot Time)



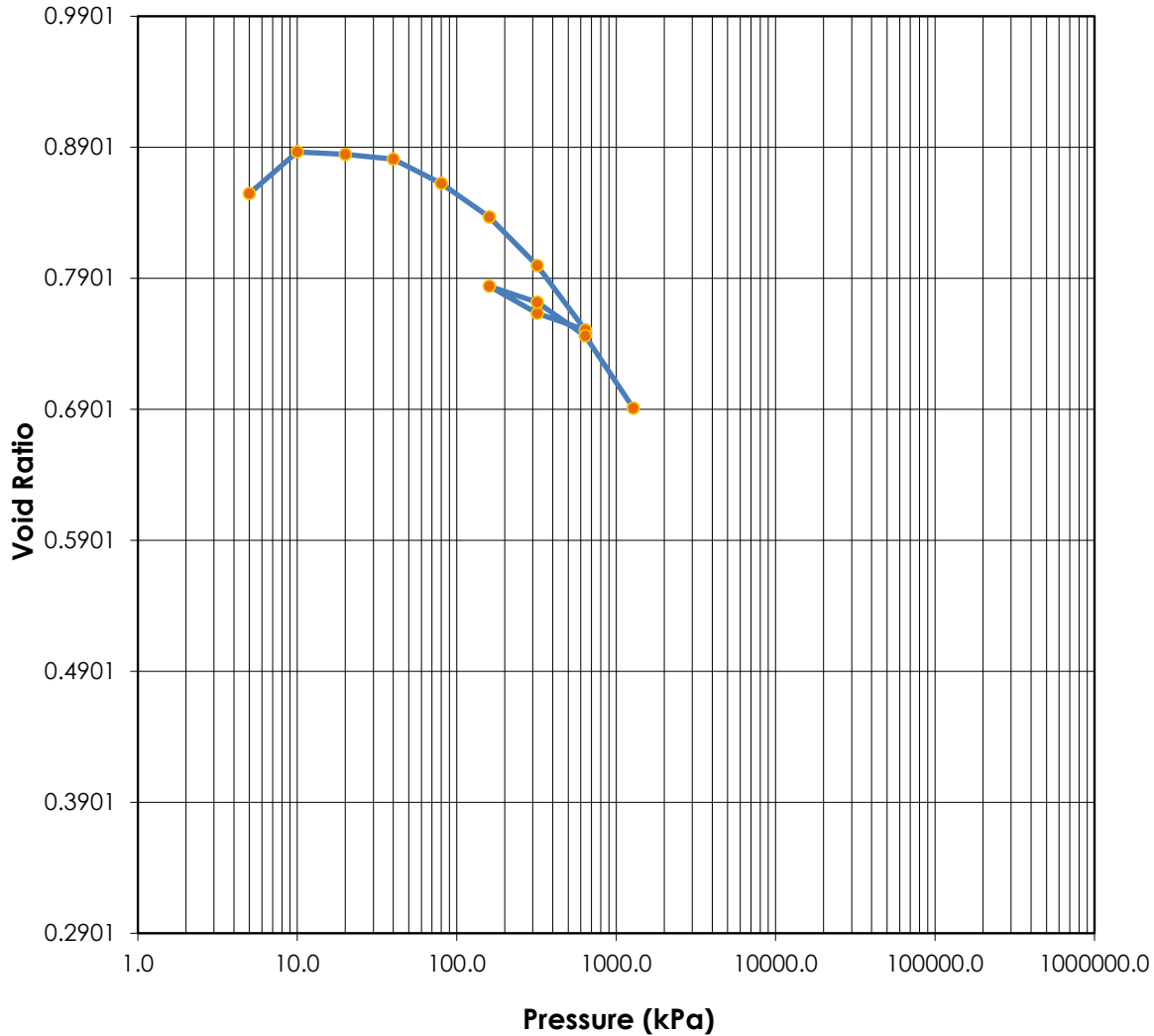
Consolidation Graph (Logarithmic Time)





Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876



	Before	After	Liquid Limits:	76	Test Date:	10-Oct-18	
Moisture (%):	33.9	27.1	Plastic Limits:	22			
Dry Density (g/cm³):	1.426	1.795	Plasticity Index (%):	54			
Saturation (%):	100	100					
Void Ratio:	0.8543	0.6906	Specific Gravity:	2.65	Assumed		
Soil Description:	Clay (CH), Some Sand						
Project Number:	110773396	Depth:	2.4-2.85m		Remarks:		
Sample Number:	GL4 ST5	Boring Number:					
Project:	SR1 2018 Investigation						
Client:	Alberta Transportation						
Location:							

Tested By: E. Wahl

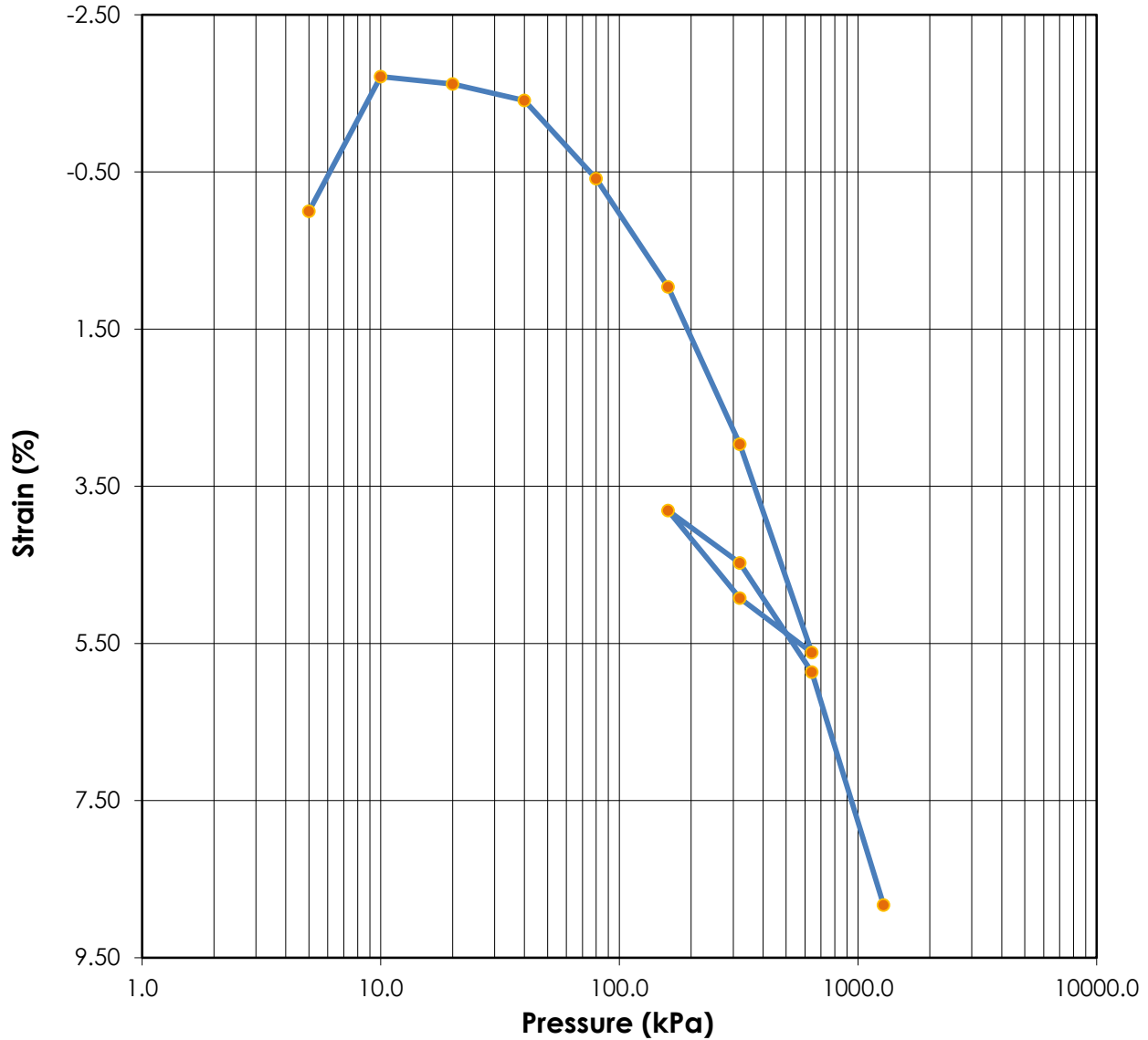
Reviewed By: C. Lamoureux

Reporting of these test results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request. The data presented above is for the sole use of the client stipulated above. Stantec is not responsible, nor can be held liable, for the use of this report by any other party, with or without the knowledge of Stantec.



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
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 Tel: (403) 253-7876

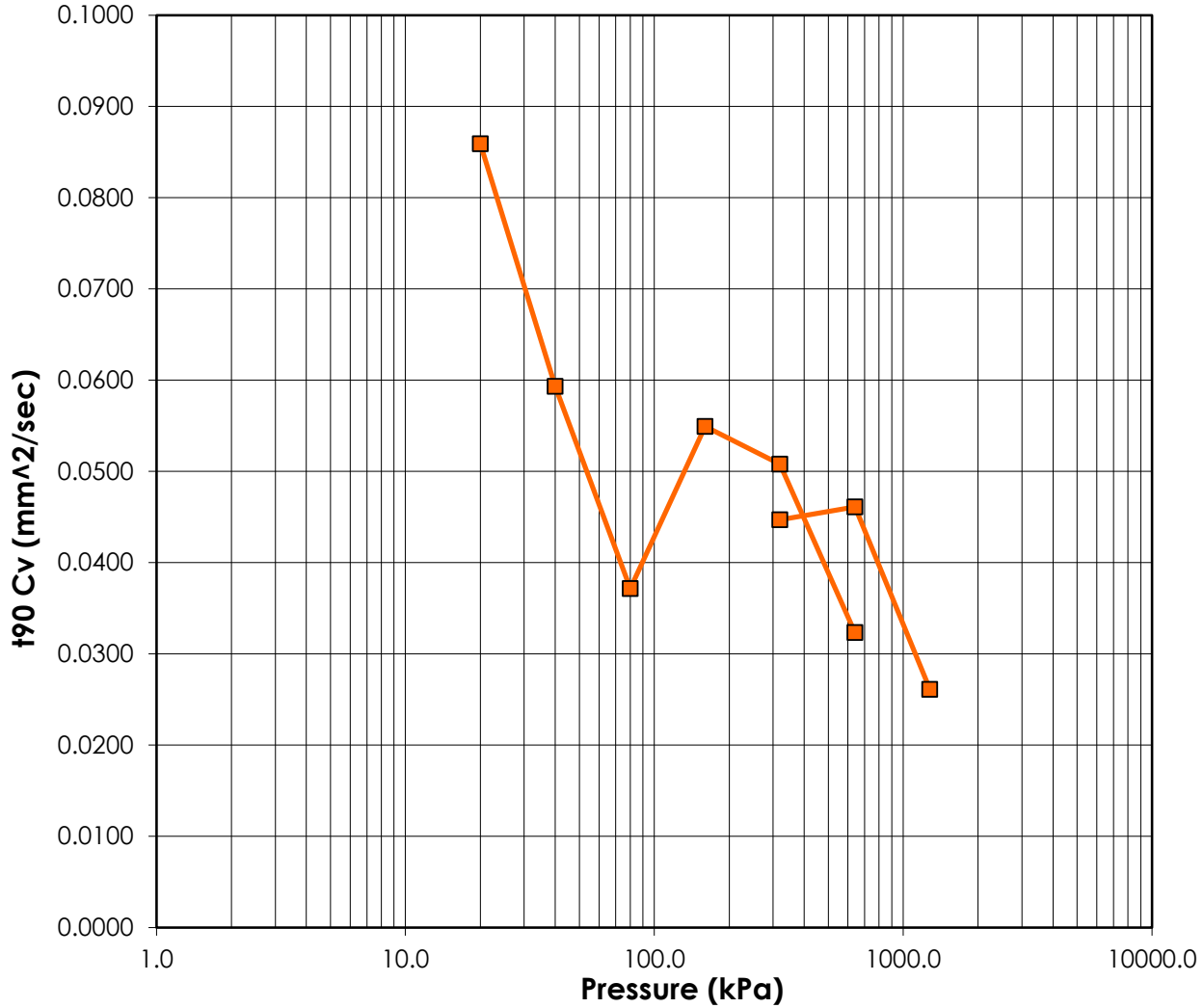


	Before	After	Liquid Limits:	76	Test Date:	10-Oct-18
Moisture (%):	33.9	27.1	Plastic Limits:	22		
Dry Density (g/cm3):	1.426	1.795	Plasticity Index (%):	54		
Saturation (%):	100	100	Specific Gravity:	2.65	Assumed	
Void Ratio:	0.8543	0.6906				
Sample Description:	Clay (CH), Some Sand					
Project Number:	110773396	Depth:	2.4-2.85m		Remarks:	
Sample Number:	GL4 ST5	Boring Number:				
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

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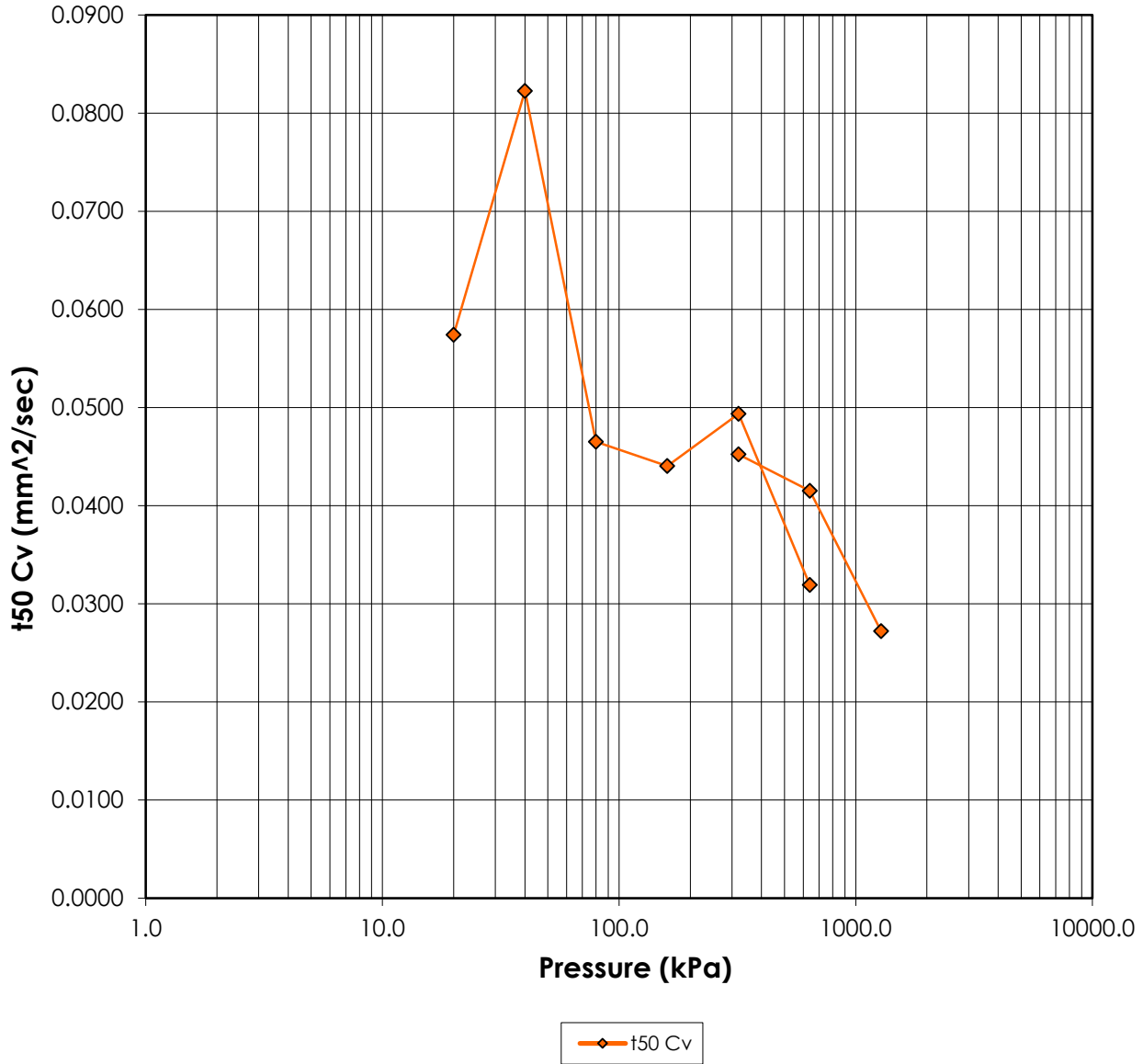
—■— t90 Cv

	Before	After	Liquid Limits:	76	Test Date:	10-Oct-18	
Moisture (%):	33.9	27.1	Plastic Limits:	22			
Dry Density (g/cm3):	1.426	1.795	Plasticity Index (%):	54			
Saturation (%):	100	100	Specific Gravity:	2.65	Assumed		
Void Ratio:	0.8543	0.6906					
Soil Description:	Clay (CH), Some Sand						
Project Number:	110773396	Depth:	2.4-2.85m		Remarks:		
Sample Number:	GL4 ST5	Boring Number:					
Project:	SR1 2018 Investigation						
Client:	Alberta Transportation						
Location:							



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
 Calgary, Alberta T2C 1G4
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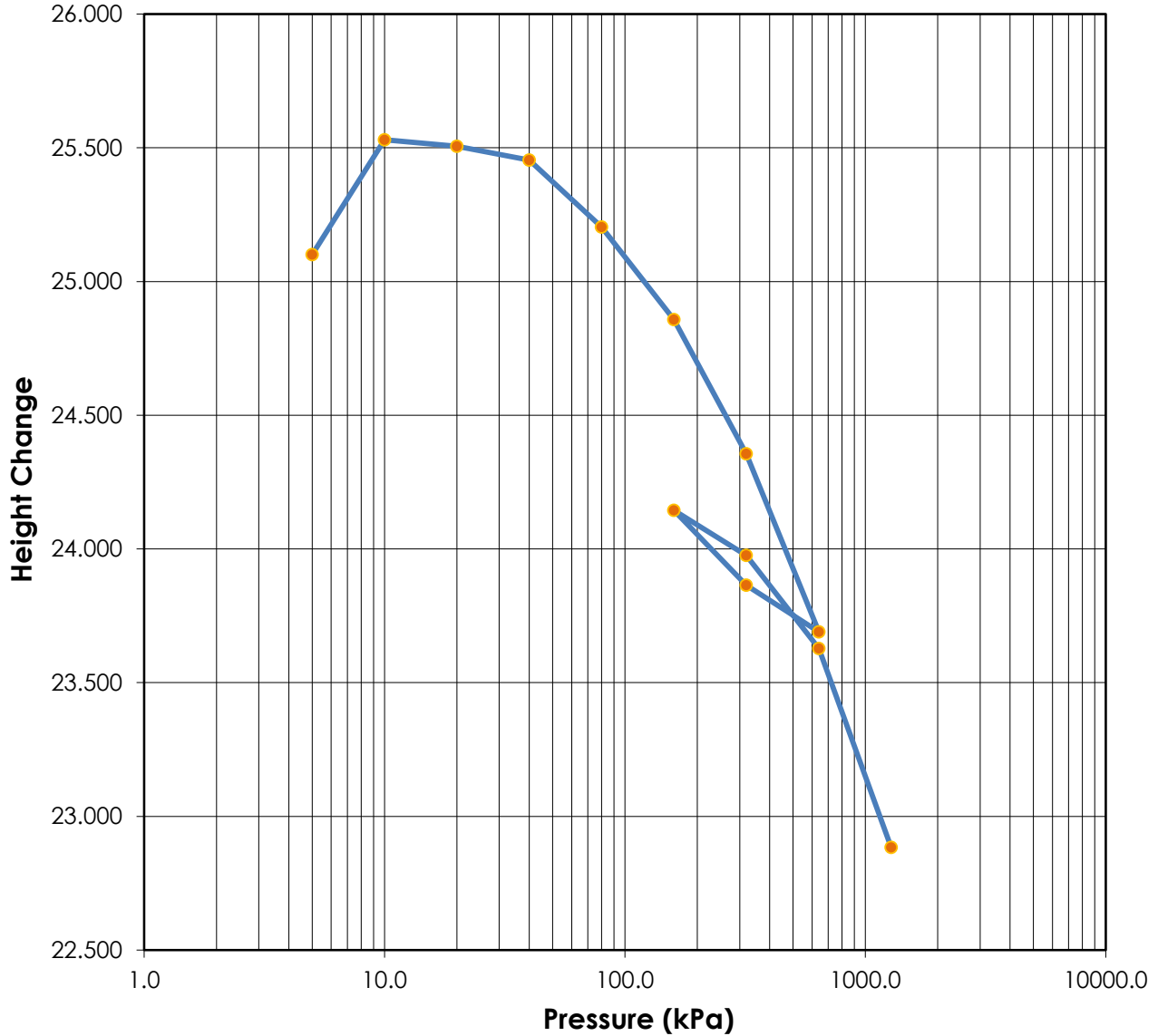


	Before	After	Liquid Limits:	76	Test Date:	10-Oct-18
Moisture (%):	33.9	27.1	Plastic Limits:	22		
Dry Density (g/cm³):	1.426	1.795	Plasticity Index (%):	54		
Saturation (%):	100	100	Specific Gravity:	2.65	Assumed	
Void Ratio:	0.8543	0.6906				
Soil Description:	Clay (CH), Some Sand					
Project Number:	110773396	Depth:	2.4-2.85m			
Sample Number:	GL4 ST5	Boring Number:				
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						
						Remarks:



Stantec Consulting Ltd.
One-Dimensional Consolidation Test
ASTM D2435
Test Results

Calgary Laboratory
 10830 - 46th Street SE
 Calgary, Alberta T2C 1G4
 Tel: (403) 253-7876



	Before	After	Liquid Limits:	76	Test Date:	10-Oct-18
Moisture (%):	33.9	27.1	Plastic Limits:	22		
Dry Density (g/cm3):	1.426	1.795	Plasticity Index (%):	54		
Saturation (%):	100	100	Specific Gravity:	2.65	Assumed	
Void Ratio:	0.8543	0.6906				
Soil Description:	Clay (CH), Some Sand					
Project Number:	110773396	Depth:	2.4-2.85m			
Sample Number:	GL4 ST5	Boring Number:				
Project:	SR1 2018 Investigation					
Client:	Alberta Transportation					
Location:						
			Remarks:			

Consolidation Test Results Summary

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Sample Number: GL4 ST5

Sample Description:

Boring Number:

Clay (CH), Some Sand

Depth: 2.4-2.85m

Remarks:

Test Number:

Sample Type: Undisturbed

Test Date: 10-Oct-18

Index	Load Sequence (kPa)	Cumulative Change in Height (mm)	Specimen Height (mm)	Height of Void (mm)	Vertical Strain (%)	Void Ratio	t ₉₀ Fitting Time (min)	t ₅₀ Fitting Time (min)	t ₉₀ Cv (mm ² /sec)	t ₅₀ Cv (mm ² /sec)
0	0.000	0.0000	25.1000	11.5668	0.00	0.8547	0.000	0.000	0.000	0.000
1	5.000	0.0000	25.1000	11.5668	0.00	0.8547	0.000	0.000	0.000	0.000
2	10.000	-0.4300	25.5300	11.9968	-1.71	0.8865	0.000	0.000	0.000	0.000
3	20.000	-0.4060	25.5060	11.9728	-1.62	0.8847	26.757	9.303	0.086	0.057
4	40.000	-0.3540	25.4540	11.9208	-1.41	0.8809	38.596	6.465	0.059	0.082
5	80.000	-0.1040	25.2040	11.6708	-0.41	0.8624	60.383	11.214	0.037	0.046
6	160.000	0.2420	24.8580	11.3248	0.96	0.8368	39.748	11.514	0.055	0.044
7	320.000	0.7440	24.3560	10.8228	2.96	0.7997	41.268	9.866	0.051	0.049
8	640.000	1.4100	23.6900	10.1568	5.62	0.7505	61.337	14.436	0.032	0.032
9	320.000	1.2360	23.8640	10.3308	4.92	0.7634	0.000	0.000	0.000	0.000
10	160.000	0.9560	24.1440	10.6108	3.81	0.7841	0.000	0.000	0.000	0.000
11	320.000	1.1240	23.9760	10.4428	4.48	0.7716	45.432	10.435	0.045	0.045
12	640.000	1.4720	23.6280	10.0948	5.86	0.7459	42.778	11.038	0.046	0.042
13	1280.000	2.2160	22.8840	9.3508	8.83	0.6910	70.823	15.799	0.026	0.027

Predicted value indicated with *

Consolidation Test Consolidation Specimen Information

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 10-Oct-18

Sample Number: GL4 ST5

Sample Description:

Boring Number:

Clay (CH), Some Sand

Depth: 2.4-2.85m

Remarks:

Sample Type: Undisturbed

Test Number:

Liquid Limit: 76

Initial Void Ratio: 0.8543

Initial Height (mm): 25.10

Plastic Limit: 22

Plasticity Index (%): 54

Initial Diameter (mm): 60.00

Specific Gravity: 2.65

Weight of Ring (g): 1902.7

Assumed

Parameters	Initial Specimen	Final Specimen
Moist Weight + Container (g)	194.55	135.92
Dry Soil + Container (g)	147.00	107.78
Weight of Container (g)	6.62	3.97
Moisture Content (%)	33.9	27.1
Void Ratio	0.8543	0.6906
Saturation (%)	100	100
Dry Density (g/cm ³)	1.426	1.795

Consolidation Test Results
(Sequence 1) Load 5.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 10-Oct-18

Test Number:

Sample Number: GL4 ST5

Soil Description:

Boring Number:

Clay (CH), Some Sand

Depth: 2.4-2.85m

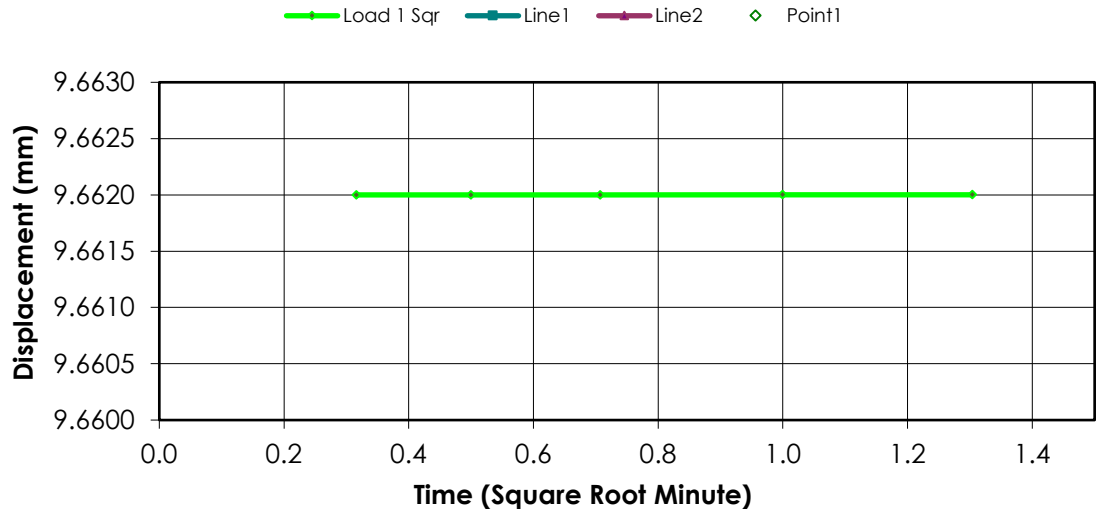
Remarks:

Sample Type: Undisturbed

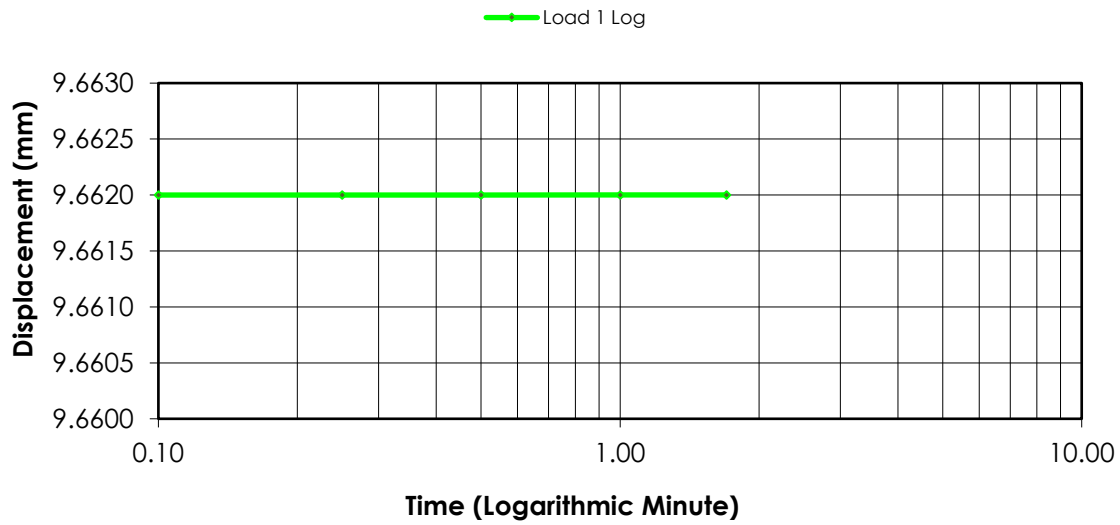
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	9.6620	0.0000	0.0000	0.8543
1	00:00:06	9.6620	0.0000	0.0000	0.8543
2	00:00:15	9.6620	0.0000	0.0000	0.8543
3	00:00:30	9.6620	0.0000	0.0000	0.8543
4	00:01:00	9.6620	0.0000	0.0000	0.8543
5	00:01:42	9.6620	0.0000	0.0000	0.8543

Consolidation Test Results (Sequence 1) Load 5.000 kPa

Consolidation Graph (Square-root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 2) Load 10.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 10-Oct-18

Test Number:

Sample Number: GL4 ST5

Soil Description:

Boring Number:

Clay (CH), Some Sand

Depth: 2.4-2.85m

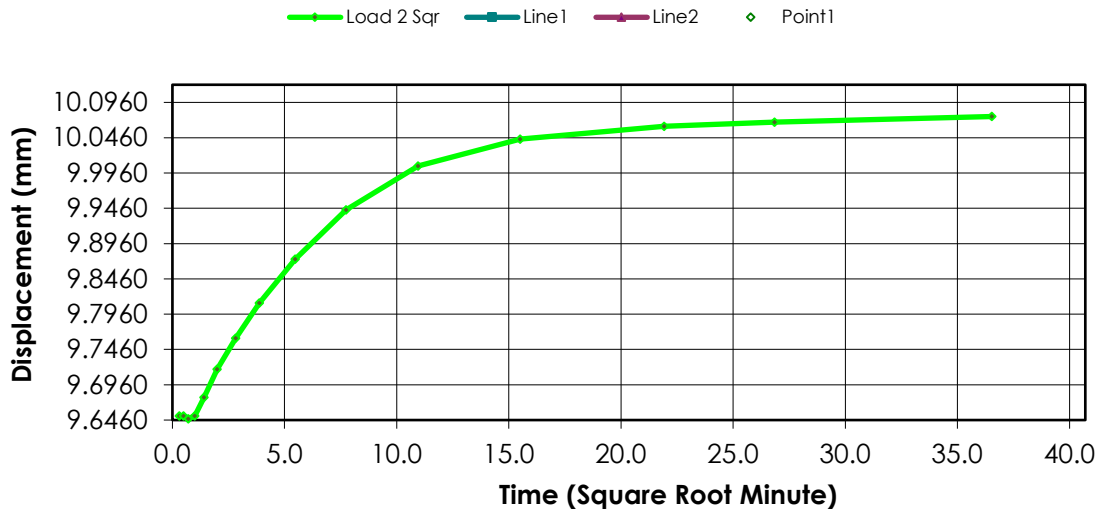
Remarks:

Sample Type: Undisturbed

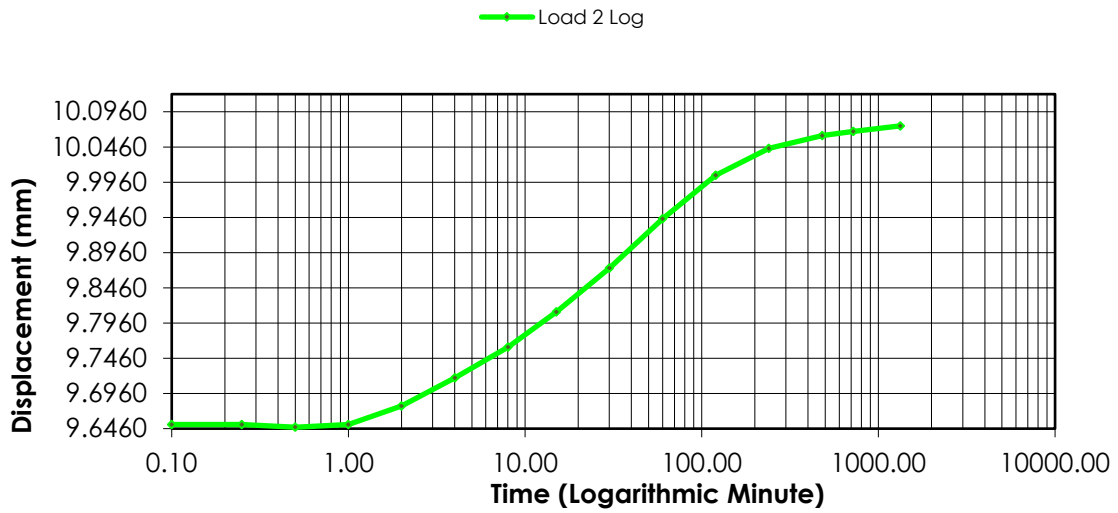
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	9.6620	0.0000	0.0000	0.8543
1	00:00:06	9.6520	-0.0060	-0.0239	0.8548
2	00:00:15	9.6520	-0.0060	-0.0239	0.8548
3	00:00:30	9.6480	-0.0020	-0.0080	0.8545
4	00:01:00	9.6520	-0.0060	-0.0239	0.8548
5	00:02:00	9.6780	-0.0320	-0.1275	0.8567
6	00:04:01	9.7180	-0.0720	-0.2869	0.8596
7	00:08:01	9.7620	-0.1160	-0.4622	0.8629
8	00:15:02	9.8120	-0.1660	-0.6614	0.8666
9	00:30:03	9.8740	-0.2280	-0.9084	0.8712
10	01:00:06	9.9440	-0.2980	-1.1873	0.8763
11	02:00:12	10.0060	-0.3600	-1.4343	0.8809
12	04:00:23	10.0440	-0.3980	-1.5857	0.8837
13	08:00:46	10.0620	-0.4160	-1.6574	0.8851
14	12:01:10	10.0680	-0.4220	-1.6813	0.8855
15	22:14:43	10.0760	-0.4300	-1.7132	0.8861

**Consolidation Test Results
(Sequence 2) Load 10.000 kPa**

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 3) Load 20.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 10-Oct-18

Test Number:

Sample Number: GL4 ST5

Soil Description:

Boring Number:

Clay (CH), Some Sand

Depth: 2.4-2.85m

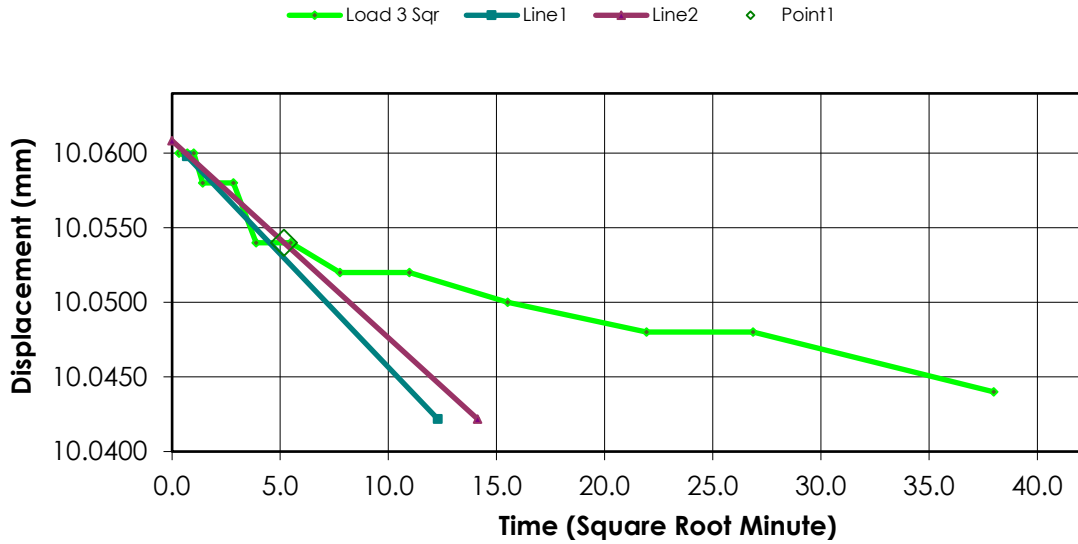
Remarks:

Sample Type: Undisturbed

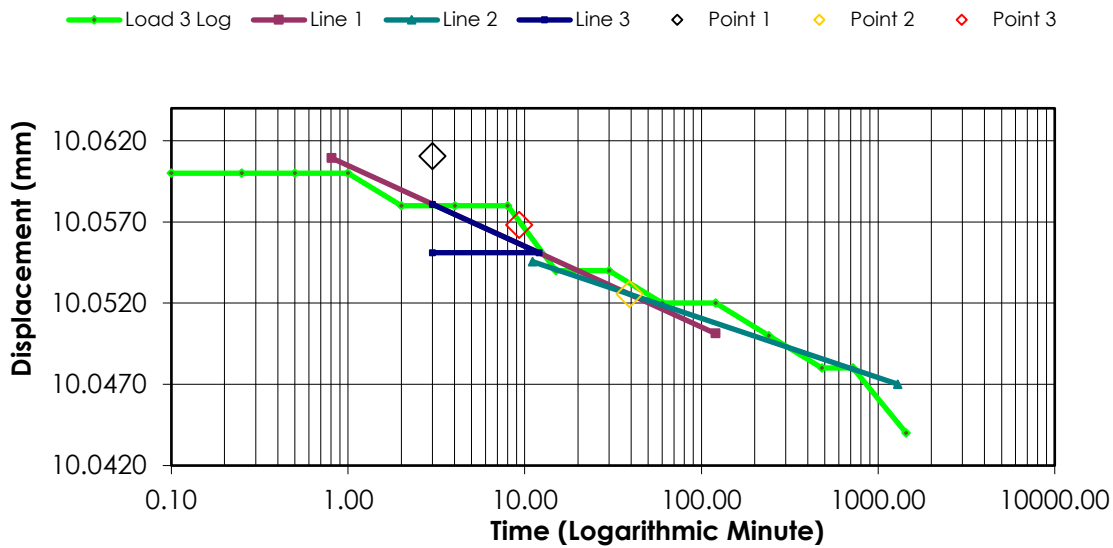
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	10.0760	-0.4300	-1.7132	0.8861
1	00:00:06	10.0600	-0.4220	-1.6813	0.8855
2	00:00:15	10.0600	-0.4220	-1.6813	0.8855
3	00:00:30	10.0600	-0.4220	-1.6813	0.8855
4	00:01:00	10.0600	-0.4220	-1.6813	0.8855
5	00:02:00	10.0580	-0.4200	-1.6733	0.8854
6	00:04:01	10.0580	-0.4200	-1.6733	0.8854
7	00:08:01	10.0580	-0.4200	-1.6733	0.8854
8	00:15:02	10.0540	-0.4160	-1.6574	0.8851
9	00:30:03	10.0540	-0.4160	-1.6574	0.8851
10	01:00:06	10.0520	-0.4140	-1.6494	0.8849
11	02:00:12	10.0520	-0.4140	-1.6494	0.8849
12	04:00:24	10.0500	-0.4120	-1.6414	0.8848
13	08:00:47	10.0480	-0.4100	-1.6335	0.8846
14	12:01:10	10.0480	-0.4100	-1.6335	0.8846
15	24:02:19	10.0440	-0.4060	-1.6175	0.8843

Consolidation Test Results (Sequence 3) Load 20.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



**Consolidation Test Results
(Sequence 4) Load 40.000 kPa**

Project: SR1 2018 Investigation
Location:
Job Number:

Project Number: 110773396

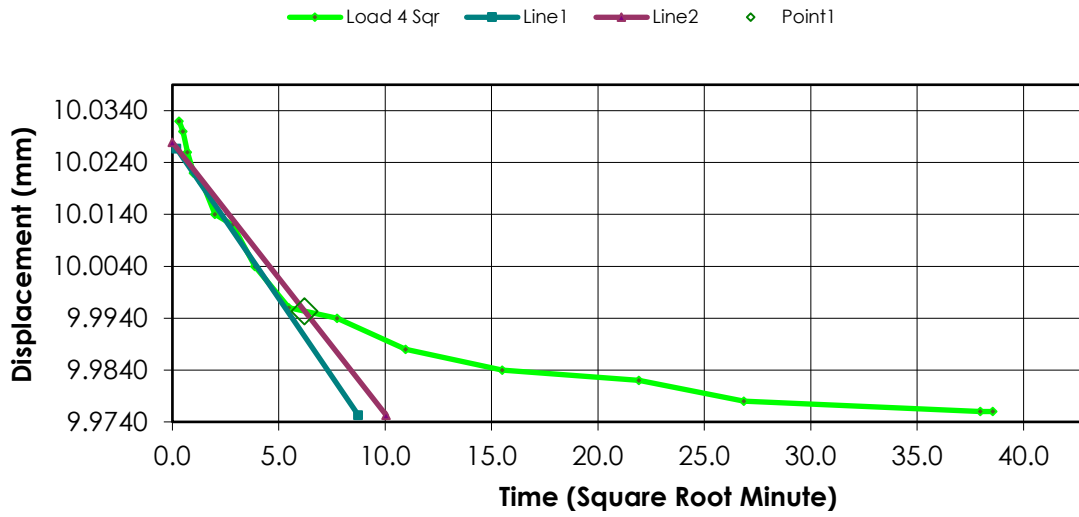
Test Date: 10-Oct-18
Test Number:

Sample Number: GL4 ST5 **Soil Description:**
Boring Number: Clay (CH), Some Sand
Depth: 2.4-2.85m **Remarks:**
Sample Type: Undisturbed

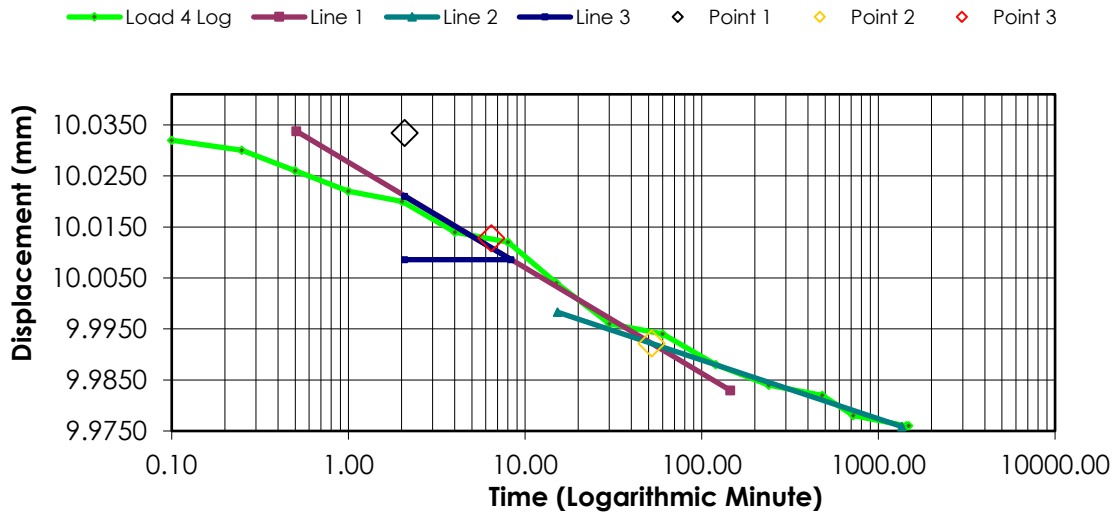
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	10.0440	-0.4060	-1.6175	0.8843
1	00:00:06	10.0320	-0.4100	-1.6335	0.8846
2	00:00:15	10.0300	-0.4080	-1.6255	0.8845
3	00:00:30	10.0260	-0.4040	-1.6096	0.8842
4	00:01:00	10.0220	-0.4000	-1.5936	0.8839
5	00:02:01	10.0200	-0.3980	-1.5857	0.8837
6	00:04:01	10.0140	-0.3920	-1.5618	0.8833
7	00:08:01	10.0120	-0.3900	-1.5538	0.8831
8	00:15:02	10.0040	-0.3820	-1.5219	0.8825
9	00:30:03	9.9960	-0.3740	-1.4900	0.8820
10	01:00:06	9.9940	-0.3720	-1.4821	0.8818
11	02:00:12	9.9880	-0.3660	-1.4582	0.8814
12	04:00:23	9.9840	-0.3620	-1.4422	0.8811
13	08:00:46	9.9820	-0.3600	-1.4343	0.8809
14	12:01:10	9.9780	-0.3560	-1.4183	0.8806
15	24:02:19	9.9760	-0.3540	-1.4104	0.8805
16	24:46:21	9.9760	-0.3540	-1.4104	0.8805

Consolidation Test Results (Sequence 4) Load 40.000 kPa

Consolidation Graph (Square Root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results (Sequence 5) Load 80.000 kPa

Project: SR1 2018 Investigation
Location:
Job Number:

Project Number: 110773396

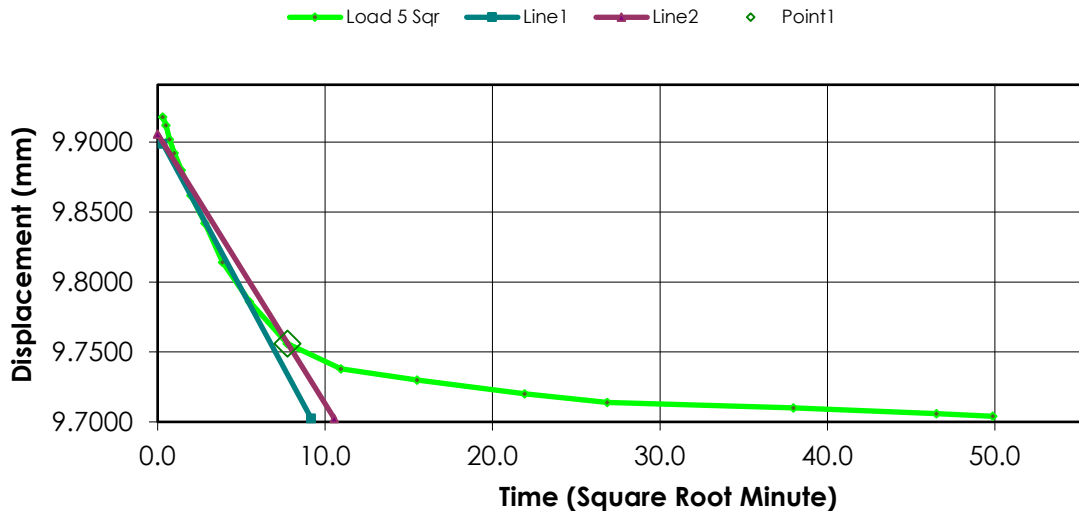
Test Date: 10-Oct-18
Test Number:

Sample Number: GL4 ST5 **Soil Description:**
Boring Number: Clay (CH), Some Sand
Depth: 2.4-2.85m **Remarks:**
Sample Type: Undisturbed

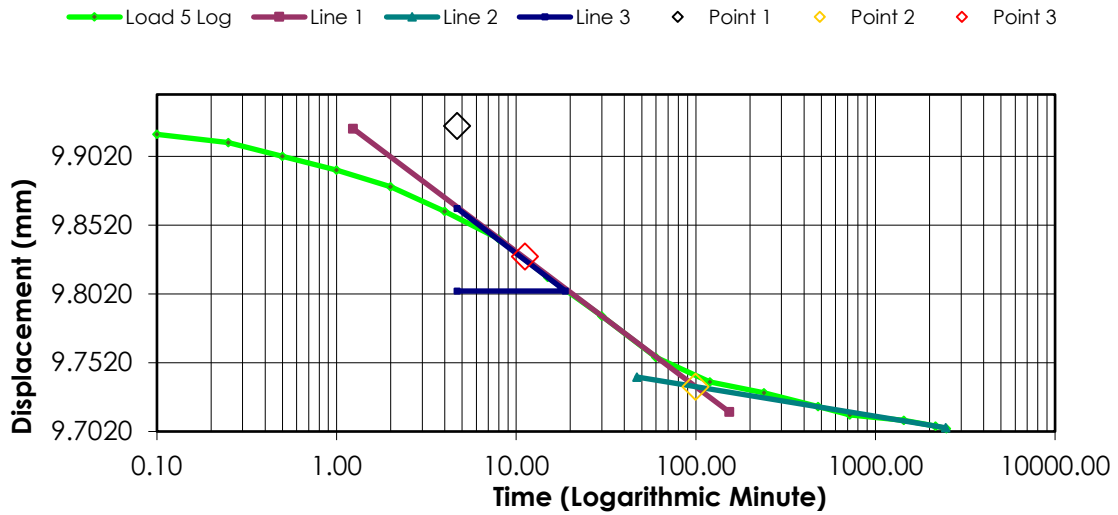
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	9.9760	-0.3540	-1.4104	0.8805
1	00:00:06	9.9180	-0.3180	-1.2669	0.8778
2	00:00:15	9.9120	-0.3120	-1.2430	0.8774
3	00:00:30	9.9020	-0.3020	-1.2032	0.8766
4	00:01:00	9.8920	-0.2920	-1.1633	0.8759
5	00:02:00	9.8800	-0.2800	-1.1155	0.8750
6	00:04:00	9.8620	-0.2620	-1.0438	0.8737
7	00:08:01	9.8420	-0.2420	-0.9641	0.8722
8	00:15:01	9.8140	-0.2140	-0.8526	0.8701
9	00:30:03	9.7860	-0.1860	-0.7410	0.8681
10	01:00:05	9.7560	-0.1560	-0.6215	0.8658
11	02:00:11	9.7380	-0.1380	-0.5498	0.8645
12	04:00:22	9.7300	-0.1300	-0.5179	0.8639
13	08:00:45	9.7200	-0.1200	-0.4781	0.8632
14	12:01:08	9.7140	-0.1140	-0.4542	0.8627
15	24:02:17	9.7100	-0.1100	-0.4383	0.8625
16	36:03:27	9.7060	-0.1060	-0.4223	0.8622
17	41:27:55	9.7040	-0.1040	-0.4143	0.8620

Consolidation Test Results (Sequence 5) Load 80.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 6) Load 160.000 kPa

Project: SR1 2018 Investigation
Location:
Job Number:

Project Number: 110773396

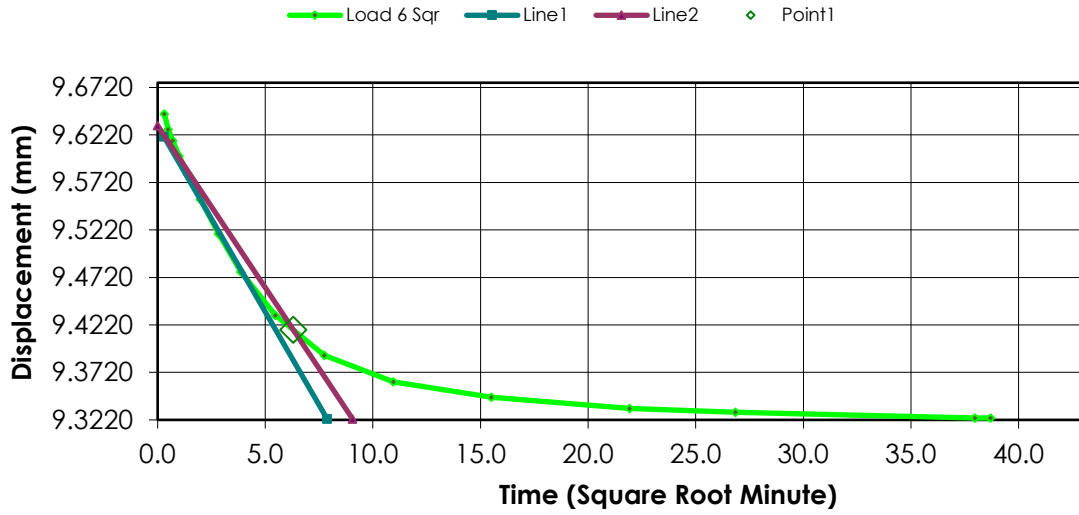
Test Date: 10-Oct-18
Test Number:

Sample Number: GL4 ST5 **Soil Description:**
Boring Number: Clay (CH), Some Sand
Depth: 2.4-2.85m **Remarks:**
Sample Type: Undisturbed

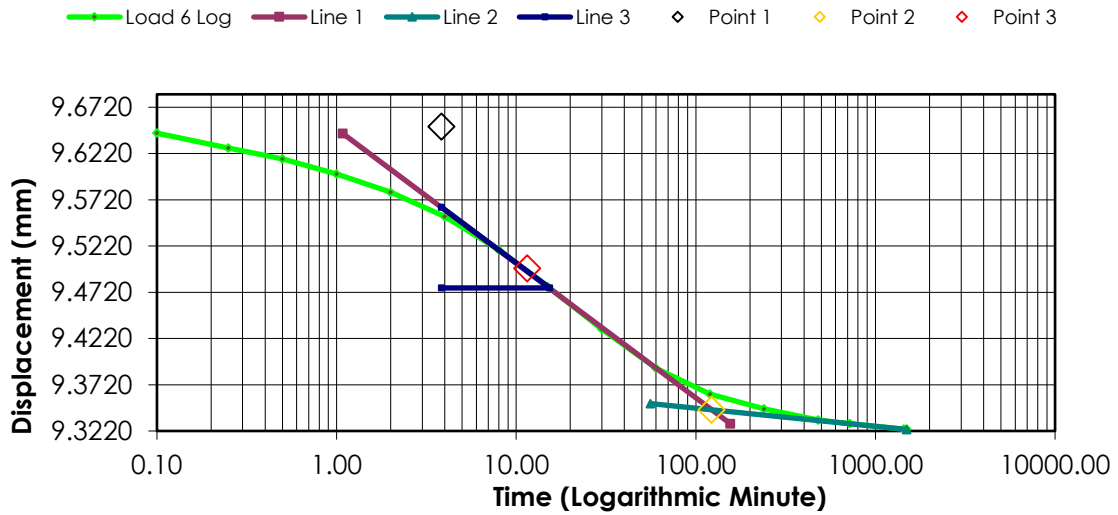
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	9.7040	-0.1040	-0.4143	0.8620
1	00:00:06	9.6440	-0.0780	-0.3108	0.8601
2	00:00:15	9.6280	-0.0620	-0.2470	0.8589
3	00:00:30	9.6160	-0.0500	-0.1992	0.8580
4	00:01:00	9.6000	-0.0340	-0.1355	0.8568
5	00:02:00	9.5800	-0.0140	-0.0558	0.8554
6	00:04:00	9.5540	0.0120	0.0478	0.8534
7	00:08:00	9.5180	0.0480	0.1912	0.8508
8	00:15:01	9.4780	0.0880	0.3506	0.8478
9	00:30:02	9.4320	0.1340	0.5339	0.8444
10	01:00:05	9.3900	0.1760	0.7012	0.8413
11	02:00:11	9.3620	0.2040	0.8127	0.8393
12	04:00:23	9.3460	0.2200	0.8765	0.8381
13	08:00:46	9.3340	0.2320	0.9243	0.8372
14	12:01:09	9.3300	0.2360	0.9402	0.8369
15	24:02:17	9.3240	0.2420	0.9641	0.8364
16	24:58:07	9.3240	0.2420	0.9641	0.8364

Consolidation Test Results (Sequence 6) Load 160.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 7) Load 320.000 kPa

Project: SR1 2018 Investigation
Location:
Job Number:

Project Number: 110773396

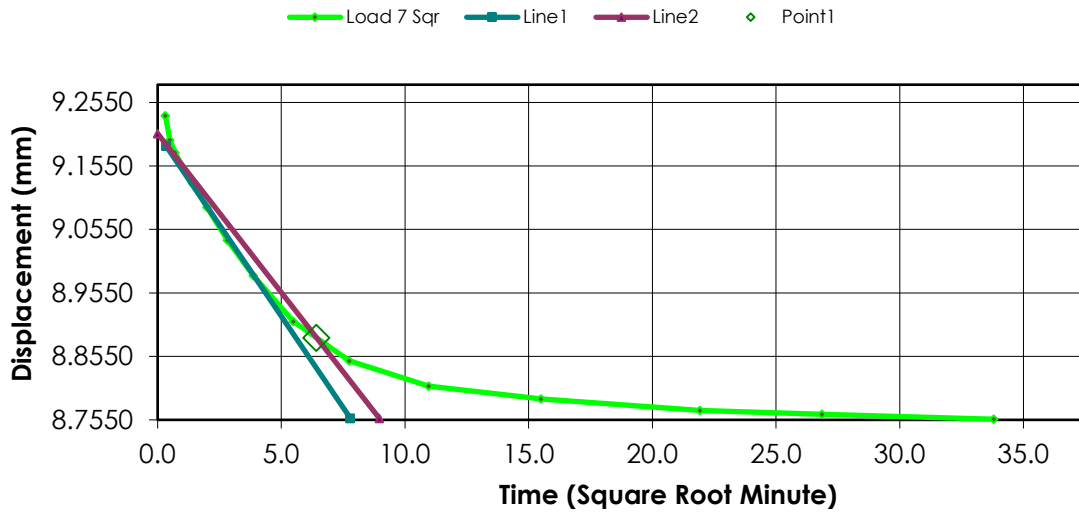
Test Date: 10-Oct-18
Test Number:

Sample Number: GL4 ST5 **Soil Description:**
Boring Number: Clay (CH), Some Sand
Depth: 2.4-2.85m **Remarks:**
Sample Type: Undisturbed

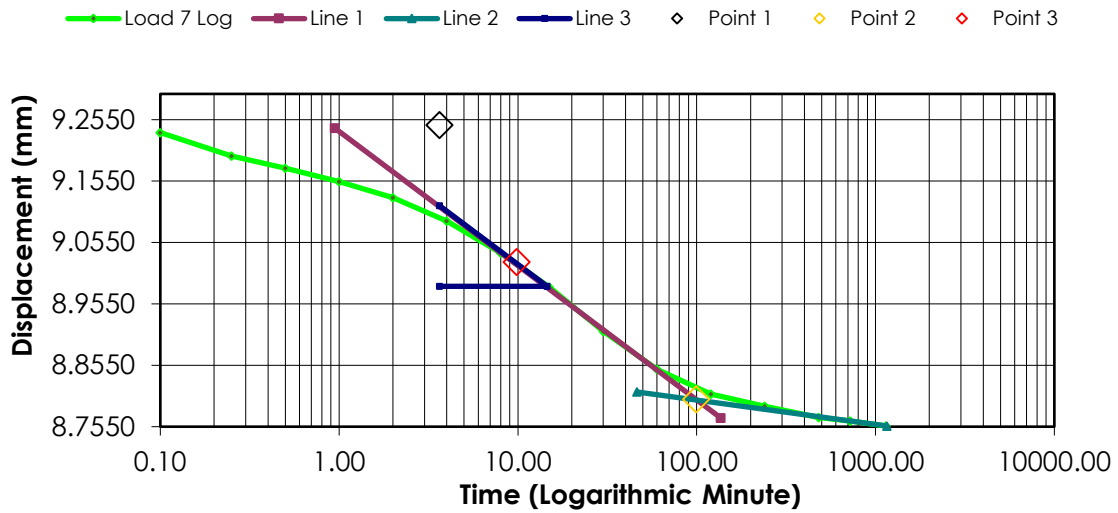
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	9.3240	0.2420	0.9641	0.8364
1	00:00:06	9.2340	0.2660	1.0598	0.8347
2	00:00:15	9.1960	0.3040	1.2112	0.8319
3	00:00:30	9.1760	0.3240	1.2908	0.8304
4	00:01:00	9.1540	0.3460	1.3785	0.8288
5	00:02:00	9.1280	0.3720	1.4821	0.8268
6	00:04:00	9.0900	0.4100	1.6335	0.8240
7	00:08:00	9.0380	0.4620	1.8406	0.8202
8	00:15:01	8.9820	0.5180	2.0637	0.8161
9	00:30:03	8.9100	0.5900	2.3506	0.8107
10	01:00:05	8.8480	0.6520	2.5976	0.8062
11	02:00:11	8.8080	0.6920	2.7570	0.8032
12	04:00:23	8.7880	0.7120	2.8367	0.8017
13	08:00:46	8.7700	0.7300	2.9084	0.8004
14	12:01:09	8.7640	0.7360	2.9323	0.8000
15	19:03:08	8.7560	0.7440	2.9641	0.7994

Consolidation Test Results (Sequence 7) Load 320.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 8) Load 640.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 10-Oct-18

Test Number:

Sample Number: GL4 ST5

Soil Description:

Boring Number:

Clay (CH), Some Sand

Depth: 2.4-2.85m

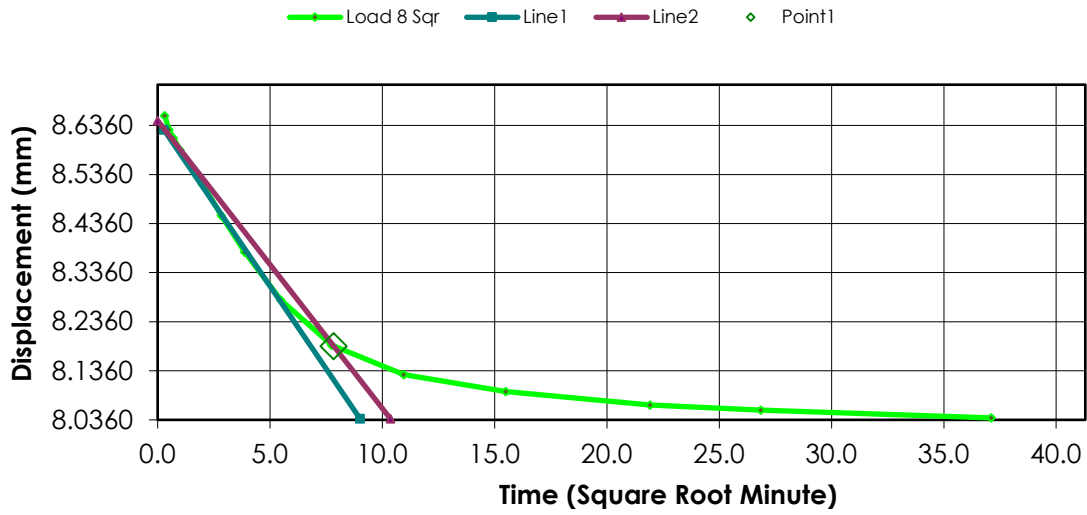
Remarks:

Sample Type: Undisturbed

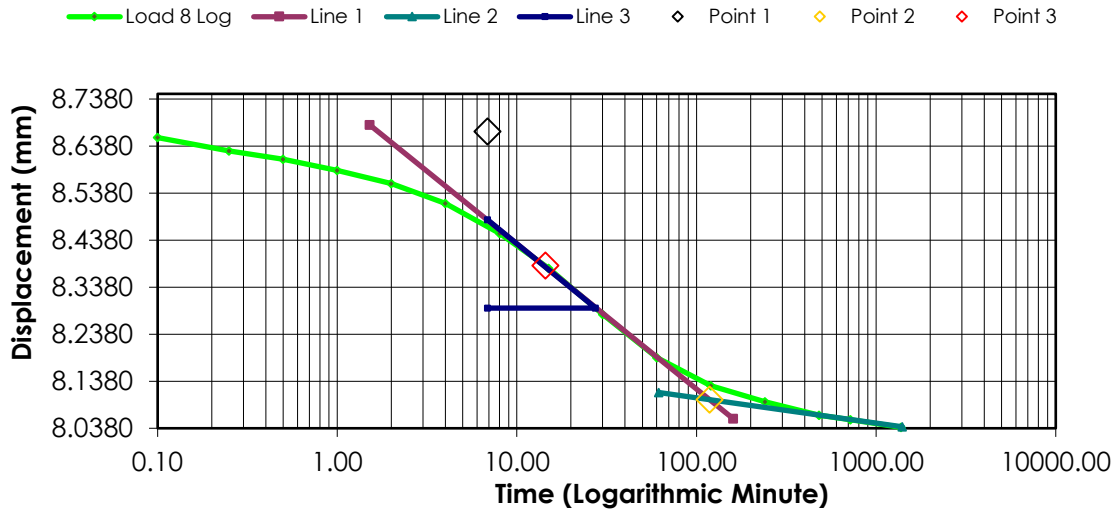
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.7560	0.7440	2.9641	0.7994
1	00:00:06	8.6560	0.7940	3.1633	0.7957
2	00:00:15	8.6280	0.8220	3.2749	0.7936
3	00:00:30	8.6100	0.8400	3.3466	0.7923
4	00:01:00	8.5860	0.8640	3.4422	0.7905
5	00:02:00	8.5580	0.8920	3.5538	0.7884
6	00:04:00	8.5160	0.9340	3.7211	0.7853
7	00:08:01	8.4520	0.9980	3.9761	0.7806
8	00:15:01	8.3780	1.0720	4.2709	0.7751
9	00:30:03	8.2800	1.1700	4.6614	0.7679
10	01:00:06	8.1880	1.2620	5.0279	0.7611
11	02:00:11	8.1280	1.3220	5.2669	0.7567
12	04:00:23	8.0940	1.3560	5.4024	0.7541
13	08:00:46	8.0660	1.3840	5.5139	0.7521
14	12:01:09	8.0560	1.3940	5.5538	0.7513
15	22:57:50	8.0400	1.4100	5.6175	0.7502

Consolidation Test Results (Sequence 8) Load 640.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 9) Rebound 320.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 10-Oct-18

Test Number:

Sample Number: GL4 ST5

Soil Description:

Boring Number:

Clay (CH), Some Sand

Depth: 2.4-2.85m

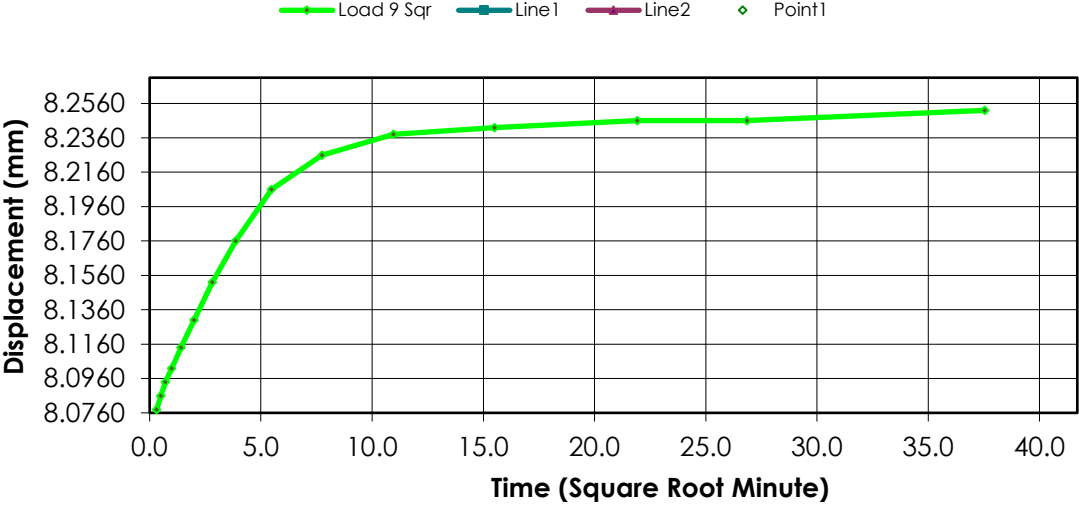
Remarks:

Sample Type: Undisturbed

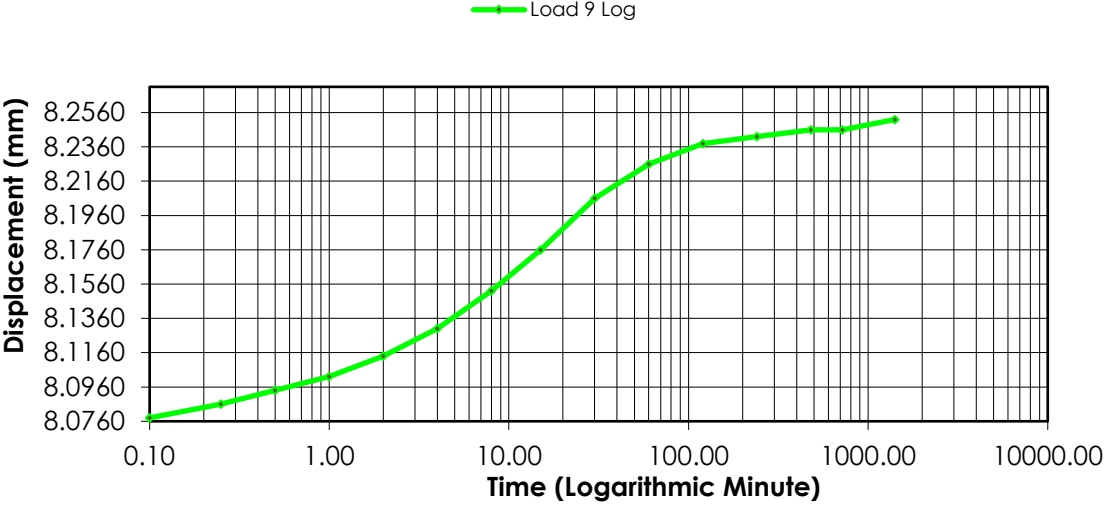
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.0400	1.4100	5.6175	0.7502
1	00:00:06	8.0780	1.4100	5.6175	0.7502
2	00:00:15	8.0860	1.4020	5.5857	0.7507
3	00:00:30	8.0940	1.3940	5.5538	0.7513
4	00:01:00	8.1020	1.3860	5.5219	0.7519
5	00:02:00	8.1140	1.3740	5.4741	0.7528
6	00:04:00	8.1300	1.3580	5.4104	0.7540
7	00:08:00	8.1520	1.3360	5.3227	0.7556
8	00:15:01	8.1760	1.3120	5.2271	0.7574
9	00:30:02	8.2060	1.2820	5.1076	0.7596
10	01:00:05	8.2260	1.2620	5.0279	0.7611
11	02:00:10	8.2380	1.2500	4.9801	0.7620
12	04:00:21	8.2420	1.2460	4.9641	0.7623
13	08:00:44	8.2460	1.2420	4.9482	0.7626
14	12:01:07	8.2460	1.2420	4.9482	0.7626
15	23:29:42	8.2520	1.2360	4.9243	0.7630

Consolidation Test Results (Sequence 9) Rebound 320.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 10) Rebound 160.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 10-Oct-18

Test Number:

Sample Number: GL4 ST5

Soil Description:

Boring Number:

Clay (CH), Some Sand

Depth: 2.4-2.85m

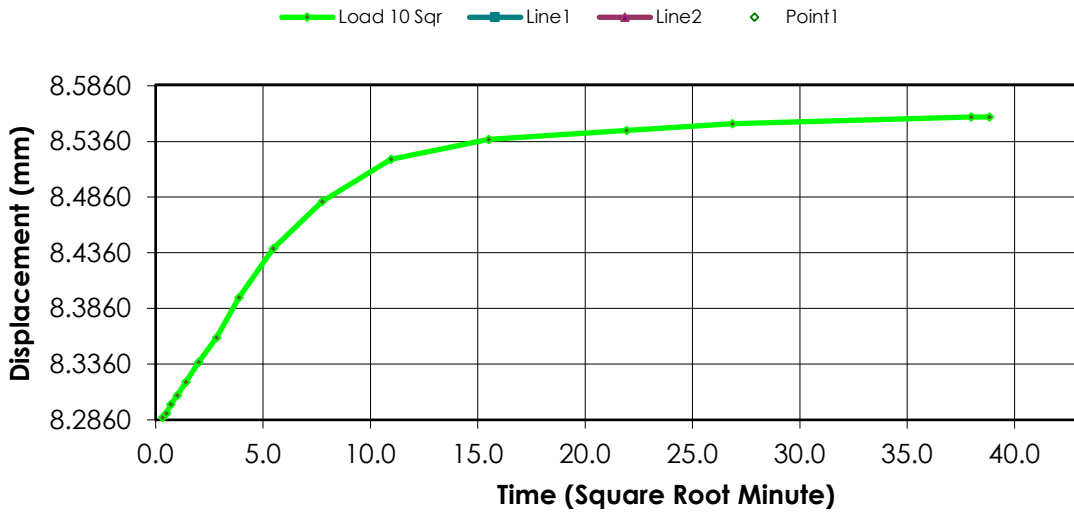
Remarks:

Sample Type: Undisturbed

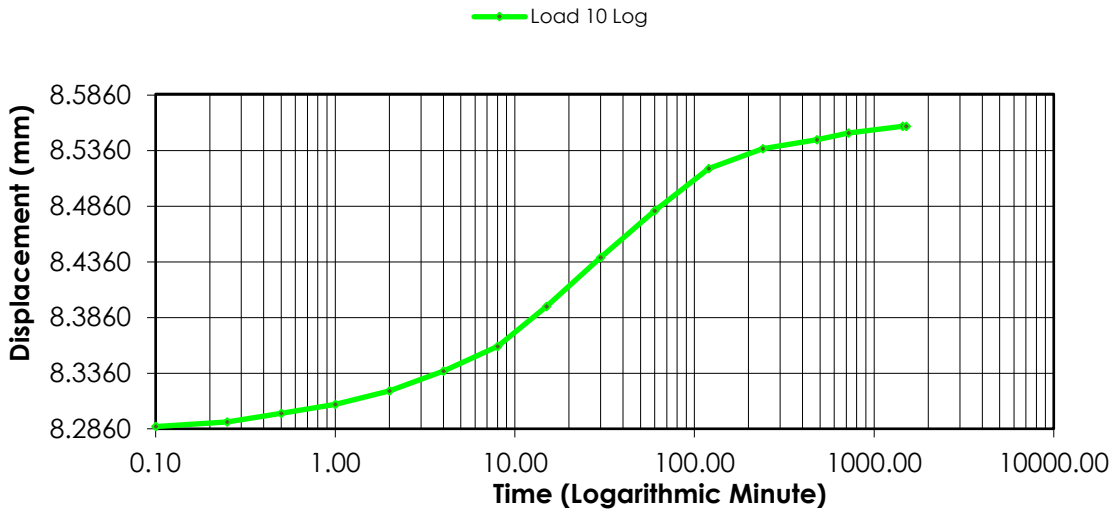
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.2520	1.2360	4.9243	0.7630
1	00:00:06	8.2880	1.2260	4.8845	0.7638
2	00:00:15	8.2920	1.2220	4.8685	0.7640
3	00:00:30	8.3000	1.2140	4.8367	0.7646
4	00:01:00	8.3080	1.2060	4.8048	0.7652
5	00:02:00	8.3200	1.1940	4.7570	0.7661
6	00:04:00	8.3380	1.1760	4.6853	0.7674
7	00:08:01	8.3600	1.1540	4.5976	0.7691
8	00:15:01	8.3960	1.1180	4.4542	0.7717
9	00:30:03	8.4400	1.0740	4.2789	0.7750
10	01:00:05	8.4820	1.0320	4.1116	0.7781
11	02:00:11	8.5200	0.9940	3.9602	0.7809
12	04:00:23	8.5380	0.9760	3.8884	0.7822
13	08:00:46	8.5460	0.9680	3.8566	0.7828
14	12:01:08	8.5520	0.9620	3.8327	0.7833
15	24:02:17	8.5580	0.9560	3.8088	0.7837
16	25:08:03	8.5580	0.9560	3.8088	0.7837

Consolidation Test Results
(Sequence 10) Rebound 160.000 kPa

Consolidation Graph (Square Root Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 11) Load 320.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 10-Oct-18

Test Number:

Sample Number: GL4 ST5

Soil Description:

Boring Number:

Clay (CH), Some Sand

Depth: 2.4-2.85m

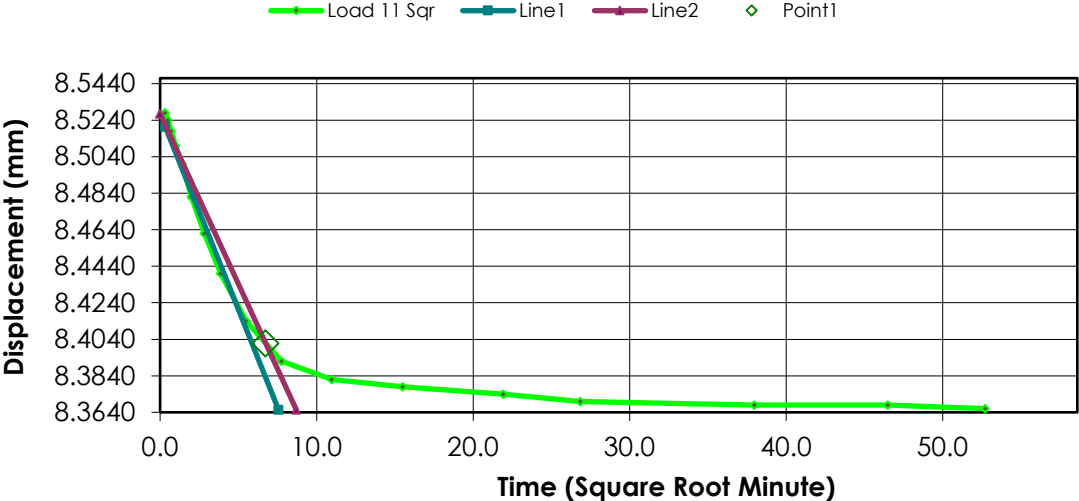
Remarks:

Sample Type: Undisturbed

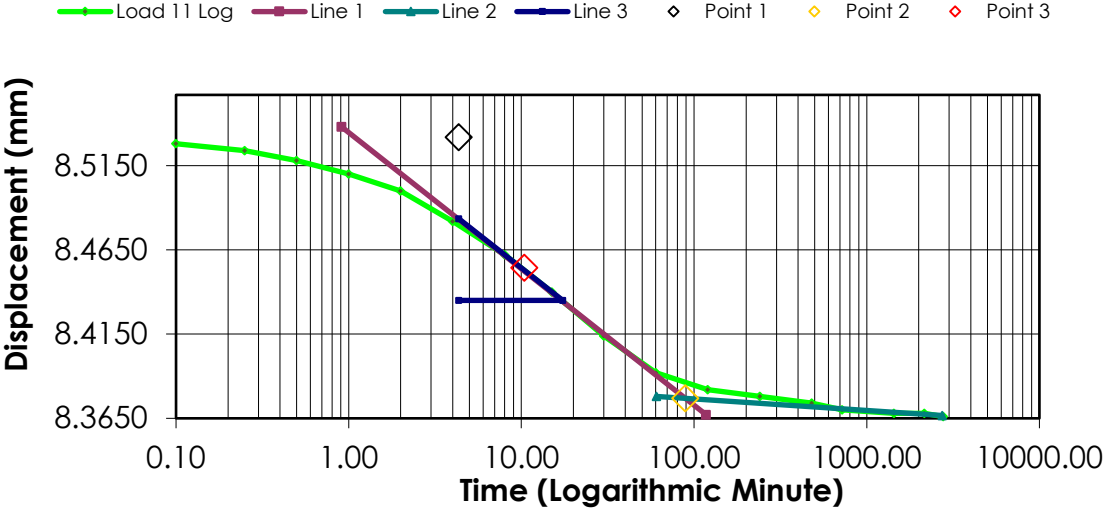
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.5580	0.9560	3.8088	0.7837
1	00:00:06	8.5280	0.9620	3.8327	0.7833
2	00:00:15	8.5240	0.9660	3.8486	0.7830
3	00:00:30	8.5180	0.9720	3.8725	0.7825
4	00:01:00	8.5100	0.9800	3.9044	0.7819
5	00:02:00	8.5000	0.9900	3.9442	0.7812
6	00:04:00	8.4820	1.0080	4.0159	0.7799
7	00:08:01	8.4620	1.0280	4.0956	0.7784
8	00:15:01	8.4400	1.0500	4.1833	0.7768
9	00:30:02	8.4140	1.0760	4.2869	0.7748
10	01:00:05	8.3920	1.0980	4.3745	0.7732
11	02:00:10	8.3820	1.1080	4.4143	0.7725
12	04:00:20	8.3780	1.1120	4.4303	0.7722
13	08:00:39	8.3740	1.1160	4.4462	0.7719
14	12:00:59	8.3700	1.1200	4.4621	0.7716
15	24:01:57	8.3680	1.1220	4.4701	0.7714
16	36:02:56	8.3680	1.1220	4.4701	0.7714
17	46:19:35	8.3660	1.1240	4.4781	0.7713

Consolidation Test Results (Sequence 11) Load 320.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 12) Load 640.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 10-Oct-18

Test Number:

Sample Number: GL4 ST5

Soil Description:

Boring Number:

Clay (CH), Some Sand

Depth: 2.4-2.85m

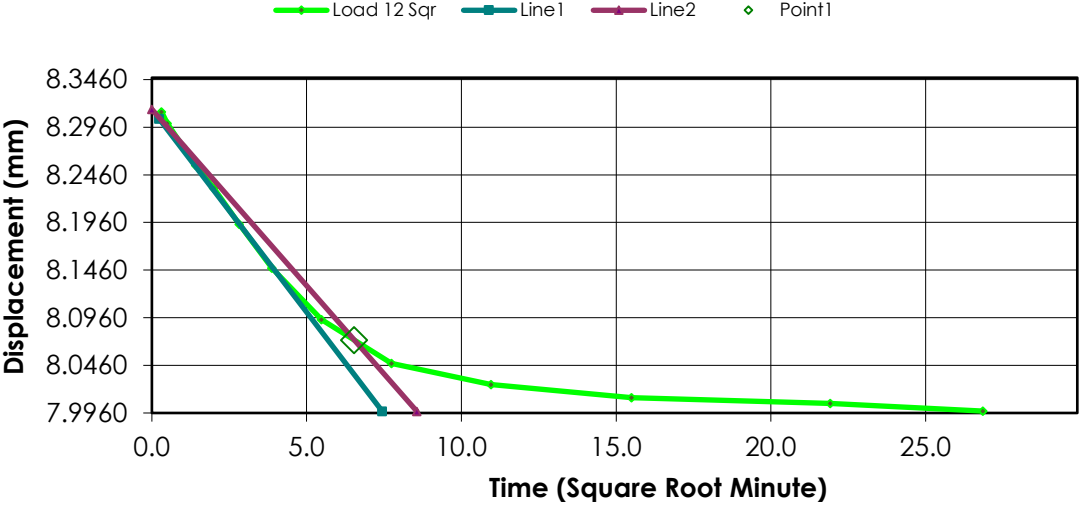
Remarks:

Sample Type: Undisturbed

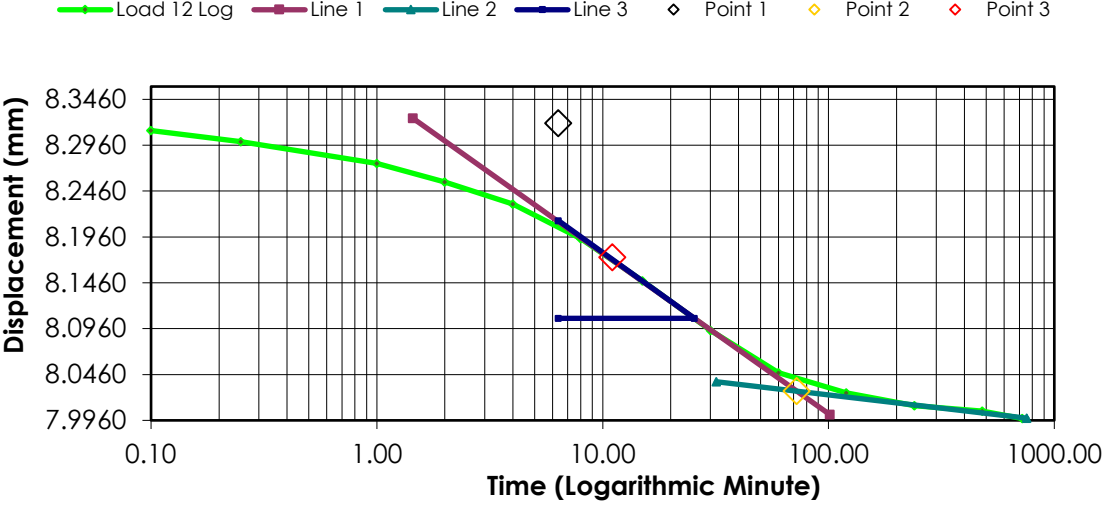
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	8.3660	1.1240	4.4781	0.7713
1	00:00:06	8.3120	1.1580	4.6135	0.7688
2	00:00:15	8.3000	1.1700	4.6614	0.7679
4	00:01:00	8.2760	1.1940	4.7570	0.7661
5	00:02:00	8.2560	1.2140	4.8367	0.7646
6	00:04:00	8.2320	1.2380	4.9323	0.7629
7	00:08:00	8.1940	1.2760	5.0837	0.7601
8	00:15:01	8.1480	1.3220	5.2669	0.7567
9	00:30:02	8.0940	1.3760	5.4821	0.7527
10	01:00:04	8.0480	1.4220	5.6653	0.7493
11	02:00:09	8.0260	1.4440	5.7530	0.7476
12	04:00:19	8.0120	1.4580	5.8088	0.7466
13	08:00:39	8.0060	1.4640	5.8327	0.7462
14	12:00:54	7.9980	1.4720	5.8645	0.7456

Consolidation Test Results (Sequence 12) Load 640.000 kPa

Consolidation Graph (Squareroot Time)



Consolidation Graph (Logarithmic Time)



Consolidation Test Results
(Sequence 13) Load 1280.000 kPa

Project: SR1 2018 Investigation

Project Number: 110773396

Location:

Job Number:

Test Date: 10-Oct-18

Test Number:

Sample Number: GL4 ST5

Soil Description:

Boring Number:

Clay (CH), Some Sand

Depth: 2.4-2.85m

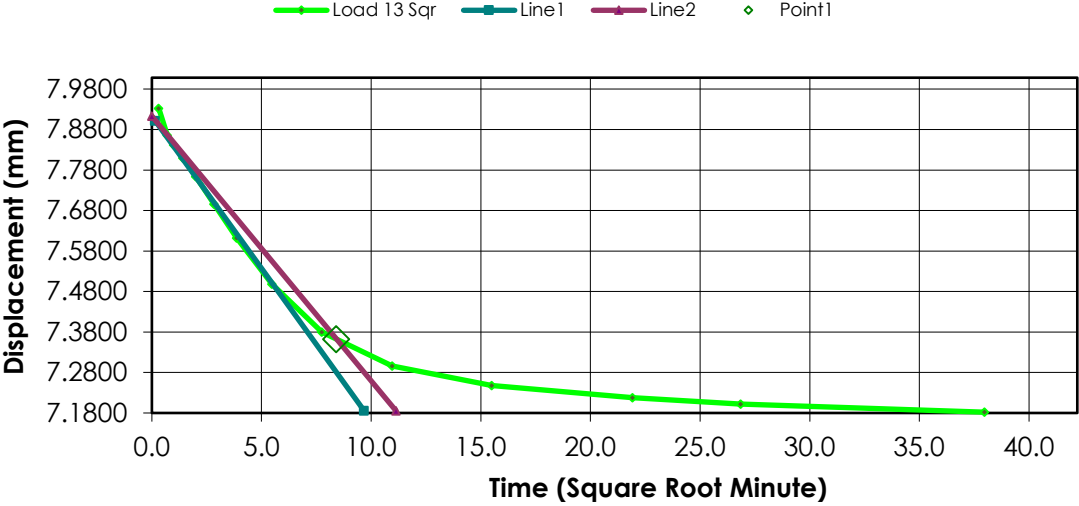
Remarks:

Sample Type: Undisturbed

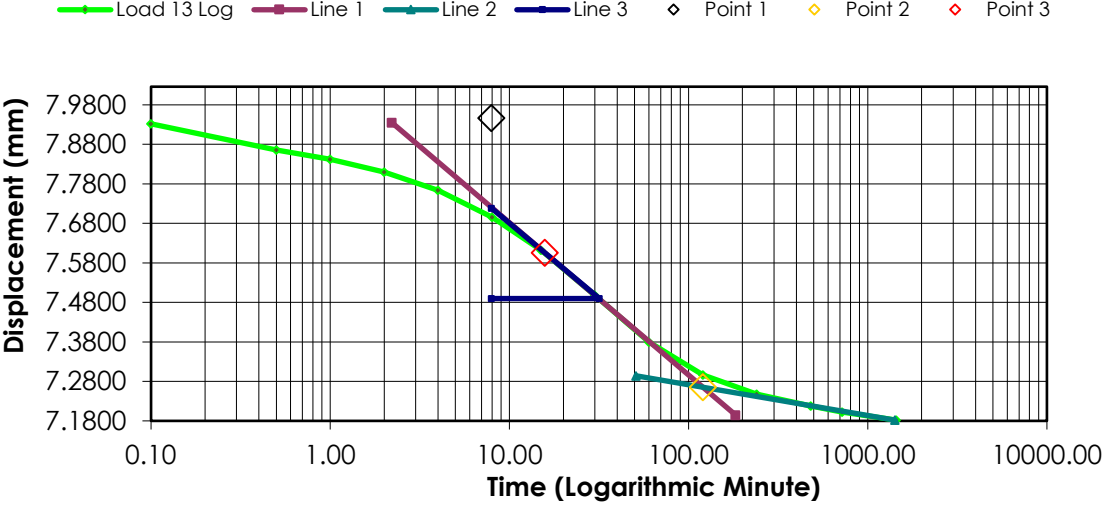
Index	Time	Displacement (mm)	Settlement (mm)	Axial Strain (%)	Void Ratio
0	00:00:00	7.9980	1.4720	5.8645	0.7456
1	00:00:06	7.9320	1.4660	5.8406	0.7460
3	00:00:30	7.8660	1.5320	6.1036	0.7411
4	00:01:00	7.8420	1.5560	6.1992	0.7394
5	00:02:00	7.8100	1.5880	6.3267	0.7370
6	00:04:00	7.7640	1.6340	6.5100	0.7336
7	00:08:00	7.6960	1.7020	6.7809	0.7286
8	00:15:01	7.6120	1.7860	7.1155	0.7224
9	00:30:02	7.4980	1.9000	7.5697	0.7140
10	01:00:05	7.3800	2.0180	8.0398	0.7052
11	02:00:10	7.2960	2.1020	8.3745	0.6990
12	04:00:19	7.2480	2.1500	8.5657	0.6955
13	08:00:39	7.2180	2.1800	8.6853	0.6933
14	12:00:59	7.2020	2.1960	8.7490	0.6921
15	24:01:57	7.1820	2.2160	8.8287	0.6906

Consolidation Test Results (Sequence 13) Load 1280.000 kPa

Consolidation Graph (Square Root Time)



Consolidation Graph (Logarithmic Time)



APPENDIX E.3: DEBRIS BARRIER BEDROCK TESTING

2018 Rock Testing Results Anchor Pull-Out



**MTC Laboratory Rock Core
Anchor Pull-Out Test**

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
 Lithology Shale, gray, moderately hard
 Hole Number DB-1 Depth (m) 28.62-28.78

Project Number 110773396
 Lab ID PO-13
 Date Received 05/15/2018
 Test Date 05/31/2018

Diameter (in) 2.398 Length (in) 5.923
 Moisture Condition As received, moist

Anchor Bond Interface

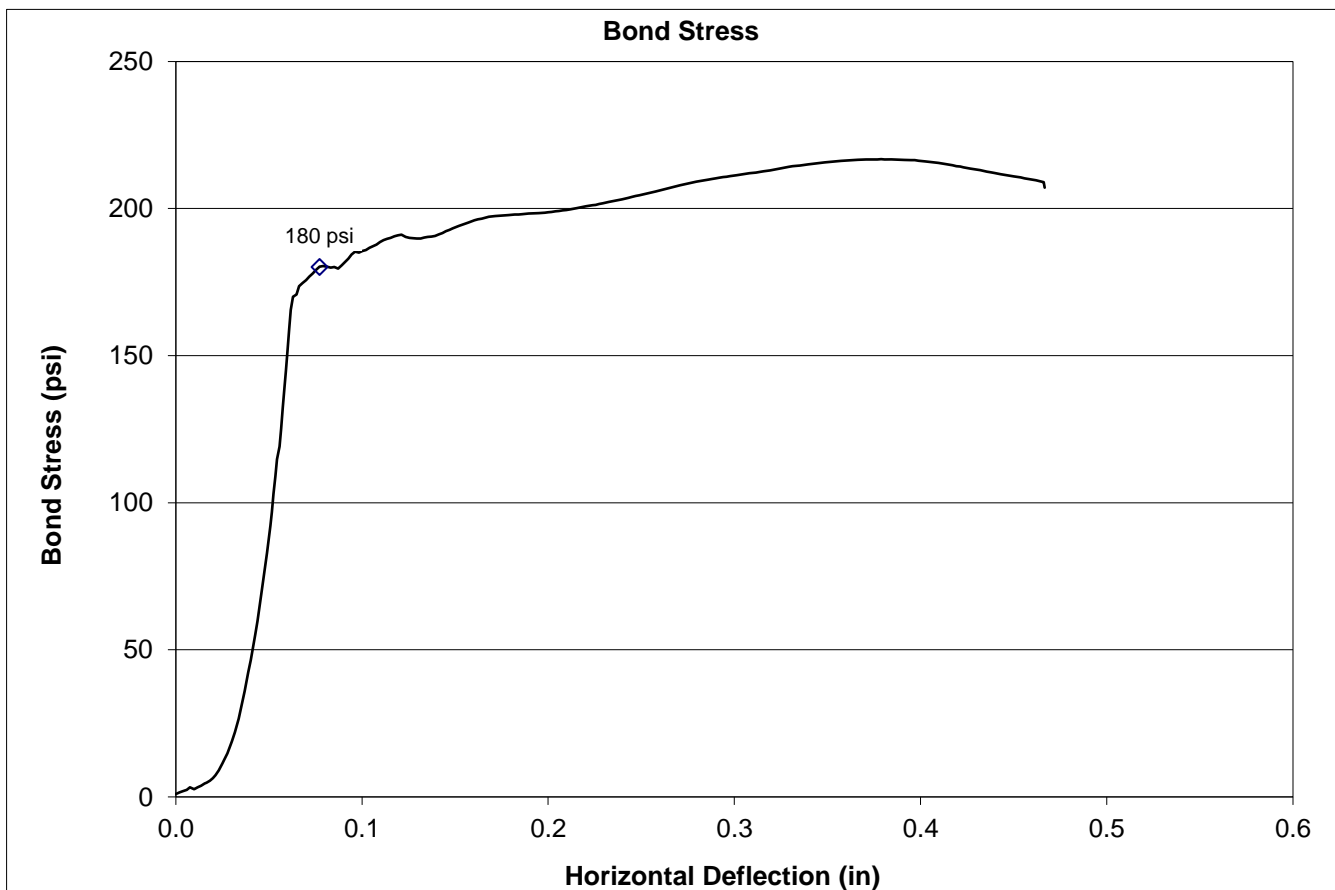
Diameter (in) 1.275
 Length (in) 5.423
 Surface Area (in²) 21.72

Anchor Preparation

Anchor Type 1/2" diameter threaded rod with 4 nuts
 Grout Type Quikrete Portland Cement, Type I/II

Grout Preparation Date 05/24/2018
 Water / Grout Ratio 0.45
 Cure Time (days) 7
 Cube Strength (psi) 7390

Maximum Load (lbf) 3915
 Maximum Stress (psi) 180
 Load Rate to Peak (lbf/min) 240
 Post Peak Shear Rate (in/min) 0.009
 Length of Intact Pull Out (in) 5.09



Comments _____

Reviewed By RJ

Time (seconds)	Shear Load (lbf)	Horizontal Dial Reading (in)	Compliance Correction (in)	Corrected Dial Reading (in)	Shear Stress (psi)	Horizontal Deflection (in)
0	23	0.9950	0.0002	0.9952	1.1	0.0000
21	33	0.9930	0.0003	0.9933	1.5	0.0019
38	42	0.9910	0.0003	0.9913	1.9	0.0038
54	52	0.9890	0.0004	0.9894	2.4	0.0058
72	70	0.9870	0.0006	0.9876	3.2	0.0076
88	57	0.9850	0.0005	0.9855	2.6	0.0097
103	70	0.9830	0.0006	0.9836	3.2	0.0116
119	82	0.9810	0.0007	0.9817	3.8	0.0135
136	98	0.9790	0.0008	0.9798	4.5	0.0154
156	110	0.9770	0.0009	0.9779	5.1	0.0173
174	129	0.9750	0.0010	0.9760	5.9	0.0192
193	152	0.9730	0.0012	0.9742	7.0	0.0210
213	189	0.9710	0.0015	0.9725	8.7	0.0227
233	230	0.9690	0.0018	0.9708	10.6	0.0244
253	274	0.9670	0.0022	0.9692	12.6	0.0260
272	322	0.9650	0.0026	0.9676	14.8	0.0276
291	377	0.9630	0.0030	0.9660	17.4	0.0292
312	436	0.9610	0.0035	0.9645	20.1	0.0307
331	500	0.9590	0.0040	0.9630	23.0	0.0322
351	571	0.9570	0.0045	0.9615	26.3	0.0337
372	653	0.9550	0.0052	0.9602	30.1	0.0350
393	742	0.9530	0.0059	0.9589	34.2	0.0363
413	827	0.9510	0.0066	0.9576	38.1	0.0376
432	919	0.9490	0.0073	0.9563	42.3	0.0389
451	1008	0.9470	0.0080	0.9550	46.4	0.0402
470	1102	0.9450	0.0087	0.9537	50.7	0.0414
488	1197	0.9430	0.0095	0.9525	55.1	0.0427
506	1296	0.9410	0.0103	0.9513	59.7	0.0439
525	1406	0.9390	0.0112	0.9502	64.7	0.0450
545	1518	0.9370	0.0120	0.9490	69.9	0.0461
563	1631	0.9350	0.0129	0.9479	75.1	0.0472
582	1748	0.9330	0.0139	0.9469	80.5	0.0483
598	1853	0.9310	0.0147	0.9457	85.3	0.0495
615	1970	0.9290	0.0156	0.9446	90.7	0.0505
635	2102	0.9270	0.0167	0.9437	96.8	0.0515
654	2237	0.9250	0.0178	0.9428	103.0	0.0524
673	2367	0.9230	0.0188	0.9418	109.0	0.0534
691	2493	0.9210	0.0198	0.9408	114.8	0.0544
707	2588	0.9190	0.0205	0.9395	119.1	0.0556
726	2720	0.9170	0.0216	0.9386	125.2	0.0566
747	2872	0.9150	0.0228	0.9378	132.2	0.0574
766	3012	0.9130	0.0239	0.9369	138.7	0.0583
785	3150	0.9110	0.0250	0.9360	145.0	0.0592
805	3298	0.9090	0.0262	0.9352	151.8	0.0600
825	3451	0.9070	0.0274	0.9344	158.9	0.0608
845	3597	0.9050	0.0286	0.9336	165.6	0.0616
862	3694	0.9030	0.0293	0.9323	170.1	0.0629
876	3709	0.9010	0.0294	0.9304	170.8	0.0647
892	3771	0.8990	0.0299	0.9289	173.6	0.0663
907	3794	0.8970	0.0301	0.9271	174.7	0.0681
921	3817	0.8950	0.0303	0.9253	175.7	0.0699
935	3843	0.8930	0.0305	0.9235	176.9	0.0717
950	3865	0.8910	0.0307	0.9217	177.9	0.0735
964	3892	0.8890	0.0309	0.9199	179.2	0.0753
978	3915	0.8870	0.0311	0.9181	180.2	0.0771
992	3919	0.8850	0.0311	0.9161	180.4	0.0791
1006	3916	0.8830	0.0311	0.9141	180.3	0.0811
1020	3907	0.8810	0.0310	0.9120	179.9	0.0832
1033	3912	0.8790	0.0311	0.9101	180.1	0.0851
1046	3901	0.8770	0.0310	0.9080	179.6	0.0872
1060	3924	0.8750	0.0311	0.9061	180.7	0.0890
1074	3949	0.8730	0.0313	0.9043	181.8	0.0908
1088	3975	0.8710	0.0316	0.9026	183.0	0.0926
1102	4005	0.8690	0.0318	0.9008	184.4	0.0944
1115	4026	0.8670	0.0320	0.8990	185.3	0.0962
1128	4020	0.8650	0.0319	0.8969	185.1	0.0983
1142	4030	0.8630	0.0320	0.8950	185.5	0.1002
1156	4037	0.8610	0.0320	0.8930	185.9	0.1021
1169	4055	0.8590	0.0322	0.8912	186.7	0.1040
1183	4067	0.8570	0.0323	0.8893	187.2	0.1059
1197	4078	0.8550	0.0324	0.8874	187.7	0.1078
1210	4097	0.8530	0.0325	0.8855	188.6	0.1097
1224	4111	0.8510	0.0326	0.8836	189.3	0.1116
1238	4121	0.8490	0.0327	0.8817	189.7	0.1135
1251	4129	0.8470	0.0328	0.8798	190.1	0.1154
1264	4139	0.8450	0.0329	0.8779	190.6	0.1173
1278	4147	0.8430	0.0329	0.8759	190.9	0.1193
1291	4151	0.8410	0.0329	0.8739	191.1	0.1212
1303	4134	0.8390	0.0328	0.8718	190.3	0.1234
1315	4128	0.8370	0.0328	0.8698	190.0	0.1254
1328	4125	0.8350	0.0327	0.8677	189.9	0.1274
1341	4122	0.8330	0.0327	0.8657	189.8	0.1295
1355	4123	0.8310	0.0327	0.8637	189.8	0.1315
1368	4130	0.8290	0.0328	0.8618	190.1	0.1334
1382	4135	0.8270	0.0328	0.8598	190.4	0.1354

	Shear	Horizontal	Compliance	Corrected	Shear	Horizontal
1395	4137	0.8250	0.0328	0.8578	190.5	0.1373
1408	4143	0.8230	0.0329	0.8559	190.7	0.1393
1421	4153	0.8210	0.0330	0.8540	191.2	0.1412
1435	4164	0.8190	0.0331	0.8521	191.7	0.1431
1449	4177	0.8170	0.0332	0.8502	192.3	0.1450
1462	4188	0.8150	0.0332	0.8482	192.8	0.1469
1476	4199	0.8130	0.0333	0.8463	193.3	0.1489
1490	4209	0.8110	0.0334	0.8444	193.8	0.1508
1504	4221	0.8090	0.0335	0.8425	194.3	0.1527
1518	4230	0.8070	0.0336	0.8406	194.7	0.1546
1532	4238	0.8050	0.0336	0.8386	195.1	0.1565
1546	4247	0.8030	0.0337	0.8367	195.5	0.1585
1559	4257	0.8010	0.0338	0.8348	196.0	0.1604
1572	4264	0.7990	0.0338	0.8328	196.3	0.1623
1585	4270	0.7970	0.0339	0.8309	196.6	0.1643
1599	4277	0.7950	0.0339	0.8289	196.9	0.1662
1613	4283	0.7930	0.0340	0.8270	197.2	0.1682
1626	4287	0.7910	0.0340	0.8250	197.4	0.1702
1640	4291	0.7890	0.0341	0.8231	197.5	0.1721
1653	4290	0.7870	0.0341	0.8211	197.5	0.1741
1666	4293	0.7850	0.0341	0.8191	197.6	0.1761
1679	4295	0.7830	0.0341	0.8171	197.7	0.1781
1693	4299	0.7810	0.0341	0.8151	197.9	0.1801
1707	4300	0.7790	0.0341	0.8131	198.0	0.1821
1721	4301	0.7770	0.0341	0.8111	198.0	0.1840
1734	4302	0.7750	0.0341	0.8091	198.1	0.1860
1747	4305	0.7730	0.0342	0.8072	198.2	0.1880
1760	4307	0.7710	0.0342	0.8052	198.3	0.1900
1773	4309	0.7690	0.0342	0.8032	198.4	0.1920
1787	4310	0.7670	0.0342	0.8012	198.4	0.1940
1801	4312	0.7650	0.0342	0.7992	198.5	0.1960
1814	4312	0.7630	0.0342	0.7972	198.5	0.1980
1826	4317	0.7610	0.0343	0.7953	198.7	0.1999
1840	4320	0.7590	0.0343	0.7933	198.9	0.2019
1853	4324	0.7570	0.0343	0.7913	199.1	0.2039
1865	4327	0.7550	0.0343	0.7893	199.2	0.2058
1878	4330	0.7530	0.0344	0.7874	199.3	0.2078
1892	4334	0.7510	0.0344	0.7854	199.5	0.2098
1906	4339	0.7490	0.0344	0.7834	199.8	0.2117
1920	4343	0.7470	0.0345	0.7815	199.9	0.2137
1935	4349	0.7450	0.0345	0.7795	200.2	0.2157
1950	4352	0.7430	0.0345	0.7775	200.4	0.2176
1964	4359	0.7410	0.0346	0.7756	200.7	0.2196
1976	4363	0.7390	0.0346	0.7736	200.9	0.2216
1989	4368	0.7370	0.0347	0.7717	201.1	0.2235
2001	4372	0.7350	0.0347	0.7697	201.3	0.2255
2012	4378	0.7330	0.0348	0.7678	201.6	0.2274
2024	4384	0.7310	0.0348	0.7658	201.8	0.2294
2036	4389	0.7290	0.0348	0.7638	202.1	0.2313
2050	4395	0.7270	0.0349	0.7619	202.3	0.2333
2063	4399	0.7250	0.0349	0.7599	202.5	0.2353
2076	4406	0.7230	0.0350	0.7580	202.8	0.2372
2089	4411	0.7210	0.0350	0.7560	203.1	0.2392
2102	4417	0.7190	0.0351	0.7541	203.3	0.2411
2115	4424	0.7170	0.0351	0.7521	203.7	0.2431
2128	4431	0.7150	0.0352	0.7502	204.0	0.2450
2141	4437	0.7130	0.0352	0.7482	204.3	0.2470
2154	4443	0.7110	0.0353	0.7463	204.5	0.2489
2168	4450	0.7090	0.0353	0.7443	204.9	0.2509
2181	4456	0.7070	0.0354	0.7424	205.1	0.2528
2194	4462	0.7050	0.0354	0.7404	205.4	0.2548
2207	4469	0.7030	0.0355	0.7385	205.7	0.2567
2221	4474	0.7010	0.0355	0.7365	206.0	0.2587
2233	4481	0.6990	0.0356	0.7346	206.3	0.2606
2246	4487	0.6970	0.0356	0.7326	206.6	0.2626
2260	4495	0.6950	0.0357	0.7307	206.9	0.2645
2274	4501	0.6930	0.0357	0.7287	207.2	0.2665
2287	4508	0.6910	0.0358	0.7268	207.5	0.2684
2300	4514	0.6890	0.0358	0.7248	207.8	0.2704
2313	4521	0.6870	0.0359	0.7229	208.1	0.2723
2326	4528	0.6850	0.0359	0.7209	208.5	0.2742
2339	4534	0.6830	0.0360	0.7190	208.7	0.2762
2352	4539	0.6810	0.0360	0.7170	209.0	0.2782
2365	4545	0.6790	0.0361	0.7151	209.2	0.2801
2379	4549	0.6770	0.0361	0.7131	209.4	0.2821
2392	4554	0.6750	0.0361	0.7111	209.7	0.2840
2405	4558	0.6730	0.0362	0.7092	209.8	0.2860
2419	4562	0.6710	0.0362	0.7072	210.0	0.2880
2432	4567	0.6690	0.0363	0.7053	210.3	0.2899
2445	4571	0.6670	0.0363	0.7033	210.4	0.2919
2458	4576	0.6650	0.0363	0.7013	210.7	0.2939
2471	4579	0.6630	0.0363	0.6993	210.8	0.2958
2485	4583	0.6610	0.0364	0.6974	211.0	0.2978
2498	4587	0.6590	0.0364	0.6954	211.2	0.2998
2511	4592	0.6570	0.0364	0.6934	211.4	0.3017
2524	4597	0.6550	0.0365	0.6915	211.6	0.3037
2538	4600	0.6530	0.0365	0.6895	211.8	0.3057

	Shear	Horizontal	Compliance	Corrected	Shear	Horizontal
2551	4603	0.6510	0.0365	0.6875	211.9	0.3076
2564	4607	0.6490	0.0366	0.6856	212.1	0.3096
2577	4611	0.6470	0.0366	0.6836	212.3	0.3116
2591	4615	0.6450	0.0366	0.6816	212.5	0.3136
2603	4619	0.6430	0.0367	0.6797	212.6	0.3155
2616	4624	0.6410	0.0367	0.6777	212.9	0.3175
2630	4626	0.6390	0.0367	0.6757	213.0	0.3195
2643	4632	0.6370	0.0368	0.6738	213.2	0.3214
2656	4637	0.6350	0.0368	0.6718	213.5	0.3234
2669	4642	0.6330	0.0368	0.6698	213.7	0.3253
2682	4647	0.6310	0.0369	0.6679	213.9	0.3273
2695	4652	0.6290	0.0369	0.6659	214.2	0.3293
2708	4656	0.6270	0.0370	0.6640	214.4	0.3312
2721	4659	0.6250	0.0370	0.6620	214.5	0.3332
2734	4662	0.6230	0.0370	0.6600	214.6	0.3352
2748	4666	0.6210	0.0370	0.6580	214.8	0.3371
2761	4668	0.6190	0.0371	0.6561	214.9	0.3391
2774	4673	0.6170	0.0371	0.6541	215.1	0.3411
2787	4677	0.6150	0.0371	0.6521	215.3	0.3431
2800	4680	0.6130	0.0371	0.6501	215.5	0.3450
2812	4683	0.6110	0.0372	0.6482	215.6	0.3470
2825	4686	0.6090	0.0372	0.6462	215.7	0.3490
2838	4688	0.6070	0.0372	0.6442	215.8	0.3510
2851	4691	0.6050	0.0372	0.6422	216.0	0.3529
2864	4694	0.6030	0.0373	0.6403	216.1	0.3549
2877	4695	0.6010	0.0373	0.6383	216.1	0.3569
2890	4697	0.5990	0.0373	0.6363	216.2	0.3589
2903	4699	0.5970	0.0373	0.6343	216.3	0.3609
2916	4701	0.5950	0.0373	0.6323	216.4	0.3629
2929	4704	0.5930	0.0373	0.6303	216.6	0.3648
2942	4705	0.5910	0.0373	0.6283	216.6	0.3668
2956	4706	0.5890	0.0374	0.6264	216.7	0.3688
2969	4707	0.5870	0.0374	0.6244	216.7	0.3708
2982	4707	0.5850	0.0374	0.6224	216.7	0.3728
2995	4709	0.5830	0.0374	0.6204	216.8	0.3748
3008	4707	0.5810	0.0374	0.6184	216.7	0.3768
3020	4708	0.5790	0.0374	0.6164	216.7	0.3788
3033	4706	0.5770	0.0374	0.6144	216.7	0.3808
3047	4707	0.5750	0.0374	0.6124	216.7	0.3828
3059	4706	0.5730	0.0374	0.6104	216.7	0.3848
3072	4706	0.5710	0.0374	0.6084	216.7	0.3868
3085	4705	0.5690	0.0373	0.6063	216.6	0.3888
3098	4704	0.5670	0.0373	0.6043	216.6	0.3908
3111	4703	0.5650	0.0373	0.6023	216.5	0.3929
3124	4703	0.5630	0.0373	0.6003	216.5	0.3949
3137	4701	0.5610	0.0373	0.5983	216.4	0.3969
3150	4698	0.5590	0.0373	0.5963	216.3	0.3989
3163	4694	0.5570	0.0373	0.5943	216.1	0.4009
3175	4692	0.5550	0.0372	0.5922	216.0	0.4029
3188	4689	0.5530	0.0372	0.5902	215.9	0.4050
3201	4686	0.5510	0.0372	0.5882	215.7	0.4070
3214	4683	0.5490	0.0372	0.5862	215.6	0.4090
3226	4678	0.5470	0.0371	0.5841	215.4	0.4111
3239	4673	0.5450	0.0371	0.5821	215.1	0.4131
3252	4669	0.5430	0.0371	0.5801	215.0	0.4151
3264	4664	0.5410	0.0370	0.5780	214.7	0.4172
3277	4658	0.5390	0.0370	0.5760	214.4	0.4192
3290	4654	0.5370	0.0369	0.5739	214.3	0.4212
3303	4648	0.5350	0.0369	0.5719	214.0	0.4233
3316	4644	0.5330	0.0369	0.5699	213.8	0.4253
3328	4639	0.5310	0.0368	0.5678	213.6	0.4274
3341	4634	0.5290	0.0368	0.5658	213.3	0.4294
3353	4628	0.5270	0.0367	0.5637	213.1	0.4314
3366	4623	0.5250	0.0367	0.5617	212.8	0.4335
3378	4618	0.5230	0.0367	0.5597	212.6	0.4355
3391	4612	0.5210	0.0366	0.5576	212.3	0.4376
3404	4607	0.5190	0.0366	0.5556	212.1	0.4396
3416	4601	0.5170	0.0365	0.5535	211.8	0.4417
3429	4597	0.5150	0.0365	0.5515	211.6	0.4437
3442	4591	0.5130	0.0364	0.5494	211.4	0.4457
3455	4587	0.5110	0.0364	0.5474	211.2	0.4478
3467	4583	0.5090	0.0364	0.5454	211.0	0.4498
3479	4578	0.5070	0.0363	0.5433	210.8	0.4518
3492	4574	0.5050	0.0363	0.5413	210.6	0.4539
3506	4568	0.5030	0.0363	0.5393	210.3	0.4559
3518	4563	0.5010	0.0362	0.5372	210.1	0.4580
3531	4559	0.4990	0.0362	0.5352	209.9	0.4600
3544	4553	0.4970	0.0361	0.5331	209.6	0.4620
3570	4538	0.4930	0.0360	0.5290	208.9	0.4662
3575	4500	0.4928	0.0357	0.5285	207.2	0.4667

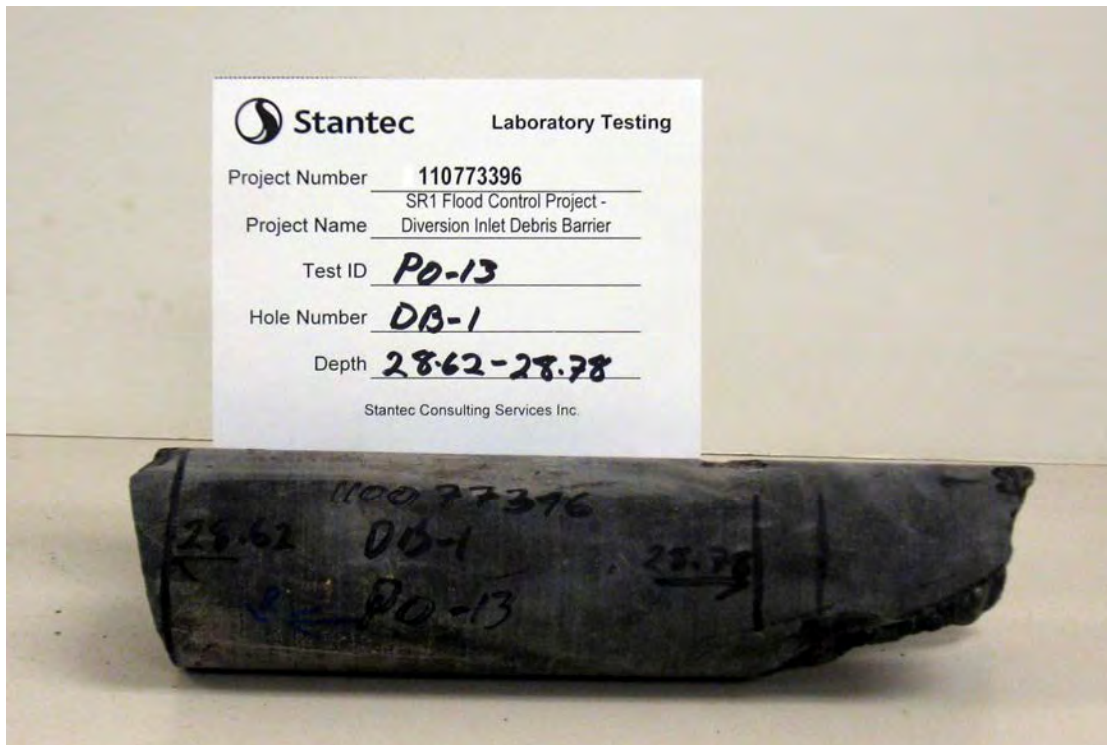


Photo Report

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
Lithology Shale, gray, moderately hard
Hole Number DB-1 Depth (m) 28.62-28.78
Test Type MTC Laboratory Rock Core Anchor Pull-Out

Project Number 110773396
Lab ID PO-13

As Received



Core Preparation





Photo Report

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
Lithology Shale, gray, moderately hard
Hole Number DB-1 Depth (m) 28.62-28.78
Test Type MTC Laboratory Rock Core Anchor Pull-Out

Project Number 110773396
Lab ID PO-13

Specimen Bore



Specimen Grout





Photo Report

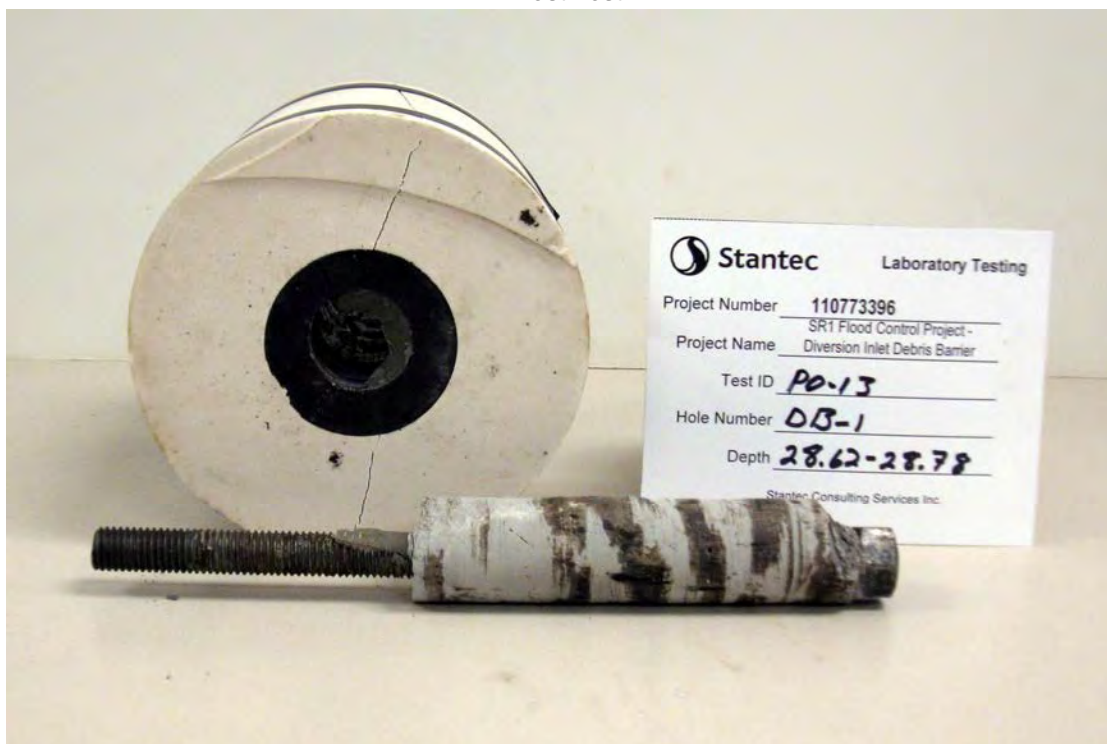
Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
Lithology Shale, gray, moderately hard
Hole Number DB-1 Depth (m) 28.62-28.78
Test Type MTC Laboratory Rock Core Anchor Pull-Out

Project Number 110773396
Lab ID PO-13

Post Test



Post Test





**MTC Laboratory Rock Core
Anchor Pull-Out Test**

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
 Lithology Sedimentary, gray, moderately hard
 Hole Number DB-1 Depth (m) 30.48-30.64

Project Number 110773396
 Lab ID PO-18
 Date Received 05/15/2018
 Test Date 05/31/2018

Diameter (in) 2.400 Length (in) 5.884
 Moisture Condition As received, moist

Anchor Bond Interface

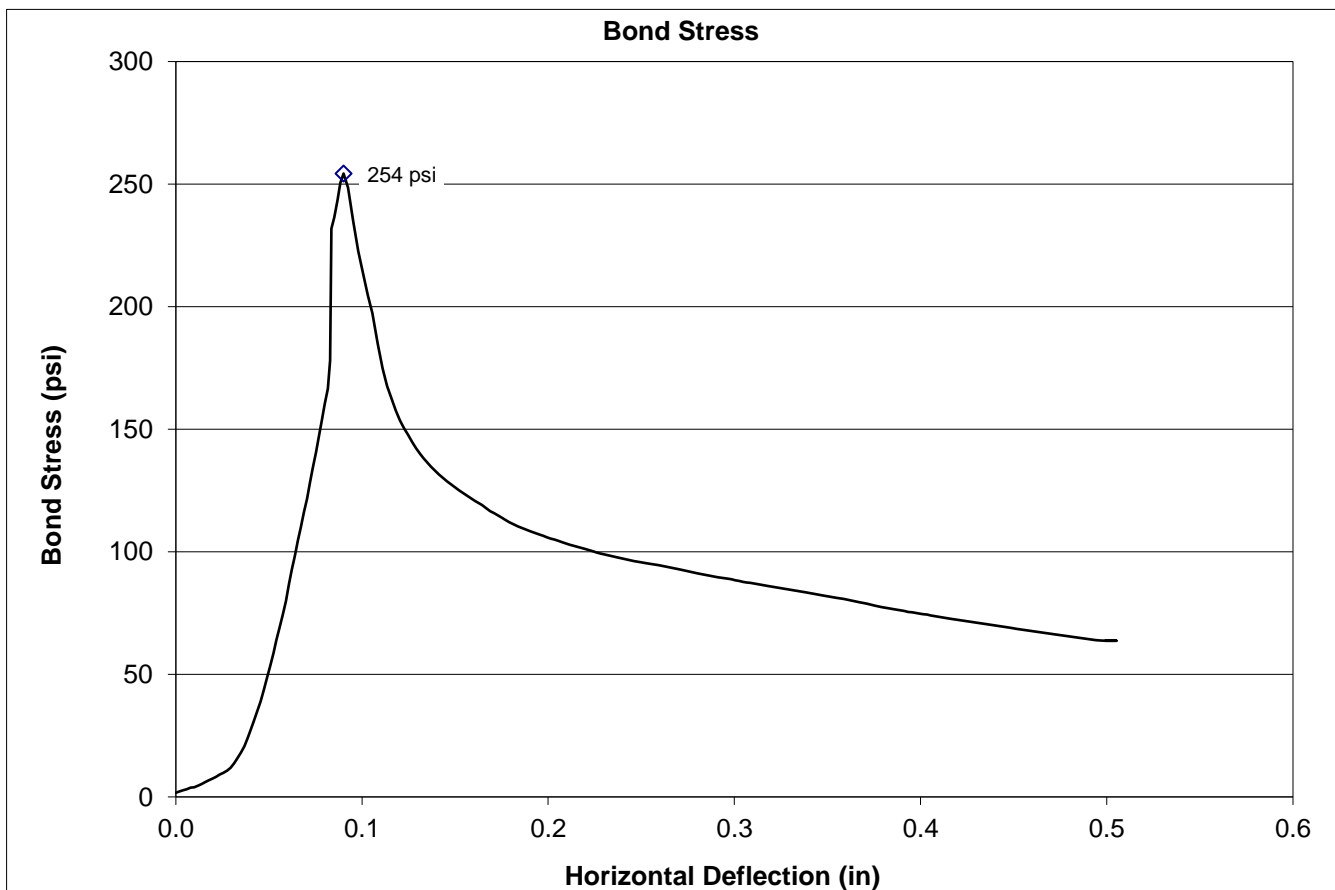
Diameter (in) 1.267
 Length (in) 5.291
 Surface Area (in²) 21.06

Anchor Preparation

Anchor Type 1/2" diameter threaded rod with 4 nuts
 Grout Type Quikrete Portland Cement, Type I/II

Grout Preparation Date 05/24/2018
 Water / Grout Ratio 0.45
 Cure Time (days) 7
 Cube Strength (psi) 7390

Maximum Load (lbf) 5358
 Maximum Stress (psi) 254
 Load Rate to Peak (lbf/min) 304
 Post Peak Shear Rate (in/min) 0.015
 Length of Intact Pull Out (in) 5.14



Comments _____

Reviewed By RJ

Time (seconds)	Shear Load (lbf)	Horizontal Dial Reading (in)	Compliance Correction (in)	Corrected Dial Reading (in)	Shear Stress (psi)	Horizontal Deflection (in)
0	36	0.9957	0.0001	0.9958	1.7	0.0000
19	46	0.9937	0.0001	0.9938	2.2	0.0020
40	58	0.9917	0.0002	0.9919	2.8	0.0039
56	66	0.9897	0.0002	0.9899	3.1	0.0059
72	80	0.9877	0.0002	0.9879	3.8	0.0079
84	83	0.9857	0.0002	0.9859	3.9	0.0099
97	95	0.9837	0.0003	0.9840	4.5	0.0118
111	110	0.9817	0.0003	0.9820	5.2	0.0138
126	126	0.9797	0.0004	0.9801	6.0	0.0157
143	142	0.9777	0.0004	0.9781	6.7	0.0177
162	156	0.9757	0.0005	0.9762	7.4	0.0196
181	172	0.9737	0.0005	0.9742	8.2	0.0216
203	192	0.9717	0.0006	0.9723	9.1	0.0235
221	207	0.9697	0.0006	0.9703	9.8	0.0255
238	224	0.9677	0.0007	0.9684	10.6	0.0274
257	250	0.9657	0.0008	0.9665	11.9	0.0294
278	288	0.9637	0.0009	0.9646	13.7	0.0312
298	334	0.9617	0.0010	0.9627	15.9	0.0331
314	380	0.9597	0.0011	0.9608	18.0	0.0350
331	434	0.9577	0.0013	0.9590	20.6	0.0368
350	504	0.9557	0.0015	0.9572	23.9	0.0386
369	584	0.9537	0.0018	0.9555	27.7	0.0404
386	662	0.9517	0.0020	0.9537	31.4	0.0421
402	741	0.9497	0.0022	0.9519	35.2	0.0439
419	822	0.9477	0.0025	0.9502	39.0	0.0456
438	921	0.9457	0.0028	0.9485	43.7	0.0473
456	1024	0.9437	0.0031	0.9468	48.6	0.0490
474	1126	0.9417	0.0034	0.9451	53.5	0.0507
493	1234	0.9397	0.0037	0.9434	58.6	0.0524
511	1347	0.9377	0.0040	0.9417	64.0	0.0541
528	1454	0.9357	0.0044	0.9401	69.0	0.0557
545	1563	0.9337	0.0047	0.9384	74.2	0.0574
562	1681	0.9317	0.0050	0.9367	79.8	0.0591
583	1823	0.9297	0.0055	0.9352	86.6	0.0606
601	1948	0.9277	0.0058	0.9335	92.5	0.0623
619	2073	0.9257	0.0062	0.9319	98.4	0.0639
637	2200	0.9237	0.0066	0.9303	104.5	0.0655
654	2324	0.9217	0.0070	0.9287	110.3	0.0671
670	2443	0.9197	0.0073	0.9270	116.0	0.0688
687	2563	0.9177	0.0077	0.9254	121.7	0.0704
705	2699	0.9157	0.0081	0.9238	128.1	0.0720
722	2829	0.9137	0.0085	0.9222	134.3	0.0736
740	2961	0.9117	0.0089	0.9206	140.6	0.0752
757	3098	0.9097	0.0093	0.9190	147.1	0.0768
774	3232	0.9077	0.0097	0.9174	153.4	0.0784
792	3374	0.9057	0.0101	0.9158	160.2	0.0800
809	3508	0.9037	0.0105	0.9142	166.6	0.0816
840	3749	0.9017	0.0112	0.9129	178.0	0.0829
979	4882	0.8977	0.0146	0.9123	231.8	0.0835
996	4978	0.8957	0.0149	0.9106	236.3	0.0852
1015	5125	0.8937	0.0154	0.9091	243.3	0.0867
1035	5275	0.8917	0.0158	0.9075	250.4	0.0883
1057	5358	0.8897	0.0161	0.9058	254.4	0.0900
1067	5235	0.8877	0.0157	0.9034	248.5	0.0924
1073	4950	0.8857	0.0149	0.9006	235.0	0.0953
1078	4689	0.8837	0.0141	0.8978	222.6	0.0980
1083	4484	0.8817	0.0135	0.8952	212.9	0.1007
1089	4307	0.8797	0.0129	0.8926	204.5	0.1032
1097	4158	0.8777	0.0125	0.8902	197.4	0.1056
1101	3889	0.8757	0.0117	0.8874	184.6	0.1084
1107	3682	0.8737	0.0110	0.8847	174.8	0.1111
1115	3530	0.8717	0.0106	0.8823	167.6	0.1135
1134	3322	0.8677	0.0100	0.8777	157.7	0.1181
1143	3236	0.8657	0.0097	0.8754	153.6	0.1204
1152	3168	0.8637	0.0095	0.8732	150.4	0.1226
1159	3108	0.8617	0.0093	0.8710	147.6	0.1248
1167	3045	0.8597	0.0091	0.8688	144.6	0.1270
1174	2995	0.8577	0.0090	0.8667	142.2	0.1291
1181	2945	0.8557	0.0088	0.8645	139.8	0.1313
1189	2902	0.8537	0.0087	0.8624	137.8	0.1334
1196	2864	0.8517	0.0086	0.8603	136.0	0.1355
1204	2827	0.8497	0.0085	0.8582	134.2	0.1376
1212	2793	0.8477	0.0084	0.8561	132.6	0.1397
1219	2765	0.8457	0.0083	0.8540	131.3	0.1418
1227	2734	0.8437	0.0082	0.8519	129.8	0.1439
1235	2707	0.8417	0.0081	0.8498	128.5	0.1460
1242	2683	0.8397	0.0080	0.8477	127.4	0.1481
1250	2659	0.8377	0.0080	0.8457	126.2	0.1501
1258	2634	0.8357	0.0079	0.8436	125.1	0.1522
1266	2612	0.8337	0.0078	0.8415	124.0	0.1543
1274	2589	0.8317	0.0078	0.8395	122.9	0.1563
1282	2568	0.8297	0.0077	0.8374	121.9	0.1584
1290	2547	0.8277	0.0076	0.8353	120.9	0.1605
1297	2526	0.8257	0.0076	0.8333	119.9	0.1625
1305	2506	0.8237	0.0075	0.8312	119.0	0.1646

	Shear	Horizontal	Compliance	Corrected	Shear	Horizontal
1313	2480	0.8217	0.0074	0.8291	117.7	0.1667
1321	2456	0.8197	0.0074	0.8271	116.6	0.1687
1329	2438	0.8177	0.0073	0.8250	115.8	0.1708
1337	2418	0.8157	0.0073	0.8230	114.8	0.1729
1345	2399	0.8137	0.0072	0.8209	113.9	0.1749
1353	2380	0.8117	0.0071	0.8188	113.0	0.1770
1361	2361	0.8097	0.0071	0.8168	112.1	0.1790
1369	2344	0.8077	0.0070	0.8147	111.3	0.1811
1377	2328	0.8057	0.0070	0.8127	110.5	0.1831
1386	2314	0.8037	0.0069	0.8106	109.9	0.1852
1394	2302	0.8017	0.0069	0.8086	109.3	0.1872
1401	2290	0.7997	0.0069	0.8066	108.7	0.1892
1409	2277	0.7977	0.0068	0.8045	108.1	0.1913
1418	2266	0.7957	0.0068	0.8025	107.6	0.1933
1426	2253	0.7937	0.0068	0.8005	107.0	0.1953
1434	2242	0.7917	0.0067	0.7984	106.4	0.1974
1442	2230	0.7897	0.0067	0.7964	105.9	0.1994
1450	2219	0.7877	0.0067	0.7944	105.4	0.2015
1458	2209	0.7857	0.0066	0.7923	104.9	0.2035
1466	2198	0.7837	0.0066	0.7903	104.4	0.2055
1474	2187	0.7817	0.0066	0.7883	103.8	0.2075
1483	2176	0.7797	0.0065	0.7862	103.3	0.2096
1491	2167	0.7777	0.0065	0.7842	102.9	0.2116
1500	2158	0.7757	0.0065	0.7822	102.5	0.2136
1508	2148	0.7737	0.0064	0.7801	102.0	0.2157
1516	2140	0.7717	0.0064	0.7781	101.6	0.2177
1524	2132	0.7697	0.0064	0.7761	101.2	0.2197
1532	2120	0.7677	0.0064	0.7741	100.7	0.2217
1541	2111	0.7657	0.0063	0.7720	100.2	0.2238
1549	2101	0.7637	0.0063	0.7700	99.8	0.2258
1557	2093	0.7617	0.0063	0.7680	99.4	0.2278
1565	2085	0.7597	0.0063	0.7660	99.0	0.2299
1573	2078	0.7577	0.0062	0.7639	98.7	0.2319
1582	2070	0.7557	0.0062	0.7619	98.3	0.2339
1590	2061	0.7537	0.0062	0.7599	97.9	0.2359
1598	2053	0.7517	0.0062	0.7579	97.5	0.2379
1607	2047	0.7497	0.0061	0.7558	97.2	0.2400
1615	2040	0.7477	0.0061	0.7538	96.9	0.2420
1623	2033	0.7457	0.0061	0.7518	96.5	0.2440
1632	2026	0.7437	0.0061	0.7498	96.2	0.2460
1648	2014	0.7397	0.0060	0.7457	95.6	0.2501
1656	2009	0.7377	0.0060	0.7437	95.4	0.2521
1664	2004	0.7357	0.0060	0.7417	95.1	0.2541
1672	2000	0.7337	0.0060	0.7397	95.0	0.2561
1680	1995	0.7317	0.0060	0.7377	94.7	0.2581
1688	1991	0.7297	0.0060	0.7357	94.5	0.2601
1696	1983	0.7277	0.0059	0.7336	94.1	0.2622
1704	1977	0.7257	0.0059	0.7316	93.9	0.2642
1712	1969	0.7237	0.0059	0.7296	93.5	0.2662
1721	1961	0.7217	0.0059	0.7276	93.1	0.2682
1729	1955	0.7197	0.0059	0.7256	92.8	0.2702
1737	1949	0.7177	0.0058	0.7235	92.5	0.2723
1745	1940	0.7157	0.0058	0.7215	92.1	0.2743
1753	1934	0.7137	0.0058	0.7195	91.8	0.2763
1761	1927	0.7117	0.0058	0.7175	91.5	0.2783
1769	1920	0.7097	0.0058	0.7155	91.2	0.2803
1777	1914	0.7077	0.0057	0.7134	90.9	0.2824
1785	1907	0.7057	0.0057	0.7114	90.5	0.2844
1794	1900	0.7037	0.0057	0.7094	90.2	0.2864
1802	1895	0.7017	0.0057	0.7074	90.0	0.2884
1810	1890	0.6997	0.0057	0.7054	89.7	0.2904
1818	1885	0.6977	0.0057	0.7034	89.5	0.2925
1826	1881	0.6957	0.0056	0.7013	89.3	0.2945
1835	1875	0.6937	0.0056	0.6993	89.0	0.2965
1843	1869	0.6917	0.0056	0.6973	88.7	0.2985
1852	1862	0.6897	0.0056	0.6953	88.4	0.3005
1860	1855	0.6877	0.0056	0.6933	88.1	0.3025
1868	1848	0.6857	0.0055	0.6912	87.7	0.3046
1876	1842	0.6837	0.0055	0.6892	87.5	0.3066
1884	1838	0.6817	0.0055	0.6872	87.3	0.3086
1892	1831	0.6797	0.0055	0.6852	86.9	0.3106
1901	1826	0.6777	0.0055	0.6832	86.7	0.3126
1909	1820	0.6757	0.0055	0.6812	86.4	0.3146
1917	1815	0.6737	0.0054	0.6791	86.2	0.3167
1925	1809	0.6717	0.0054	0.6771	85.9	0.3187
1934	1805	0.6697	0.0054	0.6751	85.7	0.3207
1942	1800	0.6677	0.0054	0.6731	85.5	0.3227
1950	1796	0.6657	0.0054	0.6711	85.3	0.3247
1958	1790	0.6637	0.0054	0.6691	85.0	0.3267
1967	1784	0.6617	0.0054	0.6671	84.7	0.3288
1975	1778	0.6597	0.0053	0.6650	84.4	0.3308
1983	1772	0.6577	0.0053	0.6630	84.1	0.3328
1991	1767	0.6557	0.0053	0.6610	83.9	0.3348
2000	1761	0.6537	0.0053	0.6590	83.6	0.3368
2008	1755	0.6517	0.0053	0.6570	83.3	0.3388
2016	1749	0.6497	0.0052	0.6549	83.0	0.3409
2025	1743	0.6477	0.0052	0.6529	82.8	0.3429

	Shear	Horizontal	Compliance	Corrected	Shear	Horizontal
2033	1737	0.6457	0.0052	0.6509	82.5	0.3449
2041	1732	0.6437	0.0052	0.6489	82.2	0.3469
2049	1727	0.6417	0.0052	0.6469	82.0	0.3489
2057	1721	0.6397	0.0052	0.6449	81.7	0.3509
2065	1715	0.6377	0.0051	0.6428	81.4	0.3530
2074	1710	0.6357	0.0051	0.6408	81.2	0.3550
2082	1706	0.6337	0.0051	0.6388	81.0	0.3570
2090	1700	0.6317	0.0051	0.6368	80.7	0.3590
2098	1694	0.6297	0.0051	0.6348	80.4	0.3610
2106	1686	0.6277	0.0051	0.6328	80.0	0.3631
2114	1680	0.6257	0.0050	0.6307	79.8	0.3651
2122	1673	0.6237	0.0050	0.6287	79.4	0.3671
2131	1666	0.6217	0.0050	0.6267	79.1	0.3691
2139	1659	0.6197	0.0050	0.6247	78.8	0.3711
2147	1651	0.6177	0.0050	0.6227	78.4	0.3732
2155	1643	0.6157	0.0049	0.6206	78.0	0.3752
2172	1630	0.6117	0.0049	0.6166	77.4	0.3792
2180	1624	0.6097	0.0049	0.6146	77.1	0.3812
2188	1619	0.6077	0.0049	0.6126	76.9	0.3833
2196	1613	0.6057	0.0048	0.6105	76.6	0.3853
2204	1607	0.6037	0.0048	0.6085	76.3	0.3873
2213	1602	0.6017	0.0048	0.6065	76.1	0.3893
2221	1597	0.5997	0.0048	0.6045	75.8	0.3913
2229	1590	0.5977	0.0048	0.6025	75.5	0.3933
2237	1585	0.5957	0.0048	0.6005	75.3	0.3954
2245	1580	0.5937	0.0047	0.5984	75.0	0.3974
2254	1575	0.5917	0.0047	0.5964	74.8	0.3994
2262	1570	0.5897	0.0047	0.5944	74.5	0.4014
2270	1566	0.5877	0.0047	0.5924	74.4	0.4034
2279	1559	0.5857	0.0047	0.5904	74.0	0.4054
2287	1554	0.5837	0.0047	0.5884	73.8	0.4074
2295	1548	0.5817	0.0046	0.5863	73.5	0.4095
2303	1543	0.5797	0.0046	0.5843	73.3	0.4115
2311	1537	0.5777	0.0046	0.5823	73.0	0.4135
2320	1532	0.5757	0.0046	0.5803	72.7	0.4155
2328	1528	0.5737	0.0046	0.5783	72.5	0.4175
2336	1522	0.5717	0.0046	0.5763	72.3	0.4195
2345	1516	0.5697	0.0045	0.5742	72.0	0.4216
2353	1511	0.5677	0.0045	0.5722	71.7	0.4236
2361	1507	0.5657	0.0045	0.5702	71.5	0.4256
2370	1502	0.5637	0.0045	0.5682	71.3	0.4276
2378	1498	0.5617	0.0045	0.5662	71.1	0.4296
2387	1492	0.5597	0.0045	0.5642	70.8	0.4316
2395	1489	0.5577	0.0045	0.5622	70.7	0.4336
2403	1483	0.5557	0.0044	0.5601	70.4	0.4357
2411	1480	0.5537	0.0044	0.5581	70.3	0.4377
2419	1474	0.5517	0.0044	0.5561	70.0	0.4397
2427	1468	0.5497	0.0044	0.5541	69.7	0.4417
2435	1463	0.5477	0.0044	0.5521	69.5	0.4437
2444	1459	0.5457	0.0044	0.5501	69.3	0.4457
2452	1454	0.5437	0.0044	0.5481	69.0	0.4477
2460	1449	0.5417	0.0043	0.5460	68.8	0.4498
2468	1444	0.5397	0.0043	0.5440	68.6	0.4518
2476	1439	0.5377	0.0043	0.5420	68.3	0.4538
2484	1434	0.5357	0.0043	0.5400	68.1	0.4558
2492	1429	0.5337	0.0043	0.5380	67.8	0.4578
2500	1425	0.5317	0.0043	0.5360	67.7	0.4598
2508	1420	0.5297	0.0043	0.5340	67.4	0.4618
2516	1415	0.5277	0.0042	0.5319	67.2	0.4639
2524	1409	0.5257	0.0042	0.5299	66.9	0.4659
2532	1406	0.5237	0.0042	0.5279	66.8	0.4679
2540	1401	0.5217	0.0042	0.5259	66.5	0.4699
2548	1396	0.5197	0.0042	0.5239	66.3	0.4719
2556	1392	0.5177	0.0042	0.5219	66.1	0.4739
2564	1388	0.5157	0.0042	0.5199	65.9	0.4759
2572	1383	0.5137	0.0041	0.5178	65.7	0.4780
2580	1378	0.5117	0.0041	0.5158	65.4	0.4800
2587	1374	0.5097	0.0041	0.5138	65.2	0.4820
2595	1369	0.5077	0.0041	0.5118	65.0	0.4840
2603	1366	0.5057	0.0041	0.5098	64.9	0.4860
2612	1360	0.5037	0.0041	0.5078	64.6	0.4880
2620	1356	0.5017	0.0041	0.5058	64.4	0.4900
2628	1350	0.4997	0.0041	0.5038	64.1	0.4921
2637	1348	0.4977	0.0040	0.5017	64.0	0.4941
2645	1344	0.4957	0.0040	0.4997	63.8	0.4961
2649	1342	0.4925	0.0040	0.4965	63.7	0.4993
2649	1342	0.4907	0.0040	0.4947	63.7	0.5011
2654	1340	0.4867	0.0040	0.4907	63.6	0.5051
2649	1342	0.4925	0.0040	0.4965	63.7	0.4993
2649	1342	0.4925	0.0040	0.4965	63.9	0.4993



Photo Report

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
Lithology Sedimentary, gray, moderately hard
Hole Number DB-1 Depth (m) 30.48-30.64
Test Type MTC Laboratory Rock Core Anchor Pull-Out

Project Number 110773396
Lab ID PO-18

As Received



Core Preparation





Photo Report

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
Lithology Sedimentary, gray, moderately hard
Hole Number DB-1 Depth (m) 30.48-30.64
Test Type MTC Laboratory Rock Core Anchor Pull-Out

Project Number 110773396
Lab ID PO-18

Specimen Bore



Specimen Grout

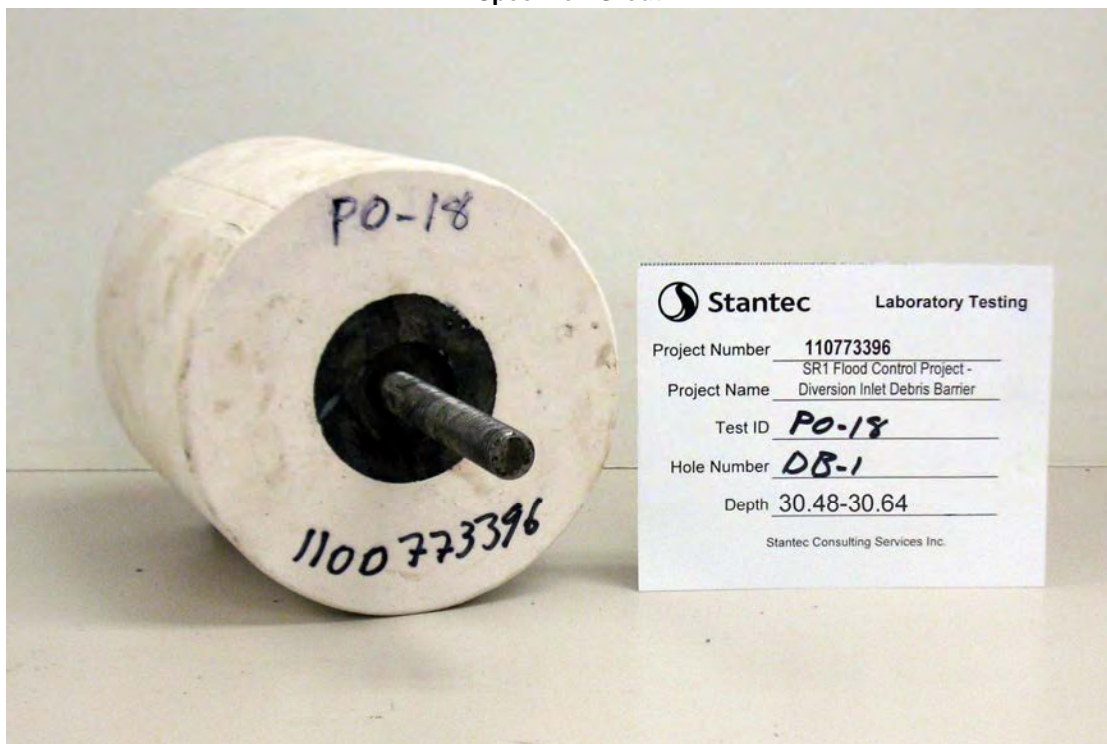




Photo Report

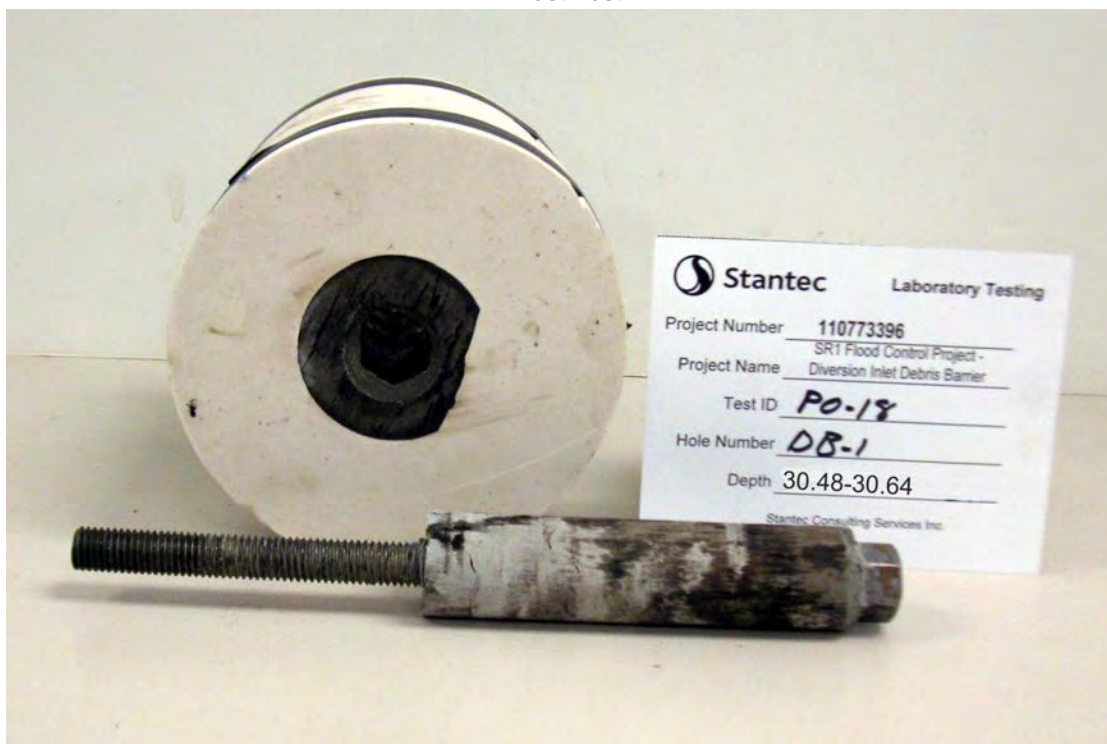
Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
Lithology Sedimentary, gray, moderately hard
Hole Number DB-1 Depth (m) 30.48-30.64
Test Type MTC Laboratory Rock Core Anchor Pull-Out

Project Number 110773396
Lab ID PO-18

Post Test



Post Test





**MTC Laboratory Rock Core
Anchor Pull-Out Test**

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
 Lithology Sandstone, gray, moderately hard
 Hole Number DB-3 Depth (m) 18.60-18.75

Project Number 110773396
 Lab ID PO-21
 Date Received 05/15/2018
 Test Date 05/31/2018

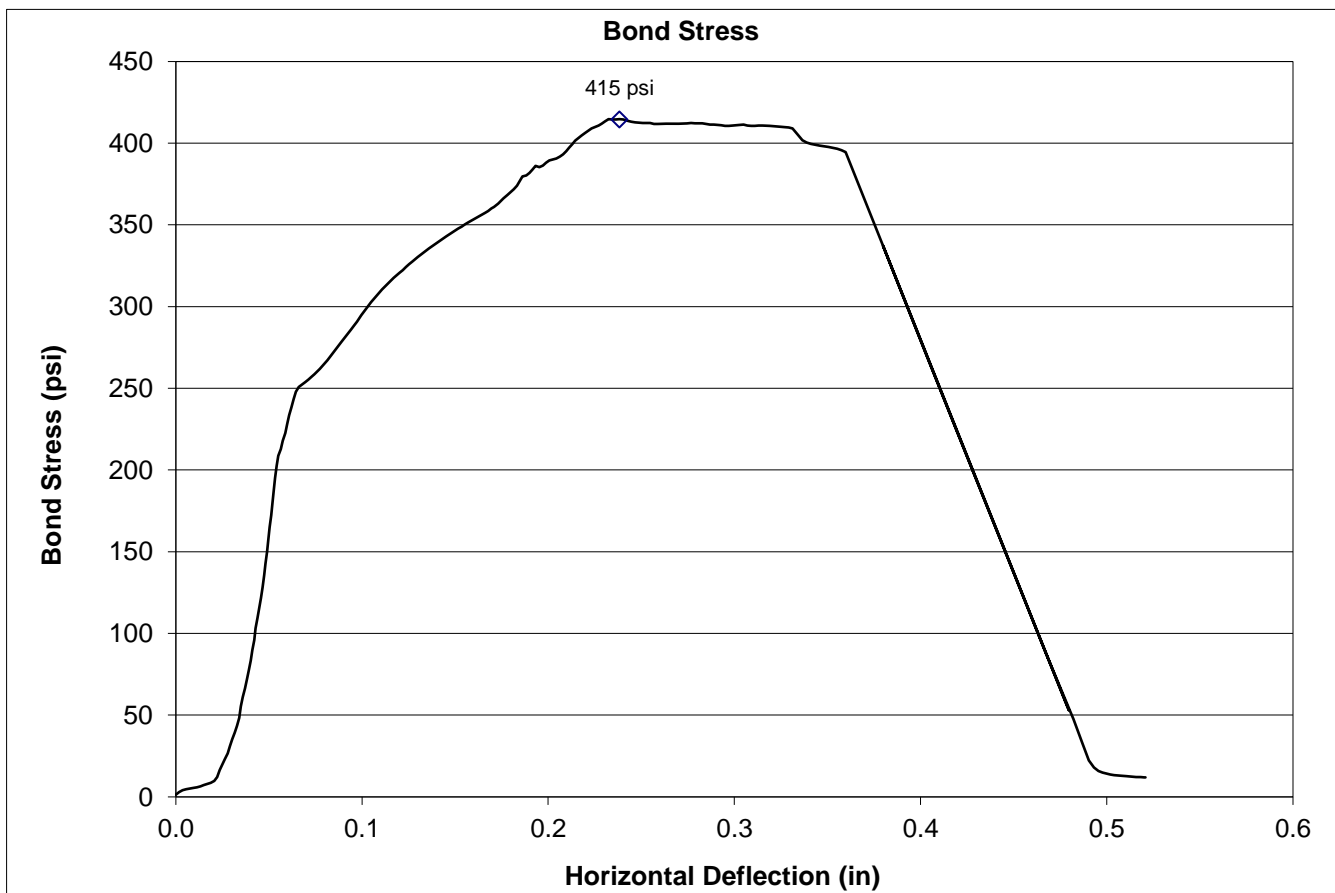
Diameter (in) 2.402 Length (in) 5.976
 Moisture Condition As received, moist

Anchor Bond Interface
 Diameter (in) 1.264
 Length (in) 5.349
 Surface Area (in²) 21.24

Anchor Preparation
 Anchor Type 1/2" diameter threaded rod with 4 nuts
 Grout Type Quikrete Portland Cement, Type I/II

Maximum Load (lbf) 8808
 Maximum Stress (psi) 415
 Load Rate to Peak (lbf/min) 207
 Post Peak Shear Rate (in/min) 0.018
 Length of Intact Pull Out (in) 4.93

Grout Preparation Date 05/24/2018
 Water / Grout Ratio 0.45
 Cure Time (days) 7
 Cube Strength (psi) 7390



Comments Specimen and Hydro-Stone encapsulation split along longitudinal axis at failure.
Terminated testing after specimen failure.

Reviewed By RJ

Time (seconds)	Shear Load (lbf)	Horizontal Dial Reading (in)	Compliance Correction (in)	Corrected Dial Reading (in)	Shear Stress (psi)	Horizontal Deflection (in)
0	31	0.9984	0.0002	0.9986	1.5	0.0000
28	60	0.9964	0.0005	0.9969	2.8	0.0018
48	85	0.9944	0.0007	0.9951	4.0	0.0036
66	97	0.9924	0.0008	0.9932	4.6	0.0055
84	108	0.9904	0.0009	0.9913	5.1	0.0074
101	115	0.9884	0.0009	0.9893	5.4	0.0093
118	123	0.9864	0.0010	0.9874	5.8	0.0113
135	137	0.9844	0.0011	0.9855	6.5	0.0132
152	154	0.9824	0.0012	0.9836	7.3	0.0150
180	183	0.9784	0.0015	0.9799	8.6	0.0188
196	206	0.9764	0.0016	0.9780	9.7	0.0206
216	257	0.9744	0.0020	0.9764	12.1	0.0222
242	349	0.9724	0.0028	0.9752	16.4	0.0235
261	418	0.9704	0.0033	0.9737	19.7	0.0249
279	488	0.9684	0.0039	0.9723	23.0	0.0264
297	564	0.9664	0.0045	0.9709	26.6	0.0278
318	659	0.9644	0.0052	0.9696	31.0	0.0290
336	749	0.9624	0.0059	0.9683	35.3	0.0303
353	837	0.9604	0.0066	0.9670	39.4	0.0316
369	924	0.9584	0.0073	0.9657	43.5	0.0329
387	1026	0.9564	0.0081	0.9645	48.3	0.0341
412	1174	0.9544	0.0093	0.9637	55.3	0.0349
433	1296	0.9524	0.0103	0.9627	61.0	0.0360
450	1409	0.9504	0.0112	0.9616	66.4	0.0371
468	1526	0.9484	0.0121	0.9605	71.9	0.0381
487	1648	0.9464	0.0131	0.9595	77.6	0.0392
505	1770	0.9444	0.0140	0.9584	83.4	0.0402
525	1906	0.9424	0.0151	0.9575	89.8	0.0411
545	2038	0.9404	0.0162	0.9566	96.0	0.0421
566	2190	0.9384	0.0174	0.9558	103.1	0.0429
585	2322	0.9364	0.0184	0.9548	109.3	0.0438
623	2585	0.9324	0.0205	0.9529	121.7	0.0457
643	2722	0.9304	0.0216	0.9520	128.2	0.0466
664	2881	0.9284	0.0229	0.9513	135.7	0.0474
684	3031	0.9264	0.0241	0.9505	142.7	0.0482
704	3186	0.9244	0.0253	0.9497	150.0	0.0490
723	3347	0.9224	0.0266	0.9490	157.6	0.0497
743	3506	0.9204	0.0278	0.9482	165.1	0.0504
761	3659	0.9184	0.0290	0.9474	172.3	0.0512
781	3826	0.9164	0.0304	0.9468	180.2	0.0519
800	3985	0.9144	0.0316	0.9460	187.7	0.0526
819	4145	0.9124	0.0329	0.9453	195.2	0.0533
838	4302	0.9104	0.0341	0.9445	202.6	0.0541
856	4431	0.9084	0.0352	0.9436	208.7	0.0551
872	4519	0.9064	0.0359	0.9423	212.8	0.0564
889	4629	0.9044	0.0367	0.9411	218.0	0.0575
905	4728	0.9024	0.0375	0.9399	222.6	0.0587
922	4846	0.9004	0.0385	0.9389	228.2	0.0598
939	4961	0.8984	0.0394	0.9378	233.6	0.0609
956	5061	0.8964	0.0402	0.9366	238.3	0.0621
972	5166	0.8944	0.0410	0.9354	243.3	0.0632
989	5264	0.8924	0.0418	0.9342	247.9	0.0645
1004	5327	0.8904	0.0423	0.9327	250.9	0.0660
1032	5388	0.8864	0.0428	0.9292	253.7	0.0695
1047	5421	0.8844	0.0430	0.9274	255.3	0.0712
1061	5459	0.8824	0.0433	0.9257	257.1	0.0729
1076	5502	0.8804	0.0437	0.9241	259.1	0.0746
1090	5535	0.8784	0.0439	0.9223	260.7	0.0763
1105	5579	0.8764	0.0443	0.9207	262.7	0.0780
1120	5623	0.8744	0.0446	0.9190	264.8	0.0796
1134	5668	0.8724	0.0450	0.9174	266.9	0.0813
1149	5718	0.8704	0.0454	0.9158	269.3	0.0829
1164	5773	0.8684	0.0458	0.9142	271.9	0.0844
1178	5822	0.8664	0.0462	0.9126	274.2	0.0860
1194	5873	0.8644	0.0466	0.9110	276.6	0.0876
1208	5916	0.8624	0.0470	0.9094	278.6	0.0893
1224	5970	0.8604	0.0474	0.9078	281.1	0.0909
1239	6022	0.8584	0.0478	0.9062	283.6	0.0924
1254	6070	0.8564	0.0482	0.9046	285.8	0.0941
1269	6122	0.8544	0.0486	0.9030	288.3	0.0957
1284	6173	0.8524	0.0490	0.9014	290.7	0.0972
1300	6232	0.8504	0.0495	0.8999	293.5	0.0988
1314	6285	0.8484	0.0499	0.8983	296.0	0.1004
1329	6335	0.8464	0.0503	0.8967	298.3	0.1020
1344	6386	0.8444	0.0507	0.8951	300.7	0.1036
1373	6482	0.8404	0.0515	0.8919	305.2	0.1068
1388	6527	0.8384	0.0518	0.8902	307.4	0.1084
1403	6574	0.8364	0.0522	0.8886	309.6	0.1101
1418	6620	0.8344	0.0525	0.8869	311.7	0.1117
1432	6661	0.8324	0.0529	0.8853	313.7	0.1134
1447	6701	0.8304	0.0532	0.8836	315.6	0.1151
1462	6734	0.8284	0.0535	0.8819	317.1	0.1168
1477	6772	0.8264	0.0538	0.8802	318.9	0.1185
1491	6810	0.8244	0.0541	0.8785	320.7	0.1202
1506	6845	0.8224	0.0543	0.8767	322.3	0.1219

	Shear	Horizontal	Compliance	Corrected	Shear	Horizontal
1521	6885	0.8204	0.0546	0.8750	324.2	0.1236
1536	6923	0.8184	0.0550	0.8734	326.0	0.1253
1550	6957	0.8164	0.0552	0.8716	327.6	0.1270
1564	6992	0.8144	0.0555	0.8699	329.3	0.1287
1578	7027	0.8124	0.0558	0.8682	330.9	0.1305
1593	7058	0.8104	0.0560	0.8664	332.4	0.1322
1607	7090	0.8084	0.0563	0.8647	333.9	0.1340
1621	7121	0.8064	0.0565	0.8629	335.3	0.1357
1636	7150	0.8044	0.0568	0.8612	336.7	0.1375
1650	7183	0.8024	0.0570	0.8594	338.3	0.1392
1664	7212	0.8004	0.0572	0.8576	339.6	0.1410
1678	7243	0.7984	0.0575	0.8559	341.1	0.1428
1707	7301	0.7944	0.0580	0.8524	343.8	0.1463
1720	7326	0.7924	0.0582	0.8506	345.0	0.1481
1735	7356	0.7904	0.0584	0.8488	346.4	0.1499
1750	7384	0.7884	0.0586	0.8470	347.7	0.1516
1764	7410	0.7864	0.0588	0.8452	348.9	0.1534
1779	7438	0.7844	0.0590	0.8434	350.3	0.1552
1794	7462	0.7824	0.0592	0.8416	351.4	0.1570
1809	7489	0.7804	0.0594	0.8398	352.7	0.1588
1823	7515	0.7784	0.0597	0.8381	353.9	0.1606
1838	7540	0.7764	0.0598	0.8362	355.1	0.1624
1852	7563	0.7744	0.0600	0.8344	356.2	0.1642
1866	7589	0.7724	0.0602	0.8326	357.4	0.1660
1880	7614	0.7704	0.0604	0.8308	358.6	0.1678
1896	7645	0.7684	0.0607	0.8291	360.0	0.1696
1913	7675	0.7664	0.0609	0.8273	361.4	0.1713
1930	7707	0.7644	0.0612	0.8256	362.9	0.1731
1949	7747	0.7624	0.0615	0.8239	364.8	0.1748
1969	7787	0.7604	0.0618	0.8222	366.7	0.1764
1990	7822	0.7584	0.0621	0.8205	368.4	0.1782
2008	7857	0.7564	0.0624	0.8188	370.0	0.1799
2028	7896	0.7544	0.0627	0.8171	371.8	0.1816
2051	7940	0.7524	0.0630	0.8154	373.9	0.1832
2102	8063	0.7484	0.0640	0.8124	379.7	0.1862
2122	8075	0.7464	0.0641	0.8105	380.3	0.1882
2139	8108	0.7444	0.0644	0.8088	381.8	0.1899
2156	8148	0.7424	0.0647	0.8071	383.7	0.1916
2184	8198	0.7404	0.0651	0.8055	386.1	0.1932
2201	8183	0.7384	0.0650	0.8034	385.4	0.1953
2217	8203	0.7364	0.0651	0.8015	386.3	0.1971
2237	8243	0.7344	0.0654	0.7998	388.2	0.1988
2255	8271	0.7324	0.0657	0.7981	389.5	0.2006
2268	8283	0.7304	0.0657	0.7961	390.1	0.2025
2284	8296	0.7284	0.0658	0.7942	390.7	0.2044
2298	8319	0.7264	0.0660	0.7924	391.8	0.2062
2312	8351	0.7244	0.0663	0.7907	393.3	0.2080
2328	8389	0.7224	0.0666	0.7890	395.1	0.2097
2342	8435	0.7204	0.0670	0.7874	397.2	0.2113
2357	8483	0.7184	0.0673	0.7857	399.5	0.2129
2371	8528	0.7164	0.0677	0.7841	401.6	0.2146
2385	8563	0.7144	0.0680	0.7824	403.2	0.2163
2399	8595	0.7124	0.0682	0.7806	404.8	0.2180
2414	8626	0.7104	0.0685	0.7789	406.2	0.2198
2429	8657	0.7084	0.0687	0.7771	407.7	0.2215
2443	8687	0.7064	0.0690	0.7754	409.1	0.2233
2472	8724	0.7024	0.0692	0.7716	410.8	0.2270
2486	8749	0.7004	0.0694	0.7698	412.0	0.2288
2500	8777	0.6984	0.0697	0.7681	413.3	0.2306
2516	8805	0.6964	0.0699	0.7663	414.6	0.2324
2531	8804	0.6944	0.0699	0.7643	414.6	0.2344
2545	8802	0.6924	0.0699	0.7623	414.5	0.2364
2558	8808	0.6904	0.0699	0.7603	414.8	0.2383
2572	8802	0.6884	0.0699	0.7583	414.5	0.2404
2586	8784	0.6864	0.0697	0.7561	413.7	0.2425
2598	8774	0.6844	0.0696	0.7540	413.2	0.2446
2611	8763	0.6824	0.0696	0.7520	412.7	0.2467
2624	8760	0.6804	0.0695	0.7499	412.5	0.2487
2639	8755	0.6784	0.0695	0.7479	412.3	0.2508
2652	8755	0.6764	0.0695	0.7459	412.3	0.2528
2665	8755	0.6744	0.0695	0.7439	412.3	0.2548
2678	8743	0.6724	0.0694	0.7418	411.7	0.2568
2694	8744	0.6704	0.0694	0.7398	411.8	0.2588
2708	8750	0.6684	0.0695	0.7379	412.1	0.2608
2722	8750	0.6664	0.0695	0.7359	412.1	0.2628
2735	8747	0.6644	0.0694	0.7338	411.9	0.2648
2749	8743	0.6624	0.0694	0.7318	411.7	0.2668
2762	8745	0.6604	0.0694	0.7298	411.8	0.2688
2790	8753	0.6564	0.0695	0.7259	412.2	0.2728
2803	8753	0.6544	0.0695	0.7239	412.2	0.2748
2817	8755	0.6524	0.0695	0.7219	412.3	0.2768
2830	8753	0.6504	0.0695	0.7199	412.2	0.2788
2845	8754	0.6484	0.0695	0.7179	412.2	0.2808
2860	8754	0.6464	0.0695	0.7159	412.2	0.2828
2872	8744	0.6444	0.0694	0.7138	411.8	0.2848
2885	8737	0.6424	0.0693	0.7117	411.4	0.2869
2898	8737	0.6404	0.0693	0.7097	411.4	0.2889

	Shear	Horizontal	Compliance	Corrected	Shear	Horizontal
2911	8731	0.6384	0.0693	0.7077	411.2	0.2909
2924	8728	0.6364	0.0693	0.7057	411.0	0.2930
2936	8721	0.6344	0.0692	0.7036	410.7	0.2950
2949	8718	0.6324	0.0692	0.7016	410.5	0.2970
2963	8722	0.6304	0.0692	0.6996	410.7	0.2990
2976	8726	0.6284	0.0693	0.6977	410.9	0.3010
2989	8730	0.6264	0.0693	0.6957	411.1	0.3030
3002	8734	0.6244	0.0693	0.6937	411.3	0.3049
3015	8725	0.6224	0.0693	0.6917	410.9	0.3070
3028	8721	0.6204	0.0692	0.6896	410.7	0.3090
3041	8721	0.6184	0.0692	0.6876	410.7	0.3110
3054	8723	0.6164	0.0692	0.6856	410.8	0.3130
3068	8724	0.6144	0.0692	0.6836	410.8	0.3150
3093	8719	0.6104	0.0692	0.6796	410.6	0.3190
3106	8715	0.6084	0.0692	0.6776	410.4	0.3211
3119	8712	0.6064	0.0692	0.6756	410.3	0.3231
3132	8706	0.6044	0.0691	0.6735	410.0	0.3251
3144	8704	0.6024	0.0691	0.6715	409.9	0.3272
3157	8698	0.6004	0.0690	0.6694	409.6	0.3292
3170	8685	0.5984	0.0689	0.6673	409.0	0.3313
3180	8607	0.5964	0.0683	0.6647	405.3	0.3339
3191	8533	0.5944	0.0677	0.6621	401.8	0.3365
3203	8505	0.5924	0.0675	0.6599	400.5	0.3387
3215	8487	0.5904	0.0674	0.6578	399.7	0.3409
3228	8478	0.5884	0.0673	0.6557	399.2	0.3430
3240	8466	0.5864	0.0672	0.6536	398.7	0.3450
3253	8459	0.5844	0.0671	0.6515	398.3	0.3471
3266	8451	0.5824	0.0671	0.6495	398.0	0.3492
3278	8443	0.5804	0.0670	0.6474	397.6	0.3512
3291	8431	0.5784	0.0669	0.6453	397.0	0.3533
3304	8419	0.5764	0.0668	0.6432	396.5	0.3554
3316	8403	0.5744	0.0667	0.6411	395.7	0.3575
3328	8378	0.5724	0.0665	0.6389	394.5	0.3597
3336	7160	0.5619	0.0568	0.6187	337.2	0.3799
3336	7160	0.5619	0.0568	0.6187	337.2	0.3799
3336	4769	0.5416	0.0379	0.5795	224.6	0.4192
3336	4769	0.5416	0.0379	0.5795	224.6	0.4192
3336	4769	0.5416	0.0379	0.5795	224.6	0.4192
3336	4769	0.5416	0.0379	0.5795	224.6	0.4192
3336	4769	0.5416	0.0379	0.5795	224.6	0.4192
3336	4769	0.5416	0.0379	0.5795	224.6	0.4192
3336	2853	0.5250	0.0226	0.5476	134.4	0.4510
3336	2853	0.5250	0.0226	0.5476	134.4	0.4510
3336	2853	0.5250	0.0226	0.5476	134.4	0.4510
3336	2853	0.5250	0.0226	0.5476	134.4	0.4510
3336	2853	0.5250	0.0226	0.5476	134.4	0.4510
3336	2853	0.5250	0.0226	0.5476	134.4	0.4510
3337	1876	0.5165	0.0149	0.5314	88.3	0.4673
3337	1876	0.5165	0.0149	0.5314	88.3	0.4673
3337	1876	0.5165	0.0149	0.5314	88.3	0.4673
3337	1462	0.5129	0.0116	0.5245	68.8	0.4741
3337	1244	0.5110	0.0099	0.5209	58.6	0.4778
3337	1124	0.5100	0.0089	0.5189	52.9	0.4797
3336	7160	0.5619	0.0568	0.6187	337.2	0.3799
3336	7160	0.5619	0.0568	0.6187	337.2	0.3799
3336	4769	0.5416	0.0379	0.5795	224.6	0.4192
3336	4769	0.5416	0.0379	0.5795	224.6	0.4192
3336	2853	0.5250	0.0226	0.5476	134.4	0.4510
3336	2853	0.5250	0.0226	0.5476	134.4	0.4510
3336	2853	0.5250	0.0226	0.5476	134.4	0.4510
3337	1876	0.5165	0.0149	0.5314	88.3	0.4673
3342	1011	0.5084	0.0080	0.5164	47.6	0.4822
3345	707	0.5062	0.0056	0.5118	33.3	0.4868
3346	475	0.5044	0.0038	0.5082	22.4	0.4905
3352	380	0.5024	0.0030	0.5054	17.9	0.4932
3361	337	0.5004	0.0027	0.5031	15.9	0.4956
3373	314	0.4984	0.0025	0.5009	14.8	0.4978
3385	301	0.4964	0.0024	0.4988	14.2	0.4999
3397	291	0.4944	0.0023	0.4967	13.7	0.5019
3409	284	0.4924	0.0023	0.4947	13.4	0.5040
3422	279	0.4904	0.0022	0.4926	13.1	0.5060
3434	274	0.4884	0.0022	0.4906	12.9	0.5081
3447	269	0.4864	0.0021	0.4885	12.7	0.5101
3459	266	0.4844	0.0021	0.4865	12.5	0.5121
3471	262	0.4824	0.0021	0.4845	12.3	0.5142
3484	259	0.4804	0.0021	0.4825	12.2	0.5162
3496	257	0.4784	0.0020	0.4804	12.1	0.5182
3509	254	0.4764	0.0020	0.4784	12.0	0.5202
3513	254	0.4758	0.0020	0.4778	12.0	0.5208



Photo Report

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
Lithology Sandstone, gray, moderately hard
Hole Number DB-3 Depth (m) 18.60-18.75
Test Type MTC Laboratory Rock Core Anchor Pull-Out

Project Number 110773396
Lab ID PO-21

As Received



Core Preparation

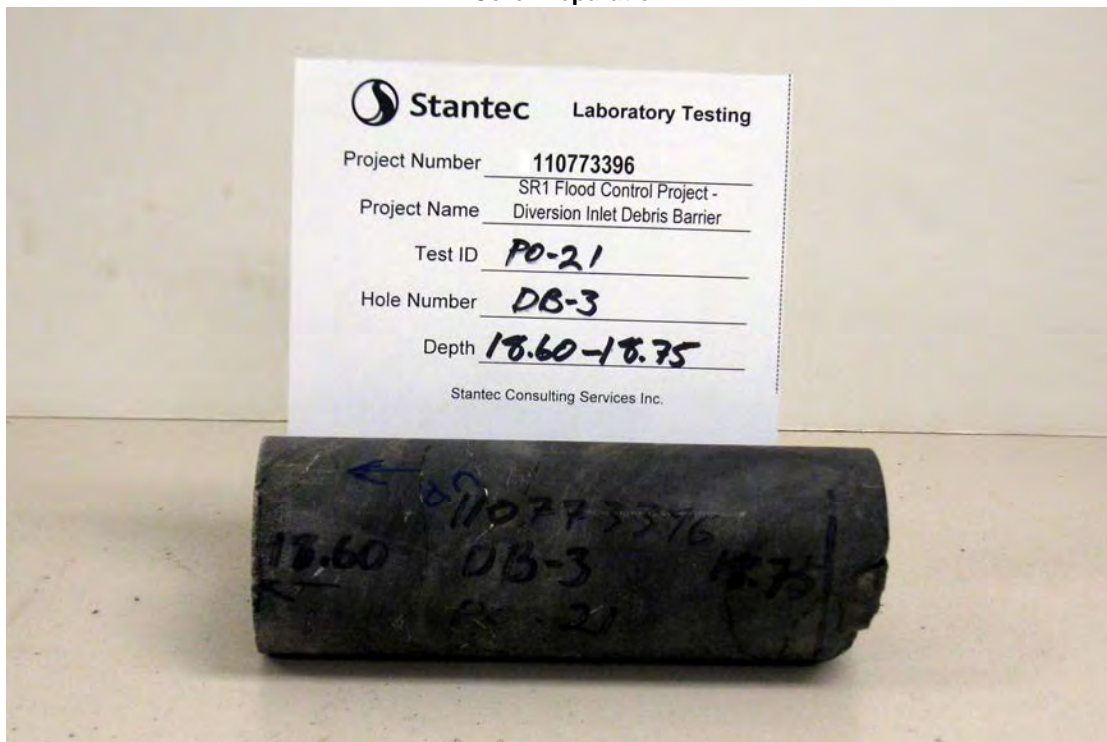


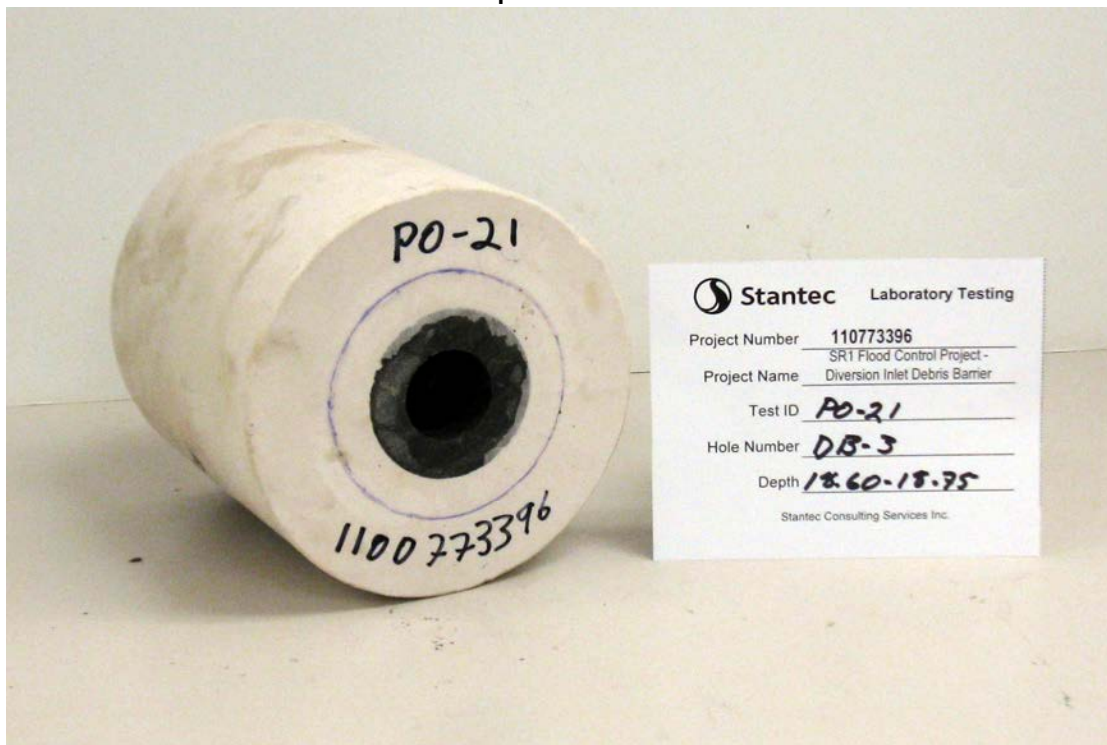


Photo Report

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
 Lithology Sandstone, gray, moderately hard
 Hole Number DB-3 Depth (m) 18.60-18.75
 Test Type MTC Laboratory Rock Core Anchor Pull-Out

Project Number 110773396
 Lab ID PO-21

Specimen Bore



Specimen Grout

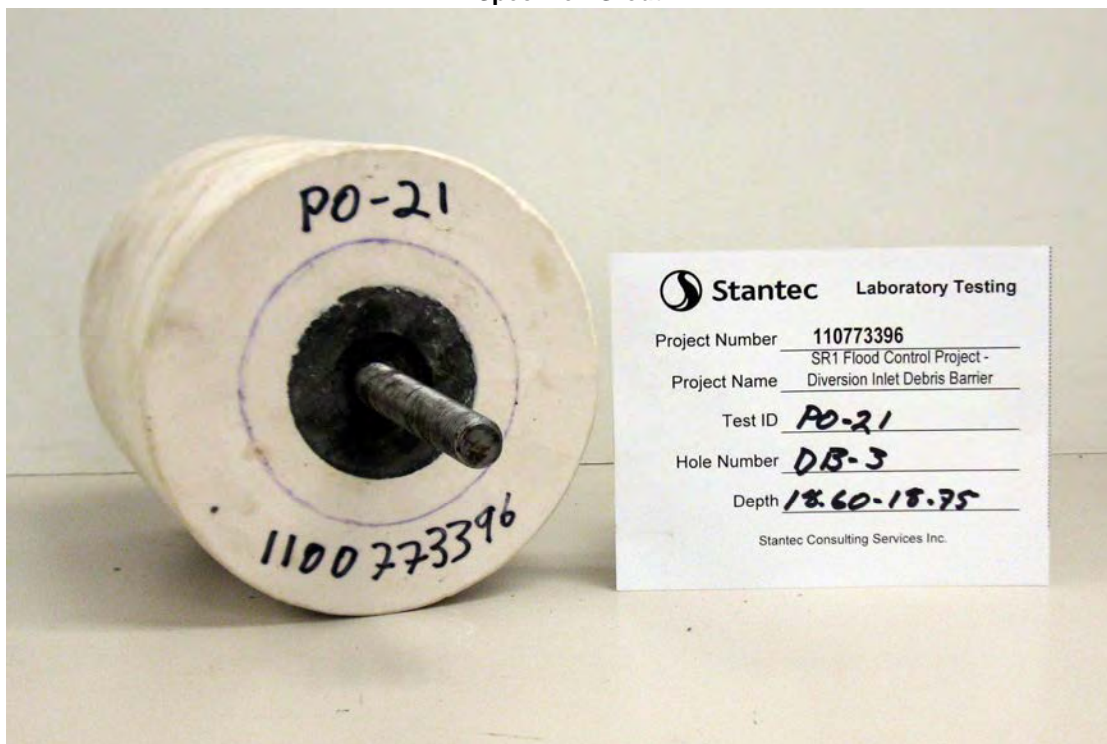




Photo Report

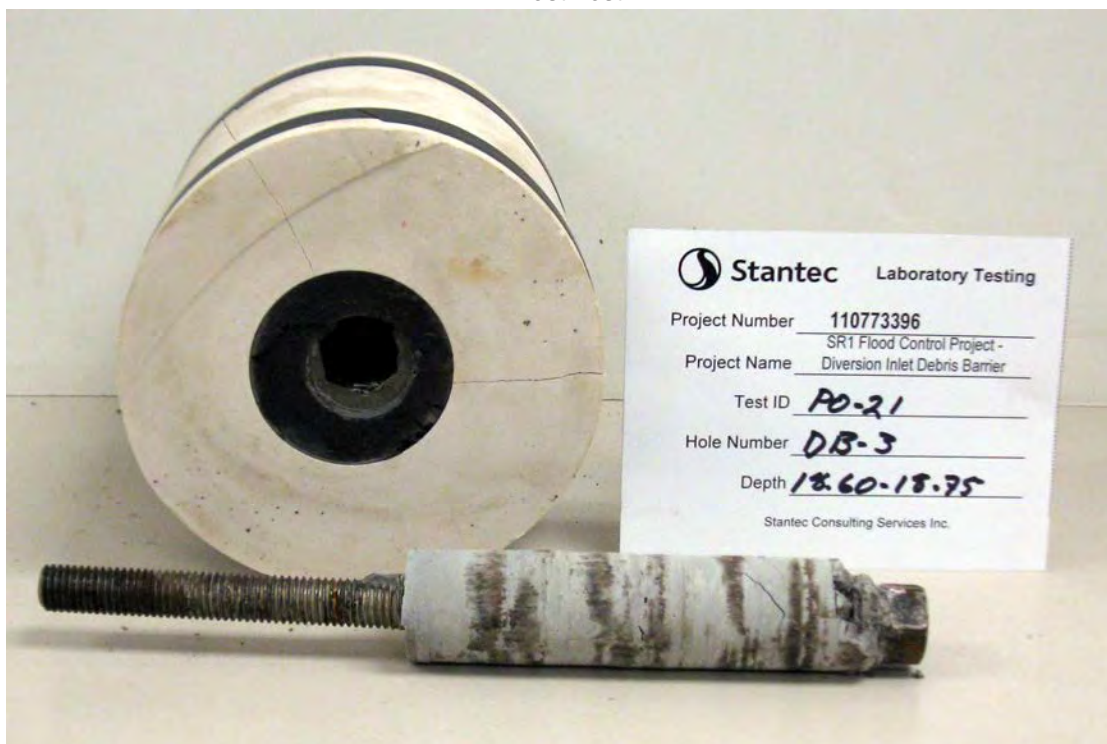
Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
 Lithology Sandstone, gray, moderately hard
 Hole Number DB-3 Depth (m) 18.60-18.75
 Test Type MTC Laboratory Rock Core Anchor Pull-Out

Project Number 110773396
 Lab ID PO-21

Post Test



Post Test





**MTC Laboratory Rock Core
Anchor Pull-Out Test**

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
 Lithology Sandstone, gray, moderately hard
 Hole Number DB-3 Depth (m) 20.89-21.03

Project Number 110773396
 Lab ID PO-23
 Date Received 05/15/2018
 Test Date 05/31/2018

Diameter (in) 2.399 Length (in) 5.561
 Moisture Condition As received, moist

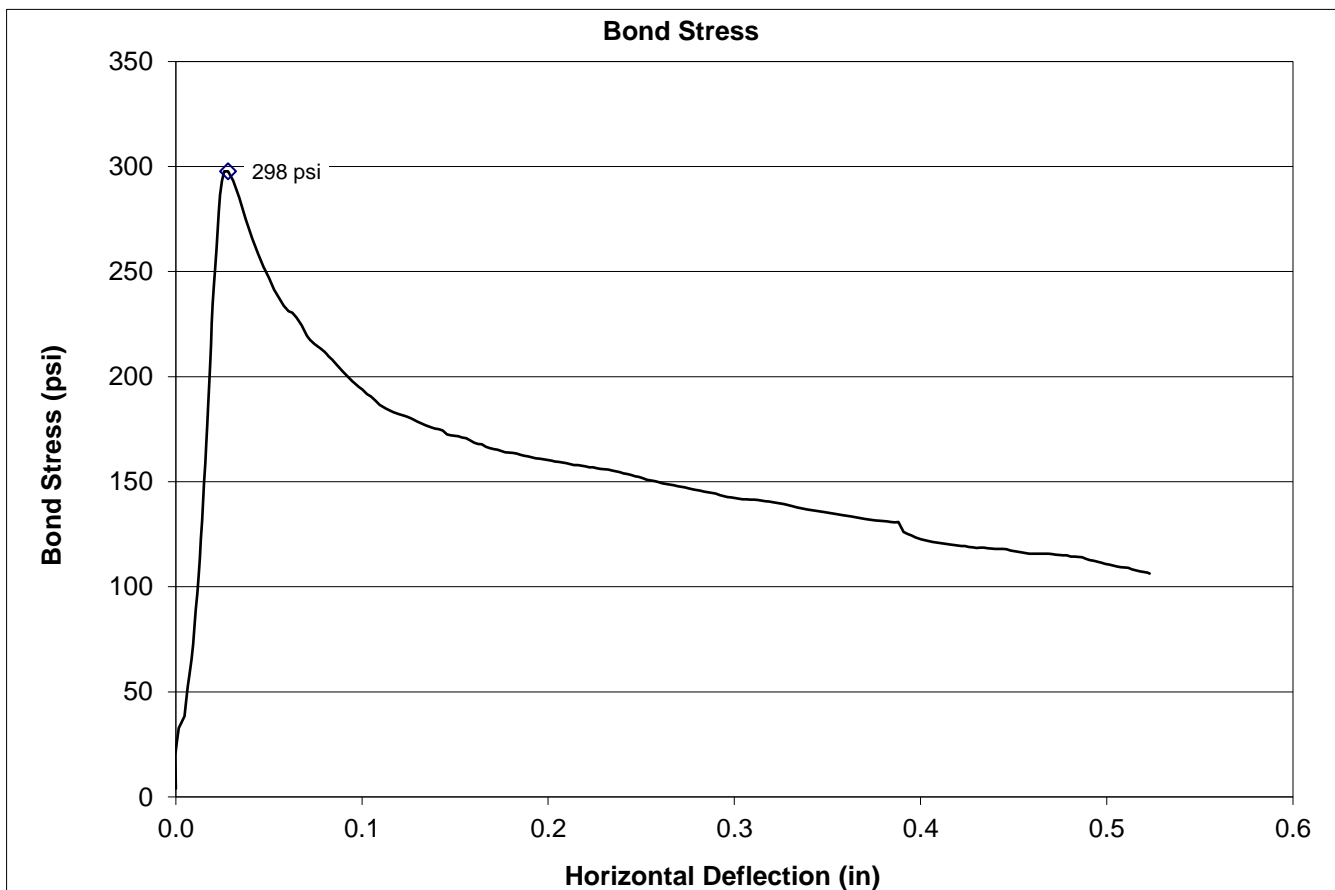
Anchor Bond Interface
 Diameter (in) 1.269
 Length (in) 4.948
 Surface Area (in²) 19.73

Anchor Preparation

Anchor Type 1/2" diameter threaded rod with 4 nuts
 Grout Type Quikrete Portland Cement, Type I/II

Grout Preparation Date 05/24/2018
 Water / Grout Ratio 0.45
 Cure Time (days) 7
 Cube Strength (psi) 7390

Maximum Load (lbf) 5877
 Maximum Stress (psi) 298
 Load Rate to Peak (lbf/min) 415
 Post Peak Shear Rate (in/min) 0.015
 Length of Intact Pull Out (in) 4.53



Comments _____

Reviewed By RJ

Time (seconds)	Shear Load (lbf)	Horizontal Dial Reading (in)	Compliance Correction (in)	Corrected Dial Reading (in)	Shear Stress (psi)	Horizontal Deflection (in)
0	80	0.9926	0.0006	0.9932	4.1	0.0000
111	389	0.9906	0.0031	0.9937	19.7	-0.0005
140	512	0.9886	0.0041	0.9927	25.9	0.0006
168	645	0.9866	0.0051	0.9917	32.7	0.0015
204	756	0.9826	0.0060	0.9886	38.3	0.0046
228	897	0.9806	0.0071	0.9877	45.5	0.0055
251	1033	0.9786	0.0082	0.9868	52.3	0.0064
272	1161	0.9766	0.0092	0.9858	58.8	0.0074
293	1293	0.9746	0.0103	0.9849	65.5	0.0084
314	1432	0.9726	0.0114	0.9840	72.6	0.0093
337	1595	0.9706	0.0127	0.9833	80.8	0.0100
359	1754	0.9686	0.0139	0.9825	88.9	0.0107
379	1907	0.9666	0.0151	0.9817	96.6	0.0115
400	2067	0.9646	0.0164	0.9810	104.7	0.0122
422	2243	0.9626	0.0178	0.9804	113.7	0.0128
444	2419	0.9606	0.0192	0.9798	122.6	0.0134
465	2590	0.9586	0.0206	0.9792	131.3	0.0141
506	2950	0.9546	0.0234	0.9780	149.5	0.0152
527	3132	0.9526	0.0249	0.9775	158.7	0.0158
547	3318	0.9506	0.0263	0.9769	168.1	0.0163
566	3490	0.9486	0.0277	0.9763	176.9	0.0169
587	3680	0.9466	0.0292	0.9758	186.5	0.0174
607	3866	0.9446	0.0307	0.9753	195.9	0.0179
626	4052	0.9426	0.0322	0.9748	205.3	0.0185
648	4252	0.9406	0.0338	0.9744	215.5	0.0189
670	4450	0.9386	0.0353	0.9739	225.5	0.0193
689	4633	0.9366	0.0368	0.9734	234.8	0.0199
709	4811	0.9346	0.0382	0.9728	243.8	0.0204
728	4975	0.9326	0.0395	0.9721	252.1	0.0211
747	5144	0.9306	0.0408	0.9714	260.7	0.0218
785	5489	0.9266	0.0436	0.9702	278.2	0.0231
804	5654	0.9246	0.0449	0.9695	286.5	0.0238
821	5784	0.9226	0.0459	0.9685	293.1	0.0247
837	5875	0.9206	0.0466	0.9672	297.7	0.0260
850	5877	0.9186	0.0466	0.9652	297.8	0.0280
861	5788	0.9166	0.0459	0.9625	293.3	0.0307
869	5628	0.9146	0.0447	0.9593	285.2	0.0340
875	5428	0.9126	0.0431	0.9557	275.1	0.0376
882	5241	0.9106	0.0416	0.9522	265.6	0.0410
891	5099	0.9086	0.0405	0.9491	258.4	0.0442
900	4977	0.9066	0.0395	0.9461	252.2	0.0471
910	4874	0.9046	0.0387	0.9433	247.0	0.0499
920	4764	0.9026	0.0378	0.9404	241.4	0.0528
942	4613	0.8986	0.0366	0.9352	233.8	0.0580
953	4561	0.8966	0.0362	0.9328	231.1	0.0604
966	4546	0.8946	0.0361	0.9307	230.4	0.0626
978	4503	0.8926	0.0357	0.9283	228.2	0.0649
989	4429	0.8906	0.0352	0.9258	224.4	0.0675
999	4340	0.8886	0.0344	0.9230	219.9	0.0702
1008	4281	0.8866	0.0340	0.9206	216.9	0.0727
1018	4246	0.8846	0.0337	0.9183	215.2	0.0749
1027	4215	0.8826	0.0335	0.9161	213.6	0.0772
1035	4190	0.8806	0.0333	0.9139	212.3	0.0794
1042	4140	0.8786	0.0329	0.9115	209.8	0.0818
1050	4105	0.8766	0.0326	0.9092	208.0	0.0841
1057	4058	0.8746	0.0322	0.9068	205.6	0.0864
1072	3970	0.8706	0.0315	0.9021	201.2	0.0911
1080	3925	0.8686	0.0312	0.8998	198.9	0.0935
1087	3887	0.8666	0.0309	0.8975	197.0	0.0958
1095	3860	0.8646	0.0306	0.8952	195.6	0.0980
1103	3826	0.8626	0.0304	0.8930	193.9	0.1003
1111	3782	0.8606	0.0300	0.8906	191.7	0.1026
1119	3758	0.8586	0.0298	0.8884	190.4	0.1048
1127	3723	0.8566	0.0296	0.8862	188.7	0.1071
1134	3681	0.8546	0.0292	0.8838	186.5	0.1094
1142	3659	0.8526	0.0290	0.8816	185.4	0.1116
1149	3638	0.8506	0.0289	0.8795	184.4	0.1138
1158	3619	0.8486	0.0287	0.8773	183.4	0.1159
1165	3605	0.8466	0.0286	0.8752	182.7	0.1180
1181	3582	0.8426	0.0284	0.8710	181.5	0.1222
1189	3569	0.8406	0.0283	0.8689	180.9	0.1243
1197	3554	0.8386	0.0282	0.8668	180.1	0.1264
1205	3535	0.8366	0.0281	0.8647	179.1	0.1286
1213	3518	0.8346	0.0279	0.8625	178.3	0.1307
1221	3498	0.8326	0.0278	0.8604	177.3	0.1329
1229	3484	0.8306	0.0277	0.8583	176.6	0.1350
1238	3474	0.8286	0.0276	0.8562	176.0	0.1371
1246	3458	0.8266	0.0274	0.8540	175.2	0.1392
1254	3453	0.8246	0.0274	0.8520	175.0	0.1412
1262	3442	0.8226	0.0273	0.8499	174.4	0.1433
1270	3405	0.8206	0.0270	0.8476	172.6	0.1456
1279	3396	0.8186	0.0270	0.8456	172.1	0.1477
1295	3386	0.8146	0.0269	0.8415	171.6	0.1518
1303	3374	0.8126	0.0268	0.8394	171.0	0.1539
1312	3370	0.8106	0.0267	0.8373	170.8	0.1559

	Shear	Horizontal	Compliance	Corrected	Shear	Horizontal
1319	3347	0.8086	0.0266	0.8352	169.6	0.1581
1328	3327	0.8066	0.0264	0.8330	168.6	0.1602
1336	3316	0.8046	0.0263	0.8309	168.0	0.1623
1344	3312	0.8026	0.0263	0.8289	167.8	0.1643
1352	3288	0.8006	0.0261	0.8267	166.6	0.1665
1360	3274	0.7986	0.0260	0.8246	165.9	0.1686
1368	3265	0.7966	0.0259	0.8225	165.5	0.1707
1376	3259	0.7946	0.0259	0.8205	165.2	0.1728
1385	3247	0.7926	0.0258	0.8184	164.5	0.1749
1393	3237	0.7906	0.0257	0.8163	164.0	0.1769
1410	3230	0.7866	0.0256	0.8122	163.7	0.1810
1418	3223	0.7846	0.0256	0.8102	163.3	0.1831
1426	3213	0.7826	0.0255	0.8081	162.8	0.1851
1435	3204	0.7806	0.0254	0.8060	162.4	0.1872
1443	3197	0.7786	0.0254	0.8040	162.0	0.1893
1452	3188	0.7766	0.0253	0.8019	161.6	0.1913
1460	3179	0.7746	0.0252	0.7998	161.1	0.1934
1468	3175	0.7726	0.0252	0.7978	160.9	0.1954
1477	3169	0.7706	0.0252	0.7958	160.6	0.1975
1485	3163	0.7686	0.0251	0.7937	160.3	0.1995
1494	3159	0.7666	0.0251	0.7917	160.1	0.2016
1502	3150	0.7646	0.0250	0.7896	159.6	0.2036
1510	3146	0.7626	0.0250	0.7876	159.4	0.2057
1527	3134	0.7586	0.0249	0.7835	158.8	0.2098
1535	3126	0.7566	0.0248	0.7814	158.4	0.2118
1543	3117	0.7546	0.0247	0.7793	158.0	0.2139
1551	3115	0.7526	0.0247	0.7773	157.9	0.2159
1560	3109	0.7506	0.0247	0.7753	157.6	0.2180
1569	3104	0.7486	0.0246	0.7732	157.3	0.2200
1577	3095	0.7466	0.0246	0.7712	156.8	0.2221
1585	3094	0.7446	0.0246	0.7692	156.8	0.2241
1594	3087	0.7426	0.0245	0.7671	156.4	0.2261
1602	3080	0.7406	0.0244	0.7650	156.1	0.2282
1610	3078	0.7386	0.0244	0.7630	156.0	0.2302
1618	3073	0.7366	0.0244	0.7610	155.7	0.2322
1626	3065	0.7346	0.0243	0.7589	155.3	0.2343
1642	3050	0.7306	0.0242	0.7548	154.6	0.2384
1650	3039	0.7286	0.0241	0.7527	154.0	0.2405
1658	3033	0.7266	0.0241	0.7507	153.7	0.2426
1667	3023	0.7246	0.0240	0.7486	153.2	0.2446
1675	3011	0.7226	0.0239	0.7465	152.6	0.2467
1683	3004	0.7206	0.0238	0.7444	152.2	0.2488
1691	2994	0.7186	0.0238	0.7424	151.7	0.2509
1699	2979	0.7166	0.0236	0.7402	151.0	0.2530
1707	2972	0.7146	0.0236	0.7382	150.6	0.2550
1715	2966	0.7126	0.0235	0.7361	150.3	0.2571
1723	2956	0.7106	0.0235	0.7341	149.8	0.2592
1731	2945	0.7086	0.0234	0.7320	149.2	0.2613
1739	2939	0.7066	0.0233	0.7299	148.9	0.2633
1756	2927	0.7026	0.0232	0.7258	148.3	0.2674
1764	2918	0.7006	0.0232	0.7238	147.9	0.2695
1772	2912	0.6986	0.0231	0.7217	147.6	0.2715
1780	2905	0.6966	0.0231	0.7197	147.2	0.2736
1789	2898	0.6946	0.0230	0.7176	146.9	0.2756
1797	2889	0.6926	0.0229	0.7155	146.4	0.2777
1805	2883	0.6906	0.0229	0.7135	146.1	0.2798
1813	2876	0.6886	0.0228	0.7114	145.7	0.2818
1821	2867	0.6866	0.0228	0.7094	145.3	0.2839
1830	2862	0.6846	0.0227	0.7073	145.0	0.2859
1838	2856	0.6826	0.0227	0.7053	144.7	0.2880
1845	2849	0.6806	0.0226	0.7032	144.4	0.2900
1854	2834	0.6786	0.0225	0.7011	143.6	0.2921
1870	2816	0.6746	0.0224	0.6970	142.7	0.2963
1878	2812	0.6726	0.0223	0.6949	142.5	0.2983
1887	2807	0.6706	0.0223	0.6929	142.2	0.3004
1895	2801	0.6686	0.0222	0.6908	141.9	0.3024
1903	2796	0.6666	0.0222	0.6888	141.7	0.3044
1911	2794	0.6646	0.0222	0.6868	141.6	0.3065
1920	2792	0.6626	0.0222	0.6848	141.5	0.3085
1928	2793	0.6606	0.0222	0.6828	141.5	0.3105
1937	2788	0.6586	0.0221	0.6807	141.3	0.3125
1945	2783	0.6566	0.0221	0.6787	141.0	0.3145
1953	2776	0.6546	0.0220	0.6766	140.7	0.3166
1962	2773	0.6526	0.0220	0.6746	140.5	0.3186
1970	2768	0.6506	0.0220	0.6726	140.3	0.3207
1986	2754	0.6466	0.0219	0.6685	139.6	0.3248
1995	2748	0.6446	0.0218	0.6664	139.3	0.3268
2002	2741	0.6426	0.0218	0.6644	138.9	0.3289
2011	2731	0.6406	0.0217	0.6623	138.4	0.3310
2019	2719	0.6386	0.0216	0.6602	137.8	0.3331
2027	2713	0.6366	0.0215	0.6581	137.5	0.3351
2035	2706	0.6346	0.0215	0.6561	137.1	0.3372
2043	2698	0.6326	0.0214	0.6540	136.7	0.3392
2051	2693	0.6306	0.0214	0.6520	136.5	0.3413
2060	2688	0.6286	0.0213	0.6499	136.2	0.3433
2068	2681	0.6266	0.0213	0.6479	135.9	0.3454
2076	2676	0.6246	0.0212	0.6458	135.6	0.3474

	Shear	Horizontal	Compliance	Corrected	Shear	Horizontal
2084	2671	0.6226	0.0212	0.6438	135.4	0.3494
2101	2658	0.6186	0.0211	0.6397	134.7	0.3535
2109	2653	0.6166	0.0211	0.6377	134.4	0.3556
2118	2648	0.6146	0.0210	0.6356	134.2	0.3576
2126	2642	0.6126	0.0210	0.6336	133.9	0.3597
2134	2637	0.6106	0.0209	0.6315	133.6	0.3617
2142	2630	0.6086	0.0209	0.6295	133.3	0.3638
2150	2624	0.6066	0.0208	0.6274	133.0	0.3658
2158	2616	0.6046	0.0208	0.6254	132.6	0.3679
2166	2611	0.6026	0.0207	0.6233	132.3	0.3699
2174	2605	0.6006	0.0207	0.6213	132.0	0.3720
2183	2600	0.5986	0.0206	0.6192	131.8	0.3740
2191	2596	0.5966	0.0206	0.6172	131.6	0.3760
2199	2594	0.5946	0.0206	0.6152	131.5	0.3780
2217	2587	0.5906	0.0205	0.6111	131.1	0.3821
2225	2582	0.5886	0.0205	0.6091	130.8	0.3841
2233	2579	0.5866	0.0205	0.6071	130.7	0.3862
2241	2581	0.5846	0.0205	0.6051	130.8	0.3881
2248	2487	0.5826	0.0197	0.6023	126.0	0.3909
2256	2470	0.5806	0.0196	0.6002	125.2	0.3930
2263	2455	0.5786	0.0195	0.5981	124.4	0.3951
2272	2436	0.5766	0.0193	0.5959	123.4	0.3973
2280	2422	0.5746	0.0192	0.5938	122.7	0.3994
2288	2412	0.5726	0.0191	0.5917	122.2	0.4015
2296	2403	0.5706	0.0191	0.5897	121.8	0.4036
2304	2399	0.5686	0.0190	0.5876	121.6	0.4056
2313	2392	0.5666	0.0190	0.5856	121.2	0.4076
2329	2381	0.5626	0.0189	0.5815	120.7	0.4117
2337	2376	0.5606	0.0189	0.5795	120.4	0.4138
2346	2369	0.5586	0.0188	0.5774	120.1	0.4158
2354	2366	0.5566	0.0188	0.5754	119.9	0.4179
2362	2361	0.5546	0.0187	0.5733	119.6	0.4199
2370	2357	0.5526	0.0187	0.5713	119.4	0.4219
2379	2355	0.5506	0.0187	0.5693	119.3	0.4239
2387	2348	0.5486	0.0186	0.5672	119.0	0.4260
2395	2344	0.5466	0.0186	0.5652	118.8	0.4280
2403	2338	0.5446	0.0186	0.5632	118.5	0.4301
2412	2341	0.5426	0.0186	0.5612	118.6	0.4321
2420	2340	0.5406	0.0186	0.5592	118.6	0.4341
2428	2336	0.5386	0.0185	0.5571	118.4	0.4361
2445	2328	0.5346	0.0185	0.5531	118.0	0.4402
2453	2329	0.5326	0.0185	0.5511	118.0	0.4421
2462	2329	0.5306	0.0185	0.5491	118.0	0.4441
2470	2327	0.5286	0.0185	0.5471	117.9	0.4462
2478	2314	0.5266	0.0184	0.5450	117.3	0.4483
2486	2308	0.5246	0.0183	0.5429	117.0	0.4503
2494	2302	0.5226	0.0183	0.5409	116.7	0.4524
2503	2295	0.5206	0.0182	0.5388	116.3	0.4544
2511	2291	0.5186	0.0182	0.5368	116.1	0.4565
2519	2285	0.5166	0.0181	0.5347	115.8	0.4585
2527	2284	0.5146	0.0181	0.5327	115.7	0.4605
2536	2285	0.5126	0.0181	0.5307	115.8	0.4625
2544	2283	0.5106	0.0181	0.5287	115.7	0.4645
2560	2283	0.5066	0.0181	0.5247	115.7	0.4685
2569	2281	0.5046	0.0181	0.5227	115.6	0.4705
2577	2275	0.5026	0.0181	0.5207	115.3	0.4726
2586	2273	0.5006	0.0180	0.5186	115.2	0.4746
2594	2270	0.4986	0.0180	0.5166	115.0	0.4766
2602	2270	0.4966	0.0180	0.5146	115.0	0.4786
2610	2256	0.4946	0.0179	0.5125	114.3	0.4807
2619	2256	0.4926	0.0179	0.5105	114.3	0.4827
2627	2254	0.4906	0.0179	0.5085	114.2	0.4847
2635	2251	0.4886	0.0179	0.5065	114.1	0.4868
2643	2235	0.4866	0.0177	0.5043	113.3	0.4889
2651	2225	0.4846	0.0177	0.5023	112.8	0.4910
2660	2219	0.4826	0.0176	0.5002	112.4	0.4930
2676	2199	0.4786	0.0175	0.4961	111.4	0.4972
2684	2188	0.4766	0.0174	0.4940	110.9	0.4993
2692	2180	0.4746	0.0173	0.4919	110.5	0.5013
2700	2171	0.4726	0.0172	0.4898	110.0	0.5034
2709	2163	0.4706	0.0172	0.4878	109.6	0.5055
2717	2158	0.4686	0.0171	0.4857	109.4	0.5075
2725	2155	0.4666	0.0171	0.4837	109.2	0.5095
2734	2150	0.4646	0.0171	0.4817	109.0	0.5116
2742	2137	0.4626	0.0170	0.4796	108.3	0.5137
2750	2126	0.4606	0.0169	0.4775	107.7	0.5158
2758	2118	0.4586	0.0168	0.4754	107.3	0.5178
2766	2111	0.4566	0.0168	0.4734	107.0	0.5199
2774	2105	0.4546	0.0167	0.4713	106.7	0.5219
2778	2098	0.4536	0.0167	0.4703	106.3	0.5230

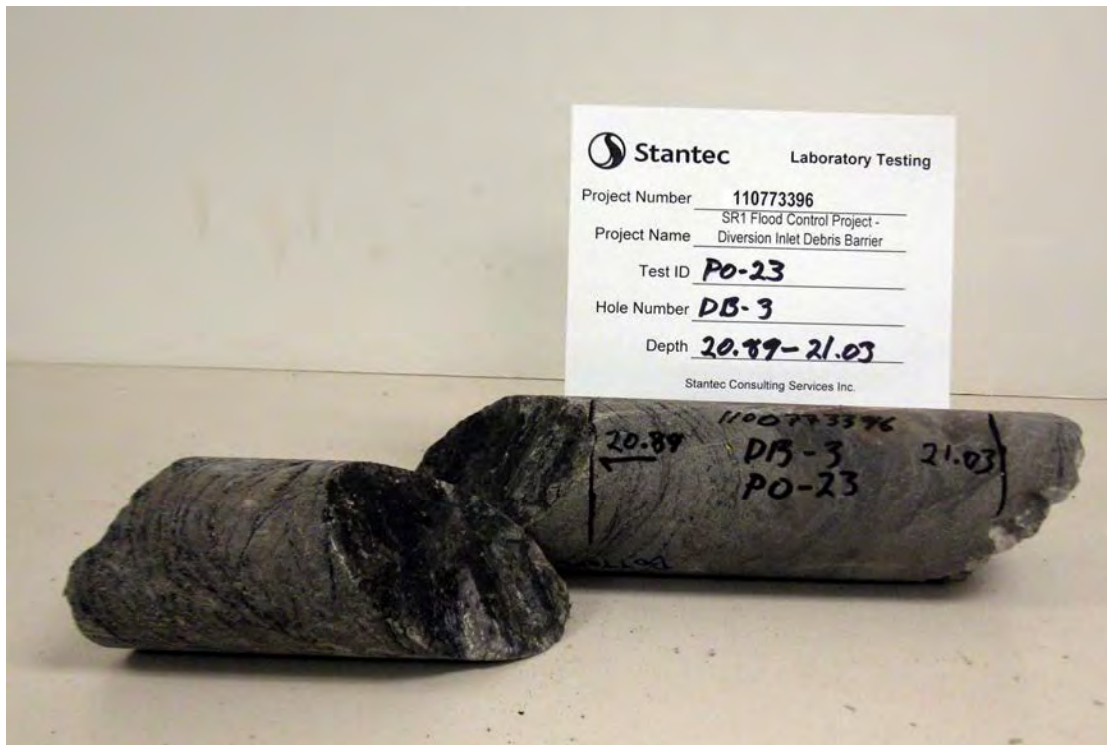


Photo Report

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
 Lithology Sandstone, gray, moderately hard
 Hole Number DB-3 Depth (m) 20.89-21.03
 Test Type MTC Laboratory Rock Core Anchor Pull-Out

Project Number 110773396
 Lab ID PO-23

As Received



Core Preparation



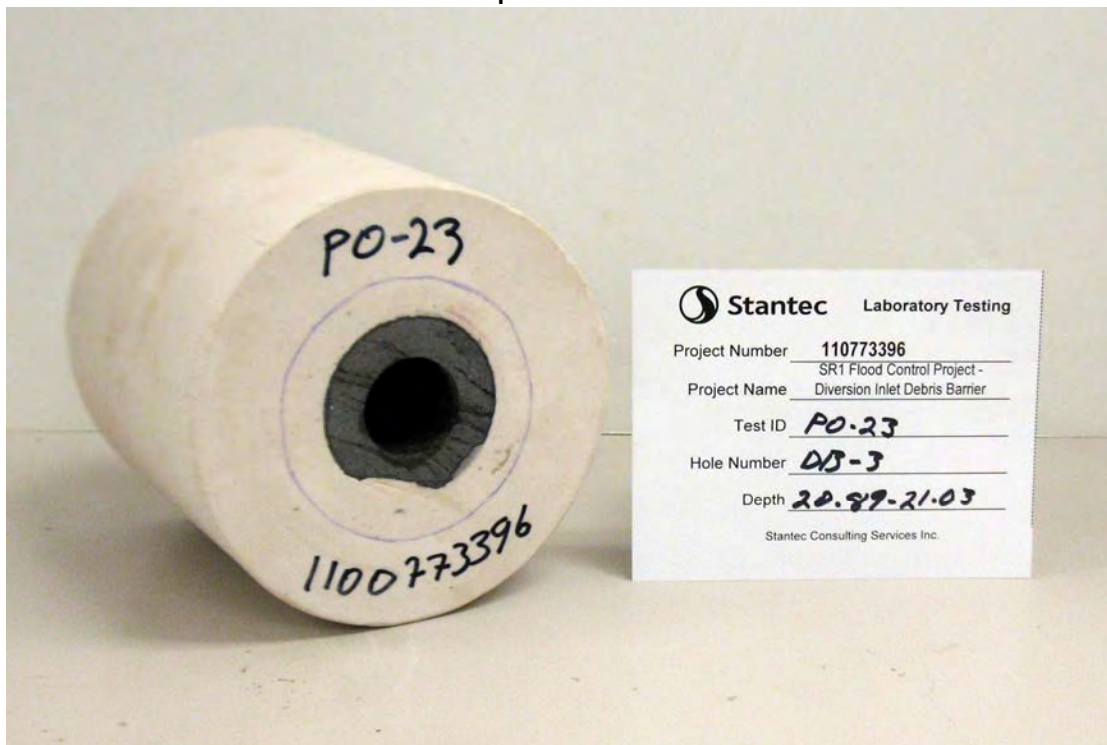


Photo Report

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
 Lithology Sandstone, gray, moderately hard
 Hole Number DB-3 Depth (m) 20.89-21.03
 Test Type MTC Laboratory Rock Core Anchor Pull-Out

Project Number 110773396
 Lab ID PO-23

Specimen Bore



Specimen Grout

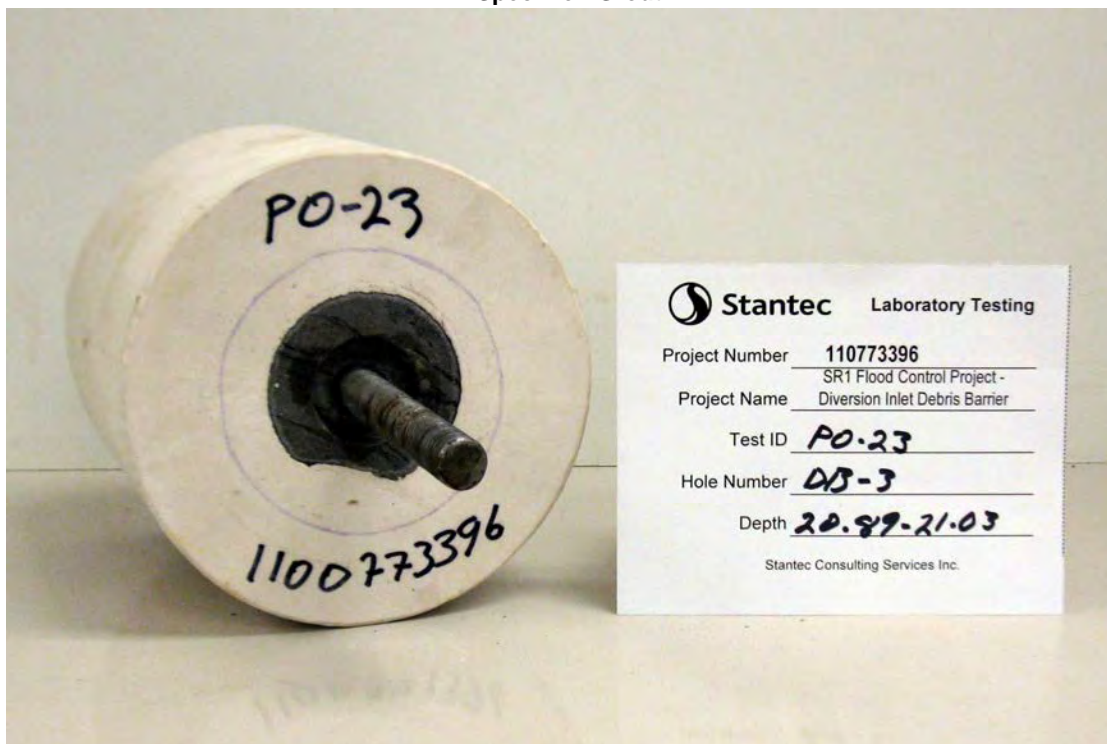


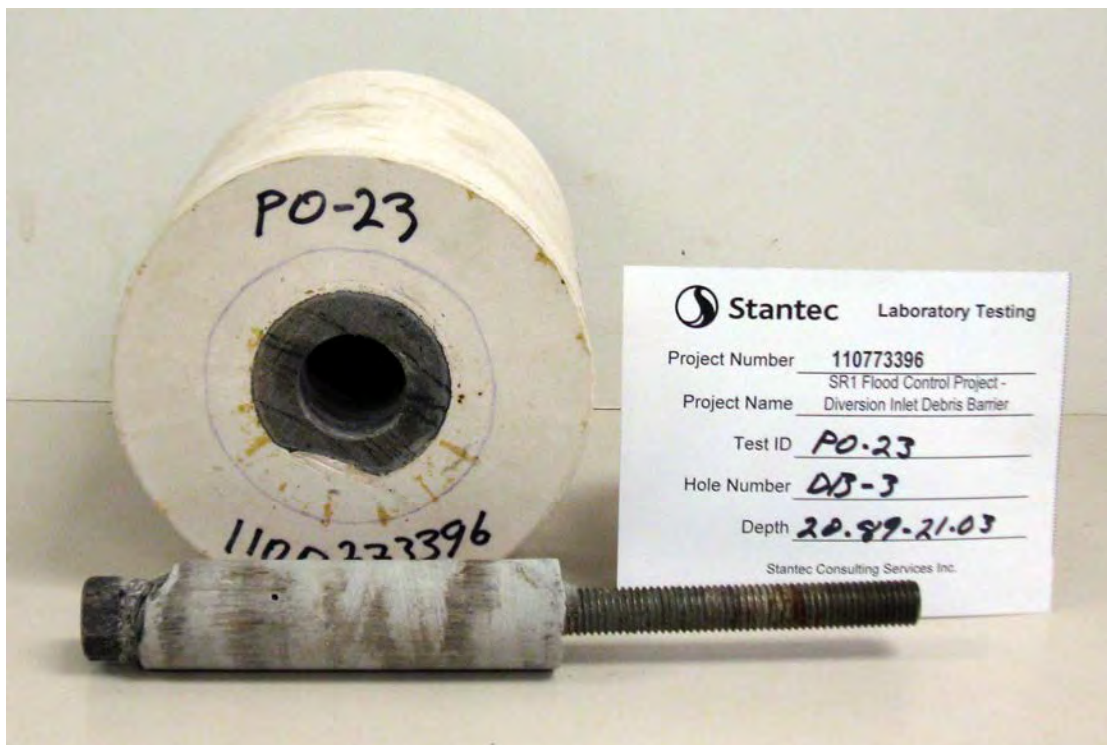


Photo Report

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
Lithology Sandstone, gray, moderately hard
Hole Number DB-3 Depth (m) 20.89-21.03
Test Type MTC Laboratory Rock Core Anchor Pull-Out

Project Number 110773396
Lab ID PO-23

Post Test



Post Test





**MTC Laboratory Rock Core
Anchor Pull-Out Test**

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
 Lithology Coal, black, soft
 Hole Number DB-3 Depth (m) 25.34-25.49

Project Number 110773396
 Lab ID PO-27
 Date Received 05/15/2018
 Test Date 05/31/2018

Diameter (in) 2.407 Length (in) 5.945
 Moisture Condition As received, moist

Anchor Bond Interface

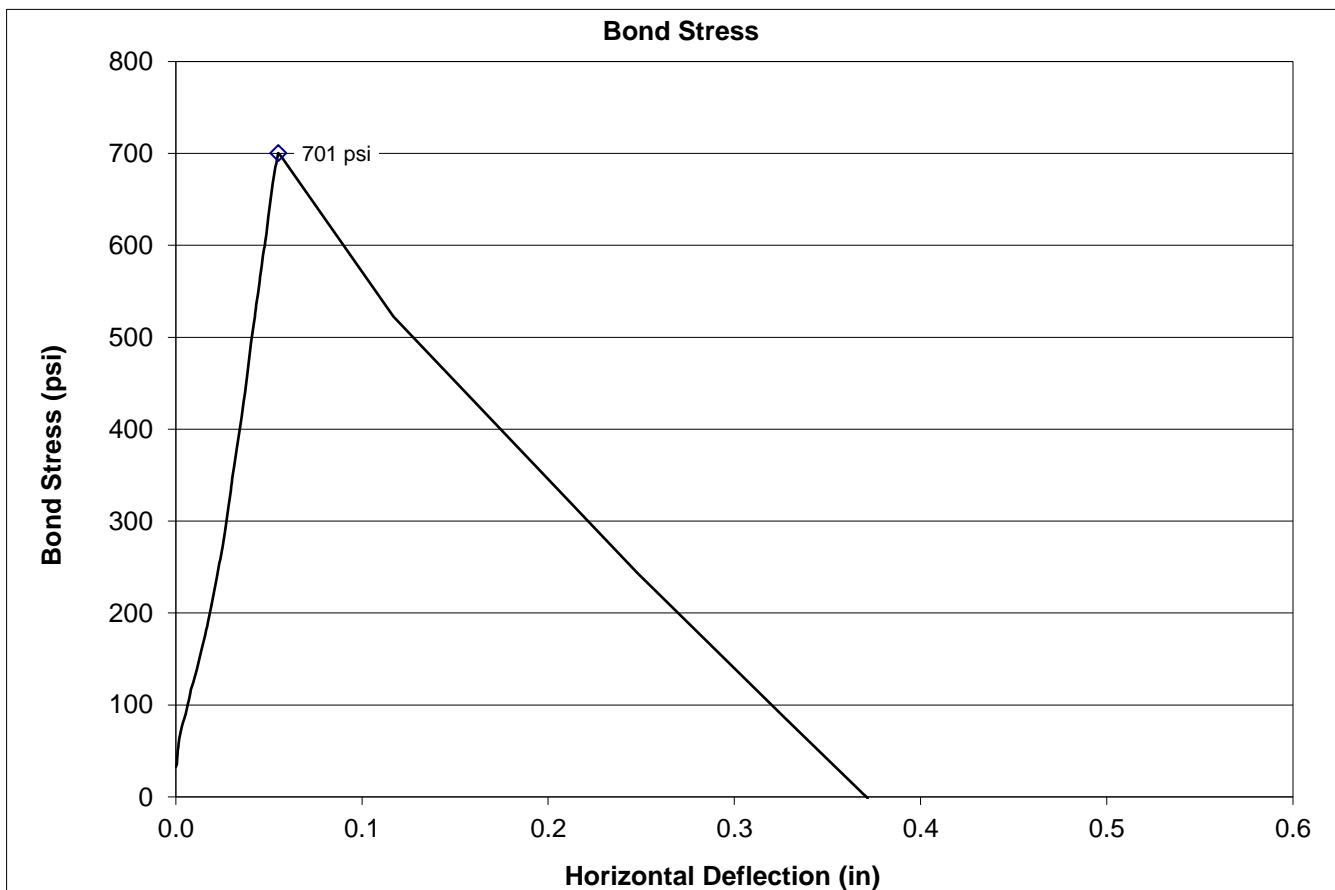
Diameter (in) 1.271
 Length (in) 5.193
 Surface Area (in²) 20.74

Anchor Preparation

Anchor Type 1/2" diameter threaded rod with 4 nuts
 Grout Type Quikrete Portland Cement, Type I/II

Grout Preparation Date 05/24/2018
 Water / Grout Ratio 0.45
 Cure Time (days) 7
 Cube Strength (psi) 7390

Maximum Load (lbf) 14534
 Maximum Stress (psi) 701
 Load Rate to Peak (lbf/min) 618
 Post Peak Shear Rate (in/min) 3.166
 Length of Intact Pull Out (in) 4.98



Comments Specimen and Hydro-Stone encapsulation split along longitudinal axis at failure.
Terminated testing after specimen failure.

Reviewed By RJ

Time (seconds)	Shear Load (lbf)	Horizontal Dial Reading (in)	Compliance Correction (in)	Corrected Dial Reading (in)	Shear Stress (psi)	Horizontal Deflection (in)
0	679	1.0085	0.0054	1.0139	32.7	0.0000
10	737	1.0075	0.0058	1.0133	35.5	0.0005
31	854	1.0065	0.0068	1.0133	41.2	0.0006
47	948	1.0055	0.0075	1.0130	45.7	0.0009
64	1050	1.0045	0.0083	1.0128	50.6	0.0011
78	1143	1.0035	0.0091	1.0126	55.1	0.0013
92	1233	1.0025	0.0098	1.0123	59.4	0.0016
104	1319	1.0015	0.0105	1.0120	63.6	0.0019
116	1400	1.0005	0.0111	1.0116	67.5	0.0023
127	1479	0.9995	0.0117	1.0112	71.3	0.0026
137	1551	0.9985	0.0123	1.0108	74.8	0.0031
146	1624	0.9975	0.0129	1.0104	78.3	0.0035
156	1696	0.9965	0.0135	1.0100	81.8	0.0039
164	1760	0.9955	0.0140	1.0095	84.9	0.0044
173	1824	0.9945	0.0145	1.0090	87.9	0.0049
181	1894	0.9935	0.0150	1.0085	91.3	0.0054
191	1968	0.9925	0.0156	1.0081	94.9	0.0058
200	2042	0.9915	0.0162	1.0077	98.4	0.0062
209	2116	0.9905	0.0168	1.0073	102.0	0.0066
218	2192	0.9895	0.0174	1.0069	105.7	0.0070
227	2268	0.9885	0.0180	1.0065	109.3	0.0074
236	2341	0.9875	0.0186	1.0061	112.9	0.0078
245	2423	0.9865	0.0192	1.0057	116.8	0.0082
253	2491	0.9855	0.0198	1.0053	120.1	0.0086
261	2555	0.9845	0.0203	1.0048	123.2	0.0091
268	2618	0.9835	0.0208	1.0043	126.2	0.0096
276	2687	0.9825	0.0213	1.0038	129.5	0.0101
283	2750	0.9815	0.0218	1.0033	132.6	0.0106
292	2825	0.9805	0.0224	1.0029	136.2	0.0110
300	2895	0.9795	0.0230	1.0025	139.6	0.0114
308	2969	0.9785	0.0236	1.0021	143.1	0.0118
317	3042	0.9775	0.0241	1.0016	146.7	0.0122
325	3116	0.9765	0.0247	1.0012	150.2	0.0127
333	3190	0.9755	0.0253	1.0008	153.8	0.0131
341	3262	0.9745	0.0259	1.0004	157.3	0.0135
349	3337	0.9735	0.0265	1.0000	160.9	0.0139
357	3415	0.9725	0.0271	0.9996	164.6	0.0143
365	3486	0.9715	0.0277	0.9992	168.1	0.0147
373	3558	0.9705	0.0282	0.9987	171.5	0.0151
381	3631	0.9695	0.0288	0.9983	175.1	0.0156
388	3704	0.9685	0.0294	0.9979	178.6	0.0160
396	3778	0.9675	0.0300	0.9975	182.1	0.0164
404	3851	0.9665	0.0306	0.9971	185.7	0.0168
412	3931	0.9655	0.0312	0.9967	189.5	0.0172
420	4009	0.9645	0.0318	0.9963	193.3	0.0176
428	4086	0.9635	0.0324	0.9959	197.0	0.0180
436	4162	0.9625	0.0330	0.9955	200.7	0.0184
444	4241	0.9615	0.0337	0.9952	204.5	0.0187
452	4320	0.9605	0.0343	0.9948	208.3	0.0191
460	4397	0.9595	0.0349	0.9944	212.0	0.0195
468	4476	0.9585	0.0355	0.9940	215.8	0.0199
476	4554	0.9575	0.0361	0.9936	219.6	0.0202
484	4632	0.9565	0.0368	0.9933	223.3	0.0206
492	4715	0.9555	0.0374	0.9929	227.3	0.0210
500	4799	0.9545	0.0381	0.9926	231.4	0.0213
508	4881	0.9535	0.0387	0.9922	235.3	0.0216
516	4960	0.9525	0.0394	0.9919	239.1	0.0220
524	5037	0.9515	0.0400	0.9915	242.8	0.0224
532	5118	0.9505	0.0406	0.9911	246.7	0.0228
540	5199	0.9495	0.0413	0.9908	250.6	0.0231
548	5281	0.9485	0.0419	0.9904	254.6	0.0235
555	5360	0.9475	0.0425	0.9900	258.4	0.0238
563	5443	0.9465	0.0432	0.9897	262.4	0.0242
571	5524	0.9455	0.0438	0.9893	266.3	0.0245
579	5605	0.9445	0.0445	0.9890	270.2	0.0249
587	5684	0.9435	0.0451	0.9886	274.0	0.0253
594	5762	0.9425	0.0457	0.9882	277.8	0.0257
602	5850	0.9415	0.0464	0.9879	282.0	0.0260
611	5939	0.9405	0.0471	0.9876	286.3	0.0262
619	6031	0.9395	0.0479	0.9874	290.8	0.0265
628	6124	0.9385	0.0486	0.9871	295.2	0.0268
636	6212	0.9375	0.0493	0.9868	299.5	0.0271
645	6298	0.9365	0.0500	0.9865	303.6	0.0274
652	6381	0.9355	0.0506	0.9861	307.6	0.0277
660	6466	0.9345	0.0513	0.9858	311.7	0.0281
669	6554	0.9335	0.0520	0.9855	316.0	0.0284
677	6644	0.9325	0.0527	0.9852	320.3	0.0287
685	6733	0.9315	0.0534	0.9849	324.6	0.0289
694	6825	0.9305	0.0542	0.9847	329.0	0.0292
702	6916	0.9295	0.0549	0.9844	333.4	0.0295
711	7006	0.9285	0.0556	0.9841	337.8	0.0298
719	7094	0.9275	0.0563	0.9838	342.0	0.0301
727	7187	0.9265	0.0570	0.9835	346.5	0.0303
735	7275	0.9255	0.0577	0.9832	350.7	0.0306
743	7364	0.9245	0.0585	0.9830	355.0	0.0309

	Shear	Horizontal	Compliance	Corrected	Shear	Horizontal
752	7454	0.9235	0.0592	0.9827	359.4	0.0312
760	7543	0.9225	0.0599	0.9824	363.7	0.0315
768	7633	0.9215	0.0606	0.9821	368.0	0.0318
776	7717	0.9205	0.0613	0.9818	372.0	0.0321
783	7801	0.9195	0.0619	0.9814	376.1	0.0325
791	7882	0.9185	0.0626	0.9811	380.0	0.0328
798	7965	0.9175	0.0632	0.9807	384.0	0.0332
806	8051	0.9165	0.0639	0.9804	388.1	0.0335
814	8139	0.9155	0.0646	0.9801	392.4	0.0338
822	8225	0.9145	0.0653	0.9798	396.5	0.0341
829	8312	0.9135	0.0660	0.9795	400.7	0.0344
837	8398	0.9125	0.0667	0.9792	404.9	0.0347
845	8488	0.9115	0.0674	0.9789	409.2	0.0350
854	8577	0.9105	0.0681	0.9786	413.5	0.0353
862	8669	0.9095	0.0688	0.9783	417.9	0.0356
870	8760	0.9085	0.0695	0.9780	422.3	0.0359
879	8847	0.9075	0.0702	0.9777	426.5	0.0362
887	8933	0.9065	0.0709	0.9774	430.7	0.0365
895	9021	0.9055	0.0716	0.9771	434.9	0.0368
904	9113	0.9045	0.0723	0.9768	439.3	0.0371
912	9200	0.9035	0.0730	0.9765	443.5	0.0374
920	9288	0.9025	0.0737	0.9762	447.8	0.0377
929	9380	0.9015	0.0745	0.9760	452.2	0.0379
937	9474	0.9005	0.0752	0.9757	456.7	0.0382
946	9567	0.8995	0.0759	0.9754	461.2	0.0385
954	9664	0.8985	0.0767	0.9752	465.9	0.0387
963	9757	0.8975	0.0774	0.9749	470.4	0.0389
971	9851	0.8965	0.0782	0.9747	474.9	0.0392
979	9941	0.8955	0.0789	0.9744	479.3	0.0395
987	10029	0.8945	0.0796	0.9741	483.5	0.0398
996	10126	0.8935	0.0804	0.9739	488.2	0.0400
1005	10219	0.8925	0.0811	0.9736	492.7	0.0403
1013	10310	0.8915	0.0818	0.9733	497.1	0.0406
1022	10395	0.8905	0.0825	0.9730	501.2	0.0409
1030	10480	0.8895	0.0832	0.9727	505.2	0.0412
1038	10567	0.8885	0.0839	0.9724	509.4	0.0415
1047	10653	0.8875	0.0846	0.9721	513.6	0.0418
1055	10740	0.8865	0.0852	0.9717	517.8	0.0421
1063	10828	0.8855	0.0859	0.9714	522.0	0.0424
1072	10921	0.8845	0.0867	0.9712	526.5	0.0427
1081	11016	0.8835	0.0874	0.9709	531.1	0.0430
1089	11108	0.8825	0.0882	0.9707	535.5	0.0432
1097	11196	0.8815	0.0889	0.9704	539.8	0.0435
1105	11283	0.8805	0.0896	0.9701	544.0	0.0438
1113	11366	0.8795	0.0902	0.9697	548.0	0.0442
1121	11456	0.8785	0.0909	0.9694	552.3	0.0445
1129	11546	0.8775	0.0916	0.9691	556.6	0.0447
1138	11639	0.8765	0.0924	0.9689	561.1	0.0450
1146	11731	0.8755	0.0931	0.9686	565.6	0.0453
1155	11821	0.8745	0.0938	0.9683	569.9	0.0456
1163	11913	0.8735	0.0946	0.9681	574.3	0.0458
1171	12002	0.8725	0.0953	0.9678	578.6	0.0461
1180	12089	0.8715	0.0960	0.9675	582.8	0.0464
1188	12177	0.8705	0.0967	0.9672	587.1	0.0467
1196	12270	0.8695	0.0974	0.9669	591.5	0.0470
1205	12361	0.8685	0.0981	0.9666	595.9	0.0473
1213	12432	0.8675	0.0987	0.9662	599.4	0.0477
1221	12518	0.8665	0.0994	0.9659	603.5	0.0480
1229	12610	0.8655	0.1001	0.9656	607.9	0.0483
1238	12701	0.8645	0.1008	0.9653	612.3	0.0486
1246	12790	0.8635	0.1015	0.9650	616.6	0.0489
1255	12885	0.8625	0.1023	0.9648	621.2	0.0491
1263	12978	0.8615	0.1030	0.9645	625.7	0.0494
1272	13073	0.8605	0.1038	0.9643	630.3	0.0496
1281	13167	0.8595	0.1045	0.9640	634.8	0.0499
1289	13257	0.8585	0.1052	0.9637	639.1	0.0502
1297	13348	0.8575	0.1059	0.9634	643.5	0.0504
1305	13438	0.8565	0.1067	0.9632	647.9	0.0507
1314	13528	0.8555	0.1074	0.9629	652.2	0.0510
1322	13617	0.8545	0.1081	0.9626	656.5	0.0513
1330	13705	0.8535	0.1088	0.9623	660.7	0.0516
1339	13794	0.8525	0.1095	0.9620	665.0	0.0519
1347	13880	0.8515	0.1102	0.9617	669.2	0.0522
1355	13969	0.8505	0.1109	0.9614	673.5	0.0525
1364	14055	0.8495	0.1116	0.9611	677.6	0.0528
1372	14136	0.8485	0.1122	0.9607	681.5	0.0532
1380	14217	0.8475	0.1128	0.9603	685.4	0.0535
1388	14297	0.8465	0.1135	0.9600	689.3	0.0539
1396	14378	0.8455	0.1141	0.9596	693.2	0.0543
1404	14458	0.8445	0.1148	0.9593	697.0	0.0546
1412	14534	0.8435	0.1154	0.9589	700.7	0.0550
1416	14612	0.8425	0.1160	0.9585	704.4	0.0554
1417	10837	0.8110	0.0860	0.8970	522.5	0.1169
1417	5050	0.7260	0.0401	0.7661	243.5	0.2478
1417	1782	0.6727	0.0141	0.6868	85.9	0.3270
1417	591	0.6528	0.0047	0.6575	28.5	0.3564
1417	175	0.6459	0.0014	0.6473	8.4	0.3666



Photo Report

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
Lithology Coal, black, soft
Hole Number DB-3 Depth (m) 25.34-25.49
Test Type MTC Laboratory Rock Core Anchor Pull-Out

Project Number 110773396
Lab ID PO-27

As Received



Core Preparation



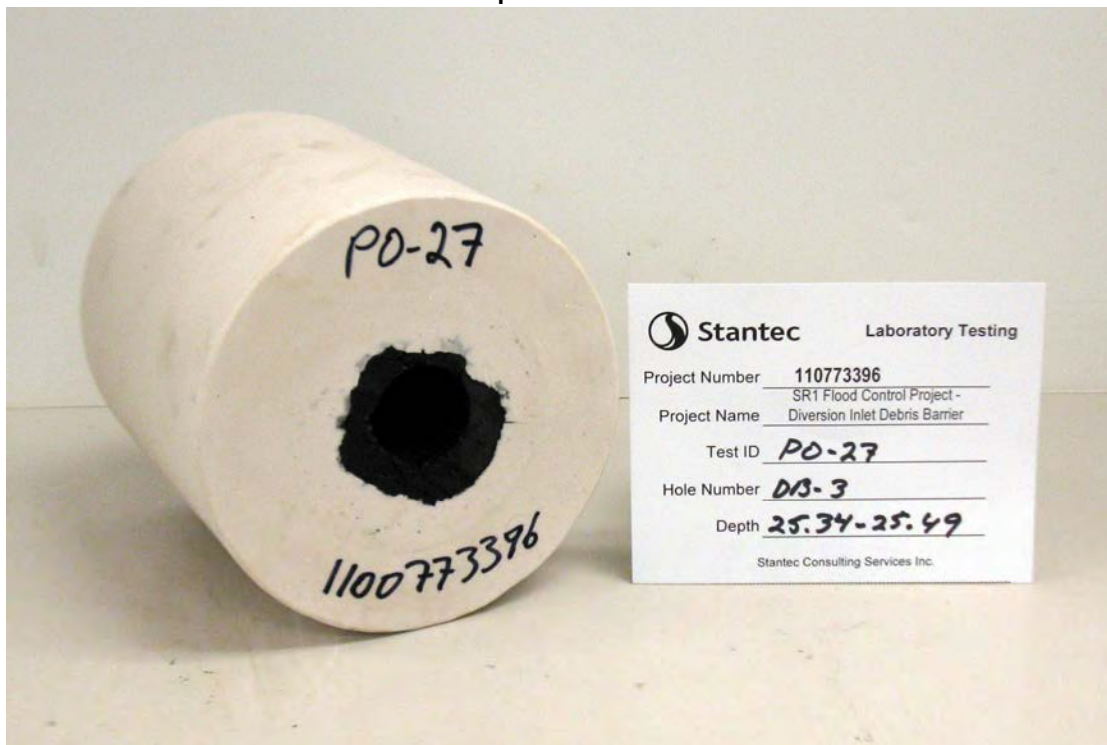


Photo Report

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
 Lithology Coal, black, soft
 Hole Number DB-3 Depth (m) 25.34-25.49
 Test Type MTC Laboratory Rock Core Anchor Pull-Out

Project Number 110773396
 Lab ID PO-27

Specimen Bore



Specimen Grout

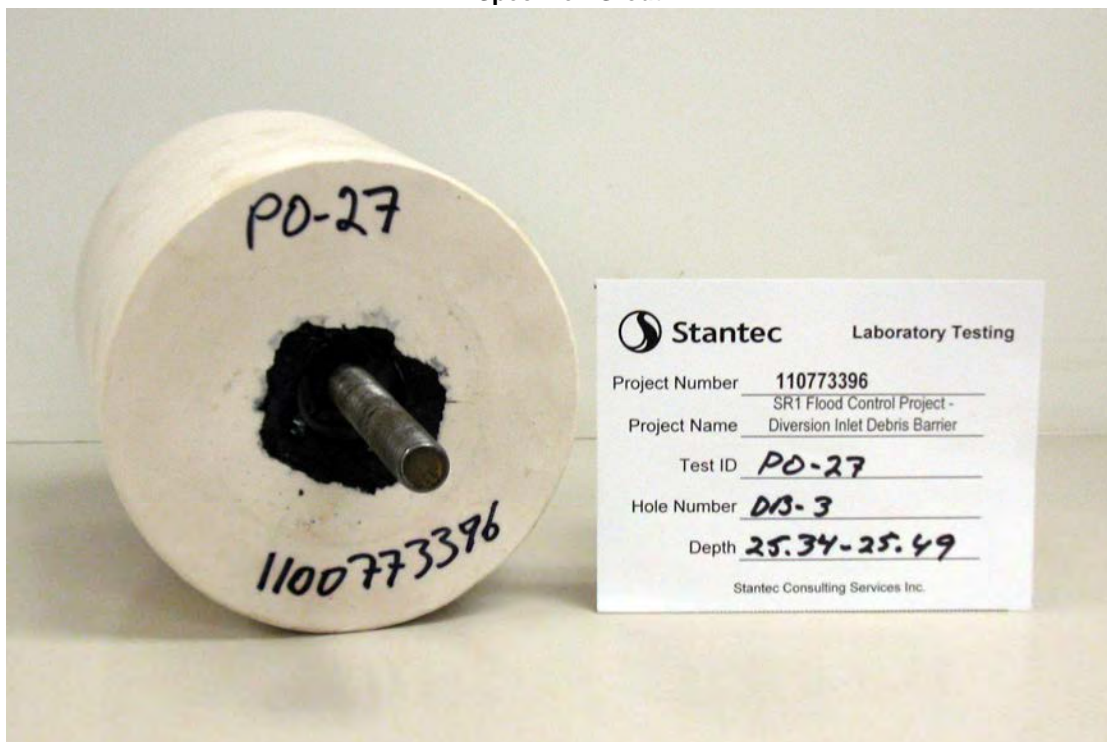




Photo Report

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
Lithology Coal, black, soft
Hole Number DB-3 Depth (m) 25.34-25.49
Test Type MTC Laboratory Rock Core Anchor Pull-Out

Project Number 110773396
Lab ID PO-27

Post Test



Post Test





**MTC Laboratory Rock Core
Anchor Pull-Out Test**

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
 Lithology Claystone, dark brown, moderately hard
 Hole Number DB-3 Depth (m) 28.78-28.93

Project Number 110773396
 Lab ID PO-30
 Date Received 05/15/2018
 Test Date 05/31/2018

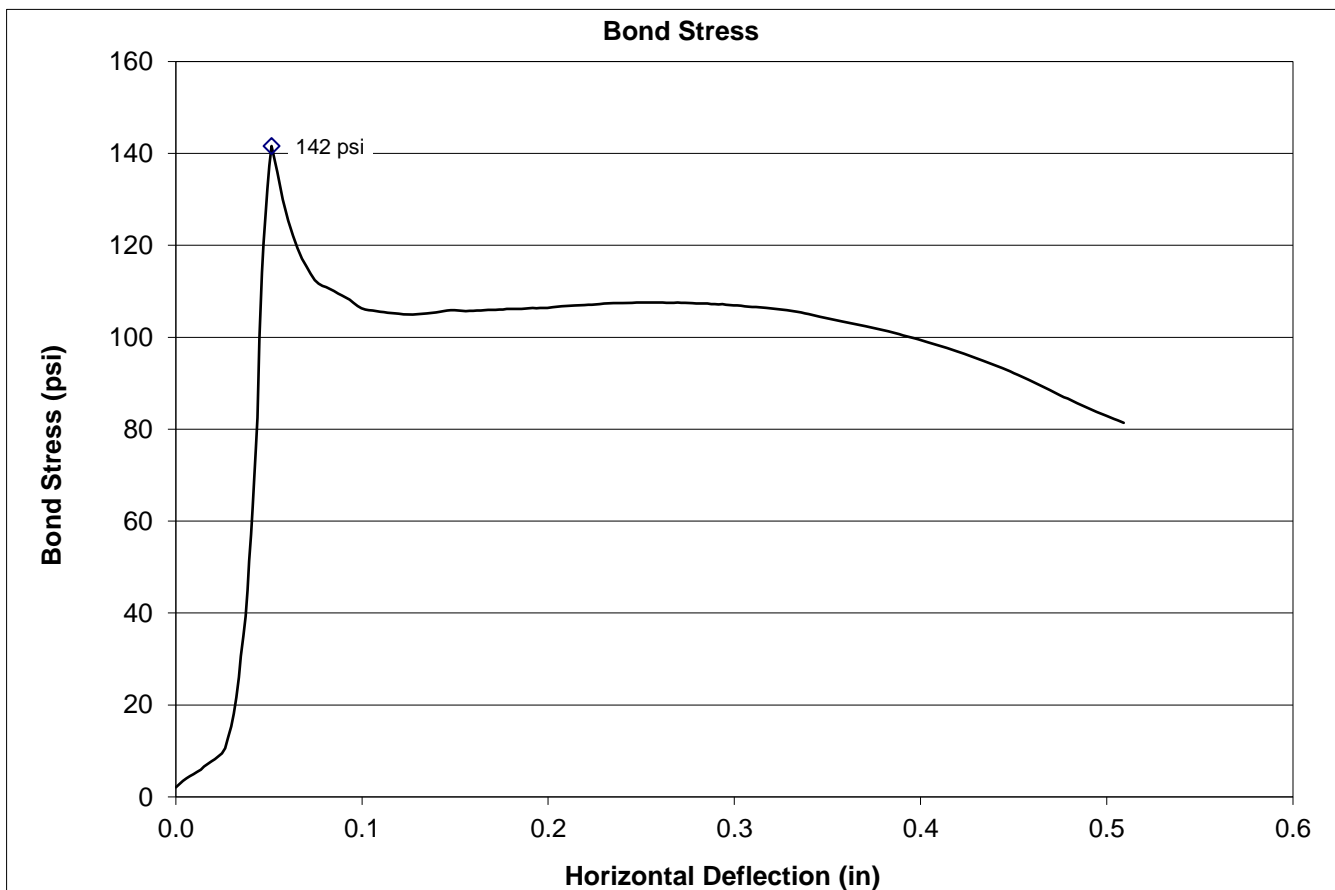
Diameter (in) 2.386 Length (in) 5.985
 Moisture Condition As received, moist

Anchor Bond Interface
 Diameter (in) 1.275
 Length (in) 5.536
 Surface Area (in²) 22.17

Anchor Preparation
 Anchor Type 1/2" diameter threaded rod with 4 nuts
 Grout Type Quikrete Portland Cement, Type I/II

Maximum Load (lbf) 3140
 Maximum Stress (psi) 142
 Load Rate to Peak (lbf/min) 266
 Post Peak Shear Rate (in/min) 0.014
 Length of Intact Pull Out (in) 5.44

Grout Preparation Date 05/24/2018
 Water / Grout Ratio 0.45
 Cure Time (days) 7
 Cube Strength (psi) 7390



Comments _____

Reviewed By RJ

Time (seconds)	Shear Load (lbf)	Horizontal Dial Reading (in)	Compliance Correction (in)	Corrected Dial Reading (in)	Shear Stress (psi)	Horizontal Deflection (in)
0	47	1.0086	0.0004	1.0090	2.1	0.0000
14	62	1.0066	0.0005	1.0071	2.8	0.0019
30	77	1.0046	0.0006	1.0052	3.5	0.0038
44	90	1.0026	0.0007	1.0033	4.1	0.0057
57	100	1.0006	0.0008	1.0014	4.5	0.0076
70	109	0.9986	0.0009	0.9995	4.9	0.0095
84	120	0.9966	0.0010	0.9976	5.4	0.0114
99	131	0.9946	0.0010	0.9956	5.9	0.0133
114	146	0.9926	0.0012	0.9938	6.6	0.0152
153	171	0.9886	0.0014	0.9900	7.7	0.0190
171	182	0.9866	0.0014	0.9880	8.2	0.0209
194	196	0.9846	0.0016	0.9862	8.8	0.0228
213	210	0.9826	0.0017	0.9843	9.5	0.0247
230	235	0.9806	0.0019	0.9825	10.6	0.0265
250	285	0.9786	0.0023	0.9809	12.9	0.0281
268	340	0.9766	0.0027	0.9793	15.3	0.0297
286	401	0.9746	0.0032	0.9778	18.1	0.0312
306	480	0.9726	0.0038	0.9764	21.7	0.0326
328	577	0.9706	0.0046	0.9752	26.0	0.0338
349	679	0.9686	0.0054	0.9740	30.6	0.0350
367	776	0.9666	0.0062	0.9728	35.0	0.0362
384	870	0.9646	0.0069	0.9715	39.2	0.0375
406	996	0.9626	0.0079	0.9705	44.9	0.0385
429	1138	0.9606	0.0090	0.9696	51.3	0.0393
449	1265	0.9586	0.0100	0.9686	57.1	0.0403
468	1396	0.9566	0.0111	0.9677	63.0	0.0413
488	1540	0.9546	0.0122	0.9668	69.5	0.0421
508	1680	0.9526	0.0133	0.9659	75.8	0.0430
528	1828	0.9506	0.0145	0.9651	82.5	0.0439
553	2016	0.9486	0.0160	0.9646	90.9	0.0444
578	2208	0.9466	0.0175	0.9641	99.6	0.0448
621	2528	0.9426	0.0201	0.9627	114.0	0.0463
640	2671	0.9406	0.0212	0.9618	120.5	0.0472
658	2801	0.9386	0.0222	0.9608	126.4	0.0481
676	2932	0.9366	0.0233	0.9599	132.3	0.0491
693	3043	0.9346	0.0242	0.9588	137.3	0.0502
709	3140	0.9326	0.0249	0.9575	141.6	0.0514
719	3014	0.9306	0.0239	0.9545	136.0	0.0544
727	2882	0.9286	0.0229	0.9515	130.0	0.0575
737	2780	0.9266	0.0221	0.9487	125.4	0.0603
747	2707	0.9246	0.0215	0.9461	122.1	0.0629
757	2646	0.9226	0.0210	0.9436	119.4	0.0654
769	2596	0.9206	0.0206	0.9412	117.1	0.0678
780	2559	0.9186	0.0203	0.9389	115.4	0.0701
792	2523	0.9166	0.0200	0.9366	113.8	0.0723
804	2493	0.9146	0.0198	0.9344	112.5	0.0746
816	2475	0.9126	0.0196	0.9322	111.7	0.0767
828	2464	0.9106	0.0196	0.9302	111.2	0.0788
838	2459	0.9086	0.0195	0.9281	110.9	0.0809
847	2449	0.9066	0.0194	0.9260	110.5	0.0829
856	2440	0.9046	0.0194	0.9240	110.1	0.0850
864	2428	0.9026	0.0193	0.9219	109.5	0.0871
872	2418	0.9006	0.0192	0.9198	109.1	0.0892
889	2398	0.8966	0.0190	0.9156	108.2	0.0933
897	2382	0.8946	0.0189	0.9135	107.5	0.0955
905	2367	0.8926	0.0188	0.9114	106.8	0.0976
914	2357	0.8906	0.0187	0.9093	106.3	0.0997
923	2351	0.8886	0.0187	0.9073	106.1	0.1017
931	2348	0.8866	0.0186	0.9052	105.9	0.1037
939	2345	0.8846	0.0186	0.9032	105.8	0.1058
947	2342	0.8826	0.0186	0.9012	105.7	0.1078
955	2340	0.8806	0.0186	0.8992	105.6	0.1098
964	2338	0.8786	0.0186	0.8972	105.5	0.1118
972	2335	0.8766	0.0185	0.8951	105.3	0.1138
981	2333	0.8746	0.0185	0.8931	105.2	0.1159
989	2332	0.8726	0.0185	0.8911	105.2	0.1179
997	2330	0.8706	0.0185	0.8891	105.1	0.1199
1006	2327	0.8686	0.0185	0.8871	105.0	0.1219
1014	2326	0.8666	0.0185	0.8851	104.9	0.1239
1023	2327	0.8646	0.0185	0.8831	105.0	0.1259
1031	2327	0.8626	0.0185	0.8811	105.0	0.1279
1040	2327	0.8606	0.0185	0.8791	105.0	0.1299
1048	2328	0.8586	0.0185	0.8771	105.0	0.1319
1056	2330	0.8566	0.0185	0.8751	105.1	0.1339
1065	2333	0.8546	0.0185	0.8731	105.2	0.1359
1082	2337	0.8506	0.0185	0.8691	105.4	0.1398
1090	2340	0.8486	0.0186	0.8672	105.6	0.1418
1098	2342	0.8466	0.0186	0.8652	105.7	0.1438
1107	2345	0.8446	0.0186	0.8632	105.8	0.1458
1115	2347	0.8426	0.0186	0.8612	105.9	0.1477
1123	2347	0.8406	0.0186	0.8592	105.9	0.1497
1132	2346	0.8386	0.0186	0.8572	105.8	0.1518
1140	2344	0.8366	0.0186	0.8552	105.7	0.1538
1149	2343	0.8346	0.0186	0.8532	105.7	0.1558
1157	2344	0.8326	0.0186	0.8512	105.7	0.1578

	Shear	Horizontal	Compliance	Corrected	Shear	Horizontal
1166	2344	0.8306	0.0186	0.8492	105.7	0.1598
1174	2346	0.8286	0.0186	0.8472	105.8	0.1618
1183	2346	0.8266	0.0186	0.8452	105.8	0.1638
1191	2348	0.8246	0.0186	0.8432	105.9	0.1657
1199	2349	0.8226	0.0186	0.8412	106.0	0.1677
1208	2349	0.8206	0.0186	0.8392	106.0	0.1697
1217	2349	0.8186	0.0186	0.8372	106.0	0.1717
1225	2351	0.8166	0.0187	0.8353	106.1	0.1737
1234	2351	0.8146	0.0187	0.8333	106.1	0.1757
1243	2353	0.8126	0.0187	0.8313	106.1	0.1777
1251	2353	0.8106	0.0187	0.8293	106.1	0.1797
1260	2354	0.8086	0.0187	0.8273	106.2	0.1817
1277	2353	0.8046	0.0187	0.8233	106.1	0.1857
1285	2355	0.8026	0.0187	0.8213	106.2	0.1877
1293	2356	0.8006	0.0187	0.8193	106.3	0.1897
1302	2358	0.7986	0.0187	0.8173	106.4	0.1917
1310	2357	0.7966	0.0187	0.8153	106.3	0.1937
1319	2358	0.7946	0.0187	0.8133	106.4	0.1957
1327	2358	0.7926	0.0187	0.8113	106.4	0.1977
1336	2358	0.7906	0.0187	0.8093	106.4	0.1997
1345	2360	0.7886	0.0187	0.8073	106.5	0.2016
1353	2362	0.7866	0.0187	0.8053	106.6	0.2036
1362	2365	0.7846	0.0188	0.8034	106.7	0.2056
1370	2367	0.7826	0.0188	0.8014	106.8	0.2076
1379	2369	0.7806	0.0188	0.7994	106.9	0.2096
1388	2369	0.7786	0.0188	0.7974	106.9	0.2116
1396	2369	0.7766	0.0188	0.7954	106.9	0.2136
1405	2370	0.7746	0.0188	0.7934	106.9	0.2156
1413	2370	0.7726	0.0188	0.7914	106.9	0.2176
1422	2372	0.7706	0.0188	0.7894	107.0	0.2195
1430	2374	0.7686	0.0188	0.7874	107.1	0.2215
1439	2374	0.7666	0.0188	0.7854	107.1	0.2235
1448	2375	0.7646	0.0189	0.7835	107.1	0.2255
1456	2377	0.7626	0.0189	0.7815	107.2	0.2275
1472	2381	0.7586	0.0189	0.7775	107.4	0.2315
1481	2381	0.7566	0.0189	0.7755	107.4	0.2335
1489	2381	0.7546	0.0189	0.7735	107.4	0.2355
1498	2381	0.7526	0.0189	0.7715	107.4	0.2375
1506	2381	0.7506	0.0189	0.7695	107.4	0.2395
1515	2381	0.7486	0.0189	0.7675	107.4	0.2415
1524	2383	0.7466	0.0189	0.7655	107.5	0.2435
1532	2384	0.7446	0.0189	0.7635	107.5	0.2455
1540	2384	0.7426	0.0189	0.7615	107.5	0.2475
1549	2384	0.7406	0.0189	0.7595	107.5	0.2495
1557	2385	0.7386	0.0189	0.7575	107.6	0.2514
1565	2385	0.7366	0.0189	0.7555	107.6	0.2534
1574	2385	0.7346	0.0189	0.7535	107.6	0.2554
1582	2385	0.7326	0.0189	0.7515	107.6	0.2574
1590	2385	0.7306	0.0189	0.7495	107.6	0.2594
1598	2384	0.7286	0.0189	0.7475	107.5	0.2615
1607	2383	0.7266	0.0189	0.7455	107.5	0.2635
1615	2383	0.7246	0.0189	0.7435	107.5	0.2655
1624	2383	0.7226	0.0189	0.7415	107.5	0.2675
1632	2384	0.7206	0.0189	0.7395	107.5	0.2695
1640	2383	0.7186	0.0189	0.7375	107.5	0.2715
1648	2382	0.7166	0.0189	0.7355	107.5	0.2735
1665	2381	0.7126	0.0189	0.7315	107.4	0.2775
1673	2380	0.7106	0.0189	0.7295	107.4	0.2795
1682	2380	0.7086	0.0189	0.7275	107.4	0.2815
1690	2379	0.7066	0.0189	0.7255	107.3	0.2835
1698	2380	0.7046	0.0189	0.7235	107.4	0.2855
1707	2376	0.7026	0.0189	0.7215	107.2	0.2875
1715	2376	0.7006	0.0189	0.7195	107.2	0.2895
1724	2375	0.6986	0.0189	0.7175	107.1	0.2915
1732	2376	0.6966	0.0189	0.7155	107.2	0.2935
1740	2373	0.6946	0.0188	0.7134	107.0	0.2955
1749	2372	0.6926	0.0188	0.7114	107.0	0.2975
1757	2371	0.6906	0.0188	0.7094	107.0	0.2996
1766	2371	0.6886	0.0188	0.7074	107.0	0.3016
1774	2369	0.6866	0.0188	0.7054	106.9	0.3036
1782	2366	0.6846	0.0188	0.7034	106.7	0.3056
1790	2365	0.6826	0.0188	0.7014	106.7	0.3076
1799	2363	0.6806	0.0188	0.6994	106.6	0.3096
1807	2362	0.6786	0.0187	0.6973	106.6	0.3116
1816	2361	0.6766	0.0187	0.6953	106.5	0.3136
1824	2359	0.6746	0.0187	0.6933	106.4	0.3156
1832	2357	0.6726	0.0187	0.6913	106.3	0.3177
1841	2357	0.6706	0.0187	0.6893	106.3	0.3197
1857	2353	0.6666	0.0187	0.6853	106.1	0.3237
1866	2350	0.6646	0.0187	0.6833	106.0	0.3257
1875	2348	0.6626	0.0186	0.6812	105.9	0.3277
1883	2344	0.6606	0.0186	0.6792	105.7	0.3298
1891	2342	0.6586	0.0186	0.6772	105.7	0.3318
1899	2339	0.6566	0.0186	0.6752	105.5	0.3338
1908	2337	0.6546	0.0185	0.6731	105.4	0.3358
1916	2332	0.6526	0.0185	0.6711	105.2	0.3379
1924	2329	0.6506	0.0185	0.6691	105.1	0.3399

	Shear	Horizontal	Compliance	Corrected	Shear	Horizontal
1933	2325	0.6486	0.0185	0.6671	104.9	0.3419
1942	2320	0.6466	0.0184	0.6650	104.7	0.3440
1950	2316	0.6446	0.0184	0.6630	104.5	0.3460
1958	2312	0.6426	0.0184	0.6610	104.3	0.3480
1966	2307	0.6406	0.0183	0.6589	104.1	0.3501
1975	2304	0.6386	0.0183	0.6569	103.9	0.3521
1983	2300	0.6366	0.0183	0.6549	103.8	0.3541
1991	2296	0.6346	0.0182	0.6528	103.6	0.3561
1999	2292	0.6326	0.0182	0.6508	103.4	0.3582
2008	2288	0.6306	0.0182	0.6488	103.2	0.3602
2016	2285	0.6286	0.0181	0.6467	103.1	0.3622
2024	2281	0.6266	0.0181	0.6447	102.9	0.3643
2032	2278	0.6246	0.0181	0.6427	102.8	0.3663
2050	2270	0.6206	0.0180	0.6386	102.4	0.3704
2059	2266	0.6186	0.0180	0.6366	102.2	0.3724
2067	2263	0.6166	0.0180	0.6346	102.1	0.3744
2076	2259	0.6146	0.0179	0.6325	101.9	0.3764
2083	2255	0.6126	0.0179	0.6305	101.7	0.3785
2092	2250	0.6106	0.0179	0.6285	101.5	0.3805
2100	2245	0.6086	0.0178	0.6264	101.3	0.3826
2109	2240	0.6066	0.0178	0.6244	101.0	0.3846
2117	2236	0.6046	0.0177	0.6223	100.9	0.3866
2125	2231	0.6026	0.0177	0.6203	100.6	0.3887
2133	2225	0.6006	0.0177	0.6183	100.4	0.3907
2142	2220	0.5986	0.0176	0.6162	100.1	0.3928
2150	2216	0.5966	0.0176	0.6142	100.0	0.3948
2158	2212	0.5946	0.0176	0.6122	99.8	0.3968
2167	2207	0.5926	0.0175	0.6101	99.6	0.3989
2175	2201	0.5906	0.0175	0.6081	99.3	0.4009
2183	2196	0.5886	0.0174	0.6060	99.1	0.4029
2191	2190	0.5866	0.0174	0.6040	98.8	0.4050
2200	2184	0.5846	0.0173	0.6019	98.5	0.4070
2208	2179	0.5826	0.0173	0.5999	98.3	0.4091
2216	2173	0.5806	0.0172	0.5978	98.0	0.4111
2224	2168	0.5786	0.0172	0.5958	97.8	0.4132
2242	2156	0.5746	0.0171	0.5917	97.3	0.4173
2250	2150	0.5726	0.0171	0.5897	97.0	0.4193
2258	2144	0.5706	0.0170	0.5876	96.7	0.4214
2266	2137	0.5686	0.0170	0.5856	96.4	0.4234
2275	2131	0.5666	0.0169	0.5835	96.1	0.4255
2283	2125	0.5646	0.0169	0.5815	95.9	0.4275
2291	2118	0.5626	0.0168	0.5794	95.5	0.4296
2299	2109	0.5606	0.0167	0.5773	95.1	0.4316
2308	2102	0.5586	0.0167	0.5753	94.8	0.4337
2316	2095	0.5566	0.0166	0.5732	94.5	0.4357
2324	2089	0.5546	0.0166	0.5712	94.2	0.4378
2333	2082	0.5526	0.0165	0.5691	93.9	0.4398
2341	2075	0.5506	0.0165	0.5671	93.6	0.4419
2349	2068	0.5486	0.0164	0.5650	93.3	0.4440
2357	2060	0.5466	0.0164	0.5630	92.9	0.4460
2365	2052	0.5446	0.0163	0.5609	92.6	0.4481
2374	2043	0.5426	0.0162	0.5588	92.2	0.4502
2382	2035	0.5406	0.0162	0.5568	91.8	0.4522
2390	2027	0.5386	0.0161	0.5547	91.4	0.4543
2399	2018	0.5366	0.0160	0.5526	91.0	0.4564
2407	2009	0.5346	0.0159	0.5505	90.6	0.4584
2415	2002	0.5326	0.0159	0.5485	90.3	0.4605
2431	1984	0.5286	0.0157	0.5443	89.5	0.4646
2439	1974	0.5266	0.0157	0.5423	89.0	0.4667
2447	1965	0.5246	0.0156	0.5402	88.6	0.4688
2455	1956	0.5226	0.0155	0.5381	88.2	0.4708
2464	1946	0.5206	0.0154	0.5360	87.8	0.4729
2472	1937	0.5186	0.0154	0.5340	87.4	0.4750
2480	1928	0.5166	0.0153	0.5319	87.0	0.4771
2488	1921	0.5146	0.0152	0.5298	86.7	0.4791
2497	1911	0.5126	0.0152	0.5278	86.2	0.4812
2505	1903	0.5106	0.0151	0.5257	85.8	0.4833
2513	1895	0.5086	0.0150	0.5236	85.5	0.4853
2521	1886	0.5066	0.0150	0.5216	85.1	0.4874
2530	1877	0.5046	0.0149	0.5195	84.7	0.4895
2538	1868	0.5026	0.0148	0.5174	84.3	0.4915
2546	1860	0.5006	0.0148	0.5154	83.9	0.4936
2555	1853	0.4986	0.0147	0.5133	83.6	0.4957
2563	1845	0.4966	0.0146	0.5112	83.2	0.4977
2572	1838	0.4946	0.0146	0.5092	82.9	0.4998
2580	1830	0.4926	0.0145	0.5071	82.6	0.5018
2588	1823	0.4906	0.0145	0.5051	82.2	0.5039
2596	1816	0.4886	0.0144	0.5030	81.9	0.5060
2605	1808	0.4866	0.0144	0.5010	81.6	0.5080
2609	1804	0.4856	0.0143	0.4999	81.4	0.5091



Photo Report

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
Lithology Claystone, dark brown, moderately hard
Hole Number DB-3 Depth (m) 28.78-28.93
Test Type MTC Laboratory Rock Core Anchor Pull-Out

Project Number 110773396
Lab ID PO-30

As Received



Core Preparation



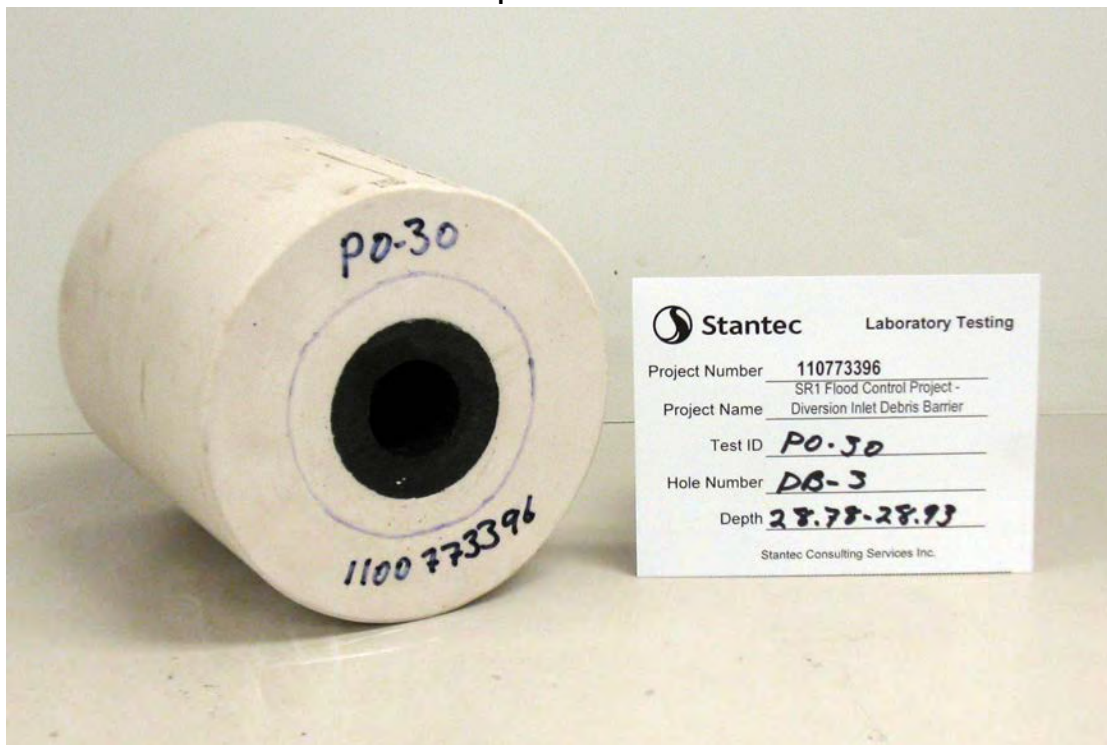


Photo Report

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
 Lithology Claystone, dark brown, moderately hard
 Hole Number DB-3 Depth (m) 28.78-28.93
 Test Type MTC Laboratory Rock Core Anchor Pull-Out

Project Number 110773396
 Lab ID PO-30

Specimen Bore



Specimen Grout

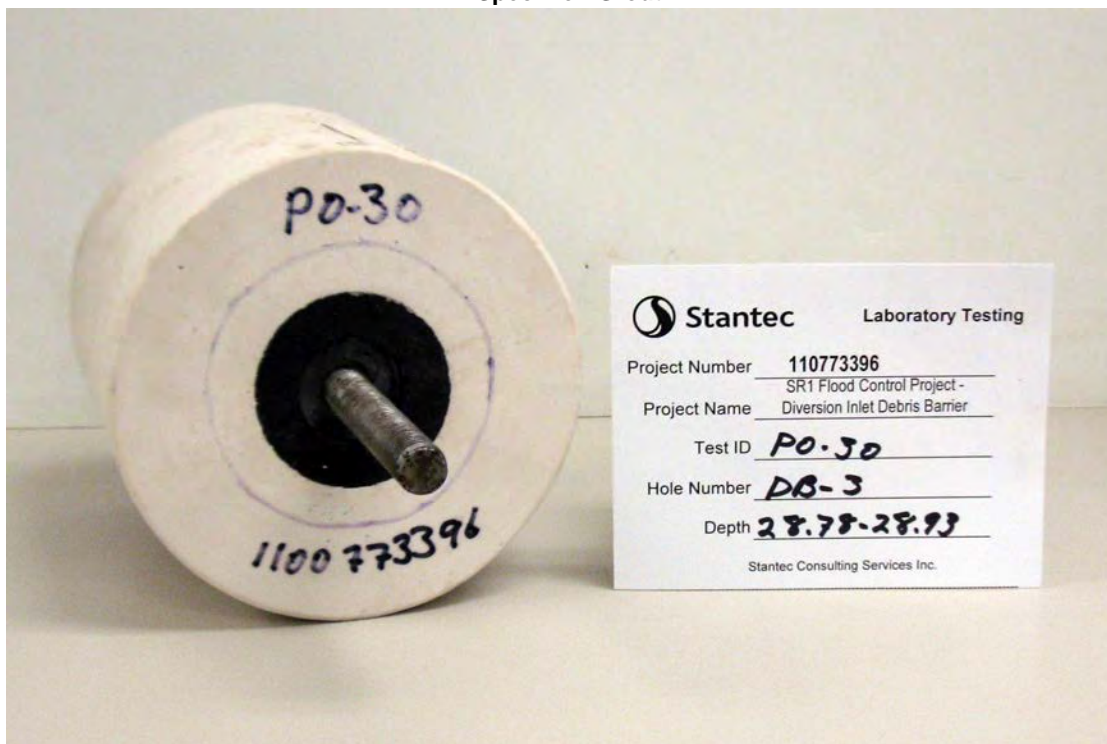




Photo Report

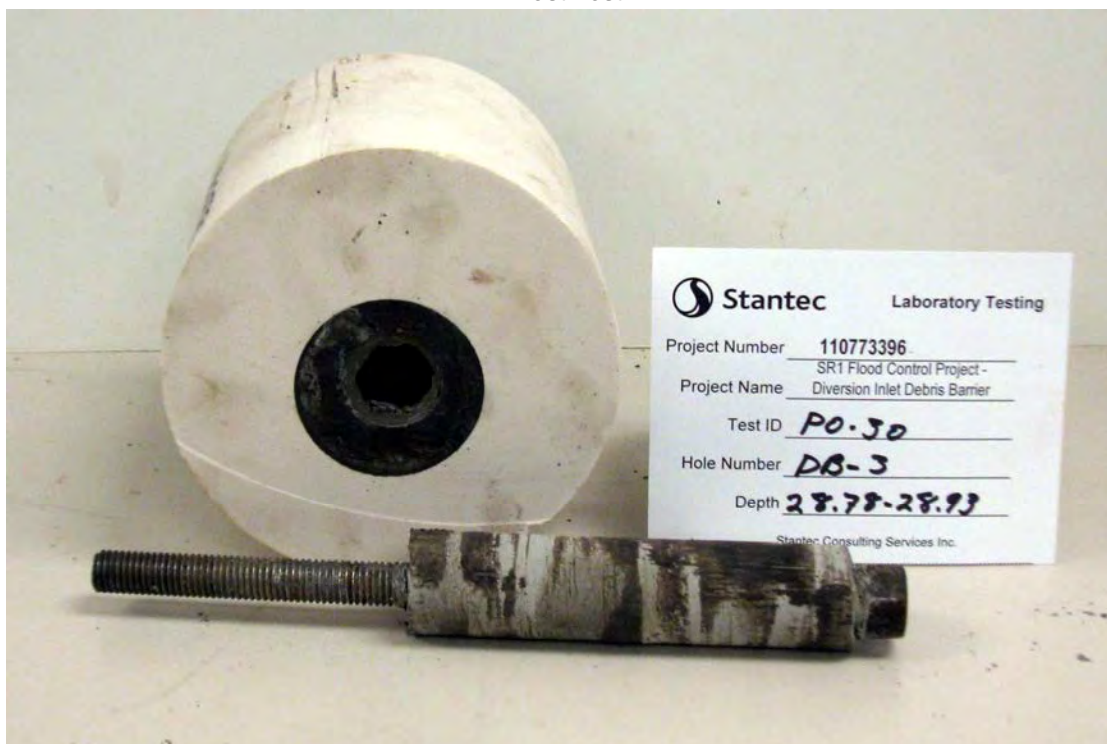
Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
 Lithology Claystone, dark brown, moderately hard
 Hole Number DB-3 Depth (m) 28.78-28.93
 Test Type MTC Laboratory Rock Core Anchor Pull-Out

Project Number 110773396
 Lab ID PO-30

Post Test



Post Test



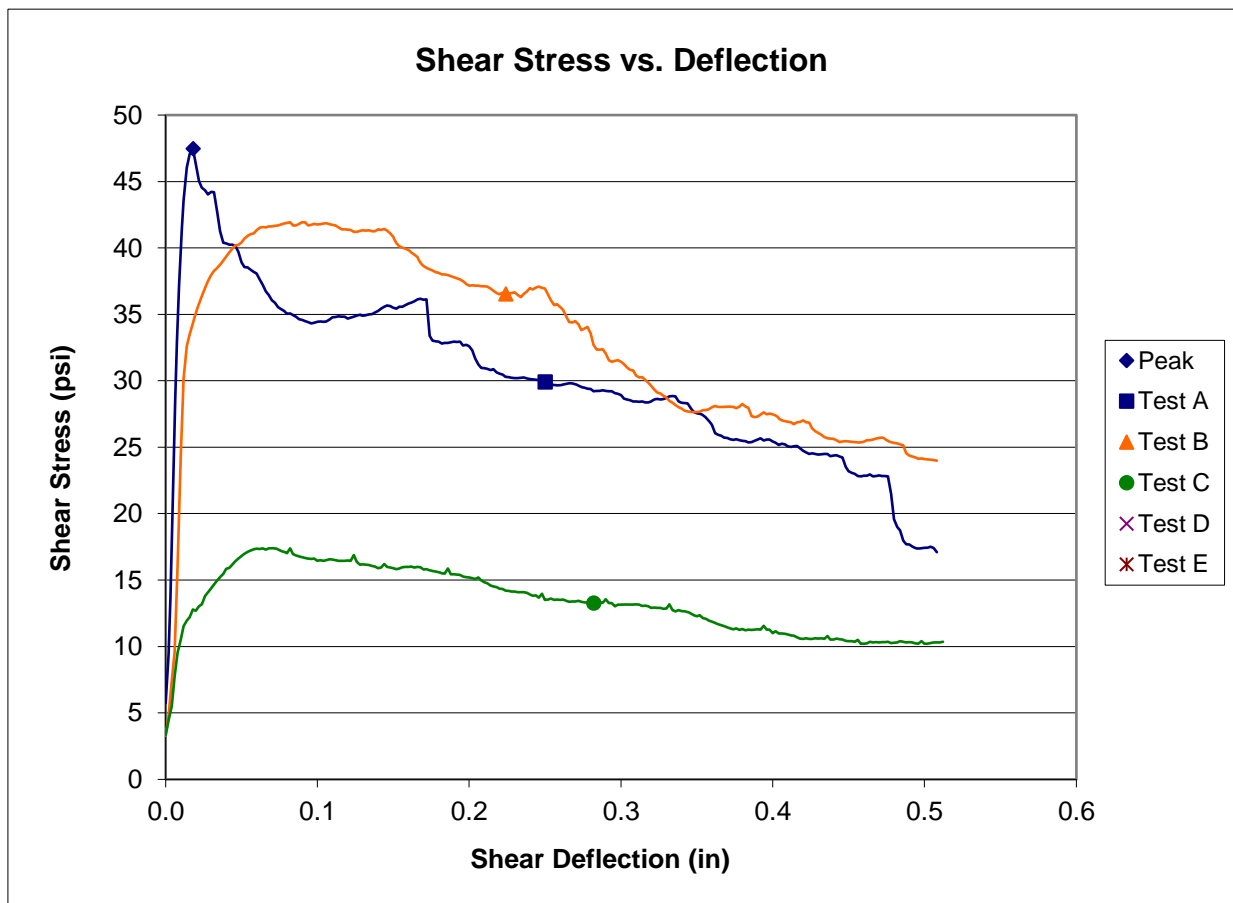
2018 Rock Testing Results
Direct Shear



Direct Shear Strength of Rock
ASTM D 5607

Project Name	<u>SR1 Flood Control Project - Inlet Debris Barrier</u>	Project Number	<u>110773396</u>
Lithology	<u>Shale, gray, moderately hard, partially healed faults</u>	Lab ID	<u>DSNF-9</u>
Hole Number	<u>DB-1</u>	Depth (m)	<u>24.16</u>
Test Type	<u>Direct shear of natural fracture</u>	Date Received	<u>05/15/2018</u>
Initial Moisture Condition	<u>As received, moist</u>	Diameter (in.)	<u>2.398</u>
At Test Moisture Condition	<u>Soaked at least 12 hours prior to test.</u>	Angle of Dip (deg.)	<u>14.7</u>
Roughness (JRC)	<u>14</u>	Area (in ²)	<u>4.67</u>

	<u>Test A</u>	<u>Test B</u>	<u>Test C</u>	<u>Test D</u>	<u>Test E</u>
Normal Stress (psi)	62.0	94.0	36.0	N/A	N/A
Peak Shear Stress (psi)	47.5				
Deflection at Peak (in)	0.0180				
Post Peak Stress (psi)	29.9	36.5	13.3	N/A	N/A
Deflection at Residual (in)	0.2500	0.2240	0.2820	N/A	N/A



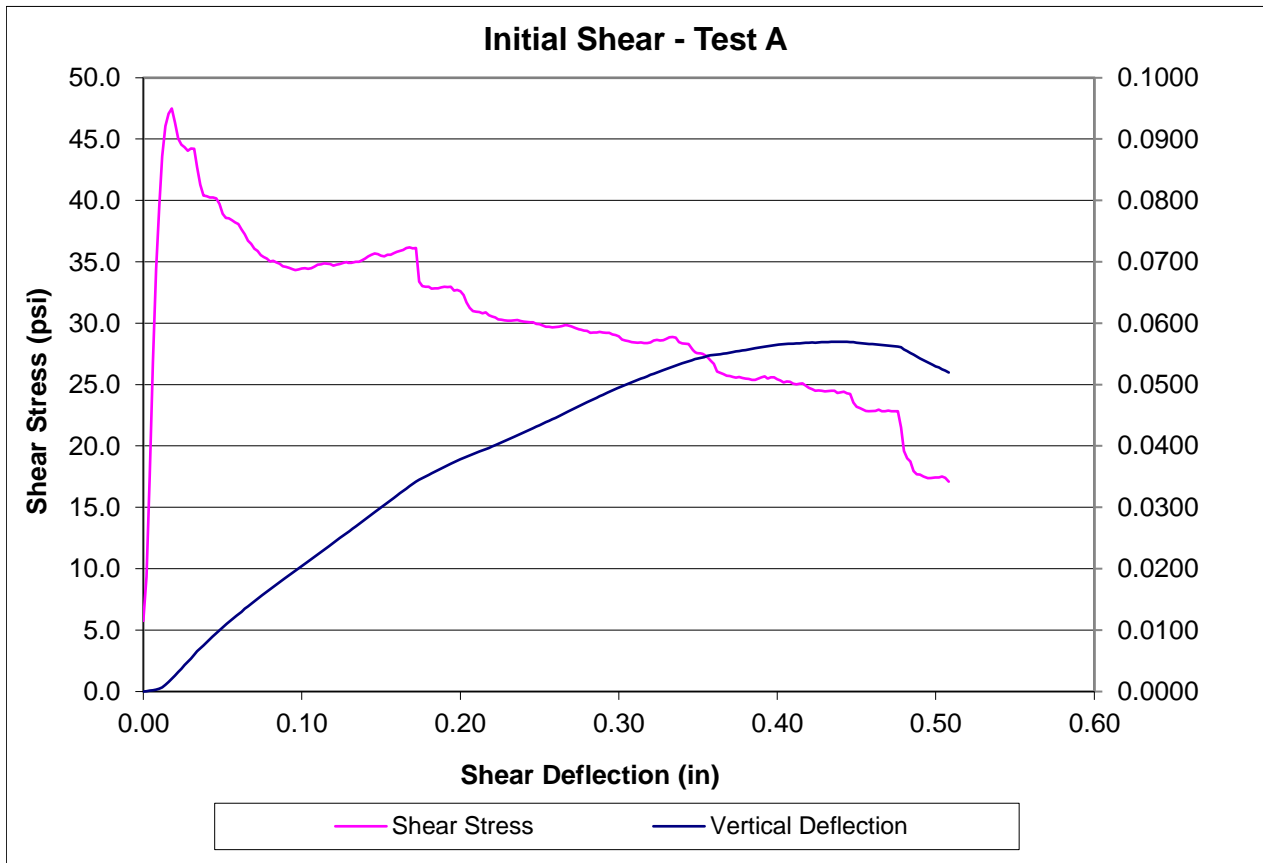
Comments Secured partially healed fault with tape for preparation.

Reviewed By RJ

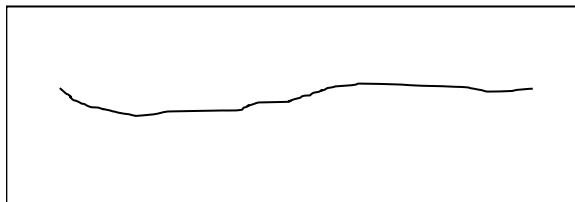


Direct Shear Strength of Rock
ASTM D 5607

Project Name	<u>SR1 Flood Control Project - Inlet Debris Barrier</u>	Project Number	<u>110773396</u>
Lithology	<u>Shale, gray, moderately hard, partially healed faults</u>	Lab ID	<u>DSNF-9</u>
Hole Number	<u>DB-1</u>	Date Received	<u>05/15/2018</u>
Depth (m)	<u>24.16</u>		
Test Type	<u>Direct shear of natural fracture</u>	Diameter (in)	<u>2.398</u>
Initial Moisture Condition	<u>As received, moist</u>	Angle of Dip (deg)	<u>14.7</u>
Test Moisture Condition	<u>Soaked at least 12 hours prior to test.</u>	Area(in ²)	<u>4.67</u>
Joint Roughness	<u>14</u>		
		Date Prepared	<u>06/26/2018</u>
Normal Stress (psi)	<u>62</u>	Date Tested	<u>06/27/2018</u>



Sketch



Shear Rate to Peak (in/min) 0.007

Encapsulation Material Hydro-Stone

Comments _____

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
0.0	1.0017	0.2534	0.2517	0.2509	0.2569	27	0.0000	0.0000	5.8
28.0	0.9997	0.2535	0.2518	0.2506	0.2573	44	0.0020	0.0001	9.4
45.0	0.9977	0.2535	0.2519	0.2503	0.2578	82	0.0040	0.0001	17.5
69.0	0.9957	0.2535	0.2520	0.2500	0.2583	125	0.0060	0.0002	26.8
86.0	0.9937	0.2535	0.2522	0.2498	0.2587	161	0.0080	0.0003	34.4
102.0	0.9917	0.2537	0.2524	0.2497	0.2590	185	0.0100	0.0005	39.6
118.0	0.9897	0.2539	0.2526	0.2496	0.2596	204	0.0120	0.0007	43.6
133.0	0.9877	0.2543	0.2530	0.2498	0.2602	215	0.0140	0.0011	46.0
148.0	0.9857	0.2548	0.2534	0.2500	0.2610	220	0.0160	0.0016	47.0
162.0	0.9837	0.2554	0.2539	0.2503	0.2617	222	0.0180	0.0021	47.5
175.0	0.9817	0.2559	0.2544	0.2508	0.2623	216	0.0200	0.0026	46.3
188.0	0.9797	0.2565	0.2550	0.2513	0.2629	210	0.0220	0.0032	45.0
202.0	0.9777	0.2570	0.2555	0.2517	0.2635	208	0.0240	0.0037	44.5
216.0	0.9757	0.2576	0.2561	0.2523	0.2641	207	0.0260	0.0043	44.3
230.0	0.9737	0.2581	0.2567	0.2527	0.2647	206	0.0280	0.0048	44.0
244.0	0.9717	0.2587	0.2572	0.2532	0.2653	206	0.0300	0.0054	44.2
257.0	0.9697	0.2593	0.2578	0.2538	0.2659	206	0.0320	0.0060	44.2
271.0	0.9677	0.2599	0.2584	0.2543	0.2665	199	0.0340	0.0065	42.7
284.0	0.9657	0.2604	0.2589	0.2548	0.2670	193	0.0360	0.0071	41.3
298.0	0.9637	0.2609	0.2594	0.2552	0.2675	189	0.0380	0.0075	40.4
311.0	0.9617	0.2614	0.2599	0.2557	0.2681	188	0.0400	0.0081	40.3
325.0	0.9597	0.2619	0.2604	0.2562	0.2686	188	0.0420	0.0085	40.2
339.0	0.9577	0.2623	0.2609	0.2566	0.2691	188	0.0440	0.0090	40.2
352.0	0.9557	0.2628	0.2614	0.2571	0.2696	187	0.0460	0.0095	40.2
366.0	0.9537	0.2633	0.2619	0.2576	0.2701	185	0.0480	0.0100	39.7
379.0	0.9517	0.2637	0.2624	0.2580	0.2706	182	0.0500	0.0105	38.9
393.0	0.9497	0.2642	0.2628	0.2584	0.2711	180	0.0520	0.0109	38.6
406.0	0.9477	0.2646	0.2632	0.2588	0.2716	180	0.0540	0.0113	38.5
420.0	0.9457	0.2650	0.2637	0.2592	0.2720	179	0.0560	0.0117	38.4
433.0	0.9437	0.2654	0.2641	0.2596	0.2725	178	0.0580	0.0122	38.2
447.0	0.9417	0.2658	0.2646	0.2600	0.2729	178	0.0600	0.0126	38.1
460.0	0.9397	0.2662	0.2650	0.2604	0.2733	176	0.0620	0.0130	37.6
474.0	0.9377	0.2666	0.2655	0.2609	0.2738	174	0.0640	0.0135	37.2
487.0	0.9357	0.2670	0.2659	0.2613	0.2742	171	0.0660	0.0139	36.7
500.0	0.9337	0.2673	0.2664	0.2617	0.2746	170	0.0680	0.0143	36.5
514.0	0.9317	0.2677	0.2669	0.2621	0.2750	168	0.0700	0.0147	36.1
528.0	0.9297	0.2680	0.2673	0.2625	0.2755	168	0.0720	0.0151	35.9
541.0	0.9277	0.2683	0.2678	0.2629	0.2759	166	0.0740	0.0155	35.5
554.0	0.9257	0.2686	0.2682	0.2633	0.2763	165	0.0760	0.0159	35.4
567.0	0.9237	0.2690	0.2687	0.2636	0.2767	165	0.0780	0.0163	35.3
580.0	0.9217	0.2693	0.2691	0.2640	0.2771	164	0.0800	0.0166	35.0
593.0	0.9197	0.2696	0.2696	0.2643	0.2775	164	0.0820	0.0170	35.1
607.0	0.9177	0.2699	0.2700	0.2647	0.2779	163	0.0840	0.0174	34.9
620.0	0.9157	0.2702	0.2705	0.2651	0.2783	163	0.0860	0.0178	34.8
634.0	0.9137	0.2706	0.2709	0.2654	0.2788	162	0.0880	0.0182	34.6
647.0	0.9117	0.2708	0.2713	0.2658	0.2792	161	0.0900	0.0186	34.6
660.0	0.9097	0.2712	0.2718	0.2661	0.2796	161	0.0920	0.0190	34.5
674.0	0.9077	0.2715	0.2722	0.2665	0.2800	161	0.0940	0.0193	34.4
687.0	0.9057	0.2718	0.2727	0.2668	0.2804	160	0.0960	0.0197	34.3
701.0	0.9037	0.2721	0.2731	0.2672	0.2808	160	0.0980	0.0201	34.4
714.0	0.9017	0.2724	0.2736	0.2675	0.2812	161	0.1000	0.0205	34.5
727.0	0.8997	0.2727	0.2740	0.2679	0.2816	161	0.1020	0.0208	34.5
741.0	0.8977	0.2730	0.2744	0.2682	0.2820	161	0.1040	0.0212	34.4
754.0	0.8957	0.2734	0.2748	0.2686	0.2824	161	0.1060	0.0216	34.5
767.0	0.8937	0.2737	0.2753	0.2690	0.2828	162	0.1080	0.0220	34.6
781.0	0.8917	0.2740	0.2757	0.2693	0.2832	162	0.1100	0.0223	34.8
793.0	0.8897	0.2743	0.2761	0.2697	0.2836	162	0.1120	0.0227	34.8
807.0	0.8877	0.2746	0.2765	0.2701	0.2839	163	0.1140	0.0231	34.9
820.0	0.8857	0.2749	0.2770	0.2704	0.2843	163	0.1160	0.0234	34.8
833.0	0.8837	0.2753	0.2774	0.2708	0.2847	163	0.1180	0.0238	34.8
847.0	0.8817	0.2756	0.2778	0.2712	0.2851	162	0.1200	0.0242	34.7
860.0	0.8797	0.2759	0.2783	0.2716	0.2855	162	0.1220	0.0246	34.8
873.0	0.8777	0.2763	0.2787	0.2720	0.2859	163	0.1240	0.0250	34.8
887.0	0.8757	0.2766	0.2792	0.2723	0.2863	163	0.1260	0.0254	34.9
900.0	0.8737	0.2769	0.2796	0.2727	0.2867	163	0.1280	0.0257	35.0
913.0	0.8717	0.2772	0.2800	0.2731	0.2871	163	0.1300	0.0261	34.9
926.0	0.8697	0.2775	0.2805	0.2735	0.2875	163	0.1320	0.0265	34.9
939.0	0.8677	0.2779	0.2809	0.2738	0.2879	163	0.1340	0.0269	35.0
952.0	0.8657	0.2782	0.2813	0.2742	0.2882	163	0.1360	0.0273	35.0
965.0	0.8637	0.2785	0.2818	0.2746	0.2886	164	0.1380	0.0277	35.1
978.0	0.8617	0.2788	0.2822	0.2750	0.2891	165	0.1400	0.0281	35.3
991.0	0.8597	0.2792	0.2827	0.2754	0.2894	165	0.1420	0.0285	35.4
1005.0	0.8577	0.2795	0.2831	0.2757	0.2898	166	0.1440	0.0288	35.6
1018.0	0.8557	0.2798	0.2836	0.2761	0.2902	167	0.1460	0.0292	35.7
1031.0	0.8537	0.2802	0.2840	0.2765	0.2906	166	0.1480	0.0296	35.6
1044.0	0.8517	0.2805	0.2844	0.2769	0.2910	166	0.1500	0.0300	35.5
1057.0	0.8497	0.2809	0.2849	0.2773	0.2914	165	0.1520	0.0304	35.4
1071.0	0.8477	0.2812	0.2853	0.2777	0.2918	166	0.1540	0.0308	35.6
1084.0	0.8457	0.2815	0.2858	0.2780	0.2922	166	0.1560	0.0312	35.6

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
1097.0	0.8437	0.2818	0.2862	0.2784	0.2926	167	0.1580	0.0315	35.7
1110.0	0.8417	0.2821	0.2866	0.2788	0.2930	167	0.1600	0.0319	35.8
1123.0	0.8397	0.2825	0.2870	0.2792	0.2934	168	0.1620	0.0323	35.9
1136.0	0.8377	0.2828	0.2875	0.2795	0.2938	168	0.1640	0.0327	36.0
1149.0	0.8357	0.2831	0.2879	0.2799	0.2942	169	0.1660	0.0331	36.1
1163.0	0.8337	0.2834	0.2884	0.2803	0.2946	169	0.1680	0.0335	36.2
1176.0	0.8317	0.2838	0.2888	0.2806	0.2950	169	0.1700	0.0338	36.1
1189.0	0.8297	0.2841	0.2892	0.2810	0.2954	169	0.1720	0.0342	36.1
1202.0	0.8277	0.2844	0.2895	0.2814	0.2956	156	0.1740	0.0345	33.4
1215.0	0.8257	0.2846	0.2898	0.2817	0.2958	154	0.1760	0.0348	33.0
1227.0	0.8237	0.2848	0.2901	0.2819	0.2961	154	0.1780	0.0350	33.0
1241.0	0.8217	0.2850	0.2904	0.2822	0.2964	154	0.1800	0.0353	33.0
1255.0	0.8197	0.2853	0.2907	0.2825	0.2966	153	0.1820	0.0356	32.8
1268.0	0.8177	0.2855	0.2910	0.2827	0.2969	153	0.1840	0.0358	32.8
1281.0	0.8157	0.2857	0.2913	0.2830	0.2971	153	0.1860	0.0360	32.8
1294.0	0.8137	0.2860	0.2916	0.2832	0.2974	154	0.1880	0.0363	32.9
1307.0	0.8117	0.2862	0.2919	0.2835	0.2977	154	0.1900	0.0366	33.0
1320.0	0.8097	0.2864	0.2922	0.2837	0.2980	154	0.1920	0.0369	32.9
1334.0	0.8077	0.2867	0.2925	0.2840	0.2982	154	0.1940	0.0371	33.0
1347.0	0.8057	0.2869	0.2927	0.2842	0.2985	152	0.1960	0.0374	32.7
1360.0	0.8037	0.2871	0.2930	0.2844	0.2987	153	0.1980	0.0376	32.7
1373.0	0.8017	0.2873	0.2932	0.2846	0.2990	152	0.2000	0.0378	32.6
1386.0	0.7997	0.2875	0.2935	0.2848	0.2992	151	0.2020	0.0380	32.3
1398.0	0.7977	0.2877	0.2938	0.2851	0.2995	148	0.2040	0.0383	31.7
1412.0	0.7957	0.2878	0.2940	0.2853	0.2997	146	0.2060	0.0385	31.2
1425.0	0.7937	0.2880	0.2943	0.2855	0.2999	145	0.2080	0.0387	31.0
1438.0	0.7917	0.2881	0.2945	0.2857	0.3001	144	0.2100	0.0389	30.9
1451.0	0.7897	0.2883	0.2948	0.2859	0.3003	144	0.2120	0.0391	30.9
1464.0	0.7877	0.2884	0.2950	0.2860	0.3005	144	0.2140	0.0393	30.8
1477.0	0.7857	0.2886	0.2953	0.2862	0.3007	144	0.2160	0.0395	30.9
1490.0	0.7837	0.2887	0.2955	0.2865	0.3009	143	0.2180	0.0397	30.6
1503.0	0.7817	0.2889	0.2958	0.2867	0.3011	143	0.2200	0.0399	30.5
1516.0	0.7797	0.2891	0.2960	0.2869	0.3014	142	0.2220	0.0401	30.5
1530.0	0.7777	0.2893	0.2963	0.2871	0.3016	141	0.2240	0.0404	30.3
1543.0	0.7757	0.2894	0.2966	0.2874	0.3018	141	0.2260	0.0406	30.3
1556.0	0.7737	0.2896	0.2968	0.2876	0.3020	141	0.2280	0.0408	30.2
1570.0	0.7717	0.2898	0.2971	0.2878	0.3022	141	0.2300	0.0410	30.2
1582.0	0.7697	0.2900	0.2974	0.2880	0.3025	141	0.2320	0.0413	30.2
1596.0	0.7677	0.2902	0.2977	0.2883	0.3027	141	0.2340	0.0415	30.2
1609.0	0.7657	0.2904	0.2980	0.2885	0.3030	141	0.2360	0.0418	30.3
1623.0	0.7637	0.2905	0.2983	0.2888	0.3032	141	0.2380	0.0420	30.2
1636.0	0.7617	0.2907	0.2986	0.2890	0.3035	141	0.2400	0.0422	30.1
1649.0	0.7597	0.2909	0.2988	0.2893	0.3037	141	0.2420	0.0425	30.1
1661.0	0.7577	0.2911	0.2991	0.2895	0.3039	140	0.2440	0.0427	30.1
1674.0	0.7557	0.2913	0.2994	0.2897	0.3041	140	0.2460	0.0429	30.1
1688.0	0.7537	0.2914	0.2997	0.2900	0.3044	140	0.2480	0.0432	30.0
1701.0	0.7517	0.2916	0.3000	0.2902	0.3046	140	0.2500	0.0434	29.9
1714.0	0.7497	0.2918	0.3003	0.2905	0.3048	139	0.2520	0.0436	29.8
1727.0	0.7477	0.2920	0.3006	0.2907	0.3051	139	0.2540	0.0439	29.7
1740.0	0.7457	0.2922	0.3008	0.2909	0.3053	139	0.2560	0.0441	29.7
1754.0	0.7437	0.2924	0.3011	0.2912	0.3055	138	0.2580	0.0443	29.7
1767.0	0.7417	0.2926	0.3014	0.2914	0.3058	139	0.2600	0.0446	29.7
1780.0	0.7397	0.2928	0.3017	0.2917	0.3060	139	0.2620	0.0448	29.7
1793.0	0.7377	0.2930	0.3020	0.2919	0.3063	139	0.2640	0.0451	29.8
1806.0	0.7357	0.2932	0.3023	0.2922	0.3066	139	0.2660	0.0454	29.8
1819.0	0.7337	0.2934	0.3026	0.2924	0.3068	139	0.2680	0.0456	29.8
1832.0	0.7317	0.2936	0.3029	0.2927	0.3071	139	0.2700	0.0458	29.7
1845.0	0.7297	0.2938	0.3032	0.2929	0.3074	138	0.2720	0.0461	29.7
1858.0	0.7277	0.2940	0.3036	0.2932	0.3076	138	0.2740	0.0464	29.5
1871.0	0.7257	0.2942	0.3039	0.2934	0.3079	138	0.2760	0.0466	29.5
1884.0	0.7237	0.2944	0.3042	0.2937	0.3081	137	0.2780	0.0469	29.4
1897.0	0.7217	0.2946	0.3045	0.2939	0.3084	137	0.2800	0.0471	29.4
1910.0	0.7197	0.2948	0.3048	0.2942	0.3086	136	0.2820	0.0474	29.2
1923.0	0.7177	0.2950	0.3051	0.2944	0.3089	137	0.2840	0.0476	29.2
1936.0	0.7157	0.2951	0.3054	0.2946	0.3091	137	0.2860	0.0478	29.2
1949.0	0.7137	0.2953	0.3057	0.2949	0.3094	137	0.2880	0.0481	29.3
1962.0	0.7117	0.2955	0.3060	0.2951	0.3096	137	0.2900	0.0483	29.2
1976.0	0.7097	0.2957	0.3063	0.2953	0.3099	136	0.2920	0.0486	29.2
1989.0	0.7077	0.2959	0.3066	0.2956	0.3101	136	0.2940	0.0488	29.2
2001.0	0.7057	0.2960	0.3068	0.2958	0.3104	136	0.2960	0.0490	29.1
2015.0	0.7037	0.2962	0.3071	0.2960	0.3106	136	0.2980	0.0493	29.0
2028.0	0.7017	0.2964	0.3074	0.2963	0.3109	135	0.3000	0.0495	28.9
2041.0	0.6997	0.2966	0.3077	0.2965	0.3111	134	0.3020	0.0498	28.7
2054.0	0.6977	0.2967	0.3080	0.2967	0.3113	133	0.3040	0.0499	28.6
2067.0	0.6957	0.2969	0.3082	0.2969	0.3115	133	0.3060	0.0501	28.5
2080.0	0.6937	0.2970	0.3085	0.2971	0.3117	133	0.3080	0.0503	28.5
2093.0	0.6917	0.2972	0.3088	0.2973	0.3119	133	0.3100	0.0506	28.4
2106.0	0.6897	0.2973	0.3090	0.2975	0.3121	133	0.3120	0.0508	28.4
2119.0	0.6877	0.2975	0.3092	0.2977	0.3123	133	0.3140	0.0510	28.4

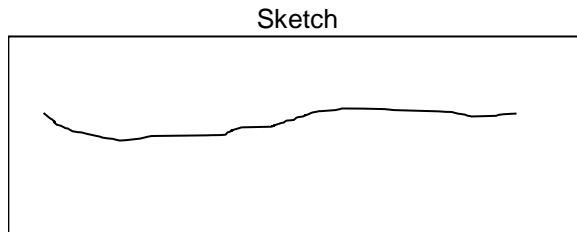
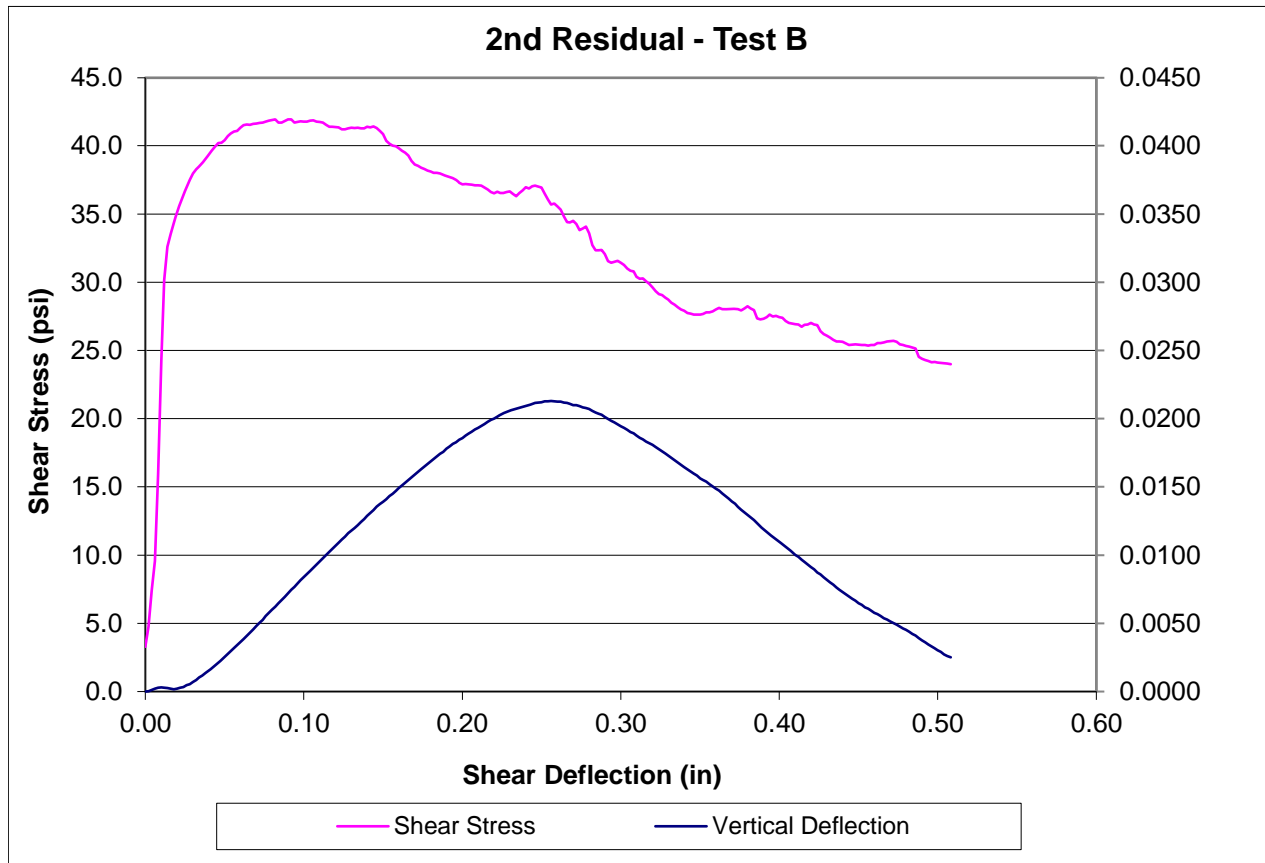
Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
2132.0	0.6857	0.2976	0.3095	0.2979	0.3125	132	0.3160	0.0512	28.4
2145.0	0.6837	0.2978	0.3097	0.2981	0.3127	132	0.3180	0.0514	28.4
2158.0	0.6817	0.2979	0.3100	0.2983	0.3130	133	0.3200	0.0516	28.4
2171.0	0.6797	0.2981	0.3102	0.2984	0.3132	133	0.3220	0.0518	28.6
2185.0	0.6777	0.2982	0.3104	0.2986	0.3134	134	0.3240	0.0519	28.6
2198.0	0.6757	0.2984	0.3107	0.2988	0.3136	133	0.3260	0.0521	28.6
2211.0	0.6737	0.2985	0.3109	0.2990	0.3138	134	0.3280	0.0523	28.6
2224.0	0.6717	0.2987	0.3111	0.2992	0.3140	134	0.3300	0.0525	28.7
2238.0	0.6697	0.2988	0.3114	0.2994	0.3142	135	0.3320	0.0527	28.8
2251.0	0.6677	0.2990	0.3116	0.2996	0.3144	135	0.3340	0.0529	28.9
2264.0	0.6657	0.2991	0.3118	0.2997	0.3146	135	0.3360	0.0531	28.8
2277.0	0.6637	0.2993	0.3120	0.2999	0.3148	133	0.3380	0.0533	28.5
2291.0	0.6617	0.2994	0.3123	0.3001	0.3149	132	0.3400	0.0534	28.3
2304.0	0.6597	0.2995	0.3125	0.3003	0.3151	132	0.3420	0.0536	28.3
2317.0	0.6577	0.2996	0.3127	0.3004	0.3153	132	0.3440	0.0538	28.3
2330.0	0.6557	0.2997	0.3129	0.3006	0.3155	130	0.3460	0.0539	27.9
2343.0	0.6537	0.2999	0.3131	0.3008	0.3156	129	0.3480	0.0541	27.7
2356.0	0.6517	0.3000	0.3133	0.3009	0.3157	129	0.3500	0.0542	27.6
2369.0	0.6497	0.3000	0.3135	0.3010	0.3159	129	0.3520	0.0544	27.5
2382.0	0.6477	0.3001	0.3136	0.3011	0.3160	128	0.3540	0.0545	27.4
2396.0	0.6457	0.3002	0.3138	0.3013	0.3162	127	0.3560	0.0547	27.2
2409.0	0.6437	0.3003	0.3140	0.3014	0.3163	126	0.3580	0.0548	27.0
2422.0	0.6417	0.3003	0.3141	0.3015	0.3164	125	0.3600	0.0549	26.7
2436.0	0.6397	0.3003	0.3142	0.3015	0.3164	122	0.3620	0.0549	26.1
2449.0	0.6377	0.3003	0.3143	0.3016	0.3165	121	0.3640	0.0549	25.9
2462.0	0.6357	0.3003	0.3145	0.3017	0.3165	121	0.3660	0.0550	25.9
2475.0	0.6337	0.3003	0.3146	0.3018	0.3166	120	0.3680	0.0551	25.7
2489.0	0.6317	0.3004	0.3147	0.3018	0.3167	120	0.3700	0.0552	25.7
2502.0	0.6297	0.3004	0.3149	0.3019	0.3168	120	0.3720	0.0553	25.6
2515.0	0.6277	0.3004	0.3151	0.3020	0.3169	119	0.3740	0.0554	25.6
2528.0	0.6257	0.3004	0.3152	0.3021	0.3170	120	0.3760	0.0554	25.6
2542.0	0.6237	0.3004	0.3154	0.3022	0.3171	119	0.3780	0.0556	25.5
2555.0	0.6217	0.3004	0.3155	0.3023	0.3172	119	0.3800	0.0556	25.5
2569.0	0.6197	0.3005	0.3157	0.3023	0.3173	119	0.3820	0.0557	25.5
2582.0	0.6177	0.3005	0.3158	0.3024	0.3174	118	0.3840	0.0558	25.4
2596.0	0.6157	0.3005	0.3160	0.3025	0.3175	119	0.3860	0.0559	25.4
2609.0	0.6137	0.3005	0.3161	0.3026	0.3176	119	0.3880	0.0560	25.5
2621.0	0.6117	0.3005	0.3163	0.3027	0.3177	119	0.3900	0.0561	25.6
2634.0	0.6097	0.3006	0.3165	0.3027	0.3178	120	0.3920	0.0562	25.7
2647.0	0.6077	0.3006	0.3166	0.3028	0.3179	119	0.3940	0.0563	25.5
2661.0	0.6057	0.3006	0.3167	0.3029	0.3180	119	0.3960	0.0563	25.6
2674.0	0.6037	0.3006	0.3169	0.3030	0.3181	119	0.3980	0.0564	25.6
2687.0	0.6017	0.3006	0.3170	0.3030	0.3181	119	0.4000	0.0564	25.4
2700.0	0.5997	0.3006	0.3171	0.3031	0.3182	118	0.4020	0.0565	25.3
2713.0	0.5977	0.3006	0.3172	0.3031	0.3183	118	0.4040	0.0566	25.2
2726.0	0.5957	0.3006	0.3173	0.3031	0.3183	118	0.4060	0.0566	25.3
2739.0	0.5937	0.3006	0.3174	0.3032	0.3184	118	0.4080	0.0567	25.2
2753.0	0.5917	0.3006	0.3174	0.3032	0.3184	117	0.4100	0.0567	25.1
2766.0	0.5897	0.3006	0.3175	0.3032	0.3185	117	0.4120	0.0567	25.0
2779.0	0.5877	0.3006	0.3175	0.3032	0.3185	117	0.4140	0.0567	25.1
2793.0	0.5857	0.3006	0.3176	0.3032	0.3186	117	0.4160	0.0568	25.1
2806.0	0.5837	0.3006	0.3177	0.3032	0.3186	116	0.4180	0.0568	24.9
2819.0	0.5817	0.3006	0.3177	0.3032	0.3186	115	0.4200	0.0568	24.7
2832.0	0.5797	0.3006	0.3178	0.3032	0.3187	115	0.4220	0.0569	24.6
2845.0	0.5777	0.3005	0.3178	0.3032	0.3187	114	0.4240	0.0568	24.5
2858.0	0.5757	0.3005	0.3179	0.3032	0.3187	115	0.4260	0.0569	24.5
2872.0	0.5737	0.3005	0.3180	0.3033	0.3187	114	0.4280	0.0569	24.5
2885.0	0.5717	0.3004	0.3180	0.3033	0.3188	114	0.4300	0.0569	24.4
2898.0	0.5697	0.3004	0.3181	0.3033	0.3188	114	0.4320	0.0569	24.5
2911.0	0.5677	0.3004	0.3182	0.3033	0.3188	114	0.4340	0.0569	24.5
2924.0	0.5657	0.3004	0.3182	0.3033	0.3189	114	0.4360	0.0570	24.5
2937.0	0.5637	0.3003	0.3183	0.3033	0.3189	114	0.4380	0.0570	24.3
2949.0	0.5617	0.3003	0.3183	0.3033	0.3189	114	0.4400	0.0570	24.4
2963.0	0.5597	0.3002	0.3184	0.3033	0.3189	114	0.4420	0.0570	24.4
2976.0	0.5577	0.3002	0.3184	0.3033	0.3189	113	0.4440	0.0570	24.3
2989.0	0.5557	0.3001	0.3184	0.3033	0.3188	113	0.4460	0.0569	24.2
3002.0	0.5537	0.2999	0.3185	0.3033	0.3188	110	0.4480	0.0569	23.5
3016.0	0.5517	0.2998	0.3185	0.3032	0.3187	108	0.4500	0.0568	23.2
3029.0	0.5497	0.2996	0.3185	0.3032	0.3186	108	0.4520	0.0568	23.1
3042.0	0.5477	0.2995	0.3185	0.3031	0.3186	107	0.4540	0.0567	23.0
3055.0	0.5457	0.2994	0.3185	0.3031	0.3185	107	0.4560	0.0567	22.8
3068.0	0.5437	0.2993	0.3185	0.3030	0.3185	107	0.4580	0.0566	22.8
3081.0	0.5417	0.2992	0.3185	0.3030	0.3185	107	0.4600	0.0566	22.9
3094.0	0.5397	0.2991	0.3186	0.3029	0.3184	107	0.4620	0.0565	22.9
3108.0	0.5377	0.2990	0.3186	0.3029	0.3184	107	0.4640	0.0565	22.9
3121.0	0.5357	0.2989	0.3186	0.3028	0.3184	107	0.4660	0.0564	22.8
3134.0	0.5337	0.2987	0.3186	0.3028	0.3183	107	0.4680	0.0564	22.8
3147.0	0.5317	0.2986	0.3186	0.3027	0.3183	107	0.4700	0.0563	22.9
3160.0	0.5297	0.2985	0.3187	0.3026	0.3182	107	0.4720	0.0563	22.8

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
3173.0	0.5277	0.2984	0.3187	0.3026	0.3182	107	0.4740	0.0563	22.8
3186.0	0.5257	0.2983	0.3187	0.3025	0.3182	107	0.4760	0.0562	22.8
3198.0	0.5237	0.2981	0.3186	0.3024	0.3180	100	0.4780	0.0561	21.5
3211.0	0.5217	0.2977	0.3183	0.3021	0.3176	91	0.4800	0.0557	19.6
3219.0	0.5197	0.2974	0.3181	0.3019	0.3174	89	0.4820	0.0555	19.0
3238.0	0.5177	0.2970	0.3179	0.3016	0.3170	88	0.4840	0.0552	18.7
3250.0	0.5157	0.2967	0.3176	0.3014	0.3167	84	0.4860	0.0549	18.0
3264.0	0.5137	0.2963	0.3174	0.3011	0.3164	83	0.4880	0.0546	17.7
3277.0	0.5117	0.2959	0.3172	0.3008	0.3161	83	0.4900	0.0543	17.7
3290.0	0.5097	0.2956	0.3170	0.3005	0.3158	82	0.4920	0.0540	17.5
3303.0	0.5077	0.2952	0.3168	0.3003	0.3155	81	0.4940	0.0537	17.4
3316.0	0.5057	0.2949	0.3166	0.3000	0.3153	81	0.4960	0.0535	17.4
3329.0	0.5037	0.2945	0.3164	0.2998	0.3150	81	0.4980	0.0532	17.4
3342.0	0.5017	0.2942	0.3162	0.2995	0.3148	81	0.5000	0.0530	17.4
3350.0	0.4997	0.2940	0.3161	0.2993	0.3146	81	0.5020	0.0528	17.4
3364.0	0.4977	0.2936	0.3159	0.2990	0.3143	82	0.5040	0.0525	17.5
3383.0	0.4957	0.2933	0.3157	0.2988	0.3141	81	0.5060	0.0523	17.4
3396.0	0.4937	0.2930	0.3155	0.2985	0.3138	80	0.5080	0.0520	17.1



Direct Shear Strength of Rock
ASTM D 5607

Project Name	<u>SR1 Flood Control Project - Inlet Debris Barrier</u>	Project Number	<u>110773396</u>
Lithology	<u>Shale, gray, moderately hard, partially healed faults</u>	Lab ID	<u>DSNF-9</u>
Hole Number	<u>DB-1</u>	Date Received	<u>05/15/2018</u>
Depth (m)	<u>24.16</u>		
Test Type	<u>Direct shear of natural fracture</u>	Diameter (in)	<u>2.398</u>
Initial Moisture Condition	<u>As received, moist</u>	Angle of Dip (deg)	<u>14.7</u>
Test Moisture Condition	<u>Soaked at least 12 hours prior to test.</u>	Area(in ²)	<u>4.67</u>
Joint Roughness	<u>14</u>		
		Date Prepared	<u>06/26/2018</u>
Normal Stress (psi)	<u>94</u>	Date Tested	<u>06/27/2018</u>



Shear Rate to Peak (in/min) N/A

Encapsulation Material Hydro-Stone

Comments _____

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
0.0	1.0055	0.2507	0.2529	0.2502	0.2524	15	0.0000	0.0000	3.3
26.0	1.0035	0.2507	0.2529	0.2499	0.2528	22	0.0020	0.0000	4.8
42.0	1.0015	0.2507	0.2530	0.2497	0.2533	35	0.0040	0.0001	7.4
59.0	0.9995	0.2508	0.2530	0.2494	0.2538	45	0.0060	0.0002	9.6
75.0	0.9975	0.2508	0.2531	0.2490	0.2544	74	0.0080	0.0003	15.9
92.0	0.9955	0.2508	0.2531	0.2486	0.2549	113	0.0100	0.0003	24.2
107.0	0.9935	0.2507	0.2531	0.2483	0.2552	141	0.0120	0.0003	30.2
122.0	0.9915	0.2506	0.2531	0.2482	0.2553	152	0.0140	0.0003	32.6
136.0	0.9895	0.2505	0.2531	0.2481	0.2553	156	0.0160	0.0002	33.5
150.0	0.9875	0.2504	0.2532	0.2480	0.2553	160	0.0180	0.0002	34.3
164.0	0.9855	0.2504	0.2532	0.2480	0.2554	164	0.0200	0.0002	35.1
178.0	0.9835	0.2505	0.2533	0.2480	0.2555	167	0.0220	0.0003	35.8
191.0	0.9815	0.2505	0.2534	0.2480	0.2556	170	0.0240	0.0003	36.4
205.0	0.9795	0.2506	0.2536	0.2481	0.2558	172	0.0260	0.0005	36.9
220.0	0.9775	0.2507	0.2537	0.2481	0.2559	175	0.0280	0.0005	37.5
233.0	0.9755	0.2509	0.2538	0.2482	0.2561	177	0.0300	0.0007	38.0
247.0	0.9735	0.2510	0.2540	0.2483	0.2563	179	0.0320	0.0008	38.3
261.0	0.9715	0.2512	0.2541	0.2485	0.2565	180	0.0340	0.0010	38.5
275.0	0.9695	0.2513	0.2543	0.2486	0.2567	181	0.0360	0.0012	38.7
288.0	0.9675	0.2515	0.2545	0.2487	0.2569	182	0.0380	0.0014	39.0
302.0	0.9655	0.2517	0.2546	0.2489	0.2571	184	0.0400	0.0015	39.4
315.0	0.9635	0.2519	0.2548	0.2490	0.2573	185	0.0420	0.0017	39.7
328.0	0.9615	0.2521	0.2550	0.2492	0.2575	186	0.0440	0.0019	39.9
341.0	0.9595	0.2523	0.2552	0.2494	0.2578	188	0.0460	0.0021	40.2
354.0	0.9575	0.2525	0.2554	0.2496	0.2580	188	0.0480	0.0023	40.2
368.0	0.9555	0.2527	0.2556	0.2497	0.2582	189	0.0500	0.0025	40.4
382.0	0.9535	0.2530	0.2558	0.2499	0.2585	190	0.0520	0.0028	40.7
395.0	0.9515	0.2532	0.2561	0.2501	0.2587	191	0.0540	0.0030	40.9
409.0	0.9495	0.2534	0.2563	0.2503	0.2590	192	0.0560	0.0032	41.0
423.0	0.9475	0.2536	0.2565	0.2505	0.2592	192	0.0580	0.0034	41.1
436.0	0.9455	0.2538	0.2567	0.2508	0.2594	193	0.0600	0.0036	41.3
449.0	0.9435	0.2541	0.2569	0.2509	0.2597	194	0.0620	0.0039	41.5
462.0	0.9415	0.2543	0.2572	0.2511	0.2599	194	0.0640	0.0041	41.6
476.0	0.9395	0.2545	0.2574	0.2514	0.2602	194	0.0660	0.0043	41.5
489.0	0.9375	0.2548	0.2576	0.2516	0.2604	194	0.0680	0.0046	41.6
503.0	0.9355	0.2550	0.2579	0.2518	0.2607	194	0.0700	0.0048	41.6
516.0	0.9335	0.2553	0.2581	0.2520	0.2610	195	0.0720	0.0051	41.7
530.0	0.9315	0.2555	0.2583	0.2522	0.2612	195	0.0740	0.0053	41.7
543.0	0.9295	0.2557	0.2586	0.2525	0.2615	195	0.0760	0.0055	41.8
556.0	0.9275	0.2560	0.2588	0.2527	0.2618	195	0.0780	0.0058	41.8
570.0	0.9255	0.2562	0.2591	0.2529	0.2620	196	0.0800	0.0060	41.9
583.0	0.9235	0.2564	0.2593	0.2531	0.2623	196	0.0820	0.0062	41.9
596.0	0.9215	0.2567	0.2595	0.2534	0.2625	195	0.0840	0.0065	41.7
609.0	0.9195	0.2569	0.2598	0.2536	0.2627	195	0.0860	0.0067	41.7
622.0	0.9175	0.2571	0.2600	0.2539	0.2630	195	0.0880	0.0070	41.8
636.0	0.9155	0.2574	0.2603	0.2541	0.2632	196	0.0900	0.0072	41.9
649.0	0.9135	0.2576	0.2605	0.2544	0.2635	196	0.0920	0.0075	41.9
662.0	0.9115	0.2578	0.2608	0.2546	0.2637	195	0.0940	0.0077	41.7
675.0	0.9095	0.2581	0.2610	0.2548	0.2639	195	0.0960	0.0079	41.7
689.0	0.9075	0.2583	0.2613	0.2551	0.2641	195	0.0980	0.0081	41.8
703.0	0.9055	0.2585	0.2615	0.2553	0.2644	195	0.1000	0.0084	41.8
715.0	0.9035	0.2587	0.2618	0.2556	0.2646	195	0.1020	0.0086	41.8
729.0	0.9015	0.2589	0.2620	0.2558	0.2648	195	0.1040	0.0088	41.8
742.0	0.8995	0.2591	0.2623	0.2560	0.2650	195	0.1060	0.0091	41.9
756.0	0.8975	0.2594	0.2625	0.2563	0.2653	195	0.1080	0.0093	41.8
769.0	0.8955	0.2596	0.2628	0.2565	0.2655	195	0.1100	0.0096	41.7
782.0	0.8935	0.2598	0.2630	0.2568	0.2657	195	0.1120	0.0098	41.7
795.0	0.8915	0.2600	0.2633	0.2570	0.2659	194	0.1140	0.0100	41.5
808.0	0.8895	0.2602	0.2635	0.2573	0.2661	193	0.1160	0.0102	41.4
821.0	0.8875	0.2604	0.2637	0.2575	0.2664	193	0.1180	0.0105	41.4
835.0	0.8855	0.2606	0.2640	0.2577	0.2666	193	0.1200	0.0107	41.4
848.0	0.8835	0.2608	0.2642	0.2580	0.2668	193	0.1220	0.0109	41.3
861.0	0.8815	0.2611	0.2645	0.2582	0.2670	192	0.1240	0.0112	41.2
875.0	0.8795	0.2613	0.2647	0.2584	0.2672	192	0.1260	0.0114	41.2
887.0	0.8775	0.2615	0.2650	0.2586	0.2675	193	0.1280	0.0116	41.3
901.0	0.8755	0.2617	0.2652	0.2588	0.2677	193	0.1300	0.0118	41.3
913.0	0.8735	0.2618	0.2654	0.2590	0.2679	193	0.1320	0.0120	41.3
926.0	0.8715	0.2620	0.2657	0.2592	0.2681	193	0.1340	0.0122	41.3
939.0	0.8695	0.2622	0.2659	0.2595	0.2683	193	0.1360	0.0124	41.3
953.0	0.8675	0.2624	0.2661	0.2597	0.2686	193	0.1380	0.0127	41.3
966.0	0.8655	0.2626	0.2664	0.2599	0.2688	193	0.1400	0.0129	41.4
979.0	0.8635	0.2628	0.2666	0.2601	0.2690	193	0.1420	0.0131	41.3
993.0	0.8615	0.2630	0.2668	0.2603	0.2693	193	0.1440	0.0133	41.4
1006.0	0.8595	0.2632	0.2671	0.2606	0.2695	193	0.1460	0.0136	41.3
1019.0	0.8575	0.2634	0.2673	0.2608	0.2697	192	0.1480	0.0138	41.1
1031.0	0.8555	0.2635	0.2675	0.2610	0.2698	191	0.1500	0.0139	40.9
1044.0	0.8535	0.2637	0.2677	0.2612	0.2700	188	0.1520	0.0141	40.4
1057.0	0.8515	0.2639	0.2679	0.2615	0.2702	187	0.1540	0.0143	40.2
1070.0	0.8495	0.2641	0.2681	0.2617	0.2703	187	0.1560	0.0145	40.0

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
1083.0	0.8475	0.2643	0.2683	0.2619	0.2705	187	0.1580	0.0147	40.0
1096.0	0.8455	0.2645	0.2686	0.2621	0.2707	186	0.1600	0.0149	39.8
1110.0	0.8435	0.2646	0.2688	0.2623	0.2709	185	0.1620	0.0151	39.6
1123.0	0.8415	0.2648	0.2690	0.2626	0.2711	184	0.1640	0.0153	39.5
1136.0	0.8395	0.2650	0.2692	0.2628	0.2712	183	0.1660	0.0155	39.3
1149.0	0.8375	0.2651	0.2695	0.2630	0.2714	182	0.1680	0.0157	38.9
1162.0	0.8355	0.2653	0.2697	0.2632	0.2716	180	0.1700	0.0159	38.6
1175.0	0.8335	0.2655	0.2699	0.2634	0.2718	180	0.1720	0.0161	38.5
1187.0	0.8315	0.2656	0.2701	0.2636	0.2720	179	0.1740	0.0163	38.4
1201.0	0.8295	0.2658	0.2703	0.2638	0.2722	179	0.1760	0.0165	38.3
1214.0	0.8275	0.2660	0.2706	0.2640	0.2724	178	0.1780	0.0167	38.2
1227.0	0.8255	0.2661	0.2708	0.2642	0.2725	178	0.1800	0.0169	38.1
1240.0	0.8235	0.2663	0.2710	0.2644	0.2727	177	0.1820	0.0171	38.0
1253.0	0.8215	0.2664	0.2712	0.2646	0.2729	177	0.1840	0.0172	38.0
1267.0	0.8195	0.2666	0.2714	0.2648	0.2731	177	0.1860	0.0174	38.0
1280.0	0.8175	0.2667	0.2716	0.2649	0.2733	177	0.1880	0.0176	37.9
1292.0	0.8155	0.2669	0.2719	0.2651	0.2735	177	0.1900	0.0178	37.8
1306.0	0.8135	0.2670	0.2721	0.2653	0.2737	176	0.1920	0.0180	37.7
1319.0	0.8115	0.2671	0.2723	0.2655	0.2739	176	0.1940	0.0182	37.6
1332.0	0.8095	0.2672	0.2725	0.2656	0.2740	175	0.1960	0.0183	37.5
1345.0	0.8075	0.2673	0.2727	0.2658	0.2742	174	0.1980	0.0185	37.3
1358.0	0.8055	0.2675	0.2728	0.2659	0.2743	174	0.2000	0.0186	37.2
1372.0	0.8035	0.2676	0.2730	0.2661	0.2745	174	0.2020	0.0188	37.2
1385.0	0.8015	0.2677	0.2732	0.2662	0.2747	174	0.2040	0.0189	37.2
1397.0	0.7995	0.2678	0.2734	0.2664	0.2748	173	0.2060	0.0191	37.2
1410.0	0.7975	0.2679	0.2736	0.2665	0.2750	173	0.2080	0.0192	37.1
1423.0	0.7955	0.2680	0.2738	0.2666	0.2751	173	0.2100	0.0193	37.1
1436.0	0.7935	0.2681	0.2739	0.2668	0.2753	173	0.2120	0.0195	37.1
1449.0	0.7915	0.2682	0.2741	0.2669	0.2754	172	0.2140	0.0196	36.9
1462.0	0.7895	0.2683	0.2743	0.2671	0.2756	172	0.2160	0.0198	36.8
1475.0	0.7875	0.2684	0.2745	0.2672	0.2757	171	0.2180	0.0199	36.6
1488.0	0.7855	0.2685	0.2746	0.2673	0.2758	170	0.2200	0.0200	36.5
1501.0	0.7835	0.2686	0.2748	0.2674	0.2760	171	0.2220	0.0202	36.6
1515.0	0.7815	0.2687	0.2750	0.2675	0.2761	171	0.2240	0.0203	36.5
1528.0	0.7795	0.2687	0.2751	0.2676	0.2763	171	0.2260	0.0204	36.5
1542.0	0.7775	0.2688	0.2753	0.2677	0.2764	171	0.2280	0.0205	36.6
1555.0	0.7755	0.2689	0.2754	0.2678	0.2765	171	0.2300	0.0206	36.7
1568.0	0.7735	0.2689	0.2755	0.2678	0.2766	170	0.2320	0.0207	36.5
1581.0	0.7715	0.2689	0.2757	0.2678	0.2767	169	0.2340	0.0207	36.3
1593.0	0.7695	0.2690	0.2757	0.2678	0.2768	171	0.2360	0.0208	36.5
1607.0	0.7675	0.2690	0.2759	0.2679	0.2769	171	0.2380	0.0209	36.7
1621.0	0.7655	0.2690	0.2760	0.2679	0.2771	173	0.2400	0.0210	37.0
1634.0	0.7635	0.2690	0.2761	0.2680	0.2771	172	0.2420	0.0210	36.9
1646.0	0.7615	0.2690	0.2762	0.2680	0.2772	173	0.2440	0.0211	37.0
1659.0	0.7595	0.2690	0.2764	0.2681	0.2773	173	0.2460	0.0212	37.1
1672.0	0.7575	0.2690	0.2764	0.2681	0.2774	173	0.2480	0.0212	37.0
1685.0	0.7555	0.2690	0.2765	0.2681	0.2774	172	0.2500	0.0212	36.9
1698.0	0.7535	0.2691	0.2766	0.2681	0.2775	170	0.2520	0.0213	36.5
1711.0	0.7515	0.2691	0.2766	0.2681	0.2775	168	0.2540	0.0213	36.1
1724.0	0.7495	0.2691	0.2767	0.2681	0.2775	167	0.2560	0.0213	35.7
1738.0	0.7475	0.2690	0.2767	0.2681	0.2775	167	0.2580	0.0213	35.8
1751.0	0.7455	0.2690	0.2767	0.2680	0.2775	166	0.2600	0.0213	35.5
1763.0	0.7435	0.2690	0.2767	0.2680	0.2775	165	0.2620	0.0213	35.3
1776.0	0.7415	0.2689	0.2766	0.2679	0.2775	163	0.2640	0.0212	34.8
1789.0	0.7395	0.2689	0.2766	0.2678	0.2775	161	0.2660	0.0212	34.4
1802.0	0.7375	0.2688	0.2765	0.2677	0.2775	161	0.2680	0.0211	34.4
1816.0	0.7355	0.2687	0.2765	0.2675	0.2775	161	0.2700	0.0210	34.5
1829.0	0.7335	0.2687	0.2765	0.2675	0.2775	160	0.2720	0.0210	34.3
1841.0	0.7315	0.2686	0.2764	0.2674	0.2775	158	0.2740	0.0209	33.8
1854.0	0.7295	0.2685	0.2763	0.2673	0.2774	158	0.2760	0.0208	33.9
1867.0	0.7275	0.2684	0.2763	0.2672	0.2774	159	0.2780	0.0208	34.1
1880.0	0.7255	0.2683	0.2762	0.2672	0.2773	157	0.2800	0.0207	33.6
1893.0	0.7235	0.2681	0.2762	0.2671	0.2771	153	0.2820	0.0206	32.7
1906.0	0.7215	0.2679	0.2762	0.2670	0.2769	151	0.2840	0.0205	32.4
1919.0	0.7195	0.2677	0.2761	0.2670	0.2768	151	0.2860	0.0204	32.4
1932.0	0.7175	0.2676	0.2761	0.2669	0.2767	151	0.2880	0.0203	32.4
1945.0	0.7155	0.2674	0.2760	0.2667	0.2766	150	0.2900	0.0201	32.1
1958.0	0.7135	0.2672	0.2759	0.2666	0.2764	147	0.2920	0.0200	31.5
1971.0	0.7115	0.2670	0.2758	0.2665	0.2763	147	0.2940	0.0199	31.4
1984.0	0.7095	0.2668	0.2758	0.2663	0.2762	147	0.2960	0.0197	31.5
1997.0	0.7075	0.2666	0.2757	0.2662	0.2760	147	0.2980	0.0196	31.6
2010.0	0.7055	0.2664	0.2756	0.2661	0.2759	147	0.3000	0.0195	31.4
2023.0	0.7035	0.2662	0.2756	0.2659	0.2758	146	0.3020	0.0193	31.3
2036.0	0.7015	0.2660	0.2755	0.2658	0.2756	145	0.3040	0.0192	31.0
2049.0	0.6995	0.2658	0.2754	0.2656	0.2755	144	0.3060	0.0190	30.8
2062.0	0.6975	0.2656	0.2754	0.2655	0.2754	144	0.3080	0.0189	30.8
2075.0	0.6955	0.2653	0.2753	0.2654	0.2752	142	0.3100	0.0188	30.4
2089.0	0.6935	0.2651	0.2752	0.2652	0.2751	141	0.3120	0.0186	30.3
2102.0	0.6915	0.2649	0.2752	0.2651	0.2749	141	0.3140	0.0185	30.3

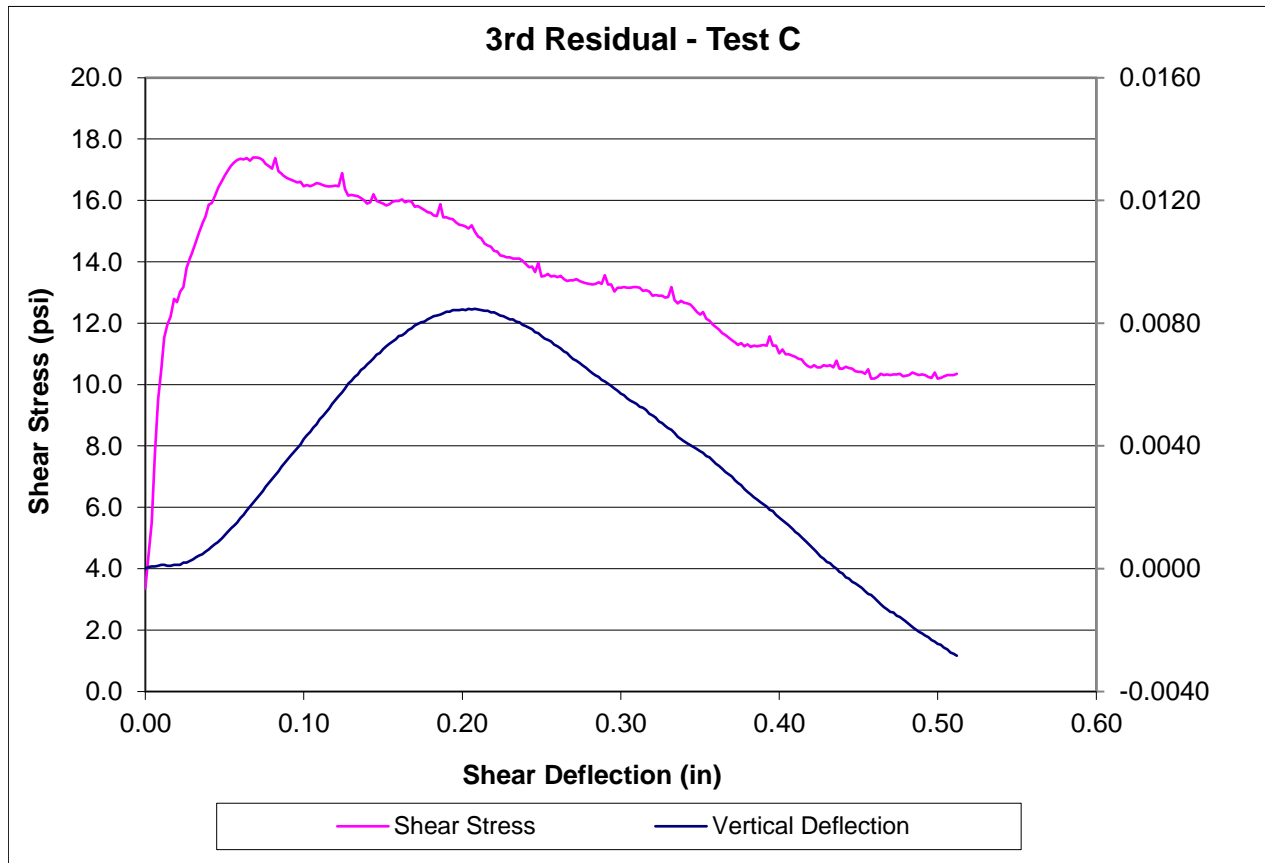
Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
2115.0	0.6895	0.2647	0.2751	0.2649	0.2748	140	0.3160	0.0183	30.1
2128.0	0.6875	0.2645	0.2750	0.2648	0.2747	139	0.3180	0.0182	29.9
2141.0	0.6855	0.2643	0.2750	0.2646	0.2746	138	0.3200	0.0181	29.6
2153.0	0.6835	0.2641	0.2749	0.2645	0.2744	137	0.3220	0.0179	29.3
2166.0	0.6815	0.2639	0.2748	0.2643	0.2742	136	0.3240	0.0178	29.1
2179.0	0.6795	0.2636	0.2747	0.2642	0.2741	136	0.3260	0.0176	29.1
2192.0	0.6775	0.2634	0.2746	0.2640	0.2739	135	0.3280	0.0174	28.9
2206.0	0.6755	0.2632	0.2745	0.2639	0.2738	134	0.3300	0.0173	28.7
2218.0	0.6735	0.2630	0.2744	0.2638	0.2736	133	0.3320	0.0172	28.5
2232.0	0.6715	0.2628	0.2743	0.2636	0.2734	132	0.3340	0.0170	28.3
2245.0	0.6695	0.2625	0.2741	0.2635	0.2732	132	0.3360	0.0168	28.2
2258.0	0.6675	0.2623	0.2740	0.2633	0.2730	131	0.3380	0.0166	28.0
2271.0	0.6655	0.2621	0.2739	0.2631	0.2729	130	0.3400	0.0165	27.9
2284.0	0.6635	0.2619	0.2738	0.2630	0.2727	130	0.3420	0.0163	27.7
2297.0	0.6615	0.2617	0.2736	0.2628	0.2725	129	0.3440	0.0161	27.7
2310.0	0.6595	0.2615	0.2735	0.2627	0.2724	129	0.3460	0.0160	27.6
2323.0	0.6575	0.2614	0.2734	0.2625	0.2722	129	0.3480	0.0158	27.6
2336.0	0.6555	0.2611	0.2732	0.2624	0.2720	129	0.3500	0.0156	27.6
2349.0	0.6535	0.2610	0.2731	0.2622	0.2719	129	0.3520	0.0155	27.7
2362.0	0.6515	0.2608	0.2730	0.2621	0.2718	130	0.3540	0.0154	27.8
2375.0	0.6495	0.2606	0.2729	0.2619	0.2716	130	0.3560	0.0152	27.8
2388.0	0.6475	0.2604	0.2728	0.2617	0.2714	130	0.3580	0.0150	27.9
2402.0	0.6455	0.2602	0.2726	0.2616	0.2713	131	0.3600	0.0149	28.0
2415.0	0.6435	0.2600	0.2725	0.2614	0.2712	131	0.3620	0.0147	28.1
2428.0	0.6415	0.2597	0.2724	0.2612	0.2710	131	0.3640	0.0145	28.0
2441.0	0.6395	0.2595	0.2722	0.2610	0.2708	131	0.3660	0.0143	28.0
2454.0	0.6375	0.2593	0.2721	0.2608	0.2706	131	0.3680	0.0142	28.0
2467.0	0.6355	0.2590	0.2719	0.2606	0.2704	131	0.3700	0.0139	28.0
2480.0	0.6335	0.2588	0.2718	0.2604	0.2703	131	0.3720	0.0138	28.0
2493.0	0.6315	0.2585	0.2716	0.2601	0.2701	131	0.3740	0.0135	28.0
2507.0	0.6295	0.2582	0.2715	0.2599	0.2699	130	0.3760	0.0133	27.9
2520.0	0.6275	0.2580	0.2713	0.2597	0.2697	131	0.3780	0.0131	28.1
2533.0	0.6255	0.2578	0.2712	0.2595	0.2695	132	0.3800	0.0130	28.2
2546.0	0.6235	0.2576	0.2710	0.2593	0.2693	131	0.3820	0.0128	28.1
2559.0	0.6215	0.2573	0.2709	0.2591	0.2692	131	0.3840	0.0126	28.0
2573.0	0.6195	0.2570	0.2707	0.2589	0.2689	128	0.3860	0.0123	27.3
2586.0	0.6175	0.2568	0.2705	0.2587	0.2687	127	0.3880	0.0121	27.3
2600.0	0.6155	0.2565	0.2704	0.2584	0.2685	128	0.3900	0.0119	27.3
2613.0	0.6135	0.2562	0.2702	0.2582	0.2683	128	0.3920	0.0117	27.4
2625.0	0.6115	0.2560	0.2701	0.2580	0.2682	129	0.3940	0.0115	27.6
2638.0	0.6095	0.2558	0.2699	0.2579	0.2680	128	0.3960	0.0114	27.5
2651.0	0.6075	0.2556	0.2698	0.2576	0.2678	129	0.3980	0.0112	27.5
2664.0	0.6055	0.2553	0.2696	0.2575	0.2676	128	0.4000	0.0110	27.4
2677.0	0.6035	0.2551	0.2695	0.2573	0.2675	128	0.4020	0.0108	27.4
2689.0	0.6015	0.2549	0.2694	0.2571	0.2673	127	0.4040	0.0106	27.2
2703.0	0.5995	0.2547	0.2692	0.2569	0.2671	126	0.4060	0.0104	27.0
2716.0	0.5975	0.2544	0.2691	0.2567	0.2669	126	0.4080	0.0102	27.0
2729.0	0.5955	0.2542	0.2689	0.2565	0.2667	126	0.4100	0.0100	26.9
2742.0	0.5935	0.2540	0.2688	0.2564	0.2665	126	0.4120	0.0099	26.9
2755.0	0.5915	0.2537	0.2686	0.2562	0.2663	125	0.4140	0.0096	26.7
2768.0	0.5895	0.2535	0.2685	0.2560	0.2662	125	0.4160	0.0095	26.9
2781.0	0.5875	0.2533	0.2683	0.2558	0.2660	126	0.4180	0.0093	26.9
2794.0	0.5855	0.2531	0.2682	0.2556	0.2658	126	0.4200	0.0091	27.0
2807.0	0.5835	0.2529	0.2681	0.2554	0.2656	126	0.4220	0.0090	26.9
2820.0	0.5815	0.2526	0.2679	0.2552	0.2654	125	0.4240	0.0087	26.8
2833.0	0.5795	0.2524	0.2678	0.2551	0.2652	123	0.4260	0.0086	26.4
2846.0	0.5775	0.2521	0.2677	0.2549	0.2650	122	0.4280	0.0084	26.2
2859.0	0.5755	0.2519	0.2675	0.2547	0.2648	122	0.4300	0.0082	26.1
2872.0	0.5735	0.2517	0.2674	0.2545	0.2646	121	0.4320	0.0080	25.9
2885.0	0.5715	0.2515	0.2672	0.2544	0.2644	120	0.4340	0.0078	25.8
2898.0	0.5695	0.2512	0.2671	0.2542	0.2642	120	0.4360	0.0076	25.7
2911.0	0.5675	0.2510	0.2669	0.2540	0.2641	120	0.4380	0.0075	25.6
2924.0	0.5655	0.2508	0.2668	0.2539	0.2639	120	0.4400	0.0073	25.6
2936.0	0.5635	0.2506	0.2667	0.2537	0.2637	119	0.4420	0.0071	25.5
2949.0	0.5615	0.2504	0.2666	0.2536	0.2635	119	0.4440	0.0070	25.4
2963.0	0.5595	0.2502	0.2665	0.2534	0.2633	119	0.4460	0.0068	25.4
2976.0	0.5575	0.2500	0.2663	0.2533	0.2632	119	0.4480	0.0066	25.5
2989.0	0.5555	0.2498	0.2662	0.2531	0.2630	119	0.4500	0.0065	25.4
3002.0	0.5535	0.2496	0.2661	0.2530	0.2629	119	0.4520	0.0064	25.4
3015.0	0.5515	0.2494	0.2660	0.2528	0.2627	119	0.4540	0.0062	25.4
3029.0	0.5495	0.2493	0.2659	0.2527	0.2626	118	0.4560	0.0061	25.3
3041.0	0.5475	0.2491	0.2658	0.2525	0.2625	119	0.4580	0.0059	25.4
3054.0	0.5455	0.2489	0.2657	0.2524	0.2623	119	0.4600	0.0058	25.4
3068.0	0.5435	0.2488	0.2656	0.2523	0.2622	119	0.4620	0.0057	25.5
3081.0	0.5415	0.2486	0.2655	0.2521	0.2621	119	0.4640	0.0055	25.5
3094.0	0.5395	0.2484	0.2654	0.2520	0.2619	119	0.4660	0.0054	25.6
3107.0	0.5375	0.2483	0.2653	0.2519	0.2618	120	0.4680	0.0053	25.6
3120.0	0.5355	0.2481	0.2652	0.2517	0.2617	120	0.4700	0.0051	25.7
3133.0	0.5335	0.2480	0.2651	0.2516	0.2616	120	0.4720	0.0050	25.7

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
3146.0	0.5315	0.2478	0.2650	0.2515	0.2615	120	0.4740	0.0049	25.6
3159.0	0.5295	0.2477	0.2649	0.2513	0.2613	119	0.4760	0.0047	25.5
3172.0	0.5275	0.2475	0.2648	0.2512	0.2612	119	0.4780	0.0046	25.4
3185.0	0.5255	0.2474	0.2647	0.2511	0.2611	118	0.4800	0.0045	25.3
3197.0	0.5235	0.2472	0.2646	0.2509	0.2610	118	0.4820	0.0044	25.3
3210.0	0.5215	0.2471	0.2644	0.2508	0.2608	118	0.4840	0.0042	25.2
3224.0	0.5195	0.2469	0.2643	0.2507	0.2607	117	0.4860	0.0041	25.1
3237.0	0.5175	0.2468	0.2641	0.2505	0.2605	115	0.4880	0.0039	24.5
3250.0	0.5155	0.2466	0.2640	0.2503	0.2603	114	0.4900	0.0038	24.4
3263.0	0.5135	0.2464	0.2638	0.2502	0.2602	113	0.4920	0.0036	24.3
3276.0	0.5115	0.2463	0.2637	0.2500	0.2600	113	0.4940	0.0035	24.2
3289.0	0.5095	0.2461	0.2635	0.2499	0.2599	113	0.4960	0.0033	24.1
3301.0	0.5075	0.2460	0.2634	0.2498	0.2597	113	0.4980	0.0032	24.1
3315.0	0.5055	0.2458	0.2633	0.2496	0.2596	113	0.5000	0.0030	24.1
3328.0	0.5035	0.2456	0.2632	0.2495	0.2595	112	0.5020	0.0029	24.1
3341.0	0.5015	0.2455	0.2630	0.2493	0.2593	112	0.5040	0.0027	24.1
3354.0	0.4995	0.2453	0.2629	0.2492	0.2592	112	0.5060	0.0026	24.0
3367.0	0.4975	0.2452	0.2628	0.2491	0.2591	112	0.5080	0.0025	24.0

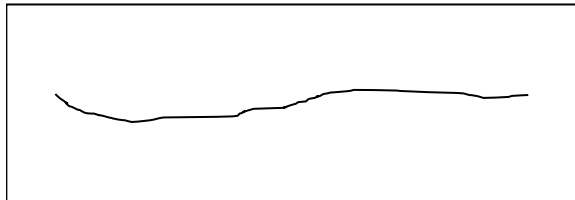


Direct Shear Strength of Rock
ASTM D 5607

Project Name	<u>SR1 Flood Control Project - Inlet Debris Barrier</u>	Project Number	<u>110773396</u>
Lithology	<u>Shale, gray, moderately hard, partially healed faults</u>	Lab ID	<u>DSNF-9</u>
Hole Number	<u>DB-1</u>	Date Received	<u>05/15/2018</u>
Depth (m)	<u>24.16</u>	Diameter (in)	<u>2.398</u>
Test Type	<u>Direct shear of natural fracture</u>	Angle of Dip (deg)	<u>14.7</u>
Initial Moisture Condition	<u>As received, moist</u>	Area(in ²)	<u>4.67</u>
Test Moisture Condition	<u>Soaked at least 12 hours prior to test.</u>		
Joint Roughness	<u>14</u>	Date Prepared	<u>06/26/2018</u>
Normal Stress (psi)	<u>36</u>	Date Tested	<u>06/27/2018</u>



Sketch



Shear Rate to Peak (in/min) N/A

Encapsulation Material Hydro-Stone

Comments _____

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
0.0	1.0061	0.2570	0.2504	0.2510	0.2562	16	0.0000	0.0000	3.4
23.0	1.0041	0.2570	0.2504	0.2508	0.2566	21	0.0020	0.0000	4.4
44.0	1.0021	0.2570	0.2505	0.2505	0.2569	26	0.0040	0.0001	5.5
59.0	1.0001	0.2569	0.2505	0.2502	0.2573	36	0.0060	0.0001	7.8
71.0	0.9981	0.2569	0.2505	0.2501	0.2575	44	0.0080	0.0001	9.5
83.0	0.9961	0.2570	0.2505	0.2499	0.2577	49	0.0100	0.0001	10.5
94.0	0.9941	0.2570	0.2505	0.2498	0.2578	54	0.0120	0.0001	11.5
107.0	0.9921	0.2570	0.2505	0.2497	0.2578	56	0.0140	0.0001	12.0
120.0	0.9901	0.2570	0.2505	0.2497	0.2578	57	0.0160	0.0001	12.2
127.0	0.9880	0.2570	0.2505	0.2497	0.2579	60	0.0181	0.0001	12.8
140.0	0.9861	0.2570	0.2505	0.2497	0.2579	59	0.0200	0.0001	12.7
154.0	0.9841	0.2570	0.2505	0.2496	0.2580	61	0.0220	0.0001	13.0
169.0	0.9821	0.2571	0.2506	0.2496	0.2581	62	0.0240	0.0002	13.2
187.0	0.9801	0.2571	0.2506	0.2496	0.2581	64	0.0260	0.0002	13.8
200.0	0.9781	0.2571	0.2507	0.2496	0.2582	66	0.0280	0.0002	14.1
214.0	0.9761	0.2572	0.2507	0.2496	0.2583	67	0.0300	0.0003	14.4
228.0	0.9741	0.2573	0.2508	0.2496	0.2584	69	0.0320	0.0004	14.7
241.0	0.9721	0.2574	0.2508	0.2496	0.2585	70	0.0340	0.0004	15.0
255.0	0.9701	0.2574	0.2509	0.2496	0.2586	71	0.0360	0.0005	15.2
268.0	0.9681	0.2575	0.2509	0.2497	0.2587	72	0.0380	0.0005	15.5
275.0	0.9661	0.2576	0.2510	0.2497	0.2588	74	0.0400	0.0006	15.9
288.0	0.9641	0.2577	0.2511	0.2497	0.2590	74	0.0420	0.0007	15.9
302.0	0.9621	0.2578	0.2511	0.2498	0.2591	75	0.0440	0.0008	16.2
321.0	0.9601	0.2579	0.2512	0.2498	0.2592	77	0.0460	0.0009	16.4
334.0	0.9581	0.2580	0.2513	0.2499	0.2593	78	0.0480	0.0010	16.6
348.0	0.9561	0.2582	0.2514	0.2499	0.2595	78	0.0500	0.0011	16.8
361.0	0.9541	0.2583	0.2515	0.2500	0.2596	79	0.0520	0.0012	17.0
374.0	0.9521	0.2584	0.2516	0.2500	0.2598	80	0.0540	0.0013	17.1
387.0	0.9501	0.2585	0.2517	0.2501	0.2599	80	0.0560	0.0014	17.2
400.0	0.9481	0.2586	0.2518	0.2502	0.2600	81	0.0580	0.0015	17.3
413.0	0.9461	0.2588	0.2519	0.2503	0.2602	81	0.0600	0.0016	17.4
420.0	0.9441	0.2589	0.2520	0.2504	0.2603	81	0.0620	0.0017	17.3
434.0	0.9421	0.2590	0.2522	0.2505	0.2605	81	0.0640	0.0019	17.4
448.0	0.9401	0.2592	0.2523	0.2506	0.2606	81	0.0660	0.0020	17.3
467.0	0.9381	0.2593	0.2524	0.2507	0.2608	81	0.0680	0.0021	17.4
481.0	0.9361	0.2594	0.2525	0.2509	0.2609	81	0.0700	0.0023	17.4
494.0	0.9341	0.2595	0.2527	0.2510	0.2610	81	0.0720	0.0024	17.4
507.0	0.9321	0.2596	0.2528	0.2511	0.2612	81	0.0740	0.0025	17.3
521.0	0.9301	0.2598	0.2530	0.2512	0.2613	80	0.0760	0.0027	17.2
534.0	0.9281	0.2599	0.2531	0.2514	0.2614	80	0.0780	0.0028	17.1
548.0	0.9261	0.2600	0.2532	0.2515	0.2616	80	0.0800	0.0029	17.0
559.0	0.9241	0.2601	0.2534	0.2516	0.2617	81	0.0820	0.0031	17.4
568.0	0.9221	0.2602	0.2535	0.2518	0.2618	79	0.0840	0.0032	16.9
583.0	0.9201	0.2604	0.2536	0.2519	0.2620	79	0.0860	0.0033	16.9
602.0	0.9181	0.2605	0.2538	0.2520	0.2621	78	0.0880	0.0034	16.8
615.0	0.9161	0.2606	0.2539	0.2522	0.2622	78	0.0900	0.0036	16.7
629.0	0.9141	0.2607	0.2541	0.2523	0.2623	78	0.0920	0.0037	16.7
642.0	0.9121	0.2608	0.2542	0.2524	0.2625	78	0.0940	0.0038	16.6
655.0	0.9101	0.2609	0.2543	0.2525	0.2626	77	0.0960	0.0039	16.6
668.0	0.9081	0.2610	0.2545	0.2526	0.2627	78	0.0980	0.0040	16.6
682.0	0.9061	0.2612	0.2546	0.2528	0.2629	77	0.1000	0.0042	16.5
695.0	0.9041	0.2613	0.2548	0.2529	0.2630	77	0.1020	0.0043	16.5
702.0	0.9021	0.2614	0.2549	0.2530	0.2631	77	0.1040	0.0044	16.5
716.0	0.9001	0.2615	0.2551	0.2531	0.2633	77	0.1060	0.0046	16.5
736.0	0.8981	0.2616	0.2552	0.2532	0.2634	77	0.1080	0.0047	16.6
749.0	0.8961	0.2617	0.2554	0.2534	0.2636	77	0.1100	0.0049	16.5
763.0	0.8941	0.2618	0.2555	0.2535	0.2637	77	0.1120	0.0050	16.5
776.0	0.8921	0.2619	0.2557	0.2536	0.2638	77	0.1140	0.0051	16.5
790.0	0.8901	0.2620	0.2558	0.2537	0.2640	77	0.1160	0.0052	16.5
803.0	0.8881	0.2622	0.2560	0.2538	0.2641	77	0.1180	0.0054	16.5
816.0	0.8861	0.2623	0.2561	0.2539	0.2643	77	0.1200	0.0055	16.5
829.0	0.8841	0.2624	0.2563	0.2540	0.2644	77	0.1220	0.0056	16.5
838.0	0.8820	0.2625	0.2564	0.2541	0.2646	79	0.1241	0.0057	16.9
849.0	0.8801	0.2626	0.2566	0.2542	0.2647	76	0.1260	0.0059	16.4
863.0	0.8781	0.2627	0.2567	0.2544	0.2649	75	0.1280	0.0060	16.2
882.0	0.8761	0.2628	0.2568	0.2545	0.2650	76	0.1300	0.0061	16.2
895.0	0.8741	0.2629	0.2570	0.2546	0.2651	75	0.1320	0.0062	16.2
908.0	0.8721	0.2629	0.2571	0.2547	0.2652	75	0.1340	0.0063	16.1
921.0	0.8701	0.2630	0.2573	0.2548	0.2654	75	0.1360	0.0065	16.1
934.0	0.8681	0.2631	0.2574	0.2548	0.2655	75	0.1380	0.0065	16.0
947.0	0.8661	0.2632	0.2575	0.2549	0.2656	74	0.1400	0.0066	15.9
961.0	0.8641	0.2632	0.2577	0.2550	0.2657	74	0.1420	0.0067	15.9
973.0	0.8621	0.2633	0.2578	0.2551	0.2658	76	0.1440	0.0068	16.2
982.0	0.8601	0.2634	0.2579	0.2552	0.2660	75	0.1460	0.0070	16.0
995.0	0.8581	0.2634	0.2580	0.2552	0.2661	74	0.1480	0.0070	15.9
1014.0	0.8561	0.2635	0.2582	0.2553	0.2662	74	0.1500	0.0071	15.9
1027.0	0.8541	0.2636	0.2583	0.2554	0.2663	74	0.1520	0.0072	15.8
1041.0	0.8521	0.2636	0.2584	0.2555	0.2664	74	0.1540	0.0073	15.9
1054.0	0.8501	0.2637	0.2585	0.2555	0.2665	75	0.1560	0.0074	16.0

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
1067.0	0.8481	0.2637	0.2586	0.2556	0.2666	75	0.1580	0.0075	16.0
1080.0	0.8461	0.2638	0.2587	0.2557	0.2667	75	0.1600	0.0076	16.0
1094.0	0.8441	0.2638	0.2588	0.2557	0.2667	75	0.1620	0.0076	16.0
1107.0	0.8421	0.2638	0.2589	0.2558	0.2668	74	0.1640	0.0077	15.9
1114.0	0.8401	0.2639	0.2590	0.2559	0.2669	75	0.1660	0.0078	16.0
1127.0	0.8381	0.2639	0.2591	0.2559	0.2670	75	0.1680	0.0078	16.0
1142.0	0.8361	0.2640	0.2592	0.2560	0.2671	74	0.1700	0.0079	15.8
1160.0	0.8341	0.2640	0.2593	0.2561	0.2671	74	0.1720	0.0080	15.8
1173.0	0.8321	0.2640	0.2594	0.2561	0.2672	74	0.1740	0.0080	15.7
1186.0	0.8301	0.2640	0.2595	0.2561	0.2672	73	0.1760	0.0081	15.7
1199.0	0.8281	0.2640	0.2596	0.2562	0.2673	73	0.1780	0.0081	15.6
1213.0	0.8261	0.2640	0.2597	0.2562	0.2674	73	0.1800	0.0082	15.6
1225.0	0.8241	0.2640	0.2598	0.2563	0.2674	72	0.1820	0.0082	15.5
1239.0	0.8221	0.2640	0.2598	0.2563	0.2675	72	0.1840	0.0082	15.5
1248.0	0.8200	0.2640	0.2599	0.2563	0.2675	74	0.1861	0.0083	15.9
1259.0	0.8181	0.2640	0.2600	0.2563	0.2676	72	0.1880	0.0083	15.4
1273.0	0.8161	0.2640	0.2601	0.2564	0.2676	72	0.1900	0.0084	15.4
1292.0	0.8141	0.2640	0.2601	0.2564	0.2676	72	0.1920	0.0084	15.4
1306.0	0.8121	0.2640	0.2602	0.2564	0.2677	72	0.1940	0.0084	15.4
1319.0	0.8101	0.2639	0.2603	0.2564	0.2677	71	0.1960	0.0084	15.3
1333.0	0.8081	0.2639	0.2603	0.2564	0.2677	71	0.1980	0.0084	15.2
1346.0	0.8061	0.2639	0.2604	0.2564	0.2677	71	0.2000	0.0084	15.2
1359.0	0.8041	0.2638	0.2604	0.2564	0.2677	71	0.2020	0.0084	15.1
1372.0	0.8021	0.2638	0.2605	0.2565	0.2677	70	0.2040	0.0085	15.1
1384.0	0.8001	0.2637	0.2605	0.2564	0.2678	71	0.2060	0.0084	15.2
1391.0	0.7981	0.2637	0.2606	0.2564	0.2678	70	0.2080	0.0085	15.0
1405.0	0.7961	0.2636	0.2606	0.2564	0.2678	69	0.2100	0.0084	14.8
1425.0	0.7941	0.2635	0.2607	0.2564	0.2677	69	0.2120	0.0084	14.8
1438.0	0.7921	0.2634	0.2607	0.2564	0.2677	68	0.2140	0.0084	14.6
1451.0	0.7901	0.2634	0.2607	0.2564	0.2677	68	0.2160	0.0084	14.5
1465.0	0.7881	0.2633	0.2607	0.2563	0.2677	68	0.2180	0.0083	14.5
1478.0	0.7861	0.2632	0.2608	0.2563	0.2677	67	0.2200	0.0083	14.4
1491.0	0.7841	0.2631	0.2608	0.2563	0.2676	67	0.2220	0.0083	14.3
1504.0	0.7821	0.2630	0.2608	0.2562	0.2676	66	0.2240	0.0082	14.2
1518.0	0.7801	0.2629	0.2608	0.2562	0.2676	66	0.2260	0.0082	14.2
1525.0	0.7781	0.2628	0.2608	0.2561	0.2676	66	0.2280	0.0082	14.1
1538.0	0.7761	0.2627	0.2608	0.2561	0.2675	66	0.2300	0.0081	14.1
1553.0	0.7741	0.2626	0.2609	0.2561	0.2675	66	0.2320	0.0081	14.1
1571.0	0.7721	0.2625	0.2609	0.2560	0.2674	66	0.2340	0.0081	14.1
1584.0	0.7701	0.2624	0.2609	0.2560	0.2674	66	0.2360	0.0080	14.1
1597.0	0.7681	0.2623	0.2609	0.2559	0.2673	66	0.2380	0.0079	14.0
1611.0	0.7661	0.2622	0.2609	0.2558	0.2673	65	0.2400	0.0079	13.9
1624.0	0.7641	0.2621	0.2609	0.2558	0.2672	65	0.2420	0.0078	13.8
1636.0	0.7621	0.2620	0.2609	0.2557	0.2672	65	0.2440	0.0078	13.8
1649.0	0.7601	0.2619	0.2608	0.2556	0.2671	64	0.2460	0.0077	13.7
1659.0	0.7581	0.2618	0.2608	0.2556	0.2671	65	0.2480	0.0077	14.0
1669.0	0.7561	0.2616	0.2608	0.2555	0.2670	63	0.2500	0.0076	13.5
1682.0	0.7541	0.2615	0.2608	0.2554	0.2669	63	0.2520	0.0075	13.5
1701.0	0.7521	0.2614	0.2608	0.2553	0.2669	64	0.2540	0.0074	13.6
1714.0	0.7501	0.2613	0.2608	0.2553	0.2668	63	0.2560	0.0074	13.5
1728.0	0.7481	0.2612	0.2607	0.2552	0.2667	63	0.2580	0.0073	13.5
1741.0	0.7461	0.2611	0.2607	0.2551	0.2667	63	0.2600	0.0072	13.5
1753.0	0.7441	0.2610	0.2607	0.2550	0.2666	63	0.2620	0.0072	13.5
1767.0	0.7421	0.2609	0.2606	0.2549	0.2665	63	0.2640	0.0071	13.4
1779.0	0.7401	0.2608	0.2606	0.2548	0.2665	62	0.2660	0.0070	13.4
1792.0	0.7381	0.2606	0.2606	0.2547	0.2664	63	0.2680	0.0069	13.4
1799.0	0.7361	0.2605	0.2605	0.2546	0.2663	63	0.2700	0.0068	13.4
1812.0	0.7341	0.2604	0.2605	0.2545	0.2663	63	0.2720	0.0068	13.4
1826.0	0.7321	0.2603	0.2604	0.2545	0.2662	62	0.2740	0.0067	13.4
1844.0	0.7301	0.2602	0.2604	0.2544	0.2661	62	0.2760	0.0066	13.3
1857.0	0.7281	0.2601	0.2603	0.2543	0.2661	62	0.2780	0.0065	13.3
1870.0	0.7261	0.2599	0.2603	0.2542	0.2660	62	0.2800	0.0064	13.3
1883.0	0.7241	0.2598	0.2603	0.2541	0.2659	62	0.2820	0.0064	13.3
1896.0	0.7221	0.2597	0.2602	0.2540	0.2659	62	0.2840	0.0063	13.3
1909.0	0.7201	0.2596	0.2602	0.2540	0.2658	62	0.2860	0.0062	13.3
1923.0	0.7181	0.2595	0.2601	0.2539	0.2657	62	0.2880	0.0061	13.3
1932.0	0.7161	0.2594	0.2601	0.2538	0.2657	63	0.2900	0.0061	13.6
1942.0	0.7141	0.2593	0.2601	0.2537	0.2656	62	0.2920	0.0060	13.3
1956.0	0.7121	0.2592	0.2600	0.2537	0.2655	62	0.2940	0.0059	13.3
1970.0	0.7101	0.2590	0.2600	0.2536	0.2655	61	0.2960	0.0059	13.0
1988.0	0.7081	0.2589	0.2600	0.2535	0.2654	61	0.2980	0.0058	13.2
2001.0	0.7061	0.2588	0.2599	0.2534	0.2653	61	0.3000	0.0057	13.2
2014.0	0.7041	0.2587	0.2599	0.2534	0.2652	62	0.3020	0.0056	13.2
2028.0	0.7021	0.2585	0.2598	0.2533	0.2652	61	0.3040	0.0055	13.2
2041.0	0.7001	0.2584	0.2598	0.2532	0.2651	61	0.3060	0.0055	13.2
2054.0	0.6981	0.2583	0.2598	0.2531	0.2651	62	0.3080	0.0054	13.2
2067.0	0.6961	0.2582	0.2598	0.2531	0.2650	62	0.3100	0.0054	13.2
2074.0	0.6941	0.2581	0.2597	0.2530	0.2649	61	0.3120	0.0053	13.2
2088.0	0.6921	0.2580	0.2597	0.2530	0.2649	61	0.3140	0.0052	13.0

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
2102.0	0.6901	0.2579	0.2597	0.2529	0.2648	61	0.3160	0.0052	13.1
2120.0	0.6881	0.2577	0.2596	0.2528	0.2647	61	0.3180	0.0050	13.0
2134.0	0.6861	0.2576	0.2596	0.2528	0.2646	60	0.3200	0.0050	12.9
2147.0	0.6841	0.2575	0.2596	0.2527	0.2645	60	0.3220	0.0049	12.9
2160.0	0.6821	0.2573	0.2595	0.2526	0.2644	60	0.3240	0.0048	12.9
2173.0	0.6801	0.2572	0.2595	0.2526	0.2643	60	0.3260	0.0047	12.9
2186.0	0.6781	0.2570	0.2595	0.2525	0.2642	60	0.3280	0.0046	12.8
2199.0	0.6761	0.2569	0.2594	0.2524	0.2642	60	0.3300	0.0046	12.9
2208.0	0.6741	0.2568	0.2594	0.2524	0.2641	62	0.3320	0.0045	13.2
2219.0	0.6721	0.2566	0.2594	0.2523	0.2640	60	0.3340	0.0044	12.7
2233.0	0.6701	0.2564	0.2593	0.2522	0.2639	59	0.3360	0.0043	12.6
2252.0	0.6681	0.2563	0.2593	0.2521	0.2638	59	0.3380	0.0042	12.7
2265.0	0.6661	0.2561	0.2593	0.2521	0.2637	59	0.3400	0.0041	12.7
2278.0	0.6641	0.2560	0.2593	0.2520	0.2636	59	0.3420	0.0041	12.6
2292.0	0.6621	0.2558	0.2593	0.2520	0.2636	59	0.3440	0.0040	12.6
2305.0	0.6601	0.2557	0.2593	0.2519	0.2635	58	0.3460	0.0039	12.5
2318.0	0.6581	0.2556	0.2593	0.2519	0.2634	58	0.3480	0.0039	12.4
2331.0	0.6561	0.2554	0.2593	0.2518	0.2634	57	0.3500	0.0038	12.3
2344.0	0.6541	0.2553	0.2593	0.2518	0.2633	58	0.3520	0.0038	12.4
2352.0	0.6521	0.2551	0.2593	0.2517	0.2632	57	0.3540	0.0037	12.1
2365.0	0.6501	0.2550	0.2593	0.2517	0.2631	56	0.3560	0.0036	12.1
2379.0	0.6481	0.2549	0.2592	0.2516	0.2630	56	0.3580	0.0035	12.0
2398.0	0.6461	0.2547	0.2592	0.2515	0.2629	55	0.3600	0.0034	11.9
2411.0	0.6441	0.2545	0.2592	0.2515	0.2628	55	0.3620	0.0033	11.8
2424.0	0.6421	0.2544	0.2591	0.2514	0.2627	55	0.3640	0.0032	11.7
2437.0	0.6401	0.2542	0.2591	0.2513	0.2626	54	0.3660	0.0031	11.6
2450.0	0.6381	0.2540	0.2591	0.2513	0.2625	54	0.3680	0.0031	11.5
2464.0	0.6361	0.2539	0.2591	0.2512	0.2624	53	0.3700	0.0030	11.4
2477.0	0.6341	0.2537	0.2590	0.2511	0.2623	53	0.3720	0.0029	11.4
2483.0	0.6321	0.2536	0.2590	0.2510	0.2622	53	0.3740	0.0028	11.3
2497.0	0.6301	0.2534	0.2590	0.2510	0.2621	53	0.3760	0.0027	11.4
2511.0	0.6281	0.2532	0.2589	0.2509	0.2620	53	0.3780	0.0026	11.2
2529.0	0.6261	0.2530	0.2589	0.2508	0.2619	53	0.3800	0.0025	11.3
2543.0	0.6241	0.2529	0.2589	0.2507	0.2618	52	0.3820	0.0024	11.2
2556.0	0.6221	0.2527	0.2588	0.2507	0.2617	53	0.3840	0.0023	11.3
2570.0	0.6201	0.2526	0.2588	0.2506	0.2616	53	0.3860	0.0022	11.2
2583.0	0.6181	0.2524	0.2588	0.2505	0.2616	53	0.3880	0.0022	11.3
2596.0	0.6161	0.2523	0.2588	0.2504	0.2615	53	0.3900	0.0021	11.3
2610.0	0.6141	0.2522	0.2587	0.2504	0.2614	53	0.3920	0.0020	11.3
2618.0	0.6121	0.2520	0.2587	0.2503	0.2613	54	0.3940	0.0019	11.6
2629.0	0.6101	0.2519	0.2587	0.2503	0.2612	53	0.3960	0.0019	11.3
2643.0	0.6081	0.2517	0.2586	0.2502	0.2611	53	0.3980	0.0017	11.3
2662.0	0.6061	0.2516	0.2586	0.2501	0.2610	51	0.4000	0.0017	11.0
2675.0	0.6041	0.2515	0.2585	0.2500	0.2609	52	0.4020	0.0016	11.1
2688.0	0.6021	0.2513	0.2585	0.2500	0.2608	51	0.4040	0.0015	11.0
2701.0	0.6001	0.2512	0.2584	0.2499	0.2607	51	0.4060	0.0014	11.0
2714.0	0.5981	0.2511	0.2584	0.2498	0.2606	51	0.4080	0.0013	10.9
2727.0	0.5961	0.2509	0.2583	0.2497	0.2605	51	0.4100	0.0012	10.9
2740.0	0.5941	0.2508	0.2583	0.2496	0.2604	51	0.4120	0.0011	10.8
2753.0	0.5921	0.2507	0.2582	0.2495	0.2603	51	0.4140	0.0010	10.8
2760.0	0.5901	0.2505	0.2581	0.2495	0.2602	50	0.4160	0.0009	10.7
2774.0	0.5881	0.2504	0.2581	0.2494	0.2601	50	0.4180	0.0008	10.6
2787.0	0.5861	0.2502	0.2580	0.2493	0.2600	49	0.4200	0.0007	10.6
2806.0	0.5841	0.2501	0.2579	0.2492	0.2599	50	0.4220	0.0006	10.6
2819.0	0.5821	0.2499	0.2579	0.2491	0.2598	49	0.4240	0.0005	10.6
2832.0	0.5801	0.2498	0.2578	0.2490	0.2596	49	0.4260	0.0004	10.6
2845.0	0.5781	0.2497	0.2578	0.2489	0.2595	50	0.4280	0.0003	10.6
2858.0	0.5761	0.2495	0.2577	0.2488	0.2595	50	0.4300	0.0002	10.6
2872.0	0.5741	0.2494	0.2577	0.2488	0.2594	50	0.4320	0.0002	10.6
2885.0	0.5721	0.2493	0.2576	0.2487	0.2593	49	0.4340	0.0001	10.6
2893.0	0.5700	0.2492	0.2576	0.2486	0.2592	50	0.4361	0.0000	10.8
2905.0	0.5681	0.2490	0.2575	0.2486	0.2591	49	0.4380	-0.0001	10.5
2919.0	0.5661	0.2489	0.2575	0.2485	0.2591	49	0.4400	-0.0002	10.5
2938.0	0.5641	0.2488	0.2574	0.2484	0.2589	49	0.4420	-0.0003	10.6
2951.0	0.5621	0.2487	0.2574	0.2483	0.2589	49	0.4440	-0.0003	10.5
2964.0	0.5601	0.2486	0.2573	0.2482	0.2588	49	0.4460	-0.0004	10.5
2978.0	0.5581	0.2485	0.2573	0.2482	0.2587	49	0.4480	-0.0005	10.4
2990.0	0.5561	0.2484	0.2572	0.2481	0.2587	49	0.4500	-0.0006	10.4
3003.0	0.5541	0.2483	0.2572	0.2480	0.2586	49	0.4520	-0.0006	10.4
3017.0	0.5521	0.2482	0.2571	0.2479	0.2585	48	0.4540	-0.0007	10.3
3029.0	0.5501	0.2481	0.2570	0.2478	0.2584	49	0.4560	-0.0008	10.5
3037.0	0.5481	0.2480	0.2570	0.2478	0.2584	48	0.4580	-0.0009	10.2
3050.0	0.5461	0.2479	0.2569	0.2477	0.2583	48	0.4600	-0.0010	10.2
3064.0	0.5441	0.2477	0.2569	0.2476	0.2582	48	0.4620	-0.0011	10.2
3083.0	0.5421	0.2476	0.2568	0.2475	0.2581	48	0.4640	-0.0012	10.3
3096.0	0.5401	0.2475	0.2567	0.2474	0.2580	48	0.4660	-0.0013	10.3
3109.0	0.5381	0.2474	0.2567	0.2473	0.2579	48	0.4680	-0.0013	10.3
3122.0	0.5361	0.2473	0.2566	0.2472	0.2579	48	0.4700	-0.0014	10.3
3135.0	0.5341	0.2473	0.2566	0.2472	0.2578	48	0.4720	-0.0014	10.3

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
3148.0	0.5321	0.2472	0.2565	0.2471	0.2577	48	0.4740	-0.0015	10.3
3161.0	0.5301	0.2471	0.2565	0.2470	0.2577	48	0.4760	-0.0016	10.3
3168.0	0.5281	0.2470	0.2564	0.2470	0.2576	48	0.4780	-0.0017	10.3
3181.0	0.5261	0.2469	0.2564	0.2469	0.2575	48	0.4800	-0.0017	10.3
3194.0	0.5241	0.2468	0.2563	0.2468	0.2575	48	0.4820	-0.0018	10.3
3213.0	0.5221	0.2467	0.2562	0.2467	0.2574	49	0.4840	-0.0019	10.4
3226.0	0.5201	0.2466	0.2562	0.2466	0.2573	48	0.4860	-0.0020	10.3
3239.0	0.5181	0.2465	0.2561	0.2466	0.2572	48	0.4880	-0.0021	10.3
3253.0	0.5161	0.2464	0.2561	0.2465	0.2572	48	0.4900	-0.0021	10.3
3266.0	0.5141	0.2464	0.2560	0.2464	0.2571	48	0.4920	-0.0022	10.3
3279.0	0.5121	0.2463	0.2560	0.2464	0.2570	48	0.4940	-0.0022	10.2
3292.0	0.5101	0.2462	0.2559	0.2463	0.2569	48	0.4960	-0.0023	10.2
3304.0	0.5081	0.2461	0.2559	0.2462	0.2569	49	0.4980	-0.0024	10.4
3312.0	0.5061	0.2460	0.2558	0.2462	0.2568	48	0.5000	-0.0025	10.2
3325.0	0.5041	0.2460	0.2558	0.2461	0.2568	48	0.5020	-0.0025	10.2
3339.0	0.5021	0.2459	0.2557	0.2460	0.2567	48	0.5040	-0.0026	10.3
3358.0	0.5001	0.2458	0.2557	0.2460	0.2566	48	0.5060	-0.0026	10.3
3371.0	0.4981	0.2457	0.2556	0.2459	0.2565	48	0.5080	-0.0027	10.3
3384.0	0.4961	0.2456	0.2556	0.2458	0.2565	48	0.5100	-0.0028	10.3
3397.0	0.4941	0.2456	0.2555	0.2458	0.2564	48	0.5120	-0.0028	10.3

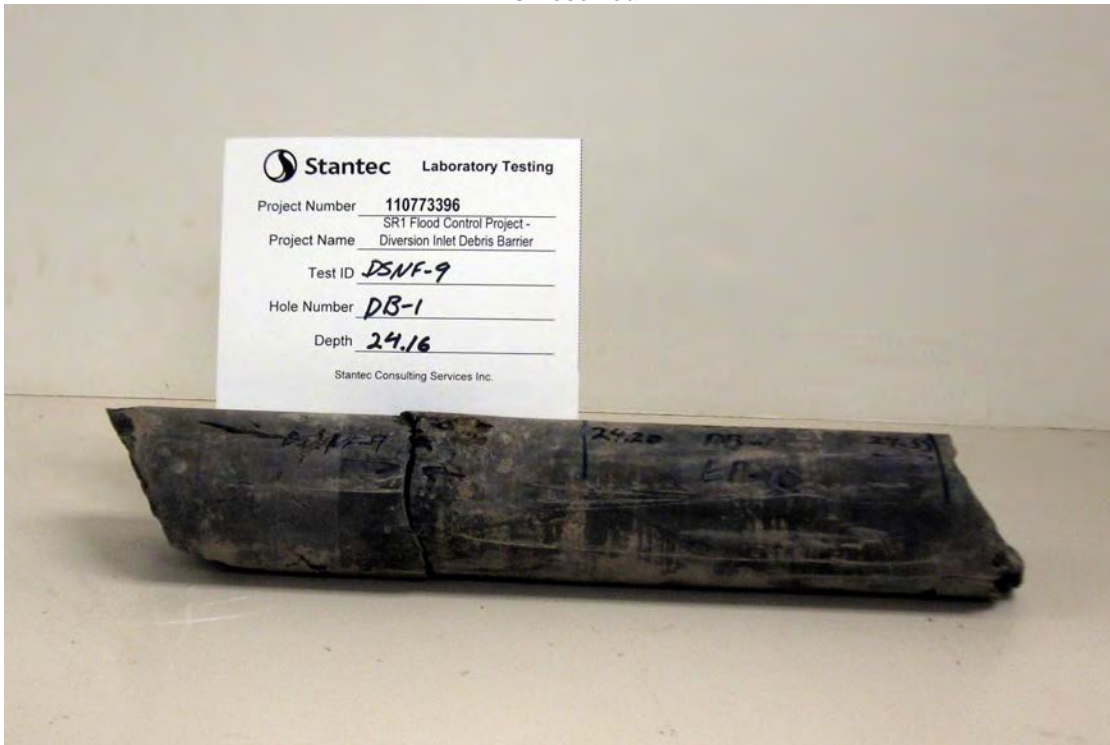


Photo Report

Project Name SR1 Flood Control Project - Inlet Debris Barrier
Lithology Shale, gray, moderately hard, partially healed faults
Hole Number DB-1 Depth (m) 24.16
Test Type Direct shear of natural fracture

Project Number 110773396
Lab ID DSNF-9

As Received



Core Preparation

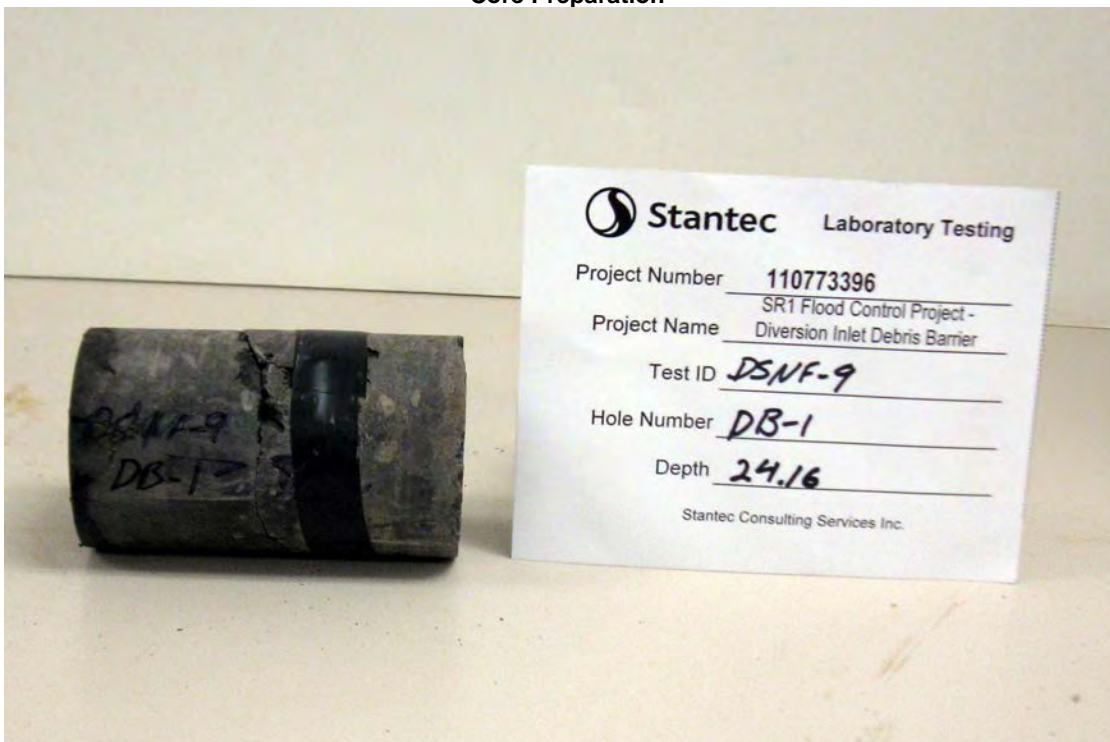




Photo Report

Project Name SR1 Flood Control Project - Inlet Debris Barrier
Lithology Shale, gray, moderately hard, partially healed faults
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Project Number 110773396
Lab ID DSNF-9

Core Preparation



Post Test

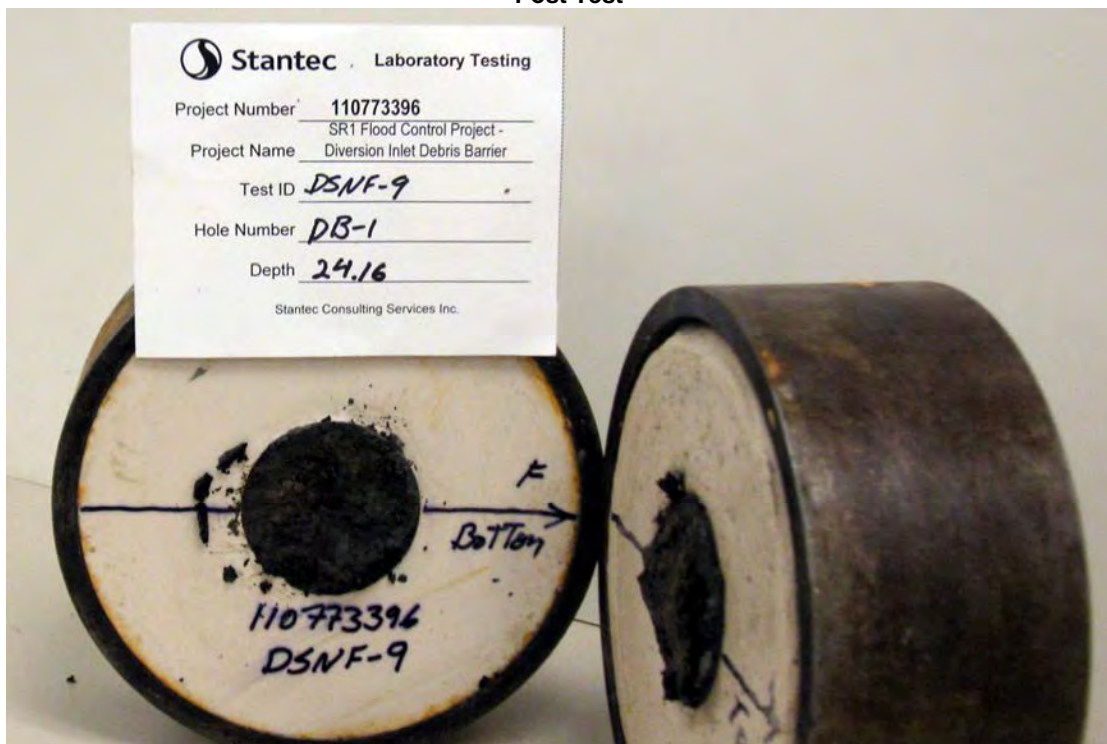




Photo Report

Project Name SR1 Flood Control Project - Inlet Debris Barrier
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Post Test

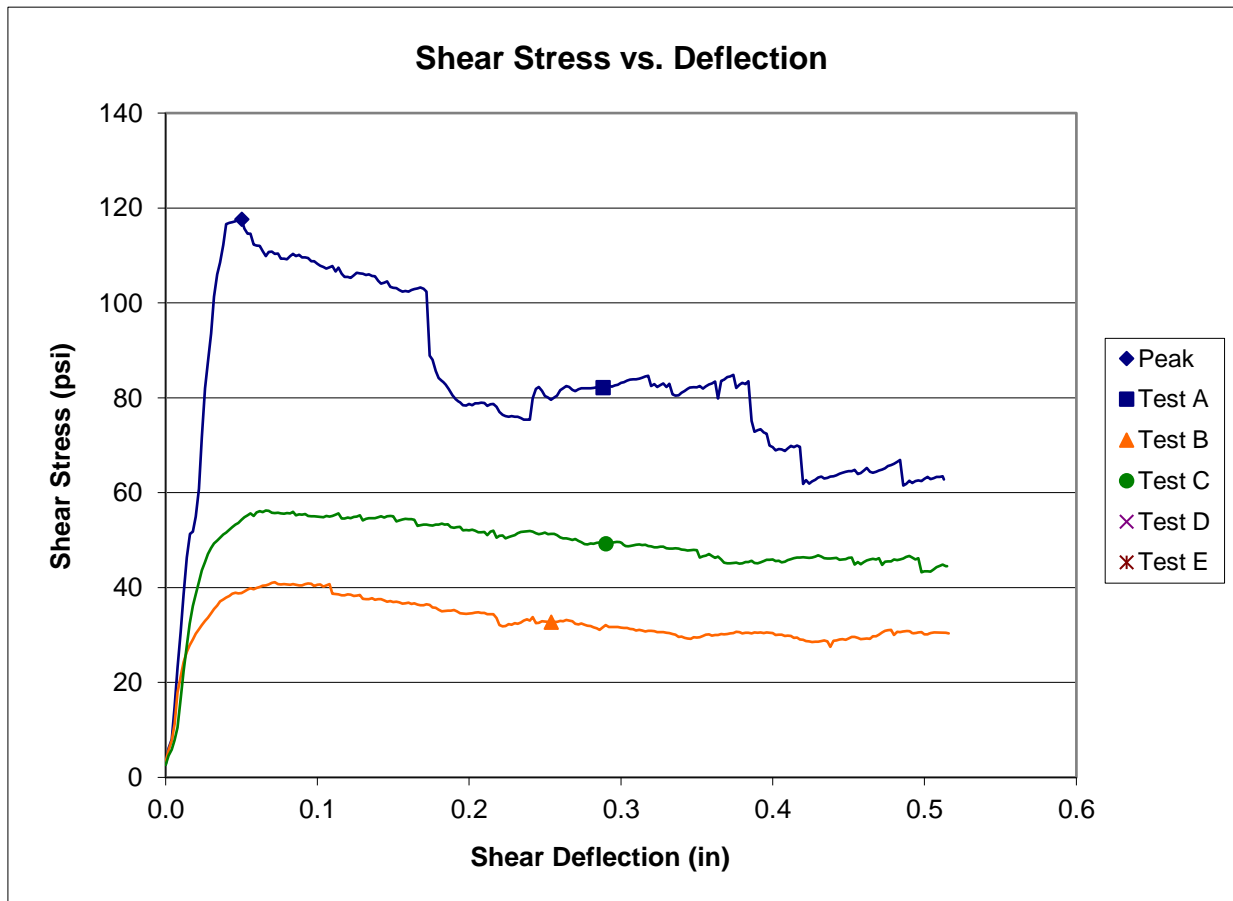




Direct Shear Strength of Rock
ASTM D 5607

Project Name	<u>SR1 Flood Control Project - Inlet Debris Barrier</u>	Project Number	<u>110773396</u>
Lithology	<u>Dolomite, tan, moderately hard</u>	Lab ID	<u>DSNF-20</u>
Hole Number	<u>DB-3</u>	Depth (m)	<u>13.86</u>
Test Type	<u>Direct shear of natural fracture</u>	Date Received	<u>05/15/2018</u>
Initial Moisture Condition	<u>As received, moist</u>	Diameter (in.)	<u>2.400</u>
At Test Moisture Condition	<u>Soaked at least 12 hours prior to test.</u>	Angle of Dip (deg.)	<u>20.0</u>
Roughness (JRC)	<u>9</u>	Area (in ²)	<u>4.81</u>

	Test A	Test B	Test C	Test D	Test E
Normal Stress (psi)	94.0	36.0	62.0	N/A	N/A
Peak Shear Stress (psi)	117.6				
Deflection at Peak (in)	0.0500				
Post Peak Stress (psi)	82.1	32.7	49.2	N/A	N/A
Deflection at Residual (in)	0.2880	0.2540	0.2900	N/A	N/A



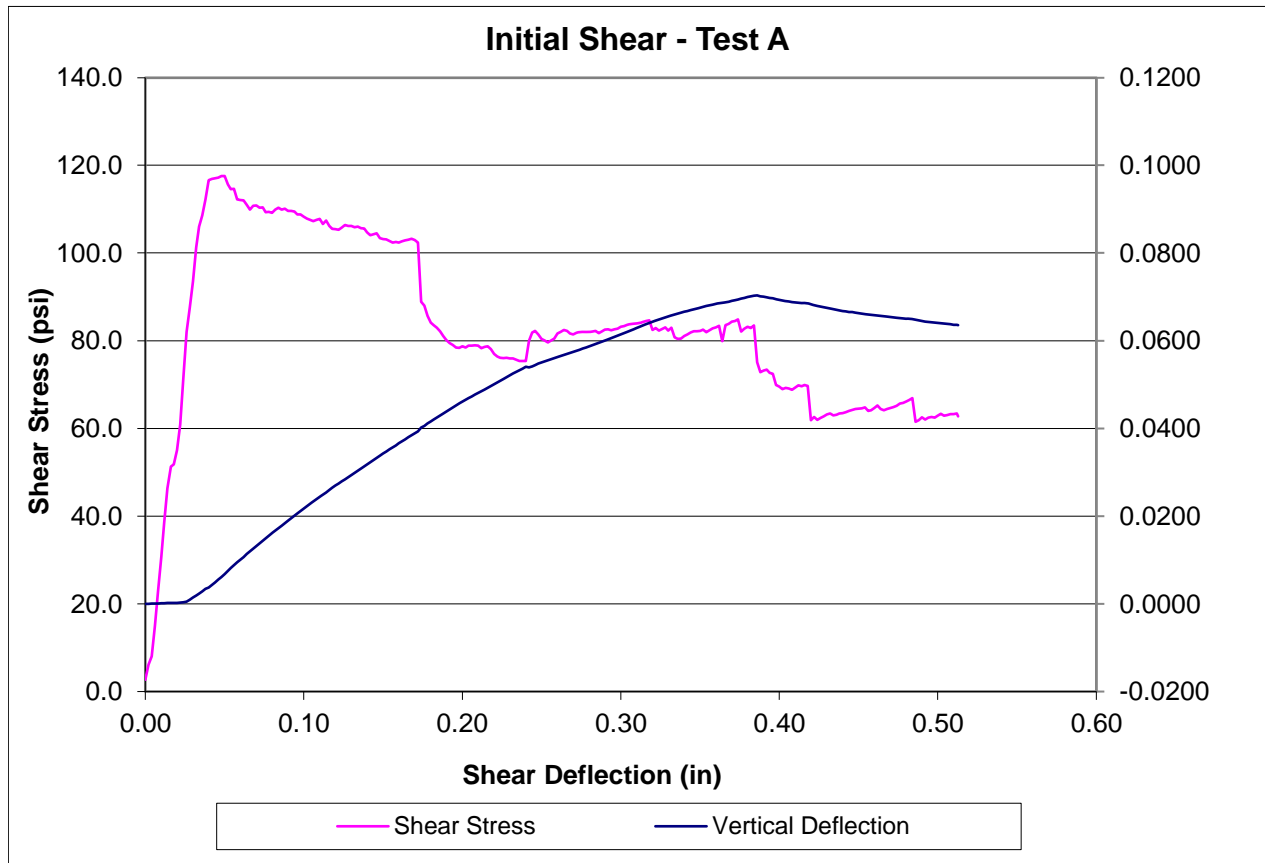
Comments _____

Reviewed By RJ

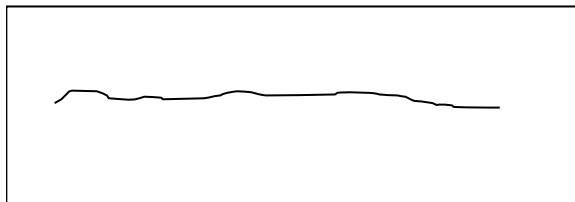


Direct Shear Strength of Rock
ASTM D 5607

Project Name	<u>SR1 Flood Control Project - Inlet Debris Barrier</u>	Project Number	<u>110773396</u>
Lithology	<u>Dolomite, tan, moderately hard</u>	Lab ID	<u>DSNF-20</u>
Hole Number	<u>DB-3</u>	Date Received	<u>05/15/2018</u>
Depth (m)	<u>13.86</u>	Diameter (in)	<u>2.400</u>
Test Type	<u>Direct shear of natural fracture</u>	Angle of Dip (deg)	<u>20.0</u>
Initial Moisture Condition	<u>As received, moist</u>	Area(in ²)	<u>4.81</u>
Test Moisture Condition	<u>Soaked at least 12 hours prior to test.</u>	Date Prepared	<u>06/27/2018</u>
Joint Roughness	<u>9</u>	Date Tested	<u>06/28/2018</u>
Normal Stress (psi)	<u>94</u>		



Sketch



Shear Rate to Peak (in/min) 0.008

Encapsulation Material Hydro-Stone

Comments _____

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
0.0	1.0092	0.2519	0.2574	0.2564	0.2572	13	0.0000	0.0000	2.7
21.0	1.0072	0.2519	0.2574	0.2562	0.2575	30	0.0020	0.0000	6.1
44.0	1.0052	0.2519	0.2574	0.2560	0.2578	39	0.0040	0.0001	8.0
60.0	1.0032	0.2519	0.2575	0.2557	0.2581	72	0.0060	0.0001	15.0
75.0	1.0012	0.2519	0.2575	0.2554	0.2584	111	0.0080	0.0001	23.1
90.0	0.9992	0.2519	0.2575	0.2552	0.2587	148	0.0100	0.0001	30.7
104.0	0.9972	0.2519	0.2576	0.2549	0.2590	186	0.0120	0.0001	38.6
118.0	0.9952	0.2520	0.2576	0.2546	0.2594	223	0.0140	0.0002	46.3
129.0	0.9931	0.2521	0.2576	0.2544	0.2597	247	0.0161	0.0002	51.3
135.0	0.9912	0.2522	0.2576	0.2543	0.2597	249	0.0180	0.0002	51.8
144.0	0.9892	0.2522	0.2575	0.2542	0.2599	263	0.0200	0.0002	55.0
156.0	0.9872	0.2523	0.2575	0.2540	0.2602	293	0.0220	0.0003	60.8
171.0	0.9852	0.2525	0.2575	0.2537	0.2607	345	0.0240	0.0004	71.7
187.0	0.9832	0.2527	0.2576	0.2532	0.2615	395	0.0260	0.0005	82.0
201.0	0.9812	0.2535	0.2577	0.2528	0.2627	422	0.0280	0.0010	87.6
217.0	0.9792	0.2543	0.2579	0.2523	0.2641	450	0.0300	0.0014	93.5
233.0	0.9772	0.2551	0.2579	0.2520	0.2653	488	0.0320	0.0019	101.3
247.0	0.9752	0.2560	0.2580	0.2518	0.2663	510	0.0340	0.0023	106.0
262.0	0.9732	0.2571	0.2581	0.2518	0.2673	523	0.0360	0.0029	108.5
277.0	0.9712	0.2579	0.2584	0.2519	0.2683	540	0.0380	0.0034	112.2
291.0	0.9692	0.2582	0.2588	0.2518	0.2690	561	0.0400	0.0037	116.6
305.0	0.9672	0.2590	0.2592	0.2521	0.2698	563	0.0420	0.0043	116.9
318.0	0.9652	0.2596	0.2597	0.2525	0.2706	563	0.0440	0.0049	117.0
332.0	0.9632	0.2603	0.2603	0.2530	0.2714	564	0.0460	0.0055	117.2
346.0	0.9612	0.2609	0.2610	0.2534	0.2722	566	0.0480	0.0062	117.5
360.0	0.9592	0.2615	0.2617	0.2539	0.2730	566	0.0500	0.0068	117.6
373.0	0.9572	0.2622	0.2623	0.2545	0.2738	557	0.0520	0.0075	115.7
387.0	0.9552	0.2629	0.2630	0.2550	0.2746	552	0.0540	0.0082	114.6
401.0	0.9532	0.2635	0.2637	0.2555	0.2754	552	0.0560	0.0088	114.6
414.0	0.9512	0.2641	0.2644	0.2561	0.2761	540	0.0580	0.0095	112.3
427.0	0.9492	0.2647	0.2650	0.2566	0.2769	539	0.0600	0.0101	112.0
441.0	0.9472	0.2652	0.2657	0.2571	0.2776	539	0.0620	0.0107	112.0
455.0	0.9452	0.2658	0.2664	0.2577	0.2784	534	0.0640	0.0114	110.9
468.0	0.9432	0.2664	0.2670	0.2582	0.2791	529	0.0660	0.0120	109.9
482.0	0.9412	0.2670	0.2676	0.2586	0.2799	533	0.0680	0.0126	110.7
495.0	0.9392	0.2675	0.2683	0.2591	0.2806	534	0.0700	0.0132	110.8
510.0	0.9372	0.2681	0.2690	0.2596	0.2814	531	0.0720	0.0138	110.3
523.0	0.9352	0.2687	0.2696	0.2601	0.2821	531	0.0740	0.0144	110.4
536.0	0.9332	0.2693	0.2702	0.2605	0.2829	526	0.0760	0.0150	109.3
550.0	0.9312	0.2699	0.2707	0.2608	0.2837	526	0.0780	0.0156	109.3
564.0	0.9292	0.2704	0.2713	0.2613	0.2844	526	0.0800	0.0161	109.2
577.0	0.9272	0.2710	0.2718	0.2616	0.2851	529	0.0820	0.0167	109.9
591.0	0.9252	0.2715	0.2724	0.2620	0.2859	531	0.0840	0.0172	110.3
605.0	0.9232	0.2721	0.2730	0.2625	0.2866	529	0.0860	0.0178	109.9
618.0	0.9212	0.2726	0.2735	0.2629	0.2874	530	0.0880	0.0184	110.1
632.0	0.9192	0.2732	0.2741	0.2633	0.2881	528	0.0900	0.0190	109.6
645.0	0.9172	0.2737	0.2747	0.2636	0.2889	528	0.0920	0.0195	109.6
659.0	0.9152	0.2742	0.2753	0.2640	0.2896	527	0.0940	0.0201	109.4
672.0	0.9132	0.2747	0.2760	0.2643	0.2904	524	0.0960	0.0206	108.8
685.0	0.9112	0.2752	0.2765	0.2647	0.2911	524	0.0980	0.0212	108.8
698.0	0.9092	0.2757	0.2771	0.2651	0.2918	521	0.1000	0.0217	108.3
712.0	0.9072	0.2762	0.2778	0.2655	0.2926	519	0.1020	0.0223	107.8
726.0	0.9052	0.2767	0.2784	0.2658	0.2933	518	0.1040	0.0228	107.6
739.0	0.9032	0.2772	0.2789	0.2661	0.2940	516	0.1060	0.0233	107.2
752.0	0.9012	0.2776	0.2795	0.2665	0.2947	518	0.1080	0.0239	107.5
766.0	0.8992	0.2781	0.2800	0.2668	0.2954	519	0.1100	0.0244	107.8
779.0	0.8972	0.2786	0.2806	0.2673	0.2961	513	0.1120	0.0249	106.6
792.0	0.8952	0.2791	0.2811	0.2677	0.2966	517	0.1140	0.0254	107.4
806.0	0.8932	0.2796	0.2817	0.2681	0.2973	511	0.1160	0.0260	106.1
819.0	0.8912	0.2802	0.2822	0.2685	0.2979	508	0.1180	0.0265	105.5
833.0	0.8892	0.2806	0.2827	0.2689	0.2985	508	0.1200	0.0270	105.5
846.0	0.8872	0.2811	0.2832	0.2693	0.2990	507	0.1220	0.0274	105.3
859.0	0.8852	0.2816	0.2837	0.2697	0.2996	509	0.1240	0.0279	105.8
872.0	0.8832	0.2820	0.2842	0.2701	0.3002	512	0.1260	0.0284	106.4
885.0	0.8812	0.2825	0.2847	0.2705	0.3008	511	0.1280	0.0289	106.2
898.0	0.8792	0.2830	0.2852	0.2708	0.3014	511	0.1300	0.0294	106.1
911.0	0.8772	0.2835	0.2856	0.2712	0.3020	510	0.1320	0.0299	105.9
925.0	0.8752	0.2839	0.2862	0.2716	0.3026	510	0.1340	0.0304	106.0
938.0	0.8732	0.2844	0.2867	0.2720	0.3032	509	0.1360	0.0309	105.7
951.0	0.8712	0.2849	0.2871	0.2724	0.3038	508	0.1380	0.0313	105.6
964.0	0.8692	0.2855	0.2876	0.2727	0.3044	504	0.1400	0.0318	104.7
978.0	0.8672	0.2860	0.2881	0.2730	0.3051	501	0.1420	0.0323	104.1
991.0	0.8652	0.2865	0.2885	0.2733	0.3057	502	0.1440	0.0328	104.3
1004.0	0.8632	0.2870	0.2890	0.2737	0.3063	503	0.1460	0.0333	104.5
1018.0	0.8612	0.2876	0.2894	0.2740	0.3070	498	0.1480	0.0338	103.4
1031.0	0.8592	0.2881	0.2899	0.2744	0.3076	497	0.1500	0.0343	103.2
1045.0	0.8572	0.2886	0.2903	0.2748	0.3082	496	0.1520	0.0348	103.1
1058.0	0.8552	0.2891	0.2908	0.2751	0.3087	494	0.1540	0.0352	102.7
1071.0	0.8532	0.2896	0.2912	0.2755	0.3093	493	0.1560	0.0357	102.3

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
1084.0	0.8512	0.2900	0.2917	0.2758	0.3099	493	0.1580	0.0361	102.5
1098.0	0.8492	0.2905	0.2922	0.2762	0.3105	493	0.1600	0.0366	102.4
1111.0	0.8472	0.2910	0.2926	0.2765	0.3111	494	0.1620	0.0371	102.7
1124.0	0.8452	0.2915	0.2930	0.2768	0.3117	495	0.1640	0.0375	102.9
1137.0	0.8432	0.2920	0.2934	0.2771	0.3124	496	0.1660	0.0380	103.0
1151.0	0.8412	0.2925	0.2938	0.2773	0.3130	497	0.1680	0.0384	103.3
1164.0	0.8392	0.2930	0.2942	0.2776	0.3136	496	0.1700	0.0389	102.9
1178.0	0.8372	0.2935	0.2946	0.2779	0.3142	493	0.1720	0.0393	102.3
1189.0	0.8352	0.2945	0.2953	0.2793	0.3145	428	0.1740	0.0402	88.9
1202.0	0.8332	0.2950	0.2956	0.2796	0.3150	424	0.1760	0.0406	88.0
1214.0	0.8312	0.2956	0.2961	0.2799	0.3158	412	0.1780	0.0411	85.6
1228.0	0.8292	0.2961	0.2965	0.2803	0.3164	405	0.1800	0.0416	84.1
1241.0	0.8272	0.2967	0.2968	0.2808	0.3167	402	0.1820	0.0420	83.6
1254.0	0.8252	0.2972	0.2972	0.2811	0.3172	399	0.1840	0.0425	83.0
1267.0	0.8232	0.2978	0.2975	0.2816	0.3178	395	0.1860	0.0430	82.1
1280.0	0.8212	0.2984	0.2978	0.2820	0.3181	390	0.1880	0.0434	81.1
1294.0	0.8192	0.2990	0.2982	0.2825	0.3187	386	0.1900	0.0439	80.1
1307.0	0.8172	0.2995	0.2986	0.2828	0.3193	383	0.1920	0.0443	79.5
1320.0	0.8152	0.3001	0.2990	0.2832	0.3198	380	0.1940	0.0448	79.0
1333.0	0.8132	0.3006	0.2994	0.2836	0.3204	378	0.1960	0.0453	78.5
1347.0	0.8112	0.3011	0.2997	0.2839	0.3209	377	0.1980	0.0457	78.4
1360.0	0.8092	0.3016	0.3000	0.2843	0.3213	379	0.2000	0.0461	78.7
1373.0	0.8072	0.3021	0.3003	0.2848	0.3216	378	0.2020	0.0465	78.5
1387.0	0.8052	0.3026	0.3006	0.2852	0.3220	380	0.2040	0.0469	78.9
1400.0	0.8032	0.3031	0.3010	0.2855	0.3225	380	0.2060	0.0473	78.9
1413.0	0.8012	0.3036	0.3012	0.2859	0.3229	380	0.2080	0.0477	79.0
1426.0	0.7992	0.3041	0.3015	0.2863	0.3233	380	0.2100	0.0481	78.9
1439.0	0.7972	0.3048	0.3017	0.2867	0.3237	377	0.2120	0.0485	78.3
1452.0	0.7952	0.3053	0.3018	0.2870	0.3241	378	0.2140	0.0488	78.6
1465.0	0.7932	0.3059	0.3021	0.2874	0.3246	379	0.2160	0.0493	78.7
1478.0	0.7912	0.3065	0.3023	0.2878	0.3250	376	0.2180	0.0497	78.1
1492.0	0.7892	0.3071	0.3025	0.2882	0.3254	371	0.2200	0.0501	77.0
1505.0	0.7872	0.3077	0.3028	0.2886	0.3258	368	0.2220	0.0505	76.4
1518.0	0.7852	0.3083	0.3029	0.2889	0.3263	367	0.2240	0.0509	76.1
1531.0	0.7832	0.3089	0.3031	0.2893	0.3267	366	0.2260	0.0513	76.0
1544.0	0.7812	0.3094	0.3033	0.2897	0.3271	366	0.2280	0.0517	76.1
1558.0	0.7792	0.3100	0.3036	0.2900	0.3276	366	0.2300	0.0521	76.0
1571.0	0.7772	0.3106	0.3038	0.2904	0.3281	366	0.2320	0.0525	76.0
1584.0	0.7752	0.3111	0.3041	0.2907	0.3285	364	0.2340	0.0529	75.7
1597.0	0.7732	0.3117	0.3043	0.2911	0.3289	363	0.2360	0.0533	75.4
1611.0	0.7712	0.3123	0.3044	0.2914	0.3293	363	0.2380	0.0536	75.4
1624.0	0.7692	0.3129	0.3046	0.2918	0.3297	363	0.2400	0.0540	75.4
1638.0	0.7672	0.3131	0.3042	0.2930	0.3283	385	0.2420	0.0539	79.9
1651.0	0.7652	0.3135	0.3043	0.2933	0.3284	394	0.2440	0.0542	81.8
1664.0	0.7632	0.3140	0.3044	0.2937	0.3286	396	0.2460	0.0545	82.3
1677.0	0.7612	0.3145	0.3045	0.2940	0.3290	392	0.2480	0.0548	81.4
1689.0	0.7592	0.3150	0.3044	0.2943	0.3292	387	0.2500	0.0550	80.4
1702.0	0.7572	0.3155	0.3044	0.2946	0.3294	385	0.2520	0.0553	80.0
1716.0	0.7552	0.3161	0.3044	0.2949	0.3297	383	0.2540	0.0556	79.6
1729.0	0.7532	0.3166	0.3044	0.2951	0.3299	385	0.2560	0.0558	80.0
1742.0	0.7512	0.3171	0.3044	0.2955	0.3301	387	0.2580	0.0561	80.5
1756.0	0.7492	0.3175	0.3043	0.2958	0.3302	393	0.2600	0.0562	81.6
1769.0	0.7472	0.3180	0.3044	0.2961	0.3304	395	0.2620	0.0565	82.0
1782.0	0.7452	0.3185	0.3044	0.2964	0.3305	397	0.2640	0.0567	82.5
1795.0	0.7432	0.3188	0.3045	0.2967	0.3307	396	0.2660	0.0570	82.3
1808.0	0.7412	0.3192	0.3046	0.2971	0.3308	393	0.2680	0.0572	81.6
1821.0	0.7392	0.3196	0.3047	0.2974	0.3310	392	0.2700	0.0575	81.4
1834.0	0.7372	0.3199	0.3048	0.2977	0.3312	394	0.2720	0.0577	81.8
1848.0	0.7352	0.3203	0.3050	0.2980	0.3314	395	0.2740	0.0580	82.0
1861.0	0.7332	0.3207	0.3051	0.2983	0.3316	395	0.2760	0.0582	82.0
1874.0	0.7312	0.3210	0.3052	0.2986	0.3319	395	0.2780	0.0585	82.0
1887.0	0.7292	0.3214	0.3054	0.2989	0.3321	395	0.2800	0.0587	82.0
1900.0	0.7272	0.3217	0.3056	0.2992	0.3323	395	0.2820	0.0590	82.1
1913.0	0.7252	0.3221	0.3058	0.2995	0.3325	396	0.2840	0.0593	82.2
1926.0	0.7232	0.3224	0.3060	0.2998	0.3328	393	0.2860	0.0595	81.7
1939.0	0.7212	0.3226	0.3062	0.3000	0.3331	395	0.2880	0.0598	82.1
1953.0	0.7192	0.3229	0.3064	0.3003	0.3333	397	0.2900	0.0600	82.5
1966.0	0.7172	0.3233	0.3066	0.3006	0.3336	398	0.2920	0.0603	82.6
1979.0	0.7152	0.3237	0.3068	0.3009	0.3339	397	0.2940	0.0606	82.4
1992.0	0.7132	0.3240	0.3071	0.3011	0.3342	398	0.2960	0.0609	82.6
2006.0	0.7112	0.3244	0.3073	0.3014	0.3345	398	0.2980	0.0612	82.8
2019.0	0.7092	0.3247	0.3075	0.3017	0.3348	400	0.3000	0.0615	83.2
2032.0	0.7072	0.3251	0.3077	0.3020	0.3350	401	0.3020	0.0617	83.3
2045.0	0.7052	0.3254	0.3080	0.3023	0.3353	403	0.3040	0.0620	83.6
2059.0	0.7032	0.3258	0.3082	0.3026	0.3356	403	0.3060	0.0623	83.8
2072.0	0.7012	0.3261	0.3084	0.3029	0.3358	404	0.3080	0.0626	83.9
2085.0	0.6992	0.3264	0.3087	0.3033	0.3361	404	0.3100	0.0629	83.9
2098.0	0.6972	0.3268	0.3089	0.3036	0.3363	405	0.3120	0.0632	84.0
2112.0	0.6952	0.3271	0.3092	0.3039	0.3366	406	0.3140	0.0635	84.3

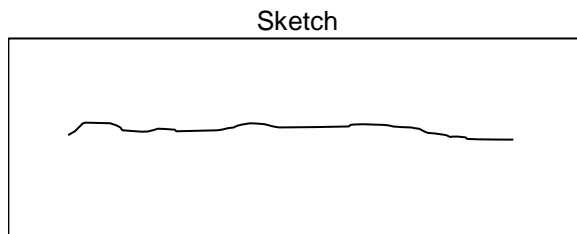
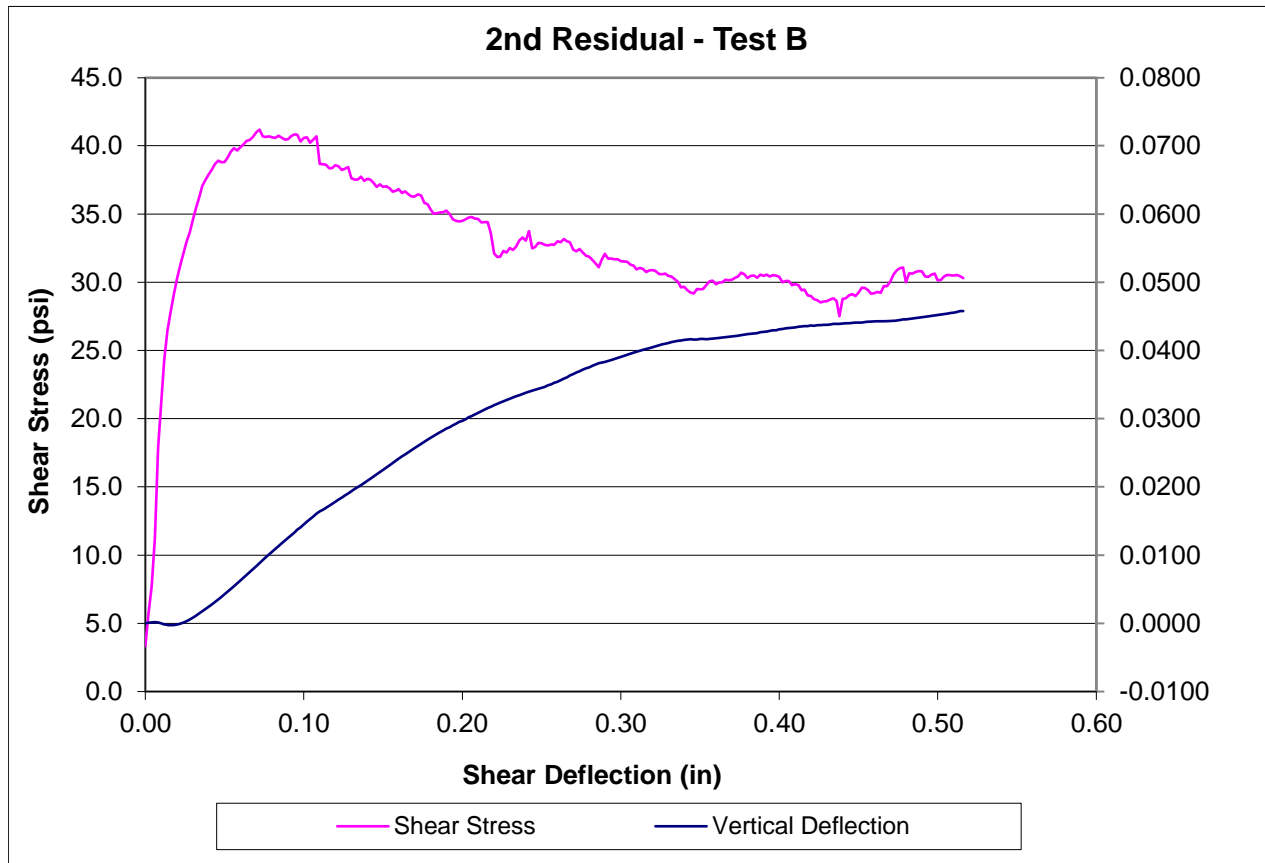
Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
2125.0	0.6932	0.3275	0.3094	0.3042	0.3369	407	0.3160	0.0638	84.5
2138.0	0.6912	0.3278	0.3096	0.3045	0.3371	408	0.3180	0.0640	84.6
2151.0	0.6892	0.3281	0.3100	0.3049	0.3373	397	0.3200	0.0644	82.4
2164.0	0.6872	0.3283	0.3102	0.3052	0.3375	399	0.3220	0.0646	82.9
2177.0	0.6852	0.3286	0.3105	0.3055	0.3377	396	0.3240	0.0649	82.3
2190.0	0.6832	0.3289	0.3107	0.3058	0.3379	398	0.3260	0.0651	82.7
2203.0	0.6812	0.3291	0.3109	0.3060	0.3381	400	0.3280	0.0653	83.0
2216.0	0.6792	0.3294	0.3111	0.3063	0.3383	396	0.3300	0.0656	82.3
2230.0	0.6772	0.3296	0.3113	0.3065	0.3385	399	0.3320	0.0658	82.9
2243.0	0.6752	0.3298	0.3115	0.3068	0.3387	389	0.3340	0.0660	80.7
2256.0	0.6732	0.3300	0.3118	0.3070	0.3389	387	0.3360	0.0662	80.4
2269.0	0.6712	0.3301	0.3120	0.3072	0.3391	388	0.3380	0.0664	80.5
2282.0	0.6692	0.3303	0.3122	0.3074	0.3393	390	0.3400	0.0666	81.1
2295.0	0.6672	0.3305	0.3124	0.3076	0.3394	392	0.3420	0.0668	81.4
2308.0	0.6652	0.3307	0.3126	0.3078	0.3396	394	0.3440	0.0670	81.9
2321.0	0.6632	0.3309	0.3128	0.3080	0.3398	396	0.3460	0.0672	82.2
2335.0	0.6612	0.3311	0.3130	0.3082	0.3399	396	0.3480	0.0673	82.2
2347.0	0.6592	0.3313	0.3132	0.3085	0.3401	396	0.3500	0.0676	82.2
2360.0	0.6572	0.3315	0.3134	0.3087	0.3402	397	0.3520	0.0677	82.5
2374.0	0.6552	0.3317	0.3135	0.3090	0.3403	394	0.3540	0.0679	81.9
2387.0	0.6532	0.3319	0.3136	0.3092	0.3404	397	0.3560	0.0681	82.4
2400.0	0.6512	0.3321	0.3137	0.3095	0.3404	399	0.3580	0.0682	82.8
2414.0	0.6492	0.3323	0.3138	0.3098	0.3404	400	0.3600	0.0684	83.0
2427.0	0.6472	0.3325	0.3140	0.3101	0.3405	402	0.3620	0.0686	83.4
2438.0	0.6452	0.3328	0.3139	0.3103	0.3404	385	0.3640	0.0686	79.9
2450.0	0.6432	0.3330	0.3139	0.3104	0.3405	402	0.3660	0.0687	83.6
2463.0	0.6412	0.3331	0.3141	0.3107	0.3406	404	0.3680	0.0689	83.8
2476.0	0.6392	0.3333	0.3143	0.3110	0.3407	406	0.3700	0.0691	84.3
2487.0	0.6372	0.3336	0.3143	0.3112	0.3407	407	0.3720	0.0692	84.5
2501.0	0.6352	0.3337	0.3145	0.3115	0.3408	408	0.3740	0.0694	84.8
2513.0	0.6332	0.3339	0.3147	0.3119	0.3408	395	0.3760	0.0696	82.1
2527.0	0.6312	0.3341	0.3149	0.3121	0.3409	398	0.3780	0.0698	82.7
2540.0	0.6292	0.3342	0.3151	0.3124	0.3410	400	0.3800	0.0700	83.2
2553.0	0.6272	0.3344	0.3153	0.3127	0.3410	399	0.3820	0.0701	82.9
2566.0	0.6252	0.3345	0.3155	0.3129	0.3411	402	0.3840	0.0703	83.5
2578.0	0.6232	0.3345	0.3156	0.3131	0.3410	362	0.3860	0.0703	75.1
2592.0	0.6212	0.3342	0.3155	0.3129	0.3408	351	0.3880	0.0701	72.8
2605.0	0.6192	0.3340	0.3154	0.3128	0.3407	352	0.3900	0.0700	73.2
2618.0	0.6172	0.3339	0.3153	0.3126	0.3406	353	0.3920	0.0699	73.4
2632.0	0.6152	0.3337	0.3152	0.3124	0.3405	350	0.3940	0.0697	72.7
2645.0	0.6132	0.3336	0.3152	0.3123	0.3404	349	0.3960	0.0697	72.5
2658.0	0.6112	0.3333	0.3151	0.3121	0.3402	337	0.3980	0.0695	69.9
2671.0	0.6092	0.3331	0.3150	0.3120	0.3401	335	0.4000	0.0693	69.6
2684.0	0.6072	0.3329	0.3149	0.3118	0.3399	332	0.4020	0.0692	68.9
2697.0	0.6052	0.3327	0.3149	0.3116	0.3398	333	0.4040	0.0690	69.2
2710.0	0.6032	0.3325	0.3149	0.3115	0.3398	333	0.4060	0.0690	69.1
2723.0	0.6012	0.3323	0.3148	0.3114	0.3396	331	0.4080	0.0688	68.8
2737.0	0.5992	0.3322	0.3148	0.3113	0.3396	334	0.4100	0.0688	69.3
2750.0	0.5972	0.3320	0.3148	0.3112	0.3395	336	0.4120	0.0687	69.8
2763.0	0.5952	0.3319	0.3148	0.3111	0.3395	335	0.4140	0.0686	69.6
2777.0	0.5932	0.3317	0.3149	0.3111	0.3394	337	0.4160	0.0686	69.9
2790.0	0.5912	0.3316	0.3149	0.3110	0.3394	335	0.4180	0.0685	69.7
2802.0	0.5892	0.3313	0.3150	0.3109	0.3392	298	0.4200	0.0684	61.9
2815.0	0.5872	0.3309	0.3148	0.3106	0.3389	302	0.4220	0.0681	62.6
2829.0	0.5852	0.3306	0.3147	0.3105	0.3387	298	0.4240	0.0679	61.9
2842.0	0.5832	0.3304	0.3146	0.3104	0.3385	300	0.4260	0.0678	62.4
2855.0	0.5812	0.3302	0.3145	0.3103	0.3383	302	0.4280	0.0676	62.7
2868.0	0.5792	0.3300	0.3144	0.3102	0.3382	304	0.4300	0.0675	63.2
2881.0	0.5772	0.3299	0.3143	0.3100	0.3380	305	0.4320	0.0673	63.4
2895.0	0.5752	0.3297	0.3142	0.3099	0.3378	303	0.4340	0.0672	63.0
2908.0	0.5732	0.3295	0.3141	0.3098	0.3377	304	0.4360	0.0671	63.1
2921.0	0.5712	0.3293	0.3140	0.3097	0.3375	305	0.4380	0.0669	63.4
2934.0	0.5692	0.3292	0.3139	0.3095	0.3374	306	0.4400	0.0668	63.5
2948.0	0.5672	0.3290	0.3139	0.3094	0.3373	307	0.4420	0.0667	63.7
2962.0	0.5652	0.3288	0.3138	0.3093	0.3372	308	0.4440	0.0666	64.0
2974.0	0.5632	0.3287	0.3138	0.3093	0.3371	309	0.4460	0.0665	64.2
2988.0	0.5612	0.3285	0.3137	0.3092	0.3369	310	0.4480	0.0664	64.4
3002.0	0.5592	0.3283	0.3137	0.3091	0.3368	311	0.4500	0.0663	64.5
3015.0	0.5572	0.3282	0.3136	0.3090	0.3367	311	0.4520	0.0662	64.6
3027.0	0.5552	0.3280	0.3136	0.3090	0.3366	312	0.4540	0.0661	64.8
3040.0	0.5532	0.3279	0.3136	0.3089	0.3364	308	0.4560	0.0660	64.0
3054.0	0.5512	0.3277	0.3136	0.3089	0.3363	309	0.4580	0.0659	64.1
3067.0	0.5492	0.3275	0.3136	0.3088	0.3362	311	0.4600	0.0658	64.6
3080.0	0.5472	0.3274	0.3135	0.3088	0.3361	314	0.4620	0.0657	65.2
3093.0	0.5452	0.3272	0.3135	0.3087	0.3360	310	0.4640	0.0656	64.4
3107.0	0.5432	0.3271	0.3135	0.3086	0.3359	309	0.4660	0.0656	64.2
3120.0	0.5412	0.3269	0.3135	0.3086	0.3358	310	0.4680	0.0655	64.4
3133.0	0.5392	0.3267	0.3135	0.3085	0.3357	311	0.4700	0.0654	64.6
3146.0	0.5372	0.3266	0.3135	0.3085	0.3356	312	0.4720	0.0653	64.9

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
3159.0	0.5352	0.3264	0.3134	0.3085	0.3354	314	0.4740	0.0652	65.1
3172.0	0.5332	0.3263	0.3134	0.3085	0.3353	316	0.4760	0.0652	65.6
3185.0	0.5312	0.3262	0.3134	0.3084	0.3352	317	0.4780	0.0651	65.8
3198.0	0.5292	0.3260	0.3135	0.3084	0.3351	318	0.4800	0.0650	66.1
3212.0	0.5272	0.3259	0.3135	0.3084	0.3350	320	0.4820	0.0650	66.5
3224.0	0.5252	0.3258	0.3135	0.3083	0.3350	322	0.4840	0.0649	66.9
3236.0	0.5232	0.3255	0.3135	0.3082	0.3348	296	0.4860	0.0648	61.5
3249.0	0.5212	0.3253	0.3134	0.3079	0.3347	298	0.4880	0.0646	61.8
3263.0	0.5192	0.3251	0.3134	0.3078	0.3346	301	0.4900	0.0645	62.5
3276.0	0.5172	0.3249	0.3133	0.3077	0.3345	299	0.4920	0.0644	62.0
3289.0	0.5152	0.3247	0.3133	0.3076	0.3345	301	0.4940	0.0643	62.4
3302.0	0.5132	0.3246	0.3133	0.3075	0.3344	301	0.4960	0.0642	62.6
3315.0	0.5112	0.3244	0.3133	0.3074	0.3343	301	0.4980	0.0641	62.4
3329.0	0.5092	0.3243	0.3133	0.3073	0.3343	303	0.5000	0.0641	62.9
3342.0	0.5072	0.3242	0.3132	0.3072	0.3342	305	0.5020	0.0640	63.3
3355.0	0.5052	0.3240	0.3132	0.3071	0.3342	303	0.5040	0.0639	62.9
3369.0	0.5032	0.3238	0.3132	0.3070	0.3341	304	0.5060	0.0638	63.0
3382.0	0.5012	0.3237	0.3132	0.3069	0.3341	305	0.5080	0.0638	63.3
3395.0	0.4992	0.3235	0.3132	0.3068	0.3340	305	0.5100	0.0637	63.3
3408.0	0.4972	0.3234	0.3132	0.3068	0.3339	305	0.5120	0.0636	63.4
3413.0	0.4965	0.3233	0.3132	0.3067	0.3339	302	0.5127	0.0636	62.8



Direct Shear Strength of Rock
ASTM D 5607

Project Name	<u>SR1 Flood Control Project - Inlet Debris Barrier</u>	Project Number	<u>110773396</u>
Lithology	<u>Dolomite, tan, moderately hard</u>	Lab ID	<u>DSNF-20</u>
Hole Number	<u>DB-3</u>	Date Received	<u>05/15/2018</u>
Depth (m)	<u>13.86</u>	Diameter (in)	<u>2.400</u>
Test Type	<u>Direct shear of natural fracture</u>	Angle of Dip (deg)	<u>20.0</u>
Initial Moisture Condition	<u>As received, moist</u>	Area(in ²)	<u>4.81</u>
Test Moisture Condition	<u>Soaked at least 12 hours prior to test.</u>	Date Prepared	<u>06/27/2018</u>
Joint Roughness	<u>9</u>	Date Tested	<u>06/28/2018</u>
Normal Stress (psi)	<u>36</u>		



Shear Rate to Peak (in/min) N/A

Encapsulation Material Hydro-Stone

Comments _____

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
0.0	1.0080	0.2537	0.2521	0.2539	0.2556	16	0.0000	0.0000	3.3
25.0	1.0060	0.2537	0.2522	0.2537	0.2560	28	0.0020	0.0001	5.7
41.0	1.0040	0.2537	0.2523	0.2534	0.2564	37	0.0040	0.0001	7.7
58.0	1.0020	0.2537	0.2523	0.2531	0.2569	54	0.0060	0.0002	11.3
73.0	1.0000	0.2537	0.2523	0.2527	0.2572	86	0.0080	0.0001	17.9
86.0	0.9980	0.2536	0.2521	0.2524	0.2572	102	0.0100	0.0000	21.3
100.0	0.9960	0.2535	0.2519	0.2520	0.2573	117	0.0120	-0.0002	24.3
114.0	0.9940	0.2534	0.2519	0.2519	0.2572	127	0.0140	-0.0002	26.4
126.0	0.9920	0.2534	0.2518	0.2518	0.2573	134	0.0160	-0.0003	27.8
139.0	0.9900	0.2534	0.2518	0.2517	0.2573	140	0.0180	-0.0003	29.1
153.0	0.9880	0.2535	0.2519	0.2517	0.2574	146	0.0200	-0.0002	30.2
167.0	0.9860	0.2536	0.2521	0.2518	0.2576	150	0.0220	0.0000	31.2
180.0	0.9840	0.2538	0.2523	0.2518	0.2579	155	0.0240	0.0001	32.1
193.0	0.9820	0.2540	0.2525	0.2519	0.2581	159	0.0260	0.0003	33.0
208.0	0.9800	0.2542	0.2527	0.2521	0.2585	162	0.0280	0.0005	33.7
222.0	0.9780	0.2545	0.2530	0.2522	0.2589	167	0.0300	0.0008	34.6
235.0	0.9760	0.2547	0.2533	0.2523	0.2594	171	0.0320	0.0011	35.5
249.0	0.9740	0.2550	0.2537	0.2524	0.2599	174	0.0340	0.0014	36.2
263.0	0.9720	0.2553	0.2540	0.2525	0.2605	178	0.0360	0.0017	37.1
276.0	0.9700	0.2556	0.2544	0.2527	0.2610	181	0.0380	0.0021	37.5
290.0	0.9680	0.2559	0.2548	0.2528	0.2615	182	0.0400	0.0024	37.9
303.0	0.9660	0.2562	0.2552	0.2530	0.2620	184	0.0420	0.0028	38.3
317.0	0.9640	0.2565	0.2556	0.2532	0.2626	186	0.0440	0.0031	38.7
330.0	0.9620	0.2568	0.2560	0.2534	0.2631	187	0.0460	0.0035	38.9
344.0	0.9600	0.2571	0.2565	0.2536	0.2636	187	0.0480	0.0039	38.8
357.0	0.9580	0.2575	0.2569	0.2539	0.2641	187	0.0500	0.0043	38.8
370.0	0.9560	0.2578	0.2573	0.2541	0.2646	189	0.0520	0.0046	39.2
384.0	0.9540	0.2582	0.2578	0.2544	0.2652	191	0.0540	0.0051	39.6
397.0	0.9520	0.2586	0.2582	0.2546	0.2657	192	0.0560	0.0054	39.8
411.0	0.9500	0.2589	0.2587	0.2550	0.2662	191	0.0580	0.0059	39.7
424.0	0.9480	0.2593	0.2591	0.2553	0.2667	192	0.0600	0.0063	39.9
437.0	0.9460	0.2597	0.2596	0.2555	0.2672	193	0.0620	0.0067	40.1
451.0	0.9440	0.2601	0.2600	0.2558	0.2678	194	0.0640	0.0071	40.4
464.0	0.9420	0.2606	0.2604	0.2560	0.2684	195	0.0660	0.0075	40.4
478.0	0.9400	0.2610	0.2609	0.2563	0.2689	196	0.0680	0.0079	40.7
492.0	0.9380	0.2614	0.2613	0.2566	0.2695	197	0.0700	0.0084	41.0
505.0	0.9360	0.2619	0.2618	0.2568	0.2701	198	0.0720	0.0088	41.2
518.0	0.9340	0.2622	0.2622	0.2571	0.2708	196	0.0740	0.0092	40.7
532.0	0.9320	0.2626	0.2627	0.2573	0.2714	196	0.0760	0.0097	40.7
545.0	0.9300	0.2629	0.2632	0.2575	0.2720	196	0.0780	0.0101	40.7
559.0	0.9280	0.2632	0.2636	0.2578	0.2726	196	0.0800	0.0105	40.6
572.0	0.9260	0.2636	0.2641	0.2580	0.2732	195	0.0820	0.0109	40.6
585.0	0.9240	0.2639	0.2646	0.2583	0.2737	196	0.0840	0.0113	40.7
599.0	0.9220	0.2643	0.2650	0.2586	0.2742	195	0.0860	0.0117	40.6
613.0	0.9200	0.2647	0.2655	0.2589	0.2747	195	0.0880	0.0121	40.5
625.0	0.9180	0.2650	0.2659	0.2593	0.2752	195	0.0900	0.0125	40.5
639.0	0.9160	0.2654	0.2663	0.2596	0.2756	196	0.0920	0.0129	40.7
652.0	0.9140	0.2657	0.2667	0.2600	0.2761	197	0.0940	0.0133	40.8
665.0	0.9120	0.2661	0.2672	0.2604	0.2765	197	0.0960	0.0137	40.8
678.0	0.9100	0.2664	0.2676	0.2608	0.2768	194	0.0980	0.0141	40.3
691.0	0.9080	0.2668	0.2680	0.2612	0.2773	195	0.1000	0.0145	40.6
705.0	0.9060	0.2672	0.2685	0.2615	0.2777	196	0.1020	0.0149	40.6
718.0	0.9040	0.2675	0.2689	0.2619	0.2782	194	0.1040	0.0153	40.2
731.0	0.9020	0.2679	0.2693	0.2621	0.2787	195	0.1060	0.0157	40.5
745.0	0.9000	0.2682	0.2698	0.2624	0.2792	196	0.1080	0.0161	40.7
758.0	0.8980	0.2687	0.2700	0.2627	0.2795	186	0.1100	0.0164	38.7
771.0	0.8960	0.2691	0.2701	0.2629	0.2798	186	0.1120	0.0167	38.7
784.0	0.8940	0.2695	0.2703	0.2632	0.2801	186	0.1140	0.0170	38.6
797.0	0.8920	0.2699	0.2705	0.2635	0.2803	185	0.1160	0.0172	38.3
811.0	0.8900	0.2702	0.2708	0.2638	0.2806	185	0.1180	0.0175	38.4
824.0	0.8880	0.2705	0.2711	0.2641	0.2809	186	0.1200	0.0178	38.6
837.0	0.8860	0.2708	0.2714	0.2644	0.2812	185	0.1220	0.0181	38.5
850.0	0.8840	0.2711	0.2717	0.2646	0.2816	184	0.1240	0.0184	38.2
864.0	0.8820	0.2714	0.2721	0.2649	0.2819	185	0.1260	0.0188	38.3
877.0	0.8800	0.2716	0.2725	0.2652	0.2822	185	0.1280	0.0191	38.4
889.0	0.8780	0.2718	0.2728	0.2654	0.2827	181	0.1300	0.0194	37.6
902.0	0.8760	0.2721	0.2732	0.2657	0.2830	181	0.1320	0.0197	37.5
915.0	0.8740	0.2723	0.2735	0.2660	0.2834	181	0.1340	0.0200	37.5
928.0	0.8720	0.2725	0.2739	0.2662	0.2837	182	0.1360	0.0203	37.7
941.0	0.8700	0.2728	0.2742	0.2664	0.2841	180	0.1380	0.0206	37.4
954.0	0.8680	0.2730	0.2746	0.2667	0.2845	181	0.1400	0.0209	37.6
967.0	0.8660	0.2733	0.2749	0.2669	0.2849	181	0.1420	0.0212	37.5
980.0	0.8640	0.2736	0.2753	0.2672	0.2852	180	0.1440	0.0215	37.3
994.0	0.8620	0.2739	0.2757	0.2676	0.2855	178	0.1460	0.0219	37.0
1007.0	0.8600	0.2742	0.2760	0.2679	0.2858	179	0.1480	0.0222	37.2
1020.0	0.8580	0.2746	0.2763	0.2683	0.2861	178	0.1500	0.0225	37.0
1033.0	0.8560	0.2749	0.2767	0.2686	0.2865	178	0.1520	0.0229	37.0
1047.0	0.8540	0.2752	0.2770	0.2690	0.2867	178	0.1540	0.0232	36.9
1059.0	0.8520	0.2755	0.2773	0.2694	0.2870	176	0.1560	0.0235	36.6

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
1073.0	0.8500	0.2759	0.2776	0.2698	0.2872	177	0.1580	0.0238	36.7
1086.0	0.8480	0.2762	0.2779	0.2702	0.2875	177	0.1600	0.0241	36.8
1100.0	0.8460	0.2765	0.2783	0.2706	0.2878	176	0.1620	0.0245	36.5
1113.0	0.8440	0.2768	0.2786	0.2709	0.2881	177	0.1640	0.0248	36.7
1126.0	0.8420	0.2771	0.2789	0.2712	0.2884	175	0.1660	0.0251	36.4
1139.0	0.8400	0.2774	0.2792	0.2715	0.2887	175	0.1680	0.0254	36.3
1152.0	0.8380	0.2777	0.2795	0.2719	0.2889	175	0.1700	0.0257	36.3
1165.0	0.8360	0.2781	0.2798	0.2722	0.2892	176	0.1720	0.0260	36.5
1178.0	0.8340	0.2784	0.2801	0.2726	0.2895	175	0.1740	0.0263	36.4
1191.0	0.8320	0.2788	0.2804	0.2729	0.2898	172	0.1760	0.0267	35.8
1204.0	0.8300	0.2790	0.2807	0.2730	0.2902	172	0.1780	0.0269	35.7
1218.0	0.8280	0.2793	0.2810	0.2733	0.2905	170	0.1800	0.0272	35.3
1231.0	0.8260	0.2796	0.2812	0.2736	0.2908	169	0.1820	0.0275	35.0
1244.0	0.8240	0.2799	0.2815	0.2738	0.2911	169	0.1840	0.0278	35.1
1258.0	0.8220	0.2801	0.2818	0.2740	0.2914	169	0.1860	0.0280	35.1
1271.0	0.8200	0.2804	0.2821	0.2742	0.2917	169	0.1880	0.0283	35.1
1285.0	0.8180	0.2807	0.2823	0.2744	0.2921	170	0.1900	0.0286	35.2
1297.0	0.8160	0.2809	0.2825	0.2746	0.2923	169	0.1920	0.0287	35.0
1311.0	0.8140	0.2813	0.2827	0.2748	0.2926	167	0.1940	0.0290	34.6
1324.0	0.8120	0.2816	0.2828	0.2750	0.2929	166	0.1960	0.0293	34.5
1337.0	0.8100	0.2820	0.2830	0.2752	0.2932	166	0.1980	0.0295	34.4
1351.0	0.8080	0.2823	0.2831	0.2753	0.2934	166	0.2000	0.0297	34.5
1364.0	0.8060	0.2826	0.2832	0.2755	0.2937	167	0.2020	0.0299	34.6
1378.0	0.8040	0.2830	0.2833	0.2758	0.2939	167	0.2040	0.0302	34.7
1390.0	0.8020	0.2833	0.2834	0.2760	0.2941	167	0.2060	0.0304	34.8
1403.0	0.8000	0.2836	0.2836	0.2762	0.2943	167	0.2080	0.0306	34.7
1415.0	0.7980	0.2840	0.2837	0.2764	0.2946	167	0.2100	0.0309	34.6
1429.0	0.7960	0.2843	0.2839	0.2766	0.2949	166	0.2120	0.0311	34.4
1442.0	0.7940	0.2846	0.2840	0.2768	0.2952	166	0.2140	0.0313	34.4
1455.0	0.7920	0.2848	0.2842	0.2769	0.2956	166	0.2160	0.0315	34.4
1468.0	0.7900	0.2851	0.2843	0.2771	0.2958	162	0.2180	0.0318	33.6
1482.0	0.7880	0.2854	0.2845	0.2773	0.2960	155	0.2200	0.0320	32.1
1495.0	0.7860	0.2858	0.2845	0.2775	0.2962	153	0.2220	0.0322	31.8
1507.0	0.7840	0.2861	0.2846	0.2777	0.2964	153	0.2240	0.0324	31.9
1521.0	0.7820	0.2863	0.2847	0.2779	0.2965	156	0.2260	0.0325	32.3
1534.0	0.7800	0.2865	0.2849	0.2782	0.2967	155	0.2280	0.0327	32.2
1548.0	0.7780	0.2867	0.2850	0.2784	0.2968	157	0.2300	0.0329	32.5
1561.0	0.7760	0.2870	0.2851	0.2787	0.2969	156	0.2320	0.0331	32.4
1574.0	0.7740	0.2873	0.2852	0.2790	0.2970	157	0.2340	0.0333	32.6
1587.0	0.7720	0.2875	0.2853	0.2792	0.2971	159	0.2360	0.0335	33.1
1600.0	0.7700	0.2878	0.2854	0.2793	0.2973	160	0.2380	0.0336	33.3
1613.0	0.7680	0.2880	0.2855	0.2794	0.2975	159	0.2400	0.0338	33.0
1627.0	0.7660	0.2883	0.2856	0.2797	0.2976	163	0.2420	0.0340	33.8
1639.0	0.7640	0.2886	0.2855	0.2802	0.2973	156	0.2440	0.0341	32.5
1652.0	0.7620	0.2890	0.2855	0.2805	0.2973	157	0.2460	0.0342	32.6
1665.0	0.7600	0.2893	0.2855	0.2808	0.2972	158	0.2480	0.0344	32.9
1678.0	0.7580	0.2897	0.2854	0.2812	0.2971	158	0.2500	0.0345	32.9
1691.0	0.7560	0.2900	0.2854	0.2815	0.2971	158	0.2520	0.0347	32.7
1704.0	0.7540	0.2904	0.2854	0.2818	0.2972	157	0.2540	0.0349	32.7
1717.0	0.7520	0.2907	0.2854	0.2821	0.2973	158	0.2560	0.0351	32.8
1730.0	0.7500	0.2911	0.2854	0.2823	0.2975	158	0.2580	0.0352	32.7
1743.0	0.7480	0.2914	0.2855	0.2825	0.2976	159	0.2600	0.0354	33.0
1757.0	0.7460	0.2918	0.2855	0.2828	0.2978	159	0.2620	0.0357	32.9
1769.0	0.7440	0.2921	0.2856	0.2830	0.2980	160	0.2640	0.0359	33.2
1783.0	0.7420	0.2924	0.2857	0.2832	0.2983	159	0.2660	0.0361	33.0
1796.0	0.7400	0.2928	0.2859	0.2834	0.2985	159	0.2680	0.0363	32.9
1809.0	0.7380	0.2932	0.2859	0.2836	0.2987	156	0.2700	0.0365	32.4
1822.0	0.7360	0.2935	0.2860	0.2839	0.2989	155	0.2720	0.0367	32.3
1836.0	0.7340	0.2938	0.2861	0.2841	0.2991	156	0.2740	0.0370	32.4
1848.0	0.7320	0.2942	0.2861	0.2844	0.2993	155	0.2760	0.0372	32.2
1861.0	0.7300	0.2946	0.2861	0.2846	0.2994	154	0.2780	0.0373	31.9
1874.0	0.7280	0.2949	0.2861	0.2849	0.2995	153	0.2800	0.0375	31.9
1887.0	0.7260	0.2953	0.2861	0.2852	0.2996	152	0.2820	0.0377	31.6
1900.0	0.7240	0.2956	0.2862	0.2855	0.2997	151	0.2840	0.0379	31.4
1913.0	0.7220	0.2959	0.2863	0.2856	0.2999	150	0.2860	0.0381	31.1
1927.0	0.7200	0.2959	0.2865	0.2855	0.3002	152	0.2880	0.0382	31.6
1940.0	0.7180	0.2960	0.2866	0.2855	0.3004	154	0.2900	0.0383	32.1
1953.0	0.7160	0.2962	0.2867	0.2856	0.3006	153	0.2920	0.0385	31.7
1966.0	0.7140	0.2964	0.2868	0.2857	0.3008	153	0.2940	0.0386	31.7
1979.0	0.7120	0.2965	0.2869	0.2858	0.3010	153	0.2960	0.0387	31.7
1992.0	0.7100	0.2967	0.2870	0.2859	0.3012	153	0.2980	0.0389	31.7
2005.0	0.7080	0.2969	0.2871	0.2861	0.3015	152	0.3000	0.0391	31.5
2018.0	0.7060	0.2971	0.2872	0.2862	0.3017	152	0.3020	0.0392	31.5
2031.0	0.7040	0.2973	0.2873	0.2864	0.3019	152	0.3040	0.0394	31.5
2045.0	0.7020	0.2975	0.2874	0.2865	0.3021	151	0.3060	0.0396	31.3
2058.0	0.7000	0.2976	0.2875	0.2867	0.3022	150	0.3080	0.0397	31.2
2071.0	0.6980	0.2977	0.2877	0.2868	0.3023	149	0.3100	0.0398	30.9
2084.0	0.6960	0.2979	0.2878	0.2869	0.3025	150	0.3120	0.0400	31.1
2097.0	0.6940	0.2980	0.2879	0.2871	0.3026	149	0.3140	0.0401	31.0

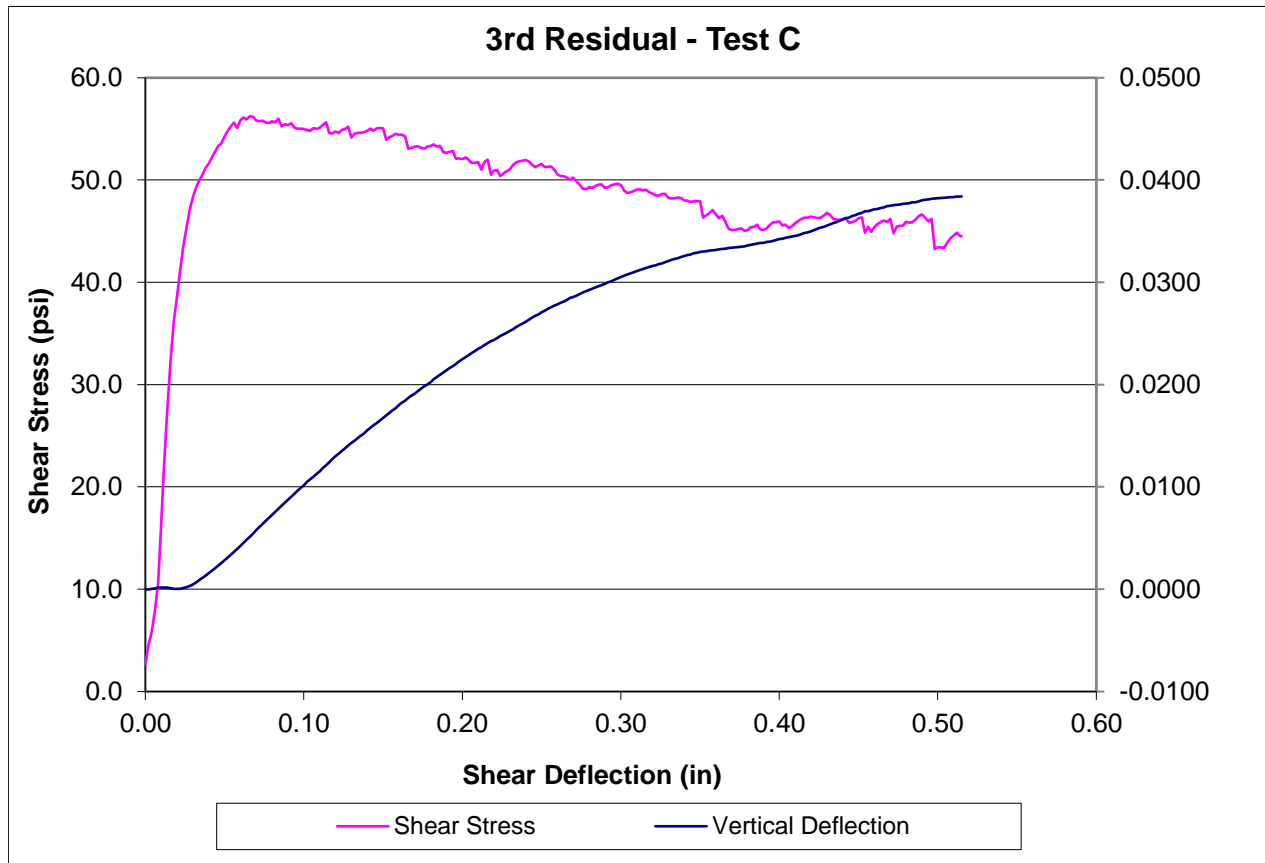
Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
2111.0	0.6920	0.2982	0.2880	0.2872	0.3027	148	0.3160	0.0402	30.7
2124.0	0.6900	0.2983	0.2882	0.2873	0.3029	149	0.3180	0.0404	30.9
2137.0	0.6880	0.2984	0.2883	0.2874	0.3030	149	0.3200	0.0405	30.9
2150.0	0.6860	0.2986	0.2884	0.2876	0.3031	148	0.3220	0.0406	30.8
2163.0	0.6840	0.2987	0.2886	0.2877	0.3033	147	0.3240	0.0408	30.6
2175.0	0.6820	0.2988	0.2887	0.2879	0.3034	147	0.3260	0.0409	30.6
2188.0	0.6800	0.2989	0.2889	0.2879	0.3035	147	0.3280	0.0410	30.6
2202.0	0.6780	0.2990	0.2890	0.2880	0.3037	147	0.3300	0.0411	30.5
2215.0	0.6760	0.2991	0.2891	0.2881	0.3038	146	0.3320	0.0412	30.4
2228.0	0.6740	0.2991	0.2893	0.2883	0.3038	146	0.3340	0.0413	30.2
2241.0	0.6720	0.2992	0.2894	0.2884	0.3039	145	0.3360	0.0414	30.0
2255.0	0.6700	0.2993	0.2895	0.2885	0.3039	143	0.3380	0.0415	29.6
2268.0	0.6680	0.2993	0.2896	0.2885	0.3040	143	0.3400	0.0415	29.7
2281.0	0.6660	0.2994	0.2896	0.2886	0.3041	142	0.3420	0.0416	29.4
2293.0	0.6640	0.2994	0.2896	0.2887	0.3041	141	0.3440	0.0416	29.2
2307.0	0.6620	0.2995	0.2895	0.2885	0.3042	140	0.3460	0.0416	29.2
2320.0	0.6600	0.2995	0.2895	0.2885	0.3042	142	0.3480	0.0416	29.5
2333.0	0.6580	0.2996	0.2896	0.2885	0.3043	142	0.3500	0.0417	29.5
2346.0	0.6560	0.2996	0.2896	0.2884	0.3044	142	0.3520	0.0417	29.5
2360.0	0.6540	0.2996	0.2895	0.2883	0.3045	143	0.3540	0.0417	29.8
2373.0	0.6520	0.2996	0.2896	0.2883	0.3045	145	0.3560	0.0417	30.1
2386.0	0.6500	0.2997	0.2896	0.2884	0.3046	145	0.3580	0.0418	30.1
2399.0	0.6480	0.2997	0.2897	0.2884	0.3046	144	0.3600	0.0418	29.8
2413.0	0.6460	0.2997	0.2898	0.2885	0.3046	144	0.3620	0.0418	30.0
2426.0	0.6440	0.2997	0.2899	0.2885	0.3047	144	0.3640	0.0419	30.0
2438.0	0.6420	0.2998	0.2899	0.2886	0.3048	145	0.3660	0.0420	30.2
2451.0	0.6400	0.2998	0.2900	0.2886	0.3048	145	0.3680	0.0420	30.1
2465.0	0.6380	0.2998	0.2901	0.2887	0.3049	145	0.3700	0.0421	30.2
2478.0	0.6360	0.2998	0.2902	0.2887	0.3049	146	0.3720	0.0421	30.3
2491.0	0.6340	0.2998	0.2903	0.2888	0.3050	146	0.3740	0.0422	30.4
2504.0	0.6320	0.2999	0.2904	0.2889	0.3051	148	0.3760	0.0423	30.7
2518.0	0.6300	0.2999	0.2906	0.2890	0.3052	147	0.3780	0.0423	30.6
2531.0	0.6280	0.3000	0.2906	0.2891	0.3052	146	0.3800	0.0424	30.3
2544.0	0.6260	0.3000	0.2907	0.2891	0.3053	147	0.3820	0.0425	30.5
2557.0	0.6240	0.3000	0.2908	0.2891	0.3054	147	0.3840	0.0425	30.5
2571.0	0.6220	0.3000	0.2909	0.2892	0.3054	146	0.3860	0.0426	30.3
2584.0	0.6200	0.3001	0.2911	0.2893	0.3055	147	0.3880	0.0427	30.6
2597.0	0.6180	0.3001	0.2912	0.2893	0.3056	147	0.3900	0.0427	30.5
2611.0	0.6160	0.3001	0.2913	0.2894	0.3056	147	0.3920	0.0428	30.6
2624.0	0.6140	0.3001	0.2915	0.2895	0.3057	146	0.3940	0.0429	30.4
2637.0	0.6120	0.3001	0.2916	0.2896	0.3058	147	0.3960	0.0430	30.5
2649.0	0.6100	0.3001	0.2917	0.2896	0.3058	147	0.3980	0.0430	30.5
2663.0	0.6080	0.3001	0.2919	0.2897	0.3059	146	0.4000	0.0431	30.4
2676.0	0.6060	0.3002	0.2920	0.2898	0.3059	144	0.4020	0.0432	30.0
2688.0	0.6040	0.3002	0.2921	0.2899	0.3060	145	0.4040	0.0432	30.1
2701.0	0.6020	0.3002	0.2922	0.2900	0.3060	145	0.4060	0.0433	30.1
2714.0	0.6000	0.3002	0.2923	0.2901	0.3060	143	0.4080	0.0433	29.8
2728.0	0.5980	0.3002	0.2924	0.2902	0.3060	144	0.4100	0.0434	29.8
2741.0	0.5960	0.3002	0.2925	0.2903	0.3061	143	0.4120	0.0435	29.8
2754.0	0.5940	0.3002	0.2927	0.2904	0.3061	142	0.4140	0.0435	29.4
2767.0	0.5920	0.3002	0.2928	0.2904	0.3061	142	0.4160	0.0436	29.5
2780.0	0.5900	0.3002	0.2928	0.2905	0.3061	140	0.4180	0.0436	29.0
2794.0	0.5880	0.3002	0.2930	0.2906	0.3061	140	0.4200	0.0437	29.0
2806.0	0.5860	0.3001	0.2930	0.2906	0.3061	138	0.4220	0.0436	28.7
2820.0	0.5840	0.3001	0.2931	0.2907	0.3062	138	0.4240	0.0437	28.7
2833.0	0.5820	0.3001	0.2932	0.2907	0.3062	137	0.4260	0.0437	28.5
2845.0	0.5800	0.3001	0.2933	0.2907	0.3062	138	0.4280	0.0438	28.6
2858.0	0.5780	0.3000	0.2934	0.2908	0.3062	138	0.4300	0.0438	28.6
2872.0	0.5760	0.3000	0.2935	0.2908	0.3062	138	0.4320	0.0438	28.7
2885.0	0.5740	0.3000	0.2936	0.2909	0.3063	139	0.4340	0.0439	28.8
2898.0	0.5720	0.3000	0.2937	0.2909	0.3063	138	0.4360	0.0439	28.6
2911.0	0.5700	0.2999	0.2937	0.2911	0.3062	132	0.4380	0.0439	27.5
2925.0	0.5680	0.2998	0.2938	0.2911	0.3063	139	0.4400	0.0439	28.8
2938.0	0.5660	0.2998	0.2939	0.2912	0.3063	139	0.4420	0.0440	28.8
2951.0	0.5640	0.2998	0.2940	0.2912	0.3063	140	0.4440	0.0440	29.0
2964.0	0.5620	0.2998	0.2941	0.2912	0.3064	140	0.4460	0.0441	29.1
2977.0	0.5600	0.2997	0.2942	0.2913	0.3064	140	0.4480	0.0441	29.0
2990.0	0.5580	0.2997	0.2943	0.2913	0.3064	141	0.4500	0.0441	29.2
3003.0	0.5560	0.2996	0.2944	0.2913	0.3064	143	0.4520	0.0441	29.6
3016.0	0.5540	0.2996	0.2945	0.2914	0.3064	142	0.4540	0.0442	29.6
3029.0	0.5520	0.2996	0.2946	0.2915	0.3064	142	0.4560	0.0442	29.4
3042.0	0.5500	0.2995	0.2947	0.2916	0.3064	140	0.4580	0.0442	29.1
3055.0	0.5480	0.2995	0.2949	0.2916	0.3064	141	0.4600	0.0443	29.2
3069.0	0.5460	0.2995	0.2950	0.2917	0.3064	141	0.4620	0.0443	29.3
3082.0	0.5440	0.2993	0.2950	0.2916	0.3064	141	0.4640	0.0443	29.2
3095.0	0.5420	0.2993	0.2951	0.2916	0.3064	143	0.4660	0.0443	29.7
3108.0	0.5400	0.2992	0.2952	0.2916	0.3064	143	0.4680	0.0443	29.7
3121.0	0.5380	0.2992	0.2953	0.2916	0.3064	145	0.4700	0.0443	30.0
3135.0	0.5360	0.2991	0.2954	0.2917	0.3065	147	0.4720	0.0444	30.6

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
3148.0	0.5340	0.2991	0.2955	0.2917	0.3065	149	0.4740	0.0444	30.9
3161.0	0.5320	0.2991	0.2957	0.2918	0.3066	149	0.4760	0.0445	31.0
3173.0	0.5300	0.2991	0.2958	0.2919	0.3067	150	0.4780	0.0446	31.1
3186.0	0.5280	0.2990	0.2959	0.2920	0.3066	144	0.4800	0.0446	30.0
3200.0	0.5260	0.2990	0.2960	0.2921	0.3067	148	0.4820	0.0446	30.7
3212.0	0.5240	0.2990	0.2962	0.2921	0.3067	148	0.4840	0.0447	30.6
3225.0	0.5220	0.2989	0.2963	0.2921	0.3068	148	0.4860	0.0447	30.7
3239.0	0.5200	0.2990	0.2964	0.2922	0.3069	148	0.4880	0.0448	30.8
3252.0	0.5180	0.2990	0.2966	0.2923	0.3069	148	0.4900	0.0449	30.8
3264.0	0.5160	0.2990	0.2967	0.2923	0.3070	146	0.4920	0.0449	30.4
3278.0	0.5140	0.2990	0.2969	0.2924	0.3070	146	0.4940	0.0450	30.4
3291.0	0.5120	0.2990	0.2970	0.2925	0.3071	147	0.4960	0.0451	30.6
3304.0	0.5100	0.2990	0.2972	0.2925	0.3072	147	0.4980	0.0452	30.6
3317.0	0.5080	0.2990	0.2973	0.2926	0.3072	145	0.5000	0.0452	30.1
3330.0	0.5060	0.2990	0.2974	0.2927	0.3073	145	0.5020	0.0453	30.2
3344.0	0.5040	0.2989	0.2976	0.2927	0.3073	146	0.5040	0.0453	30.4
3357.0	0.5020	0.2990	0.2977	0.2928	0.3074	147	0.5060	0.0454	30.5
3370.0	0.5000	0.2989	0.2979	0.2929	0.3075	147	0.5080	0.0455	30.5
3383.0	0.4980	0.2990	0.2980	0.2929	0.3076	147	0.5100	0.0455	30.5
3396.0	0.4960	0.2990	0.2982	0.2930	0.3077	147	0.5120	0.0456	30.5
3410.0	0.4940	0.2990	0.2984	0.2931	0.3078	147	0.5140	0.0458	30.5
3421.0	0.4921	0.2990	0.2985	0.2932	0.3078	146	0.5159	0.0458	30.3

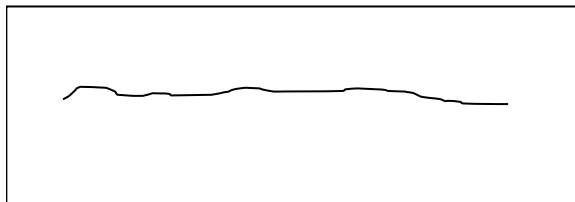


Direct Shear Strength of Rock
ASTM D 5607

Project Name	<u>SR1 Flood Control Project - Inlet Debris Barrier</u>	Project Number	<u>110773396</u>
Lithology	<u>Dolomite, tan, moderately hard</u>	Lab ID	<u>DSNF-20</u>
Hole Number	<u>DB-3</u>	Date Received	<u>05/15/2018</u>
Depth (m)	<u>13.86</u>	Diameter (in)	<u>2.400</u>
Test Type	<u>Direct shear of natural fracture</u>	Angle of Dip (deg)	<u>20.0</u>
Initial Moisture Condition	<u>As received, moist</u>	Area(in ²)	<u>4.81</u>
Test Moisture Condition	<u>Soaked at least 12 hours prior to test.</u>	Date Prepared	<u>06/27/2018</u>
Joint Roughness	<u>9</u>	Date Tested	<u>06/28/2018</u>
Normal Stress (psi)	<u>62</u>		



Sketch



Shear Rate to Peak (in/min) N/A

Encapsulation Material Hydro-Stone

Comments _____

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
0.0	1.0093	0.2552	0.2515	0.2570	0.2530	13	0.0000	0.0000	2.7
30.0	1.0073	0.2551	0.2515	0.2567	0.2533	22	0.0020	0.0000	4.6
45.0	1.0053	0.2551	0.2516	0.2565	0.2537	28	0.0040	0.0000	5.8
61.0	1.0033	0.2551	0.2516	0.2562	0.2541	38	0.0060	0.0001	7.9
76.0	1.0013	0.2551	0.2517	0.2559	0.2546	51	0.0080	0.0001	10.5
90.0	0.9993	0.2551	0.2517	0.2556	0.2550	80	0.0100	0.0002	16.6
103.0	0.9973	0.2551	0.2516	0.2553	0.2553	108	0.0120	0.0002	22.4
118.0	0.9953	0.2551	0.2516	0.2549	0.2557	133	0.0140	0.0001	27.7
132.0	0.9933	0.2551	0.2515	0.2545	0.2560	156	0.0160	0.0001	32.4
145.0	0.9913	0.2550	0.2515	0.2541	0.2563	174	0.0180	0.0000	36.2
158.0	0.9893	0.2550	0.2515	0.2538	0.2565	186	0.0200	0.0000	38.6
172.0	0.9873	0.2550	0.2515	0.2536	0.2568	198	0.0220	0.0000	41.2
186.0	0.9853	0.2550	0.2516	0.2534	0.2572	210	0.0240	0.0001	43.6
199.0	0.9833	0.2551	0.2517	0.2532	0.2575	218	0.0260	0.0002	45.4
212.0	0.9813	0.2552	0.2518	0.2531	0.2579	227	0.0280	0.0003	47.1
225.0	0.9793	0.2553	0.2520	0.2530	0.2583	233	0.0300	0.0005	48.3
239.0	0.9773	0.2555	0.2522	0.2530	0.2587	237	0.0320	0.0007	49.3
252.0	0.9753	0.2557	0.2524	0.2529	0.2592	240	0.0340	0.0009	49.9
266.0	0.9733	0.2560	0.2526	0.2529	0.2596	243	0.0360	0.0011	50.5
280.0	0.9713	0.2562	0.2528	0.2529	0.2601	246	0.0380	0.0013	51.2
293.0	0.9693	0.2564	0.2531	0.2529	0.2606	248	0.0400	0.0016	51.6
307.0	0.9673	0.2567	0.2533	0.2529	0.2611	251	0.0420	0.0018	52.2
320.0	0.9653	0.2569	0.2536	0.2529	0.2616	254	0.0440	0.0021	52.7
334.0	0.9633	0.2571	0.2539	0.2529	0.2620	257	0.0460	0.0023	53.3
347.0	0.9613	0.2574	0.2542	0.2529	0.2625	258	0.0480	0.0026	53.6
360.0	0.9593	0.2576	0.2545	0.2529	0.2630	261	0.0500	0.0028	54.3
374.0	0.9573	0.2578	0.2548	0.2530	0.2635	264	0.0520	0.0031	54.8
387.0	0.9553	0.2580	0.2552	0.2530	0.2639	266	0.0540	0.0034	55.2
401.0	0.9533	0.2582	0.2556	0.2531	0.2644	268	0.0560	0.0037	55.6
414.0	0.9513	0.2584	0.2560	0.2532	0.2649	265	0.0580	0.0040	55.1
427.0	0.9493	0.2586	0.2563	0.2534	0.2653	269	0.0600	0.0042	55.8
441.0	0.9473	0.2589	0.2567	0.2535	0.2657	270	0.0620	0.0045	56.1
454.0	0.9453	0.2591	0.2571	0.2537	0.2662	269	0.0640	0.0049	55.9
468.0	0.9433	0.2593	0.2575	0.2538	0.2666	271	0.0660	0.0051	56.3
481.0	0.9413	0.2596	0.2579	0.2540	0.2670	270	0.0680	0.0055	56.2
494.0	0.9393	0.2598	0.2583	0.2543	0.2674	269	0.0700	0.0058	55.8
508.0	0.9373	0.2601	0.2587	0.2545	0.2678	268	0.0720	0.0061	55.7
521.0	0.9353	0.2603	0.2590	0.2547	0.2682	269	0.0740	0.0064	55.8
534.0	0.9333	0.2606	0.2594	0.2549	0.2685	268	0.0760	0.0067	55.6
547.0	0.9313	0.2608	0.2597	0.2552	0.2689	268	0.0780	0.0070	55.6
561.0	0.9293	0.2611	0.2601	0.2554	0.2693	268	0.0800	0.0073	55.7
574.0	0.9273	0.2613	0.2604	0.2556	0.2696	268	0.0820	0.0076	55.6
587.0	0.9253	0.2616	0.2607	0.2558	0.2700	269	0.0840	0.0079	56.0
601.0	0.9233	0.2619	0.2611	0.2561	0.2703	266	0.0860	0.0082	55.2
614.0	0.9213	0.2621	0.2614	0.2563	0.2707	267	0.0880	0.0085	55.4
627.0	0.9193	0.2624	0.2617	0.2566	0.2710	266	0.0900	0.0087	55.3
640.0	0.9173	0.2626	0.2621	0.2568	0.2714	267	0.0920	0.0090	55.5
654.0	0.9153	0.2629	0.2624	0.2570	0.2717	265	0.0940	0.0093	55.1
667.0	0.9133	0.2631	0.2627	0.2573	0.2720	265	0.0960	0.0096	55.0
680.0	0.9113	0.2633	0.2631	0.2575	0.2723	265	0.0980	0.0099	55.0
693.0	0.9093	0.2636	0.2634	0.2577	0.2726	265	0.1000	0.0102	55.0
706.0	0.9073	0.2639	0.2637	0.2580	0.2730	264	0.1020	0.0105	54.9
720.0	0.9053	0.2641	0.2640	0.2582	0.2733	264	0.1040	0.0107	54.8
733.0	0.9033	0.2643	0.2643	0.2584	0.2736	265	0.1060	0.0110	55.1
746.0	0.9013	0.2646	0.2646	0.2587	0.2739	265	0.1080	0.0113	55.0
760.0	0.8993	0.2648	0.2649	0.2589	0.2742	265	0.1100	0.0115	55.1
773.0	0.8973	0.2651	0.2653	0.2591	0.2746	267	0.1120	0.0119	55.4
786.0	0.8953	0.2653	0.2656	0.2593	0.2749	268	0.1140	0.0121	55.6
799.0	0.8933	0.2656	0.2659	0.2597	0.2752	263	0.1160	0.0124	54.6
813.0	0.8913	0.2659	0.2662	0.2600	0.2754	263	0.1180	0.0127	54.5
826.0	0.8893	0.2662	0.2664	0.2603	0.2757	264	0.1200	0.0130	54.7
839.0	0.8873	0.2664	0.2667	0.2605	0.2760	263	0.1220	0.0132	54.6
852.0	0.8853	0.2667	0.2669	0.2608	0.2763	264	0.1240	0.0135	54.9
865.0	0.8833	0.2670	0.2672	0.2610	0.2765	265	0.1260	0.0138	55.0
879.0	0.8813	0.2673	0.2675	0.2613	0.2768	266	0.1280	0.0141	55.2
891.0	0.8793	0.2675	0.2677	0.2616	0.2771	261	0.1300	0.0143	54.1
904.0	0.8773	0.2677	0.2680	0.2617	0.2774	262	0.1320	0.0145	54.5
917.0	0.8753	0.2679	0.2683	0.2619	0.2777	263	0.1340	0.0148	54.6
930.0	0.8733	0.2681	0.2686	0.2621	0.2780	263	0.1360	0.0150	54.6
943.0	0.8713	0.2683	0.2688	0.2623	0.2782	263	0.1380	0.0152	54.7
956.0	0.8693	0.2686	0.2691	0.2625	0.2785	264	0.1400	0.0155	54.8
970.0	0.8673	0.2688	0.2694	0.2627	0.2788	265	0.1420	0.0158	55.0
983.0	0.8653	0.2690	0.2697	0.2629	0.2791	264	0.1440	0.0160	54.8
996.0	0.8633	0.2692	0.2699	0.2631	0.2794	265	0.1460	0.0162	55.0
1009.0	0.8613	0.2695	0.2702	0.2633	0.2797	265	0.1480	0.0165	55.1
1023.0	0.8593	0.2697	0.2704	0.2635	0.2800	265	0.1500	0.0167	55.0
1035.0	0.8573	0.2700	0.2706	0.2638	0.2802	260	0.1520	0.0170	53.9
1048.0	0.8553	0.2703	0.2708	0.2641	0.2804	261	0.1540	0.0172	54.2
1061.0	0.8533	0.2706	0.2710	0.2643	0.2807	262	0.1560	0.0175	54.3

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
1075.0	0.8513	0.2709	0.2712	0.2645	0.2809	262	0.1580	0.0177	54.5
1088.0	0.8493	0.2712	0.2714	0.2648	0.2812	262	0.1600	0.0180	54.4
1101.0	0.8473	0.2715	0.2716	0.2650	0.2815	262	0.1620	0.0182	54.4
1114.0	0.8453	0.2717	0.2718	0.2652	0.2817	261	0.1640	0.0184	54.3
1127.0	0.8433	0.2720	0.2720	0.2655	0.2820	255	0.1660	0.0187	53.0
1140.0	0.8413	0.2722	0.2723	0.2657	0.2822	256	0.1680	0.0189	53.1
1153.0	0.8393	0.2724	0.2725	0.2659	0.2824	256	0.1700	0.0191	53.2
1167.0	0.8373	0.2726	0.2727	0.2661	0.2827	257	0.1720	0.0194	53.3
1180.0	0.8353	0.2729	0.2730	0.2663	0.2830	256	0.1740	0.0196	53.1
1193.0	0.8333	0.2731	0.2732	0.2665	0.2832	255	0.1760	0.0198	53.1
1206.0	0.8313	0.2733	0.2734	0.2667	0.2834	256	0.1780	0.0200	53.2
1220.0	0.8293	0.2735	0.2736	0.2669	0.2837	257	0.1800	0.0203	53.3
1233.0	0.8273	0.2738	0.2739	0.2671	0.2840	257	0.1820	0.0205	53.5
1246.0	0.8253	0.2740	0.2741	0.2673	0.2842	256	0.1840	0.0207	53.3
1259.0	0.8233	0.2742	0.2743	0.2675	0.2845	257	0.1860	0.0210	53.3
1273.0	0.8213	0.2744	0.2746	0.2677	0.2847	254	0.1880	0.0212	52.7
1286.0	0.8193	0.2747	0.2747	0.2679	0.2850	253	0.1900	0.0214	52.6
1299.0	0.8173	0.2749	0.2749	0.2681	0.2852	254	0.1920	0.0216	52.7
1312.0	0.8153	0.2751	0.2751	0.2683	0.2854	254	0.1940	0.0218	52.8
1326.0	0.8133	0.2753	0.2753	0.2686	0.2856	251	0.1960	0.0220	52.1
1339.0	0.8113	0.2756	0.2756	0.2688	0.2858	251	0.1980	0.0223	52.1
1352.0	0.8093	0.2758	0.2758	0.2690	0.2860	251	0.2000	0.0225	52.0
1365.0	0.8073	0.2760	0.2760	0.2692	0.2862	251	0.2020	0.0227	52.2
1379.0	0.8053	0.2762	0.2762	0.2693	0.2865	250	0.2040	0.0229	52.0
1392.0	0.8033	0.2764	0.2764	0.2695	0.2867	249	0.2060	0.0231	51.7
1405.0	0.8013	0.2766	0.2766	0.2697	0.2869	249	0.2080	0.0233	51.7
1417.0	0.7993	0.2768	0.2768	0.2699	0.2871	249	0.2100	0.0235	51.7
1431.0	0.7973	0.2770	0.2769	0.2701	0.2873	246	0.2120	0.0237	51.0
1444.0	0.7953	0.2772	0.2771	0.2703	0.2875	249	0.2140	0.0239	51.8
1457.0	0.7933	0.2774	0.2773	0.2705	0.2877	250	0.2160	0.0241	52.0
1470.0	0.7913	0.2777	0.2774	0.2708	0.2877	243	0.2180	0.0242	50.5
1484.0	0.7893	0.2779	0.2775	0.2710	0.2878	245	0.2200	0.0244	50.9
1497.0	0.7873	0.2781	0.2776	0.2713	0.2879	245	0.2220	0.0246	51.0
1510.0	0.7853	0.2784	0.2777	0.2715	0.2880	243	0.2240	0.0247	50.4
1523.0	0.7833	0.2787	0.2778	0.2717	0.2881	244	0.2260	0.0249	50.6
1536.0	0.7813	0.2789	0.2779	0.2719	0.2882	245	0.2280	0.0251	50.8
1550.0	0.7793	0.2792	0.2780	0.2721	0.2884	246	0.2300	0.0253	51.0
1563.0	0.7773	0.2794	0.2781	0.2723	0.2885	248	0.2320	0.0254	51.5
1576.0	0.7753	0.2797	0.2783	0.2725	0.2886	249	0.2340	0.0256	51.7
1590.0	0.7733	0.2799	0.2784	0.2728	0.2888	249	0.2360	0.0258	51.8
1603.0	0.7713	0.2802	0.2785	0.2730	0.2889	250	0.2380	0.0260	51.9
1615.0	0.7693	0.2804	0.2785	0.2733	0.2891	250	0.2400	0.0262	51.9
1629.0	0.7673	0.2807	0.2786	0.2735	0.2893	249	0.2420	0.0264	51.8
1643.0	0.7653	0.2809	0.2787	0.2738	0.2895	248	0.2440	0.0266	51.5
1655.0	0.7633	0.2811	0.2788	0.2740	0.2896	247	0.2460	0.0267	51.3
1668.0	0.7613	0.2813	0.2789	0.2742	0.2897	248	0.2480	0.0269	51.4
1681.0	0.7593	0.2815	0.2791	0.2744	0.2899	248	0.2500	0.0271	51.6
1694.0	0.7573	0.2817	0.2792	0.2746	0.2900	247	0.2520	0.0272	51.2
1707.0	0.7553	0.2820	0.2794	0.2747	0.2902	247	0.2540	0.0274	51.3
1720.0	0.7533	0.2821	0.2795	0.2749	0.2904	247	0.2560	0.0276	51.3
1733.0	0.7513	0.2824	0.2796	0.2750	0.2906	246	0.2580	0.0277	51.0
1746.0	0.7493	0.2825	0.2797	0.2751	0.2908	243	0.2600	0.0279	50.5
1759.0	0.7473	0.2827	0.2798	0.2752	0.2910	243	0.2620	0.0280	50.4
1772.0	0.7453	0.2829	0.2799	0.2752	0.2912	242	0.2640	0.0281	50.4
1785.0	0.7433	0.2830	0.2800	0.2753	0.2915	242	0.2660	0.0283	50.2
1798.0	0.7413	0.2832	0.2802	0.2754	0.2917	241	0.2680	0.0285	50.0
1811.0	0.7393	0.2833	0.2803	0.2754	0.2919	242	0.2700	0.0286	50.2
1824.0	0.7373	0.2834	0.2804	0.2755	0.2921	240	0.2720	0.0287	49.9
1838.0	0.7353	0.2835	0.2806	0.2756	0.2923	239	0.2740	0.0288	49.6
1851.0	0.7333	0.2837	0.2808	0.2757	0.2925	237	0.2760	0.0290	49.1
1863.0	0.7313	0.2838	0.2809	0.2758	0.2927	236	0.2780	0.0291	49.1
1876.0	0.7293	0.2839	0.2811	0.2758	0.2929	237	0.2800	0.0293	49.3
1890.0	0.7273	0.2840	0.2812	0.2759	0.2931	237	0.2820	0.0294	49.2
1903.0	0.7253	0.2841	0.2814	0.2759	0.2933	238	0.2840	0.0295	49.4
1916.0	0.7233	0.2842	0.2815	0.2760	0.2935	238	0.2860	0.0296	49.5
1929.0	0.7213	0.2843	0.2817	0.2760	0.2936	239	0.2880	0.0297	49.6
1942.0	0.7193	0.2844	0.2818	0.2761	0.2938	237	0.2900	0.0299	49.2
1955.0	0.7173	0.2845	0.2820	0.2762	0.2940	237	0.2920	0.0300	49.3
1968.0	0.7153	0.2846	0.2821	0.2762	0.2942	238	0.2940	0.0301	49.5
1981.0	0.7133	0.2847	0.2823	0.2763	0.2944	239	0.2960	0.0303	49.6
1995.0	0.7113	0.2848	0.2824	0.2764	0.2946	239	0.2980	0.0304	49.6
2008.0	0.7093	0.2849	0.2826	0.2765	0.2948	238	0.3000	0.0305	49.5
2021.0	0.7073	0.2850	0.2828	0.2766	0.2949	236	0.3020	0.0307	49.0
2034.0	0.7053	0.2851	0.2829	0.2767	0.2950	235	0.3040	0.0308	48.7
2047.0	0.7033	0.2852	0.2830	0.2768	0.2951	235	0.3060	0.0309	48.8
2061.0	0.7013	0.2853	0.2831	0.2769	0.2952	235	0.3080	0.0310	48.9
2074.0	0.6993	0.2854	0.2833	0.2770	0.2953	236	0.3100	0.0311	49.0
2087.0	0.6973	0.2855	0.2834	0.2771	0.2954	236	0.3120	0.0312	49.1
2100.0	0.6953	0.2856	0.2835	0.2773	0.2955	236	0.3140	0.0313	49.0

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
2114.0	0.6933	0.2857	0.2836	0.2774	0.2956	236	0.3160	0.0314	49.0
2127.0	0.6913	0.2858	0.2837	0.2775	0.2957	235	0.3180	0.0315	48.8
2140.0	0.6893	0.2859	0.2838	0.2777	0.2957	234	0.3200	0.0316	48.7
2153.0	0.6873	0.2860	0.2838	0.2778	0.2957	233	0.3220	0.0317	48.5
2166.0	0.6853	0.2861	0.2839	0.2780	0.2958	233	0.3240	0.0318	48.5
2179.0	0.6833	0.2862	0.2840	0.2781	0.2958	234	0.3260	0.0319	48.6
2192.0	0.6813	0.2863	0.2841	0.2783	0.2959	234	0.3280	0.0320	48.6
2205.0	0.6793	0.2864	0.2842	0.2784	0.2959	232	0.3300	0.0321	48.3
2218.0	0.6773	0.2865	0.2843	0.2786	0.2960	232	0.3320	0.0322	48.2
2232.0	0.6753	0.2866	0.2844	0.2787	0.2961	232	0.3340	0.0323	48.2
2245.0	0.6733	0.2867	0.2845	0.2788	0.2961	233	0.3360	0.0324	48.3
2258.0	0.6713	0.2868	0.2846	0.2790	0.2962	232	0.3380	0.0325	48.2
2271.0	0.6693	0.2869	0.2847	0.2791	0.2962	231	0.3400	0.0326	48.0
2284.0	0.6673	0.2870	0.2848	0.2792	0.2963	231	0.3420	0.0327	48.0
2297.0	0.6653	0.2870	0.2849	0.2794	0.2963	230	0.3440	0.0327	47.8
2310.0	0.6633	0.2871	0.2850	0.2795	0.2964	231	0.3460	0.0328	47.9
2323.0	0.6613	0.2871	0.2851	0.2796	0.2964	231	0.3480	0.0329	47.9
2336.0	0.6593	0.2872	0.2852	0.2797	0.2965	231	0.3500	0.0330	47.9
2349.0	0.6573	0.2872	0.2853	0.2799	0.2963	223	0.3520	0.0330	46.3
2362.0	0.6553	0.2873	0.2852	0.2801	0.2962	224	0.3540	0.0330	46.6
2376.0	0.6533	0.2873	0.2853	0.2803	0.2961	225	0.3560	0.0331	46.8
2389.0	0.6513	0.2874	0.2853	0.2804	0.2961	227	0.3580	0.0331	47.0
2402.0	0.6493	0.2874	0.2854	0.2805	0.2960	225	0.3600	0.0332	46.6
2415.0	0.6473	0.2874	0.2855	0.2807	0.2960	223	0.3620	0.0332	46.3
2429.0	0.6453	0.2874	0.2855	0.2808	0.2960	224	0.3640	0.0333	46.5
2441.0	0.6433	0.2874	0.2856	0.2809	0.2959	221	0.3660	0.0333	45.9
2454.0	0.6413	0.2874	0.2857	0.2810	0.2959	218	0.3680	0.0333	45.2
2467.0	0.6393	0.2874	0.2858	0.2811	0.2959	217	0.3700	0.0334	45.1
2481.0	0.6373	0.2874	0.2859	0.2811	0.2959	217	0.3720	0.0334	45.1
2494.0	0.6353	0.2874	0.2859	0.2812	0.2959	218	0.3740	0.0334	45.2
2507.0	0.6333	0.2874	0.2860	0.2813	0.2958	218	0.3760	0.0335	45.3
2520.0	0.6313	0.2874	0.2861	0.2814	0.2958	217	0.3780	0.0335	45.0
2533.0	0.6293	0.2874	0.2863	0.2815	0.2959	217	0.3800	0.0336	45.1
2547.0	0.6273	0.2874	0.2864	0.2816	0.2959	218	0.3820	0.0337	45.4
2560.0	0.6253	0.2874	0.2865	0.2817	0.2959	219	0.3840	0.0337	45.4
2573.0	0.6233	0.2874	0.2866	0.2818	0.2960	220	0.3860	0.0338	45.6
2587.0	0.6213	0.2874	0.2867	0.2819	0.2960	217	0.3880	0.0338	45.2
2600.0	0.6193	0.2874	0.2868	0.2819	0.2960	217	0.3900	0.0339	45.1
2613.0	0.6173	0.2874	0.2869	0.2820	0.2961	218	0.3920	0.0339	45.3
2627.0	0.6153	0.2874	0.2870	0.2820	0.2962	219	0.3940	0.0340	45.6
2640.0	0.6133	0.2874	0.2871	0.2821	0.2962	221	0.3960	0.0340	45.8
2653.0	0.6113	0.2874	0.2873	0.2822	0.2963	221	0.3980	0.0341	45.9
2666.0	0.6093	0.2875	0.2874	0.2822	0.2964	221	0.4000	0.0342	45.9
2679.0	0.6073	0.2875	0.2875	0.2823	0.2964	219	0.4020	0.0343	45.6
2691.0	0.6053	0.2875	0.2877	0.2824	0.2965	220	0.4040	0.0344	45.6
2704.0	0.6033	0.2875	0.2878	0.2825	0.2965	218	0.4060	0.0344	45.3
2717.0	0.6013	0.2875	0.2879	0.2826	0.2966	219	0.4080	0.0345	45.5
2730.0	0.5993	0.2875	0.2881	0.2826	0.2966	220	0.4100	0.0345	45.8
2744.0	0.5973	0.2875	0.2882	0.2827	0.2967	221	0.4120	0.0346	46.0
2757.0	0.5953	0.2875	0.2884	0.2828	0.2968	222	0.4140	0.0347	46.2
2770.0	0.5933	0.2876	0.2885	0.2829	0.2969	223	0.4160	0.0348	46.3
2783.0	0.5913	0.2876	0.2887	0.2830	0.2969	223	0.4180	0.0349	46.3
2797.0	0.5893	0.2876	0.2889	0.2831	0.2970	223	0.4200	0.0350	46.4
2810.0	0.5873	0.2876	0.2890	0.2833	0.2971	223	0.4220	0.0351	46.3
2823.0	0.5853	0.2877	0.2892	0.2834	0.2972	223	0.4240	0.0352	46.3
2836.0	0.5833	0.2878	0.2894	0.2835	0.2973	223	0.4260	0.0353	46.3
2849.0	0.5813	0.2878	0.2895	0.2836	0.2974	224	0.4280	0.0354	46.5
2862.0	0.5793	0.2879	0.2897	0.2837	0.2975	225	0.4300	0.0355	46.8
2875.0	0.5773	0.2879	0.2899	0.2839	0.2976	224	0.4320	0.0357	46.5
2888.0	0.5753	0.2880	0.2901	0.2840	0.2977	222	0.4340	0.0358	46.2
2902.0	0.5733	0.2880	0.2902	0.2842	0.2978	222	0.4360	0.0359	46.1
2914.0	0.5713	0.2881	0.2904	0.2843	0.2979	222	0.4380	0.0360	46.1
2928.0	0.5693	0.2882	0.2906	0.2844	0.2980	222	0.4400	0.0361	46.2
2942.0	0.5673	0.2882	0.2908	0.2846	0.2981	223	0.4420	0.0363	46.3
2955.0	0.5653	0.2883	0.2909	0.2847	0.2981	221	0.4440	0.0363	45.8
2967.0	0.5633	0.2884	0.2911	0.2849	0.2982	221	0.4460	0.0365	45.9
2980.0	0.5613	0.2884	0.2913	0.2850	0.2983	221	0.4480	0.0366	46.0
2994.0	0.5593	0.2885	0.2914	0.2851	0.2984	223	0.4500	0.0367	46.2
3007.0	0.5573	0.2885	0.2916	0.2852	0.2985	223	0.4520	0.0368	46.3
3020.0	0.5553	0.2886	0.2918	0.2854	0.2986	216	0.4540	0.0369	44.8
3033.0	0.5533	0.2886	0.2919	0.2854	0.2986	219	0.4560	0.0370	45.4
3046.0	0.5513	0.2886	0.2920	0.2855	0.2987	216	0.4580	0.0370	44.9
3059.0	0.5493	0.2886	0.2922	0.2856	0.2988	218	0.4600	0.0371	45.4
3072.0	0.5473	0.2886	0.2923	0.2856	0.2988	220	0.4620	0.0372	45.7
3085.0	0.5453	0.2886	0.2925	0.2857	0.2989	221	0.4640	0.0373	45.9
3099.0	0.5433	0.2886	0.2926	0.2858	0.2990	222	0.4660	0.0373	46.0
3112.0	0.5413	0.2886	0.2928	0.2859	0.2991	221	0.4680	0.0374	45.9
3125.0	0.5393	0.2886	0.2929	0.2860	0.2991	222	0.4700	0.0375	46.2
3138.0	0.5373	0.2886	0.2930	0.2861	0.2991	216	0.4720	0.0375	44.8

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
3151.0	0.5353	0.2886	0.2931	0.2861	0.2992	219	0.4740	0.0376	45.4
3164.0	0.5333	0.2885	0.2932	0.2862	0.2992	219	0.4760	0.0376	45.5
3176.0	0.5313	0.2885	0.2933	0.2863	0.2992	219	0.4780	0.0377	45.5
3190.0	0.5293	0.2885	0.2934	0.2863	0.2992	221	0.4800	0.0377	45.9
3203.0	0.5273	0.2885	0.2935	0.2864	0.2992	221	0.4820	0.0377	45.8
3216.0	0.5253	0.2885	0.2936	0.2865	0.2993	221	0.4840	0.0378	45.9
3228.0	0.5233	0.2885	0.2937	0.2865	0.2993	222	0.4860	0.0378	46.1
3241.0	0.5213	0.2885	0.2938	0.2866	0.2994	224	0.4880	0.0379	46.5
3255.0	0.5193	0.2885	0.2940	0.2867	0.2995	225	0.4900	0.0380	46.6
3268.0	0.5173	0.2885	0.2941	0.2868	0.2995	223	0.4920	0.0381	46.3
3281.0	0.5153	0.2885	0.2942	0.2869	0.2995	221	0.4940	0.0381	45.9
3294.0	0.5133	0.2885	0.2943	0.2870	0.2995	222	0.4960	0.0382	46.2
3307.0	0.5113	0.2885	0.2944	0.2871	0.2995	208	0.4980	0.0382	43.2
3320.0	0.5093	0.2884	0.2945	0.2871	0.2995	209	0.5000	0.0382	43.4
3333.0	0.5073	0.2884	0.2946	0.2871	0.2996	209	0.5020	0.0383	43.4
3346.0	0.5053	0.2884	0.2946	0.2871	0.2996	209	0.5040	0.0383	43.4
3360.0	0.5033	0.2883	0.2947	0.2871	0.2997	211	0.5060	0.0383	43.8
3373.0	0.5013	0.2883	0.2948	0.2871	0.2997	213	0.5080	0.0383	44.3
3386.0	0.4993	0.2883	0.2949	0.2871	0.2997	215	0.5100	0.0383	44.6
3399.0	0.4973	0.2883	0.2950	0.2871	0.2998	216	0.5120	0.0384	44.8
3412.0	0.4953	0.2882	0.2950	0.2872	0.2998	214	0.5140	0.0384	44.5
3419.0	0.4944	0.2882	0.2951	0.2872	0.2998	214	0.5149	0.0384	44.5

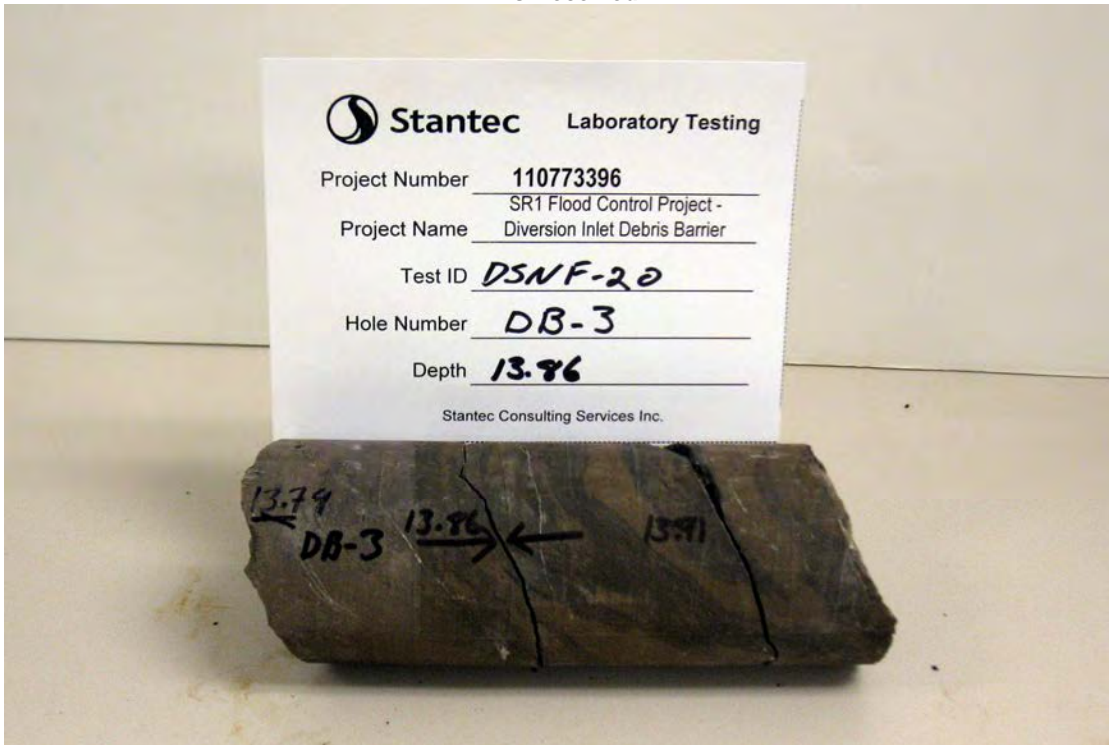


Photo Report

Project Name SR1 Flood Control Project - Inlet Debris Barrier
 Lithology Dolomite, tan, moderately hard
 Hole Number DB-3 Depth (m) 13.86
 Test Type Direct shear of natural fracture

Project Number 110773396
 Lab ID DSNF-20

As Received



Core Preparation





Photo Report

Project Name SR1 Flood Control Project - Inlet Debris Barrier
 Lithology Dolomite, tan, moderately hard
 Hole Number DB-3 Depth (m) 13.86
 Test Type Direct shear of natural fracture

Project Number 110773396
 Lab ID DSNF-20

Core Preparation



Post Test



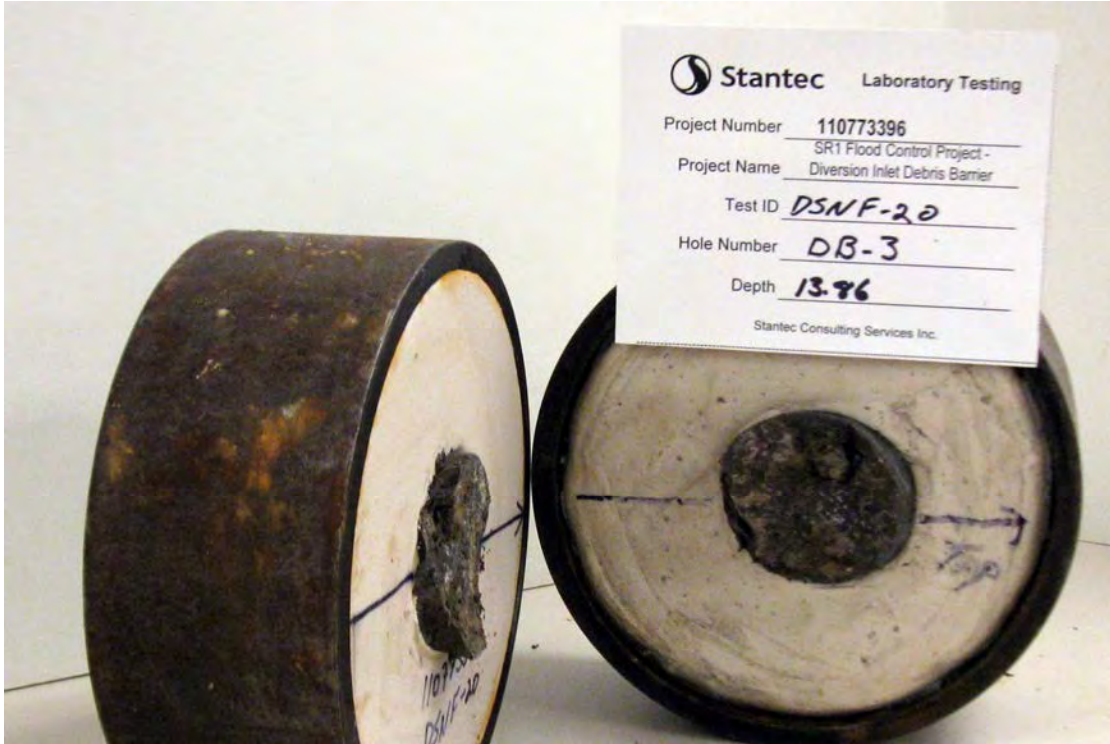


Photo Report

Project Name SR1 Flood Control Project - Inlet Debris Barrier
Lithology Dolomite, tan, moderately hard
Hole Number DB-3 Depth (m) 13.86
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Lab ID DSNF-20

Post Test

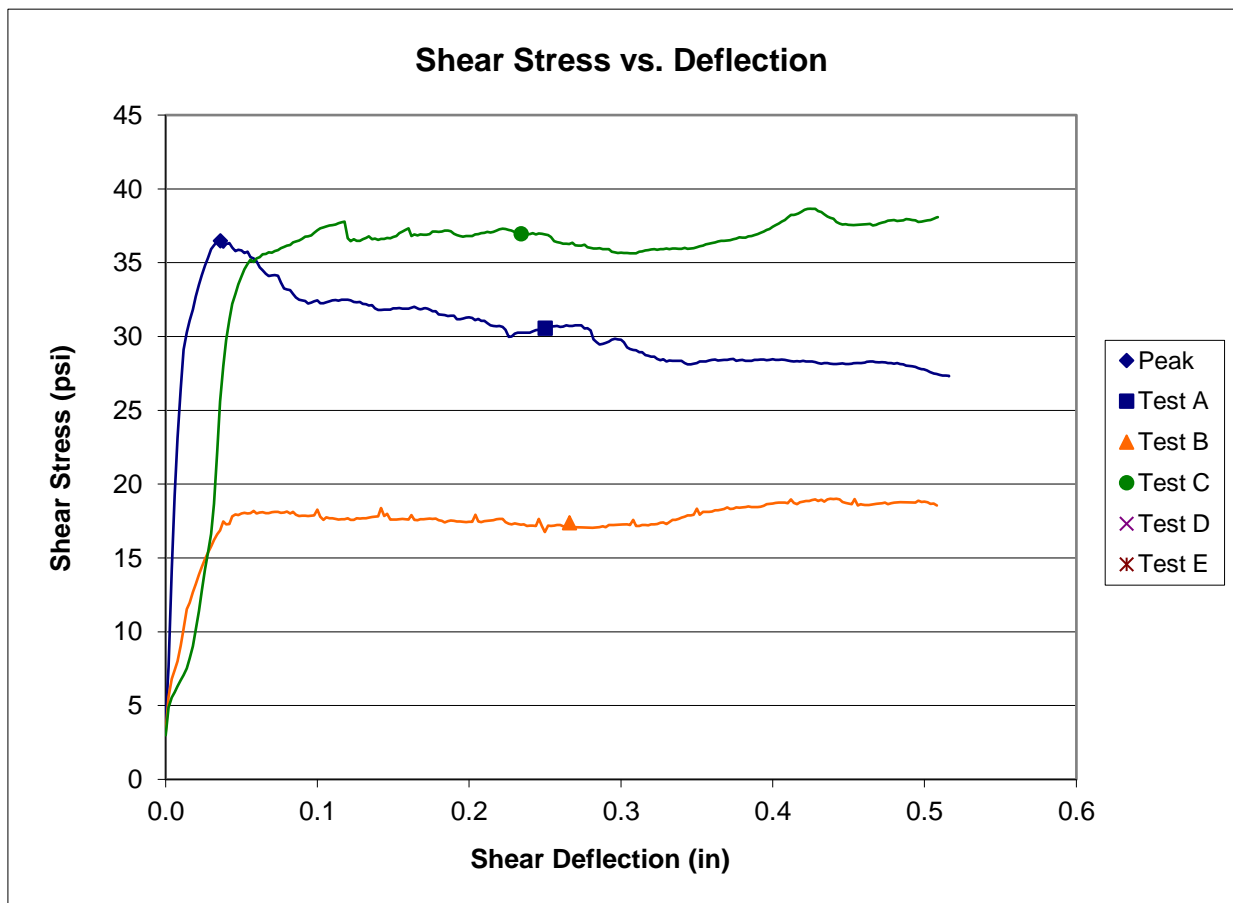




Direct Shear Strength of Rock
ASTM D 5607

Project Name	<u>SR1 Flood Control Project - Inlet Debris Barrier</u>	Project Number	<u>110773396</u>
Lithology	<u>Shale, gray, moderately hard, partially healed faults</u>	Lab ID	<u>DSNF-22</u>
Hole Number	<u>DB-3</u>	Depth (m)	<u>19.44</u>
Test Type	<u>Direct shear of natural fracture</u>	Date Received	<u>05/15/2018</u>
Initial Moisture Condition	<u>As received, moist</u>	Diameter (in.)	<u>2.397</u>
At Test Moisture Condition	<u>Soaked at least 12 hours prior to test.</u>	Angle of Dip (deg.)	<u>35.7</u>
Roughness (JRC)	<u>10</u>	Area (in ²)	<u>5.56</u>

	Test A	Test B	Test C	Test D	Test E
Normal Stress (psi)	62.0	36.0	94.0	N/A	N/A
Peak Shear Stress (psi)	36.5				
Deflection at Peak (in)	0.0360				
Post Peak Stress (psi)	30.6	17.4	37.0	N/A	N/A
Deflection at Residual (in)	0.2500	0.2660	0.2340	N/A	N/A



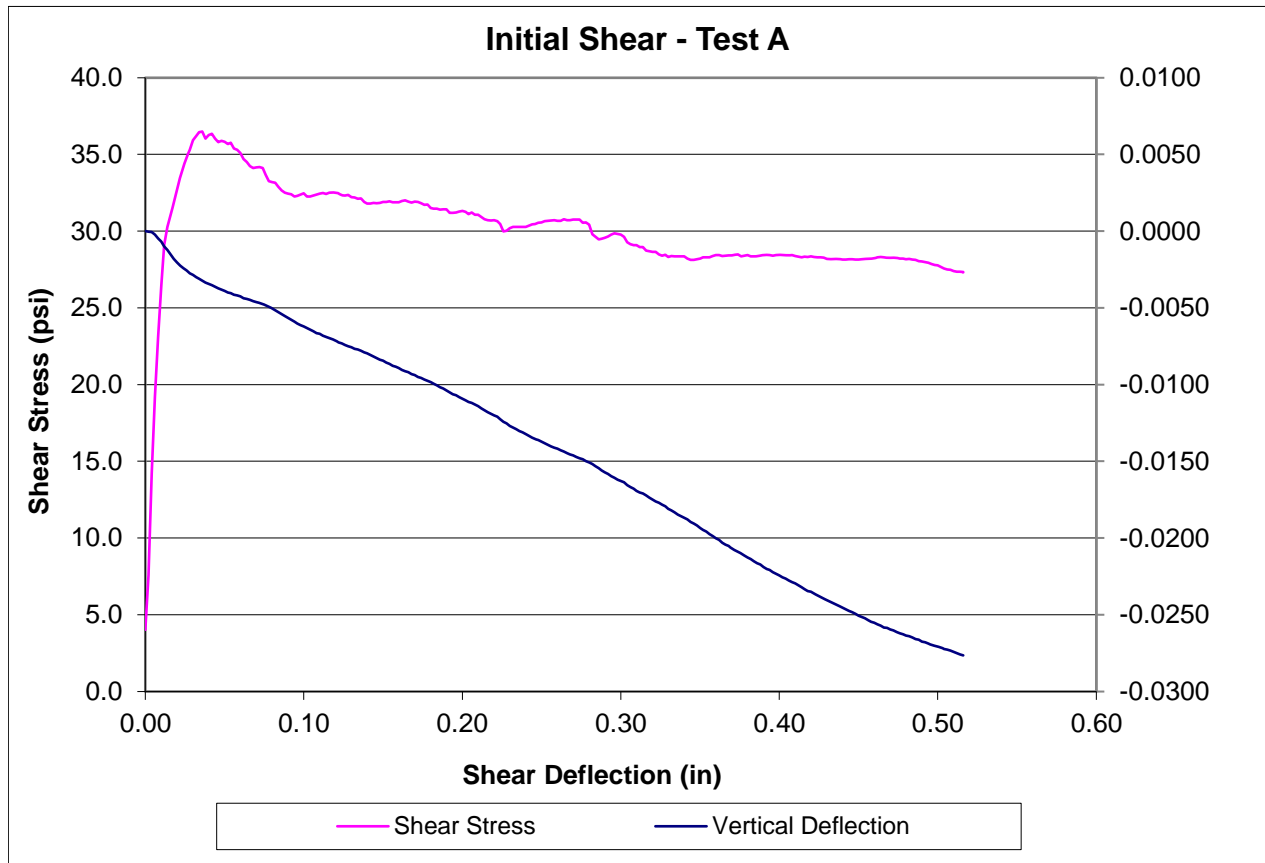
Comments Secured partially healed faults with tape for specimen preparation.

Reviewed By RJ

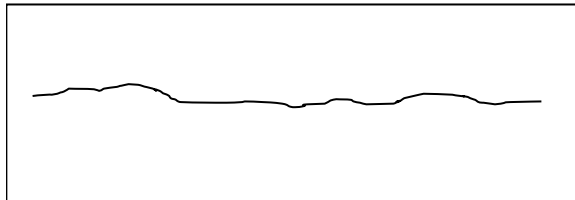


Direct Shear Strength of Rock
ASTM D 5607

Project Name	<u>SR1 Flood Control Project - Inlet Debris Barrier</u>	Project Number	<u>110773396</u>
Lithology	<u>Shale, gray, moderately hard, partially healed faults</u>	Lab ID	<u>DSNF-22</u>
Hole Number	<u>DB-3</u>	Date Received	<u>05/15/2018</u>
Depth (m)	<u>19.44</u>		
Test Type	<u>Direct shear of natural fracture</u>	Diameter (in)	<u>2.397</u>
Initial Moisture Condition	<u>As received, moist</u>	Angle of Dip (deg)	<u>35.7</u>
Test Moisture Condition	<u>Soaked at least 12 hours prior to test.</u>	Area(in ²)	<u>5.56</u>
Joint Roughness	<u>10</u>		
		Date Prepared	<u>06/28/2018</u>
Normal Stress (psi)	<u>62</u>	Date Tested	<u>06/29/2018</u>



Sketch



Shear Rate to Peak (in/min) 0.009

Encapsulation Material Hydro-Stone

Comments _____

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
0.0	1.0064	0.2565	0.2532	0.2517	0.2542	22	0.0000	0.0000	4.0
20.0	1.0044	0.2564	0.2532	0.2513	0.2545	42	0.0020	0.0000	7.6
30.0	1.0024	0.2564	0.2531	0.2509	0.2549	79	0.0040	-0.0001	14.2
40.0	1.0004	0.2563	0.2529	0.2504	0.2551	107	0.0060	-0.0002	19.2
50.0	0.9984	0.2561	0.2526	0.2498	0.2552	128	0.0080	-0.0005	23.1
63.0	0.9964	0.2560	0.2523	0.2492	0.2553	147	0.0100	-0.0007	26.4
78.0	0.9944	0.2558	0.2519	0.2486	0.2553	162	0.0120	-0.0010	29.1
92.0	0.9924	0.2557	0.2516	0.2482	0.2552	168	0.0140	-0.0012	30.3
107.0	0.9904	0.2555	0.2512	0.2477	0.2551	173	0.0160	-0.0015	31.1
121.0	0.9884	0.2553	0.2508	0.2473	0.2549	177	0.0180	-0.0018	31.8
135.0	0.9864	0.2551	0.2505	0.2469	0.2549	182	0.0200	-0.0021	32.7
149.0	0.9844	0.2549	0.2503	0.2466	0.2548	186	0.0220	-0.0022	33.5
162.0	0.9824	0.2548	0.2501	0.2463	0.2547	190	0.0240	-0.0024	34.2
177.0	0.9804	0.2546	0.2499	0.2461	0.2547	193	0.0260	-0.0026	34.8
190.0	0.9784	0.2545	0.2497	0.2458	0.2546	196	0.0280	-0.0028	35.3
204.0	0.9764	0.2544	0.2496	0.2456	0.2546	200	0.0300	-0.0029	35.9
218.0	0.9744	0.2543	0.2494	0.2454	0.2545	201	0.0320	-0.0030	36.2
231.0	0.9724	0.2542	0.2493	0.2452	0.2545	202	0.0340	-0.0031	36.4
245.0	0.9704	0.2541	0.2492	0.2450	0.2544	203	0.0360	-0.0032	36.5
258.0	0.9684	0.2540	0.2491	0.2448	0.2543	200	0.0380	-0.0034	36.0
271.0	0.9664	0.2539	0.2490	0.2446	0.2543	201	0.0400	-0.0035	36.3
285.0	0.9644	0.2538	0.2489	0.2445	0.2543	202	0.0420	-0.0035	36.3
298.0	0.9624	0.2537	0.2488	0.2444	0.2542	200	0.0440	-0.0036	36.0
312.0	0.9604	0.2536	0.2487	0.2442	0.2542	199	0.0460	-0.0037	35.8
325.0	0.9584	0.2535	0.2487	0.2440	0.2541	199	0.0480	-0.0038	35.9
338.0	0.9564	0.2534	0.2486	0.2439	0.2541	199	0.0500	-0.0039	35.8
352.0	0.9544	0.2533	0.2485	0.2437	0.2541	198	0.0520	-0.0040	35.7
365.0	0.9524	0.2532	0.2485	0.2436	0.2541	199	0.0540	-0.0041	35.8
379.0	0.9504	0.2531	0.2484	0.2434	0.2541	197	0.0560	-0.0041	35.4
392.0	0.9484	0.2530	0.2484	0.2433	0.2541	196	0.0580	-0.0042	35.3
405.0	0.9464	0.2530	0.2483	0.2432	0.2541	195	0.0600	-0.0043	35.1
418.0	0.9444	0.2529	0.2482	0.2430	0.2540	193	0.0620	-0.0044	34.7
432.0	0.9424	0.2528	0.2482	0.2429	0.2540	192	0.0640	-0.0044	34.5
445.0	0.9404	0.2527	0.2482	0.2429	0.2539	190	0.0660	-0.0045	34.2
459.0	0.9384	0.2526	0.2481	0.2427	0.2539	189	0.0680	-0.0046	34.1
472.0	0.9364	0.2525	0.2481	0.2426	0.2539	190	0.0700	-0.0046	34.1
485.0	0.9344	0.2524	0.2481	0.2425	0.2538	190	0.0720	-0.0047	34.2
498.0	0.9324	0.2523	0.2480	0.2424	0.2538	190	0.0740	-0.0048	34.1
511.0	0.9304	0.2522	0.2480	0.2423	0.2538	187	0.0760	-0.0048	33.7
524.0	0.9284	0.2520	0.2479	0.2422	0.2537	185	0.0780	-0.0050	33.2
537.0	0.9264	0.2519	0.2479	0.2421	0.2536	184	0.0800	-0.0050	33.2
550.0	0.9244	0.2518	0.2478	0.2419	0.2535	184	0.0820	-0.0051	33.1
564.0	0.9224	0.2516	0.2477	0.2418	0.2534	183	0.0840	-0.0053	32.9
577.0	0.9204	0.2514	0.2477	0.2417	0.2532	181	0.0860	-0.0054	32.6
589.0	0.9184	0.2512	0.2475	0.2416	0.2531	181	0.0880	-0.0056	32.5
602.0	0.9164	0.2511	0.2475	0.2415	0.2529	180	0.0900	-0.0057	32.4
615.0	0.9144	0.2509	0.2474	0.2413	0.2528	180	0.0920	-0.0058	32.4
628.0	0.9124	0.2508	0.2473	0.2412	0.2527	179	0.0940	-0.0059	32.2
641.0	0.9104	0.2506	0.2472	0.2411	0.2526	179	0.0960	-0.0060	32.3
654.0	0.9084	0.2505	0.2471	0.2410	0.2525	180	0.0980	-0.0061	32.4
668.0	0.9064	0.2504	0.2470	0.2409	0.2524	180	0.1000	-0.0062	32.5
681.0	0.9044	0.2502	0.2470	0.2408	0.2523	179	0.1020	-0.0063	32.3
693.0	0.9024	0.2501	0.2469	0.2406	0.2523	179	0.1040	-0.0064	32.3
706.0	0.9004	0.2500	0.2468	0.2405	0.2522	180	0.1060	-0.0065	32.3
720.0	0.8984	0.2498	0.2467	0.2404	0.2521	180	0.1080	-0.0067	32.4
733.0	0.8964	0.2497	0.2467	0.2403	0.2521	180	0.1100	-0.0067	32.4
745.0	0.8944	0.2496	0.2466	0.2401	0.2520	180	0.1120	-0.0068	32.5
758.0	0.8924	0.2495	0.2466	0.2400	0.2519	180	0.1140	-0.0069	32.4
771.0	0.8904	0.2494	0.2465	0.2399	0.2519	181	0.1160	-0.0070	32.5
784.0	0.8884	0.2493	0.2465	0.2398	0.2518	181	0.1180	-0.0071	32.5
797.0	0.8864	0.2492	0.2464	0.2397	0.2518	181	0.1200	-0.0071	32.5
811.0	0.8844	0.2490	0.2463	0.2396	0.2517	180	0.1220	-0.0073	32.5
824.0	0.8824	0.2489	0.2463	0.2394	0.2517	180	0.1240	-0.0073	32.3
836.0	0.8804	0.2488	0.2462	0.2393	0.2516	180	0.1260	-0.0074	32.3
850.0	0.8784	0.2487	0.2462	0.2392	0.2515	180	0.1280	-0.0075	32.3
863.0	0.8764	0.2486	0.2461	0.2391	0.2515	179	0.1300	-0.0076	32.2
876.0	0.8744	0.2485	0.2460	0.2390	0.2514	179	0.1320	-0.0077	32.2
888.0	0.8724	0.2484	0.2460	0.2389	0.2514	178	0.1340	-0.0077	32.1
901.0	0.8704	0.2483	0.2459	0.2389	0.2513	178	0.1360	-0.0078	32.1
914.0	0.8684	0.2481	0.2459	0.2388	0.2512	177	0.1380	-0.0079	31.9
927.0	0.8664	0.2480	0.2459	0.2386	0.2512	177	0.1400	-0.0080	31.8
939.0	0.8644	0.2479	0.2458	0.2385	0.2511	177	0.1420	-0.0081	31.8
953.0	0.8624	0.2477	0.2457	0.2384	0.2511	177	0.1440	-0.0082	31.8
966.0	0.8604	0.2476	0.2457	0.2382	0.2510	177	0.1460	-0.0083	31.8
979.0	0.8584	0.2475	0.2456	0.2381	0.2509	177	0.1480	-0.0084	31.8
992.0	0.8564	0.2473	0.2456	0.2380	0.2509	177	0.1500	-0.0085	31.9
1005.0	0.8544	0.2472	0.2455	0.2378	0.2508	177	0.1520	-0.0086	31.9
1017.0	0.8524	0.2471	0.2454	0.2377	0.2508	177	0.1540	-0.0087	31.9
1030.0	0.8504	0.2469	0.2454	0.2375	0.2507	177	0.1560	-0.0088	31.9

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
1043.0	0.8484	0.2468	0.2453	0.2374	0.2507	177	0.1580	-0.0089	31.9
1056.0	0.8464	0.2467	0.2453	0.2373	0.2506	177	0.1600	-0.0089	31.9
1069.0	0.8444	0.2465	0.2452	0.2371	0.2506	178	0.1620	-0.0091	32.0
1082.0	0.8424	0.2464	0.2452	0.2370	0.2505	178	0.1640	-0.0091	32.0
1094.0	0.8404	0.2463	0.2451	0.2369	0.2505	177	0.1660	-0.0092	31.9
1107.0	0.8384	0.2461	0.2450	0.2368	0.2504	177	0.1680	-0.0093	31.8
1120.0	0.8364	0.2460	0.2450	0.2367	0.2504	177	0.1700	-0.0094	31.9
1133.0	0.8344	0.2459	0.2449	0.2365	0.2503	177	0.1720	-0.0095	31.9
1145.0	0.8324	0.2458	0.2449	0.2364	0.2502	177	0.1740	-0.0096	31.8
1158.0	0.8304	0.2456	0.2448	0.2363	0.2502	176	0.1760	-0.0097	31.7
1171.0	0.8284	0.2455	0.2448	0.2362	0.2501	176	0.1780	-0.0098	31.7
1184.0	0.8264	0.2454	0.2447	0.2361	0.2500	175	0.1800	-0.0099	31.5
1196.0	0.8244	0.2452	0.2447	0.2359	0.2500	175	0.1820	-0.0100	31.5
1209.0	0.8224	0.2451	0.2446	0.2358	0.2499	175	0.1840	-0.0101	31.4
1223.0	0.8204	0.2449	0.2445	0.2357	0.2498	174	0.1860	-0.0102	31.4
1235.0	0.8184	0.2448	0.2445	0.2356	0.2497	175	0.1880	-0.0103	31.4
1248.0	0.8164	0.2446	0.2444	0.2354	0.2497	175	0.1900	-0.0104	31.4
1261.0	0.8144	0.2445	0.2443	0.2353	0.2495	173	0.1920	-0.0105	31.2
1273.0	0.8124	0.2443	0.2442	0.2352	0.2494	173	0.1940	-0.0106	31.2
1286.0	0.8104	0.2442	0.2442	0.2351	0.2493	173	0.1960	-0.0107	31.2
1299.0	0.8084	0.2440	0.2441	0.2350	0.2492	174	0.1980	-0.0108	31.3
1312.0	0.8064	0.2439	0.2440	0.2349	0.2491	174	0.2000	-0.0109	31.3
1325.0	0.8044	0.2438	0.2439	0.2348	0.2490	174	0.2020	-0.0110	31.3
1338.0	0.8024	0.2437	0.2438	0.2347	0.2489	173	0.2040	-0.0111	31.1
1350.0	0.8004	0.2435	0.2438	0.2346	0.2489	173	0.2060	-0.0112	31.2
1363.0	0.7984	0.2434	0.2437	0.2345	0.2488	173	0.2080	-0.0113	31.1
1376.0	0.7964	0.2433	0.2436	0.2344	0.2487	173	0.2100	-0.0114	31.1
1389.0	0.7944	0.2431	0.2435	0.2343	0.2485	172	0.2120	-0.0116	30.9
1402.0	0.7924	0.2430	0.2434	0.2341	0.2484	171	0.2140	-0.0117	30.8
1414.0	0.7904	0.2428	0.2433	0.2340	0.2483	171	0.2160	-0.0118	30.7
1427.0	0.7884	0.2427	0.2432	0.2339	0.2482	171	0.2180	-0.0119	30.7
1440.0	0.7864	0.2426	0.2431	0.2338	0.2481	171	0.2200	-0.0120	30.7
1453.0	0.7844	0.2425	0.2430	0.2337	0.2480	170	0.2220	-0.0121	30.6
1466.0	0.7824	0.2423	0.2429	0.2336	0.2478	169	0.2240	-0.0123	30.5
1479.0	0.7804	0.2421	0.2427	0.2335	0.2476	167	0.2260	-0.0124	30.0
1492.0	0.7784	0.2420	0.2426	0.2334	0.2475	167	0.2280	-0.0125	30.0
1505.0	0.7764	0.2418	0.2425	0.2332	0.2473	168	0.2300	-0.0127	30.2
1517.0	0.7744	0.2417	0.2424	0.2331	0.2472	168	0.2320	-0.0128	30.3
1530.0	0.7724	0.2416	0.2423	0.2330	0.2471	168	0.2340	-0.0129	30.3
1543.0	0.7704	0.2414	0.2422	0.2329	0.2470	168	0.2360	-0.0130	30.3
1556.0	0.7684	0.2413	0.2421	0.2328	0.2469	168	0.2380	-0.0131	30.3
1569.0	0.7664	0.2412	0.2420	0.2327	0.2468	168	0.2400	-0.0132	30.3
1581.0	0.7644	0.2410	0.2419	0.2326	0.2466	169	0.2420	-0.0134	30.4
1594.0	0.7624	0.2409	0.2419	0.2325	0.2465	169	0.2440	-0.0135	30.4
1606.0	0.7604	0.2408	0.2418	0.2324	0.2464	169	0.2460	-0.0136	30.5
1619.0	0.7584	0.2407	0.2417	0.2323	0.2464	170	0.2480	-0.0136	30.5
1632.0	0.7564	0.2406	0.2416	0.2322	0.2463	170	0.2500	-0.0137	30.6
1645.0	0.7544	0.2405	0.2415	0.2321	0.2462	170	0.2520	-0.0138	30.6
1657.0	0.7524	0.2404	0.2414	0.2320	0.2461	170	0.2540	-0.0139	30.7
1670.0	0.7504	0.2403	0.2413	0.2319	0.2460	171	0.2560	-0.0140	30.7
1683.0	0.7484	0.2402	0.2412	0.2318	0.2459	171	0.2580	-0.0141	30.7
1696.0	0.7464	0.2401	0.2412	0.2318	0.2458	170	0.2600	-0.0142	30.7
1709.0	0.7444	0.2400	0.2411	0.2317	0.2457	170	0.2620	-0.0143	30.7
1722.0	0.7424	0.2399	0.2410	0.2316	0.2456	171	0.2640	-0.0144	30.8
1734.0	0.7404	0.2398	0.2409	0.2315	0.2455	171	0.2660	-0.0145	30.7
1747.0	0.7384	0.2397	0.2409	0.2314	0.2454	171	0.2680	-0.0146	30.7
1760.0	0.7364	0.2396	0.2408	0.2314	0.2453	171	0.2700	-0.0146	30.7
1773.0	0.7344	0.2395	0.2407	0.2313	0.2452	171	0.2720	-0.0147	30.7
1786.0	0.7324	0.2394	0.2406	0.2312	0.2452	171	0.2740	-0.0148	30.7
1798.0	0.7304	0.2393	0.2406	0.2311	0.2451	170	0.2760	-0.0149	30.5
1811.0	0.7284	0.2392	0.2405	0.2309	0.2450	170	0.2780	-0.0150	30.6
1824.0	0.7264	0.2391	0.2404	0.2308	0.2450	169	0.2800	-0.0151	30.4
1836.0	0.7244	0.2390	0.2403	0.2307	0.2449	166	0.2820	-0.0152	29.8
1848.0	0.7224	0.2388	0.2402	0.2305	0.2448	165	0.2840	-0.0153	29.6
1861.0	0.7204	0.2387	0.2401	0.2303	0.2447	164	0.2860	-0.0155	29.5
1874.0	0.7184	0.2385	0.2399	0.2302	0.2446	164	0.2880	-0.0156	29.5
1886.0	0.7164	0.2384	0.2398	0.2300	0.2445	164	0.2900	-0.0157	29.6
1898.0	0.7144	0.2383	0.2397	0.2299	0.2444	165	0.2920	-0.0158	29.6
1911.0	0.7124	0.2381	0.2396	0.2297	0.2443	165	0.2940	-0.0160	29.8
1924.0	0.7104	0.2380	0.2395	0.2296	0.2442	166	0.2960	-0.0161	29.8
1937.0	0.7084	0.2379	0.2394	0.2294	0.2441	166	0.2980	-0.0162	29.8
1950.0	0.7064	0.2378	0.2393	0.2293	0.2441	165	0.3000	-0.0163	29.8
1962.0	0.7044	0.2377	0.2392	0.2292	0.2440	165	0.3020	-0.0164	29.6
1975.0	0.7024	0.2375	0.2390	0.2290	0.2439	163	0.3040	-0.0166	29.3
1988.0	0.7004	0.2374	0.2389	0.2288	0.2438	162	0.3060	-0.0167	29.1
2001.0	0.6984	0.2373	0.2388	0.2287	0.2437	162	0.3080	-0.0168	29.1
2013.0	0.6964	0.2371	0.2387	0.2285	0.2436	162	0.3100	-0.0169	29.1
2026.0	0.6944	0.2370	0.2386	0.2284	0.2435	161	0.3120	-0.0170	28.9
2039.0	0.6924	0.2369	0.2385	0.2283	0.2435	161	0.3140	-0.0171	28.9

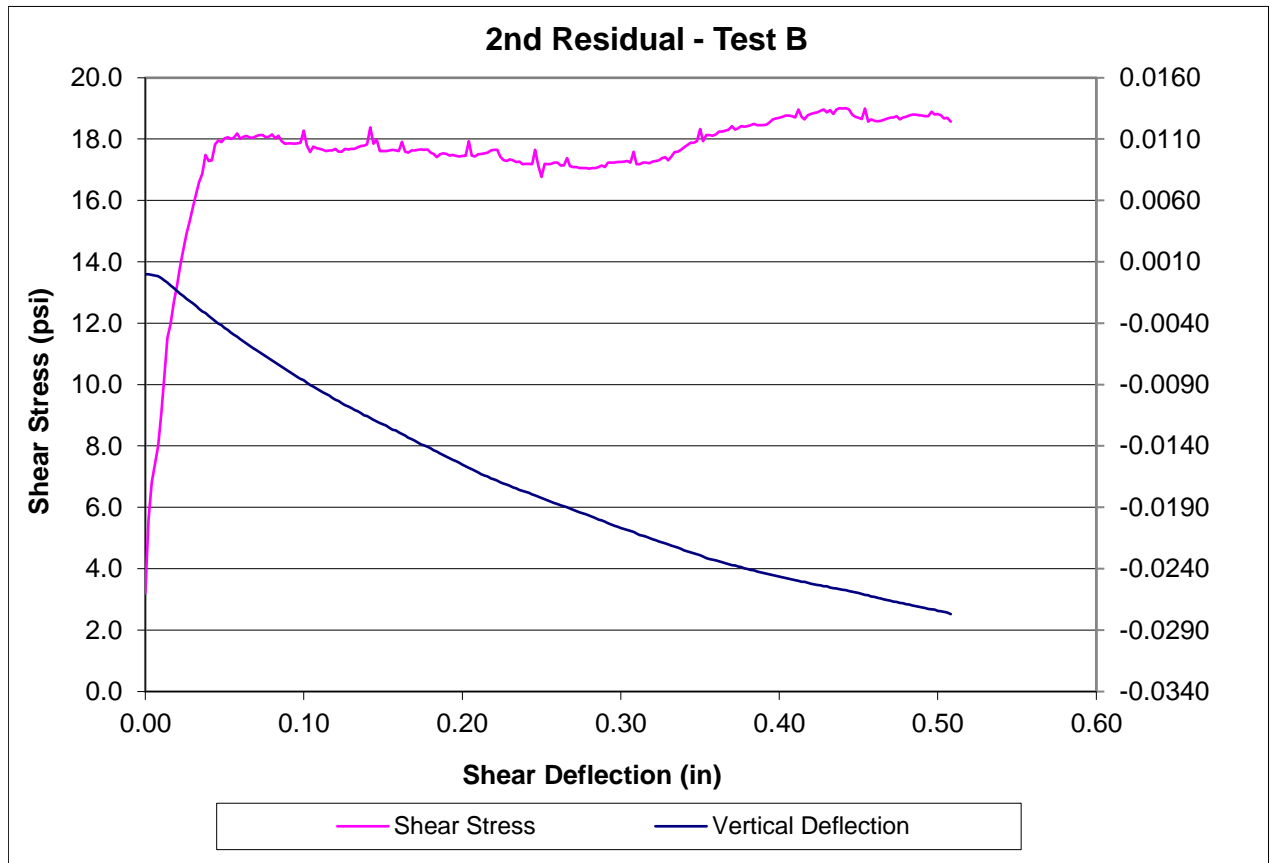
Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
2052.0	0.6904	0.2368	0.2384	0.2281	0.2434	160	0.3160	-0.0172	28.7
2064.0	0.6884	0.2367	0.2382	0.2279	0.2433	159	0.3180	-0.0174	28.7
2077.0	0.6864	0.2365	0.2381	0.2278	0.2432	159	0.3200	-0.0175	28.6
2090.0	0.6844	0.2364	0.2380	0.2276	0.2431	159	0.3220	-0.0176	28.6
2102.0	0.6824	0.2363	0.2379	0.2275	0.2431	158	0.3240	-0.0177	28.5
2114.0	0.6804	0.2362	0.2378	0.2274	0.2430	158	0.3260	-0.0178	28.4
2127.0	0.6784	0.2361	0.2377	0.2272	0.2429	158	0.3280	-0.0179	28.5
2140.0	0.6764	0.2359	0.2375	0.2270	0.2428	157	0.3300	-0.0181	28.3
2153.0	0.6744	0.2358	0.2374	0.2269	0.2427	158	0.3320	-0.0182	28.4
2166.0	0.6724	0.2357	0.2373	0.2267	0.2426	158	0.3340	-0.0183	28.4
2179.0	0.6704	0.2356	0.2371	0.2265	0.2425	158	0.3360	-0.0185	28.4
2192.0	0.6684	0.2355	0.2370	0.2264	0.2424	158	0.3380	-0.0186	28.4
2204.0	0.6664	0.2354	0.2369	0.2262	0.2424	158	0.3400	-0.0187	28.4
2217.0	0.6644	0.2353	0.2368	0.2261	0.2423	157	0.3420	-0.0188	28.2
2230.0	0.6624	0.2351	0.2366	0.2259	0.2422	156	0.3440	-0.0190	28.1
2243.0	0.6604	0.2350	0.2365	0.2258	0.2421	156	0.3460	-0.0191	28.1
2256.0	0.6584	0.2349	0.2364	0.2256	0.2420	156	0.3480	-0.0192	28.2
2269.0	0.6564	0.2347	0.2362	0.2254	0.2419	157	0.3500	-0.0194	28.2
2282.0	0.6544	0.2346	0.2361	0.2252	0.2418	157	0.3520	-0.0195	28.3
2295.0	0.6524	0.2345	0.2360	0.2250	0.2418	157	0.3540	-0.0196	28.3
2307.0	0.6504	0.2343	0.2358	0.2248	0.2417	157	0.3560	-0.0198	28.3
2320.0	0.6484	0.2342	0.2357	0.2246	0.2416	158	0.3580	-0.0199	28.4
2333.0	0.6464	0.2340	0.2356	0.2244	0.2415	158	0.3600	-0.0200	28.4
2346.0	0.6444	0.2339	0.2355	0.2242	0.2415	158	0.3620	-0.0201	28.4
2358.0	0.6424	0.2337	0.2353	0.2240	0.2414	158	0.3640	-0.0203	28.4
2371.0	0.6404	0.2336	0.2352	0.2238	0.2413	158	0.3660	-0.0204	28.4
2384.0	0.6384	0.2335	0.2351	0.2236	0.2413	158	0.3680	-0.0205	28.4
2397.0	0.6364	0.2333	0.2350	0.2234	0.2412	158	0.3700	-0.0207	28.4
2410.0	0.6344	0.2332	0.2348	0.2233	0.2411	158	0.3720	-0.0208	28.5
2422.0	0.6324	0.2331	0.2347	0.2231	0.2411	158	0.3740	-0.0209	28.5
2435.0	0.6304	0.2330	0.2346	0.2229	0.2410	158	0.3760	-0.0210	28.4
2448.0	0.6284	0.2329	0.2344	0.2227	0.2410	158	0.3780	-0.0212	28.4
2461.0	0.6264	0.2328	0.2343	0.2225	0.2409	158	0.3800	-0.0213	28.4
2473.0	0.6244	0.2327	0.2342	0.2224	0.2408	158	0.3820	-0.0214	28.4
2486.0	0.6224	0.2326	0.2340	0.2222	0.2407	158	0.3840	-0.0215	28.4
2499.0	0.6204	0.2324	0.2339	0.2220	0.2407	158	0.3860	-0.0217	28.4
2512.0	0.6184	0.2324	0.2338	0.2219	0.2406	158	0.3880	-0.0217	28.4
2525.0	0.6164	0.2322	0.2336	0.2217	0.2405	158	0.3900	-0.0219	28.4
2538.0	0.6144	0.2321	0.2335	0.2215	0.2404	158	0.3920	-0.0220	28.4
2550.0	0.6124	0.2321	0.2334	0.2214	0.2404	158	0.3940	-0.0221	28.4
2562.0	0.6104	0.2320	0.2332	0.2212	0.2403	158	0.3960	-0.0222	28.4
2575.0	0.6084	0.2319	0.2331	0.2211	0.2402	158	0.3980	-0.0223	28.4
2588.0	0.6064	0.2318	0.2330	0.2209	0.2402	158	0.4000	-0.0224	28.5
2600.0	0.6044	0.2317	0.2328	0.2208	0.2401	158	0.4020	-0.0226	28.4
2613.0	0.6024	0.2316	0.2327	0.2207	0.2400	158	0.4040	-0.0227	28.4
2625.0	0.6004	0.2315	0.2326	0.2205	0.2399	158	0.4060	-0.0228	28.4
2638.0	0.5984	0.2315	0.2324	0.2204	0.2398	158	0.4080	-0.0229	28.4
2651.0	0.5964	0.2314	0.2323	0.2203	0.2398	158	0.4100	-0.0230	28.4
2663.0	0.5944	0.2313	0.2322	0.2201	0.2397	157	0.4120	-0.0231	28.3
2676.0	0.5924	0.2312	0.2320	0.2200	0.2396	157	0.4140	-0.0232	28.3
2689.0	0.5904	0.2311	0.2319	0.2198	0.2395	157	0.4160	-0.0233	28.3
2702.0	0.5884	0.2310	0.2317	0.2197	0.2394	157	0.4180	-0.0235	28.3
2715.0	0.5864	0.2310	0.2316	0.2196	0.2394	158	0.4200	-0.0235	28.4
2728.0	0.5844	0.2309	0.2315	0.2194	0.2393	157	0.4220	-0.0236	28.3
2740.0	0.5824	0.2308	0.2314	0.2193	0.2392	157	0.4240	-0.0237	28.3
2752.0	0.5804	0.2307	0.2312	0.2192	0.2391	157	0.4260	-0.0239	28.3
2765.0	0.5784	0.2307	0.2311	0.2190	0.2391	157	0.4280	-0.0239	28.3
2778.0	0.5764	0.2306	0.2310	0.2189	0.2389	157	0.4300	-0.0241	28.2
2791.0	0.5744	0.2305	0.2308	0.2188	0.2389	156	0.4320	-0.0242	28.2
2804.0	0.5724	0.2304	0.2307	0.2187	0.2388	157	0.4340	-0.0243	28.2
2817.0	0.5704	0.2303	0.2306	0.2186	0.2387	157	0.4360	-0.0244	28.2
2830.0	0.5684	0.2303	0.2305	0.2184	0.2386	156	0.4380	-0.0245	28.2
2843.0	0.5664	0.2302	0.2304	0.2183	0.2386	156	0.4400	-0.0245	28.1
2855.0	0.5644	0.2301	0.2302	0.2182	0.2385	156	0.4420	-0.0247	28.1
2867.0	0.5624	0.2300	0.2301	0.2181	0.2384	156	0.4440	-0.0248	28.2
2880.0	0.5604	0.2300	0.2300	0.2180	0.2383	157	0.4460	-0.0248	28.2
2893.0	0.5584	0.2299	0.2299	0.2179	0.2382	156	0.4480	-0.0249	28.1
2906.0	0.5564	0.2298	0.2297	0.2178	0.2381	156	0.4500	-0.0251	28.1
2919.0	0.5544	0.2298	0.2296	0.2176	0.2380	156	0.4520	-0.0252	28.2
2931.0	0.5524	0.2297	0.2295	0.2175	0.2380	157	0.4540	-0.0252	28.2
2944.0	0.5504	0.2296	0.2293	0.2174	0.2379	157	0.4560	-0.0254	28.2
2957.0	0.5484	0.2295	0.2292	0.2173	0.2378	157	0.4580	-0.0255	28.2
2969.0	0.5464	0.2295	0.2291	0.2172	0.2377	157	0.4600	-0.0255	28.2
2982.0	0.5444	0.2294	0.2290	0.2171	0.2376	157	0.4620	-0.0256	28.3
2995.0	0.5424	0.2294	0.2289	0.2170	0.2375	157	0.4640	-0.0257	28.3
3008.0	0.5404	0.2293	0.2287	0.2169	0.2374	157	0.4660	-0.0258	28.3
3020.0	0.5384	0.2293	0.2286	0.2169	0.2374	157	0.4680	-0.0259	28.3
3033.0	0.5364	0.2292	0.2285	0.2168	0.2373	157	0.4700	-0.0260	28.2
3046.0	0.5344	0.2292	0.2284	0.2167	0.2372	157	0.4720	-0.0260	28.3

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
3059.0	0.5324	0.2291	0.2283	0.2166	0.2371	157	0.4740	-0.0261	28.2
3071.0	0.5304	0.2291	0.2281	0.2166	0.2370	157	0.4760	-0.0262	28.2
3084.0	0.5284	0.2291	0.2280	0.2165	0.2369	157	0.4780	-0.0263	28.2
3097.0	0.5264	0.2290	0.2279	0.2164	0.2369	156	0.4800	-0.0264	28.2
3109.0	0.5244	0.2290	0.2278	0.2164	0.2368	157	0.4820	-0.0264	28.2
3121.0	0.5224	0.2290	0.2277	0.2163	0.2367	156	0.4840	-0.0265	28.1
3134.0	0.5204	0.2289	0.2276	0.2162	0.2366	156	0.4860	-0.0266	28.1
3147.0	0.5184	0.2289	0.2275	0.2162	0.2365	156	0.4880	-0.0266	28.0
3160.0	0.5164	0.2288	0.2273	0.2161	0.2364	156	0.4900	-0.0268	28.0
3172.0	0.5144	0.2288	0.2272	0.2161	0.2363	155	0.4920	-0.0268	28.0
3185.0	0.5124	0.2288	0.2271	0.2160	0.2362	155	0.4940	-0.0269	27.9
3197.0	0.5104	0.2287	0.2270	0.2160	0.2361	155	0.4960	-0.0270	27.8
3210.0	0.5084	0.2287	0.2269	0.2159	0.2360	154	0.4980	-0.0270	27.8
3223.0	0.5064	0.2287	0.2268	0.2159	0.2359	154	0.5000	-0.0271	27.8
3236.0	0.5044	0.2287	0.2267	0.2159	0.2358	154	0.5020	-0.0271	27.7
3248.0	0.5024	0.2286	0.2266	0.2158	0.2357	153	0.5040	-0.0272	27.6
3261.0	0.5004	0.2286	0.2265	0.2158	0.2356	153	0.5060	-0.0273	27.5
3273.0	0.4984	0.2286	0.2264	0.2158	0.2355	153	0.5080	-0.0273	27.5
3286.0	0.4964	0.2285	0.2262	0.2158	0.2354	152	0.5100	-0.0274	27.4
3299.0	0.4944	0.2285	0.2261	0.2157	0.2353	152	0.5120	-0.0275	27.3
3312.0	0.4924	0.2285	0.2260	0.2157	0.2351	152	0.5140	-0.0276	27.3
3324.0	0.4904	0.2285	0.2259	0.2157	0.2350	152	0.5160	-0.0276	27.3
3325.0	0.4904	0.2285	0.2259	0.2157	0.2350	152	0.5160	-0.0276	27.3



Direct Shear Strength of Rock
ASTM D 5607

Project Name	<u>SR1 Flood Control Project - Inlet Debris Barrier</u>	Project Number	<u>110773396</u>
Lithology	<u>Shale, gray, moderately hard, partially healed faults</u>	Lab ID	<u>DSNF-22</u>
Hole Number	<u>DB-3</u>	Date Received	<u>05/15/2018</u>
Depth (m)	<u>19.44</u>		
Test Type	<u>Direct shear of natural fracture</u>	Diameter (in)	<u>2.397</u>
Initial Moisture Condition	<u>As received, moist</u>	Angle of Dip (deg)	<u>35.7</u>
Test Moisture Condition	<u>Soaked at least 12 hours prior to test.</u>	Area(in ²)	<u>5.56</u>
Joint Roughness	<u>10</u>		
		Date Prepared	<u>06/28/2018</u>
Normal Stress (psi)	<u>36</u>	Date Tested	<u>06/29/2018</u>



Sketch



Shear Rate to Peak (in/min) N/A

Encapsulation Material Hydro-Stone

Comments _____

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
0.0	1.0036	0.2510	0.2550	0.2544	0.2560	18	0.0000	0.0000	3.2
30.0	1.0016	0.2510	0.2550	0.2540	0.2564	31	0.0020	0.0000	5.6
44.0	0.9996	0.2508	0.2550	0.2535	0.2568	38	0.0040	-0.0001	6.8
58.0	0.9976	0.2507	0.2550	0.2530	0.2572	41	0.0060	-0.0001	7.4
72.0	0.9956	0.2506	0.2550	0.2525	0.2576	44	0.0080	-0.0002	8.0
85.0	0.9936	0.2504	0.2549	0.2520	0.2578	50	0.0100	-0.0003	9.1
97.0	0.9916	0.2502	0.2547	0.2515	0.2579	57	0.0120	-0.0005	10.2
108.0	0.9896	0.2500	0.2545	0.2512	0.2579	64	0.0140	-0.0007	11.5
114.0	0.9876	0.2498	0.2543	0.2508	0.2578	67	0.0160	-0.0009	12.0
127.0	0.9856	0.2497	0.2540	0.2502	0.2579	70	0.0180	-0.0011	12.7
140.0	0.9836	0.2496	0.2537	0.2497	0.2579	73	0.0200	-0.0014	13.2
157.0	0.9816	0.2494	0.2534	0.2492	0.2580	77	0.0220	-0.0016	13.9
170.0	0.9796	0.2493	0.2531	0.2487	0.2581	80	0.0240	-0.0018	14.4
183.0	0.9776	0.2491	0.2529	0.2481	0.2582	83	0.0260	-0.0020	14.9
196.0	0.9756	0.2489	0.2527	0.2476	0.2584	85	0.0280	-0.0022	15.3
208.0	0.9736	0.2487	0.2525	0.2471	0.2585	88	0.0300	-0.0024	15.8
221.0	0.9716	0.2485	0.2523	0.2466	0.2586	90	0.0320	-0.0026	16.2
234.0	0.9696	0.2483	0.2520	0.2462	0.2586	92	0.0340	-0.0028	16.6
247.0	0.9676	0.2481	0.2518	0.2457	0.2586	94	0.0360	-0.0031	16.9
254.0	0.9656	0.2480	0.2517	0.2454	0.2586	97	0.0380	-0.0032	17.5
266.0	0.9636	0.2478	0.2514	0.2450	0.2586	96	0.0400	-0.0034	17.3
281.0	0.9616	0.2476	0.2512	0.2446	0.2585	96	0.0420	-0.0036	17.3
298.0	0.9596	0.2474	0.2510	0.2443	0.2584	99	0.0440	-0.0038	17.8
311.0	0.9576	0.2472	0.2508	0.2440	0.2583	100	0.0460	-0.0040	17.9
325.0	0.9556	0.2471	0.2506	0.2438	0.2582	99	0.0480	-0.0042	17.9
338.0	0.9536	0.2469	0.2504	0.2435	0.2580	100	0.0500	-0.0044	18.0
351.0	0.9516	0.2468	0.2502	0.2433	0.2579	100	0.0520	-0.0046	18.1
364.0	0.9496	0.2466	0.2500	0.2430	0.2577	100	0.0540	-0.0048	18.0
376.0	0.9476	0.2464	0.2498	0.2428	0.2576	100	0.0560	-0.0050	18.0
389.0	0.9456	0.2463	0.2496	0.2426	0.2575	101	0.0580	-0.0051	18.2
396.0	0.9436	0.2461	0.2494	0.2424	0.2573	100	0.0600	-0.0053	18.0
410.0	0.9416	0.2459	0.2492	0.2421	0.2572	100	0.0620	-0.0055	18.1
428.0	0.9396	0.2458	0.2490	0.2419	0.2570	101	0.0640	-0.0057	18.1
442.0	0.9376	0.2456	0.2488	0.2417	0.2569	100	0.0660	-0.0058	18.0
454.0	0.9356	0.2454	0.2487	0.2414	0.2567	100	0.0680	-0.0061	18.0
467.0	0.9336	0.2453	0.2485	0.2412	0.2566	101	0.0700	-0.0062	18.1
480.0	0.9316	0.2451	0.2484	0.2410	0.2565	101	0.0720	-0.0063	18.1
493.0	0.9296	0.2449	0.2483	0.2408	0.2563	101	0.0740	-0.0065	18.1
505.0	0.9276	0.2447	0.2481	0.2406	0.2562	100	0.0760	-0.0067	18.1
518.0	0.9256	0.2445	0.2480	0.2403	0.2561	100	0.0780	-0.0069	18.1
525.0	0.9236	0.2443	0.2479	0.2401	0.2560	101	0.0800	-0.0070	18.1
539.0	0.9216	0.2441	0.2478	0.2399	0.2558	100	0.0820	-0.0072	18.0
557.0	0.9196	0.2439	0.2477	0.2396	0.2557	101	0.0840	-0.0074	18.1
569.0	0.9176	0.2437	0.2475	0.2394	0.2556	100	0.0860	-0.0076	17.9
582.0	0.9156	0.2435	0.2474	0.2392	0.2555	99	0.0880	-0.0077	17.8
595.0	0.9136	0.2432	0.2473	0.2389	0.2554	99	0.0900	-0.0079	17.9
608.0	0.9116	0.2430	0.2472	0.2387	0.2552	99	0.0920	-0.0081	17.9
621.0	0.9096	0.2428	0.2471	0.2384	0.2552	99	0.0940	-0.0082	17.8
634.0	0.9076	0.2426	0.2470	0.2382	0.2551	99	0.0960	-0.0084	17.9
646.0	0.9056	0.2424	0.2468	0.2380	0.2550	99	0.0980	-0.0086	17.9
657.0	0.9036	0.2423	0.2468	0.2378	0.2549	102	0.1000	-0.0086	18.3
665.0	0.9016	0.2420	0.2467	0.2375	0.2548	99	0.1020	-0.0089	17.8
679.0	0.8996	0.2418	0.2465	0.2373	0.2547	98	0.1040	-0.0090	17.6
697.0	0.8976	0.2416	0.2464	0.2371	0.2546	99	0.1060	-0.0092	17.7
710.0	0.8956	0.2414	0.2463	0.2368	0.2546	98	0.1080	-0.0093	17.7
723.0	0.8936	0.2412	0.2462	0.2366	0.2545	98	0.1100	-0.0095	17.7
735.0	0.8916	0.2410	0.2461	0.2364	0.2544	98	0.1120	-0.0096	17.6
748.0	0.8896	0.2408	0.2460	0.2362	0.2543	98	0.1140	-0.0098	17.6
761.0	0.8876	0.2407	0.2459	0.2360	0.2542	98	0.1160	-0.0099	17.6
774.0	0.8856	0.2405	0.2458	0.2357	0.2541	98	0.1180	-0.0101	17.6
787.0	0.8836	0.2403	0.2456	0.2355	0.2541	98	0.1200	-0.0102	17.7
794.0	0.8816	0.2401	0.2456	0.2353	0.2540	98	0.1220	-0.0104	17.6
807.0	0.8796	0.2399	0.2454	0.2351	0.2539	98	0.1240	-0.0105	17.6
825.0	0.8776	0.2397	0.2453	0.2349	0.2538	98	0.1260	-0.0107	17.7
838.0	0.8756	0.2396	0.2452	0.2347	0.2538	98	0.1280	-0.0108	17.8
851.0	0.8736	0.2394	0.2451	0.2345	0.2537	98	0.1300	-0.0109	17.7
864.0	0.8716	0.2392	0.2450	0.2343	0.2536	98	0.1320	-0.0111	17.7
876.0	0.8696	0.2391	0.2449	0.2341	0.2536	99	0.1340	-0.0112	17.7
888.0	0.8676	0.2389	0.2448	0.2339	0.2535	99	0.1360	-0.0113	17.8
901.0	0.8656	0.2387	0.2446	0.2337	0.2534	99	0.1380	-0.0115	17.8
914.0	0.8636	0.2386	0.2446	0.2335	0.2534	99	0.1400	-0.0116	17.8
923.0	0.8616	0.2384	0.2445	0.2333	0.2533	102	0.1420	-0.0117	18.4
934.0	0.8596	0.2382	0.2444	0.2331	0.2532	99	0.1440	-0.0119	17.8
953.0	0.8576	0.2381	0.2442	0.2329	0.2532	100	0.1460	-0.0120	18.0
965.0	0.8556	0.2379	0.2441	0.2328	0.2531	98	0.1480	-0.0121	17.6
978.0	0.8536	0.2377	0.2440	0.2326	0.2531	98	0.1500	-0.0123	17.6
991.0	0.8516	0.2376	0.2440	0.2324	0.2530	98	0.1520	-0.0124	17.6
1004.0	0.8496	0.2374	0.2438	0.2322	0.2529	98	0.1540	-0.0125	17.6
1016.0	0.8476	0.2372	0.2437	0.2320	0.2528	98	0.1560	-0.0127	17.6

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
1028.0	0.8456	0.2371	0.2437	0.2318	0.2528	98	0.1580	-0.0128	17.6
1041.0	0.8436	0.2369	0.2436	0.2316	0.2527	98	0.1600	-0.0129	17.6
1053.0	0.8416	0.2367	0.2435	0.2315	0.2526	100	0.1620	-0.0130	17.9
1061.0	0.8396	0.2366	0.2434	0.2313	0.2525	98	0.1640	-0.0132	17.6
1074.0	0.8376	0.2364	0.2432	0.2311	0.2524	98	0.1660	-0.0133	17.6
1092.0	0.8356	0.2363	0.2431	0.2309	0.2523	98	0.1680	-0.0135	17.6
1105.0	0.8336	0.2361	0.2430	0.2308	0.2522	98	0.1700	-0.0136	17.6
1117.0	0.8316	0.2360	0.2428	0.2306	0.2521	98	0.1720	-0.0137	17.6
1130.0	0.8296	0.2358	0.2427	0.2304	0.2520	98	0.1740	-0.0139	17.7
1143.0	0.8276	0.2357	0.2426	0.2303	0.2520	98	0.1760	-0.0140	17.6
1155.0	0.8256	0.2356	0.2425	0.2301	0.2519	98	0.1780	-0.0141	17.7
1168.0	0.8236	0.2354	0.2424	0.2300	0.2518	98	0.1800	-0.0142	17.6
1181.0	0.8216	0.2353	0.2422	0.2298	0.2517	97	0.1820	-0.0144	17.5
1188.0	0.8196	0.2352	0.2421	0.2297	0.2516	97	0.1840	-0.0145	17.4
1201.0	0.8176	0.2350	0.2420	0.2295	0.2514	97	0.1860	-0.0146	17.5
1219.0	0.8156	0.2349	0.2418	0.2294	0.2513	97	0.1880	-0.0148	17.5
1231.0	0.8136	0.2348	0.2416	0.2293	0.2512	97	0.1900	-0.0149	17.5
1244.0	0.8116	0.2347	0.2415	0.2292	0.2510	97	0.1920	-0.0150	17.5
1257.0	0.8096	0.2346	0.2414	0.2290	0.2509	97	0.1940	-0.0151	17.5
1269.0	0.8076	0.2345	0.2412	0.2289	0.2508	97	0.1960	-0.0153	17.4
1282.0	0.8056	0.2344	0.2411	0.2288	0.2506	97	0.1980	-0.0154	17.4
1295.0	0.8036	0.2342	0.2409	0.2287	0.2505	97	0.2000	-0.0155	17.4
1308.0	0.8016	0.2341	0.2408	0.2285	0.2504	97	0.2020	-0.0157	17.4
1317.0	0.7995	0.2340	0.2406	0.2284	0.2503	100	0.2041	-0.0158	17.9
1327.0	0.7976	0.2339	0.2405	0.2283	0.2501	97	0.2060	-0.0159	17.5
1340.0	0.7956	0.2338	0.2403	0.2282	0.2500	97	0.2080	-0.0160	17.4
1358.0	0.7936	0.2337	0.2402	0.2281	0.2498	97	0.2100	-0.0162	17.5
1370.0	0.7916	0.2336	0.2400	0.2279	0.2497	97	0.2120	-0.0163	17.5
1384.0	0.7896	0.2335	0.2399	0.2278	0.2496	97	0.2140	-0.0164	17.5
1396.0	0.7876	0.2334	0.2398	0.2277	0.2495	98	0.2160	-0.0165	17.6
1408.0	0.7856	0.2332	0.2396	0.2276	0.2494	98	0.2180	-0.0167	17.6
1421.0	0.7836	0.2332	0.2395	0.2275	0.2493	98	0.2200	-0.0167	17.6
1434.0	0.7816	0.2331	0.2394	0.2274	0.2492	98	0.2220	-0.0168	17.6
1447.0	0.7796	0.2330	0.2393	0.2272	0.2491	97	0.2240	-0.0170	17.4
1454.0	0.7776	0.2329	0.2392	0.2271	0.2490	96	0.2260	-0.0171	17.3
1467.0	0.7756	0.2328	0.2391	0.2270	0.2489	96	0.2280	-0.0172	17.3
1485.0	0.7736	0.2327	0.2390	0.2269	0.2488	96	0.2300	-0.0173	17.3
1498.0	0.7716	0.2326	0.2388	0.2268	0.2487	96	0.2320	-0.0174	17.3
1510.0	0.7696	0.2325	0.2387	0.2268	0.2486	96	0.2340	-0.0175	17.2
1524.0	0.7676	0.2324	0.2386	0.2266	0.2485	96	0.2360	-0.0176	17.3
1536.0	0.7656	0.2324	0.2385	0.2265	0.2484	95	0.2380	-0.0177	17.2
1549.0	0.7636	0.2323	0.2384	0.2264	0.2483	96	0.2400	-0.0178	17.2
1561.0	0.7616	0.2322	0.2383	0.2264	0.2482	96	0.2420	-0.0178	17.2
1574.0	0.7596	0.2321	0.2382	0.2262	0.2481	95	0.2440	-0.0180	17.2
1582.0	0.7576	0.2320	0.2381	0.2262	0.2480	98	0.2460	-0.0180	17.6
1593.0	0.7556	0.2320	0.2380	0.2260	0.2479	95	0.2480	-0.0181	17.1
1611.0	0.7536	0.2319	0.2378	0.2260	0.2478	93	0.2500	-0.0182	16.8
1624.0	0.7516	0.2318	0.2377	0.2258	0.2477	96	0.2520	-0.0184	17.2
1637.0	0.7496	0.2317	0.2376	0.2257	0.2476	95	0.2540	-0.0185	17.2
1650.0	0.7476	0.2316	0.2375	0.2256	0.2475	96	0.2560	-0.0186	17.2
1663.0	0.7456	0.2315	0.2374	0.2255	0.2474	96	0.2580	-0.0187	17.2
1676.0	0.7436	0.2315	0.2373	0.2254	0.2473	96	0.2600	-0.0187	17.2
1688.0	0.7416	0.2314	0.2372	0.2253	0.2472	95	0.2620	-0.0188	17.1
1701.0	0.7396	0.2313	0.2371	0.2252	0.2471	95	0.2640	-0.0189	17.1
1713.0	0.7376	0.2312	0.2370	0.2251	0.2471	97	0.2660	-0.0190	17.4
1721.0	0.7356	0.2311	0.2369	0.2250	0.2470	95	0.2680	-0.0191	17.1
1734.0	0.7336	0.2310	0.2368	0.2249	0.2469	95	0.2700	-0.0192	17.1
1751.0	0.7316	0.2309	0.2367	0.2248	0.2468	95	0.2720	-0.0193	17.1
1764.0	0.7296	0.2308	0.2366	0.2247	0.2467	95	0.2740	-0.0194	17.0
1777.0	0.7276	0.2308	0.2365	0.2246	0.2466	95	0.2760	-0.0195	17.0
1789.0	0.7256	0.2307	0.2364	0.2244	0.2466	95	0.2780	-0.0196	17.0
1802.0	0.7236	0.2306	0.2363	0.2243	0.2465	95	0.2800	-0.0197	17.0
1815.0	0.7216	0.2305	0.2362	0.2242	0.2464	95	0.2820	-0.0198	17.0
1827.0	0.7196	0.2304	0.2361	0.2241	0.2463	95	0.2840	-0.0199	17.0
1840.0	0.7176	0.2303	0.2359	0.2240	0.2462	95	0.2860	-0.0200	17.1
1847.0	0.7156	0.2302	0.2359	0.2239	0.2462	95	0.2880	-0.0201	17.1
1859.0	0.7136	0.2301	0.2358	0.2237	0.2461	95	0.2900	-0.0202	17.1
1878.0	0.7116	0.2300	0.2356	0.2236	0.2460	96	0.2920	-0.0203	17.2
1890.0	0.7096	0.2299	0.2355	0.2235	0.2459	96	0.2940	-0.0204	17.2
1903.0	0.7076	0.2298	0.2354	0.2234	0.2458	96	0.2960	-0.0205	17.2
1916.0	0.7056	0.2297	0.2353	0.2233	0.2458	96	0.2980	-0.0206	17.2
1929.0	0.7036	0.2296	0.2352	0.2232	0.2457	96	0.3000	-0.0207	17.2
1941.0	0.7016	0.2295	0.2351	0.2231	0.2456	96	0.3020	-0.0208	17.3
1954.0	0.6996	0.2295	0.2350	0.2230	0.2455	96	0.3040	-0.0209	17.3
1966.0	0.6976	0.2294	0.2349	0.2229	0.2455	96	0.3060	-0.0209	17.2
1977.0	0.6956	0.2293	0.2349	0.2228	0.2454	98	0.3080	-0.0210	17.6
1986.0	0.6936	0.2292	0.2348	0.2226	0.2453	95	0.3100	-0.0211	17.2
1999.0	0.6916	0.2291	0.2346	0.2225	0.2452	95	0.3120	-0.0213	17.2
2017.0	0.6896	0.2291	0.2345	0.2225	0.2451	96	0.3140	-0.0213	17.2

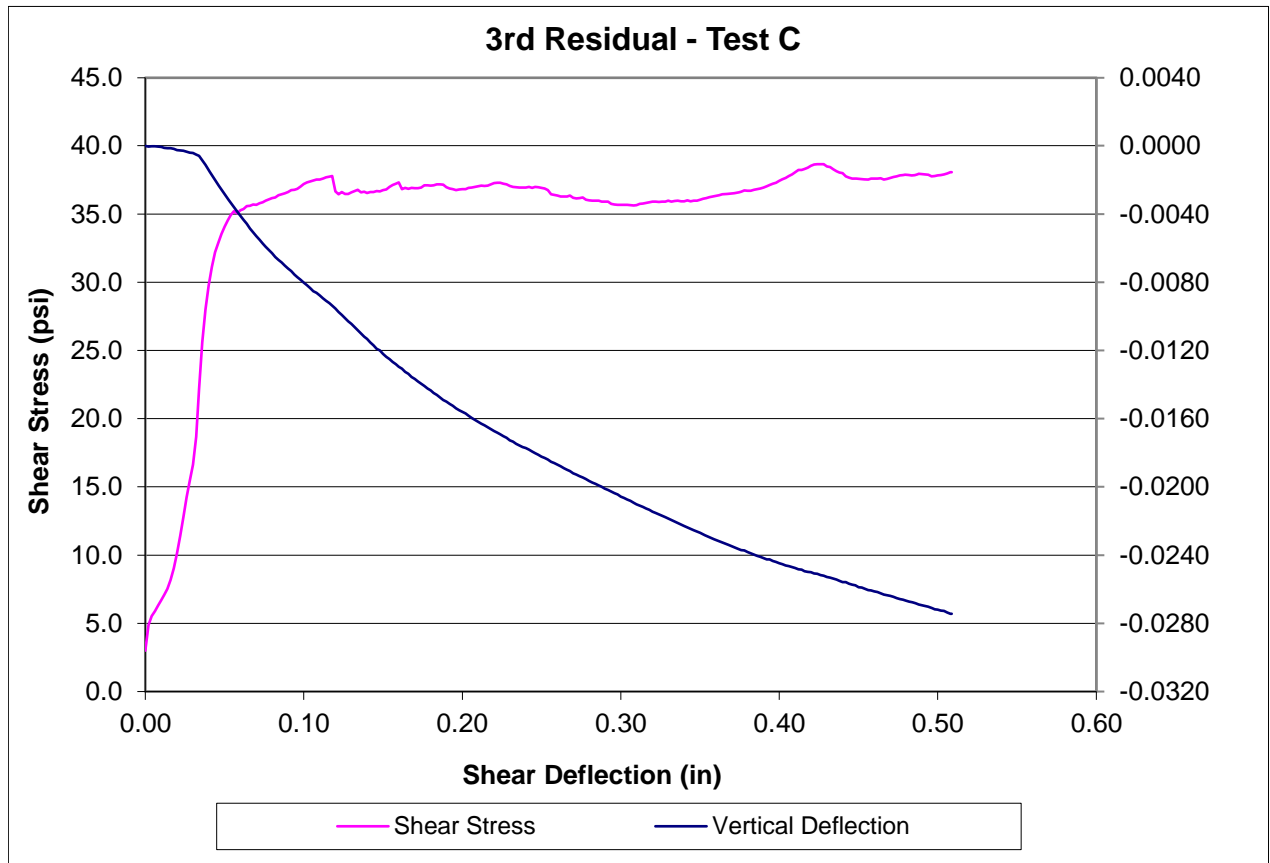
Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
2029.0	0.6876	0.2290	0.2344	0.2224	0.2450	96	0.3160	-0.0214	17.2
2042.0	0.6856	0.2289	0.2343	0.2222	0.2450	96	0.3180	-0.0215	17.2
2055.0	0.6836	0.2288	0.2342	0.2221	0.2449	96	0.3200	-0.0216	17.3
2067.0	0.6816	0.2288	0.2341	0.2220	0.2448	96	0.3220	-0.0217	17.3
2079.0	0.6796	0.2287	0.2340	0.2219	0.2447	96	0.3240	-0.0218	17.3
2092.0	0.6776	0.2286	0.2339	0.2219	0.2446	97	0.3260	-0.0219	17.4
2105.0	0.6756	0.2286	0.2338	0.2217	0.2446	97	0.3280	-0.0219	17.4
2112.0	0.6736	0.2285	0.2337	0.2216	0.2445	96	0.3300	-0.0220	17.3
2125.0	0.6716	0.2284	0.2336	0.2215	0.2444	97	0.3320	-0.0221	17.4
2144.0	0.6696	0.2283	0.2335	0.2215	0.2443	98	0.3340	-0.0222	17.6
2156.0	0.6676	0.2283	0.2334	0.2214	0.2442	98	0.3360	-0.0223	17.6
2169.0	0.6656	0.2282	0.2332	0.2213	0.2442	98	0.3380	-0.0224	17.6
2182.0	0.6636	0.2281	0.2331	0.2211	0.2441	99	0.3400	-0.0225	17.7
2195.0	0.6616	0.2280	0.2330	0.2210	0.2440	99	0.3420	-0.0226	17.8
2208.0	0.6596	0.2280	0.2329	0.2209	0.2439	99	0.3440	-0.0227	17.9
2220.0	0.6576	0.2279	0.2328	0.2209	0.2438	99	0.3460	-0.0228	17.9
2233.0	0.6556	0.2279	0.2327	0.2208	0.2437	100	0.3480	-0.0228	17.9
2243.0	0.6536	0.2278	0.2326	0.2207	0.2437	102	0.3500	-0.0229	18.3
2253.0	0.6516	0.2277	0.2325	0.2206	0.2436	100	0.3520	-0.0230	17.9
2271.0	0.6496	0.2277	0.2323	0.2205	0.2434	101	0.3540	-0.0231	18.1
2285.0	0.6476	0.2276	0.2322	0.2204	0.2434	101	0.3560	-0.0232	18.1
2298.0	0.6456	0.2276	0.2321	0.2203	0.2433	101	0.3580	-0.0233	18.1
2310.0	0.6436	0.2275	0.2321	0.2202	0.2433	101	0.3600	-0.0233	18.1
2323.0	0.6416	0.2274	0.2320	0.2202	0.2432	101	0.3620	-0.0234	18.2
2336.0	0.6396	0.2274	0.2319	0.2201	0.2431	101	0.3640	-0.0235	18.2
2348.0	0.6376	0.2273	0.2318	0.2200	0.2431	102	0.3660	-0.0236	18.3
2361.0	0.6356	0.2273	0.2317	0.2199	0.2430	102	0.3680	-0.0236	18.3
2373.0	0.6336	0.2272	0.2316	0.2198	0.2430	102	0.3700	-0.0237	18.4
2381.0	0.6316	0.2272	0.2316	0.2198	0.2429	102	0.3720	-0.0237	18.3
2394.0	0.6296	0.2271	0.2315	0.2197	0.2429	102	0.3740	-0.0238	18.3
2412.0	0.6276	0.2271	0.2314	0.2196	0.2428	102	0.3760	-0.0239	18.4
2424.0	0.6256	0.2270	0.2313	0.2195	0.2427	102	0.3780	-0.0240	18.4
2437.0	0.6236	0.2269	0.2312	0.2195	0.2427	102	0.3800	-0.0240	18.4
2450.0	0.6216	0.2269	0.2311	0.2194	0.2426	103	0.3820	-0.0241	18.5
2462.0	0.6196	0.2269	0.2311	0.2193	0.2426	103	0.3840	-0.0241	18.5
2475.0	0.6176	0.2268	0.2310	0.2192	0.2425	103	0.3860	-0.0242	18.5
2488.0	0.6156	0.2268	0.2309	0.2192	0.2424	103	0.3880	-0.0243	18.5
2500.0	0.6136	0.2267	0.2308	0.2191	0.2424	103	0.3900	-0.0244	18.5
2507.0	0.6116	0.2267	0.2308	0.2190	0.2423	103	0.3920	-0.0244	18.5
2520.0	0.6096	0.2266	0.2307	0.2190	0.2423	103	0.3940	-0.0245	18.5
2538.0	0.6076	0.2266	0.2306	0.2189	0.2422	104	0.3960	-0.0245	18.6
2551.0	0.6056	0.2266	0.2305	0.2189	0.2421	104	0.3980	-0.0246	18.7
2563.0	0.6036	0.2265	0.2304	0.2188	0.2421	104	0.4000	-0.0247	18.7
2575.0	0.6016	0.2265	0.2303	0.2187	0.2420	104	0.4020	-0.0247	18.7
2588.0	0.5996	0.2264	0.2303	0.2187	0.2420	104	0.4040	-0.0248	18.8
2600.0	0.5976	0.2264	0.2302	0.2186	0.2419	104	0.4060	-0.0248	18.8
2613.0	0.5956	0.2264	0.2301	0.2186	0.2419	104	0.4080	-0.0249	18.7
2625.0	0.5936	0.2263	0.2301	0.2185	0.2418	104	0.4100	-0.0249	18.7
2638.0	0.5916	0.2263	0.2300	0.2184	0.2418	105	0.4120	-0.0250	19.0
2646.0	0.5896	0.2262	0.2299	0.2184	0.2417	104	0.4140	-0.0251	18.7
2659.0	0.5876	0.2262	0.2299	0.2183	0.2417	104	0.4160	-0.0251	18.6
2677.0	0.5856	0.2261	0.2298	0.2183	0.2416	104	0.4180	-0.0252	18.8
2690.0	0.5836	0.2261	0.2297	0.2182	0.2415	105	0.4200	-0.0252	18.8
2702.0	0.5816	0.2261	0.2296	0.2181	0.2415	105	0.4220	-0.0253	18.8
2714.0	0.5796	0.2260	0.2296	0.2181	0.2414	105	0.4240	-0.0253	18.9
2727.0	0.5776	0.2260	0.2295	0.2181	0.2414	105	0.4260	-0.0254	18.9
2740.0	0.5756	0.2260	0.2294	0.2180	0.2413	105	0.4280	-0.0254	19.0
2753.0	0.5736	0.2260	0.2294	0.2180	0.2413	105	0.4300	-0.0254	18.9
2766.0	0.5716	0.2259	0.2293	0.2179	0.2412	105	0.4320	-0.0255	18.9
2773.0	0.5696	0.2259	0.2292	0.2178	0.2412	105	0.4340	-0.0256	18.8
2786.0	0.5676	0.2258	0.2292	0.2178	0.2412	105	0.4360	-0.0256	19.0
2804.0	0.5656	0.2258	0.2291	0.2177	0.2411	106	0.4380	-0.0257	19.0
2816.0	0.5636	0.2258	0.2290	0.2177	0.2410	106	0.4400	-0.0257	19.0
2829.0	0.5616	0.2257	0.2290	0.2177	0.2410	106	0.4420	-0.0258	19.0
2842.0	0.5596	0.2257	0.2289	0.2176	0.2409	105	0.4440	-0.0258	19.0
2854.0	0.5576	0.2257	0.2288	0.2175	0.2409	104	0.4460	-0.0259	18.8
2867.0	0.5556	0.2256	0.2288	0.2175	0.2408	104	0.4480	-0.0259	18.7
2879.0	0.5536	0.2256	0.2287	0.2174	0.2408	104	0.4500	-0.0260	18.7
2892.0	0.5516	0.2255	0.2286	0.2174	0.2407	104	0.4520	-0.0261	18.6
2903.0	0.5496	0.2255	0.2285	0.2173	0.2406	106	0.4540	-0.0261	19.0
2912.0	0.5476	0.2254	0.2285	0.2173	0.2406	103	0.4560	-0.0262	18.6
2930.0	0.5456	0.2254	0.2283	0.2172	0.2405	104	0.4580	-0.0263	18.6
2943.0	0.5436	0.2253	0.2283	0.2172	0.2404	103	0.4600	-0.0263	18.6
2956.0	0.5416	0.2253	0.2282	0.2171	0.2403	103	0.4620	-0.0264	18.6
2968.0	0.5396	0.2253	0.2281	0.2170	0.2403	103	0.4640	-0.0264	18.6
2981.0	0.5376	0.2252	0.2280	0.2170	0.2402	103	0.4660	-0.0265	18.6
2994.0	0.5356	0.2252	0.2279	0.2169	0.2402	104	0.4680	-0.0266	18.7
3006.0	0.5336	0.2252	0.2278	0.2169	0.2401	104	0.4700	-0.0266	18.7
3019.0	0.5316	0.2251	0.2278	0.2168	0.2400	104	0.4720	-0.0267	18.7

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
3031.0	0.5296	0.2251	0.2277	0.2168	0.2400	104	0.4740	-0.0267	18.7
3039.0	0.5276	0.2251	0.2276	0.2167	0.2399	104	0.4760	-0.0268	18.6
3051.0	0.5256	0.2250	0.2276	0.2167	0.2399	104	0.4780	-0.0268	18.7
3069.0	0.5236	0.2250	0.2274	0.2166	0.2398	104	0.4800	-0.0269	18.7
3081.0	0.5216	0.2250	0.2274	0.2166	0.2397	104	0.4820	-0.0269	18.8
3094.0	0.5196	0.2249	0.2273	0.2166	0.2396	104	0.4840	-0.0270	18.8
3107.0	0.5176	0.2249	0.2272	0.2165	0.2396	104	0.4860	-0.0271	18.8
3120.0	0.5156	0.2249	0.2271	0.2165	0.2395	104	0.4880	-0.0271	18.8
3132.0	0.5136	0.2249	0.2270	0.2164	0.2395	104	0.4900	-0.0272	18.8
3145.0	0.5116	0.2248	0.2270	0.2164	0.2394	104	0.4920	-0.0272	18.7
3157.0	0.5096	0.2248	0.2269	0.2163	0.2393	104	0.4940	-0.0273	18.7
3169.0	0.5076	0.2248	0.2268	0.2163	0.2393	105	0.4960	-0.0273	18.9
3177.0	0.5056	0.2248	0.2268	0.2163	0.2392	104	0.4980	-0.0273	18.8
3195.0	0.5036	0.2248	0.2266	0.2162	0.2391	105	0.5000	-0.0274	18.8
3208.0	0.5016	0.2247	0.2266	0.2162	0.2391	104	0.5020	-0.0275	18.8
3220.0	0.4996	0.2247	0.2265	0.2161	0.2390	104	0.5040	-0.0275	18.7
3233.0	0.4976	0.2247	0.2264	0.2161	0.2389	104	0.5060	-0.0276	18.7
3246.0	0.4956	0.2246	0.2263	0.2160	0.2388	103	0.5080	-0.0277	18.6

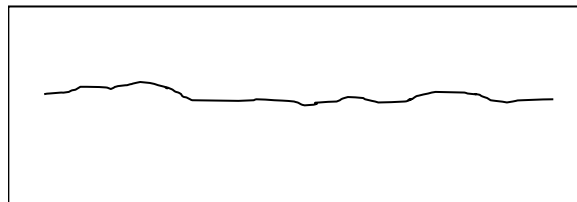


Direct Shear Strength of Rock
ASTM D 5607

Project Name	<u>SR1 Flood Control Project - Inlet Debris Barrier</u>	Project Number	<u>110773396</u>
Lithology	<u>Shale, gray, moderately hard, partially healed faults</u>	Lab ID	<u>DSNF-22</u>
Hole Number	<u>DB-3</u>	Date Received	<u>05/15/2018</u>
Depth (m)	<u>19.44</u>		
Test Type	<u>Direct shear of natural fracture</u>	Diameter (in)	<u>2.397</u>
Initial Moisture Condition	<u>As received, moist</u>	Angle of Dip (deg)	<u>35.7</u>
Test Moisture Condition	<u>Soaked at least 12 hours prior to test.</u>	Area(in ²)	<u>5.56</u>
Joint Roughness	<u>10</u>		
		Date Prepared	<u>06/28/2018</u>
Normal Stress (psi)	<u>94</u>	Date Tested	<u>06/29/2018</u>



Sketch



Shear Rate to Peak (in/min) N/A

Encapsulation Material Hydro-Stone

Comments _____

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
0.0	1.0042	0.2508	0.2524	0.2531	0.2538	17	0.0000	0.0000	3.0
24.0	1.0022	0.2507	0.2523	0.2526	0.2543	27	0.0020	0.0000	4.9
36.0	1.0001	0.2507	0.2523	0.2522	0.2548	31	0.0041	0.0000	5.5
46.0	0.9982	0.2507	0.2523	0.2518	0.2552	33	0.0060	0.0000	5.9
60.0	0.9962	0.2507	0.2522	0.2514	0.2556	35	0.0080	0.0000	6.3
79.0	0.9942	0.2507	0.2522	0.2510	0.2559	37	0.0100	-0.0001	6.7
90.0	0.9922	0.2506	0.2522	0.2507	0.2561	39	0.0120	-0.0001	7.1
101.0	0.9902	0.2506	0.2521	0.2504	0.2564	42	0.0140	-0.0002	7.5
112.0	0.9882	0.2506	0.2521	0.2502	0.2566	46	0.0160	-0.0002	8.2
123.0	0.9862	0.2506	0.2521	0.2499	0.2568	50	0.0180	-0.0002	9.0
135.0	0.9842	0.2505	0.2520	0.2495	0.2571	56	0.0200	-0.0002	10.1
148.0	0.9822	0.2505	0.2520	0.2491	0.2574	63	0.0220	-0.0003	11.4
161.0	0.9802	0.2505	0.2519	0.2487	0.2578	71	0.0240	-0.0003	12.8
175.0	0.9782	0.2504	0.2519	0.2483	0.2581	79	0.0260	-0.0004	14.2
188.0	0.9761	0.2504	0.2518	0.2480	0.2583	86	0.0281	-0.0003	15.4
195.0	0.9742	0.2504	0.2518	0.2477	0.2585	92	0.0300	-0.0004	16.6
214.0	0.9722	0.2503	0.2517	0.2474	0.2586	104	0.0320	-0.0005	18.7
226.0	0.9702	0.2502	0.2516	0.2471	0.2588	123	0.0340	-0.0006	22.2
240.0	0.9682	0.2500	0.2513	0.2467	0.2587	142	0.0360	-0.0008	25.6
253.0	0.9662	0.2498	0.2510	0.2462	0.2586	156	0.0380	-0.0011	28.0
266.0	0.9642	0.2495	0.2507	0.2458	0.2584	165	0.0400	-0.0014	29.8
280.0	0.9622	0.2492	0.2504	0.2454	0.2582	173	0.0420	-0.0017	31.1
293.0	0.9602	0.2489	0.2501	0.2450	0.2580	179	0.0440	-0.0020	32.2
306.0	0.9582	0.2487	0.2498	0.2446	0.2578	183	0.0460	-0.0023	32.9
319.0	0.9562	0.2484	0.2495	0.2443	0.2576	186	0.0480	-0.0026	33.5
333.0	0.9542	0.2482	0.2492	0.2440	0.2574	189	0.0500	-0.0028	34.1
346.0	0.9522	0.2479	0.2490	0.2436	0.2572	192	0.0520	-0.0031	34.5
360.0	0.9502	0.2477	0.2487	0.2433	0.2570	194	0.0540	-0.0033	34.9
373.0	0.9482	0.2474	0.2485	0.2430	0.2568	196	0.0560	-0.0036	35.2
386.0	0.9462	0.2472	0.2482	0.2427	0.2566	195	0.0580	-0.0039	35.0
400.0	0.9442	0.2469	0.2480	0.2423	0.2564	196	0.0600	-0.0041	35.3
413.0	0.9422	0.2467	0.2477	0.2420	0.2563	197	0.0620	-0.0044	35.4
426.0	0.9402	0.2465	0.2475	0.2417	0.2561	198	0.0640	-0.0046	35.6
440.0	0.9382	0.2462	0.2473	0.2413	0.2559	198	0.0660	-0.0048	35.6
453.0	0.9362	0.2460	0.2470	0.2410	0.2558	198	0.0680	-0.0051	35.7
466.0	0.9342	0.2458	0.2468	0.2407	0.2556	198	0.0700	-0.0053	35.7
479.0	0.9322	0.2456	0.2466	0.2404	0.2555	199	0.0720	-0.0055	35.8
492.0	0.9302	0.2454	0.2464	0.2401	0.2553	199	0.0740	-0.0057	35.9
504.0	0.9282	0.2452	0.2462	0.2398	0.2552	200	0.0760	-0.0059	36.0
517.0	0.9262	0.2451	0.2460	0.2395	0.2551	200	0.0780	-0.0061	36.1
530.0	0.9242	0.2449	0.2458	0.2392	0.2550	201	0.0800	-0.0063	36.2
543.0	0.9222	0.2447	0.2456	0.2389	0.2548	201	0.0820	-0.0065	36.2
556.0	0.9202	0.2445	0.2454	0.2387	0.2547	202	0.0840	-0.0067	36.4
568.0	0.9182	0.2444	0.2453	0.2384	0.2546	202	0.0860	-0.0069	36.4
581.0	0.9162	0.2442	0.2451	0.2382	0.2545	203	0.0880	-0.0070	36.5
594.0	0.9142	0.2441	0.2449	0.2379	0.2544	203	0.0900	-0.0072	36.6
607.0	0.9122	0.2439	0.2448	0.2377	0.2543	204	0.0920	-0.0073	36.8
620.0	0.9102	0.2437	0.2446	0.2374	0.2542	204	0.0940	-0.0076	36.8
634.0	0.9082	0.2436	0.2444	0.2372	0.2541	205	0.0960	-0.0077	36.8
647.0	0.9062	0.2434	0.2443	0.2370	0.2540	206	0.0980	-0.0079	37.0
660.0	0.9042	0.2433	0.2441	0.2367	0.2539	207	0.1000	-0.0080	37.2
672.0	0.9022	0.2431	0.2440	0.2365	0.2538	207	0.1020	-0.0082	37.3
685.0	0.9002	0.2430	0.2438	0.2362	0.2537	208	0.1040	-0.0084	37.4
698.0	0.8982	0.2428	0.2436	0.2360	0.2536	208	0.1060	-0.0085	37.5
711.0	0.8962	0.2427	0.2435	0.2358	0.2536	208	0.1080	-0.0086	37.5
724.0	0.8942	0.2425	0.2434	0.2356	0.2535	209	0.1100	-0.0088	37.5
737.0	0.8922	0.2424	0.2432	0.2353	0.2534	209	0.1120	-0.0089	37.6
750.0	0.8902	0.2422	0.2431	0.2351	0.2533	209	0.1140	-0.0091	37.7
763.0	0.8882	0.2421	0.2429	0.2349	0.2533	210	0.1160	-0.0092	37.7
776.0	0.8862	0.2419	0.2428	0.2347	0.2532	210	0.1180	-0.0094	37.8
789.0	0.8842	0.2418	0.2426	0.2345	0.2530	204	0.1200	-0.0096	36.7
802.0	0.8822	0.2416	0.2424	0.2343	0.2528	203	0.1220	-0.0098	36.5
814.0	0.8802	0.2414	0.2422	0.2341	0.2527	203	0.1240	-0.0099	36.6
827.0	0.8782	0.2412	0.2420	0.2340	0.2525	203	0.1260	-0.0101	36.5
840.0	0.8762	0.2410	0.2418	0.2338	0.2523	203	0.1280	-0.0103	36.5
853.0	0.8742	0.2408	0.2417	0.2337	0.2521	203	0.1300	-0.0105	36.6
865.0	0.8722	0.2407	0.2415	0.2335	0.2519	204	0.1320	-0.0106	36.7
878.0	0.8702	0.2405	0.2413	0.2333	0.2517	204	0.1340	-0.0108	36.8
891.0	0.8682	0.2403	0.2411	0.2332	0.2515	203	0.1360	-0.0110	36.6
904.0	0.8662	0.2401	0.2409	0.2330	0.2513	204	0.1380	-0.0112	36.6
917.0	0.8642	0.2400	0.2407	0.2329	0.2512	203	0.1400	-0.0113	36.5
931.0	0.8622	0.2398	0.2405	0.2327	0.2510	203	0.1420	-0.0115	36.6
943.0	0.8602	0.2396	0.2403	0.2326	0.2508	203	0.1440	-0.0117	36.6
956.0	0.8582	0.2394	0.2401	0.2324	0.2506	204	0.1460	-0.0119	36.7
969.0	0.8562	0.2393	0.2400	0.2323	0.2505	204	0.1480	-0.0120	36.7
982.0	0.8542	0.2391	0.2398	0.2321	0.2503	204	0.1500	-0.0122	36.7
995.0	0.8522	0.2390	0.2396	0.2319	0.2501	204	0.1520	-0.0124	36.8
1008.0	0.8502	0.2388	0.2395	0.2318	0.2500	206	0.1540	-0.0125	37.0
1020.0	0.8482	0.2386	0.2393	0.2317	0.2498	206	0.1560	-0.0127	37.1

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
1033.0	0.8462	0.2385	0.2392	0.2315	0.2497	207	0.1580	-0.0128	37.2
1046.0	0.8442	0.2384	0.2390	0.2314	0.2495	207	0.1600	-0.0130	37.3
1059.0	0.8422	0.2382	0.2389	0.2313	0.2494	205	0.1620	-0.0131	36.8
1071.0	0.8402	0.2380	0.2387	0.2311	0.2493	205	0.1640	-0.0133	36.9
1084.0	0.8382	0.2379	0.2386	0.2310	0.2491	205	0.1660	-0.0134	36.8
1097.0	0.8362	0.2377	0.2384	0.2308	0.2490	205	0.1680	-0.0136	36.9
1110.0	0.8342	0.2376	0.2383	0.2306	0.2489	205	0.1700	-0.0137	36.9
1122.0	0.8322	0.2374	0.2382	0.2305	0.2487	205	0.1720	-0.0138	36.9
1135.0	0.8302	0.2373	0.2380	0.2304	0.2486	205	0.1740	-0.0140	36.9
1148.0	0.8282	0.2372	0.2379	0.2302	0.2485	206	0.1760	-0.0141	37.1
1160.0	0.8262	0.2370	0.2377	0.2301	0.2484	206	0.1780	-0.0142	37.1
1173.0	0.8242	0.2369	0.2376	0.2300	0.2482	206	0.1800	-0.0144	37.1
1186.0	0.8222	0.2368	0.2374	0.2298	0.2481	206	0.1820	-0.0145	37.1
1199.0	0.8202	0.2367	0.2373	0.2297	0.2480	207	0.1840	-0.0146	37.2
1212.0	0.8182	0.2366	0.2371	0.2295	0.2479	207	0.1860	-0.0148	37.2
1224.0	0.8162	0.2364	0.2370	0.2294	0.2477	206	0.1880	-0.0149	37.1
1237.0	0.8142	0.2363	0.2369	0.2293	0.2476	205	0.1900	-0.0150	37.0
1250.0	0.8122	0.2362	0.2367	0.2292	0.2475	205	0.1920	-0.0151	36.9
1262.0	0.8102	0.2361	0.2366	0.2291	0.2473	205	0.1940	-0.0153	36.8
1275.0	0.8082	0.2360	0.2364	0.2289	0.2472	204	0.1960	-0.0154	36.8
1288.0	0.8062	0.2359	0.2363	0.2288	0.2471	204	0.1980	-0.0155	36.8
1301.0	0.8042	0.2358	0.2362	0.2287	0.2470	205	0.2000	-0.0156	36.8
1314.0	0.8022	0.2357	0.2361	0.2286	0.2469	205	0.2020	-0.0157	36.8
1326.0	0.8002	0.2356	0.2359	0.2285	0.2468	205	0.2040	-0.0158	36.9
1339.0	0.7982	0.2355	0.2358	0.2283	0.2467	205	0.2060	-0.0160	36.9
1352.0	0.7962	0.2353	0.2357	0.2282	0.2466	206	0.2080	-0.0161	37.0
1364.0	0.7942	0.2352	0.2356	0.2281	0.2465	206	0.2100	-0.0162	37.0
1377.0	0.7922	0.2351	0.2354	0.2280	0.2464	206	0.2120	-0.0163	37.1
1390.0	0.7902	0.2350	0.2353	0.2279	0.2463	206	0.2140	-0.0164	37.0
1403.0	0.7882	0.2349	0.2352	0.2278	0.2462	206	0.2160	-0.0165	37.1
1415.0	0.7862	0.2348	0.2351	0.2276	0.2461	207	0.2180	-0.0166	37.2
1428.0	0.7842	0.2347	0.2350	0.2275	0.2460	207	0.2200	-0.0167	37.3
1441.0	0.7822	0.2346	0.2349	0.2274	0.2459	207	0.2220	-0.0168	37.3
1454.0	0.7802	0.2345	0.2348	0.2273	0.2458	207	0.2240	-0.0169	37.3
1467.0	0.7782	0.2344	0.2347	0.2272	0.2457	207	0.2260	-0.0170	37.2
1480.0	0.7762	0.2343	0.2346	0.2271	0.2456	207	0.2280	-0.0171	37.2
1493.0	0.7742	0.2342	0.2344	0.2269	0.2455	206	0.2300	-0.0173	37.1
1506.0	0.7722	0.2341	0.2343	0.2269	0.2454	205	0.2320	-0.0174	37.0
1518.0	0.7702	0.2340	0.2342	0.2267	0.2453	205	0.2340	-0.0175	37.0
1531.0	0.7682	0.2339	0.2341	0.2266	0.2452	205	0.2360	-0.0176	36.9
1544.0	0.7662	0.2338	0.2340	0.2265	0.2451	205	0.2380	-0.0177	36.9
1557.0	0.7642	0.2338	0.2339	0.2264	0.2451	205	0.2400	-0.0177	36.9
1569.0	0.7622	0.2337	0.2338	0.2263	0.2450	206	0.2420	-0.0178	37.0
1582.0	0.7602	0.2336	0.2337	0.2262	0.2449	205	0.2440	-0.0179	36.9
1595.0	0.7582	0.2335	0.2336	0.2261	0.2448	205	0.2460	-0.0180	37.0
1607.0	0.7562	0.2334	0.2335	0.2260	0.2447	205	0.2480	-0.0181	37.0
1620.0	0.7542	0.2333	0.2334	0.2259	0.2446	205	0.2500	-0.0182	36.9
1632.0	0.7522	0.2333	0.2333	0.2258	0.2445	205	0.2520	-0.0183	36.9
1645.0	0.7502	0.2332	0.2331	0.2257	0.2445	204	0.2540	-0.0184	36.7
1658.0	0.7482	0.2331	0.2330	0.2256	0.2443	203	0.2560	-0.0185	36.5
1671.0	0.7462	0.2330	0.2329	0.2255	0.2443	202	0.2580	-0.0186	36.4
1684.0	0.7442	0.2329	0.2328	0.2254	0.2442	202	0.2600	-0.0187	36.3
1697.0	0.7422	0.2328	0.2327	0.2253	0.2441	202	0.2620	-0.0188	36.3
1710.0	0.7402	0.2327	0.2326	0.2252	0.2440	202	0.2640	-0.0189	36.3
1722.0	0.7382	0.2326	0.2325	0.2251	0.2439	202	0.2660	-0.0190	36.3
1736.0	0.7362	0.2326	0.2324	0.2250	0.2438	202	0.2680	-0.0191	36.3
1748.0	0.7342	0.2325	0.2322	0.2249	0.2437	201	0.2700	-0.0192	36.2
1761.0	0.7322	0.2324	0.2322	0.2248	0.2436	201	0.2720	-0.0193	36.1
1773.0	0.7302	0.2323	0.2320	0.2247	0.2436	201	0.2740	-0.0194	36.2
1786.0	0.7282	0.2323	0.2319	0.2246	0.2435	201	0.2760	-0.0195	36.2
1799.0	0.7262	0.2322	0.2318	0.2245	0.2434	200	0.2780	-0.0196	36.1
1811.0	0.7242	0.2321	0.2317	0.2244	0.2433	200	0.2800	-0.0197	36.0
1824.0	0.7222	0.2320	0.2316	0.2243	0.2432	200	0.2820	-0.0198	36.0
1837.0	0.7202	0.2319	0.2315	0.2242	0.2432	200	0.2840	-0.0198	36.0
1850.0	0.7182	0.2318	0.2314	0.2241	0.2431	200	0.2860	-0.0199	36.0
1863.0	0.7162	0.2318	0.2313	0.2240	0.2430	200	0.2880	-0.0200	35.9
1875.0	0.7142	0.2317	0.2312	0.2239	0.2429	200	0.2900	-0.0201	35.9
1888.0	0.7122	0.2316	0.2311	0.2238	0.2429	200	0.2920	-0.0202	35.9
1901.0	0.7102	0.2315	0.2310	0.2237	0.2428	199	0.2940	-0.0203	35.8
1913.0	0.7082	0.2314	0.2309	0.2236	0.2427	198	0.2960	-0.0204	35.7
1926.0	0.7062	0.2314	0.2308	0.2235	0.2426	198	0.2980	-0.0205	35.7
1939.0	0.7042	0.2313	0.2307	0.2233	0.2425	198	0.3000	-0.0206	35.7
1952.0	0.7022	0.2312	0.2306	0.2232	0.2425	198	0.3020	-0.0207	35.7
1964.0	0.7002	0.2311	0.2305	0.2231	0.2424	198	0.3040	-0.0208	35.7
1977.0	0.6982	0.2311	0.2304	0.2230	0.2423	198	0.3060	-0.0208	35.6
1990.0	0.6962	0.2310	0.2303	0.2229	0.2422	198	0.3080	-0.0209	35.6
2003.0	0.6942	0.2309	0.2302	0.2228	0.2421	198	0.3100	-0.0210	35.6
2016.0	0.6922	0.2308	0.2301	0.2227	0.2421	199	0.3120	-0.0211	35.7
2028.0	0.6902	0.2308	0.2300	0.2226	0.2420	199	0.3140	-0.0212	35.8

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
2041.0	0.6882	0.2307	0.2299	0.2225	0.2419	199	0.3160	-0.0213	35.8
2053.0	0.6862	0.2306	0.2298	0.2224	0.2419	199	0.3180	-0.0214	35.9
2066.0	0.6842	0.2305	0.2297	0.2223	0.2418	199	0.3200	-0.0215	35.9
2078.0	0.6822	0.2305	0.2296	0.2222	0.2417	200	0.3220	-0.0215	35.9
2091.0	0.6802	0.2304	0.2295	0.2221	0.2417	199	0.3240	-0.0216	35.9
2104.0	0.6782	0.2303	0.2294	0.2220	0.2416	200	0.3260	-0.0217	35.9
2117.0	0.6762	0.2303	0.2293	0.2219	0.2415	200	0.3280	-0.0218	35.9
2130.0	0.6742	0.2302	0.2292	0.2218	0.2415	200	0.3300	-0.0219	36.0
2143.0	0.6722	0.2301	0.2291	0.2217	0.2414	200	0.3320	-0.0220	35.9
2155.0	0.6702	0.2301	0.2290	0.2216	0.2413	200	0.3340	-0.0220	35.9
2168.0	0.6682	0.2300	0.2289	0.2214	0.2413	200	0.3360	-0.0221	36.0
2181.0	0.6662	0.2299	0.2288	0.2213	0.2412	200	0.3380	-0.0222	35.9
2194.0	0.6642	0.2299	0.2287	0.2212	0.2412	200	0.3400	-0.0223	35.9
2207.0	0.6622	0.2298	0.2286	0.2211	0.2411	200	0.3420	-0.0224	36.0
2220.0	0.6602	0.2298	0.2285	0.2210	0.2410	200	0.3440	-0.0225	35.9
2233.0	0.6582	0.2297	0.2284	0.2209	0.2409	200	0.3460	-0.0226	36.0
2246.0	0.6562	0.2296	0.2283	0.2208	0.2409	200	0.3480	-0.0226	36.0
2259.0	0.6542	0.2296	0.2282	0.2207	0.2408	200	0.3500	-0.0227	36.1
2271.0	0.6522	0.2295	0.2281	0.2206	0.2408	201	0.3520	-0.0228	36.1
2284.0	0.6502	0.2294	0.2280	0.2205	0.2407	201	0.3540	-0.0229	36.2
2297.0	0.6482	0.2294	0.2279	0.2204	0.2406	201	0.3560	-0.0230	36.2
2310.0	0.6462	0.2293	0.2278	0.2203	0.2406	202	0.3580	-0.0230	36.3
2323.0	0.6442	0.2293	0.2277	0.2202	0.2405	202	0.3600	-0.0231	36.3
2335.0	0.6422	0.2292	0.2276	0.2201	0.2404	202	0.3620	-0.0232	36.4
2348.0	0.6402	0.2292	0.2275	0.2200	0.2404	202	0.3640	-0.0233	36.4
2361.0	0.6382	0.2291	0.2274	0.2200	0.2403	203	0.3660	-0.0233	36.5
2374.0	0.6362	0.2291	0.2273	0.2199	0.2402	203	0.3680	-0.0234	36.5
2387.0	0.6342	0.2290	0.2272	0.2198	0.2402	203	0.3700	-0.0235	36.5
2399.0	0.6322	0.2290	0.2271	0.2197	0.2401	203	0.3720	-0.0236	36.5
2413.0	0.6302	0.2289	0.2270	0.2196	0.2401	203	0.3740	-0.0236	36.6
2425.0	0.6282	0.2289	0.2269	0.2195	0.2400	204	0.3760	-0.0237	36.6
2438.0	0.6262	0.2289	0.2268	0.2195	0.2400	204	0.3780	-0.0237	36.7
2450.0	0.6242	0.2288	0.2267	0.2194	0.2399	204	0.3800	-0.0238	36.7
2464.0	0.6222	0.2288	0.2266	0.2193	0.2398	204	0.3820	-0.0239	36.7
2476.0	0.6202	0.2287	0.2265	0.2192	0.2398	204	0.3840	-0.0240	36.8
2489.0	0.6182	0.2287	0.2264	0.2191	0.2397	205	0.3860	-0.0241	36.8
2502.0	0.6162	0.2287	0.2263	0.2191	0.2396	205	0.3880	-0.0241	36.9
2515.0	0.6142	0.2286	0.2262	0.2190	0.2396	205	0.3900	-0.0242	36.9
2527.0	0.6122	0.2286	0.2261	0.2189	0.2395	206	0.3920	-0.0243	37.0
2540.0	0.6102	0.2286	0.2261	0.2189	0.2395	206	0.3940	-0.0243	37.1
2552.0	0.6082	0.2285	0.2260	0.2188	0.2394	207	0.3960	-0.0244	37.2
2565.0	0.6062	0.2285	0.2259	0.2187	0.2394	207	0.3980	-0.0244	37.3
2578.0	0.6042	0.2285	0.2258	0.2186	0.2393	208	0.4000	-0.0245	37.4
2590.0	0.6022	0.2284	0.2257	0.2186	0.2393	209	0.4020	-0.0245	37.6
2603.0	0.6002	0.2284	0.2256	0.2185	0.2392	209	0.4040	-0.0246	37.6
2616.0	0.5982	0.2284	0.2255	0.2184	0.2392	210	0.4060	-0.0247	37.8
2628.0	0.5962	0.2284	0.2254	0.2184	0.2391	211	0.4080	-0.0247	37.9
2641.0	0.5942	0.2283	0.2254	0.2183	0.2391	211	0.4100	-0.0248	38.1
2654.0	0.5922	0.2283	0.2253	0.2182	0.2390	212	0.4120	-0.0248	38.2
2667.0	0.5902	0.2283	0.2252	0.2182	0.2390	212	0.4140	-0.0249	38.2
2680.0	0.5882	0.2282	0.2251	0.2181	0.2389	213	0.4160	-0.0250	38.3
2692.0	0.5862	0.2282	0.2251	0.2180	0.2389	213	0.4180	-0.0250	38.4
2705.0	0.5842	0.2282	0.2250	0.2180	0.2389	214	0.4200	-0.0250	38.5
2718.0	0.5822	0.2282	0.2249	0.2179	0.2388	215	0.4220	-0.0251	38.6
2730.0	0.5802	0.2282	0.2248	0.2179	0.2388	215	0.4240	-0.0251	38.6
2743.0	0.5782	0.2281	0.2248	0.2178	0.2387	215	0.4260	-0.0252	38.6
2756.0	0.5762	0.2281	0.2247	0.2178	0.2387	215	0.4280	-0.0252	38.7
2769.0	0.5742	0.2281	0.2246	0.2177	0.2386	214	0.4300	-0.0253	38.5
2782.0	0.5722	0.2280	0.2245	0.2177	0.2386	214	0.4320	-0.0253	38.4
2795.0	0.5702	0.2280	0.2245	0.2176	0.2385	213	0.4340	-0.0254	38.3
2808.0	0.5682	0.2280	0.2244	0.2175	0.2385	212	0.4360	-0.0254	38.1
2820.0	0.5662	0.2279	0.2243	0.2175	0.2384	211	0.4380	-0.0255	38.0
2832.0	0.5642	0.2279	0.2242	0.2174	0.2383	211	0.4400	-0.0256	38.0
2845.0	0.5622	0.2279	0.2242	0.2174	0.2383	210	0.4420	-0.0256	37.8
2858.0	0.5602	0.2278	0.2241	0.2173	0.2382	209	0.4440	-0.0257	37.7
2871.0	0.5582	0.2278	0.2240	0.2173	0.2381	209	0.4460	-0.0257	37.6
2884.0	0.5562	0.2278	0.2239	0.2172	0.2381	209	0.4480	-0.0258	37.6
2896.0	0.5542	0.2277	0.2238	0.2171	0.2380	209	0.4500	-0.0259	37.6
2909.0	0.5522	0.2277	0.2237	0.2171	0.2380	209	0.4520	-0.0259	37.6
2923.0	0.5502	0.2277	0.2236	0.2170	0.2379	209	0.4540	-0.0260	37.5
2935.0	0.5482	0.2276	0.2235	0.2170	0.2378	209	0.4560	-0.0261	37.5
2948.0	0.5462	0.2276	0.2235	0.2169	0.2378	209	0.4580	-0.0261	37.6
2960.0	0.5442	0.2276	0.2234	0.2169	0.2377	209	0.4600	-0.0261	37.6
2974.0	0.5422	0.2276	0.2233	0.2168	0.2377	209	0.4620	-0.0262	37.6
2986.0	0.5402	0.2275	0.2232	0.2168	0.2376	209	0.4640	-0.0263	37.6
2999.0	0.5382	0.2275	0.2231	0.2167	0.2375	208	0.4660	-0.0263	37.5
3012.0	0.5362	0.2275	0.2230	0.2167	0.2375	209	0.4680	-0.0264	37.6
3025.0	0.5342	0.2275	0.2230	0.2166	0.2374	209	0.4700	-0.0264	37.6
3037.0	0.5322	0.2274	0.2229	0.2166	0.2374	210	0.4720	-0.0265	37.7

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
3050.0	0.5302	0.2274	0.2228	0.2165	0.2373	210	0.4740	-0.0265	37.8
3063.0	0.5282	0.2274	0.2227	0.2164	0.2373	210	0.4760	-0.0266	37.8
3076.0	0.5262	0.2274	0.2226	0.2164	0.2372	210	0.4780	-0.0266	37.9
3088.0	0.5242	0.2273	0.2226	0.2163	0.2372	211	0.4800	-0.0267	37.9
3100.0	0.5222	0.2273	0.2225	0.2163	0.2371	210	0.4820	-0.0267	37.8
3113.0	0.5202	0.2273	0.2224	0.2162	0.2371	210	0.4840	-0.0268	37.8
3126.0	0.5182	0.2273	0.2223	0.2162	0.2370	210	0.4860	-0.0268	37.9
3139.0	0.5162	0.2272	0.2222	0.2161	0.2370	211	0.4880	-0.0269	37.9
3152.0	0.5142	0.2272	0.2222	0.2160	0.2369	211	0.4900	-0.0270	37.9
3165.0	0.5122	0.2272	0.2221	0.2160	0.2369	211	0.4920	-0.0270	37.9
3177.0	0.5102	0.2272	0.2220	0.2159	0.2369	210	0.4940	-0.0270	37.9
3190.0	0.5082	0.2271	0.2219	0.2159	0.2368	210	0.4960	-0.0271	37.8
3202.0	0.5062	0.2271	0.2218	0.2158	0.2367	210	0.4980	-0.0272	37.8
3216.0	0.5042	0.2271	0.2217	0.2158	0.2367	210	0.5000	-0.0272	37.8
3228.0	0.5022	0.2271	0.2217	0.2157	0.2366	210	0.5020	-0.0273	37.9
3241.0	0.5002	0.2271	0.2216	0.2157	0.2366	211	0.5040	-0.0273	37.9
3254.0	0.4982	0.2270	0.2215	0.2156	0.2365	211	0.5060	-0.0274	38.0
3267.0	0.4962	0.2270	0.2214	0.2155	0.2365	211	0.5080	-0.0274	38.1
3271.0	0.4956	0.2270	0.2214	0.2155	0.2365	212	0.5086	-0.0274	38.1



Photo Report

Project Name SR1 Flood Control Project - Inlet Debris Barrier
Lithology Shale, gray, moderately hard, partially healed faults
Hole Number DB-3 Depth (m) 19.44
Test Type Direct shear of natural fracture

Project Number 110773396
Lab ID DSNF-22

As Received



Core Preparation



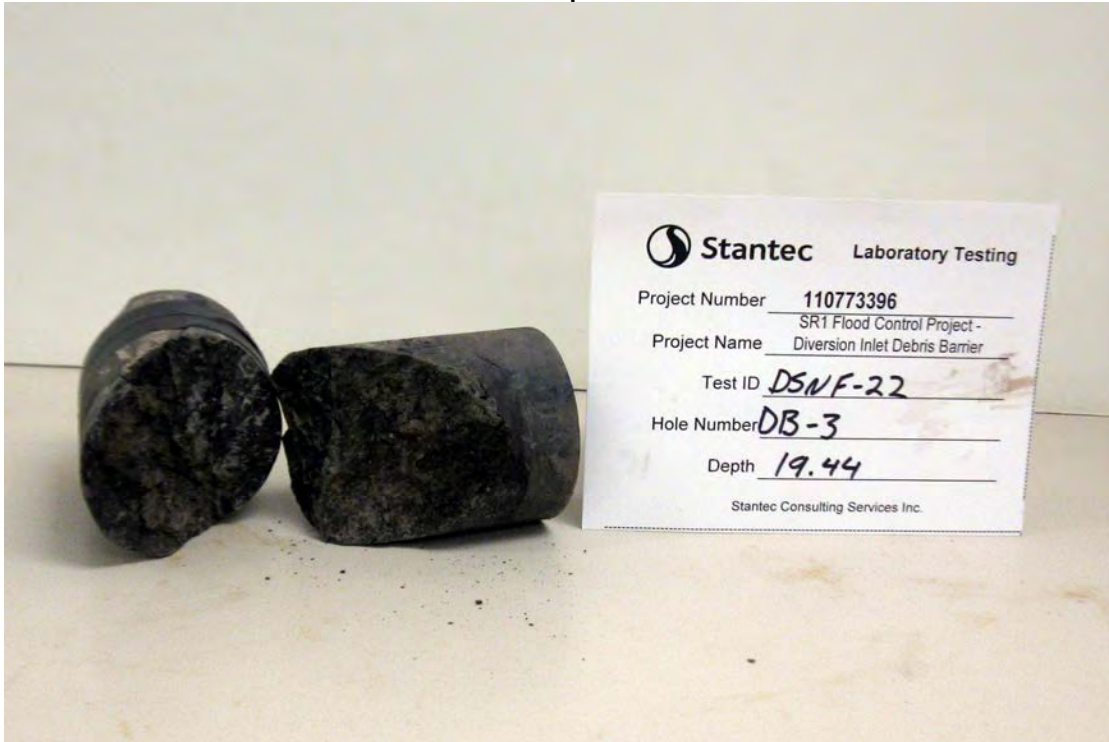


Photo Report

Project Name SR1 Flood Control Project - Inlet Debris Barrier
 Lithology Shale, gray, moderately hard, partially healed faults
 Hole Number DB-3 Depth (m) 19.44
 Test Type Direct shear of natural fracture

Project Number 110773396
 Lab ID DSNF-22

Core Preparation



Post Test





Photo Report

Project Name SR1 Flood Control Project - Inlet Debris Barrier
Lithology Shale, gray, moderately hard, partially healed faults
Hole Number DB-3 Depth (m) 19.44
Test Type Direct shear of natural fracture

Project Number 110773396
Lab ID DSNF-22

Post Test

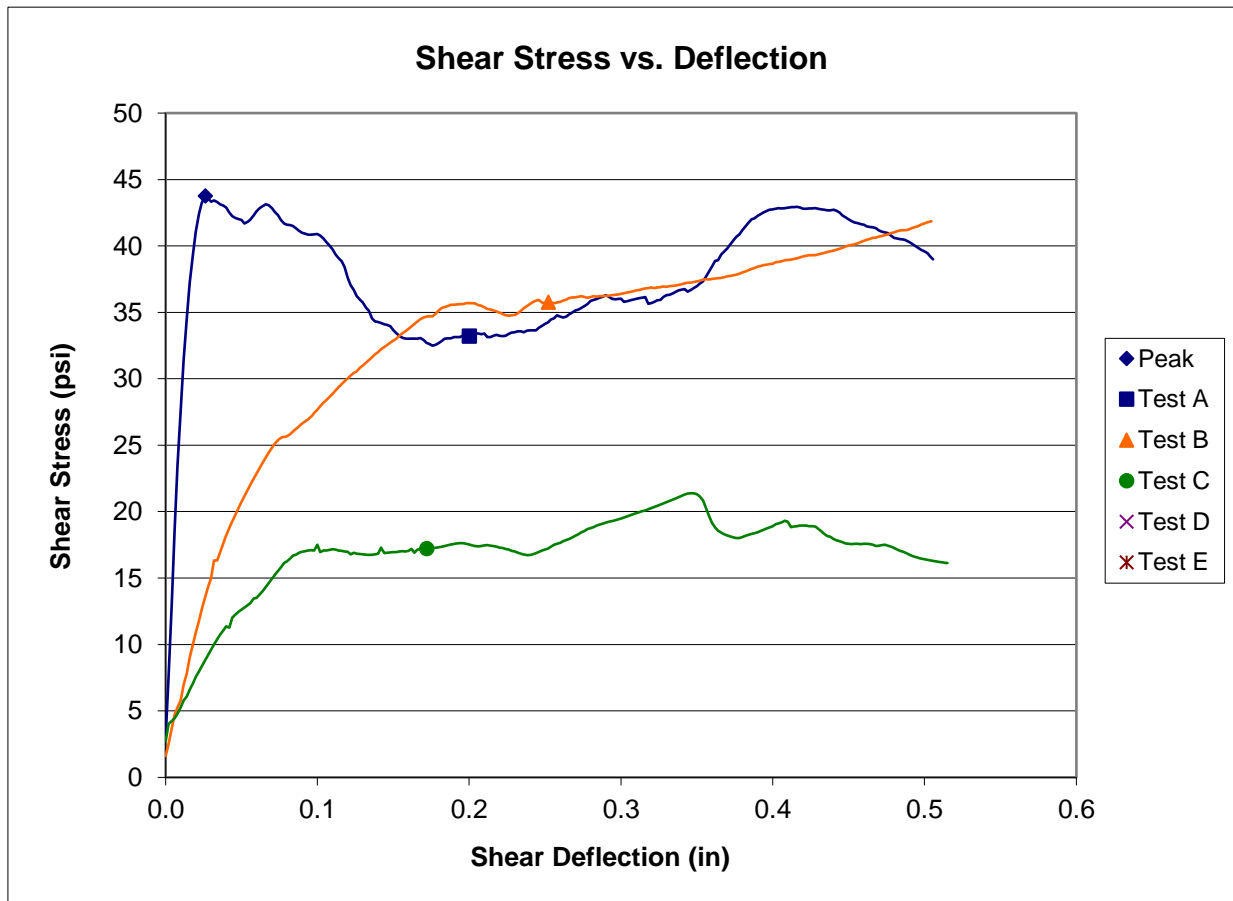




Direct Shear Strength of Rock
ASTM D 5607

Project Name	<u>SR1 Flood Control Project - Inlet Debris Barrier</u>	Project Number	<u>110773396</u>
Lithology	<u>Shale, gray, moderately hard, partially healed faults</u>	Lab ID	<u>DSNF-31</u>
Hole Number	<u>DB-3</u>	Depth (m)	<u>29.40</u>
Test Type	<u>Direct shear of natural fracture</u>	Date Received	<u>05/15/2018</u>
Initial Moisture Condition	<u>As received, moist</u>	Diameter (in.)	<u>2.401</u>
At Test Moisture Condition	<u>Soaked at least 12 hours prior to test.</u>	Angle of Dip (deg.)	<u>49.3</u>
Roughness (JRC)	<u>14</u>	Area (in ²)	<u>6.94</u>

	<u>Test A</u>	<u>Test B</u>	<u>Test C</u>	<u>Test D</u>	<u>Test E</u>
Normal Stress (psi)	120.0	80.0	40.0	N/A	N/A
Peak Shear Stress (psi)	43.8				
Deflection at Peak (in)	0.0260				
Post Peak Stress (psi)	33.2	35.8	17.2	N/A	N/A
Deflection at Residual (in)	0.2000	0.2520	0.1720	N/A	N/A



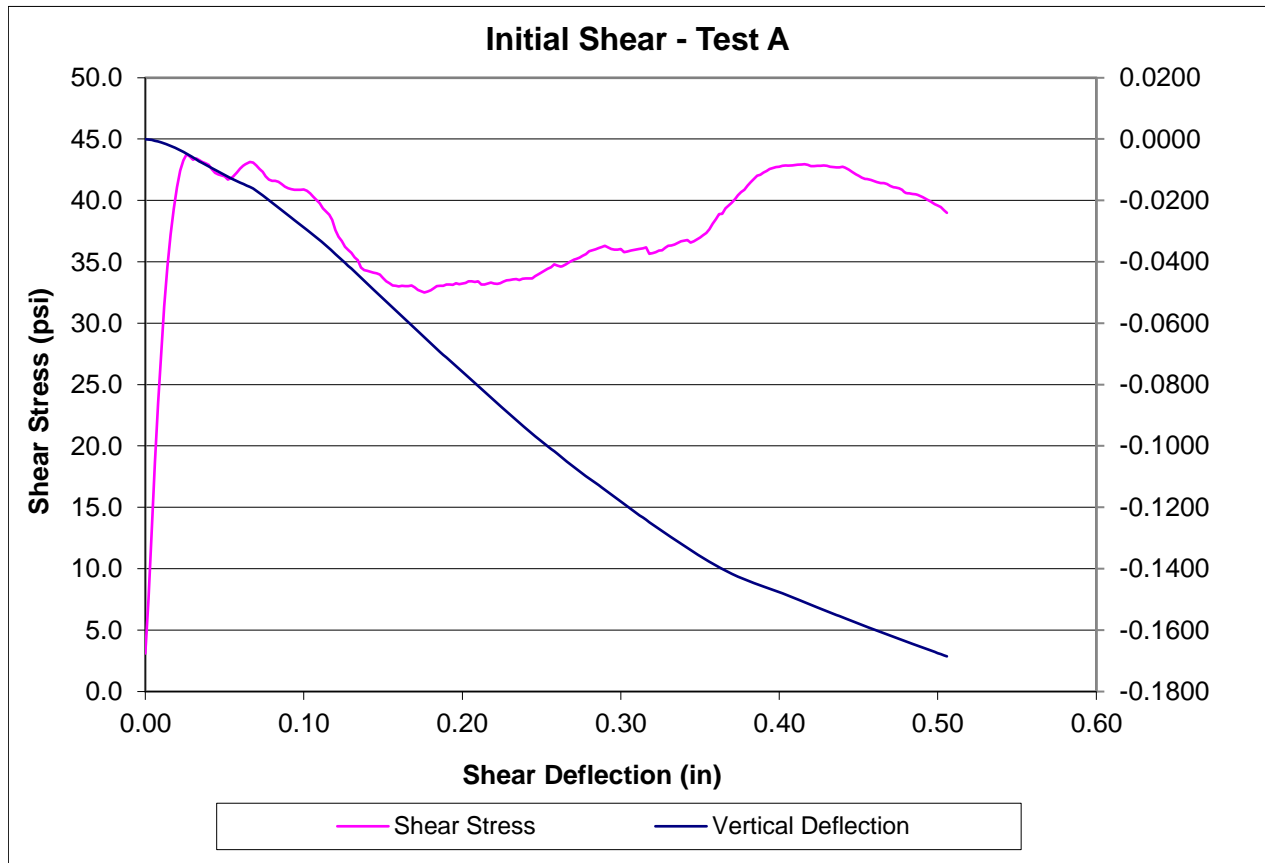
Comments Significant deterioration of specimen shear surfaces occurred with each test.

Reviewed By RJ

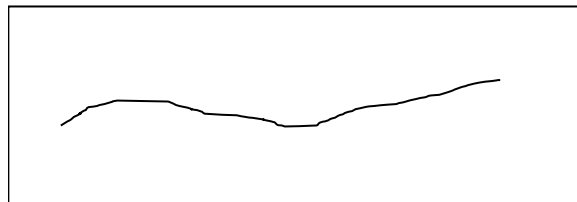


Direct Shear Strength of Rock
ASTM D 5607

Project Name	<u>SR1 Flood Control Project - Inlet Debris Barrier</u>	Project Number	<u>110773396</u>
Lithology	<u>Shale, gray, moderately hard, partially healed faults</u>	Lab ID	<u>DSNF-31</u>
Hole Number	<u>DB-3</u>	Date Received	<u>05/15/2018</u>
Depth (m)	<u>29.40</u>		
Test Type	<u>Direct shear of natural fracture</u>	Diameter (in)	<u>2.401</u>
Initial Moisture Condition	<u>As received, moist</u>	Angle of Dip (deg)	<u>49.3</u>
Test Moisture Condition	<u>Soaked at least 12 hours prior to test.</u>	Area(in ²)	<u>6.94</u>
Joint Roughness	<u>14</u>		
		Date Prepared	<u>06/28/2018</u>
Normal Stress (psi)	<u>120</u>	Date Tested	<u>06/29/2018</u>



Sketch



Shear Rate to Peak (in/min) 0.008

Encapsulation Material Hydro-Stone

Comments _____

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
0.0	1.0019	0.2536	0.2523	0.2566	0.2539	22	0.0000	0.0000	3.1
26.0	0.9999	0.2534	0.2521	0.2562	0.2540	52	0.0020	-0.0002	7.5
44.0	0.9979	0.2533	0.2519	0.2557	0.2541	91	0.0040	-0.0003	13.1
60.0	0.9959	0.2530	0.2516	0.2553	0.2542	130	0.0060	-0.0006	18.7
77.0	0.9939	0.2528	0.2513	0.2548	0.2542	163	0.0080	-0.0008	23.5
91.0	0.9919	0.2525	0.2509	0.2542	0.2541	192	0.0100	-0.0012	27.7
106.0	0.9899	0.2523	0.2506	0.2537	0.2541	218	0.0120	-0.0014	31.4
121.0	0.9879	0.2519	0.2502	0.2530	0.2539	240	0.0140	-0.0019	34.6
136.0	0.9859	0.2516	0.2497	0.2523	0.2537	258	0.0160	-0.0023	37.2
151.0	0.9839	0.2513	0.2492	0.2515	0.2536	273	0.0180	-0.0027	39.3
165.0	0.9819	0.2509	0.2487	0.2508	0.2534	285	0.0200	-0.0031	41.1
179.0	0.9799	0.2504	0.2482	0.2500	0.2531	294	0.0220	-0.0037	42.4
193.0	0.9779	0.2498	0.2477	0.2492	0.2527	300	0.0240	-0.0042	43.2
207.0	0.9759	0.2492	0.2472	0.2484	0.2523	304	0.0260	-0.0048	43.8
221.0	0.9739	0.2485	0.2467	0.2476	0.2518	302	0.0280	-0.0055	43.6
234.0	0.9719	0.2477	0.2463	0.2469	0.2512	301	0.0300	-0.0061	43.3
248.0	0.9699	0.2470	0.2458	0.2463	0.2506	301	0.0320	-0.0067	43.4
261.0	0.9679	0.2462	0.2454	0.2457	0.2500	300	0.0340	-0.0073	43.3
275.0	0.9659	0.2455	0.2450	0.2451	0.2495	299	0.0360	-0.0078	43.1
289.0	0.9639	0.2447	0.2446	0.2445	0.2489	299	0.0380	-0.0084	43.0
302.0	0.9619	0.2440	0.2443	0.2439	0.2484	298	0.0400	-0.0090	42.9
315.0	0.9599	0.2432	0.2439	0.2434	0.2479	295	0.0420	-0.0095	42.5
328.0	0.9579	0.2424	0.2435	0.2428	0.2474	293	0.0440	-0.0101	42.2
341.0	0.9559	0.2417	0.2432	0.2422	0.2469	292	0.0460	-0.0106	42.1
355.0	0.9539	0.2409	0.2428	0.2416	0.2464	292	0.0480	-0.0112	42.0
367.0	0.9519	0.2401	0.2425	0.2410	0.2459	291	0.0500	-0.0117	42.0
381.0	0.9499	0.2393	0.2421	0.2404	0.2454	289	0.0520	-0.0123	41.7
394.0	0.9479	0.2386	0.2418	0.2399	0.2449	290	0.0540	-0.0128	41.8
407.0	0.9459	0.2378	0.2415	0.2394	0.2444	291	0.0560	-0.0133	42.0
421.0	0.9439	0.2372	0.2412	0.2389	0.2439	293	0.0580	-0.0138	42.3
434.0	0.9419	0.2365	0.2409	0.2385	0.2435	296	0.0600	-0.0143	42.6
447.0	0.9399	0.2359	0.2407	0.2380	0.2430	297	0.0620	-0.0147	42.8
460.0	0.9379	0.2352	0.2404	0.2376	0.2425	298	0.0640	-0.0152	43.0
473.0	0.9359	0.2345	0.2401	0.2371	0.2421	299	0.0660	-0.0157	43.1
487.0	0.9339	0.2338	0.2397	0.2366	0.2415	299	0.0680	-0.0162	43.1
499.0	0.9319	0.2329	0.2392	0.2359	0.2409	297	0.0700	-0.0169	42.8
513.0	0.9299	0.2319	0.2387	0.2352	0.2402	295	0.0720	-0.0176	42.6
525.0	0.9279	0.2309	0.2382	0.2345	0.2394	294	0.0740	-0.0184	42.3
538.0	0.9259	0.2299	0.2376	0.2337	0.2386	291	0.0760	-0.0192	42.0
551.0	0.9239	0.2288	0.2370	0.2329	0.2378	289	0.0780	-0.0200	41.7
564.0	0.9219	0.2278	0.2364	0.2321	0.2370	289	0.0800	-0.0208	41.6
577.0	0.9199	0.2268	0.2358	0.2313	0.2362	288	0.0820	-0.0216	41.6
589.0	0.9179	0.2258	0.2352	0.2306	0.2354	288	0.0840	-0.0224	41.5
602.0	0.9159	0.2247	0.2346	0.2298	0.2346	287	0.0860	-0.0232	41.3
615.0	0.9139	0.2236	0.2340	0.2290	0.2337	285	0.0880	-0.0240	41.1
628.0	0.9119	0.2226	0.2334	0.2281	0.2329	284	0.0900	-0.0249	41.0
641.0	0.9099	0.2216	0.2328	0.2274	0.2321	284	0.0920	-0.0256	40.9
654.0	0.9079	0.2205	0.2322	0.2265	0.2313	283	0.0940	-0.0265	40.9
667.0	0.9059	0.2196	0.2316	0.2258	0.2305	283	0.0960	-0.0272	40.9
680.0	0.9039	0.2186	0.2310	0.2250	0.2297	284	0.0980	-0.0280	40.9
692.0	0.9019	0.2176	0.2304	0.2242	0.2289	284	0.1000	-0.0288	40.9
706.0	0.8999	0.2167	0.2298	0.2234	0.2281	283	0.1020	-0.0296	40.8
719.0	0.8979	0.2156	0.2292	0.2226	0.2273	281	0.1040	-0.0304	40.6
732.0	0.8959	0.2146	0.2285	0.2217	0.2264	280	0.1060	-0.0313	40.3
744.0	0.8939	0.2136	0.2279	0.2209	0.2256	278	0.1080	-0.0321	40.0
757.0	0.8919	0.2125	0.2272	0.2201	0.2247	276	0.1100	-0.0330	39.8
770.0	0.8899	0.2114	0.2265	0.2192	0.2238	273	0.1120	-0.0339	39.3
782.0	0.8879	0.2104	0.2258	0.2183	0.2229	271	0.1140	-0.0348	39.1
795.0	0.8859	0.2093	0.2251	0.2174	0.2220	269	0.1160	-0.0357	38.8
808.0	0.8839	0.2082	0.2243	0.2165	0.2210	267	0.1180	-0.0366	38.4
821.0	0.8819	0.2070	0.2236	0.2156	0.2201	261	0.1200	-0.0375	37.6
834.0	0.8799	0.2059	0.2228	0.2146	0.2192	257	0.1220	-0.0385	37.0
847.0	0.8779	0.2048	0.2221	0.2137	0.2182	255	0.1240	-0.0394	36.7
860.0	0.8759	0.2037	0.2213	0.2127	0.2172	251	0.1260	-0.0404	36.2
872.0	0.8739	0.2025	0.2205	0.2117	0.2163	250	0.1280	-0.0414	36.0
884.0	0.8719	0.2015	0.2198	0.2108	0.2154	248	0.1300	-0.0422	35.7
897.0	0.8699	0.2004	0.2190	0.2098	0.2145	245	0.1320	-0.0432	35.4
910.0	0.8679	0.1992	0.2181	0.2088	0.2135	244	0.1340	-0.0442	35.1
923.0	0.8659	0.1980	0.2173	0.2078	0.2125	240	0.1360	-0.0452	34.5
936.0	0.8639	0.1968	0.2164	0.2068	0.2115	238	0.1380	-0.0462	34.3
949.0	0.8619	0.1957	0.2156	0.2058	0.2106	238	0.1400	-0.0472	34.3
962.0	0.8599	0.1946	0.2148	0.2048	0.2097	237	0.1420	-0.0481	34.2
975.0	0.8579	0.1935	0.2140	0.2039	0.2088	237	0.1440	-0.0491	34.1
988.0	0.8559	0.1924	0.2132	0.2029	0.2078	236	0.1460	-0.0500	34.1
1001.0	0.8539	0.1913	0.2124	0.2020	0.2070	236	0.1480	-0.0509	34.0
1013.0	0.8519	0.1901	0.2116	0.2010	0.2060	234	0.1500	-0.0519	33.7
1026.0	0.8499	0.1889	0.2108	0.2000	0.2051	232	0.1520	-0.0529	33.4
1039.0	0.8479	0.1877	0.2099	0.1990	0.2041	231	0.1540	-0.0539	33.3
1052.0	0.8459	0.1865	0.2091	0.1980	0.2031	229	0.1560	-0.0549	33.1

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
1065.0	0.8439	0.1853	0.2082	0.1970	0.2021	229	0.1580	-0.0560	33.0
1078.0	0.8419	0.1842	0.2074	0.1960	0.2012	229	0.1600	-0.0569	33.0
1090.0	0.8399	0.1832	0.2067	0.1951	0.2003	229	0.1620	-0.0578	33.0
1103.0	0.8379	0.1821	0.2059	0.1941	0.1993	229	0.1640	-0.0588	33.0
1116.0	0.8359	0.1809	0.2051	0.1931	0.1984	229	0.1660	-0.0597	33.0
1129.0	0.8339	0.1798	0.2043	0.1922	0.1974	229	0.1680	-0.0607	33.1
1141.0	0.8319	0.1787	0.2035	0.1912	0.1964	228	0.1700	-0.0617	32.9
1154.0	0.8299	0.1775	0.2027	0.1902	0.1954	227	0.1720	-0.0627	32.7
1167.0	0.8279	0.1763	0.2019	0.1892	0.1944	226	0.1740	-0.0637	32.6
1180.0	0.8259	0.1751	0.2011	0.1883	0.1934	225	0.1760	-0.0646	32.5
1192.0	0.8239	0.1740	0.2003	0.1873	0.1924	226	0.1780	-0.0656	32.6
1205.0	0.8219	0.1729	0.1995	0.1864	0.1915	227	0.1800	-0.0665	32.7
1219.0	0.8199	0.1717	0.1987	0.1854	0.1905	228	0.1820	-0.0675	32.8
1232.0	0.8179	0.1706	0.1979	0.1844	0.1896	229	0.1840	-0.0685	33.0
1244.0	0.8159	0.1695	0.1972	0.1835	0.1887	229	0.1860	-0.0694	33.0
1257.0	0.8139	0.1684	0.1964	0.1826	0.1878	229	0.1880	-0.0703	33.0
1270.0	0.8119	0.1673	0.1957	0.1817	0.1868	230	0.1900	-0.0712	33.1
1282.0	0.8099	0.1661	0.1950	0.1808	0.1859	230	0.1920	-0.0722	33.1
1295.0	0.8079	0.1650	0.1942	0.1798	0.1850	230	0.1940	-0.0731	33.1
1308.0	0.8059	0.1639	0.1935	0.1789	0.1841	231	0.1960	-0.0740	33.3
1321.0	0.8039	0.1627	0.1927	0.1780	0.1831	230	0.1980	-0.0750	33.2
1333.0	0.8019	0.1616	0.1920	0.1770	0.1822	230	0.2000	-0.0759	33.2
1346.0	0.7999	0.1606	0.1913	0.1762	0.1813	231	0.2020	-0.0768	33.3
1358.0	0.7979	0.1595	0.1905	0.1753	0.1804	232	0.2040	-0.0777	33.4
1371.0	0.7959	0.1583	0.1898	0.1744	0.1794	232	0.2060	-0.0786	33.4
1384.0	0.7939	0.1572	0.1890	0.1734	0.1785	231	0.2080	-0.0796	33.3
1397.0	0.7919	0.1561	0.1883	0.1726	0.1776	232	0.2100	-0.0805	33.4
1410.0	0.7899	0.1550	0.1875	0.1716	0.1767	230	0.2120	-0.0814	33.1
1423.0	0.7879	0.1539	0.1867	0.1707	0.1757	230	0.2140	-0.0824	33.1
1435.0	0.7859	0.1528	0.1860	0.1698	0.1748	231	0.2160	-0.0833	33.2
1447.0	0.7839	0.1517	0.1853	0.1689	0.1740	231	0.2180	-0.0841	33.3
1461.0	0.7819	0.1506	0.1845	0.1679	0.1730	231	0.2200	-0.0851	33.2
1474.0	0.7799	0.1495	0.1837	0.1669	0.1721	230	0.2220	-0.0861	33.2
1486.0	0.7779	0.1484	0.1829	0.1660	0.1711	231	0.2240	-0.0870	33.2
1499.0	0.7759	0.1472	0.1822	0.1650	0.1702	232	0.2260	-0.0880	33.4
1512.0	0.7739	0.1462	0.1815	0.1641	0.1693	232	0.2280	-0.0888	33.5
1525.0	0.7719	0.1451	0.1807	0.1632	0.1684	232	0.2300	-0.0898	33.5
1538.0	0.7699	0.1440	0.1800	0.1624	0.1675	233	0.2320	-0.0906	33.6
1551.0	0.7679	0.1430	0.1793	0.1614	0.1666	233	0.2340	-0.0915	33.6
1564.0	0.7659	0.1419	0.1785	0.1605	0.1657	232	0.2360	-0.0925	33.5
1576.0	0.7639	0.1408	0.1778	0.1596	0.1648	233	0.2380	-0.0934	33.6
1589.0	0.7619	0.1398	0.1771	0.1587	0.1640	233	0.2400	-0.0942	33.6
1601.0	0.7599	0.1387	0.1763	0.1578	0.1631	233	0.2420	-0.0951	33.6
1614.0	0.7579	0.1377	0.1756	0.1569	0.1622	233	0.2440	-0.0960	33.6
1627.0	0.7559	0.1367	0.1749	0.1561	0.1613	235	0.2460	-0.0969	33.8
1639.0	0.7539	0.1358	0.1742	0.1553	0.1605	236	0.2480	-0.0977	34.0
1652.0	0.7519	0.1348	0.1735	0.1544	0.1597	237	0.2500	-0.0985	34.1
1665.0	0.7499	0.1338	0.1728	0.1536	0.1589	238	0.2520	-0.0993	34.3
1678.0	0.7479	0.1329	0.1721	0.1528	0.1580	239	0.2540	-0.1002	34.5
1691.0	0.7459	0.1320	0.1714	0.1520	0.1572	240	0.2560	-0.1010	34.6
1704.0	0.7439	0.1310	0.1708	0.1513	0.1565	241	0.2580	-0.1017	34.8
1717.0	0.7419	0.1300	0.1701	0.1504	0.1557	241	0.2600	-0.1026	34.7
1729.0	0.7399	0.1290	0.1694	0.1495	0.1548	240	0.2620	-0.1034	34.6
1742.0	0.7379	0.1280	0.1687	0.1486	0.1540	241	0.2640	-0.1043	34.7
1756.0	0.7359	0.1269	0.1680	0.1478	0.1531	242	0.2660	-0.1052	34.9
1768.0	0.7339	0.1260	0.1673	0.1469	0.1523	243	0.2680	-0.1060	35.0
1781.0	0.7319	0.1250	0.1667	0.1461	0.1516	244	0.2700	-0.1068	35.1
1793.0	0.7299	0.1241	0.1661	0.1453	0.1509	244	0.2720	-0.1075	35.2
1806.0	0.7279	0.1231	0.1654	0.1445	0.1501	245	0.2740	-0.1083	35.3
1819.0	0.7259	0.1221	0.1648	0.1437	0.1493	246	0.2760	-0.1091	35.5
1831.0	0.7239	0.1212	0.1642	0.1430	0.1486	247	0.2780	-0.1099	35.6
1844.0	0.7219	0.1203	0.1636	0.1422	0.1479	249	0.2800	-0.1106	35.9
1857.0	0.7199	0.1195	0.1630	0.1415	0.1472	249	0.2820	-0.1113	35.9
1870.0	0.7179	0.1186	0.1624	0.1407	0.1464	250	0.2840	-0.1121	36.0
1882.0	0.7159	0.1177	0.1618	0.1400	0.1457	251	0.2860	-0.1128	36.1
1895.0	0.7139	0.1169	0.1612	0.1393	0.1450	251	0.2880	-0.1135	36.2
1907.0	0.7119	0.1160	0.1606	0.1386	0.1442	252	0.2900	-0.1143	36.3
1920.0	0.7099	0.1151	0.1599	0.1378	0.1434	251	0.2920	-0.1151	36.2
1933.0	0.7079	0.1141	0.1593	0.1370	0.1427	250	0.2940	-0.1158	36.0
1945.0	0.7059	0.1132	0.1587	0.1363	0.1419	250	0.2960	-0.1166	36.0
1958.0	0.7039	0.1123	0.1581	0.1355	0.1411	250	0.2980	-0.1174	36.0
1971.0	0.7019	0.1113	0.1574	0.1347	0.1403	250	0.3000	-0.1182	36.0
1984.0	0.6999	0.1104	0.1568	0.1339	0.1396	248	0.3020	-0.1189	35.8
1996.0	0.6979	0.1095	0.1562	0.1332	0.1388	249	0.3040	-0.1197	35.8
2009.0	0.6959	0.1086	0.1556	0.1324	0.1381	249	0.3060	-0.1204	35.9
2022.0	0.6939	0.1077	0.1550	0.1317	0.1374	250	0.3080	-0.1212	36.0
2035.0	0.6919	0.1067	0.1544	0.1310	0.1366	250	0.3100	-0.1219	36.0
2047.0	0.6899	0.1058	0.1539	0.1303	0.1359	250	0.3120	-0.1226	36.1
2060.0	0.6879	0.1050	0.1533	0.1295	0.1352	250	0.3140	-0.1234	36.1

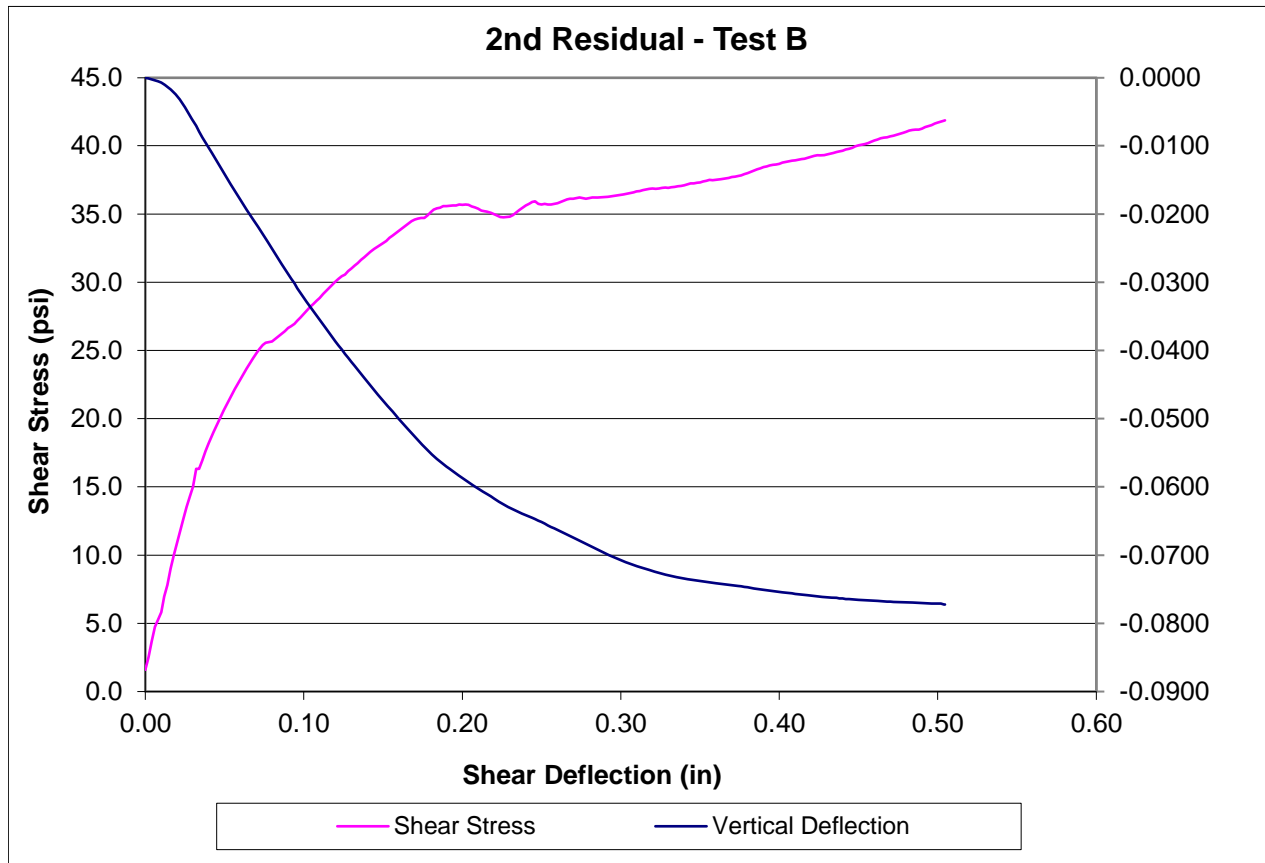
Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
2073.0	0.6859	0.1041	0.1527	0.1288	0.1345	251	0.3160	-0.1241	36.2
2085.0	0.6839	0.1031	0.1521	0.1281	0.1337	247	0.3180	-0.1249	35.7
2098.0	0.6819	0.1022	0.1516	0.1273	0.1330	248	0.3200	-0.1256	35.7
2110.0	0.6799	0.1014	0.1510	0.1266	0.1323	248	0.3220	-0.1263	35.8
2123.0	0.6779	0.1005	0.1504	0.1259	0.1316	249	0.3240	-0.1270	35.9
2136.0	0.6759	0.0996	0.1499	0.1251	0.1309	249	0.3260	-0.1277	35.9
2149.0	0.6739	0.0988	0.1493	0.1244	0.1302	251	0.3280	-0.1284	36.1
2161.0	0.6719	0.0980	0.1488	0.1237	0.1295	252	0.3300	-0.1291	36.3
2174.0	0.6699	0.0971	0.1482	0.1230	0.1288	252	0.3320	-0.1298	36.3
2187.0	0.6679	0.0963	0.1477	0.1223	0.1282	253	0.3340	-0.1305	36.4
2200.0	0.6659	0.0955	0.1471	0.1217	0.1275	253	0.3360	-0.1312	36.5
2213.0	0.6639	0.0946	0.1466	0.1210	0.1268	254	0.3380	-0.1319	36.7
2226.0	0.6619	0.0938	0.1461	0.1203	0.1262	255	0.3400	-0.1325	36.7
2239.0	0.6599	0.0930	0.1456	0.1196	0.1255	255	0.3420	-0.1332	36.8
2251.0	0.6579	0.0921	0.1450	0.1189	0.1248	254	0.3440	-0.1339	36.6
2264.0	0.6559	0.0913	0.1445	0.1182	0.1241	254	0.3460	-0.1346	36.7
2277.0	0.6539	0.0905	0.1439	0.1175	0.1234	255	0.3480	-0.1353	36.8
2290.0	0.6519	0.0897	0.1435	0.1168	0.1228	257	0.3500	-0.1359	37.0
2303.0	0.6499	0.0889	0.1430	0.1162	0.1222	258	0.3520	-0.1365	37.2
2316.0	0.6479	0.0881	0.1425	0.1155	0.1215	259	0.3540	-0.1372	37.3
2329.0	0.6459	0.0873	0.1420	0.1149	0.1209	261	0.3560	-0.1378	37.7
2341.0	0.6439	0.0866	0.1415	0.1144	0.1203	264	0.3580	-0.1384	38.1
2354.0	0.6419	0.0859	0.1411	0.1139	0.1197	267	0.3600	-0.1390	38.4
2367.0	0.6399	0.0852	0.1407	0.1134	0.1191	270	0.3620	-0.1395	38.9
2380.0	0.6379	0.0845	0.1403	0.1129	0.1184	270	0.3640	-0.1401	38.9
2393.0	0.6359	0.0838	0.1400	0.1125	0.1178	273	0.3660	-0.1406	39.3
2406.0	0.6339	0.0831	0.1396	0.1121	0.1172	275	0.3680	-0.1411	39.6
2419.0	0.6319	0.0824	0.1392	0.1117	0.1166	276	0.3700	-0.1416	39.8
2432.0	0.6299	0.0818	0.1389	0.1114	0.1160	278	0.3720	-0.1421	40.1
2444.0	0.6279	0.0811	0.1386	0.1110	0.1154	280	0.3740	-0.1426	40.4
2457.0	0.6259	0.0806	0.1383	0.1108	0.1148	282	0.3760	-0.1430	40.7
2470.0	0.6239	0.0799	0.1381	0.1105	0.1142	284	0.3780	-0.1434	40.9
2483.0	0.6219	0.0793	0.1378	0.1102	0.1136	286	0.3800	-0.1439	41.2
2496.0	0.6199	0.0788	0.1376	0.1100	0.1131	288	0.3820	-0.1442	41.5
2509.0	0.6179	0.0782	0.1373	0.1097	0.1126	290	0.3840	-0.1447	41.7
2522.0	0.6159	0.0776	0.1371	0.1095	0.1120	291	0.3860	-0.1451	42.0
2535.0	0.6139	0.0770	0.1369	0.1093	0.1115	292	0.3880	-0.1454	42.1
2547.0	0.6119	0.0765	0.1367	0.1090	0.1110	293	0.3900	-0.1458	42.3
2560.0	0.6099	0.0760	0.1365	0.1089	0.1105	294	0.3920	-0.1461	42.4
2572.0	0.6079	0.0755	0.1363	0.1087	0.1099	295	0.3940	-0.1465	42.5
2585.0	0.6059	0.0750	0.1361	0.1085	0.1094	296	0.3960	-0.1469	42.6
2597.0	0.6039	0.0745	0.1358	0.1083	0.1088	296	0.3980	-0.1473	42.7
2610.0	0.6019	0.0740	0.1356	0.1082	0.1082	297	0.4000	-0.1476	42.7
2622.0	0.5999	0.0735	0.1352	0.1080	0.1075	297	0.4020	-0.1481	42.8
2636.0	0.5979	0.0730	0.1349	0.1079	0.1068	297	0.4040	-0.1485	42.8
2648.0	0.5959	0.0726	0.1345	0.1078	0.1061	297	0.4060	-0.1489	42.8
2661.0	0.5939	0.0721	0.1341	0.1076	0.1054	297	0.4080	-0.1493	42.8
2674.0	0.5919	0.0717	0.1337	0.1075	0.1047	297	0.4100	-0.1497	42.9
2687.0	0.5899	0.0712	0.1334	0.1074	0.1040	298	0.4120	-0.1501	42.9
2700.0	0.5879	0.0708	0.1330	0.1073	0.1033	298	0.4140	-0.1505	42.9
2713.0	0.5859	0.0703	0.1326	0.1072	0.1026	298	0.4160	-0.1509	42.9
2725.0	0.5839	0.0699	0.1322	0.1070	0.1019	298	0.4180	-0.1514	42.9
2738.0	0.5819	0.0695	0.1318	0.1069	0.1011	297	0.4200	-0.1518	42.8
2751.0	0.5799	0.0691	0.1314	0.1068	0.1004	297	0.4220	-0.1522	42.8
2763.0	0.5779	0.0687	0.1310	0.1067	0.0997	297	0.4240	-0.1526	42.8
2777.0	0.5759	0.0682	0.1305	0.1066	0.0989	297	0.4260	-0.1531	42.8
2790.0	0.5739	0.0678	0.1301	0.1065	0.0982	297	0.4280	-0.1535	42.8
2803.0	0.5719	0.0674	0.1297	0.1064	0.0975	297	0.4300	-0.1539	42.8
2816.0	0.5699	0.0670	0.1293	0.1063	0.0968	297	0.4320	-0.1543	42.7
2829.0	0.5679	0.0666	0.1289	0.1062	0.0961	296	0.4340	-0.1547	42.7
2841.0	0.5659	0.0662	0.1285	0.1061	0.0954	296	0.4360	-0.1551	42.7
2853.0	0.5639	0.0659	0.1281	0.1060	0.0947	296	0.4380	-0.1554	42.7
2866.0	0.5619	0.0655	0.1277	0.1060	0.0940	296	0.4400	-0.1558	42.7
2879.0	0.5599	0.0651	0.1272	0.1059	0.0933	296	0.4420	-0.1562	42.6
2892.0	0.5579	0.0647	0.1268	0.1058	0.0926	295	0.4440	-0.1566	42.5
2905.0	0.5559	0.0643	0.1264	0.1057	0.0919	293	0.4460	-0.1570	42.3
2918.0	0.5539	0.0639	0.1260	0.1056	0.0912	292	0.4480	-0.1574	42.2
2931.0	0.5519	0.0635	0.1255	0.1055	0.0904	291	0.4500	-0.1579	42.0
2944.0	0.5499	0.0631	0.1251	0.1054	0.0897	290	0.4520	-0.1583	41.9
2956.0	0.5479	0.0628	0.1247	0.1053	0.0890	290	0.4540	-0.1587	41.7
2969.0	0.5459	0.0624	0.1243	0.1052	0.0883	289	0.4560	-0.1591	41.7
2982.0	0.5439	0.0620	0.1238	0.1051	0.0876	289	0.4580	-0.1595	41.6
2995.0	0.5419	0.0616	0.1234	0.1050	0.0869	289	0.4600	-0.1599	41.6
3007.0	0.5399	0.0613	0.1230	0.1049	0.0862	288	0.4620	-0.1603	41.5
3020.0	0.5379	0.0609	0.1225	0.1048	0.0856	287	0.4640	-0.1607	41.4
3033.0	0.5359	0.0606	0.1221	0.1047	0.0849	287	0.4660	-0.1610	41.4
3046.0	0.5339	0.0603	0.1217	0.1046	0.0842	287	0.4680	-0.1614	41.3
3058.0	0.5319	0.0599	0.1213	0.1045	0.0835	286	0.4700	-0.1618	41.2
3071.0	0.5299	0.0596	0.1209	0.1044	0.0829	285	0.4720	-0.1622	41.1

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
3084.0	0.5279	0.0593	0.1204	0.1043	0.0822	285	0.4740	-0.1626	41.0
3097.0	0.5259	0.0589	0.1200	0.1042	0.0816	284	0.4760	-0.1629	41.0
3109.0	0.5239	0.0586	0.1196	0.1041	0.0809	283	0.4780	-0.1633	40.8
3121.0	0.5219	0.0583	0.1192	0.1040	0.0803	282	0.4800	-0.1637	40.6
3134.0	0.5199	0.0579	0.1187	0.1039	0.0796	281	0.4820	-0.1641	40.6
3147.0	0.5179	0.0576	0.1183	0.1038	0.0789	281	0.4840	-0.1645	40.5
3160.0	0.5159	0.0572	0.1179	0.1037	0.0782	281	0.4860	-0.1649	40.5
3172.0	0.5139	0.0569	0.1175	0.1036	0.0776	280	0.4880	-0.1652	40.4
3186.0	0.5119	0.0565	0.1171	0.1036	0.0769	280	0.4900	-0.1656	40.3
3198.0	0.5099	0.0562	0.1167	0.1035	0.0763	279	0.4920	-0.1659	40.1
3211.0	0.5079	0.0559	0.1163	0.1034	0.0756	277	0.4940	-0.1663	40.0
3224.0	0.5059	0.0555	0.1159	0.1033	0.0750	277	0.4960	-0.1667	39.9
3237.0	0.5039	0.0552	0.1154	0.1032	0.0743	275	0.4980	-0.1671	39.7
3249.0	0.5019	0.0548	0.1150	0.1031	0.0737	275	0.5000	-0.1675	39.6
3262.0	0.4999	0.0545	0.1146	0.1030	0.0730	274	0.5020	-0.1678	39.4
3274.0	0.4979	0.0542	0.1142	0.1029	0.0724	272	0.5040	-0.1682	39.2
3285.0	0.4963	0.0538	0.1139	0.1028	0.0718	270	0.5056	-0.1685	39.0

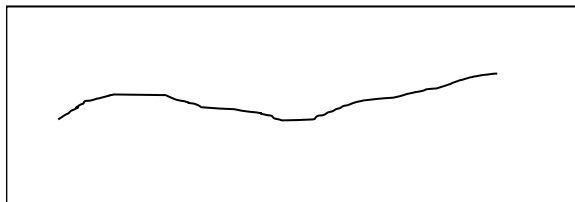


Direct Shear Strength of Rock
ASTM D 5607

Project Name	<u>SR1 Flood Control Project - Inlet Debris Barrier</u>	Project Number	<u>110773396</u>
Lithology	<u>Shale, gray, moderately hard, partially healed faults</u>	Lab ID	<u>DSNF-31</u>
Hole Number	<u>DB-3</u>	Date Received	<u>05/15/2018</u>
Depth (m)	<u>29.40</u>		
Test Type	<u>Direct shear of natural fracture</u>	Diameter (in)	<u>2.401</u>
Initial Moisture Condition	<u>As received, moist</u>	Angle of Dip (deg)	<u>49.3</u>
Test Moisture Condition	<u>Soaked at least 12 hours prior to test.</u>	Area(in ²)	<u>6.94</u>
Joint Roughness	<u>14</u>		
		Date Prepared	<u>06/28/2018</u>
Normal Stress (psi)	<u>80</u>	Date Tested	<u>06/29/2018</u>



Sketch



Shear Rate to Peak (in/min) N/A

Encapsulation Material Hydro-Stone

Comments _____

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
0.0	1.0017	0.2507	0.2531	0.2570	0.2575	11	0.0000	0.0000	1.6
26.0	0.9997	0.2505	0.2530	0.2565	0.2577	17	0.0020	-0.0001	2.5
42.0	0.9977	0.2503	0.2529	0.2561	0.2580	26	0.0040	-0.0002	3.7
57.0	0.9957	0.2501	0.2528	0.2555	0.2582	33	0.0060	-0.0004	4.7
65.0	0.9937	0.2499	0.2527	0.2552	0.2583	37	0.0080	-0.0006	5.3
77.0	0.9917	0.2497	0.2526	0.2546	0.2584	40	0.0100	-0.0008	5.8
90.0	0.9897	0.2493	0.2524	0.2542	0.2584	48	0.0120	-0.0010	7.0
108.0	0.9877	0.2488	0.2521	0.2536	0.2582	54	0.0140	-0.0014	7.8
120.0	0.9857	0.2484	0.2518	0.2530	0.2581	62	0.0160	-0.0018	9.0
131.0	0.9837	0.2479	0.2515	0.2524	0.2578	69	0.0180	-0.0022	10.0
142.0	0.9817	0.2473	0.2512	0.2517	0.2575	76	0.0200	-0.0026	10.9
153.0	0.9797	0.2466	0.2507	0.2509	0.2571	82	0.0220	-0.0032	11.8
166.0	0.9777	0.2457	0.2501	0.2500	0.2566	88	0.0240	-0.0040	12.7
180.0	0.9757	0.2447	0.2495	0.2489	0.2560	94	0.0260	-0.0048	13.5
193.0	0.9737	0.2437	0.2489	0.2479	0.2555	99	0.0280	-0.0056	14.3
206.0	0.9717	0.2427	0.2482	0.2469	0.2550	104	0.0300	-0.0064	15.0
217.0	0.9697	0.2418	0.2477	0.2459	0.2546	113	0.0320	-0.0071	16.3
227.0	0.9677	0.2407	0.2471	0.2449	0.2540	113	0.0340	-0.0079	16.3
246.0	0.9657	0.2396	0.2465	0.2438	0.2533	118	0.0360	-0.0088	16.9
259.0	0.9637	0.2386	0.2460	0.2428	0.2528	122	0.0380	-0.0095	17.6
273.0	0.9617	0.2376	0.2454	0.2418	0.2523	126	0.0400	-0.0103	18.2
286.0	0.9597	0.2366	0.2449	0.2408	0.2517	130	0.0420	-0.0111	18.8
299.0	0.9577	0.2356	0.2444	0.2398	0.2512	134	0.0440	-0.0118	19.3
312.0	0.9557	0.2345	0.2439	0.2387	0.2507	137	0.0460	-0.0126	19.7
326.0	0.9537	0.2335	0.2433	0.2377	0.2501	141	0.0480	-0.0134	20.3
339.0	0.9517	0.2324	0.2428	0.2367	0.2496	144	0.0500	-0.0142	20.7
353.0	0.9497	0.2314	0.2424	0.2357	0.2491	147	0.0520	-0.0149	21.2
366.0	0.9477	0.2304	0.2419	0.2347	0.2486	150	0.0540	-0.0157	21.6
379.0	0.9457	0.2293	0.2414	0.2337	0.2481	153	0.0560	-0.0165	22.1
393.0	0.9437	0.2283	0.2409	0.2327	0.2476	156	0.0580	-0.0172	22.5
406.0	0.9417	0.2273	0.2405	0.2317	0.2471	159	0.0600	-0.0179	22.9
419.0	0.9397	0.2262	0.2400	0.2307	0.2467	162	0.0620	-0.0187	23.3
433.0	0.9377	0.2251	0.2396	0.2297	0.2462	164	0.0640	-0.0194	23.7
446.0	0.9357	0.2241	0.2392	0.2287	0.2458	167	0.0660	-0.0201	24.0
459.0	0.9337	0.2231	0.2388	0.2277	0.2454	170	0.0680	-0.0208	24.4
472.0	0.9317	0.2221	0.2384	0.2267	0.2451	172	0.0700	-0.0215	24.8
486.0	0.9297	0.2211	0.2381	0.2258	0.2446	174	0.0720	-0.0222	25.1
499.0	0.9277	0.2201	0.2377	0.2248	0.2442	176	0.0740	-0.0229	25.4
512.0	0.9257	0.2192	0.2372	0.2240	0.2436	177	0.0760	-0.0236	25.6
525.0	0.9237	0.2181	0.2366	0.2232	0.2429	178	0.0780	-0.0244	25.6
538.0	0.9217	0.2172	0.2360	0.2224	0.2422	178	0.0800	-0.0251	25.7
551.0	0.9197	0.2162	0.2355	0.2216	0.2415	179	0.0820	-0.0259	25.8
563.0	0.9177	0.2153	0.2350	0.2208	0.2408	181	0.0840	-0.0266	26.0
576.0	0.9157	0.2144	0.2345	0.2201	0.2402	182	0.0860	-0.0273	26.2
589.0	0.9137	0.2134	0.2339	0.2193	0.2395	183	0.0880	-0.0281	26.4
602.0	0.9117	0.2125	0.2334	0.2185	0.2389	185	0.0900	-0.0288	26.6
615.0	0.9097	0.2116	0.2329	0.2177	0.2382	186	0.0920	-0.0295	26.8
628.0	0.9077	0.2107	0.2324	0.2170	0.2376	187	0.0940	-0.0302	26.9
641.0	0.9057	0.2097	0.2319	0.2162	0.2369	189	0.0960	-0.0309	27.2
654.0	0.9037	0.2088	0.2314	0.2155	0.2363	190	0.0980	-0.0316	27.4
667.0	0.9017	0.2080	0.2309	0.2147	0.2357	192	0.1000	-0.0323	27.7
680.0	0.8997	0.2071	0.2304	0.2140	0.2351	194	0.1020	-0.0329	27.9
693.0	0.8977	0.2062	0.2299	0.2133	0.2345	196	0.1040	-0.0336	28.2
706.0	0.8957	0.2054	0.2295	0.2126	0.2339	197	0.1060	-0.0342	28.4
718.0	0.8937	0.2045	0.2290	0.2119	0.2333	199	0.1080	-0.0349	28.6
731.0	0.8917	0.2037	0.2286	0.2112	0.2327	200	0.1100	-0.0355	28.8
744.0	0.8897	0.2028	0.2281	0.2105	0.2322	202	0.1120	-0.0362	29.1
757.0	0.8877	0.2020	0.2277	0.2098	0.2316	204	0.1140	-0.0368	29.4
770.0	0.8857	0.2012	0.2273	0.2091	0.2311	205	0.1160	-0.0374	29.6
783.0	0.8837	0.2003	0.2269	0.2084	0.2305	207	0.1180	-0.0381	29.8
796.0	0.8817	0.1995	0.2264	0.2077	0.2300	208	0.1200	-0.0387	30.0
809.0	0.8797	0.1987	0.2260	0.2071	0.2294	210	0.1220	-0.0393	30.2
822.0	0.8777	0.1979	0.2256	0.2064	0.2289	211	0.1240	-0.0399	30.4
835.0	0.8757	0.1971	0.2252	0.2057	0.2283	212	0.1260	-0.0405	30.6
848.0	0.8737	0.1963	0.2248	0.2050	0.2278	214	0.1280	-0.0411	30.8
861.0	0.8717	0.1955	0.2244	0.2044	0.2273	215	0.1300	-0.0417	31.0
874.0	0.8697	0.1947	0.2240	0.2037	0.2268	217	0.1320	-0.0423	31.2
886.0	0.8677	0.1940	0.2236	0.2031	0.2263	218	0.1340	-0.0428	31.4
899.0	0.8657	0.1932	0.2232	0.2025	0.2258	219	0.1360	-0.0434	31.6
912.0	0.8637	0.1924	0.2228	0.2018	0.2253	221	0.1380	-0.0440	31.8
926.0	0.8617	0.1916	0.2224	0.2012	0.2248	222	0.1400	-0.0446	32.0
939.0	0.8597	0.1909	0.2220	0.2005	0.2243	224	0.1420	-0.0452	32.2
952.0	0.8577	0.1901	0.2217	0.1999	0.2238	225	0.1440	-0.0457	32.4
964.0	0.8557	0.1894	0.2213	0.1993	0.2233	226	0.1460	-0.0463	32.6
977.0	0.8537	0.1886	0.2209	0.1987	0.2228	227	0.1480	-0.0468	32.7
990.0	0.8517	0.1879	0.2205	0.1981	0.2223	228	0.1500	-0.0474	32.9
1003.0	0.8497	0.1871	0.2201	0.1975	0.2218	229	0.1520	-0.0480	33.0
1016.0	0.8477	0.1864	0.2198	0.1969	0.2213	231	0.1540	-0.0485	33.2
1028.0	0.8457	0.1857	0.2194	0.1964	0.2209	232	0.1560	-0.0490	33.4

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
1041.0	0.8437	0.1850	0.2190	0.1958	0.2204	233	0.1580	-0.0495	33.6
1054.0	0.8417	0.1843	0.2187	0.1952	0.2199	234	0.1600	-0.0501	33.7
1067.0	0.8397	0.1837	0.2183	0.1946	0.2195	236	0.1620	-0.0506	34.0
1080.0	0.8377	0.1830	0.2179	0.1940	0.2190	237	0.1640	-0.0511	34.1
1093.0	0.8357	0.1823	0.2175	0.1934	0.2185	238	0.1660	-0.0517	34.3
1106.0	0.8337	0.1817	0.2172	0.1929	0.2181	239	0.1680	-0.0521	34.5
1118.0	0.8317	0.1811	0.2168	0.1924	0.2176	240	0.1700	-0.0526	34.6
1131.0	0.8297	0.1804	0.2164	0.1918	0.2171	241	0.1720	-0.0532	34.7
1144.0	0.8277	0.1798	0.2160	0.1913	0.2166	241	0.1740	-0.0537	34.7
1157.0	0.8257	0.1792	0.2155	0.1908	0.2161	241	0.1760	-0.0542	34.7
1170.0	0.8237	0.1786	0.2152	0.1903	0.2156	242	0.1780	-0.0547	34.9
1183.0	0.8217	0.1780	0.2149	0.1899	0.2151	244	0.1800	-0.0551	35.1
1196.0	0.8197	0.1775	0.2146	0.1896	0.2146	245	0.1820	-0.0555	35.3
1209.0	0.8177	0.1769	0.2143	0.1893	0.2141	246	0.1840	-0.0559	35.4
1221.0	0.8157	0.1765	0.2140	0.1890	0.2136	246	0.1860	-0.0563	35.5
1235.0	0.8137	0.1760	0.2138	0.1888	0.2131	247	0.1880	-0.0567	35.6
1247.0	0.8117	0.1755	0.2135	0.1886	0.2126	247	0.1900	-0.0570	35.6
1260.0	0.8097	0.1751	0.2132	0.1884	0.2121	247	0.1920	-0.0574	35.6
1272.0	0.8077	0.1746	0.2130	0.1883	0.2115	247	0.1940	-0.0577	35.6
1285.0	0.8057	0.1742	0.2128	0.1881	0.2110	247	0.1960	-0.0581	35.6
1299.0	0.8037	0.1737	0.2126	0.1880	0.2105	248	0.1980	-0.0584	35.7
1311.0	0.8017	0.1732	0.2124	0.1879	0.2100	248	0.2000	-0.0587	35.7
1324.0	0.7997	0.1728	0.2122	0.1878	0.2095	248	0.2020	-0.0590	35.7
1336.0	0.7977	0.1723	0.2120	0.1877	0.2090	247	0.2040	-0.0593	35.7
1350.0	0.7957	0.1718	0.2118	0.1876	0.2085	247	0.2060	-0.0597	35.6
1362.0	0.7937	0.1714	0.2117	0.1875	0.2080	246	0.2080	-0.0599	35.5
1375.0	0.7917	0.1709	0.2115	0.1874	0.2075	245	0.2100	-0.0603	35.4
1388.0	0.7897	0.1704	0.2113	0.1873	0.2070	245	0.2120	-0.0606	35.2
1400.0	0.7877	0.1700	0.2112	0.1872	0.2065	244	0.2140	-0.0609	35.2
1413.0	0.7857	0.1696	0.2110	0.1871	0.2061	244	0.2160	-0.0611	35.1
1425.0	0.7837	0.1691	0.2109	0.1871	0.2056	243	0.2180	-0.0614	35.1
1439.0	0.7817	0.1686	0.2107	0.1870	0.2051	243	0.2200	-0.0617	35.0
1451.0	0.7797	0.1682	0.2106	0.1869	0.2046	242	0.2220	-0.0620	34.9
1464.0	0.7777	0.1678	0.2104	0.1868	0.2041	241	0.2240	-0.0623	34.8
1477.0	0.7757	0.1673	0.2103	0.1867	0.2037	241	0.2260	-0.0626	34.8
1490.0	0.7737	0.1669	0.2102	0.1866	0.2032	241	0.2280	-0.0629	34.8
1503.0	0.7717	0.1665	0.2101	0.1865	0.2028	241	0.2300	-0.0631	34.8
1515.0	0.7697	0.1661	0.2100	0.1864	0.2025	242	0.2320	-0.0633	34.9
1528.0	0.7677	0.1658	0.2099	0.1864	0.2021	244	0.2340	-0.0635	35.1
1541.0	0.7657	0.1655	0.2098	0.1863	0.2017	245	0.2360	-0.0638	35.3
1554.0	0.7637	0.1652	0.2097	0.1863	0.2014	246	0.2380	-0.0639	35.5
1566.0	0.7617	0.1649	0.2096	0.1862	0.2010	247	0.2400	-0.0642	35.6
1579.0	0.7597	0.1646	0.2095	0.1862	0.2007	248	0.2420	-0.0643	35.8
1592.0	0.7577	0.1643	0.2094	0.1861	0.2004	249	0.2440	-0.0645	35.9
1605.0	0.7557	0.1640	0.2093	0.1861	0.2000	249	0.2460	-0.0647	35.9
1618.0	0.7537	0.1636	0.2092	0.1860	0.1997	248	0.2480	-0.0650	35.7
1630.0	0.7517	0.1633	0.2091	0.1859	0.1994	248	0.2500	-0.0652	35.7
1643.0	0.7497	0.1630	0.2090	0.1858	0.1990	248	0.2520	-0.0654	35.8
1656.0	0.7477	0.1626	0.2089	0.1856	0.1986	248	0.2540	-0.0657	35.7
1669.0	0.7457	0.1623	0.2087	0.1855	0.1983	248	0.2560	-0.0659	35.7
1682.0	0.7437	0.1619	0.2086	0.1854	0.1980	248	0.2580	-0.0661	35.7
1695.0	0.7417	0.1616	0.2085	0.1853	0.1976	248	0.2600	-0.0663	35.8
1707.0	0.7397	0.1613	0.2084	0.1852	0.1973	249	0.2620	-0.0665	35.9
1720.0	0.7377	0.1610	0.2082	0.1851	0.1970	250	0.2640	-0.0668	36.0
1733.0	0.7357	0.1606	0.2081	0.1850	0.1966	250	0.2660	-0.0670	36.1
1746.0	0.7337	0.1603	0.2080	0.1850	0.1963	251	0.2680	-0.0672	36.1
1758.0	0.7317	0.1600	0.2078	0.1849	0.1959	251	0.2700	-0.0674	36.1
1770.0	0.7297	0.1597	0.2077	0.1848	0.1955	251	0.2720	-0.0677	36.2
1783.0	0.7277	0.1594	0.2075	0.1847	0.1951	251	0.2740	-0.0679	36.2
1796.0	0.7257	0.1590	0.2074	0.1847	0.1947	251	0.2760	-0.0681	36.2
1809.0	0.7237	0.1587	0.2072	0.1846	0.1943	251	0.2780	-0.0684	36.1
1821.0	0.7217	0.1584	0.2070	0.1845	0.1939	251	0.2800	-0.0686	36.2
1834.0	0.7197	0.1581	0.2069	0.1845	0.1935	251	0.2820	-0.0688	36.2
1847.0	0.7177	0.1578	0.2067	0.1845	0.1931	251	0.2840	-0.0691	36.2
1860.0	0.7157	0.1575	0.2065	0.1844	0.1926	251	0.2860	-0.0693	36.2
1872.0	0.7137	0.1573	0.2064	0.1844	0.1923	251	0.2880	-0.0695	36.2
1885.0	0.7117	0.1570	0.2062	0.1843	0.1918	251	0.2900	-0.0698	36.2
1898.0	0.7097	0.1567	0.2061	0.1843	0.1914	252	0.2920	-0.0700	36.3
1910.0	0.7077	0.1564	0.2059	0.1843	0.1910	252	0.2940	-0.0702	36.3
1923.0	0.7057	0.1562	0.2058	0.1842	0.1907	252	0.2960	-0.0704	36.3
1936.0	0.7037	0.1559	0.2056	0.1842	0.1903	252	0.2980	-0.0706	36.3
1949.0	0.7017	0.1557	0.2055	0.1842	0.1899	252	0.3000	-0.0708	36.4
1961.0	0.6997	0.1555	0.2054	0.1842	0.1896	253	0.3020	-0.0709	36.4
1974.0	0.6977	0.1552	0.2052	0.1842	0.1893	253	0.3040	-0.0711	36.5
1987.0	0.6957	0.1550	0.2051	0.1841	0.1889	253	0.3060	-0.0713	36.5
2000.0	0.6937	0.1548	0.2050	0.1841	0.1886	254	0.3080	-0.0715	36.6
2013.0	0.6917	0.1546	0.2049	0.1841	0.1883	254	0.3100	-0.0716	36.6
2025.0	0.6897	0.1544	0.2048	0.1841	0.1880	254	0.3120	-0.0718	36.7
2038.0	0.6877	0.1542	0.2047	0.1841	0.1878	255	0.3140	-0.0719	36.7

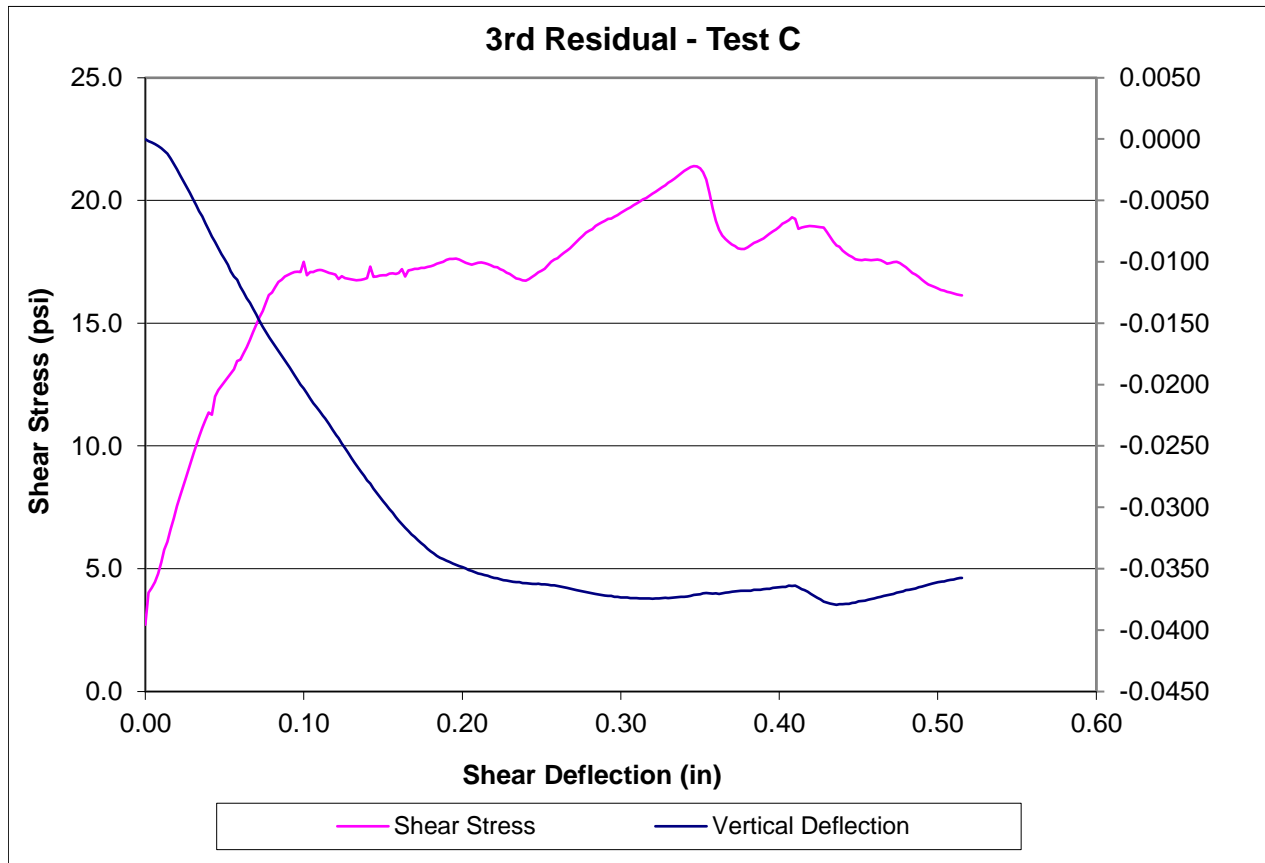
Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
2051.0	0.6857	0.1540	0.2046	0.1841	0.1875	255	0.3160	-0.0720	36.8
2063.0	0.6837	0.1538	0.2045	0.1840	0.1872	256	0.3180	-0.0722	36.8
2075.0	0.6817	0.1536	0.2044	0.1840	0.1869	256	0.3200	-0.0724	36.9
2088.0	0.6797	0.1534	0.2043	0.1840	0.1867	256	0.3220	-0.0725	36.8
2101.0	0.6777	0.1532	0.2042	0.1840	0.1864	256	0.3240	-0.0726	36.9
2114.0	0.6757	0.1530	0.2041	0.1840	0.1862	256	0.3260	-0.0728	36.9
2127.0	0.6737	0.1529	0.2041	0.1840	0.1859	256	0.3280	-0.0729	36.9
2140.0	0.6717	0.1527	0.2040	0.1840	0.1857	256	0.3300	-0.0730	36.9
2153.0	0.6697	0.1526	0.2040	0.1840	0.1855	256	0.3320	-0.0731	37.0
2166.0	0.6677	0.1524	0.2039	0.1840	0.1853	257	0.3340	-0.0732	37.0
2178.0	0.6657	0.1523	0.2038	0.1840	0.1851	257	0.3360	-0.0733	37.0
2191.0	0.6637	0.1521	0.2038	0.1840	0.1849	257	0.3380	-0.0734	37.1
2205.0	0.6617	0.1520	0.2037	0.1840	0.1848	257	0.3400	-0.0735	37.1
2217.0	0.6597	0.1519	0.2037	0.1841	0.1846	258	0.3420	-0.0735	37.2
2230.0	0.6577	0.1518	0.2036	0.1841	0.1844	258	0.3440	-0.0736	37.2
2243.0	0.6557	0.1517	0.2036	0.1841	0.1842	258	0.3460	-0.0737	37.2
2256.0	0.6537	0.1516	0.2036	0.1841	0.1841	259	0.3480	-0.0737	37.3
2269.0	0.6517	0.1515	0.2035	0.1841	0.1839	259	0.3500	-0.0738	37.3
2281.0	0.6497	0.1514	0.2035	0.1841	0.1838	259	0.3520	-0.0739	37.4
2294.0	0.6477	0.1513	0.2034	0.1842	0.1836	260	0.3540	-0.0740	37.4
2307.0	0.6457	0.1512	0.2034	0.1842	0.1835	260	0.3560	-0.0740	37.5
2320.0	0.6437	0.1511	0.2034	0.1842	0.1833	260	0.3580	-0.0741	37.5
2332.0	0.6417	0.1511	0.2033	0.1842	0.1832	260	0.3600	-0.0741	37.5
2346.0	0.6397	0.1510	0.2033	0.1842	0.1830	261	0.3620	-0.0742	37.6
2359.0	0.6377	0.1509	0.2032	0.1843	0.1829	261	0.3640	-0.0743	37.6
2371.0	0.6357	0.1509	0.2032	0.1843	0.1828	261	0.3660	-0.0743	37.6
2384.0	0.6337	0.1508	0.2032	0.1843	0.1826	261	0.3680	-0.0744	37.6
2397.0	0.6317	0.1507	0.2031	0.1844	0.1825	262	0.3700	-0.0744	37.7
2410.0	0.6297	0.1507	0.2031	0.1844	0.1823	262	0.3720	-0.0745	37.7
2423.0	0.6277	0.1506	0.2031	0.1844	0.1822	262	0.3740	-0.0745	37.8
2435.0	0.6257	0.1505	0.2030	0.1845	0.1820	262	0.3760	-0.0746	37.8
2448.0	0.6237	0.1505	0.2029	0.1845	0.1818	263	0.3780	-0.0747	37.9
2461.0	0.6217	0.1504	0.2028	0.1846	0.1816	264	0.3800	-0.0747	38.0
2474.0	0.6197	0.1503	0.2028	0.1846	0.1814	264	0.3820	-0.0748	38.1
2487.0	0.6177	0.1502	0.2027	0.1847	0.1812	265	0.3840	-0.0749	38.2
2500.0	0.6157	0.1502	0.2026	0.1847	0.1810	266	0.3860	-0.0750	38.3
2513.0	0.6137	0.1501	0.2025	0.1848	0.1808	266	0.3880	-0.0750	38.3
2526.0	0.6117	0.1500	0.2025	0.1848	0.1806	267	0.3900	-0.0751	38.4
2538.0	0.6097	0.1500	0.2024	0.1849	0.1804	267	0.3920	-0.0752	38.5
2551.0	0.6077	0.1499	0.2023	0.1849	0.1803	267	0.3940	-0.0752	38.5
2564.0	0.6057	0.1499	0.2023	0.1849	0.1801	268	0.3960	-0.0753	38.6
2576.0	0.6037	0.1498	0.2022	0.1850	0.1799	268	0.3980	-0.0754	38.6
2589.0	0.6017	0.1497	0.2021	0.1850	0.1798	268	0.4000	-0.0754	38.7
2601.0	0.5997	0.1497	0.2021	0.1851	0.1797	269	0.4020	-0.0754	38.8
2614.0	0.5977	0.1496	0.2020	0.1851	0.1795	269	0.4040	-0.0755	38.8
2627.0	0.5957	0.1496	0.2019	0.1852	0.1794	270	0.4060	-0.0756	38.9
2640.0	0.5937	0.1495	0.2019	0.1852	0.1793	270	0.4080	-0.0756	38.9
2653.0	0.5917	0.1494	0.2018	0.1852	0.1791	270	0.4100	-0.0757	38.9
2666.0	0.5897	0.1494	0.2018	0.1853	0.1789	270	0.4120	-0.0757	39.0
2679.0	0.5877	0.1493	0.2017	0.1853	0.1788	271	0.4140	-0.0758	39.0
2692.0	0.5857	0.1493	0.2017	0.1854	0.1786	271	0.4160	-0.0758	39.1
2704.0	0.5837	0.1492	0.2016	0.1854	0.1785	271	0.4180	-0.0759	39.1
2717.0	0.5817	0.1491	0.2016	0.1854	0.1784	272	0.4200	-0.0760	39.2
2729.0	0.5797	0.1491	0.2015	0.1855	0.1782	272	0.4220	-0.0760	39.3
2742.0	0.5777	0.1490	0.2015	0.1855	0.1781	273	0.4240	-0.0761	39.3
2755.0	0.5757	0.1489	0.2014	0.1856	0.1780	273	0.4260	-0.0761	39.3
2768.0	0.5737	0.1489	0.2014	0.1856	0.1778	273	0.4280	-0.0762	39.3
2781.0	0.5717	0.1488	0.2014	0.1857	0.1777	273	0.4300	-0.0762	39.4
2794.0	0.5697	0.1488	0.2014	0.1857	0.1776	273	0.4320	-0.0762	39.4
2807.0	0.5677	0.1487	0.2013	0.1857	0.1775	274	0.4340	-0.0763	39.5
2819.0	0.5657	0.1487	0.2013	0.1858	0.1774	274	0.4360	-0.0763	39.5
2832.0	0.5637	0.1486	0.2013	0.1858	0.1772	275	0.4380	-0.0764	39.6
2844.0	0.5617	0.1486	0.2013	0.1859	0.1771	275	0.4400	-0.0764	39.6
2857.0	0.5597	0.1485	0.2012	0.1859	0.1770	276	0.4420	-0.0764	39.7
2870.0	0.5577	0.1484	0.2012	0.1860	0.1769	276	0.4440	-0.0765	39.8
2883.0	0.5557	0.1484	0.2012	0.1860	0.1767	276	0.4460	-0.0765	39.8
2896.0	0.5537	0.1484	0.2012	0.1861	0.1766	277	0.4480	-0.0765	40.0
2909.0	0.5517	0.1483	0.2011	0.1861	0.1765	278	0.4500	-0.0766	40.0
2921.0	0.5497	0.1483	0.2011	0.1861	0.1764	278	0.4520	-0.0766	40.1
2934.0	0.5477	0.1482	0.2011	0.1862	0.1763	278	0.4540	-0.0766	40.1
2947.0	0.5457	0.1482	0.2011	0.1863	0.1762	279	0.4560	-0.0766	40.2
2960.0	0.5437	0.1482	0.2011	0.1863	0.1761	280	0.4580	-0.0767	40.3
2972.0	0.5417	0.1481	0.2010	0.1864	0.1760	280	0.4600	-0.0767	40.4
2985.0	0.5397	0.1481	0.2010	0.1864	0.1758	281	0.4620	-0.0768	40.5
2998.0	0.5377	0.1481	0.2010	0.1865	0.1758	281	0.4640	-0.0767	40.5
3011.0	0.5357	0.1480	0.2010	0.1865	0.1756	282	0.4660	-0.0768	40.6
3023.0	0.5337	0.1480	0.2010	0.1866	0.1755	282	0.4680	-0.0768	40.6
3036.0	0.5317	0.1480	0.2010	0.1866	0.1754	282	0.4700	-0.0768	40.7
3048.0	0.5297	0.1480	0.2009	0.1867	0.1753	283	0.4720	-0.0769	40.7

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
3061.0	0.5277	0.1479	0.2009	0.1868	0.1752	283	0.4740	-0.0769	40.8
3074.0	0.5257	0.1479	0.2009	0.1868	0.1751	284	0.4760	-0.0769	40.9
3086.0	0.5237	0.1479	0.2009	0.1869	0.1750	284	0.4780	-0.0769	41.0
3099.0	0.5217	0.1479	0.2009	0.1869	0.1749	285	0.4800	-0.0769	41.0
3112.0	0.5197	0.1479	0.2008	0.1870	0.1748	285	0.4820	-0.0770	41.1
3125.0	0.5177	0.1479	0.2008	0.1871	0.1747	286	0.4840	-0.0770	41.2
3137.0	0.5157	0.1478	0.2008	0.1871	0.1747	286	0.4860	-0.0770	41.2
3150.0	0.5137	0.1478	0.2008	0.1872	0.1745	286	0.4880	-0.0770	41.2
3163.0	0.5117	0.1478	0.2007	0.1873	0.1744	286	0.4900	-0.0770	41.3
3175.0	0.5097	0.1478	0.2007	0.1873	0.1743	287	0.4920	-0.0771	41.4
3188.0	0.5077	0.1478	0.2007	0.1874	0.1742	287	0.4940	-0.0771	41.4
3201.0	0.5057	0.1477	0.2007	0.1874	0.1741	288	0.4960	-0.0771	41.5
3214.0	0.5037	0.1477	0.2006	0.1875	0.1740	289	0.4980	-0.0771	41.6
3227.0	0.5017	0.1477	0.2006	0.1876	0.1739	289	0.5000	-0.0771	41.7
3239.0	0.4997	0.1477	0.2006	0.1877	0.1738	290	0.5020	-0.0771	41.8
3252.0	0.4977	0.1477	0.2005	0.1877	0.1736	290	0.5040	-0.0772	41.8
3255.0	0.4973	0.1477	0.2005	0.1877	0.1736	290	0.5044	-0.0772	41.9

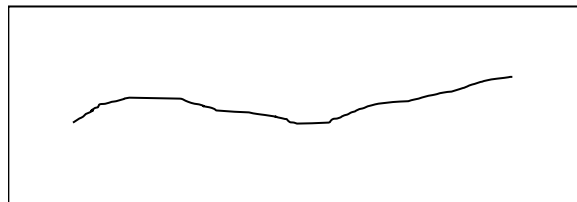


Direct Shear Strength of Rock
ASTM D 5607

Project Name	<u>SR1 Flood Control Project - Inlet Debris Barrier</u>	Project Number	<u>110773396</u>
Lithology	<u>Shale, gray, moderately hard, partially healed faults</u>	Lab ID	<u>DSNF-31</u>
Hole Number	<u>DB-3</u>	Date Received	<u>05/15/2018</u>
Depth (m)	<u>29.40</u>		
Test Type	<u>Direct shear of natural fracture</u>	Diameter (in)	<u>2.401</u>
Initial Moisture Condition	<u>As received, moist</u>	Angle of Dip (deg)	<u>49.3</u>
Test Moisture Condition	<u>Soaked at least 12 hours prior to test.</u>	Area(in ²)	<u>6.94</u>
Joint Roughness	<u>14</u>		
		Date Prepared	<u>06/28/2018</u>
Normal Stress (psi)	<u>40</u>	Date Tested	<u>06/29/2018</u>



Sketch



Shear Rate to Peak (in/min) N/A

Encapsulation Material Hydro-Stone

Comments _____

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
0.0	1.0088	0.2521	0.2561	0.2565	0.2552	19	0.0000	0.0000	2.7
26.0	1.0068	0.2518	0.2560	0.2559	0.2555	28	0.0020	-0.0002	4.0
39.0	1.0048	0.2517	0.2559	0.2555	0.2557	29	0.0040	-0.0003	4.2
53.0	1.0028	0.2515	0.2558	0.2550	0.2559	31	0.0060	-0.0004	4.5
67.0	1.0008	0.2513	0.2556	0.2546	0.2561	33	0.0080	-0.0006	4.8
81.0	0.9988	0.2511	0.2555	0.2540	0.2563	37	0.0100	-0.0007	5.3
93.0	0.9968	0.2507	0.2554	0.2535	0.2564	40	0.0120	-0.0010	5.8
100.0	0.9948	0.2505	0.2552	0.2529	0.2565	42	0.0140	-0.0012	6.1
112.0	0.9928	0.2500	0.2550	0.2522	0.2564	46	0.0160	-0.0016	6.6
125.0	0.9908	0.2494	0.2547	0.2514	0.2563	49	0.0180	-0.0020	7.0
138.0	0.9888	0.2488	0.2544	0.2506	0.2562	52	0.0200	-0.0025	7.6
157.0	0.9868	0.2481	0.2541	0.2498	0.2560	55	0.0220	-0.0030	8.0
170.0	0.9848	0.2476	0.2538	0.2490	0.2558	58	0.0240	-0.0034	8.4
182.0	0.9828	0.2469	0.2535	0.2482	0.2557	61	0.0260	-0.0039	8.8
195.0	0.9808	0.2463	0.2532	0.2474	0.2555	64	0.0280	-0.0044	9.2
208.0	0.9788	0.2456	0.2529	0.2466	0.2552	67	0.0300	-0.0049	9.6
221.0	0.9768	0.2450	0.2525	0.2458	0.2550	70	0.0320	-0.0054	10.0
234.0	0.9748	0.2443	0.2522	0.2450	0.2548	72	0.0340	-0.0059	10.4
240.0	0.9728	0.2437	0.2520	0.2443	0.2547	75	0.0360	-0.0063	10.7
253.0	0.9708	0.2430	0.2516	0.2434	0.2544	77	0.0380	-0.0069	11.1
267.0	0.9688	0.2423	0.2512	0.2426	0.2542	79	0.0400	-0.0074	11.4
285.0	0.9668	0.2415	0.2509	0.2418	0.2539	78	0.0420	-0.0079	11.3
298.0	0.9648	0.2409	0.2506	0.2411	0.2537	83	0.0440	-0.0084	12.0
311.0	0.9628	0.2402	0.2503	0.2404	0.2535	85	0.0460	-0.0089	12.3
324.0	0.9608	0.2396	0.2500	0.2396	0.2532	86	0.0480	-0.0094	12.4
336.0	0.9588	0.2390	0.2497	0.2390	0.2530	88	0.0500	-0.0098	12.6
349.0	0.9568	0.2384	0.2494	0.2383	0.2528	89	0.0520	-0.0103	12.8
363.0	0.9548	0.2377	0.2490	0.2376	0.2525	90	0.0540	-0.0108	13.0
375.0	0.9528	0.2371	0.2488	0.2369	0.2523	91	0.0560	-0.0112	13.1
382.0	0.9508	0.2367	0.2486	0.2364	0.2523	93	0.0580	-0.0115	13.5
395.0	0.9488	0.2359	0.2482	0.2356	0.2520	94	0.0600	-0.0120	13.5
408.0	0.9468	0.2353	0.2479	0.2350	0.2518	96	0.0620	-0.0125	13.8
426.0	0.9448	0.2347	0.2476	0.2342	0.2515	97	0.0640	-0.0130	14.0
439.0	0.9428	0.2342	0.2473	0.2336	0.2514	99	0.0660	-0.0134	14.3
453.0	0.9408	0.2336	0.2469	0.2329	0.2512	102	0.0680	-0.0138	14.6
466.0	0.9388	0.2330	0.2466	0.2321	0.2510	104	0.0700	-0.0143	14.9
480.0	0.9368	0.2324	0.2462	0.2313	0.2508	106	0.0720	-0.0148	15.2
493.0	0.9348	0.2318	0.2458	0.2305	0.2507	108	0.0740	-0.0153	15.5
506.0	0.9328	0.2313	0.2455	0.2298	0.2505	110	0.0760	-0.0157	15.8
519.0	0.9308	0.2307	0.2452	0.2292	0.2503	112	0.0780	-0.0161	16.1
526.0	0.9288	0.2302	0.2450	0.2285	0.2502	113	0.0800	-0.0165	16.2
540.0	0.9268	0.2297	0.2447	0.2280	0.2500	114	0.0820	-0.0169	16.5
558.0	0.9248	0.2292	0.2444	0.2274	0.2498	116	0.0840	-0.0173	16.7
571.0	0.9228	0.2286	0.2442	0.2269	0.2496	116	0.0860	-0.0176	16.8
584.0	0.9208	0.2280	0.2440	0.2264	0.2494	117	0.0880	-0.0180	16.9
597.0	0.9188	0.2274	0.2439	0.2259	0.2491	118	0.0900	-0.0184	17.0
609.0	0.9168	0.2267	0.2437	0.2254	0.2488	118	0.0920	-0.0188	17.0
623.0	0.9148	0.2259	0.2436	0.2249	0.2486	119	0.0940	-0.0192	17.1
635.0	0.9128	0.2253	0.2435	0.2244	0.2483	119	0.0960	-0.0196	17.1
648.0	0.9108	0.2246	0.2434	0.2239	0.2480	119	0.0980	-0.0200	17.1
659.0	0.9088	0.2239	0.2434	0.2235	0.2478	121	0.1000	-0.0203	17.5
669.0	0.9068	0.2232	0.2433	0.2230	0.2475	118	0.1020	-0.0207	17.0
687.0	0.9048	0.2225	0.2432	0.2225	0.2472	119	0.1040	-0.0211	17.1
700.0	0.9028	0.2218	0.2431	0.2220	0.2469	119	0.1060	-0.0215	17.1
713.0	0.9008	0.2212	0.2431	0.2216	0.2467	119	0.1080	-0.0218	17.1
726.0	0.8988	0.2205	0.2430	0.2212	0.2465	119	0.1100	-0.0222	17.2
739.0	0.8968	0.2198	0.2430	0.2207	0.2462	119	0.1120	-0.0226	17.1
751.0	0.8948	0.2192	0.2429	0.2203	0.2460	119	0.1140	-0.0229	17.1
764.0	0.8928	0.2185	0.2429	0.2198	0.2457	118	0.1160	-0.0232	17.1
777.0	0.8908	0.2177	0.2429	0.2193	0.2455	118	0.1180	-0.0236	17.0
790.0	0.8888	0.2170	0.2428	0.2188	0.2452	118	0.1200	-0.0240	17.0
798.0	0.8868	0.2163	0.2428	0.2183	0.2450	117	0.1220	-0.0244	16.8
816.0	0.8848	0.2155	0.2428	0.2177	0.2447	117	0.1240	-0.0248	16.9
829.0	0.8828	0.2147	0.2428	0.2172	0.2445	117	0.1260	-0.0252	16.8
842.0	0.8808	0.2139	0.2428	0.2167	0.2443	117	0.1280	-0.0256	16.8
855.0	0.8788	0.2131	0.2427	0.2161	0.2441	116	0.1300	-0.0260	16.8
868.0	0.8768	0.2123	0.2427	0.2156	0.2438	116	0.1320	-0.0264	16.8
880.0	0.8748	0.2116	0.2427	0.2151	0.2436	116	0.1340	-0.0267	16.7
893.0	0.8728	0.2108	0.2427	0.2146	0.2434	116	0.1360	-0.0271	16.8
906.0	0.8708	0.2101	0.2427	0.2141	0.2432	117	0.1380	-0.0274	16.8
919.0	0.8688	0.2094	0.2427	0.2136	0.2430	117	0.1400	-0.0278	16.8
929.0	0.8668	0.2088	0.2428	0.2133	0.2428	120	0.1420	-0.0280	17.3
944.0	0.8648	0.2080	0.2428	0.2127	0.2425	117	0.1440	-0.0285	16.9
958.0	0.8628	0.2073	0.2428	0.2123	0.2422	117	0.1460	-0.0288	16.9
971.0	0.8608	0.2066	0.2428	0.2119	0.2420	118	0.1480	-0.0292	16.9
984.0	0.8588	0.2059	0.2428	0.2115	0.2417	118	0.1500	-0.0295	17.0
997.0	0.8568	0.2053	0.2428	0.2112	0.2414	118	0.1520	-0.0298	17.0
1010.0	0.8548	0.2046	0.2428	0.2108	0.2411	118	0.1540	-0.0302	17.0
1023.0	0.8528	0.2040	0.2428	0.2105	0.2409	118	0.1560	-0.0304	17.0

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
1036.0	0.8508	0.2033	0.2428	0.2101	0.2405	118	0.1580	-0.0308	17.0
1049.0	0.8488	0.2027	0.2428	0.2098	0.2403	118	0.1600	-0.0311	17.0
1061.0	0.8468	0.2021	0.2428	0.2095	0.2400	119	0.1620	-0.0314	17.2
1071.0	0.8448	0.2015	0.2429	0.2092	0.2397	117	0.1640	-0.0317	16.9
1087.0	0.8428	0.2009	0.2429	0.2090	0.2394	119	0.1660	-0.0319	17.1
1100.0	0.8408	0.2004	0.2429	0.2087	0.2391	119	0.1680	-0.0322	17.2
1113.0	0.8388	0.1999	0.2429	0.2085	0.2389	119	0.1700	-0.0324	17.2
1126.0	0.8368	0.1994	0.2429	0.2084	0.2385	119	0.1720	-0.0327	17.2
1139.0	0.8348	0.1990	0.2429	0.2082	0.2382	120	0.1740	-0.0329	17.3
1152.0	0.8328	0.1985	0.2429	0.2081	0.2379	120	0.1760	-0.0331	17.3
1164.0	0.8308	0.1981	0.2428	0.2080	0.2375	120	0.1780	-0.0334	17.3
1177.0	0.8288	0.1977	0.2428	0.2079	0.2372	120	0.1800	-0.0336	17.3
1190.0	0.8268	0.1974	0.2428	0.2078	0.2369	120	0.1820	-0.0337	17.4
1202.0	0.8248	0.1970	0.2428	0.2077	0.2366	121	0.1840	-0.0340	17.4
1215.0	0.8228	0.1967	0.2428	0.2077	0.2363	121	0.1860	-0.0341	17.5
1229.0	0.8208	0.1964	0.2428	0.2077	0.2361	121	0.1880	-0.0342	17.5
1242.0	0.8188	0.1962	0.2428	0.2077	0.2358	122	0.1900	-0.0343	17.6
1255.0	0.8168	0.1960	0.2428	0.2077	0.2356	122	0.1920	-0.0345	17.6
1267.0	0.8148	0.1957	0.2428	0.2077	0.2354	122	0.1940	-0.0346	17.6
1280.0	0.8128	0.1955	0.2428	0.2077	0.2352	122	0.1960	-0.0347	17.6
1293.0	0.8108	0.1953	0.2428	0.2077	0.2350	122	0.1980	-0.0348	17.6
1305.0	0.8088	0.1951	0.2428	0.2077	0.2348	122	0.2000	-0.0349	17.5
1318.0	0.8068	0.1949	0.2428	0.2077	0.2346	121	0.2020	-0.0350	17.5
1331.0	0.8048	0.1947	0.2428	0.2077	0.2343	121	0.2040	-0.0351	17.4
1344.0	0.8028	0.1945	0.2428	0.2078	0.2341	121	0.2060	-0.0352	17.4
1357.0	0.8008	0.1943	0.2428	0.2078	0.2339	121	0.2080	-0.0353	17.4
1369.0	0.7988	0.1941	0.2428	0.2079	0.2336	121	0.2100	-0.0354	17.5
1382.0	0.7968	0.1940	0.2428	0.2079	0.2334	121	0.2120	-0.0355	17.5
1395.0	0.7948	0.1939	0.2428	0.2080	0.2331	121	0.2140	-0.0355	17.4
1408.0	0.7928	0.1937	0.2428	0.2082	0.2329	121	0.2160	-0.0356	17.4
1421.0	0.7908	0.1936	0.2427	0.2083	0.2326	120	0.2180	-0.0357	17.4
1434.0	0.7888	0.1935	0.2427	0.2084	0.2323	120	0.2200	-0.0357	17.3
1446.0	0.7868	0.1934	0.2427	0.2086	0.2321	120	0.2220	-0.0358	17.3
1459.0	0.7848	0.1933	0.2427	0.2087	0.2318	119	0.2240	-0.0358	17.2
1471.0	0.7828	0.1932	0.2426	0.2089	0.2315	119	0.2260	-0.0359	17.1
1484.0	0.7808	0.1932	0.2426	0.2091	0.2312	118	0.2280	-0.0360	17.1
1497.0	0.7788	0.1931	0.2426	0.2092	0.2310	118	0.2300	-0.0360	17.0
1511.0	0.7768	0.1930	0.2425	0.2094	0.2307	117	0.2320	-0.0361	16.9
1523.0	0.7748	0.1930	0.2425	0.2096	0.2304	117	0.2340	-0.0361	16.8
1536.0	0.7728	0.1930	0.2425	0.2098	0.2302	117	0.2360	-0.0361	16.8
1549.0	0.7708	0.1929	0.2424	0.2100	0.2299	116	0.2380	-0.0362	16.7
1561.0	0.7688	0.1929	0.2424	0.2102	0.2297	116	0.2400	-0.0362	16.7
1574.0	0.7668	0.1929	0.2423	0.2104	0.2294	117	0.2420	-0.0362	16.8
1587.0	0.7648	0.1929	0.2423	0.2106	0.2292	117	0.2440	-0.0362	16.9
1600.0	0.7628	0.1929	0.2422	0.2108	0.2290	118	0.2460	-0.0363	17.0
1612.0	0.7608	0.1930	0.2422	0.2110	0.2288	118	0.2480	-0.0362	17.1
1625.0	0.7588	0.1930	0.2421	0.2112	0.2285	119	0.2500	-0.0363	17.1
1638.0	0.7568	0.1930	0.2421	0.2114	0.2283	119	0.2520	-0.0363	17.2
1651.0	0.7548	0.1930	0.2420	0.2116	0.2281	120	0.2540	-0.0363	17.4
1664.0	0.7528	0.1930	0.2419	0.2117	0.2279	121	0.2560	-0.0363	17.5
1677.0	0.7508	0.1931	0.2419	0.2118	0.2277	122	0.2580	-0.0363	17.6
1690.0	0.7488	0.1931	0.2418	0.2119	0.2275	122	0.2600	-0.0364	17.6
1703.0	0.7468	0.1931	0.2417	0.2120	0.2273	123	0.2620	-0.0365	17.8
1715.0	0.7448	0.1930	0.2416	0.2121	0.2272	124	0.2640	-0.0365	17.9
1728.0	0.7428	0.1930	0.2416	0.2121	0.2270	125	0.2660	-0.0365	17.9
1741.0	0.7408	0.1930	0.2415	0.2122	0.2268	125	0.2680	-0.0366	18.0
1754.0	0.7388	0.1930	0.2414	0.2123	0.2266	126	0.2700	-0.0366	18.2
1767.0	0.7368	0.1929	0.2413	0.2123	0.2264	127	0.2720	-0.0367	18.3
1781.0	0.7348	0.1929	0.2412	0.2124	0.2262	128	0.2740	-0.0368	18.4
1793.0	0.7328	0.1928	0.2411	0.2124	0.2261	129	0.2760	-0.0369	18.6
1806.0	0.7308	0.1928	0.2411	0.2125	0.2259	130	0.2780	-0.0369	18.7
1818.0	0.7288	0.1928	0.2410	0.2126	0.2257	130	0.2800	-0.0370	18.8
1831.0	0.7268	0.1927	0.2410	0.2126	0.2256	131	0.2820	-0.0370	18.8
1844.0	0.7248	0.1927	0.2409	0.2127	0.2254	132	0.2840	-0.0371	19.0
1857.0	0.7228	0.1927	0.2408	0.2127	0.2253	132	0.2860	-0.0371	19.0
1870.0	0.7208	0.1927	0.2408	0.2128	0.2251	133	0.2880	-0.0371	19.1
1883.0	0.7188	0.1926	0.2407	0.2129	0.2250	133	0.2900	-0.0372	19.2
1896.0	0.7168	0.1926	0.2407	0.2129	0.2249	134	0.2920	-0.0372	19.2
1908.0	0.7148	0.1926	0.2407	0.2130	0.2248	134	0.2940	-0.0372	19.3
1921.0	0.7128	0.1926	0.2406	0.2130	0.2246	134	0.2960	-0.0373	19.3
1934.0	0.7108	0.1925	0.2406	0.2131	0.2245	135	0.2980	-0.0373	19.4
1947.0	0.7088	0.1925	0.2405	0.2131	0.2244	135	0.3000	-0.0373	19.5
1960.0	0.7068	0.1925	0.2405	0.2132	0.2243	136	0.3020	-0.0373	19.6
1972.0	0.7048	0.1925	0.2405	0.2133	0.2242	136	0.3040	-0.0373	19.6
1986.0	0.7028	0.1925	0.2404	0.2133	0.2241	137	0.3060	-0.0374	19.7
1998.0	0.7008	0.1925	0.2404	0.2134	0.2240	137	0.3080	-0.0374	19.8
2011.0	0.6988	0.1925	0.2404	0.2135	0.2239	138	0.3100	-0.0374	19.9
2023.0	0.6968	0.1925	0.2404	0.2135	0.2238	138	0.3120	-0.0374	20.0
2037.0	0.6948	0.1925	0.2404	0.2136	0.2237	139	0.3140	-0.0374	20.0

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
2050.0	0.6928	0.1925	0.2403	0.2137	0.2237	139	0.3160	-0.0374	20.1
2063.0	0.6908	0.1925	0.2403	0.2138	0.2236	140	0.3180	-0.0374	20.2
2075.0	0.6888	0.1925	0.2403	0.2138	0.2235	141	0.3200	-0.0374	20.3
2088.0	0.6868	0.1925	0.2403	0.2139	0.2235	141	0.3220	-0.0374	20.4
2101.0	0.6848	0.1925	0.2403	0.2140	0.2234	142	0.3240	-0.0374	20.4
2113.0	0.6828	0.1926	0.2403	0.2141	0.2233	142	0.3260	-0.0374	20.5
2125.0	0.6808	0.1926	0.2403	0.2142	0.2233	143	0.3280	-0.0374	20.6
2138.0	0.6788	0.1926	0.2402	0.2143	0.2232	144	0.3300	-0.0374	20.7
2152.0	0.6768	0.1926	0.2402	0.2144	0.2232	144	0.3320	-0.0374	20.8
2164.0	0.6748	0.1927	0.2402	0.2145	0.2231	145	0.3340	-0.0374	20.9
2177.0	0.6728	0.1927	0.2402	0.2146	0.2231	146	0.3360	-0.0373	21.0
2190.0	0.6708	0.1928	0.2402	0.2147	0.2230	146	0.3380	-0.0373	21.1
2203.0	0.6688	0.1928	0.2402	0.2148	0.2230	147	0.3400	-0.0373	21.2
2216.0	0.6668	0.1929	0.2402	0.2149	0.2229	148	0.3420	-0.0372	21.3
2229.0	0.6648	0.1930	0.2402	0.2151	0.2228	148	0.3440	-0.0372	21.4
2242.0	0.6628	0.1931	0.2402	0.2153	0.2228	148	0.3460	-0.0371	21.4
2255.0	0.6608	0.1931	0.2402	0.2155	0.2227	148	0.3480	-0.0371	21.4
2268.0	0.6588	0.1932	0.2402	0.2157	0.2225	148	0.3500	-0.0371	21.3
2280.0	0.6568	0.1934	0.2402	0.2159	0.2224	147	0.3520	-0.0370	21.1
2293.0	0.6548	0.1935	0.2401	0.2163	0.2221	145	0.3540	-0.0370	20.8
2306.0	0.6528	0.1936	0.2400	0.2166	0.2217	141	0.3560	-0.0370	20.3
2318.0	0.6508	0.1937	0.2398	0.2170	0.2213	137	0.3580	-0.0370	19.7
2331.0	0.6488	0.1939	0.2397	0.2174	0.2209	133	0.3600	-0.0370	19.2
2344.0	0.6468	0.1940	0.2395	0.2177	0.2205	130	0.3620	-0.0370	18.8
2357.0	0.6448	0.1942	0.2394	0.2180	0.2203	129	0.3640	-0.0370	18.6
2369.0	0.6428	0.1943	0.2394	0.2183	0.2201	128	0.3660	-0.0370	18.4
2382.0	0.6408	0.1945	0.2393	0.2185	0.2199	127	0.3680	-0.0369	18.3
2395.0	0.6388	0.1946	0.2393	0.2188	0.2197	126	0.3700	-0.0369	18.2
2408.0	0.6368	0.1947	0.2392	0.2190	0.2196	126	0.3720	-0.0368	18.1
2421.0	0.6348	0.1948	0.2392	0.2192	0.2194	125	0.3740	-0.0368	18.0
2433.0	0.6328	0.1949	0.2391	0.2194	0.2193	125	0.3760	-0.0368	18.0
2446.0	0.6308	0.1950	0.2391	0.2195	0.2191	125	0.3780	-0.0368	18.0
2459.0	0.6288	0.1950	0.2390	0.2197	0.2190	125	0.3800	-0.0368	18.1
2472.0	0.6268	0.1951	0.2390	0.2198	0.2188	126	0.3820	-0.0368	18.2
2484.0	0.6248	0.1952	0.2390	0.2200	0.2188	127	0.3840	-0.0367	18.3
2497.0	0.6228	0.1952	0.2390	0.2201	0.2187	127	0.3860	-0.0367	18.3
2510.0	0.6208	0.1953	0.2389	0.2202	0.2186	128	0.3880	-0.0367	18.4
2523.0	0.6188	0.1954	0.2390	0.2204	0.2185	128	0.3900	-0.0366	18.5
2536.0	0.6168	0.1955	0.2389	0.2205	0.2185	129	0.3920	-0.0366	18.6
2549.0	0.6148	0.1955	0.2389	0.2206	0.2184	129	0.3940	-0.0366	18.6
2562.0	0.6128	0.1956	0.2389	0.2208	0.2184	130	0.3960	-0.0365	18.7
2574.0	0.6108	0.1957	0.2389	0.2209	0.2183	131	0.3980	-0.0365	18.8
2587.0	0.6088	0.1957	0.2389	0.2210	0.2183	131	0.4000	-0.0365	18.9
2600.0	0.6068	0.1958	0.2389	0.2211	0.2182	132	0.4020	-0.0365	19.0
2613.0	0.6048	0.1958	0.2389	0.2212	0.2181	133	0.4040	-0.0365	19.1
2625.0	0.6028	0.1959	0.2390	0.2214	0.2181	133	0.4060	-0.0364	19.2
2638.0	0.6008	0.1959	0.2389	0.2215	0.2180	134	0.4080	-0.0364	19.3
2651.0	0.5988	0.1960	0.2389	0.2216	0.2179	134	0.4100	-0.0364	19.2
2663.0	0.5968	0.1960	0.2387	0.2217	0.2175	131	0.4120	-0.0365	18.8
2676.0	0.5948	0.1959	0.2385	0.2218	0.2171	131	0.4140	-0.0367	18.9
2689.0	0.5928	0.1959	0.2383	0.2219	0.2168	131	0.4160	-0.0367	18.9
2702.0	0.5908	0.1959	0.2380	0.2221	0.2164	131	0.4180	-0.0369	18.9
2715.0	0.5888	0.1959	0.2377	0.2222	0.2159	132	0.4200	-0.0371	19.0
2728.0	0.5868	0.1960	0.2373	0.2223	0.2155	131	0.4220	-0.0372	18.9
2741.0	0.5848	0.1961	0.2369	0.2224	0.2150	131	0.4240	-0.0374	18.9
2753.0	0.5828	0.1962	0.2365	0.2226	0.2146	131	0.4260	-0.0375	18.9
2766.0	0.5808	0.1963	0.2361	0.2227	0.2141	131	0.4280	-0.0377	18.9
2779.0	0.5788	0.1964	0.2358	0.2229	0.2138	130	0.4300	-0.0378	18.7
2792.0	0.5768	0.1966	0.2355	0.2231	0.2134	128	0.4320	-0.0378	18.5
2805.0	0.5748	0.1967	0.2353	0.2233	0.2131	127	0.4340	-0.0379	18.3
2818.0	0.5728	0.1968	0.2351	0.2234	0.2129	126	0.4360	-0.0379	18.2
2830.0	0.5708	0.1970	0.2350	0.2236	0.2127	126	0.4380	-0.0379	18.1
2844.0	0.5688	0.1971	0.2349	0.2238	0.2126	125	0.4400	-0.0379	17.9
2857.0	0.5668	0.1973	0.2348	0.2240	0.2124	124	0.4420	-0.0378	17.8
2869.0	0.5648	0.1974	0.2347	0.2241	0.2123	123	0.4440	-0.0378	17.8
2881.0	0.5628	0.1976	0.2347	0.2243	0.2122	123	0.4460	-0.0378	17.7
2894.0	0.5608	0.1977	0.2346	0.2245	0.2121	122	0.4480	-0.0378	17.6
2907.0	0.5588	0.1979	0.2346	0.2247	0.2121	122	0.4500	-0.0377	17.6
2920.0	0.5568	0.1980	0.2346	0.2248	0.2120	122	0.4520	-0.0376	17.6
2933.0	0.5548	0.1981	0.2345	0.2250	0.2119	122	0.4540	-0.0376	17.6
2946.0	0.5528	0.1983	0.2345	0.2252	0.2118	122	0.4560	-0.0375	17.6
2959.0	0.5508	0.1984	0.2344	0.2254	0.2118	122	0.4580	-0.0375	17.6
2971.0	0.5488	0.1986	0.2344	0.2255	0.2117	122	0.4600	-0.0374	17.6
2984.0	0.5468	0.1987	0.2344	0.2257	0.2117	122	0.4620	-0.0373	17.6
2997.0	0.5448	0.1989	0.2344	0.2259	0.2116	122	0.4640	-0.0373	17.6
3010.0	0.5428	0.1990	0.2344	0.2261	0.2116	121	0.4660	-0.0372	17.5
3023.0	0.5408	0.1992	0.2344	0.2262	0.2115	121	0.4680	-0.0372	17.4
3035.0	0.5388	0.1993	0.2343	0.2264	0.2115	121	0.4700	-0.0371	17.4
3048.0	0.5368	0.1994	0.2343	0.2266	0.2114	121	0.4720	-0.0370	17.5

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
3061.0	0.5348	0.1996	0.2343	0.2268	0.2114	121	0.4740	-0.0369	17.5
3074.0	0.5328	0.1997	0.2343	0.2270	0.2113	121	0.4760	-0.0369	17.4
3086.0	0.5308	0.1998	0.2343	0.2272	0.2112	120	0.4780	-0.0368	17.4
3099.0	0.5288	0.2000	0.2343	0.2274	0.2112	120	0.4800	-0.0367	17.3
3112.0	0.5268	0.2001	0.2343	0.2275	0.2111	119	0.4820	-0.0367	17.2
3124.0	0.5248	0.2002	0.2343	0.2277	0.2110	118	0.4840	-0.0367	17.0
3137.0	0.5228	0.2003	0.2343	0.2279	0.2110	118	0.4860	-0.0366	17.0
3149.0	0.5208	0.2005	0.2343	0.2281	0.2110	117	0.4880	-0.0365	16.9
3162.0	0.5188	0.2006	0.2343	0.2283	0.2109	116	0.4900	-0.0365	16.8
3175.0	0.5168	0.2007	0.2343	0.2285	0.2109	116	0.4920	-0.0364	16.7
3188.0	0.5148	0.2009	0.2343	0.2287	0.2108	115	0.4940	-0.0363	16.6
3201.0	0.5128	0.2010	0.2343	0.2289	0.2108	115	0.4960	-0.0362	16.5
3213.0	0.5108	0.2011	0.2343	0.2291	0.2107	114	0.4980	-0.0362	16.5
3226.0	0.5088	0.2012	0.2343	0.2293	0.2107	114	0.5000	-0.0361	16.4
3238.0	0.5068	0.2013	0.2343	0.2294	0.2106	113	0.5020	-0.0361	16.3
3251.0	0.5048	0.2014	0.2343	0.2296	0.2105	113	0.5040	-0.0360	16.3
3264.0	0.5028	0.2015	0.2343	0.2298	0.2105	113	0.5060	-0.0360	16.3
3277.0	0.5008	0.2016	0.2343	0.2300	0.2104	113	0.5080	-0.0359	16.2
3289.0	0.4988	0.2017	0.2343	0.2301	0.2103	112	0.5100	-0.0359	16.2
3303.0	0.4968	0.2018	0.2343	0.2303	0.2103	112	0.5120	-0.0358	16.2
3316.0	0.4948	0.2019	0.2343	0.2305	0.2102	112	0.5140	-0.0357	16.1
3322.0	0.4937	0.2019	0.2343	0.2305	0.2102	112	0.5151	-0.0357	16.1



Photo Report

Project Name SR1 Flood Control Project - Inlet Debris Barrier
 Lithology Shale, gray, moderately hard, partially healed faults
 Hole Number DB-3 Depth (m) 29.40
 Test Type Direct shear of natural fracture

Project Number 110773396
 Lab ID DSNF-31

As Received



Core Preparation





Photo Report

Project Name SR1 Flood Control Project - Inlet Debris Barrier
Lithology Shale, gray, moderately hard, partially healed faults
Hole Number DB-3 Depth (m) 29.40
Test Type Direct shear of natural fracture

Project Number 110773396
Lab ID DSNF-31

Core Preparation



Post Test





Photo Report

Project Name SR1 Flood Control Project - Inlet Debris Barrier
Lithology Shale, gray, moderately hard, partially healed faults
Hole Number DB-3 Depth (m) 29.40
Test Type Direct shear of natural fracture

Project Number 110773396
Lab ID DSNF-31

Post Test

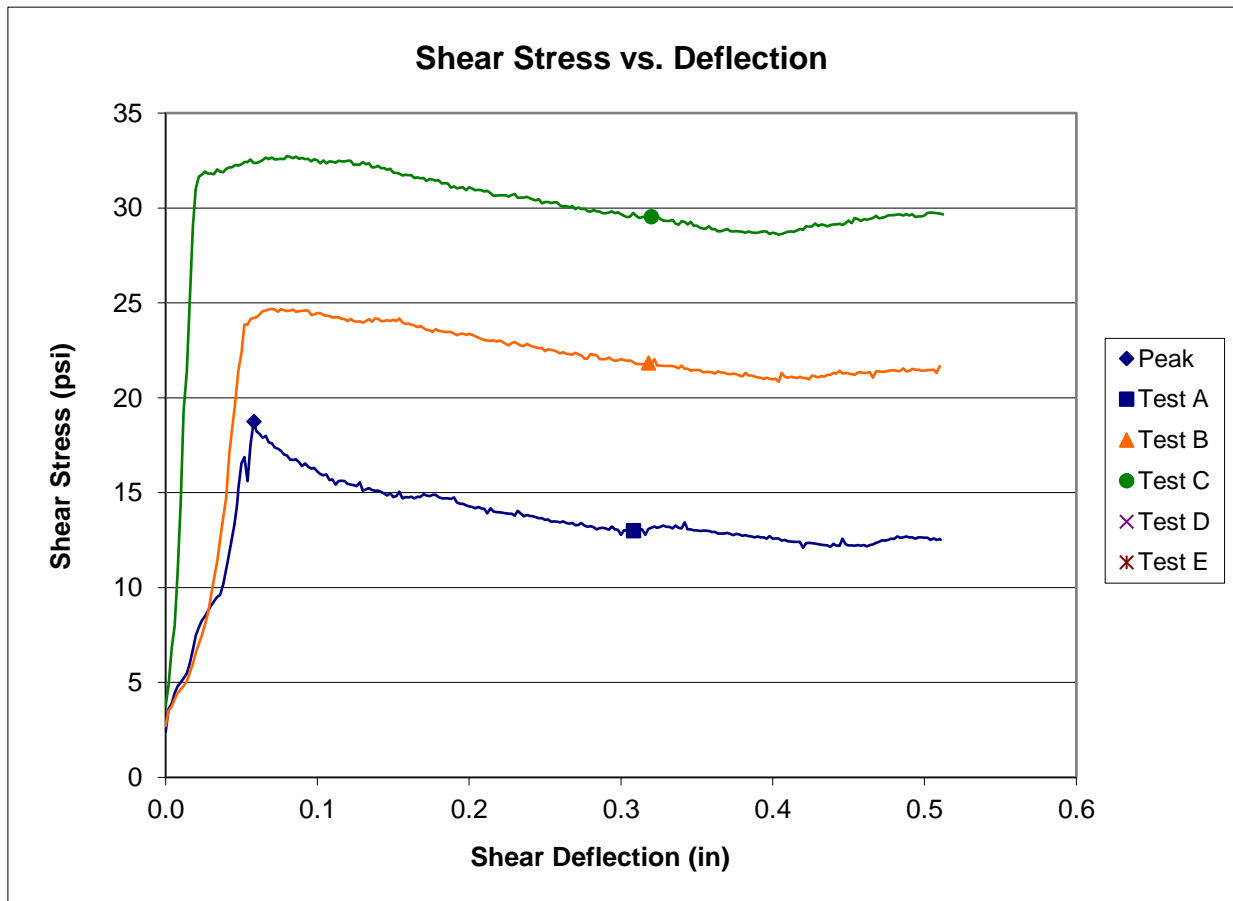




Direct Shear Strength of Rock
ASTM D 5607

Project Name <u>SR1 Flood Control Project - Inlet Debris Barrier</u>	Project Number <u>110773396</u>
Lithology <u>Dolomite, gray, moderately hard, partially healed faults</u>	Lab ID <u>DSSS-6</u>
Hole Number <u>DB-1</u> Depth (m) <u>20.26</u>	Date Received <u>05/15/2018</u>
Test Type <u>Direct shear of sawn surface</u>	
Initial Moisture Condition <u>As received, moist</u>	Diameter (in.) <u>2.398</u>
At Test Moisture Condition <u>Soaked at least 12 hours prior to test.</u>	Angle of Dip (deg.) <u>0.0</u>
Roughness (JRC) <u>1</u>	Area (in ²) <u>4.52</u>

	Test A	Test B	Test C	Test D	Test E
Normal Stress (psi)	29.0	51.0	73.0	N/A	N/A
Peak Shear Stress (psi)	18.8				
Deflection at Peak (in)	0.0580				
Post Peak Stress (psi)	13.0	21.8	29.5	N/A	N/A
Deflection at Residual (in)	0.3080	0.3180	0.3200	N/A	N/A



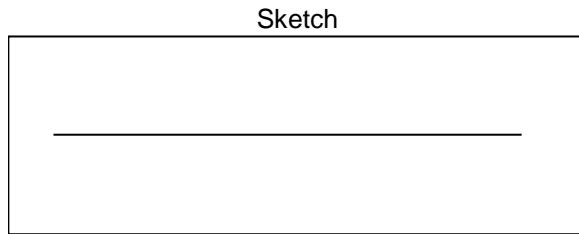
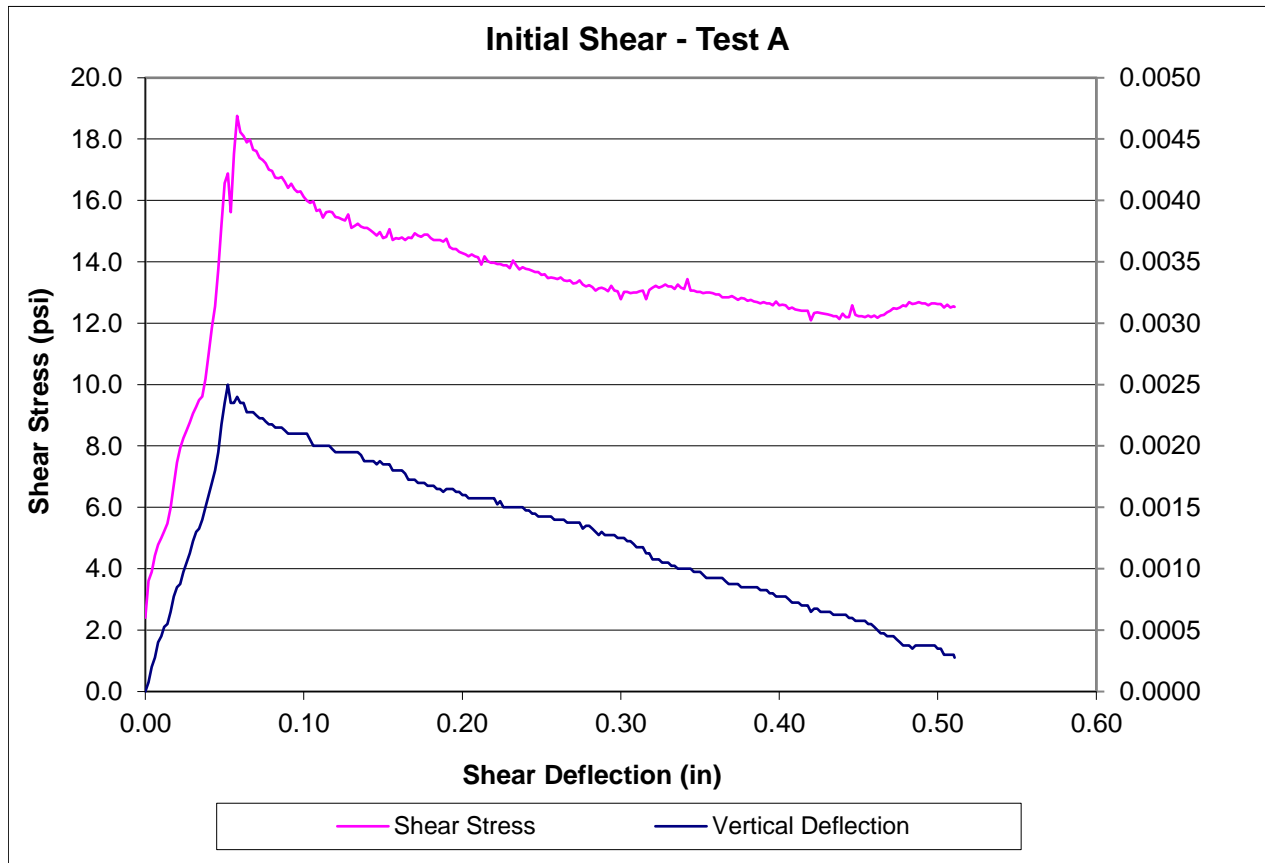
Comments Secured partially healed fault with tape for preparation.

Reviewed By RJ



Direct Shear Strength of Rock
ASTM D 5607

Project Name	<u>SR1 Flood Control Project - Inlet Debris Barrier</u>	Project Number	<u>110773396</u>
Lithology	<u>Dolomite, gray, moderately hard, partially healed faults</u>	Lab ID	<u>DSSS-6</u>
Hole Number	<u>DB-1</u>	Date Received	<u>05/15/2018</u>
Depth (m)	<u>20.26</u>		
Test Type	<u>Direct shear of sawn surface</u>	Diameter (in)	<u>2.398</u>
Initial Moisture Condition	<u>As received, moist</u>	Angle of Dip (deg)	<u>0.0</u>
Test Moisture Condition	<u>Soaked at least 12 hours prior to test.</u>	Area(in ²)	<u>4.52</u>
Joint Roughness	<u>1</u>		
		Date Prepared	<u>06/29/2018</u>
Normal Stress (psi)	<u>29</u>	Date Tested	<u>07/02/2018</u>



Shear Rate to Peak (in/min) 0.009

Encapsulation Material Hydro-Stone

Comments _____

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
0.0	1.0040	0.2568	0.2536	0.2508	0.2526	11	0.0000	0.0000	2.4
27.0	1.0020	0.2568	0.2536	0.2504	0.2533	16	0.0020	0.0001	3.6
49.0	1.0000	0.2569	0.2536	0.2501	0.2540	18	0.0040	0.0002	3.9
64.0	0.9980	0.2569	0.2537	0.2498	0.2545	20	0.0060	0.0003	4.4
79.0	0.9960	0.2570	0.2538	0.2496	0.2550	22	0.0080	0.0004	4.8
93.0	0.9940	0.2570	0.2538	0.2494	0.2554	23	0.0100	0.0005	5.0
107.0	0.9920	0.2571	0.2539	0.2492	0.2557	24	0.0120	0.0005	5.2
120.0	0.9900	0.2571	0.2539	0.2490	0.2560	25	0.0140	0.0005	5.5
134.0	0.9880	0.2572	0.2540	0.2488	0.2564	27	0.0160	0.0006	6.0
141.0	0.9860	0.2573	0.2541	0.2487	0.2568	30	0.0180	0.0008	6.7
155.0	0.9840	0.2574	0.2542	0.2485	0.2571	34	0.0200	0.0008	7.5
168.0	0.9820	0.2574	0.2542	0.2484	0.2573	36	0.0220	0.0009	7.9
182.0	0.9800	0.2575	0.2543	0.2484	0.2575	37	0.0240	0.0010	8.3
200.0	0.9780	0.2575	0.2544	0.2483	0.2578	38	0.0260	0.0011	8.5
212.0	0.9760	0.2576	0.2545	0.2482	0.2580	40	0.0280	0.0011	8.8
223.0	0.9740	0.2577	0.2546	0.2481	0.2583	41	0.0300	0.0012	9.1
234.0	0.9720	0.2577	0.2547	0.2481	0.2585	42	0.0320	0.0013	9.3
243.0	0.9700	0.2578	0.2547	0.2480	0.2586	43	0.0340	0.0013	9.5
254.0	0.9680	0.2578	0.2548	0.2478	0.2590	43	0.0360	0.0014	9.6
264.0	0.9660	0.2579	0.2549	0.2478	0.2592	46	0.0380	0.0015	10.2
275.0	0.9640	0.2580	0.2550	0.2478	0.2594	50	0.0400	0.0016	11.0
286.0	0.9620	0.2581	0.2551	0.2477	0.2597	54	0.0420	0.0017	11.8
290.0	0.9600	0.2582	0.2552	0.2477	0.2599	57	0.0440	0.0018	12.6
301.0	0.9580	0.2583	0.2554	0.2477	0.2602	62	0.0460	0.0020	13.8
314.0	0.9560	0.2585	0.2557	0.2478	0.2605	69	0.0480	0.0022	15.2
332.0	0.9540	0.2586	0.2559	0.2479	0.2608	75	0.0500	0.0023	16.6
344.0	0.9520	0.2588	0.2560	0.2480	0.2610	76	0.0520	0.0025	16.9
357.0	0.9500	0.2587	0.2558	0.2479	0.2608	71	0.0540	0.0023	15.6
371.0	0.9480	0.2587	0.2558	0.2478	0.2609	79	0.0560	0.0024	17.5
385.0	0.9460	0.2588	0.2558	0.2477	0.2611	85	0.0580	0.0024	18.8
398.0	0.9440	0.2588	0.2558	0.2477	0.2609	82	0.0600	0.0024	18.2
411.0	0.9420	0.2588	0.2557	0.2478	0.2609	82	0.0620	0.0024	18.1
425.0	0.9400	0.2587	0.2557	0.2477	0.2608	81	0.0640	0.0023	17.9
434.0	0.9380	0.2587	0.2557	0.2477	0.2608	81	0.0660	0.0023	18.0
446.0	0.9360	0.2587	0.2557	0.2478	0.2607	80	0.0680	0.0023	17.6
460.0	0.9340	0.2587	0.2557	0.2478	0.2606	80	0.0700	0.0022	17.6
478.0	0.9320	0.2587	0.2557	0.2477	0.2606	79	0.0720	0.0022	17.4
492.0	0.9300	0.2587	0.2557	0.2477	0.2606	78	0.0740	0.0022	17.3
505.0	0.9280	0.2587	0.2556	0.2477	0.2606	78	0.0760	0.0022	17.2
519.0	0.9260	0.2587	0.2556	0.2477	0.2605	77	0.0780	0.0022	17.0
531.0	0.9240	0.2587	0.2556	0.2477	0.2605	77	0.0800	0.0022	17.0
544.0	0.9220	0.2586	0.2556	0.2477	0.2605	76	0.0820	0.0021	16.7
557.0	0.9200	0.2586	0.2556	0.2477	0.2605	76	0.0840	0.0021	16.7
570.0	0.9180	0.2586	0.2556	0.2477	0.2605	76	0.0860	0.0021	16.8
577.0	0.9160	0.2586	0.2555	0.2477	0.2605	75	0.0880	0.0021	16.6
591.0	0.9140	0.2586	0.2555	0.2477	0.2604	74	0.0900	0.0021	16.4
610.0	0.9120	0.2586	0.2555	0.2477	0.2604	75	0.0920	0.0021	16.5
623.0	0.9100	0.2586	0.2555	0.2477	0.2604	74	0.0940	0.0021	16.4
636.0	0.9080	0.2586	0.2555	0.2477	0.2604	74	0.0960	0.0021	16.3
649.0	0.9060	0.2586	0.2555	0.2477	0.2604	74	0.0980	0.0021	16.3
662.0	0.9040	0.2586	0.2555	0.2477	0.2604	73	0.1000	0.0021	16.1
675.0	0.9020	0.2586	0.2555	0.2477	0.2604	72	0.1020	0.0021	16.0
688.0	0.9000	0.2586	0.2555	0.2476	0.2603	72	0.1040	0.0021	15.9
701.0	0.8980	0.2585	0.2554	0.2476	0.2603	72	0.1060	0.0020	16.0
708.0	0.8960	0.2585	0.2554	0.2476	0.2603	71	0.1080	0.0020	15.7
721.0	0.8940	0.2585	0.2554	0.2476	0.2603	71	0.1100	0.0020	15.7
737.0	0.8920	0.2585	0.2554	0.2476	0.2603	70	0.1120	0.0020	15.4
754.0	0.8900	0.2585	0.2554	0.2476	0.2603	71	0.1140	0.0020	15.6
767.0	0.8880	0.2585	0.2554	0.2476	0.2603	71	0.1160	0.0020	15.6
780.0	0.8860	0.2585	0.2554	0.2476	0.2602	71	0.1180	0.0020	15.6
793.0	0.8840	0.2585	0.2553	0.2476	0.2602	70	0.1200	0.0020	15.5
806.0	0.8820	0.2585	0.2553	0.2476	0.2602	70	0.1220	0.0020	15.4
819.0	0.8800	0.2585	0.2553	0.2476	0.2602	70	0.1240	0.0020	15.4
832.0	0.8780	0.2585	0.2553	0.2476	0.2602	69	0.1260	0.0020	15.3
842.0	0.8760	0.2585	0.2553	0.2476	0.2602	70	0.1280	0.0020	15.5
852.0	0.8740	0.2585	0.2553	0.2476	0.2602	68	0.1300	0.0020	15.1
865.0	0.8720	0.2585	0.2553	0.2476	0.2602	69	0.1320	0.0020	15.2
883.0	0.8700	0.2585	0.2553	0.2476	0.2602	69	0.1340	0.0020	15.2
897.0	0.8680	0.2585	0.2553	0.2476	0.2601	68	0.1360	0.0019	15.1
909.0	0.8660	0.2585	0.2552	0.2475	0.2601	68	0.1380	0.0019	15.1
922.0	0.8640	0.2585	0.2552	0.2475	0.2601	68	0.1400	0.0019	15.1
936.0	0.8620	0.2585	0.2552	0.2475	0.2601	68	0.1420	0.0019	15.0
949.0	0.8600	0.2585	0.2552	0.2475	0.2601	68	0.1440	0.0019	14.9
961.0	0.8580	0.2584	0.2552	0.2475	0.2601	67	0.1460	0.0019	14.9
974.0	0.8560	0.2585	0.2552	0.2475	0.2601	68	0.1480	0.0019	15.0
981.0	0.8540	0.2584	0.2552	0.2475	0.2601	67	0.1500	0.0019	14.8
994.0	0.8520	0.2584	0.2552	0.2475	0.2601	67	0.1520	0.0019	14.8
1014.0	0.8500	0.2584	0.2552	0.2475	0.2601	68	0.1540	0.0019	15.1
1026.0	0.8480	0.2584	0.2551	0.2475	0.2600	66	0.1560	0.0018	14.7

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
1039.0	0.8460	0.2584	0.2551	0.2475	0.2600	67	0.1580	0.0018	14.8
1053.0	0.8440	0.2584	0.2551	0.2475	0.2600	67	0.1600	0.0018	14.7
1066.0	0.8420	0.2584	0.2551	0.2475	0.2600	67	0.1620	0.0018	14.8
1078.0	0.8400	0.2584	0.2551	0.2474	0.2600	66	0.1640	0.0018	14.7
1091.0	0.8380	0.2584	0.2550	0.2474	0.2599	67	0.1660	0.0017	14.8
1104.0	0.8360	0.2584	0.2550	0.2474	0.2599	67	0.1680	0.0017	14.8
1112.0	0.8340	0.2584	0.2550	0.2474	0.2599	67	0.1700	0.0017	14.9
1123.0	0.8320	0.2583	0.2550	0.2474	0.2599	67	0.1720	0.0017	14.9
1137.0	0.8300	0.2583	0.2550	0.2474	0.2599	67	0.1740	0.0017	14.8
1155.0	0.8280	0.2583	0.2550	0.2474	0.2599	67	0.1760	0.0017	14.9
1168.0	0.8260	0.2583	0.2549	0.2474	0.2599	67	0.1780	0.0017	14.9
1181.0	0.8240	0.2583	0.2549	0.2474	0.2599	67	0.1800	0.0017	14.8
1194.0	0.8220	0.2583	0.2549	0.2474	0.2599	66	0.1820	0.0017	14.7
1207.0	0.8200	0.2583	0.2549	0.2474	0.2598	66	0.1840	0.0016	14.7
1220.0	0.8180	0.2583	0.2549	0.2474	0.2598	66	0.1860	0.0016	14.7
1232.0	0.8160	0.2583	0.2549	0.2473	0.2598	66	0.1880	0.0016	14.7
1244.0	0.8140	0.2583	0.2549	0.2474	0.2598	67	0.1900	0.0016	14.7
1252.0	0.8120	0.2583	0.2549	0.2474	0.2598	65	0.1920	0.0016	14.5
1265.0	0.8100	0.2583	0.2549	0.2474	0.2598	65	0.1940	0.0016	14.4
1284.0	0.8080	0.2583	0.2549	0.2473	0.2598	65	0.1960	0.0016	14.4
1297.0	0.8060	0.2583	0.2549	0.2473	0.2598	65	0.1980	0.0016	14.3
1311.0	0.8040	0.2583	0.2548	0.2473	0.2598	65	0.2000	0.0016	14.3
1323.0	0.8020	0.2583	0.2548	0.2473	0.2598	64	0.2020	0.0016	14.2
1336.0	0.8000	0.2583	0.2548	0.2473	0.2597	64	0.2040	0.0016	14.2
1348.0	0.7980	0.2583	0.2548	0.2473	0.2597	64	0.2060	0.0016	14.2
1361.0	0.7960	0.2583	0.2548	0.2473	0.2597	64	0.2080	0.0016	14.2
1374.0	0.7940	0.2583	0.2548	0.2473	0.2597	64	0.2100	0.0016	14.1
1381.0	0.7920	0.2583	0.2548	0.2473	0.2597	63	0.2120	0.0016	13.9
1394.0	0.7900	0.2583	0.2548	0.2473	0.2597	64	0.2140	0.0016	14.2
1407.0	0.7880	0.2583	0.2548	0.2473	0.2597	63	0.2160	0.0016	14.0
1426.0	0.7860	0.2583	0.2548	0.2473	0.2597	63	0.2180	0.0016	14.0
1438.0	0.7840	0.2583	0.2548	0.2473	0.2597	63	0.2200	0.0016	14.0
1451.0	0.7820	0.2582	0.2547	0.2473	0.2597	63	0.2220	0.0015	13.9
1465.0	0.7800	0.2583	0.2547	0.2473	0.2597	63	0.2240	0.0015	13.9
1478.0	0.7780	0.2582	0.2547	0.2473	0.2596	63	0.2260	0.0015	13.9
1491.0	0.7760	0.2582	0.2547	0.2473	0.2596	63	0.2280	0.0015	13.9
1503.0	0.7740	0.2582	0.2547	0.2473	0.2596	62	0.2300	0.0015	13.8
1513.0	0.7720	0.2582	0.2547	0.2473	0.2596	63	0.2320	0.0015	14.0
1522.0	0.7700	0.2582	0.2547	0.2473	0.2596	63	0.2340	0.0015	13.9
1536.0	0.7680	0.2582	0.2547	0.2473	0.2596	62	0.2360	0.0015	13.8
1555.0	0.7660	0.2582	0.2547	0.2473	0.2596	62	0.2380	0.0015	13.8
1568.0	0.7640	0.2582	0.2546	0.2473	0.2596	62	0.2400	0.0015	13.8
1581.0	0.7620	0.2582	0.2546	0.2473	0.2596	62	0.2420	0.0015	13.8
1593.0	0.7600	0.2582	0.2546	0.2472	0.2596	62	0.2440	0.0014	13.7
1606.0	0.7580	0.2582	0.2546	0.2472	0.2596	62	0.2460	0.0014	13.7
1619.0	0.7560	0.2582	0.2546	0.2472	0.2595	62	0.2480	0.0014	13.7
1631.0	0.7540	0.2582	0.2546	0.2472	0.2595	61	0.2500	0.0014	13.6
1644.0	0.7520	0.2582	0.2546	0.2472	0.2595	61	0.2520	0.0014	13.6
1651.0	0.7500	0.2582	0.2546	0.2472	0.2595	61	0.2540	0.0014	13.5
1664.0	0.7480	0.2582	0.2546	0.2472	0.2595	61	0.2560	0.0014	13.5
1678.0	0.7460	0.2582	0.2545	0.2472	0.2595	61	0.2580	0.0014	13.5
1696.0	0.7440	0.2582	0.2545	0.2472	0.2595	61	0.2600	0.0014	13.4
1709.0	0.7420	0.2582	0.2545	0.2472	0.2595	61	0.2620	0.0014	13.5
1722.0	0.7400	0.2582	0.2545	0.2472	0.2595	61	0.2640	0.0014	13.4
1734.0	0.7380	0.2582	0.2545	0.2472	0.2594	60	0.2660	0.0014	13.4
1747.0	0.7360	0.2582	0.2545	0.2472	0.2594	61	0.2680	0.0014	13.4
1760.0	0.7340	0.2582	0.2545	0.2472	0.2594	60	0.2700	0.0014	13.3
1773.0	0.7320	0.2582	0.2545	0.2472	0.2594	60	0.2720	0.0014	13.3
1780.0	0.7300	0.2582	0.2545	0.2472	0.2594	61	0.2740	0.0014	13.4
1792.0	0.7280	0.2582	0.2544	0.2471	0.2594	60	0.2760	0.0013	13.3
1805.0	0.7260	0.2582	0.2544	0.2472	0.2594	60	0.2780	0.0013	13.2
1824.0	0.7240	0.2582	0.2544	0.2472	0.2594	60	0.2800	0.0013	13.2
1837.0	0.7220	0.2582	0.2544	0.2471	0.2594	60	0.2820	0.0013	13.2
1849.0	0.7200	0.2582	0.2544	0.2471	0.2593	59	0.2840	0.0013	13.1
1862.0	0.7180	0.2581	0.2544	0.2471	0.2593	59	0.2860	0.0013	13.1
1875.0	0.7160	0.2582	0.2544	0.2471	0.2593	59	0.2880	0.0013	13.2
1888.0	0.7140	0.2581	0.2544	0.2471	0.2593	59	0.2900	0.0013	13.1
1900.0	0.7120	0.2581	0.2544	0.2471	0.2593	59	0.2920	0.0013	13.0
1912.0	0.7100	0.2581	0.2544	0.2471	0.2593	60	0.2940	0.0013	13.2
1920.0	0.7080	0.2581	0.2544	0.2471	0.2593	59	0.2960	0.0013	13.1
1933.0	0.7060	0.2581	0.2543	0.2471	0.2593	59	0.2980	0.0012	13.0
1947.0	0.7040	0.2581	0.2543	0.2471	0.2593	58	0.3000	0.0012	12.8
1964.0	0.7020	0.2581	0.2543	0.2471	0.2593	59	0.3020	0.0012	13.0
1977.0	0.7000	0.2581	0.2543	0.2471	0.2592	59	0.3040	0.0012	13.0
1990.0	0.6980	0.2581	0.2543	0.2471	0.2592	59	0.3060	0.0012	13.0
2002.0	0.6960	0.2581	0.2543	0.2470	0.2592	59	0.3080	0.0012	13.0
2015.0	0.6940	0.2581	0.2542	0.2470	0.2592	59	0.3100	0.0012	13.0
2028.0	0.6920	0.2581	0.2542	0.2470	0.2592	59	0.3120	0.0012	13.0
2041.0	0.6900	0.2581	0.2542	0.2470	0.2592	59	0.3140	0.0012	13.1

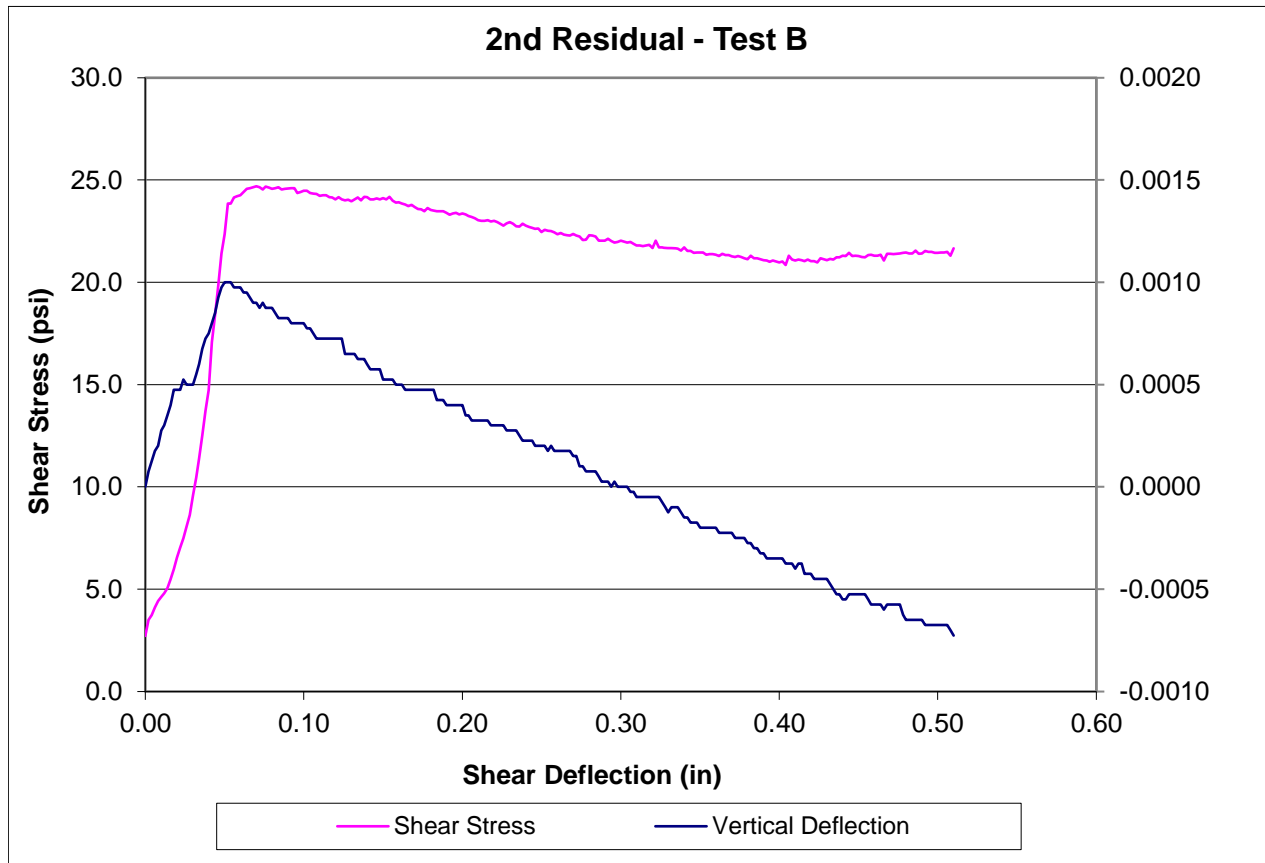
Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
2048.0	0.6880	0.2580	0.2542	0.2470	0.2591	58	0.3160	0.0011	12.8
2060.0	0.6860	0.2580	0.2542	0.2470	0.2591	59	0.3180	0.0011	13.1
2074.0	0.6840	0.2580	0.2541	0.2469	0.2591	59	0.3200	0.0011	13.2
2092.0	0.6820	0.2580	0.2541	0.2469	0.2591	60	0.3220	0.0011	13.2
2104.0	0.6800	0.2580	0.2541	0.2469	0.2591	59	0.3240	0.0011	13.2
2118.0	0.6780	0.2580	0.2541	0.2469	0.2590	60	0.3260	0.0011	13.2
2131.0	0.6760	0.2580	0.2541	0.2469	0.2590	60	0.3280	0.0011	13.3
2143.0	0.6740	0.2580	0.2541	0.2469	0.2590	60	0.3300	0.0011	13.2
2156.0	0.6720	0.2580	0.2540	0.2469	0.2590	60	0.3320	0.0010	13.2
2169.0	0.6700	0.2580	0.2540	0.2469	0.2590	59	0.3340	0.0010	13.1
2180.0	0.6680	0.2580	0.2540	0.2468	0.2590	60	0.3360	0.0010	13.3
2189.0	0.6660	0.2580	0.2540	0.2468	0.2590	59	0.3380	0.0010	13.2
2202.0	0.6640	0.2580	0.2540	0.2468	0.2590	59	0.3400	0.0010	13.1
2221.0	0.6620	0.2580	0.2540	0.2468	0.2590	61	0.3420	0.0010	13.4
2234.0	0.6600	0.2580	0.2540	0.2468	0.2590	59	0.3440	0.0010	13.1
2247.0	0.6580	0.2580	0.2540	0.2468	0.2589	59	0.3460	0.0010	13.1
2259.0	0.6560	0.2580	0.2540	0.2468	0.2589	59	0.3480	0.0010	13.0
2272.0	0.6540	0.2580	0.2540	0.2468	0.2589	59	0.3500	0.0010	13.0
2285.0	0.6520	0.2579	0.2540	0.2468	0.2589	59	0.3520	0.0010	13.0
2298.0	0.6500	0.2579	0.2539	0.2468	0.2589	59	0.3540	0.0009	13.0
2311.0	0.6480	0.2579	0.2539	0.2468	0.2589	59	0.3560	0.0009	13.0
2318.0	0.6460	0.2579	0.2539	0.2468	0.2589	59	0.3580	0.0009	13.0
2331.0	0.6440	0.2579	0.2539	0.2468	0.2589	58	0.3600	0.0009	12.9
2344.0	0.6420	0.2579	0.2539	0.2468	0.2589	58	0.3620	0.0009	12.9
2363.0	0.6400	0.2579	0.2539	0.2468	0.2589	58	0.3640	0.0009	12.8
2376.0	0.6380	0.2579	0.2539	0.2468	0.2588	58	0.3660	0.0009	12.8
2389.0	0.6360	0.2579	0.2539	0.2467	0.2588	58	0.3680	0.0009	12.8
2401.0	0.6340	0.2579	0.2539	0.2467	0.2588	58	0.3700	0.0009	12.9
2414.0	0.6320	0.2579	0.2539	0.2467	0.2588	58	0.3720	0.0009	12.8
2427.0	0.6300	0.2579	0.2539	0.2467	0.2588	58	0.3740	0.0009	12.8
2440.0	0.6280	0.2579	0.2538	0.2467	0.2588	58	0.3760	0.0009	12.8
2448.0	0.6260	0.2579	0.2538	0.2467	0.2588	58	0.3780	0.0009	12.8
2459.0	0.6240	0.2579	0.2538	0.2467	0.2588	58	0.3800	0.0009	12.7
2472.0	0.6220	0.2579	0.2538	0.2467	0.2588	58	0.3820	0.0009	12.8
2491.0	0.6200	0.2579	0.2538	0.2467	0.2588	57	0.3840	0.0009	12.7
2504.0	0.6180	0.2579	0.2538	0.2467	0.2588	57	0.3860	0.0009	12.7
2518.0	0.6160	0.2579	0.2538	0.2467	0.2587	57	0.3880	0.0008	12.6
2531.0	0.6140	0.2579	0.2538	0.2467	0.2587	57	0.3900	0.0008	12.7
2543.0	0.6120	0.2579	0.2538	0.2467	0.2587	57	0.3920	0.0008	12.6
2555.0	0.6100	0.2579	0.2537	0.2467	0.2587	57	0.3940	0.0008	12.6
2568.0	0.6080	0.2579	0.2538	0.2466	0.2587	57	0.3960	0.0008	12.6
2580.0	0.6060	0.2579	0.2537	0.2466	0.2587	57	0.3980	0.0008	12.7
2587.0	0.6040	0.2579	0.2537	0.2466	0.2587	57	0.4000	0.0008	12.6
2600.0	0.6020	0.2579	0.2537	0.2466	0.2587	57	0.4020	0.0008	12.6
2613.0	0.6000	0.2579	0.2537	0.2466	0.2587	57	0.4040	0.0008	12.6
2632.0	0.5980	0.2579	0.2537	0.2466	0.2586	56	0.4060	0.0008	12.5
2645.0	0.5960	0.2578	0.2537	0.2466	0.2586	57	0.4080	0.0007	12.5
2658.0	0.5940	0.2578	0.2537	0.2466	0.2586	56	0.4100	0.0007	12.4
2670.0	0.5920	0.2578	0.2537	0.2466	0.2586	56	0.4120	0.0007	12.4
2683.0	0.5900	0.2578	0.2536	0.2466	0.2586	56	0.4140	0.0007	12.4
2696.0	0.5880	0.2578	0.2536	0.2466	0.2586	56	0.4160	0.0007	12.4
2709.0	0.5860	0.2578	0.2536	0.2466	0.2586	56	0.4180	0.0007	12.4
2716.0	0.5840	0.2578	0.2536	0.2465	0.2585	55	0.4200	0.0006	12.1
2729.0	0.5820	0.2578	0.2536	0.2465	0.2586	56	0.4220	0.0007	12.3
2743.0	0.5800	0.2578	0.2536	0.2465	0.2586	56	0.4240	0.0007	12.4
2761.0	0.5780	0.2578	0.2536	0.2465	0.2585	56	0.4260	0.0006	12.3
2774.0	0.5760	0.2578	0.2536	0.2465	0.2585	56	0.4280	0.0006	12.3
2788.0	0.5740	0.2578	0.2536	0.2465	0.2585	56	0.4300	0.0006	12.3
2800.0	0.5720	0.2578	0.2536	0.2465	0.2585	55	0.4320	0.0006	12.3
2813.0	0.5700	0.2578	0.2535	0.2465	0.2585	55	0.4340	0.0006	12.2
2826.0	0.5680	0.2578	0.2535	0.2465	0.2585	55	0.4360	0.0006	12.2
2839.0	0.5660	0.2578	0.2535	0.2465	0.2585	55	0.4380	0.0006	12.1
2849.0	0.5640	0.2578	0.2535	0.2465	0.2585	56	0.4400	0.0006	12.3
2858.0	0.5620	0.2578	0.2535	0.2465	0.2585	55	0.4420	0.0006	12.2
2871.0	0.5600	0.2578	0.2535	0.2465	0.2584	55	0.4440	0.0006	12.2
2890.0	0.5580	0.2578	0.2535	0.2464	0.2585	57	0.4460	0.0006	12.6
2903.0	0.5560	0.2578	0.2535	0.2464	0.2584	55	0.4480	0.0006	12.3
2916.0	0.5540	0.2578	0.2535	0.2464	0.2584	55	0.4500	0.0006	12.2
2929.0	0.5520	0.2578	0.2535	0.2464	0.2584	55	0.4520	0.0006	12.2
2942.0	0.5500	0.2578	0.2535	0.2464	0.2584	55	0.4540	0.0006	12.2
2954.0	0.5480	0.2578	0.2534	0.2464	0.2584	55	0.4560	0.0005	12.2
2967.0	0.5460	0.2578	0.2534	0.2464	0.2584	55	0.4580	0.0005	12.2
2980.0	0.5440	0.2577	0.2534	0.2464	0.2584	55	0.4600	0.0005	12.2
2987.0	0.5420	0.2577	0.2534	0.2464	0.2583	55	0.4620	0.0005	12.2
3000.0	0.5400	0.2577	0.2534	0.2463	0.2583	55	0.4640	0.0005	12.2
3013.0	0.5380	0.2577	0.2534	0.2463	0.2583	55	0.4660	0.0005	12.3
3032.0	0.5360	0.2577	0.2533	0.2463	0.2583	56	0.4680	0.0005	12.4
3045.0	0.5340	0.2577	0.2533	0.2463	0.2583	56	0.4700	0.0005	12.4
3057.0	0.5320	0.2577	0.2533	0.2463	0.2583	56	0.4720	0.0005	12.5

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
3070.0	0.5300	0.2577	0.2533	0.2463	0.2582	56	0.4740	0.0004	12.5
3083.0	0.5280	0.2577	0.2533	0.2462	0.2582	57	0.4760	0.0004	12.5
3095.0	0.5260	0.2577	0.2532	0.2462	0.2582	57	0.4780	0.0004	12.6
3107.0	0.5240	0.2577	0.2532	0.2462	0.2582	57	0.4800	0.0004	12.6
3117.0	0.5220	0.2577	0.2532	0.2462	0.2582	57	0.4820	0.0004	12.7
3127.0	0.5200	0.2576	0.2532	0.2462	0.2582	57	0.4840	0.0003	12.6
3141.0	0.5180	0.2577	0.2532	0.2462	0.2582	57	0.4860	0.0004	12.6
3159.0	0.5160	0.2577	0.2532	0.2462	0.2582	57	0.4880	0.0004	12.7
3172.0	0.5140	0.2577	0.2532	0.2462	0.2582	57	0.4900	0.0004	12.6
3185.0	0.5120	0.2577	0.2532	0.2462	0.2582	57	0.4920	0.0004	12.6
3198.0	0.5100	0.2577	0.2532	0.2462	0.2582	57	0.4940	0.0004	12.6
3210.0	0.5080	0.2577	0.2532	0.2462	0.2582	57	0.4960	0.0004	12.6
3223.0	0.5060	0.2577	0.2532	0.2462	0.2582	57	0.4980	0.0004	12.6
3236.0	0.5040	0.2577	0.2532	0.2462	0.2581	57	0.5000	0.0003	12.6
3249.0	0.5020	0.2577	0.2532	0.2462	0.2581	57	0.5020	0.0003	12.6
3255.0	0.5000	0.2576	0.2531	0.2462	0.2581	57	0.5040	0.0003	12.5
3268.0	0.4980	0.2576	0.2531	0.2462	0.2581	57	0.5060	0.0003	12.6
3282.0	0.4960	0.2577	0.2531	0.2461	0.2581	57	0.5080	0.0003	12.5
3301.0	0.4940	0.2577	0.2531	0.2461	0.2581	57	0.5100	0.0003	12.6
3304.0	0.4935	0.2576	0.2531	0.2461	0.2581	57	0.5105	0.0003	12.5



Direct Shear Strength of Rock
ASTM D 5607

Project Name	<u>SR1 Flood Control Project - Inlet Debris Barrier</u>	Project Number	<u>110773396</u>
Lithology	<u>Dolomite, gray, moderately hard, partially healed faults</u>	Lab ID	<u>DSSS-6</u>
Hole Number	<u>DB-1</u>	Date Received	<u>05/15/2018</u>
Depth (m)	<u>20.26</u>		
Test Type	<u>Direct shear of sawn surface</u>	Diameter (in)	<u>2.398</u>
Initial Moisture Condition	<u>As received, moist</u>	Angle of Dip (deg)	<u>0.0</u>
Test Moisture Condition	<u>Soaked at least 12 hours prior to test.</u>	Area(in ²)	<u>4.52</u>
Joint Roughness	<u>1</u>		
		Date Prepared	<u>06/29/2018</u>
Normal Stress (psi)	<u>51</u>	Date Tested	<u>07/02/2018</u>



Sketch



Shear Rate to Peak (in/min) N/A

Encapsulation Material Hydro-Stone

Comments _____

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
0.0	1.0064	0.2559	0.2529	0.2522	0.2559	12	0.0000	0.0000	2.7
19.0	1.0044	0.2558	0.2530	0.2519	0.2565	16	0.0020	0.0001	3.5
34.0	1.0024	0.2557	0.2531	0.2517	0.2569	17	0.0040	0.0001	3.7
57.0	1.0004	0.2557	0.2532	0.2514	0.2573	19	0.0060	0.0002	4.1
72.0	0.9984	0.2556	0.2534	0.2511	0.2576	20	0.0080	0.0002	4.4
87.0	0.9964	0.2556	0.2535	0.2509	0.2580	21	0.0100	0.0003	4.6
101.0	0.9944	0.2555	0.2536	0.2507	0.2583	22	0.0120	0.0003	4.8
114.0	0.9924	0.2555	0.2536	0.2506	0.2586	23	0.0140	0.0003	5.0
126.0	0.9904	0.2555	0.2537	0.2503	0.2590	25	0.0160	0.0004	5.5
139.0	0.9884	0.2555	0.2538	0.2502	0.2593	27	0.0180	0.0005	6.0
151.0	0.9864	0.2555	0.2538	0.2500	0.2595	30	0.0200	0.0005	6.6
161.0	0.9844	0.2555	0.2538	0.2499	0.2596	32	0.0220	0.0005	7.0
166.0	0.9824	0.2555	0.2539	0.2499	0.2597	34	0.0240	0.0005	7.5
177.0	0.9804	0.2554	0.2539	0.2498	0.2598	36	0.0260	0.0005	8.1
188.0	0.9784	0.2554	0.2539	0.2497	0.2599	39	0.0280	0.0005	8.6
205.0	0.9764	0.2554	0.2539	0.2496	0.2600	43	0.0300	0.0005	9.6
216.0	0.9744	0.2554	0.2540	0.2495	0.2602	47	0.0320	0.0005	10.5
226.0	0.9724	0.2555	0.2540	0.2494	0.2604	51	0.0340	0.0006	11.4
237.0	0.9704	0.2555	0.2541	0.2493	0.2607	57	0.0360	0.0007	12.5
249.0	0.9684	0.2556	0.2542	0.2492	0.2608	62	0.0380	0.0007	13.7
261.0	0.9664	0.2556	0.2542	0.2491	0.2610	67	0.0400	0.0007	14.7
274.0	0.9644	0.2556	0.2543	0.2490	0.2612	77	0.0420	0.0008	17.1
288.0	0.9624	0.2557	0.2543	0.2487	0.2616	83	0.0440	0.0008	18.4
301.0	0.9604	0.2557	0.2544	0.2484	0.2621	90	0.0460	0.0009	19.8
314.0	0.9584	0.2557	0.2545	0.2481	0.2625	97	0.0480	0.0010	21.4
322.0	0.9564	0.2558	0.2545	0.2479	0.2627	101	0.0500	0.0010	22.4
342.0	0.9544	0.2558	0.2545	0.2477	0.2629	108	0.0520	0.0010	23.8
355.0	0.9524	0.2558	0.2545	0.2477	0.2629	108	0.0540	0.0010	23.8
368.0	0.9504	0.2558	0.2545	0.2476	0.2629	109	0.0560	0.0010	24.1
382.0	0.9484	0.2558	0.2545	0.2476	0.2629	109	0.0580	0.0010	24.2
395.0	0.9464	0.2558	0.2545	0.2476	0.2629	110	0.0600	0.0010	24.2
408.0	0.9444	0.2558	0.2544	0.2476	0.2629	110	0.0620	0.0010	24.4
422.0	0.9424	0.2558	0.2544	0.2476	0.2629	111	0.0640	0.0010	24.6
435.0	0.9404	0.2558	0.2544	0.2475	0.2629	111	0.0660	0.0009	24.6
449.0	0.9384	0.2557	0.2544	0.2475	0.2629	111	0.0680	0.0009	24.6
462.0	0.9364	0.2557	0.2544	0.2475	0.2629	112	0.0700	0.0009	24.7
475.0	0.9344	0.2557	0.2544	0.2475	0.2628	111	0.0720	0.0009	24.6
489.0	0.9324	0.2557	0.2544	0.2475	0.2629	111	0.0740	0.0009	24.5
502.0	0.9304	0.2557	0.2544	0.2475	0.2628	111	0.0760	0.0009	24.7
516.0	0.9284	0.2557	0.2544	0.2475	0.2628	111	0.0780	0.0009	24.6
529.0	0.9264	0.2557	0.2544	0.2475	0.2628	111	0.0800	0.0009	24.6
541.0	0.9244	0.2557	0.2544	0.2474	0.2628	111	0.0820	0.0008	24.6
554.0	0.9224	0.2557	0.2543	0.2474	0.2628	111	0.0840	0.0008	24.6
567.0	0.9204	0.2557	0.2543	0.2474	0.2628	111	0.0860	0.0008	24.5
580.0	0.9184	0.2557	0.2543	0.2474	0.2628	111	0.0880	0.0008	24.6
593.0	0.9164	0.2557	0.2543	0.2474	0.2628	111	0.0900	0.0008	24.6
607.0	0.9144	0.2556	0.2543	0.2474	0.2628	111	0.0920	0.0008	24.6
620.0	0.9124	0.2556	0.2543	0.2474	0.2628	111	0.0940	0.0008	24.6
632.0	0.9104	0.2556	0.2543	0.2474	0.2628	110	0.0960	0.0008	24.4
646.0	0.9084	0.2556	0.2543	0.2474	0.2628	110	0.0980	0.0008	24.4
659.0	0.9064	0.2556	0.2543	0.2474	0.2628	111	0.1000	0.0008	24.5
672.0	0.9044	0.2556	0.2543	0.2474	0.2627	111	0.1020	0.0008	24.5
685.0	0.9024	0.2556	0.2543	0.2474	0.2627	110	0.1040	0.0008	24.4
697.0	0.9004	0.2556	0.2542	0.2474	0.2627	110	0.1060	0.0007	24.3
711.0	0.8984	0.2556	0.2542	0.2473	0.2627	110	0.1080	0.0007	24.3
724.0	0.8964	0.2556	0.2542	0.2473	0.2627	109	0.1100	0.0007	24.2
737.0	0.8944	0.2556	0.2542	0.2473	0.2627	110	0.1120	0.0007	24.2
750.0	0.8924	0.2556	0.2542	0.2473	0.2627	110	0.1140	0.0007	24.2
764.0	0.8904	0.2556	0.2542	0.2473	0.2627	109	0.1160	0.0007	24.2
777.0	0.8884	0.2556	0.2542	0.2473	0.2627	109	0.1180	0.0007	24.1
790.0	0.8864	0.2556	0.2542	0.2473	0.2627	109	0.1200	0.0007	24.0
803.0	0.8844	0.2556	0.2542	0.2473	0.2627	109	0.1220	0.0007	24.2
816.0	0.8824	0.2556	0.2542	0.2473	0.2627	109	0.1240	0.0007	24.0
829.0	0.8804	0.2555	0.2541	0.2473	0.2626	108	0.1260	0.0006	24.0
842.0	0.8784	0.2555	0.2541	0.2473	0.2626	109	0.1280	0.0006	24.0
855.0	0.8764	0.2555	0.2541	0.2473	0.2626	108	0.1300	0.0006	24.0
867.0	0.8744	0.2555	0.2541	0.2473	0.2626	109	0.1320	0.0006	24.0
880.0	0.8724	0.2555	0.2541	0.2472	0.2626	109	0.1340	0.0006	24.1
893.0	0.8704	0.2555	0.2541	0.2472	0.2626	108	0.1360	0.0006	24.0
906.0	0.8684	0.2555	0.2541	0.2472	0.2626	109	0.1380	0.0006	24.2
919.0	0.8664	0.2555	0.2540	0.2472	0.2626	109	0.1400	0.0006	24.2
932.0	0.8644	0.2555	0.2540	0.2472	0.2625	109	0.1420	0.0006	24.0
945.0	0.8624	0.2555	0.2540	0.2472	0.2625	109	0.1440	0.0006	24.0
958.0	0.8604	0.2555	0.2540	0.2472	0.2625	109	0.1460	0.0006	24.1
971.0	0.8584	0.2555	0.2540	0.2472	0.2625	109	0.1480	0.0006	24.0
984.0	0.8564	0.2554	0.2540	0.2471	0.2625	109	0.1500	0.0005	24.1
997.0	0.8544	0.2554	0.2540	0.2471	0.2625	109	0.1520	0.0005	24.0
1009.0	0.8524	0.2554	0.2540	0.2471	0.2625	109	0.1540	0.0005	24.2
1023.0	0.8504	0.2554	0.2540	0.2471	0.2625	108	0.1560	0.0005	24.0

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
1036.0	0.8484	0.2554	0.2539	0.2471	0.2625	108	0.1580	0.0005	23.9
1048.0	0.8464	0.2554	0.2539	0.2471	0.2625	108	0.1600	0.0005	23.9
1062.0	0.8444	0.2554	0.2539	0.2471	0.2625	108	0.1620	0.0005	23.8
1075.0	0.8424	0.2554	0.2539	0.2471	0.2624	108	0.1640	0.0005	23.8
1087.0	0.8404	0.2554	0.2539	0.2471	0.2624	107	0.1660	0.0005	23.7
1100.0	0.8384	0.2554	0.2539	0.2471	0.2624	107	0.1680	0.0005	23.8
1113.0	0.8364	0.2554	0.2539	0.2471	0.2624	107	0.1700	0.0005	23.7
1126.0	0.8344	0.2554	0.2539	0.2471	0.2624	107	0.1720	0.0005	23.6
1138.0	0.8324	0.2554	0.2539	0.2471	0.2624	106	0.1740	0.0005	23.6
1151.0	0.8304	0.2554	0.2539	0.2471	0.2624	106	0.1760	0.0005	23.5
1165.0	0.8284	0.2554	0.2539	0.2471	0.2624	107	0.1780	0.0005	23.6
1177.0	0.8264	0.2554	0.2539	0.2471	0.2624	106	0.1800	0.0005	23.5
1190.0	0.8244	0.2554	0.2539	0.2471	0.2624	106	0.1820	0.0005	23.5
1203.0	0.8224	0.2554	0.2538	0.2471	0.2623	106	0.1840	0.0004	23.5
1216.0	0.8204	0.2554	0.2538	0.2471	0.2623	106	0.1860	0.0004	23.5
1229.0	0.8184	0.2554	0.2538	0.2471	0.2623	106	0.1880	0.0004	23.5
1241.0	0.8164	0.2554	0.2538	0.2470	0.2623	106	0.1900	0.0004	23.4
1254.0	0.8144	0.2554	0.2538	0.2470	0.2623	105	0.1920	0.0004	23.3
1266.0	0.8124	0.2554	0.2538	0.2470	0.2623	106	0.1940	0.0004	23.4
1280.0	0.8104	0.2554	0.2538	0.2470	0.2623	106	0.1960	0.0004	23.4
1293.0	0.8084	0.2554	0.2538	0.2470	0.2623	105	0.1980	0.0004	23.3
1306.0	0.8064	0.2554	0.2538	0.2470	0.2623	106	0.2000	0.0004	23.4
1319.0	0.8044	0.2553	0.2538	0.2470	0.2622	105	0.2020	0.0003	23.3
1332.0	0.8024	0.2553	0.2538	0.2470	0.2622	105	0.2040	0.0003	23.2
1344.0	0.8004	0.2553	0.2537	0.2470	0.2622	105	0.2060	0.0003	23.2
1356.0	0.7984	0.2553	0.2537	0.2470	0.2622	104	0.2080	0.0003	23.1
1369.0	0.7964	0.2553	0.2537	0.2470	0.2622	104	0.2100	0.0003	23.0
1382.0	0.7944	0.2553	0.2537	0.2470	0.2622	104	0.2120	0.0003	23.0
1395.0	0.7924	0.2553	0.2537	0.2470	0.2622	104	0.2140	0.0003	23.0
1405.0	0.7904	0.2553	0.2537	0.2470	0.2622	104	0.2160	0.0003	23.0
1421.0	0.7884	0.2553	0.2537	0.2470	0.2621	104	0.2180	0.0003	23.0
1433.0	0.7864	0.2553	0.2537	0.2470	0.2621	104	0.2200	0.0003	23.0
1446.0	0.7844	0.2553	0.2537	0.2470	0.2621	104	0.2220	0.0003	22.9
1459.0	0.7824	0.2553	0.2537	0.2470	0.2621	103	0.2240	0.0003	22.9
1472.0	0.7804	0.2553	0.2537	0.2470	0.2621	103	0.2260	0.0003	22.8
1485.0	0.7784	0.2553	0.2536	0.2470	0.2621	103	0.2280	0.0003	22.9
1498.0	0.7764	0.2553	0.2536	0.2470	0.2621	104	0.2300	0.0003	22.9
1511.0	0.7744	0.2553	0.2536	0.2470	0.2621	103	0.2320	0.0003	22.9
1524.0	0.7724	0.2553	0.2536	0.2470	0.2621	103	0.2340	0.0003	22.7
1535.0	0.7704	0.2553	0.2536	0.2470	0.2620	103	0.2360	0.0002	22.7
1549.0	0.7684	0.2553	0.2536	0.2469	0.2620	103	0.2380	0.0002	22.9
1563.0	0.7664	0.2553	0.2536	0.2469	0.2620	103	0.2400	0.0002	22.8
1576.0	0.7644	0.2553	0.2536	0.2469	0.2620	103	0.2420	0.0002	22.7
1588.0	0.7624	0.2553	0.2536	0.2469	0.2620	102	0.2440	0.0002	22.7
1601.0	0.7604	0.2553	0.2535	0.2469	0.2620	102	0.2460	0.0002	22.6
1613.0	0.7584	0.2553	0.2535	0.2469	0.2620	102	0.2480	0.0002	22.6
1626.0	0.7564	0.2553	0.2535	0.2469	0.2620	101	0.2500	0.0002	22.5
1639.0	0.7544	0.2553	0.2535	0.2469	0.2620	102	0.2520	0.0002	22.6
1652.0	0.7524	0.2553	0.2535	0.2469	0.2619	102	0.2540	0.0002	22.5
1664.0	0.7504	0.2553	0.2535	0.2469	0.2620	102	0.2560	0.0002	22.5
1677.0	0.7484	0.2553	0.2535	0.2469	0.2619	101	0.2580	0.0002	22.4
1691.0	0.7464	0.2553	0.2535	0.2469	0.2619	101	0.2600	0.0002	22.3
1703.0	0.7444	0.2553	0.2535	0.2469	0.2619	101	0.2620	0.0002	22.4
1716.0	0.7424	0.2553	0.2535	0.2469	0.2619	101	0.2640	0.0002	22.3
1729.0	0.7404	0.2553	0.2535	0.2469	0.2619	101	0.2660	0.0002	22.3
1742.0	0.7384	0.2553	0.2535	0.2469	0.2619	101	0.2680	0.0002	22.3
1755.0	0.7364	0.2553	0.2534	0.2469	0.2619	101	0.2700	0.0001	22.4
1768.0	0.7344	0.2553	0.2534	0.2469	0.2619	101	0.2720	0.0001	22.3
1780.0	0.7324	0.2552	0.2534	0.2469	0.2618	100	0.2740	0.0001	22.2
1792.0	0.7304	0.2552	0.2534	0.2469	0.2618	100	0.2760	0.0001	22.1
1804.0	0.7284	0.2552	0.2534	0.2468	0.2618	100	0.2780	0.0001	22.1
1819.0	0.7264	0.2552	0.2534	0.2468	0.2618	101	0.2800	0.0001	22.3
1831.0	0.7244	0.2552	0.2534	0.2468	0.2618	101	0.2820	0.0001	22.3
1844.0	0.7224	0.2552	0.2534	0.2468	0.2618	100	0.2840	0.0001	22.2
1857.0	0.7204	0.2552	0.2533	0.2468	0.2618	100	0.2860	0.0000	22.0
1870.0	0.7184	0.2552	0.2533	0.2468	0.2617	100	0.2880	0.0000	22.0
1883.0	0.7164	0.2552	0.2533	0.2468	0.2617	100	0.2900	0.0000	22.0
1895.0	0.7144	0.2552	0.2533	0.2468	0.2617	100	0.2920	0.0000	22.1
1908.0	0.7124	0.2552	0.2533	0.2467	0.2617	99	0.2940	0.0000	22.0
1921.0	0.7104	0.2552	0.2533	0.2468	0.2617	99	0.2960	0.0000	21.9
1934.0	0.7084	0.2552	0.2533	0.2467	0.2617	99	0.2980	0.0000	22.0
1945.0	0.7064	0.2552	0.2533	0.2467	0.2617	100	0.3000	0.0000	22.0
1959.0	0.7044	0.2552	0.2533	0.2467	0.2617	99	0.3020	0.0000	22.0
1972.0	0.7024	0.2552	0.2533	0.2467	0.2617	99	0.3040	0.0000	21.9
1985.0	0.7004	0.2552	0.2532	0.2467	0.2617	99	0.3060	0.0000	22.0
1998.0	0.6984	0.2552	0.2532	0.2467	0.2617	99	0.3080	0.0000	21.9
2010.0	0.6964	0.2552	0.2532	0.2467	0.2616	98	0.3100	-0.0001	21.8
2023.0	0.6944	0.2552	0.2532	0.2467	0.2616	98	0.3120	-0.0001	21.8
2036.0	0.6924	0.2552	0.2532	0.2467	0.2616	98	0.3140	-0.0001	21.8

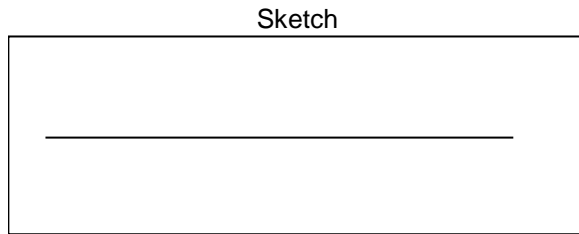
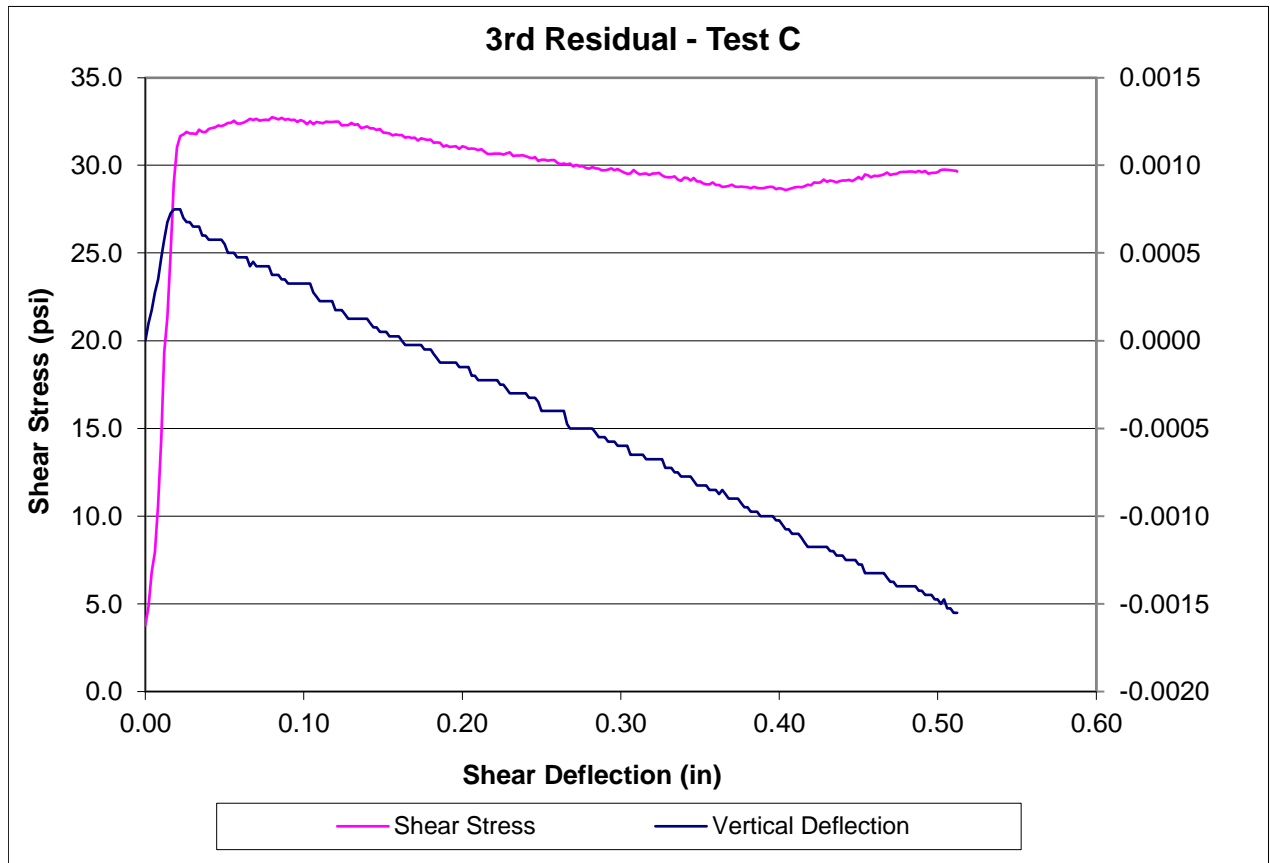
Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
2049.0	0.6904	0.2552	0.2532	0.2467	0.2616	98	0.3160	-0.0001	21.8
2062.0	0.6884	0.2552	0.2532	0.2467	0.2616	99	0.3180	-0.0001	21.8
2070.0	0.6864	0.2552	0.2532	0.2467	0.2616	98	0.3200	-0.0001	21.7
2087.0	0.6844	0.2552	0.2532	0.2467	0.2616	100	0.3220	-0.0001	22.0
2100.0	0.6824	0.2552	0.2532	0.2467	0.2616	98	0.3240	-0.0001	21.7
2112.0	0.6804	0.2552	0.2532	0.2467	0.2615	98	0.3260	-0.0001	21.7
2125.0	0.6784	0.2551	0.2532	0.2467	0.2615	98	0.3280	-0.0001	21.7
2138.0	0.6764	0.2551	0.2531	0.2467	0.2615	98	0.3300	-0.0001	21.7
2151.0	0.6744	0.2552	0.2531	0.2467	0.2615	98	0.3320	-0.0001	21.7
2164.0	0.6724	0.2552	0.2531	0.2467	0.2615	98	0.3340	-0.0001	21.7
2177.0	0.6704	0.2552	0.2531	0.2467	0.2615	98	0.3360	-0.0001	21.6
2190.0	0.6684	0.2551	0.2531	0.2467	0.2615	97	0.3380	-0.0001	21.5
2202.0	0.6664	0.2551	0.2531	0.2466	0.2615	98	0.3400	-0.0002	21.7
2212.0	0.6644	0.2551	0.2531	0.2466	0.2615	97	0.3420	-0.0002	21.5
2229.0	0.6624	0.2551	0.2531	0.2466	0.2614	97	0.3440	-0.0002	21.5
2242.0	0.6604	0.2551	0.2531	0.2466	0.2614	97	0.3460	-0.0002	21.4
2255.0	0.6584	0.2551	0.2531	0.2466	0.2614	97	0.3480	-0.0002	21.5
2268.0	0.6564	0.2551	0.2530	0.2466	0.2614	97	0.3500	-0.0002	21.5
2281.0	0.6544	0.2551	0.2530	0.2466	0.2614	97	0.3520	-0.0002	21.5
2294.0	0.6524	0.2551	0.2530	0.2466	0.2614	96	0.3540	-0.0002	21.3
2306.0	0.6504	0.2551	0.2530	0.2466	0.2614	97	0.3560	-0.0002	21.4
2319.0	0.6484	0.2551	0.2530	0.2466	0.2614	97	0.3580	-0.0002	21.4
2333.0	0.6464	0.2551	0.2530	0.2466	0.2614	96	0.3600	-0.0002	21.3
2341.0	0.6444	0.2551	0.2530	0.2466	0.2613	96	0.3620	-0.0002	21.3
2358.0	0.6424	0.2551	0.2530	0.2466	0.2613	97	0.3640	-0.0002	21.4
2371.0	0.6404	0.2551	0.2530	0.2466	0.2613	96	0.3660	-0.0002	21.3
2384.0	0.6384	0.2551	0.2530	0.2466	0.2613	96	0.3680	-0.0002	21.3
2397.0	0.6364	0.2551	0.2530	0.2466	0.2613	96	0.3700	-0.0002	21.3
2409.0	0.6344	0.2551	0.2529	0.2466	0.2613	96	0.3720	-0.0003	21.2
2422.0	0.6324	0.2551	0.2529	0.2466	0.2613	96	0.3740	-0.0003	21.3
2435.0	0.6304	0.2551	0.2529	0.2466	0.2613	96	0.3760	-0.0003	21.2
2448.0	0.6284	0.2551	0.2529	0.2466	0.2613	96	0.3780	-0.0003	21.2
2460.0	0.6264	0.2551	0.2529	0.2466	0.2612	95	0.3800	-0.0003	21.1
2470.0	0.6244	0.2551	0.2529	0.2465	0.2613	96	0.3820	-0.0003	21.3
2481.0	0.6224	0.2551	0.2529	0.2465	0.2612	96	0.3840	-0.0003	21.2
2499.0	0.6204	0.2551	0.2529	0.2465	0.2612	96	0.3860	-0.0003	21.2
2512.0	0.6184	0.2551	0.2528	0.2465	0.2612	95	0.3880	-0.0003	21.1
2525.0	0.6164	0.2551	0.2528	0.2465	0.2612	95	0.3900	-0.0003	21.1
2538.0	0.6144	0.2551	0.2528	0.2465	0.2611	95	0.3920	-0.0004	21.1
2550.0	0.6124	0.2551	0.2528	0.2465	0.2611	95	0.3940	-0.0004	21.0
2563.0	0.6104	0.2551	0.2528	0.2465	0.2611	95	0.3960	-0.0004	21.1
2576.0	0.6084	0.2551	0.2528	0.2465	0.2611	95	0.3980	-0.0004	21.0
2588.0	0.6064	0.2551	0.2528	0.2465	0.2611	95	0.4000	-0.0004	21.0
2601.0	0.6044	0.2551	0.2528	0.2465	0.2611	95	0.4020	-0.0004	21.0
2608.0	0.6024	0.2551	0.2528	0.2465	0.2610	94	0.4040	-0.0004	20.8
2626.0	0.6004	0.2551	0.2527	0.2465	0.2611	96	0.4060	-0.0004	21.3
2640.0	0.5984	0.2551	0.2527	0.2465	0.2611	95	0.4080	-0.0004	21.1
2653.0	0.5964	0.2551	0.2527	0.2465	0.2610	95	0.4100	-0.0004	21.1
2665.0	0.5944	0.2551	0.2527	0.2465	0.2611	95	0.4120	-0.0004	21.1
2678.0	0.5924	0.2551	0.2527	0.2465	0.2611	95	0.4140	-0.0004	21.1
2691.0	0.5904	0.2551	0.2527	0.2464	0.2610	95	0.4160	-0.0004	21.0
2704.0	0.5884	0.2551	0.2527	0.2464	0.2610	95	0.4180	-0.0004	21.1
2717.0	0.5864	0.2551	0.2527	0.2464	0.2610	95	0.4200	-0.0004	21.0
2730.0	0.5844	0.2551	0.2526	0.2464	0.2610	95	0.4220	-0.0005	21.0
2738.0	0.5824	0.2551	0.2526	0.2464	0.2610	95	0.4240	-0.0005	21.0
2750.0	0.5804	0.2551	0.2526	0.2464	0.2610	96	0.4260	-0.0005	21.2
2768.0	0.5784	0.2551	0.2526	0.2464	0.2610	95	0.4280	-0.0005	21.1
2781.0	0.5764	0.2551	0.2526	0.2464	0.2610	95	0.4300	-0.0005	21.1
2795.0	0.5744	0.2551	0.2526	0.2463	0.2610	96	0.4320	-0.0005	21.1
2808.0	0.5724	0.2551	0.2526	0.2463	0.2609	95	0.4340	-0.0005	21.1
2820.0	0.5704	0.2551	0.2525	0.2463	0.2609	96	0.4360	-0.0005	21.2
2833.0	0.5684	0.2551	0.2525	0.2463	0.2609	96	0.4380	-0.0005	21.2
2846.0	0.5664	0.2550	0.2525	0.2463	0.2609	96	0.4400	-0.0006	21.3
2859.0	0.5644	0.2550	0.2525	0.2463	0.2609	96	0.4420	-0.0006	21.3
2870.0	0.5624	0.2551	0.2525	0.2463	0.2609	97	0.4440	-0.0005	21.4
2879.0	0.5604	0.2551	0.2525	0.2463	0.2609	96	0.4460	-0.0005	21.3
2898.0	0.5584	0.2551	0.2525	0.2463	0.2609	96	0.4480	-0.0005	21.3
2910.0	0.5564	0.2551	0.2525	0.2463	0.2609	96	0.4500	-0.0005	21.3
2923.0	0.5544	0.2551	0.2525	0.2463	0.2609	96	0.4520	-0.0005	21.2
2936.0	0.5524	0.2551	0.2525	0.2463	0.2609	96	0.4540	-0.0005	21.2
2949.0	0.5504	0.2551	0.2524	0.2463	0.2609	96	0.4560	-0.0006	21.3
2961.0	0.5484	0.2551	0.2524	0.2462	0.2609	96	0.4580	-0.0006	21.3
2974.0	0.5464	0.2551	0.2524	0.2462	0.2609	96	0.4600	-0.0006	21.3
2987.0	0.5444	0.2551	0.2524	0.2462	0.2609	96	0.4620	-0.0006	21.3
3000.0	0.5424	0.2551	0.2524	0.2462	0.2609	96	0.4640	-0.0006	21.3
3007.0	0.5404	0.2551	0.2524	0.2462	0.2608	95	0.4660	-0.0006	21.1
3025.0	0.5384	0.2551	0.2524	0.2462	0.2609	97	0.4680	-0.0006	21.4
3039.0	0.5364	0.2551	0.2524	0.2462	0.2609	97	0.4700	-0.0006	21.4
3051.0	0.5344	0.2551	0.2524	0.2462	0.2609	97	0.4720	-0.0006	21.4

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
3064.0	0.5324	0.2551	0.2524	0.2462	0.2609	97	0.4740	-0.0006	21.4
3076.0	0.5304	0.2551	0.2524	0.2462	0.2609	97	0.4760	-0.0006	21.4
3089.0	0.5284	0.2551	0.2523	0.2462	0.2608	97	0.4780	-0.0006	21.4
3102.0	0.5264	0.2551	0.2523	0.2461	0.2608	97	0.4800	-0.0007	21.5
3114.0	0.5244	0.2551	0.2523	0.2461	0.2608	97	0.4820	-0.0007	21.4
3126.0	0.5224	0.2551	0.2523	0.2461	0.2608	97	0.4840	-0.0007	21.4
3138.0	0.5204	0.2551	0.2523	0.2461	0.2608	97	0.4860	-0.0007	21.5
3147.0	0.5184	0.2551	0.2523	0.2461	0.2608	97	0.4880	-0.0007	21.4
3165.0	0.5164	0.2551	0.2523	0.2461	0.2608	97	0.4900	-0.0007	21.4
3178.0	0.5144	0.2551	0.2522	0.2461	0.2608	97	0.4920	-0.0007	21.5
3191.0	0.5124	0.2551	0.2522	0.2461	0.2608	97	0.4940	-0.0007	21.5
3204.0	0.5104	0.2551	0.2522	0.2461	0.2608	97	0.4960	-0.0007	21.5
3216.0	0.5084	0.2551	0.2522	0.2461	0.2608	97	0.4980	-0.0007	21.4
3229.0	0.5064	0.2551	0.2522	0.2461	0.2608	97	0.5000	-0.0007	21.4
3242.0	0.5044	0.2551	0.2522	0.2461	0.2608	97	0.5020	-0.0007	21.5
3255.0	0.5024	0.2551	0.2522	0.2461	0.2608	97	0.5040	-0.0007	21.5
3268.0	0.5004	0.2551	0.2522	0.2461	0.2608	97	0.5060	-0.0007	21.5
3275.0	0.4984	0.2551	0.2522	0.2461	0.2607	96	0.5080	-0.0007	21.3
3294.0	0.4964	0.2551	0.2522	0.2460	0.2607	98	0.5100	-0.0007	21.7



Direct Shear Strength of Rock
ASTM D 5607

Project Name	<u>SR1 Flood Control Project - Inlet Debris Barrier</u>	Project Number	<u>110773396</u>
Lithology	<u>Dolomite, gray, moderately hard, partially healed faults</u>	Lab ID	<u>DSSS-6</u>
Hole Number	<u>DB-1</u>	Date Received	<u>05/15/2018</u>
Depth (m)	<u>20.26</u>	Diameter (in)	<u>2.398</u>
Test Type	<u>Direct shear of sawn surface</u>	Angle of Dip (deg)	<u>0.0</u>
Initial Moisture Condition	<u>As received, moist</u>	Area(in ²)	<u>4.52</u>
Test Moisture Condition	<u>Soaked at least 12 hours prior to test.</u>		
Joint Roughness	<u>1</u>	Date Prepared	<u>06/29/2018</u>
Normal Stress (psi)	<u>73</u>	Date Tested	<u>07/02/2018</u>



Shear Rate to Peak (in/min) N/A
Encapsulation Material Hydro-Stone

Comments _____

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
0.0	1.0072	0.2551	0.2544	0.2537	0.2532	17	0.0000	0.0000	3.8
23.0	1.0052	0.2551	0.2545	0.2534	0.2538	22	0.0020	0.0001	4.8
31.0	1.0032	0.2552	0.2545	0.2531	0.2543	31	0.0040	0.0002	6.8
46.0	1.0012	0.2553	0.2546	0.2528	0.2548	36	0.0060	0.0003	7.9
68.0	0.9992	0.2553	0.2547	0.2524	0.2554	48	0.0080	0.0004	10.7
83.0	0.9972	0.2554	0.2549	0.2521	0.2559	65	0.0100	0.0005	14.5
99.0	0.9952	0.2555	0.2550	0.2518	0.2564	87	0.0120	0.0006	19.3
113.0	0.9932	0.2556	0.2550	0.2516	0.2569	97	0.0140	0.0007	21.4
127.0	0.9912	0.2557	0.2550	0.2513	0.2573	113	0.0160	0.0007	25.0
141.0	0.9892	0.2557	0.2551	0.2510	0.2576	131	0.0180	0.0007	29.0
155.0	0.9872	0.2557	0.2551	0.2509	0.2577	140	0.0200	0.0007	31.0
169.0	0.9852	0.2557	0.2551	0.2509	0.2577	143	0.0220	0.0007	31.7
182.0	0.9832	0.2556	0.2550	0.2509	0.2577	143	0.0240	0.0007	31.8
195.0	0.9812	0.2556	0.2550	0.2508	0.2577	144	0.0260	0.0007	31.9
208.0	0.9792	0.2556	0.2550	0.2508	0.2577	144	0.0280	0.0007	31.8
222.0	0.9772	0.2556	0.2550	0.2508	0.2576	144	0.0300	0.0006	31.8
236.0	0.9752	0.2556	0.2550	0.2508	0.2576	144	0.0320	0.0006	31.8
248.0	0.9732	0.2556	0.2550	0.2508	0.2576	145	0.0340	0.0006	32.0
262.0	0.9712	0.2555	0.2550	0.2507	0.2576	144	0.0360	0.0006	31.9
275.0	0.9692	0.2555	0.2550	0.2507	0.2576	144	0.0380	0.0006	31.9
288.0	0.9672	0.2555	0.2549	0.2507	0.2576	145	0.0400	0.0006	32.1
301.0	0.9652	0.2555	0.2549	0.2507	0.2576	145	0.0420	0.0006	32.1
315.0	0.9632	0.2555	0.2549	0.2507	0.2576	145	0.0440	0.0006	32.1
328.0	0.9612	0.2555	0.2549	0.2507	0.2576	146	0.0460	0.0006	32.3
341.0	0.9592	0.2555	0.2549	0.2507	0.2576	146	0.0480	0.0006	32.2
354.0	0.9572	0.2554	0.2549	0.2507	0.2576	146	0.0500	0.0005	32.3
367.0	0.9552	0.2554	0.2549	0.2506	0.2575	146	0.0520	0.0005	32.4
381.0	0.9532	0.2554	0.2549	0.2506	0.2575	146	0.0540	0.0005	32.4
394.0	0.9512	0.2554	0.2549	0.2506	0.2575	147	0.0560	0.0005	32.5
406.0	0.9492	0.2554	0.2548	0.2506	0.2575	146	0.0580	0.0005	32.4
419.0	0.9472	0.2554	0.2548	0.2506	0.2575	146	0.0600	0.0005	32.4
433.0	0.9452	0.2554	0.2548	0.2506	0.2575	147	0.0620	0.0005	32.4
446.0	0.9432	0.2554	0.2548	0.2506	0.2575	147	0.0640	0.0005	32.5
459.0	0.9412	0.2553	0.2548	0.2505	0.2575	148	0.0660	0.0004	32.7
472.0	0.9392	0.2554	0.2548	0.2505	0.2575	147	0.0680	0.0005	32.6
486.0	0.9372	0.2553	0.2548	0.2505	0.2575	148	0.0700	0.0004	32.7
498.0	0.9352	0.2553	0.2548	0.2505	0.2575	147	0.0720	0.0004	32.5
511.0	0.9332	0.2553	0.2548	0.2505	0.2575	147	0.0740	0.0004	32.6
524.0	0.9312	0.2553	0.2548	0.2505	0.2575	147	0.0760	0.0004	32.6
538.0	0.9292	0.2553	0.2548	0.2505	0.2575	147	0.0780	0.0004	32.6
550.0	0.9272	0.2553	0.2547	0.2505	0.2574	148	0.0800	0.0004	32.7
563.0	0.9252	0.2553	0.2547	0.2505	0.2574	148	0.0820	0.0004	32.7
576.0	0.9232	0.2553	0.2547	0.2505	0.2574	147	0.0840	0.0004	32.6
588.0	0.9212	0.2553	0.2547	0.2504	0.2574	148	0.0860	0.0004	32.7
601.0	0.9192	0.2553	0.2547	0.2504	0.2574	147	0.0880	0.0004	32.6
614.0	0.9172	0.2552	0.2547	0.2504	0.2574	147	0.0900	0.0003	32.6
627.0	0.9152	0.2552	0.2547	0.2504	0.2574	147	0.0920	0.0003	32.6
640.0	0.9132	0.2552	0.2547	0.2504	0.2574	147	0.0940	0.0003	32.6
653.0	0.9112	0.2552	0.2547	0.2504	0.2574	147	0.0960	0.0003	32.5
666.0	0.9092	0.2552	0.2547	0.2504	0.2574	147	0.0980	0.0003	32.6
678.0	0.9072	0.2552	0.2547	0.2504	0.2574	147	0.1000	0.0003	32.5
691.0	0.9052	0.2552	0.2547	0.2504	0.2574	146	0.1020	0.0003	32.3
704.0	0.9032	0.2552	0.2547	0.2504	0.2574	147	0.1040	0.0003	32.5
716.0	0.9012	0.2552	0.2546	0.2504	0.2573	146	0.1060	0.0003	32.3
730.0	0.8992	0.2552	0.2546	0.2503	0.2573	147	0.1080	0.0002	32.5
742.0	0.8972	0.2551	0.2546	0.2503	0.2573	147	0.1100	0.0002	32.4
755.0	0.8952	0.2551	0.2546	0.2503	0.2573	146	0.1120	0.0002	32.4
768.0	0.8932	0.2551	0.2546	0.2503	0.2573	147	0.1140	0.0002	32.5
782.0	0.8912	0.2551	0.2546	0.2503	0.2573	147	0.1160	0.0002	32.5
795.0	0.8892	0.2551	0.2546	0.2503	0.2573	147	0.1180	0.0002	32.5
807.0	0.8872	0.2551	0.2545	0.2503	0.2572	147	0.1200	0.0002	32.5
820.0	0.8852	0.2551	0.2545	0.2503	0.2572	147	0.1220	0.0002	32.5
833.0	0.8832	0.2551	0.2545	0.2503	0.2572	146	0.1240	0.0002	32.3
846.0	0.8812	0.2551	0.2545	0.2502	0.2572	146	0.1260	0.0001	32.3
859.0	0.8792	0.2550	0.2545	0.2502	0.2572	146	0.1280	0.0001	32.3
871.0	0.8772	0.2550	0.2545	0.2502	0.2572	146	0.1300	0.0001	32.4
884.0	0.8752	0.2550	0.2545	0.2502	0.2572	146	0.1320	0.0001	32.3
897.0	0.8732	0.2550	0.2545	0.2502	0.2572	146	0.1340	0.0001	32.3
910.0	0.8712	0.2550	0.2545	0.2502	0.2572	145	0.1360	0.0001	32.1
922.0	0.8692	0.2550	0.2545	0.2502	0.2572	145	0.1380	0.0001	32.1
935.0	0.8672	0.2550	0.2545	0.2502	0.2572	146	0.1400	0.0001	32.2
948.0	0.8652	0.2550	0.2544	0.2502	0.2572	145	0.1420	0.0001	32.1
961.0	0.8632	0.2550	0.2544	0.2502	0.2571	145	0.1440	0.0001	32.1
974.0	0.8612	0.2550	0.2544	0.2502	0.2571	145	0.1460	0.0001	32.0
987.0	0.8592	0.2550	0.2544	0.2501	0.2571	145	0.1480	0.0000	32.1
1000.0	0.8572	0.2550	0.2544	0.2501	0.2571	144	0.1500	0.0000	31.9
1012.0	0.8552	0.2550	0.2544	0.2501	0.2571	144	0.1520	0.0000	31.8
1025.0	0.8532	0.2549	0.2544	0.2501	0.2571	144	0.1540	0.0000	31.8
1038.0	0.8512	0.2549	0.2544	0.2501	0.2571	143	0.1560	0.0000	31.7

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
1051.0	0.8492	0.2549	0.2544	0.2501	0.2571	143	0.1580	0.0000	31.8
1064.0	0.8472	0.2549	0.2544	0.2501	0.2571	143	0.1600	0.0000	31.7
1077.0	0.8452	0.2549	0.2543	0.2501	0.2571	143	0.1620	0.0000	31.7
1090.0	0.8432	0.2549	0.2543	0.2501	0.2570	143	0.1640	0.0000	31.6
1102.0	0.8412	0.2549	0.2543	0.2501	0.2570	143	0.1660	0.0000	31.6
1115.0	0.8392	0.2549	0.2543	0.2501	0.2570	143	0.1680	0.0000	31.6
1128.0	0.8372	0.2549	0.2543	0.2501	0.2570	143	0.1700	0.0000	31.6
1141.0	0.8352	0.2549	0.2543	0.2501	0.2570	142	0.1720	0.0000	31.4
1153.0	0.8332	0.2549	0.2543	0.2501	0.2570	142	0.1740	0.0000	31.5
1166.0	0.8312	0.2549	0.2543	0.2500	0.2570	142	0.1760	0.0000	31.5
1179.0	0.8292	0.2549	0.2543	0.2500	0.2570	142	0.1780	0.0000	31.4
1192.0	0.8272	0.2549	0.2543	0.2500	0.2570	142	0.1800	0.0000	31.5
1204.0	0.8252	0.2548	0.2543	0.2500	0.2570	141	0.1820	-0.0001	31.3
1217.0	0.8232	0.2548	0.2542	0.2500	0.2570	141	0.1840	-0.0001	31.3
1230.0	0.8212	0.2548	0.2542	0.2500	0.2569	141	0.1860	-0.0001	31.3
1243.0	0.8192	0.2548	0.2542	0.2500	0.2569	140	0.1880	-0.0001	31.1
1256.0	0.8172	0.2548	0.2542	0.2500	0.2569	141	0.1900	-0.0001	31.1
1268.0	0.8152	0.2548	0.2542	0.2500	0.2569	140	0.1920	-0.0001	31.0
1281.0	0.8132	0.2548	0.2542	0.2500	0.2569	140	0.1940	-0.0001	31.1
1294.0	0.8112	0.2548	0.2542	0.2500	0.2569	140	0.1960	-0.0001	31.1
1307.0	0.8092	0.2548	0.2542	0.2499	0.2569	140	0.1980	-0.0001	30.9
1320.0	0.8072	0.2548	0.2542	0.2499	0.2569	140	0.2000	-0.0001	31.1
1333.0	0.8052	0.2548	0.2542	0.2499	0.2569	140	0.2020	-0.0001	31.0
1345.0	0.8032	0.2548	0.2542	0.2499	0.2569	140	0.2040	-0.0001	30.9
1358.0	0.8012	0.2547	0.2541	0.2499	0.2569	140	0.2060	-0.0002	31.0
1370.0	0.7992	0.2547	0.2541	0.2499	0.2569	140	0.2080	-0.0002	30.9
1382.0	0.7972	0.2547	0.2541	0.2499	0.2568	139	0.2100	-0.0002	30.9
1396.0	0.7952	0.2547	0.2541	0.2499	0.2568	140	0.2120	-0.0002	30.9
1408.0	0.7932	0.2547	0.2541	0.2499	0.2568	139	0.2140	-0.0002	30.8
1421.0	0.7912	0.2547	0.2541	0.2499	0.2568	138	0.2160	-0.0002	30.6
1434.0	0.7892	0.2547	0.2541	0.2499	0.2568	138	0.2180	-0.0002	30.6
1447.0	0.7872	0.2547	0.2541	0.2499	0.2568	139	0.2200	-0.0002	30.7
1460.0	0.7852	0.2547	0.2541	0.2499	0.2568	139	0.2220	-0.0002	30.7
1472.0	0.7832	0.2547	0.2541	0.2498	0.2568	139	0.2240	-0.0003	30.7
1485.0	0.7812	0.2547	0.2541	0.2498	0.2568	138	0.2260	-0.0003	30.6
1498.0	0.7792	0.2547	0.2540	0.2498	0.2568	139	0.2280	-0.0003	30.7
1512.0	0.7772	0.2547	0.2540	0.2498	0.2567	139	0.2300	-0.0003	30.7
1525.0	0.7752	0.2547	0.2540	0.2498	0.2567	138	0.2320	-0.0003	30.5
1537.0	0.7732	0.2547	0.2540	0.2498	0.2567	138	0.2340	-0.0003	30.6
1550.0	0.7712	0.2547	0.2540	0.2498	0.2567	138	0.2360	-0.0003	30.6
1563.0	0.7692	0.2547	0.2540	0.2498	0.2567	138	0.2380	-0.0003	30.6
1576.0	0.7672	0.2547	0.2540	0.2498	0.2567	138	0.2400	-0.0003	30.5
1589.0	0.7652	0.2546	0.2540	0.2498	0.2567	138	0.2420	-0.0003	30.4
1602.0	0.7632	0.2546	0.2540	0.2498	0.2567	137	0.2440	-0.0003	30.4
1614.0	0.7612	0.2546	0.2540	0.2498	0.2567	138	0.2460	-0.0003	30.5
1626.0	0.7592	0.2546	0.2539	0.2498	0.2567	137	0.2480	-0.0004	30.2
1639.0	0.7572	0.2546	0.2539	0.2497	0.2566	137	0.2500	-0.0004	30.3
1651.0	0.7552	0.2546	0.2539	0.2497	0.2566	137	0.2520	-0.0004	30.3
1664.0	0.7532	0.2546	0.2539	0.2497	0.2566	137	0.2540	-0.0004	30.3
1677.0	0.7512	0.2546	0.2539	0.2497	0.2566	137	0.2560	-0.0004	30.3
1690.0	0.7492	0.2546	0.2539	0.2497	0.2566	137	0.2580	-0.0004	30.3
1703.0	0.7472	0.2546	0.2539	0.2497	0.2566	136	0.2600	-0.0004	30.1
1716.0	0.7452	0.2546	0.2539	0.2497	0.2566	136	0.2620	-0.0004	30.1
1729.0	0.7432	0.2546	0.2539	0.2497	0.2566	136	0.2640	-0.0004	30.1
1741.0	0.7412	0.2545	0.2538	0.2497	0.2565	136	0.2660	-0.0005	30.0
1754.0	0.7392	0.2545	0.2538	0.2496	0.2565	136	0.2680	-0.0005	30.1
1767.0	0.7372	0.2545	0.2538	0.2496	0.2565	135	0.2700	-0.0005	29.9
1780.0	0.7352	0.2545	0.2538	0.2496	0.2565	136	0.2720	-0.0005	30.0
1792.0	0.7332	0.2545	0.2538	0.2496	0.2565	135	0.2740	-0.0005	29.9
1804.0	0.7312	0.2545	0.2538	0.2496	0.2565	135	0.2760	-0.0005	30.0
1817.0	0.7292	0.2545	0.2538	0.2496	0.2565	135	0.2780	-0.0005	29.8
1830.0	0.7272	0.2545	0.2538	0.2496	0.2565	135	0.2800	-0.0005	29.8
1843.0	0.7252	0.2545	0.2538	0.2496	0.2565	135	0.2820	-0.0005	29.9
1855.0	0.7232	0.2545	0.2538	0.2496	0.2564	135	0.2840	-0.0005	29.8
1868.0	0.7212	0.2545	0.2537	0.2496	0.2564	135	0.2860	-0.0005	29.8
1880.0	0.7192	0.2545	0.2537	0.2496	0.2564	134	0.2880	-0.0005	29.7
1893.0	0.7172	0.2545	0.2537	0.2496	0.2564	134	0.2900	-0.0005	29.7
1906.0	0.7152	0.2545	0.2537	0.2495	0.2564	134	0.2920	-0.0006	29.8
1918.0	0.7132	0.2545	0.2537	0.2495	0.2564	135	0.2940	-0.0006	29.8
1931.0	0.7112	0.2545	0.2537	0.2495	0.2564	134	0.2960	-0.0006	29.7
1944.0	0.7092	0.2544	0.2537	0.2495	0.2564	135	0.2980	-0.0006	29.8
1957.0	0.7072	0.2544	0.2537	0.2495	0.2564	134	0.3000	-0.0006	29.7
1969.0	0.7052	0.2544	0.2537	0.2495	0.2564	134	0.3020	-0.0006	29.6
1982.0	0.7032	0.2544	0.2537	0.2495	0.2564	133	0.3040	-0.0006	29.5
1995.0	0.7012	0.2544	0.2536	0.2495	0.2563	133	0.3060	-0.0006	29.5
2007.0	0.6992	0.2544	0.2536	0.2495	0.2563	134	0.3080	-0.0006	29.7
2020.0	0.6972	0.2544	0.2536	0.2495	0.2563	134	0.3100	-0.0006	29.6
2032.0	0.6952	0.2544	0.2536	0.2495	0.2563	133	0.3120	-0.0006	29.5
2046.0	0.6932	0.2544	0.2536	0.2495	0.2563	133	0.3140	-0.0006	29.5

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
2058.0	0.6912	0.2544	0.2536	0.2494	0.2563	133	0.3160	-0.0007	29.5
2071.0	0.6892	0.2544	0.2536	0.2494	0.2563	133	0.3180	-0.0007	29.4
2084.0	0.6872	0.2544	0.2536	0.2494	0.2563	133	0.3200	-0.0007	29.5
2096.0	0.6852	0.2544	0.2536	0.2494	0.2563	133	0.3220	-0.0007	29.5
2109.0	0.6832	0.2544	0.2536	0.2494	0.2563	134	0.3240	-0.0007	29.6
2121.0	0.6812	0.2544	0.2536	0.2494	0.2563	133	0.3260	-0.0007	29.4
2134.0	0.6792	0.2544	0.2535	0.2494	0.2562	133	0.3280	-0.0007	29.3
2147.0	0.6772	0.2544	0.2535	0.2494	0.2562	132	0.3300	-0.0007	29.3
2160.0	0.6752	0.2544	0.2535	0.2494	0.2562	132	0.3320	-0.0007	29.3
2172.0	0.6732	0.2543	0.2535	0.2494	0.2562	133	0.3340	-0.0007	29.4
2185.0	0.6712	0.2543	0.2535	0.2494	0.2562	132	0.3360	-0.0007	29.2
2198.0	0.6692	0.2543	0.2535	0.2493	0.2562	132	0.3380	-0.0008	29.1
2211.0	0.6672	0.2543	0.2535	0.2493	0.2562	132	0.3400	-0.0008	29.3
2223.0	0.6652	0.2543	0.2535	0.2493	0.2562	132	0.3420	-0.0008	29.3
2236.0	0.6632	0.2543	0.2535	0.2493	0.2562	132	0.3440	-0.0008	29.1
2249.0	0.6612	0.2543	0.2535	0.2493	0.2561	132	0.3460	-0.0008	29.3
2262.0	0.6592	0.2543	0.2534	0.2493	0.2561	131	0.3480	-0.0008	29.1
2274.0	0.6572	0.2543	0.2534	0.2493	0.2561	131	0.3500	-0.0008	29.1
2287.0	0.6552	0.2543	0.2534	0.2493	0.2561	131	0.3520	-0.0008	29.0
2300.0	0.6532	0.2543	0.2534	0.2493	0.2561	131	0.3540	-0.0008	28.9
2313.0	0.6512	0.2543	0.2534	0.2492	0.2561	131	0.3560	-0.0009	28.9
2326.0	0.6492	0.2543	0.2534	0.2492	0.2561	131	0.3580	-0.0009	29.0
2339.0	0.6472	0.2543	0.2534	0.2492	0.2561	130	0.3600	-0.0009	28.9
2352.0	0.6452	0.2543	0.2534	0.2492	0.2560	130	0.3620	-0.0009	28.9
2364.0	0.6432	0.2543	0.2534	0.2492	0.2561	130	0.3640	-0.0009	28.8
2377.0	0.6412	0.2543	0.2534	0.2492	0.2560	130	0.3660	-0.0009	28.8
2390.0	0.6392	0.2543	0.2533	0.2492	0.2560	130	0.3680	-0.0009	28.8
2402.0	0.6372	0.2543	0.2533	0.2492	0.2560	131	0.3700	-0.0009	28.9
2415.0	0.6352	0.2543	0.2533	0.2492	0.2560	130	0.3720	-0.0009	28.8
2427.0	0.6332	0.2543	0.2533	0.2492	0.2560	130	0.3740	-0.0009	28.8
2440.0	0.6312	0.2542	0.2533	0.2492	0.2560	130	0.3760	-0.0009	28.8
2453.0	0.6292	0.2542	0.2533	0.2491	0.2560	130	0.3780	-0.0010	28.8
2466.0	0.6272	0.2542	0.2533	0.2491	0.2560	130	0.3800	-0.0010	28.7
2479.0	0.6252	0.2542	0.2533	0.2491	0.2559	130	0.3820	-0.0010	28.7
2491.0	0.6232	0.2542	0.2533	0.2491	0.2559	130	0.3840	-0.0010	28.8
2505.0	0.6212	0.2542	0.2533	0.2491	0.2559	130	0.3860	-0.0010	28.7
2517.0	0.6192	0.2542	0.2532	0.2491	0.2559	130	0.3880	-0.0010	28.7
2530.0	0.6172	0.2542	0.2532	0.2491	0.2559	130	0.3900	-0.0010	28.7
2543.0	0.6152	0.2542	0.2532	0.2491	0.2559	130	0.3920	-0.0010	28.7
2556.0	0.6132	0.2542	0.2532	0.2491	0.2559	130	0.3940	-0.0010	28.8
2568.0	0.6112	0.2542	0.2532	0.2491	0.2559	130	0.3960	-0.0010	28.8
2580.0	0.6092	0.2542	0.2532	0.2490	0.2559	129	0.3980	-0.0010	28.6
2593.0	0.6072	0.2542	0.2532	0.2490	0.2559	130	0.4000	-0.0010	28.7
2606.0	0.6052	0.2542	0.2532	0.2490	0.2558	129	0.4020	-0.0011	28.7
2618.0	0.6032	0.2542	0.2531	0.2490	0.2558	129	0.4040	-0.0011	28.6
2631.0	0.6012	0.2542	0.2531	0.2490	0.2558	129	0.4060	-0.0011	28.6
2644.0	0.5992	0.2541	0.2531	0.2490	0.2558	130	0.4080	-0.0011	28.7
2657.0	0.5972	0.2541	0.2531	0.2490	0.2558	130	0.4100	-0.0011	28.7
2669.0	0.5952	0.2541	0.2531	0.2490	0.2558	130	0.4120	-0.0011	28.8
2682.0	0.5932	0.2541	0.2531	0.2489	0.2558	130	0.4140	-0.0011	28.7
2695.0	0.5912	0.2541	0.2530	0.2489	0.2558	130	0.4160	-0.0011	28.8
2708.0	0.5892	0.2541	0.2530	0.2489	0.2557	131	0.4180	-0.0012	28.9
2721.0	0.5872	0.2541	0.2530	0.2489	0.2557	130	0.4200	-0.0012	28.9
2734.0	0.5852	0.2541	0.2530	0.2489	0.2557	131	0.4220	-0.0012	29.0
2747.0	0.5832	0.2541	0.2530	0.2489	0.2557	131	0.4240	-0.0012	29.0
2759.0	0.5812	0.2541	0.2530	0.2489	0.2557	131	0.4260	-0.0012	29.0
2772.0	0.5792	0.2541	0.2530	0.2489	0.2557	132	0.4280	-0.0012	29.2
2785.0	0.5772	0.2541	0.2530	0.2489	0.2557	131	0.4300	-0.0012	29.0
2798.0	0.5752	0.2541	0.2530	0.2488	0.2557	132	0.4320	-0.0012	29.1
2811.0	0.5732	0.2541	0.2530	0.2488	0.2557	131	0.4340	-0.0012	29.1
2824.0	0.5712	0.2541	0.2529	0.2488	0.2557	131	0.4360	-0.0012	29.0
2837.0	0.5692	0.2541	0.2529	0.2488	0.2557	131	0.4380	-0.0012	29.1
2850.0	0.5672	0.2541	0.2529	0.2488	0.2557	132	0.4400	-0.0012	29.1
2862.0	0.5652	0.2541	0.2529	0.2488	0.2556	132	0.4420	-0.0012	29.1
2875.0	0.5632	0.2541	0.2529	0.2488	0.2556	132	0.4440	-0.0012	29.2
2888.0	0.5612	0.2541	0.2529	0.2488	0.2556	131	0.4460	-0.0012	29.1
2901.0	0.5592	0.2541	0.2529	0.2488	0.2556	132	0.4480	-0.0012	29.2
2914.0	0.5572	0.2541	0.2529	0.2487	0.2556	133	0.4500	-0.0013	29.3
2926.0	0.5552	0.2541	0.2529	0.2487	0.2556	132	0.4520	-0.0013	29.2
2939.0	0.5532	0.2540	0.2528	0.2487	0.2556	133	0.4540	-0.0013	29.5
2952.0	0.5512	0.2540	0.2528	0.2487	0.2556	133	0.4560	-0.0013	29.4
2965.0	0.5492	0.2540	0.2528	0.2487	0.2556	132	0.4580	-0.0013	29.3
2977.0	0.5472	0.2540	0.2528	0.2487	0.2556	133	0.4600	-0.0013	29.4
2990.0	0.5452	0.2540	0.2528	0.2487	0.2556	133	0.4620	-0.0013	29.4
3003.0	0.5432	0.2540	0.2528	0.2487	0.2556	133	0.4640	-0.0013	29.4
3016.0	0.5412	0.2540	0.2528	0.2487	0.2556	133	0.4660	-0.0013	29.5
3028.0	0.5392	0.2540	0.2528	0.2486	0.2556	134	0.4680	-0.0013	29.6
3042.0	0.5372	0.2540	0.2528	0.2486	0.2555	133	0.4700	-0.0014	29.4
3054.0	0.5352	0.2540	0.2528	0.2486	0.2555	133	0.4720	-0.0014	29.5

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
3067.0	0.5332	0.2540	0.2527	0.2486	0.2555	133	0.4740	-0.0014	29.5
3079.0	0.5312	0.2540	0.2527	0.2486	0.2555	134	0.4760	-0.0014	29.6
3092.0	0.5292	0.2540	0.2527	0.2486	0.2555	134	0.4780	-0.0014	29.6
3105.0	0.5272	0.2540	0.2527	0.2486	0.2555	134	0.4800	-0.0014	29.6
3117.0	0.5252	0.2540	0.2527	0.2486	0.2555	134	0.4820	-0.0014	29.6
3129.0	0.5232	0.2540	0.2527	0.2486	0.2555	134	0.4840	-0.0014	29.6
3142.0	0.5212	0.2540	0.2527	0.2486	0.2555	134	0.4860	-0.0014	29.6
3155.0	0.5192	0.2540	0.2527	0.2485	0.2555	134	0.4880	-0.0014	29.7
3168.0	0.5172	0.2540	0.2527	0.2485	0.2555	134	0.4900	-0.0014	29.6
3181.0	0.5152	0.2540	0.2526	0.2485	0.2555	134	0.4920	-0.0015	29.7
3194.0	0.5132	0.2540	0.2526	0.2485	0.2555	133	0.4940	-0.0015	29.5
3206.0	0.5112	0.2540	0.2526	0.2485	0.2555	134	0.4960	-0.0015	29.6
3219.0	0.5092	0.2540	0.2526	0.2485	0.2554	134	0.4980	-0.0015	29.6
3231.0	0.5072	0.2540	0.2526	0.2485	0.2554	134	0.5000	-0.0015	29.6
3244.0	0.5052	0.2539	0.2526	0.2485	0.2554	134	0.5020	-0.0015	29.7
3257.0	0.5032	0.2540	0.2526	0.2485	0.2554	134	0.5040	-0.0015	29.8
3270.0	0.5012	0.2539	0.2526	0.2484	0.2554	134	0.5060	-0.0015	29.7
3283.0	0.4992	0.2539	0.2526	0.2484	0.2554	134	0.5080	-0.0015	29.7
3296.0	0.4972	0.2539	0.2525	0.2484	0.2554	134	0.5100	-0.0016	29.7
3309.0	0.4952	0.2539	0.2525	0.2484	0.2554	134	0.5120	-0.0016	29.7
3310.0	0.4951	0.2539	0.2525	0.2484	0.2554	134	0.5121	-0.0016	29.6

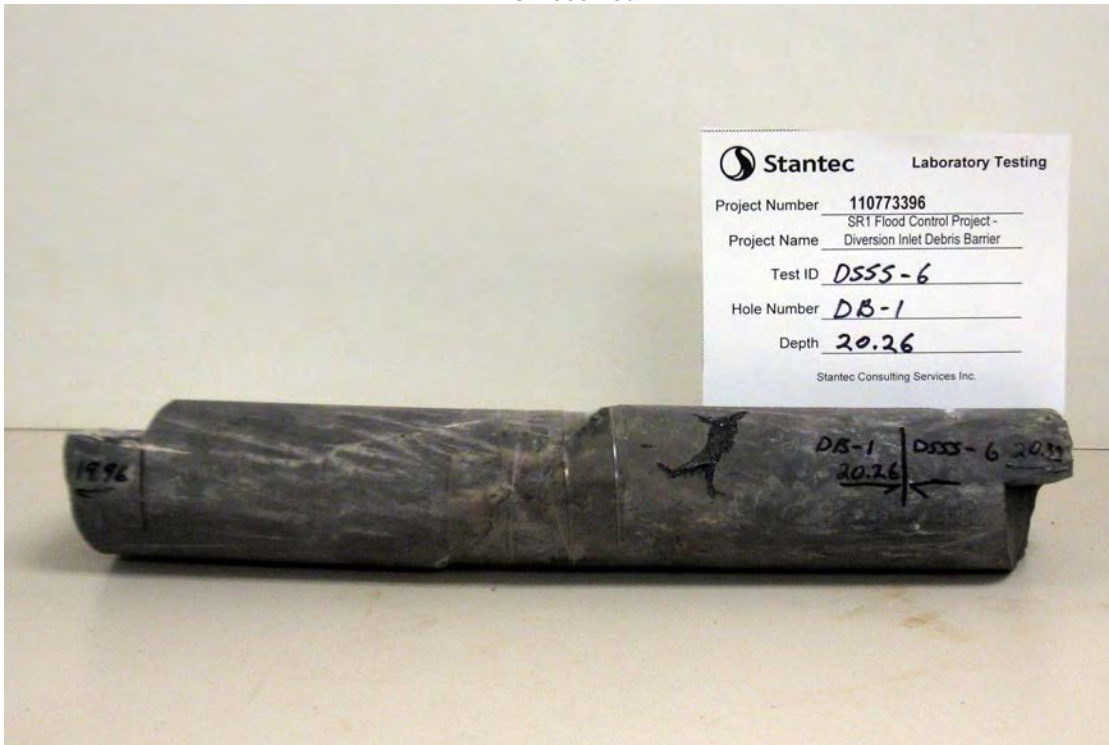


Photo Report

Project Name SR1 Flood Control Project - Inlet Debris Barrier
Lithology Dolomite, gray, moderately hard, partially healed faults
Hole Number DB-1 Depth (m) 20.26
Test Type Direct shear of sawn surface

Project Number 110773396
Lab ID DSSS-6

As Received



Core Preparation





Photo Report

Project Name SR1 Flood Control Project - Inlet Debris Barrier
 Lithology Dolomite, gray, moderately hard, partially healed faults
 Hole Number DB-1 Depth (m) 20.26
 Test Type Direct shear of sawn surface

Project Number 110773396
 Lab ID DSSS-6

Core Preparation



Post Test

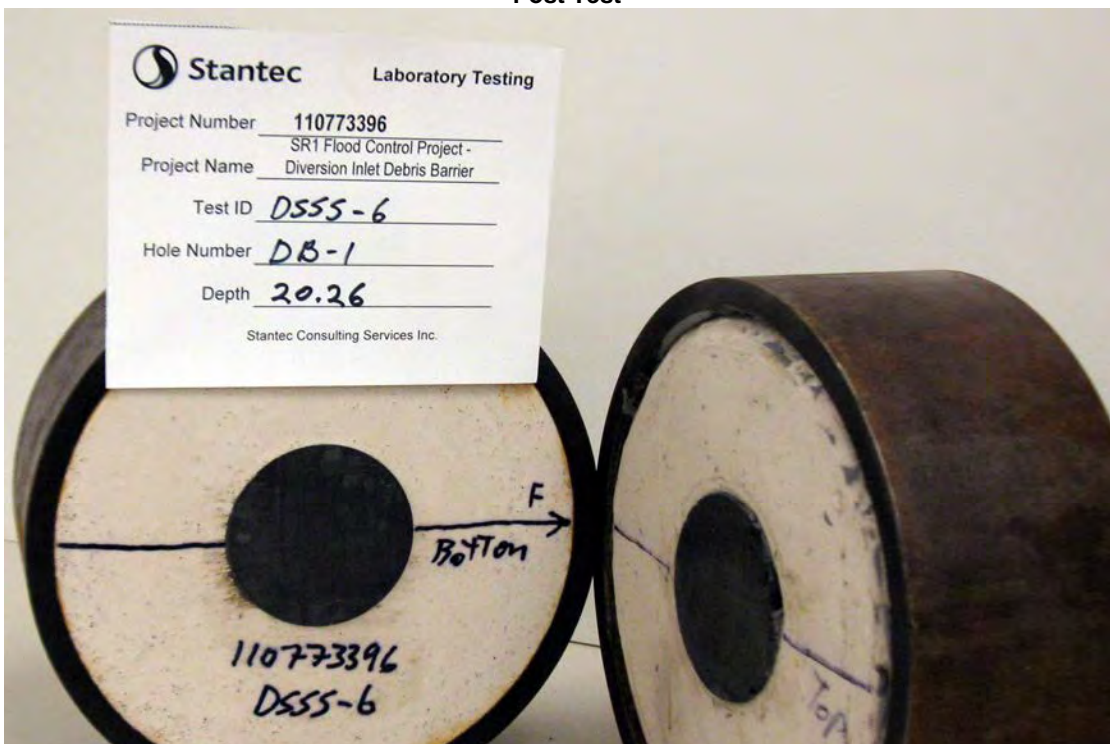




Photo Report

Project Name SR1 Flood Control Project - Inlet Debris Barrier
 Lithology Dolomite, gray, moderately hard, partially healed faults
 Hole Number DB-1 Depth (m) 20.26
 Test Type Direct shear of sawn surface

Project Number 110773396
 Lab ID DSSS-6

Post Test

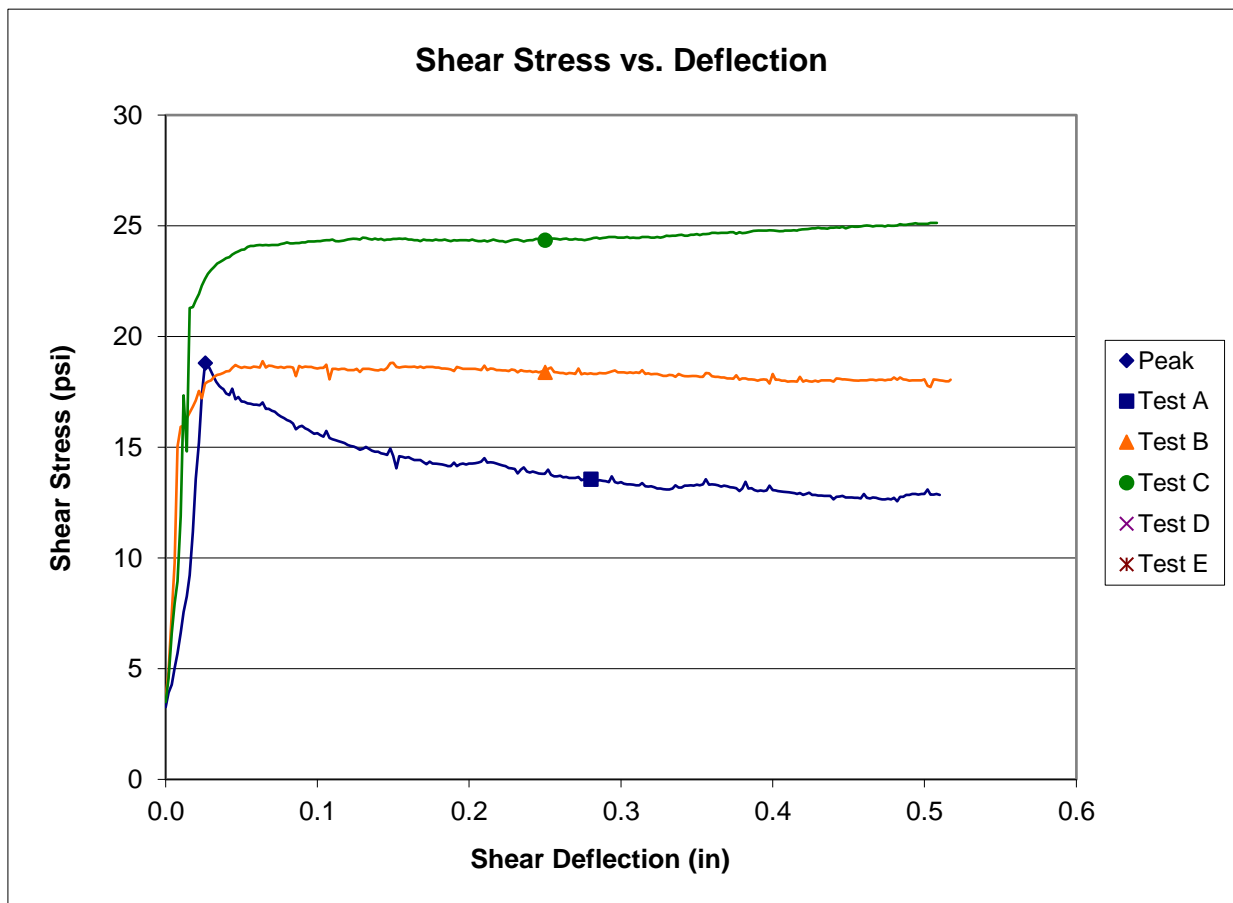




Direct Shear Strength of Rock
ASTM D 5607

Project Name	<u>SR1 Flood Control Project - Inlet Debris Barrier</u>	Project Number	<u>110773396</u>
Lithology	<u>Shale, gray, moderately hard</u>	Lab ID	<u>DSSS-11</u>
Hole Number	<u>DB-1</u>	Depth (m)	<u>25.20</u>
Test Type	<u>Direct shear of sawn surface</u>	Date Received	<u>05/15/2018</u>
Initial Moisture Condition	<u>As received, moist</u>	Diameter (in.)	<u>2.398</u>
At Test Moisture Condition	<u>Soaked at least 12 hours prior to test.</u>	Angle of Dip (deg.)	<u>0.0</u>
Roughness (JRC)	<u>1</u>	Area (in ²)	<u>4.52</u>

	<u>Test A</u>	<u>Test B</u>	<u>Test C</u>	<u>Test D</u>	<u>Test E</u>
Normal Stress (psi)	36.0	62.0	94.0	N/A	N/A
Peak Shear Stress (psi)	18.8				
Deflection at Peak (in)	0.0260				
Post Peak Stress (psi)	13.6	18.4	24.4	N/A	N/A
Deflection at Residual (in)	0.2800	0.2500	0.2500	N/A	N/A



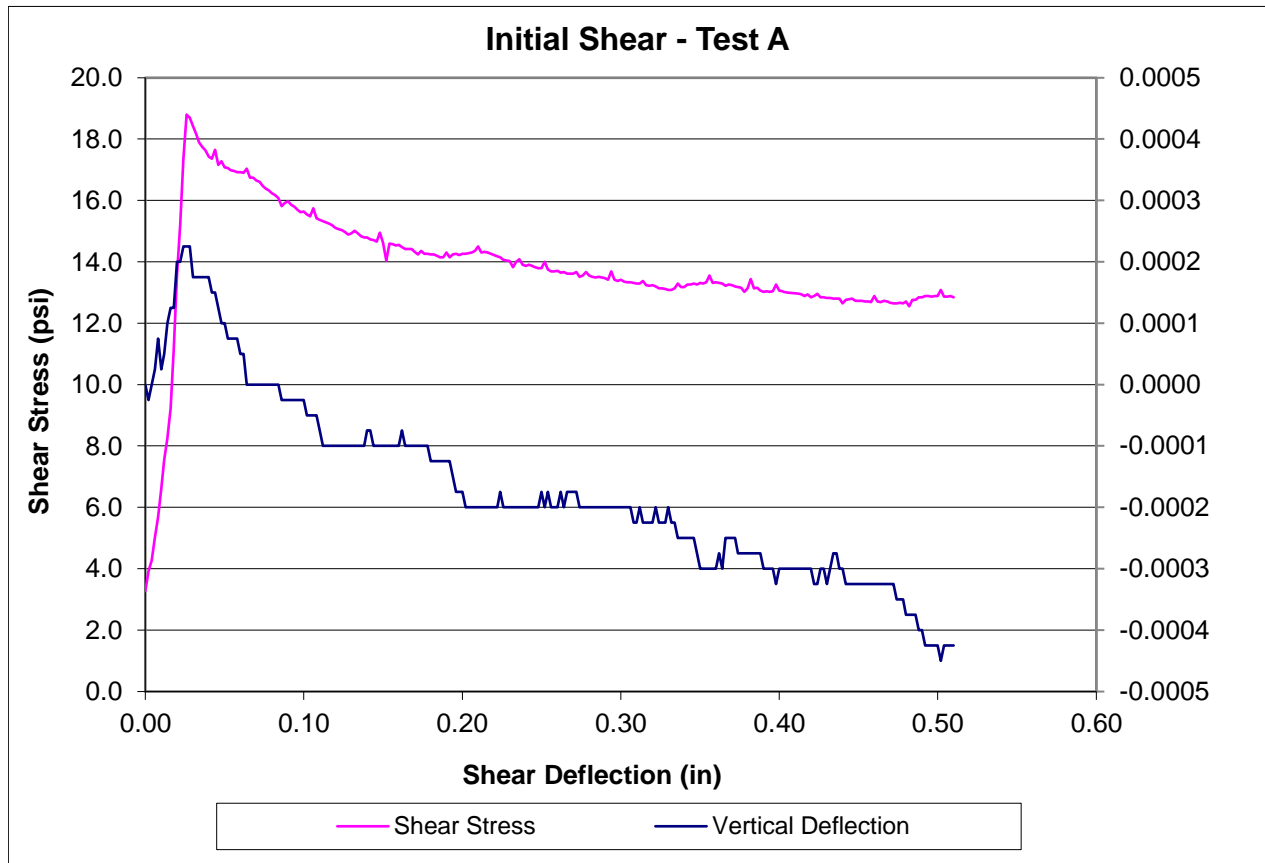
Comments _____

Reviewed By RJ



Direct Shear Strength of Rock
ASTM D 5607

Project Name	<u>SR1 Flood Control Project - Inlet Debris Barrier</u>	Project Number	<u>110773396</u>
Lithology	<u>Shale, gray, moderately hard</u>	Lab ID	<u>DSSS-11</u>
Hole Number	<u>DB-1</u>	Date Received	<u>05/15/2018</u>
Depth (m)	<u>25.20</u>	Diameter (in)	<u>2.398</u>
Test Type	<u>Direct shear of sawn surface</u>	Angle of Dip (deg)	<u>0.0</u>
Initial Moisture Condition	<u>As received, moist</u>	Area(in ²)	<u>4.52</u>
Test Moisture Condition	<u>Soaked at least 12 hours prior to test.</u>	Date Prepared	<u>06/29/2018</u>
Joint Roughness	<u>1</u>	Date Tested	<u>07/02/2018</u>
Normal Stress (psi)	<u>36</u>		



Sketch



Shear Rate to Peak (in/min) 0.009

Encapsulation Material Hydro-Stone

Comments _____

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
0.0	1.0050	0.2532	0.2574	0.2516	0.2556	15	0.0000	0.0000	3.3
22.0	1.0030	0.2532	0.2573	0.2514	0.2558	18	0.0020	0.0000	3.9
44.0	1.0010	0.2532	0.2573	0.2513	0.2560	19	0.0040	0.0000	4.3
58.0	0.9990	0.2533	0.2573	0.2511	0.2562	23	0.0060	0.0000	5.0
70.0	0.9970	0.2534	0.2573	0.2510	0.2564	26	0.0080	0.0001	5.7
82.0	0.9950	0.2534	0.2572	0.2508	0.2565	30	0.0100	0.0000	6.6
93.0	0.9930	0.2534	0.2572	0.2507	0.2567	34	0.0120	0.0000	7.6
105.0	0.9910	0.2535	0.2572	0.2506	0.2569	37	0.0140	0.0001	8.3
118.0	0.9890	0.2536	0.2572	0.2504	0.2571	42	0.0160	0.0001	9.2
130.0	0.9870	0.2536	0.2572	0.2502	0.2573	51	0.0180	0.0001	11.2
140.0	0.9850	0.2537	0.2572	0.2501	0.2576	61	0.0200	0.0002	13.6
145.0	0.9830	0.2538	0.2572	0.2499	0.2577	69	0.0220	0.0002	15.2
155.0	0.9810	0.2538	0.2572	0.2498	0.2579	78	0.0240	0.0002	17.4
167.0	0.9790	0.2538	0.2572	0.2497	0.2580	85	0.0260	0.0002	18.8
185.0	0.9770	0.2539	0.2571	0.2497	0.2580	84	0.0280	0.0002	18.7
198.0	0.9750	0.2538	0.2571	0.2496	0.2580	83	0.0300	0.0002	18.4
210.0	0.9730	0.2538	0.2571	0.2496	0.2580	82	0.0320	0.0002	18.2
224.0	0.9710	0.2538	0.2571	0.2496	0.2580	81	0.0340	0.0002	17.9
238.0	0.9690	0.2538	0.2571	0.2496	0.2580	80	0.0360	0.0002	17.7
251.0	0.9670	0.2538	0.2571	0.2496	0.2580	80	0.0380	0.0002	17.6
264.0	0.9650	0.2538	0.2571	0.2496	0.2580	79	0.0400	0.0002	17.4
277.0	0.9630	0.2537	0.2571	0.2496	0.2580	78	0.0420	0.0001	17.4
286.0	0.9610	0.2537	0.2571	0.2496	0.2580	80	0.0440	0.0001	17.6
298.0	0.9590	0.2537	0.2571	0.2496	0.2579	78	0.0460	0.0001	17.2
317.0	0.9570	0.2537	0.2571	0.2495	0.2579	78	0.0480	0.0001	17.3
330.0	0.9550	0.2537	0.2571	0.2495	0.2579	77	0.0500	0.0001	17.1
343.0	0.9530	0.2536	0.2571	0.2495	0.2579	77	0.0520	0.0001	17.0
356.0	0.9510	0.2536	0.2571	0.2495	0.2579	77	0.0540	0.0001	17.0
370.0	0.9490	0.2536	0.2571	0.2495	0.2579	77	0.0560	0.0001	17.0
383.0	0.9470	0.2536	0.2571	0.2495	0.2579	76	0.0580	0.0001	16.9
396.0	0.9450	0.2536	0.2571	0.2495	0.2578	76	0.0600	0.0000	16.9
409.0	0.9430	0.2536	0.2571	0.2495	0.2578	76	0.0620	0.0000	16.9
422.0	0.9410	0.2535	0.2571	0.2494	0.2578	77	0.0640	0.0000	17.0
430.0	0.9390	0.2535	0.2571	0.2494	0.2578	76	0.0660	0.0000	16.7
444.0	0.9370	0.2535	0.2571	0.2494	0.2578	76	0.0680	0.0000	16.7
462.0	0.9350	0.2535	0.2571	0.2494	0.2578	75	0.0700	0.0000	16.7
475.0	0.9330	0.2535	0.2571	0.2494	0.2578	75	0.0720	0.0000	16.6
488.0	0.9310	0.2535	0.2571	0.2494	0.2578	74	0.0740	0.0000	16.5
501.0	0.9290	0.2535	0.2571	0.2494	0.2578	74	0.0760	0.0000	16.4
514.0	0.9270	0.2535	0.2571	0.2494	0.2578	74	0.0780	0.0000	16.3
527.0	0.9250	0.2535	0.2571	0.2494	0.2578	73	0.0800	0.0000	16.2
540.0	0.9230	0.2535	0.2571	0.2494	0.2578	73	0.0820	0.0000	16.2
553.0	0.9210	0.2535	0.2571	0.2494	0.2578	73	0.0840	0.0000	16.1
560.0	0.9190	0.2534	0.2571	0.2494	0.2578	71	0.0860	0.0000	15.8
572.0	0.9170	0.2534	0.2571	0.2494	0.2578	72	0.0880	0.0000	15.9
591.0	0.9150	0.2534	0.2571	0.2494	0.2578	72	0.0900	0.0000	16.0
604.0	0.9130	0.2534	0.2571	0.2494	0.2578	72	0.0920	0.0000	15.9
617.0	0.9110	0.2534	0.2571	0.2494	0.2578	71	0.0940	0.0000	15.8
630.0	0.9090	0.2534	0.2571	0.2494	0.2578	71	0.0960	0.0000	15.7
643.0	0.9070	0.2534	0.2571	0.2494	0.2578	71	0.0980	0.0000	15.6
656.0	0.9050	0.2534	0.2571	0.2494	0.2578	71	0.1000	0.0000	15.6
668.0	0.9030	0.2534	0.2571	0.2494	0.2577	70	0.1020	0.0000	15.5
681.0	0.9010	0.2534	0.2571	0.2494	0.2577	70	0.1040	0.0000	15.5
693.0	0.8990	0.2534	0.2571	0.2494	0.2577	71	0.1060	0.0000	15.7
702.0	0.8970	0.2534	0.2571	0.2494	0.2577	70	0.1080	0.0000	15.4
716.0	0.8950	0.2533	0.2571	0.2494	0.2577	69	0.1100	-0.0001	15.4
734.0	0.8930	0.2533	0.2571	0.2493	0.2577	69	0.1120	-0.0001	15.3
747.0	0.8910	0.2533	0.2571	0.2493	0.2577	69	0.1140	-0.0001	15.3
760.0	0.8890	0.2533	0.2571	0.2493	0.2577	69	0.1160	-0.0001	15.2
772.0	0.8870	0.2533	0.2571	0.2493	0.2577	69	0.1180	-0.0001	15.2
785.0	0.8850	0.2533	0.2571	0.2493	0.2577	68	0.1200	-0.0001	15.1
798.0	0.8830	0.2533	0.2571	0.2493	0.2577	68	0.1220	-0.0001	15.1
811.0	0.8810	0.2533	0.2571	0.2493	0.2577	68	0.1240	-0.0001	15.0
824.0	0.8790	0.2533	0.2571	0.2493	0.2577	68	0.1260	-0.0001	15.0
830.0	0.8770	0.2533	0.2571	0.2493	0.2577	67	0.1280	-0.0001	14.9
844.0	0.8750	0.2533	0.2571	0.2493	0.2577	67	0.1300	-0.0001	14.9
863.0	0.8730	0.2533	0.2571	0.2493	0.2577	68	0.1320	-0.0001	15.0
875.0	0.8710	0.2533	0.2571	0.2493	0.2577	67	0.1340	-0.0001	14.9
889.0	0.8690	0.2533	0.2571	0.2493	0.2577	67	0.1360	-0.0001	14.8
902.0	0.8670	0.2533	0.2571	0.2493	0.2577	67	0.1380	-0.0001	14.8
914.0	0.8650	0.2533	0.2572	0.2493	0.2577	67	0.1400	-0.0001	14.8
927.0	0.8630	0.2533	0.2572	0.2493	0.2577	67	0.1420	-0.0001	14.7
940.0	0.8610	0.2532	0.2572	0.2493	0.2577	66	0.1440	-0.0001	14.7
952.0	0.8590	0.2532	0.2572	0.2493	0.2577	66	0.1460	-0.0001	14.7
962.0	0.8570	0.2532	0.2572	0.2493	0.2577	68	0.1480	-0.0001	14.9
972.0	0.8550	0.2532	0.2572	0.2493	0.2577	66	0.1500	-0.0001	14.6
991.0	0.8530	0.2532	0.2572	0.2493	0.2577	63	0.1520	-0.0001	14.0
1004.0	0.8510	0.2532	0.2572	0.2493	0.2577	66	0.1540	-0.0001	14.6
1018.0	0.8490	0.2532	0.2572	0.2493	0.2577	66	0.1560	-0.0001	14.6

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
1030.0	0.8470	0.2532	0.2572	0.2493	0.2577	66	0.1580	-0.0001	14.5
1043.0	0.8450	0.2532	0.2572	0.2493	0.2577	66	0.1600	-0.0001	14.5
1056.0	0.8430	0.2532	0.2572	0.2493	0.2578	65	0.1620	-0.0001	14.5
1069.0	0.8410	0.2532	0.2572	0.2492	0.2578	65	0.1640	-0.0001	14.4
1081.0	0.8390	0.2532	0.2572	0.2492	0.2578	65	0.1660	-0.0001	14.4
1094.0	0.8370	0.2532	0.2572	0.2492	0.2578	65	0.1680	-0.0001	14.4
1101.0	0.8350	0.2532	0.2572	0.2492	0.2578	65	0.1700	-0.0001	14.3
1114.0	0.8330	0.2532	0.2572	0.2492	0.2578	64	0.1720	-0.0001	14.2
1132.0	0.8310	0.2532	0.2572	0.2492	0.2578	65	0.1740	-0.0001	14.3
1145.0	0.8290	0.2532	0.2572	0.2492	0.2578	64	0.1760	-0.0001	14.3
1159.0	0.8270	0.2532	0.2572	0.2492	0.2578	64	0.1780	-0.0001	14.3
1171.0	0.8250	0.2531	0.2572	0.2492	0.2578	64	0.1800	-0.0001	14.2
1183.0	0.8230	0.2531	0.2572	0.2492	0.2578	64	0.1820	-0.0001	14.2
1197.0	0.8210	0.2531	0.2572	0.2492	0.2578	64	0.1840	-0.0001	14.2
1210.0	0.8190	0.2531	0.2572	0.2492	0.2578	64	0.1860	-0.0001	14.1
1222.0	0.8170	0.2531	0.2572	0.2492	0.2578	64	0.1880	-0.0001	14.1
1230.0	0.8150	0.2531	0.2572	0.2492	0.2578	65	0.1900	-0.0001	14.3
1242.0	0.8130	0.2531	0.2572	0.2492	0.2578	64	0.1920	-0.0001	14.1
1261.0	0.8110	0.2531	0.2572	0.2492	0.2577	64	0.1940	-0.0002	14.2
1274.0	0.8090	0.2531	0.2572	0.2491	0.2577	64	0.1960	-0.0002	14.3
1287.0	0.8070	0.2531	0.2572	0.2491	0.2577	64	0.1980	-0.0002	14.2
1300.0	0.8050	0.2531	0.2572	0.2491	0.2577	64	0.2000	-0.0002	14.3
1313.0	0.8030	0.2530	0.2572	0.2491	0.2577	64	0.2020	-0.0002	14.3
1325.0	0.8010	0.2530	0.2572	0.2491	0.2577	65	0.2040	-0.0002	14.3
1337.0	0.7990	0.2530	0.2572	0.2491	0.2577	65	0.2060	-0.0002	14.3
1350.0	0.7970	0.2530	0.2572	0.2491	0.2577	65	0.2080	-0.0002	14.3
1362.0	0.7950	0.2530	0.2572	0.2491	0.2577	66	0.2100	-0.0002	14.5
1370.0	0.7930	0.2530	0.2572	0.2491	0.2577	65	0.2120	-0.0002	14.3
1382.0	0.7910	0.2530	0.2572	0.2491	0.2577	65	0.2140	-0.0002	14.3
1402.0	0.7890	0.2530	0.2572	0.2491	0.2577	65	0.2160	-0.0002	14.3
1414.0	0.7870	0.2530	0.2572	0.2491	0.2577	64	0.2180	-0.0002	14.3
1427.0	0.7850	0.2530	0.2572	0.2491	0.2577	64	0.2200	-0.0002	14.2
1440.0	0.7830	0.2530	0.2572	0.2491	0.2577	64	0.2220	-0.0002	14.2
1453.0	0.7810	0.2530	0.2572	0.2491	0.2578	64	0.2240	-0.0002	14.1
1466.0	0.7790	0.2530	0.2572	0.2490	0.2578	64	0.2260	-0.0002	14.1
1479.0	0.7770	0.2530	0.2572	0.2490	0.2578	63	0.2280	-0.0002	14.0
1492.0	0.7750	0.2530	0.2572	0.2490	0.2578	63	0.2300	-0.0002	14.0
1499.0	0.7730	0.2530	0.2572	0.2490	0.2578	62	0.2320	-0.0002	13.8
1512.0	0.7710	0.2530	0.2572	0.2490	0.2578	63	0.2340	-0.0002	14.0
1531.0	0.7690	0.2530	0.2572	0.2490	0.2578	64	0.2360	-0.0002	14.1
1544.0	0.7670	0.2530	0.2572	0.2490	0.2578	63	0.2380	-0.0002	13.9
1557.0	0.7650	0.2530	0.2572	0.2490	0.2578	63	0.2400	-0.0002	13.9
1569.0	0.7630	0.2530	0.2572	0.2490	0.2578	63	0.2420	-0.0002	13.9
1582.0	0.7610	0.2530	0.2572	0.2490	0.2578	63	0.2440	-0.0002	13.9
1594.0	0.7590	0.2530	0.2572	0.2490	0.2578	62	0.2460	-0.0002	13.8
1607.0	0.7570	0.2530	0.2572	0.2490	0.2578	62	0.2480	-0.0002	13.8
1620.0	0.7550	0.2530	0.2573	0.2490	0.2578	62	0.2500	-0.0002	13.8
1631.0	0.7530	0.2529	0.2573	0.2490	0.2578	63	0.2520	-0.0002	14.0
1639.0	0.7510	0.2530	0.2573	0.2490	0.2578	62	0.2540	-0.0002	13.8
1653.0	0.7490	0.2529	0.2573	0.2490	0.2578	62	0.2560	-0.0002	13.7
1672.0	0.7470	0.2529	0.2573	0.2490	0.2578	62	0.2580	-0.0002	13.7
1684.0	0.7450	0.2529	0.2573	0.2490	0.2578	62	0.2600	-0.0002	13.7
1697.0	0.7430	0.2530	0.2573	0.2490	0.2578	62	0.2620	-0.0002	13.6
1710.0	0.7410	0.2529	0.2573	0.2490	0.2578	62	0.2640	-0.0002	13.7
1723.0	0.7390	0.2529	0.2573	0.2490	0.2579	62	0.2660	-0.0002	13.6
1736.0	0.7370	0.2529	0.2573	0.2490	0.2579	62	0.2680	-0.0002	13.6
1749.0	0.7350	0.2529	0.2573	0.2490	0.2579	62	0.2700	-0.0002	13.6
1762.0	0.7330	0.2529	0.2573	0.2490	0.2579	62	0.2720	-0.0002	13.7
1768.0	0.7310	0.2529	0.2573	0.2489	0.2579	61	0.2740	-0.0002	13.5
1781.0	0.7290	0.2529	0.2573	0.2489	0.2579	61	0.2760	-0.0002	13.6
1800.0	0.7270	0.2529	0.2573	0.2489	0.2579	62	0.2780	-0.0002	13.7
1812.0	0.7250	0.2529	0.2573	0.2489	0.2579	61	0.2800	-0.0002	13.6
1825.0	0.7230	0.2529	0.2573	0.2489	0.2579	61	0.2820	-0.0002	13.5
1838.0	0.7210	0.2529	0.2573	0.2489	0.2579	61	0.2840	-0.0002	13.5
1851.0	0.7190	0.2529	0.2573	0.2489	0.2579	61	0.2860	-0.0002	13.5
1864.0	0.7170	0.2529	0.2573	0.2489	0.2579	61	0.2880	-0.0002	13.5
1876.0	0.7150	0.2529	0.2573	0.2489	0.2579	61	0.2900	-0.0002	13.5
1889.0	0.7130	0.2529	0.2573	0.2489	0.2579	61	0.2920	-0.0002	13.4
1898.0	0.7110	0.2529	0.2573	0.2489	0.2579	62	0.2940	-0.0002	13.7
1909.0	0.7090	0.2529	0.2573	0.2489	0.2579	61	0.2960	-0.0002	13.4
1921.0	0.7070	0.2529	0.2573	0.2489	0.2579	60	0.2980	-0.0002	13.4
1940.0	0.7050	0.2529	0.2573	0.2489	0.2579	61	0.3000	-0.0002	13.4
1953.0	0.7030	0.2529	0.2573	0.2489	0.2579	60	0.3020	-0.0002	13.4
1966.0	0.7010	0.2529	0.2573	0.2489	0.2579	60	0.3040	-0.0002	13.3
1979.0	0.6990	0.2529	0.2573	0.2489	0.2579	60	0.3060	-0.0002	13.3
1991.0	0.6970	0.2529	0.2573	0.2488	0.2579	60	0.3080	-0.0002	13.3
2004.0	0.6950	0.2529	0.2573	0.2488	0.2579	60	0.3100	-0.0002	13.3
2018.0	0.6930	0.2529	0.2573	0.2488	0.2580	60	0.3120	-0.0002	13.3
2030.0	0.6910	0.2529	0.2573	0.2488	0.2579	60	0.3140	-0.0002	13.4

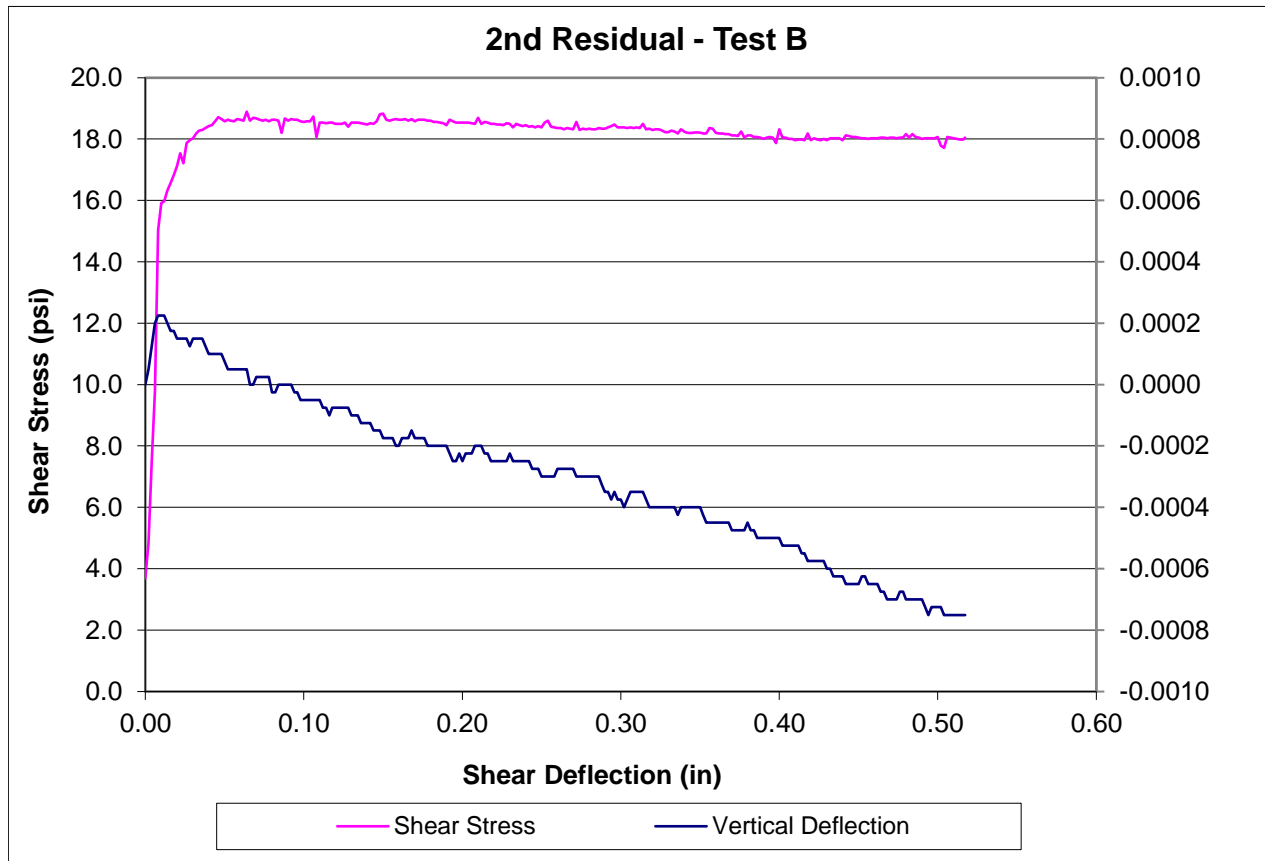
Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
2037.0	0.6890	0.2528	0.2573	0.2488	0.2580	60	0.3160	-0.0002	13.2
2050.0	0.6870	0.2528	0.2573	0.2488	0.2580	60	0.3180	-0.0002	13.2
2069.0	0.6850	0.2528	0.2573	0.2488	0.2580	60	0.3200	-0.0002	13.2
2081.0	0.6830	0.2528	0.2574	0.2488	0.2580	60	0.3220	-0.0002	13.2
2094.0	0.6810	0.2528	0.2573	0.2488	0.2580	59	0.3240	-0.0002	13.1
2107.0	0.6790	0.2528	0.2573	0.2488	0.2580	59	0.3260	-0.0002	13.1
2120.0	0.6770	0.2528	0.2573	0.2488	0.2580	59	0.3280	-0.0002	13.1
2133.0	0.6750	0.2528	0.2574	0.2488	0.2580	59	0.3300	-0.0002	13.1
2146.0	0.6730	0.2528	0.2573	0.2488	0.2580	59	0.3320	-0.0002	13.1
2159.0	0.6710	0.2528	0.2573	0.2488	0.2580	59	0.3340	-0.0002	13.1
2166.0	0.6690	0.2528	0.2573	0.2487	0.2580	60	0.3360	-0.0003	13.3
2179.0	0.6670	0.2528	0.2573	0.2487	0.2580	60	0.3380	-0.0003	13.2
2192.0	0.6650	0.2528	0.2573	0.2487	0.2580	60	0.3400	-0.0003	13.2
2210.0	0.6630	0.2528	0.2573	0.2487	0.2580	60	0.3420	-0.0003	13.3
2224.0	0.6610	0.2528	0.2573	0.2487	0.2580	60	0.3440	-0.0003	13.3
2236.0	0.6590	0.2528	0.2573	0.2487	0.2580	60	0.3460	-0.0003	13.3
2249.0	0.6570	0.2527	0.2573	0.2487	0.2580	60	0.3480	-0.0003	13.3
2262.0	0.6550	0.2527	0.2573	0.2486	0.2580	60	0.3500	-0.0003	13.3
2275.0	0.6530	0.2527	0.2573	0.2486	0.2580	60	0.3520	-0.0003	13.3
2288.0	0.6510	0.2527	0.2573	0.2486	0.2580	60	0.3540	-0.0003	13.3
2299.0	0.6490	0.2527	0.2573	0.2486	0.2580	61	0.3560	-0.0003	13.6
2308.0	0.6470	0.2527	0.2573	0.2486	0.2580	60	0.3580	-0.0003	13.3
2322.0	0.6450	0.2527	0.2573	0.2486	0.2580	60	0.3600	-0.0003	13.3
2340.0	0.6430	0.2527	0.2574	0.2486	0.2580	60	0.3620	-0.0003	13.3
2353.0	0.6410	0.2527	0.2573	0.2486	0.2580	60	0.3640	-0.0003	13.3
2366.0	0.6390	0.2527	0.2574	0.2486	0.2581	60	0.3660	-0.0003	13.2
2378.0	0.6370	0.2527	0.2574	0.2486	0.2581	60	0.3680	-0.0003	13.3
2391.0	0.6350	0.2527	0.2574	0.2486	0.2581	60	0.3700	-0.0003	13.2
2403.0	0.6330	0.2527	0.2574	0.2486	0.2581	60	0.3720	-0.0003	13.2
2416.0	0.6310	0.2527	0.2574	0.2485	0.2581	60	0.3740	-0.0003	13.2
2430.0	0.6290	0.2527	0.2574	0.2485	0.2581	59	0.3760	-0.0003	13.2
2436.0	0.6270	0.2527	0.2574	0.2485	0.2581	59	0.3780	-0.0003	13.0
2449.0	0.6250	0.2527	0.2574	0.2485	0.2581	59	0.3800	-0.0003	13.1
2468.0	0.6230	0.2527	0.2574	0.2485	0.2581	61	0.3820	-0.0003	13.4
2482.0	0.6210	0.2527	0.2574	0.2485	0.2581	59	0.3840	-0.0003	13.1
2495.0	0.6190	0.2527	0.2574	0.2485	0.2581	59	0.3860	-0.0003	13.2
2507.0	0.6170	0.2527	0.2574	0.2485	0.2581	59	0.3880	-0.0003	13.1
2520.0	0.6150	0.2526	0.2574	0.2485	0.2581	59	0.3900	-0.0003	13.0
2533.0	0.6130	0.2526	0.2574	0.2485	0.2581	59	0.3920	-0.0003	13.0
2545.0	0.6110	0.2526	0.2574	0.2485	0.2581	59	0.3940	-0.0003	13.0
2557.0	0.6090	0.2526	0.2574	0.2485	0.2581	59	0.3960	-0.0003	13.0
2568.0	0.6070	0.2526	0.2574	0.2484	0.2581	60	0.3980	-0.0003	13.3
2577.0	0.6050	0.2526	0.2574	0.2484	0.2582	59	0.4000	-0.0003	13.1
2590.0	0.6030	0.2526	0.2574	0.2484	0.2582	59	0.4020	-0.0003	13.0
2609.0	0.6010	0.2526	0.2574	0.2484	0.2582	59	0.4040	-0.0003	13.0
2622.0	0.5990	0.2526	0.2574	0.2484	0.2582	59	0.4060	-0.0003	13.0
2635.0	0.5970	0.2526	0.2574	0.2484	0.2582	59	0.4080	-0.0003	13.0
2647.0	0.5950	0.2526	0.2574	0.2484	0.2582	59	0.4100	-0.0003	13.0
2660.0	0.5930	0.2526	0.2574	0.2484	0.2582	59	0.4120	-0.0003	13.0
2673.0	0.5910	0.2526	0.2574	0.2484	0.2582	58	0.4140	-0.0003	12.9
2686.0	0.5890	0.2526	0.2574	0.2484	0.2582	58	0.4160	-0.0003	12.9
2699.0	0.5870	0.2526	0.2574	0.2484	0.2582	58	0.4180	-0.0003	12.9
2706.0	0.5850	0.2526	0.2574	0.2484	0.2582	58	0.4200	-0.0003	12.8
2719.0	0.5830	0.2526	0.2574	0.2483	0.2582	58	0.4220	-0.0003	12.9
2738.0	0.5810	0.2526	0.2574	0.2483	0.2582	59	0.4240	-0.0003	13.0
2751.0	0.5790	0.2526	0.2575	0.2483	0.2582	58	0.4260	-0.0003	12.8
2764.0	0.5770	0.2526	0.2575	0.2483	0.2582	58	0.4280	-0.0003	12.8
2777.0	0.5750	0.2525	0.2575	0.2483	0.2582	58	0.4300	-0.0003	12.8
2790.0	0.5730	0.2526	0.2575	0.2483	0.2582	58	0.4320	-0.0003	12.8
2803.0	0.5710	0.2526	0.2575	0.2483	0.2583	58	0.4340	-0.0003	12.8
2816.0	0.5690	0.2526	0.2575	0.2483	0.2583	58	0.4360	-0.0003	12.8
2829.0	0.5670	0.2525	0.2575	0.2483	0.2583	58	0.4380	-0.0003	12.8
2836.0	0.5650	0.2525	0.2575	0.2483	0.2583	57	0.4400	-0.0003	12.6
2848.0	0.5630	0.2525	0.2575	0.2482	0.2583	58	0.4420	-0.0003	12.8
2861.0	0.5610	0.2525	0.2575	0.2482	0.2583	58	0.4440	-0.0003	12.8
2880.0	0.5590	0.2525	0.2575	0.2482	0.2583	58	0.4460	-0.0003	12.8
2893.0	0.5570	0.2525	0.2575	0.2482	0.2583	58	0.4480	-0.0003	12.7
2906.0	0.5550	0.2525	0.2575	0.2482	0.2583	58	0.4500	-0.0003	12.7
2919.0	0.5530	0.2525	0.2575	0.2482	0.2583	58	0.4520	-0.0003	12.7
2932.0	0.5510	0.2525	0.2575	0.2482	0.2583	57	0.4540	-0.0003	12.7
2944.0	0.5490	0.2525	0.2575	0.2482	0.2583	57	0.4560	-0.0003	12.7
2957.0	0.5470	0.2525	0.2575	0.2482	0.2583	57	0.4580	-0.0003	12.7
2968.0	0.5450	0.2525	0.2575	0.2482	0.2583	58	0.4600	-0.0003	12.9
2977.0	0.5430	0.2525	0.2575	0.2482	0.2583	57	0.4620	-0.0003	12.7
2990.0	0.5410	0.2525	0.2575	0.2481	0.2584	57	0.4640	-0.0003	12.7
3009.0	0.5390	0.2525	0.2575	0.2481	0.2584	58	0.4660	-0.0003	12.7
3022.0	0.5370	0.2525	0.2575	0.2481	0.2584	57	0.4680	-0.0003	12.7
3035.0	0.5350	0.2525	0.2575	0.2481	0.2584	57	0.4700	-0.0003	12.7
3047.0	0.5330	0.2525	0.2575	0.2481	0.2584	57	0.4720	-0.0003	12.6

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
3060.0	0.5310	0.2524	0.2575	0.2481	0.2584	57	0.4740	-0.0004	12.6
3073.0	0.5290	0.2524	0.2575	0.2481	0.2584	57	0.4760	-0.0004	12.7
3085.0	0.5270	0.2524	0.2575	0.2481	0.2584	57	0.4780	-0.0004	12.6
3098.0	0.5250	0.2524	0.2575	0.2480	0.2584	57	0.4800	-0.0004	12.7
3104.0	0.5230	0.2524	0.2575	0.2480	0.2584	57	0.4820	-0.0004	12.6
3117.0	0.5210	0.2524	0.2575	0.2480	0.2584	58	0.4840	-0.0004	12.8
3131.0	0.5190	0.2524	0.2575	0.2480	0.2584	58	0.4860	-0.0004	12.8
3149.0	0.5170	0.2524	0.2575	0.2479	0.2584	58	0.4880	-0.0004	12.8
3162.0	0.5150	0.2524	0.2575	0.2479	0.2584	58	0.4900	-0.0004	12.8
3175.0	0.5130	0.2523	0.2575	0.2479	0.2584	58	0.4920	-0.0004	12.9
3188.0	0.5110	0.2523	0.2575	0.2479	0.2584	58	0.4940	-0.0004	12.9
3200.0	0.5090	0.2523	0.2575	0.2479	0.2584	58	0.4960	-0.0004	12.9
3213.0	0.5070	0.2523	0.2575	0.2479	0.2584	58	0.4980	-0.0004	12.9
3226.0	0.5050	0.2523	0.2575	0.2479	0.2584	58	0.5000	-0.0004	12.9
3237.0	0.5030	0.2523	0.2575	0.2478	0.2584	59	0.5020	-0.0005	13.1
3246.0	0.5010	0.2523	0.2575	0.2478	0.2585	58	0.5040	-0.0004	12.9
3259.0	0.4990	0.2523	0.2575	0.2478	0.2585	58	0.5060	-0.0004	12.9
3278.0	0.4970	0.2523	0.2575	0.2478	0.2585	58	0.5080	-0.0004	12.9
3291.0	0.4950	0.2523	0.2575	0.2478	0.2585	58	0.5100	-0.0004	12.8



Direct Shear Strength of Rock
ASTM D 5607

Project Name	<u>SR1 Flood Control Project - Inlet Debris Barrier</u>	Project Number	<u>110773396</u>
Lithology	<u>Shale, gray, moderately hard</u>	Lab ID	<u>DSSS-11</u>
Hole Number	<u>DB-1</u>	Date Received	<u>05/15/2018</u>
Depth (m)	<u>25.20</u>	Diameter (in)	<u>2.398</u>
Test Type	<u>Direct shear of sawn surface</u>	Angle of Dip (deg)	<u>0.0</u>
Initial Moisture Condition	<u>As received, moist</u>	Area(in ²)	<u>4.52</u>
Test Moisture Condition	<u>Soaked at least 12 hours prior to test.</u>	Date Prepared	<u>06/29/2018</u>
Joint Roughness	<u>1</u>	Date Tested	<u>07/02/2018</u>
Normal Stress (psi)	<u>62</u>		



Sketch



Shear Rate to Peak (in/min) N/A

Encapsulation Material Hydro-Stone

Comments _____

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
0.0	1.0086	0.2590	0.2552	0.2536	0.2564	17	0.0000	0.0000	3.7
16.0	1.0066	0.2591	0.2552	0.2533	0.2568	22	0.0020	0.0000	4.8
31.0	1.0046	0.2592	0.2552	0.2531	0.2572	34	0.0040	0.0001	7.5
52.0	1.0026	0.2593	0.2553	0.2528	0.2576	44	0.0060	0.0002	9.8
68.0	1.0006	0.2593	0.2553	0.2525	0.2580	68	0.0080	0.0002	15.0
83.0	0.9986	0.2593	0.2553	0.2524	0.2581	72	0.0100	0.0002	15.9
97.0	0.9966	0.2593	0.2553	0.2524	0.2581	72	0.0120	0.0002	16.0
111.0	0.9946	0.2593	0.2553	0.2523	0.2581	74	0.0140	0.0002	16.3
124.0	0.9926	0.2592	0.2553	0.2523	0.2581	75	0.0160	0.0002	16.6
137.0	0.9906	0.2592	0.2553	0.2523	0.2581	76	0.0180	0.0002	16.8
150.0	0.9886	0.2592	0.2553	0.2522	0.2581	77	0.0200	0.0001	17.1
163.0	0.9866	0.2592	0.2553	0.2522	0.2581	79	0.0220	0.0001	17.5
172.0	0.9846	0.2592	0.2553	0.2522	0.2581	78	0.0240	0.0001	17.2
191.0	0.9826	0.2591	0.2553	0.2522	0.2582	81	0.0260	0.0001	17.9
204.0	0.9806	0.2591	0.2553	0.2521	0.2582	81	0.0280	0.0001	18.0
217.0	0.9786	0.2591	0.2554	0.2521	0.2582	81	0.0300	0.0001	18.0
231.0	0.9766	0.2591	0.2554	0.2521	0.2582	82	0.0320	0.0001	18.2
244.0	0.9746	0.2591	0.2554	0.2521	0.2582	83	0.0340	0.0001	18.3
257.0	0.9726	0.2591	0.2554	0.2521	0.2582	83	0.0360	0.0001	18.3
271.0	0.9706	0.2590	0.2554	0.2521	0.2582	83	0.0380	0.0001	18.4
284.0	0.9686	0.2590	0.2554	0.2520	0.2582	83	0.0400	0.0001	18.4
297.0	0.9666	0.2590	0.2554	0.2520	0.2582	83	0.0420	0.0001	18.4
306.0	0.9646	0.2590	0.2554	0.2520	0.2582	84	0.0440	0.0001	18.6
324.0	0.9626	0.2590	0.2554	0.2520	0.2582	85	0.0460	0.0001	18.7
338.0	0.9606	0.2590	0.2554	0.2520	0.2582	84	0.0480	0.0001	18.6
350.0	0.9586	0.2589	0.2554	0.2520	0.2582	84	0.0500	0.0001	18.6
363.0	0.9566	0.2589	0.2554	0.2519	0.2582	84	0.0520	0.0000	18.6
377.0	0.9546	0.2589	0.2554	0.2519	0.2582	84	0.0540	0.0000	18.6
390.0	0.9526	0.2589	0.2554	0.2519	0.2582	84	0.0560	0.0000	18.6
403.0	0.9506	0.2589	0.2554	0.2519	0.2582	84	0.0580	0.0000	18.6
416.0	0.9486	0.2589	0.2554	0.2519	0.2582	84	0.0600	0.0000	18.6
429.0	0.9466	0.2589	0.2554	0.2519	0.2582	84	0.0620	0.0000	18.6
441.0	0.9446	0.2589	0.2554	0.2519	0.2582	85	0.0640	0.0000	18.9
450.0	0.9426	0.2588	0.2554	0.2518	0.2582	84	0.0660	0.0000	18.6
469.0	0.9406	0.2588	0.2554	0.2518	0.2582	84	0.0680	0.0000	18.7
482.0	0.9386	0.2588	0.2554	0.2518	0.2583	84	0.0700	0.0000	18.7
495.0	0.9366	0.2588	0.2554	0.2518	0.2583	84	0.0720	0.0000	18.6
508.0	0.9346	0.2588	0.2554	0.2518	0.2583	84	0.0740	0.0000	18.6
521.0	0.9326	0.2588	0.2554	0.2518	0.2583	84	0.0760	0.0000	18.6
534.0	0.9306	0.2588	0.2554	0.2518	0.2583	84	0.0780	0.0000	18.6
547.0	0.9286	0.2587	0.2554	0.2517	0.2583	84	0.0800	0.0000	18.6
560.0	0.9266	0.2587	0.2554	0.2517	0.2583	84	0.0820	0.0000	18.6
573.0	0.9246	0.2587	0.2555	0.2517	0.2583	84	0.0840	0.0000	18.6
580.0	0.9226	0.2587	0.2555	0.2517	0.2583	82	0.0860	0.0000	18.2
599.0	0.9206	0.2587	0.2555	0.2517	0.2583	84	0.0880	0.0000	18.7
611.0	0.9186	0.2587	0.2555	0.2517	0.2583	84	0.0900	0.0000	18.6
624.0	0.9166	0.2587	0.2555	0.2517	0.2583	84	0.0920	0.0000	18.6
637.0	0.9146	0.2587	0.2555	0.2516	0.2583	84	0.0940	0.0000	18.6
650.0	0.9126	0.2587	0.2555	0.2516	0.2583	84	0.0960	0.0000	18.6
663.0	0.9106	0.2586	0.2555	0.2516	0.2583	84	0.0980	0.0000	18.6
675.0	0.9086	0.2586	0.2555	0.2516	0.2583	84	0.1000	0.0000	18.6
688.0	0.9066	0.2586	0.2555	0.2516	0.2583	84	0.1020	0.0000	18.6
701.0	0.9046	0.2586	0.2555	0.2516	0.2583	84	0.1040	0.0000	18.6
713.0	0.9026	0.2586	0.2555	0.2516	0.2583	85	0.1060	0.0000	18.7
723.0	0.9006	0.2586	0.2555	0.2516	0.2583	82	0.1080	0.0000	18.1
740.0	0.8986	0.2586	0.2555	0.2516	0.2583	84	0.1100	0.0000	18.5
753.0	0.8966	0.2586	0.2555	0.2515	0.2583	84	0.1120	-0.0001	18.5
766.0	0.8946	0.2586	0.2555	0.2515	0.2583	84	0.1140	-0.0001	18.5
779.0	0.8926	0.2585	0.2555	0.2515	0.2583	84	0.1160	-0.0001	18.5
792.0	0.8906	0.2585	0.2555	0.2515	0.2584	84	0.1180	-0.0001	18.5
805.0	0.8886	0.2585	0.2555	0.2515	0.2584	84	0.1200	-0.0001	18.5
818.0	0.8866	0.2585	0.2555	0.2515	0.2584	84	0.1220	-0.0001	18.5
831.0	0.8846	0.2585	0.2555	0.2515	0.2584	84	0.1240	-0.0001	18.5
843.0	0.8826	0.2585	0.2555	0.2515	0.2584	84	0.1260	-0.0001	18.5
851.0	0.8806	0.2585	0.2555	0.2515	0.2584	83	0.1280	-0.0001	18.4
869.0	0.8786	0.2585	0.2555	0.2514	0.2584	84	0.1300	-0.0001	18.5
882.0	0.8766	0.2585	0.2555	0.2514	0.2584	84	0.1320	-0.0001	18.5
895.0	0.8746	0.2585	0.2555	0.2514	0.2584	84	0.1340	-0.0001	18.5
908.0	0.8726	0.2584	0.2555	0.2514	0.2584	84	0.1360	-0.0001	18.5
921.0	0.8706	0.2584	0.2555	0.2514	0.2584	84	0.1380	-0.0001	18.5
934.0	0.8686	0.2584	0.2555	0.2514	0.2584	83	0.1400	-0.0001	18.5
947.0	0.8666	0.2584	0.2555	0.2514	0.2584	84	0.1420	-0.0001	18.5
960.0	0.8646	0.2584	0.2555	0.2513	0.2584	84	0.1440	-0.0001	18.5
973.0	0.8626	0.2584	0.2555	0.2513	0.2584	84	0.1460	-0.0001	18.6
982.0	0.8606	0.2584	0.2555	0.2513	0.2584	85	0.1480	-0.0001	18.8
999.0	0.8586	0.2583	0.2555	0.2513	0.2584	85	0.1500	-0.0002	18.8
1012.0	0.8566	0.2583	0.2555	0.2513	0.2584	84	0.1520	-0.0002	18.6
1025.0	0.8546	0.2583	0.2555	0.2513	0.2584	84	0.1540	-0.0002	18.6
1038.0	0.8526	0.2583	0.2556	0.2512	0.2584	84	0.1560	-0.0002	18.6

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
1051.0	0.8506	0.2583	0.2555	0.2512	0.2584	84	0.1580	-0.0002	18.6
1064.0	0.8486	0.2583	0.2555	0.2512	0.2584	84	0.1600	-0.0002	18.6
1076.0	0.8466	0.2583	0.2556	0.2512	0.2584	84	0.1620	-0.0002	18.6
1089.0	0.8446	0.2583	0.2556	0.2512	0.2584	84	0.1640	-0.0002	18.6
1102.0	0.8426	0.2583	0.2556	0.2512	0.2584	84	0.1660	-0.0002	18.6
1115.0	0.8406	0.2583	0.2556	0.2512	0.2585	84	0.1680	-0.0001	18.6
1122.0	0.8386	0.2582	0.2556	0.2512	0.2585	84	0.1700	-0.0002	18.6
1140.0	0.8366	0.2582	0.2556	0.2512	0.2585	84	0.1720	-0.0002	18.6
1153.0	0.8346	0.2582	0.2556	0.2512	0.2585	84	0.1740	-0.0002	18.6
1166.0	0.8326	0.2582	0.2556	0.2512	0.2585	84	0.1760	-0.0002	18.6
1179.0	0.8306	0.2582	0.2556	0.2511	0.2585	84	0.1780	-0.0002	18.6
1192.0	0.8286	0.2582	0.2556	0.2511	0.2585	84	0.1800	-0.0002	18.6
1205.0	0.8266	0.2582	0.2556	0.2511	0.2585	84	0.1820	-0.0002	18.6
1218.0	0.8246	0.2582	0.2556	0.2511	0.2585	84	0.1840	-0.0002	18.6
1231.0	0.8226	0.2582	0.2556	0.2511	0.2585	84	0.1860	-0.0002	18.5
1244.0	0.8206	0.2582	0.2556	0.2511	0.2585	84	0.1880	-0.0002	18.5
1252.0	0.8186	0.2582	0.2556	0.2511	0.2585	83	0.1900	-0.0002	18.4
1270.0	0.8166	0.2581	0.2556	0.2511	0.2585	84	0.1920	-0.0002	18.6
1282.0	0.8146	0.2581	0.2556	0.2510	0.2585	84	0.1940	-0.0002	18.6
1296.0	0.8126	0.2581	0.2556	0.2510	0.2585	84	0.1960	-0.0002	18.5
1309.0	0.8106	0.2581	0.2556	0.2510	0.2586	84	0.1980	-0.0002	18.5
1321.0	0.8086	0.2581	0.2556	0.2510	0.2585	84	0.2000	-0.0002	18.5
1334.0	0.8066	0.2581	0.2556	0.2510	0.2586	84	0.2020	-0.0002	18.5
1347.0	0.8046	0.2581	0.2556	0.2510	0.2586	84	0.2040	-0.0002	18.5
1360.0	0.8026	0.2581	0.2556	0.2510	0.2586	84	0.2060	-0.0002	18.5
1373.0	0.8006	0.2581	0.2557	0.2510	0.2586	84	0.2080	-0.0002	18.5
1384.0	0.7986	0.2581	0.2557	0.2510	0.2586	84	0.2100	-0.0002	18.7
1393.0	0.7966	0.2581	0.2557	0.2510	0.2586	84	0.2120	-0.0002	18.5
1411.0	0.7946	0.2581	0.2557	0.2509	0.2586	84	0.2140	-0.0002	18.6
1424.0	0.7926	0.2581	0.2557	0.2509	0.2586	84	0.2160	-0.0002	18.5
1438.0	0.7906	0.2580	0.2557	0.2509	0.2586	84	0.2180	-0.0002	18.5
1451.0	0.7886	0.2580	0.2557	0.2509	0.2586	84	0.2200	-0.0002	18.5
1464.0	0.7866	0.2580	0.2557	0.2509	0.2586	83	0.2220	-0.0002	18.5
1477.0	0.7846	0.2580	0.2557	0.2509	0.2586	83	0.2240	-0.0002	18.5
1490.0	0.7826	0.2580	0.2557	0.2509	0.2586	83	0.2260	-0.0002	18.4
1503.0	0.7806	0.2580	0.2557	0.2509	0.2586	84	0.2280	-0.0002	18.5
1516.0	0.7786	0.2580	0.2557	0.2509	0.2587	84	0.2300	-0.0002	18.5
1524.0	0.7766	0.2580	0.2557	0.2508	0.2587	83	0.2320	-0.0002	18.4
1542.0	0.7746	0.2580	0.2557	0.2508	0.2587	84	0.2340	-0.0002	18.5
1555.0	0.7726	0.2580	0.2557	0.2508	0.2587	83	0.2360	-0.0002	18.4
1568.0	0.7706	0.2580	0.2557	0.2508	0.2587	83	0.2380	-0.0002	18.4
1581.0	0.7686	0.2580	0.2557	0.2508	0.2587	83	0.2400	-0.0002	18.4
1594.0	0.7666	0.2580	0.2557	0.2508	0.2587	83	0.2420	-0.0002	18.4
1607.0	0.7646	0.2579	0.2557	0.2508	0.2587	83	0.2440	-0.0003	18.4
1619.0	0.7626	0.2579	0.2557	0.2508	0.2587	83	0.2460	-0.0003	18.4
1632.0	0.7606	0.2579	0.2557	0.2508	0.2587	83	0.2480	-0.0003	18.4
1645.0	0.7586	0.2579	0.2557	0.2507	0.2587	83	0.2500	-0.0003	18.4
1653.0	0.7566	0.2579	0.2557	0.2507	0.2587	84	0.2520	-0.0003	18.5
1670.0	0.7546	0.2579	0.2557	0.2507	0.2587	84	0.2540	-0.0003	18.6
1683.0	0.7526	0.2579	0.2557	0.2507	0.2587	83	0.2560	-0.0003	18.4
1697.0	0.7506	0.2579	0.2557	0.2507	0.2587	83	0.2580	-0.0003	18.4
1710.0	0.7486	0.2579	0.2557	0.2507	0.2588	83	0.2600	-0.0003	18.4
1723.0	0.7466	0.2579	0.2557	0.2507	0.2588	83	0.2620	-0.0003	18.4
1735.0	0.7446	0.2579	0.2557	0.2507	0.2588	83	0.2640	-0.0003	18.3
1748.0	0.7426	0.2579	0.2557	0.2507	0.2588	83	0.2660	-0.0003	18.4
1761.0	0.7406	0.2579	0.2557	0.2507	0.2588	83	0.2680	-0.0003	18.3
1774.0	0.7386	0.2579	0.2558	0.2506	0.2588	83	0.2700	-0.0003	18.3
1786.0	0.7366	0.2578	0.2558	0.2506	0.2588	84	0.2720	-0.0003	18.6
1795.0	0.7346	0.2578	0.2558	0.2506	0.2588	83	0.2740	-0.0003	18.3
1813.0	0.7326	0.2578	0.2558	0.2506	0.2588	83	0.2760	-0.0003	18.3
1825.0	0.7306	0.2578	0.2558	0.2506	0.2588	83	0.2780	-0.0003	18.3
1838.0	0.7286	0.2578	0.2558	0.2506	0.2588	83	0.2800	-0.0003	18.3
1851.0	0.7266	0.2578	0.2558	0.2506	0.2588	83	0.2820	-0.0003	18.3
1864.0	0.7246	0.2578	0.2558	0.2506	0.2588	83	0.2840	-0.0003	18.3
1877.0	0.7226	0.2578	0.2558	0.2506	0.2588	83	0.2860	-0.0003	18.4
1890.0	0.7206	0.2578	0.2558	0.2505	0.2588	83	0.2880	-0.0003	18.3
1903.0	0.7186	0.2577	0.2558	0.2505	0.2588	83	0.2900	-0.0004	18.3
1915.0	0.7166	0.2577	0.2558	0.2505	0.2588	83	0.2920	-0.0004	18.4
1923.0	0.7146	0.2577	0.2557	0.2505	0.2588	83	0.2940	-0.0004	18.4
1941.0	0.7126	0.2577	0.2558	0.2505	0.2588	83	0.2960	-0.0004	18.5
1954.0	0.7106	0.2577	0.2557	0.2505	0.2588	83	0.2980	-0.0004	18.4
1967.0	0.7086	0.2577	0.2558	0.2504	0.2588	83	0.3000	-0.0004	18.4
1979.0	0.7066	0.2577	0.2557	0.2504	0.2588	83	0.3020	-0.0004	18.4
1992.0	0.7046	0.2577	0.2558	0.2504	0.2588	83	0.3040	-0.0004	18.4
2005.0	0.7026	0.2577	0.2558	0.2504	0.2589	83	0.3060	-0.0003	18.4
2018.0	0.7006	0.2577	0.2558	0.2504	0.2589	83	0.3080	-0.0003	18.4
2031.0	0.6986	0.2577	0.2558	0.2504	0.2589	83	0.3100	-0.0003	18.4
2043.0	0.6966	0.2577	0.2558	0.2504	0.2589	83	0.3120	-0.0003	18.4
2056.0	0.6946	0.2577	0.2558	0.2504	0.2589	84	0.3140	-0.0003	18.5

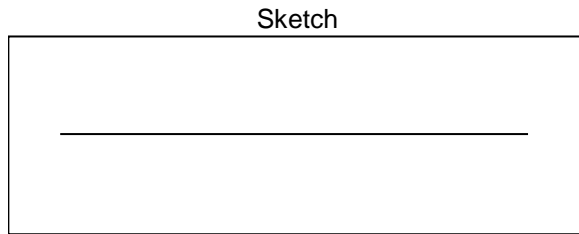
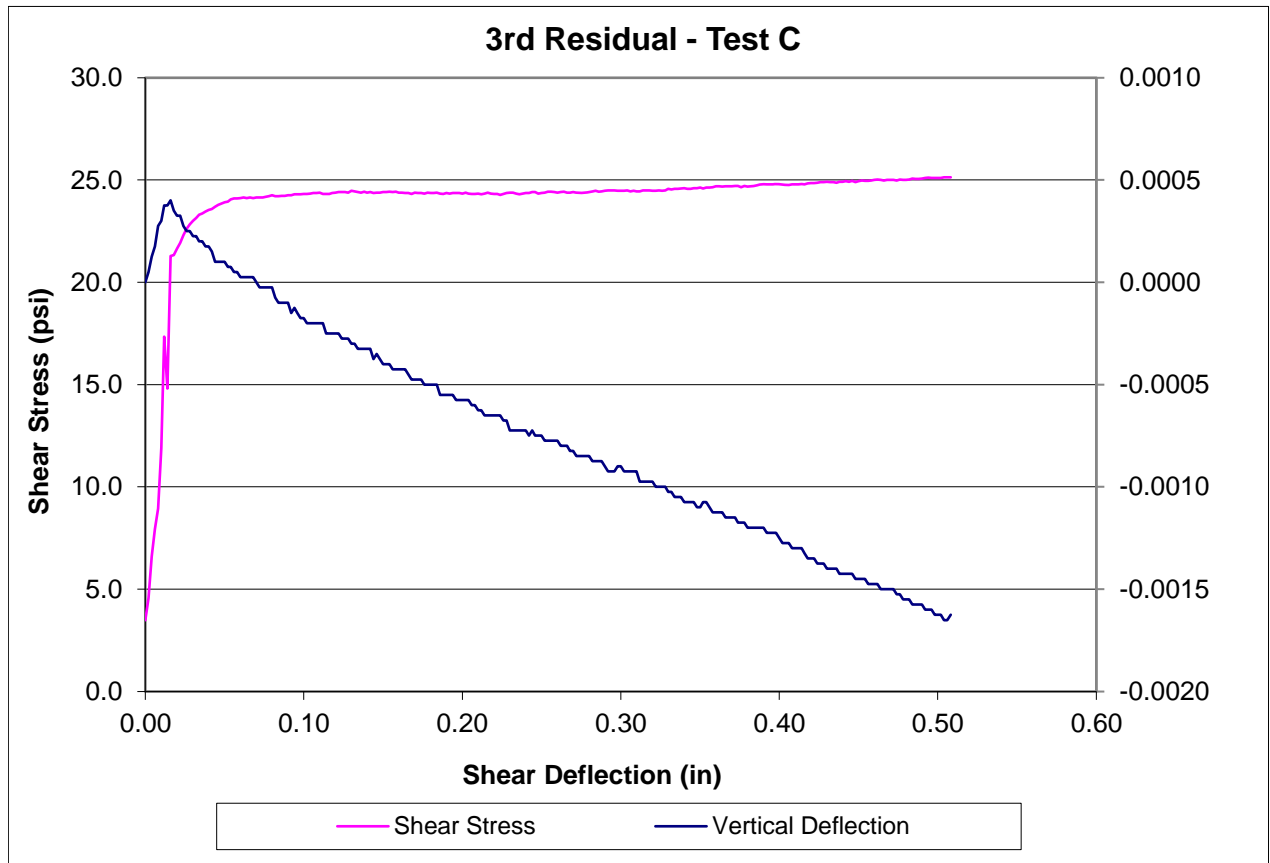
Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
2065.0	0.6926	0.2576	0.2558	0.2504	0.2589	83	0.3160	-0.0004	18.3
2083.0	0.6906	0.2576	0.2558	0.2503	0.2589	83	0.3180	-0.0004	18.3
2095.0	0.6886	0.2576	0.2558	0.2503	0.2589	83	0.3200	-0.0004	18.3
2108.0	0.6866	0.2576	0.2558	0.2503	0.2589	83	0.3220	-0.0004	18.3
2121.0	0.6846	0.2576	0.2558	0.2503	0.2589	83	0.3240	-0.0004	18.3
2134.0	0.6826	0.2576	0.2558	0.2503	0.2589	83	0.3260	-0.0004	18.3
2146.0	0.6806	0.2576	0.2558	0.2503	0.2589	82	0.3280	-0.0004	18.2
2159.0	0.6786	0.2576	0.2558	0.2503	0.2589	82	0.3300	-0.0004	18.2
2173.0	0.6766	0.2576	0.2558	0.2503	0.2589	83	0.3320	-0.0004	18.3
2186.0	0.6746	0.2576	0.2558	0.2503	0.2589	82	0.3340	-0.0004	18.2
2193.0	0.6726	0.2576	0.2558	0.2502	0.2589	82	0.3360	-0.0004	18.2
2212.0	0.6706	0.2576	0.2558	0.2502	0.2590	83	0.3380	-0.0004	18.3
2224.0	0.6686	0.2576	0.2558	0.2502	0.2590	82	0.3400	-0.0004	18.2
2237.0	0.6666	0.2576	0.2558	0.2502	0.2590	82	0.3420	-0.0004	18.2
2250.0	0.6646	0.2576	0.2558	0.2502	0.2590	82	0.3440	-0.0004	18.2
2263.0	0.6626	0.2576	0.2558	0.2502	0.2590	82	0.3460	-0.0004	18.2
2276.0	0.6606	0.2576	0.2558	0.2502	0.2590	82	0.3480	-0.0004	18.2
2289.0	0.6586	0.2576	0.2558	0.2502	0.2590	82	0.3500	-0.0004	18.2
2302.0	0.6566	0.2575	0.2558	0.2502	0.2590	82	0.3520	-0.0004	18.2
2315.0	0.6546	0.2575	0.2558	0.2501	0.2590	82	0.3540	-0.0004	18.2
2324.0	0.6526	0.2575	0.2558	0.2501	0.2590	83	0.3560	-0.0004	18.4
2341.0	0.6506	0.2575	0.2558	0.2501	0.2590	83	0.3580	-0.0004	18.3
2354.0	0.6486	0.2575	0.2558	0.2501	0.2590	82	0.3600	-0.0004	18.2
2368.0	0.6466	0.2575	0.2558	0.2501	0.2590	82	0.3620	-0.0004	18.2
2381.0	0.6446	0.2575	0.2558	0.2501	0.2590	82	0.3640	-0.0004	18.2
2393.0	0.6426	0.2575	0.2558	0.2501	0.2590	82	0.3660	-0.0004	18.2
2406.0	0.6406	0.2575	0.2558	0.2501	0.2590	82	0.3680	-0.0004	18.2
2418.0	0.6386	0.2575	0.2558	0.2500	0.2590	82	0.3700	-0.0005	18.1
2431.0	0.6366	0.2575	0.2558	0.2500	0.2590	82	0.3720	-0.0005	18.1
2444.0	0.6346	0.2575	0.2558	0.2500	0.2590	82	0.3740	-0.0005	18.1
2456.0	0.6326	0.2575	0.2558	0.2500	0.2590	82	0.3760	-0.0005	18.2
2465.0	0.6306	0.2575	0.2558	0.2500	0.2590	82	0.3780	-0.0005	18.0
2483.0	0.6286	0.2575	0.2558	0.2500	0.2591	82	0.3800	-0.0004	18.1
2496.0	0.6266	0.2574	0.2558	0.2500	0.2591	82	0.3820	-0.0005	18.1
2509.0	0.6246	0.2574	0.2558	0.2500	0.2591	82	0.3840	-0.0005	18.1
2522.0	0.6226	0.2574	0.2558	0.2499	0.2591	82	0.3860	-0.0005	18.1
2535.0	0.6206	0.2574	0.2558	0.2499	0.2591	82	0.3880	-0.0005	18.0
2547.0	0.6186	0.2574	0.2558	0.2499	0.2591	81	0.3900	-0.0005	18.0
2560.0	0.6166	0.2574	0.2558	0.2499	0.2591	82	0.3920	-0.0005	18.0
2573.0	0.6146	0.2574	0.2558	0.2499	0.2591	82	0.3940	-0.0005	18.1
2586.0	0.6126	0.2574	0.2558	0.2499	0.2591	82	0.3960	-0.0005	18.0
2593.0	0.6106	0.2574	0.2558	0.2499	0.2591	81	0.3980	-0.0005	17.9
2611.0	0.6086	0.2574	0.2558	0.2499	0.2591	83	0.4000	-0.0005	18.3
2624.0	0.6066	0.2574	0.2558	0.2498	0.2591	82	0.4020	-0.0005	18.0
2637.0	0.6046	0.2574	0.2558	0.2498	0.2591	82	0.4040	-0.0005	18.0
2650.0	0.6026	0.2574	0.2558	0.2498	0.2591	81	0.4060	-0.0005	18.0
2663.0	0.6006	0.2574	0.2558	0.2498	0.2591	81	0.4080	-0.0005	18.0
2676.0	0.5986	0.2574	0.2558	0.2498	0.2591	81	0.4100	-0.0005	18.0
2688.0	0.5966	0.2574	0.2558	0.2498	0.2591	81	0.4120	-0.0005	18.0
2701.0	0.5946	0.2573	0.2558	0.2498	0.2591	81	0.4140	-0.0005	18.0
2714.0	0.5926	0.2573	0.2558	0.2498	0.2591	81	0.4160	-0.0005	18.0
2724.0	0.5906	0.2573	0.2558	0.2497	0.2591	82	0.4180	-0.0006	18.2
2735.0	0.5886	0.2573	0.2558	0.2497	0.2591	81	0.4200	-0.0006	18.0
2753.0	0.5866	0.2573	0.2558	0.2497	0.2591	81	0.4220	-0.0006	18.0
2766.0	0.5846	0.2573	0.2558	0.2497	0.2591	81	0.4240	-0.0006	18.0
2779.0	0.5826	0.2573	0.2558	0.2497	0.2591	81	0.4260	-0.0006	18.0
2792.0	0.5806	0.2573	0.2558	0.2497	0.2591	81	0.4280	-0.0006	18.0
2804.0	0.5786	0.2573	0.2558	0.2496	0.2591	81	0.4300	-0.0006	18.0
2817.0	0.5766	0.2573	0.2558	0.2496	0.2591	81	0.4320	-0.0006	18.0
2831.0	0.5746	0.2572	0.2558	0.2496	0.2591	81	0.4340	-0.0006	18.0
2843.0	0.5726	0.2572	0.2558	0.2496	0.2591	81	0.4360	-0.0006	18.0
2856.0	0.5706	0.2572	0.2558	0.2496	0.2591	81	0.4380	-0.0006	18.0
2864.0	0.5686	0.2572	0.2558	0.2496	0.2591	81	0.4400	-0.0006	18.0
2882.0	0.5666	0.2572	0.2558	0.2495	0.2591	82	0.4420	-0.0007	18.1
2895.0	0.5646	0.2572	0.2558	0.2495	0.2591	82	0.4440	-0.0007	18.1
2907.0	0.5626	0.2572	0.2558	0.2495	0.2591	82	0.4460	-0.0007	18.1
2920.0	0.5606	0.2572	0.2558	0.2495	0.2591	82	0.4480	-0.0007	18.1
2933.0	0.5586	0.2572	0.2558	0.2495	0.2591	82	0.4500	-0.0007	18.0
2946.0	0.5566	0.2572	0.2558	0.2495	0.2592	81	0.4520	-0.0006	18.0
2959.0	0.5546	0.2572	0.2558	0.2495	0.2592	81	0.4540	-0.0006	18.0
2972.0	0.5526	0.2572	0.2558	0.2494	0.2592	81	0.4560	-0.0007	18.0
2985.0	0.5506	0.2572	0.2558	0.2494	0.2592	81	0.4580	-0.0007	18.0
2992.0	0.5486	0.2572	0.2558	0.2494	0.2592	81	0.4600	-0.0007	18.0
3005.0	0.5466	0.2572	0.2558	0.2494	0.2592	81	0.4620	-0.0007	18.0
3023.0	0.5446	0.2571	0.2558	0.2494	0.2592	82	0.4640	-0.0007	18.0
3036.0	0.5426	0.2571	0.2558	0.2494	0.2592	82	0.4660	-0.0007	18.0
3049.0	0.5406	0.2571	0.2558	0.2493	0.2592	81	0.4680	-0.0007	18.0
3062.0	0.5386	0.2571	0.2558	0.2493	0.2592	82	0.4700	-0.0007	18.0
3075.0	0.5366	0.2571	0.2558	0.2493	0.2592	82	0.4720	-0.0007	18.0

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
3088.0	0.5346	0.2571	0.2558	0.2493	0.2592	81	0.4740	-0.0007	18.0
3100.0	0.5326	0.2571	0.2558	0.2493	0.2593	82	0.4760	-0.0007	18.0
3113.0	0.5306	0.2571	0.2558	0.2493	0.2593	82	0.4780	-0.0007	18.0
3124.0	0.5286	0.2571	0.2558	0.2492	0.2593	82	0.4800	-0.0007	18.2
3133.0	0.5266	0.2571	0.2558	0.2492	0.2593	82	0.4820	-0.0007	18.0
3151.0	0.5246	0.2571	0.2558	0.2492	0.2593	82	0.4840	-0.0007	18.2
3164.0	0.5226	0.2571	0.2558	0.2492	0.2593	82	0.4860	-0.0007	18.1
3177.0	0.5206	0.2571	0.2558	0.2492	0.2593	82	0.4880	-0.0007	18.0
3190.0	0.5186	0.2571	0.2558	0.2492	0.2593	81	0.4900	-0.0007	18.0
3202.0	0.5166	0.2571	0.2558	0.2491	0.2593	81	0.4920	-0.0007	18.0
3215.0	0.5146	0.2570	0.2558	0.2491	0.2593	81	0.4940	-0.0008	18.0
3228.0	0.5126	0.2570	0.2558	0.2491	0.2594	81	0.4960	-0.0007	18.0
3241.0	0.5106	0.2570	0.2558	0.2491	0.2594	81	0.4980	-0.0007	18.0
3253.0	0.5086	0.2570	0.2558	0.2491	0.2594	82	0.5000	-0.0007	18.1
3260.0	0.5066	0.2570	0.2558	0.2491	0.2594	80	0.5020	-0.0007	17.8
3279.0	0.5046	0.2570	0.2558	0.2490	0.2594	80	0.5040	-0.0007	17.7
3292.0	0.5026	0.2570	0.2558	0.2490	0.2594	82	0.5060	-0.0007	18.1
3305.0	0.5006	0.2570	0.2558	0.2490	0.2594	82	0.5080	-0.0007	18.0
3318.0	0.4986	0.2570	0.2558	0.2490	0.2594	81	0.5100	-0.0007	18.0
3331.0	0.4966	0.2570	0.2558	0.2490	0.2594	81	0.5120	-0.0007	18.0
3344.0	0.4946	0.2570	0.2558	0.2489	0.2595	81	0.5140	-0.0007	18.0
3356.0	0.4926	0.2570	0.2558	0.2489	0.2595	81	0.5160	-0.0007	18.0
3364.0	0.4914	0.2570	0.2558	0.2489	0.2595	82	0.5172	-0.0007	18.0



Direct Shear Strength of Rock
ASTM D 5607

Project Name	<u>SR1 Flood Control Project - Inlet Debris Barrier</u>	Project Number	<u>110773396</u>
Lithology	<u>Shale, gray, moderately hard</u>	Lab ID	<u>DSSS-11</u>
Hole Number	<u>DB-1</u>	Date Received	<u>05/15/2018</u>
Depth (m)	<u>25.20</u>	Diameter (in)	<u>2.398</u>
Test Type	<u>Direct shear of sawn surface</u>	Angle of Dip (deg)	<u>0.0</u>
Initial Moisture Condition	<u>As received, moist</u>	Area(in ²)	<u>4.52</u>
Test Moisture Condition	<u>Soaked at least 12 hours prior to test.</u>	Date Prepared	<u>06/29/2018</u>
Joint Roughness	<u>1</u>	Date Tested	<u>07/02/2018</u>
Normal Stress (psi)	<u>94</u>		



Shear Rate to Peak (in/min) N/A

Encapsulation Material Hydro-Stone

Comments _____

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
0.0	1.0017	0.2568	0.2548	0.2516	0.2564	16	0.0000	0.0000	3.5
31.0	0.9997	0.2568	0.2548	0.2513	0.2569	21	0.0020	0.0000	4.6
47.0	0.9977	0.2568	0.2549	0.2511	0.2573	30	0.0040	0.0001	6.6
62.0	0.9957	0.2569	0.2549	0.2508	0.2577	36	0.0060	0.0002	7.9
77.0	0.9937	0.2570	0.2550	0.2505	0.2582	40	0.0080	0.0003	8.9
93.0	0.9917	0.2570	0.2550	0.2502	0.2586	54	0.0100	0.0003	11.9
108.0	0.9897	0.2571	0.2551	0.2499	0.2590	78	0.0120	0.0004	17.3
116.0	0.9877	0.2571	0.2551	0.2497	0.2592	67	0.0140	0.0004	14.8
139.0	0.9857	0.2571	0.2551	0.2495	0.2595	96	0.0160	0.0004	21.3
153.0	0.9837	0.2570	0.2551	0.2494	0.2595	96	0.0180	0.0004	21.3
167.0	0.9817	0.2570	0.2551	0.2493	0.2595	98	0.0200	0.0003	21.6
180.0	0.9797	0.2570	0.2551	0.2493	0.2595	99	0.0220	0.0003	21.9
195.0	0.9777	0.2570	0.2550	0.2492	0.2595	101	0.0240	0.0003	22.3
208.0	0.9757	0.2569	0.2550	0.2492	0.2595	102	0.0260	0.0002	22.6
222.0	0.9737	0.2569	0.2550	0.2492	0.2595	103	0.0280	0.0002	22.8
236.0	0.9717	0.2569	0.2550	0.2491	0.2595	104	0.0300	0.0002	23.0
251.0	0.9697	0.2569	0.2550	0.2491	0.2595	105	0.0320	0.0002	23.1
265.0	0.9677	0.2568	0.2550	0.2491	0.2595	105	0.0340	0.0002	23.3
279.0	0.9657	0.2568	0.2550	0.2491	0.2595	106	0.0360	0.0002	23.4
292.0	0.9637	0.2568	0.2550	0.2490	0.2595	106	0.0380	0.0002	23.4
306.0	0.9617	0.2568	0.2550	0.2490	0.2595	106	0.0400	0.0002	23.5
320.0	0.9597	0.2568	0.2549	0.2490	0.2595	107	0.0420	0.0001	23.6
333.0	0.9577	0.2567	0.2549	0.2489	0.2595	107	0.0440	0.0001	23.7
346.0	0.9557	0.2567	0.2549	0.2489	0.2595	107	0.0460	0.0001	23.8
360.0	0.9537	0.2567	0.2549	0.2489	0.2595	108	0.0480	0.0001	23.8
373.0	0.9517	0.2567	0.2549	0.2489	0.2595	108	0.0500	0.0001	23.9
387.0	0.9497	0.2567	0.2549	0.2488	0.2595	108	0.0520	0.0001	23.9
401.0	0.9477	0.2567	0.2549	0.2488	0.2595	109	0.0540	0.0001	24.0
414.0	0.9457	0.2566	0.2549	0.2488	0.2595	109	0.0560	0.0000	24.1
428.0	0.9437	0.2566	0.2549	0.2488	0.2595	109	0.0580	0.0000	24.1
441.0	0.9417	0.2566	0.2549	0.2487	0.2595	109	0.0600	0.0000	24.1
455.0	0.9397	0.2566	0.2549	0.2487	0.2595	109	0.0620	0.0000	24.1
469.0	0.9377	0.2566	0.2549	0.2487	0.2595	109	0.0640	0.0000	24.1
482.0	0.9357	0.2566	0.2549	0.2487	0.2595	109	0.0660	0.0000	24.1
495.0	0.9337	0.2566	0.2549	0.2487	0.2595	109	0.0680	0.0000	24.1
508.0	0.9317	0.2565	0.2549	0.2487	0.2595	109	0.0700	0.0000	24.1
521.0	0.9297	0.2565	0.2549	0.2486	0.2595	109	0.0720	0.0000	24.1
535.0	0.9277	0.2565	0.2549	0.2486	0.2595	109	0.0740	0.0000	24.1
548.0	0.9257	0.2565	0.2549	0.2486	0.2595	109	0.0760	0.0000	24.2
561.0	0.9237	0.2565	0.2549	0.2486	0.2595	109	0.0780	0.0000	24.2
574.0	0.9217	0.2565	0.2549	0.2486	0.2595	110	0.0800	0.0000	24.2
587.0	0.9197	0.2565	0.2549	0.2485	0.2594	109	0.0820	-0.0001	24.2
600.0	0.9177	0.2564	0.2548	0.2485	0.2595	109	0.0840	-0.0001	24.2
614.0	0.9157	0.2564	0.2548	0.2485	0.2595	109	0.0860	-0.0001	24.2
626.0	0.9137	0.2564	0.2548	0.2485	0.2595	109	0.0880	-0.0001	24.2
640.0	0.9117	0.2564	0.2548	0.2485	0.2595	110	0.0900	-0.0001	24.2
652.0	0.9097	0.2564	0.2548	0.2484	0.2594	110	0.0920	-0.0001	24.2
666.0	0.9077	0.2564	0.2548	0.2484	0.2595	110	0.0940	-0.0001	24.3
679.0	0.9057	0.2564	0.2548	0.2484	0.2594	110	0.0960	-0.0001	24.3
692.0	0.9037	0.2563	0.2548	0.2484	0.2594	110	0.0980	-0.0002	24.3
705.0	0.9017	0.2563	0.2548	0.2484	0.2594	110	0.1000	-0.0002	24.3
719.0	0.8997	0.2563	0.2548	0.2483	0.2594	110	0.1020	-0.0002	24.3
733.0	0.8977	0.2563	0.2548	0.2483	0.2594	110	0.1040	-0.0002	24.3
746.0	0.8957	0.2563	0.2548	0.2483	0.2594	110	0.1060	-0.0002	24.4
759.0	0.8937	0.2563	0.2548	0.2483	0.2594	110	0.1080	-0.0002	24.4
772.0	0.8917	0.2563	0.2548	0.2483	0.2594	110	0.1100	-0.0002	24.4
785.0	0.8897	0.2563	0.2548	0.2483	0.2594	110	0.1120	-0.0002	24.3
798.0	0.8877	0.2562	0.2548	0.2482	0.2594	110	0.1140	-0.0003	24.3
811.0	0.8857	0.2562	0.2548	0.2482	0.2594	110	0.1160	-0.0003	24.3
824.0	0.8837	0.2562	0.2548	0.2482	0.2594	110	0.1180	-0.0003	24.4
838.0	0.8817	0.2562	0.2548	0.2482	0.2594	110	0.1200	-0.0003	24.4
851.0	0.8797	0.2562	0.2548	0.2482	0.2594	110	0.1220	-0.0003	24.4
864.0	0.8777	0.2562	0.2548	0.2481	0.2594	110	0.1240	-0.0003	24.4
877.0	0.8757	0.2562	0.2548	0.2481	0.2594	110	0.1260	-0.0003	24.4
890.0	0.8737	0.2562	0.2548	0.2481	0.2594	110	0.1280	-0.0003	24.4
903.0	0.8717	0.2561	0.2548	0.2481	0.2594	111	0.1300	-0.0003	24.5
917.0	0.8697	0.2561	0.2548	0.2481	0.2594	110	0.1320	-0.0003	24.4
930.0	0.8677	0.2561	0.2548	0.2480	0.2594	110	0.1340	-0.0003	24.4
943.0	0.8657	0.2561	0.2548	0.2480	0.2594	110	0.1360	-0.0003	24.4
956.0	0.8637	0.2561	0.2548	0.2480	0.2594	110	0.1380	-0.0003	24.4
969.0	0.8617	0.2561	0.2548	0.2480	0.2594	110	0.1400	-0.0003	24.4
982.0	0.8597	0.2561	0.2548	0.2480	0.2594	110	0.1420	-0.0003	24.4
995.0	0.8577	0.2561	0.2547	0.2479	0.2594	110	0.1440	-0.0004	24.4
1009.0	0.8557	0.2561	0.2548	0.2479	0.2594	110	0.1460	-0.0004	24.4
1022.0	0.8537	0.2561	0.2547	0.2479	0.2594	110	0.1480	-0.0004	24.4
1035.0	0.8517	0.2560	0.2547	0.2479	0.2594	110	0.1500	-0.0004	24.4
1048.0	0.8497	0.2560	0.2547	0.2479	0.2594	110	0.1520	-0.0004	24.4
1061.0	0.8477	0.2560	0.2547	0.2479	0.2594	110	0.1540	-0.0004	24.4
1074.0	0.8457	0.2560	0.2547	0.2478	0.2594	110	0.1560	-0.0004	24.4

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
1088.0	0.8437	0.2560	0.2547	0.2478	0.2594	110	0.1580	-0.0004	24.4
1101.0	0.8417	0.2560	0.2547	0.2478	0.2594	110	0.1600	-0.0004	24.4
1114.0	0.8397	0.2560	0.2547	0.2478	0.2594	110	0.1620	-0.0004	24.4
1127.0	0.8377	0.2560	0.2547	0.2478	0.2594	110	0.1640	-0.0004	24.4
1140.0	0.8357	0.2560	0.2547	0.2477	0.2594	110	0.1660	-0.0005	24.4
1153.0	0.8337	0.2559	0.2547	0.2477	0.2594	110	0.1680	-0.0005	24.3
1166.0	0.8317	0.2559	0.2547	0.2477	0.2594	110	0.1700	-0.0005	24.4
1179.0	0.8297	0.2559	0.2547	0.2477	0.2594	110	0.1720	-0.0005	24.4
1192.0	0.8277	0.2559	0.2547	0.2477	0.2594	110	0.1740	-0.0005	24.4
1205.0	0.8257	0.2559	0.2547	0.2476	0.2594	110	0.1760	-0.0005	24.3
1218.0	0.8237	0.2559	0.2547	0.2476	0.2594	110	0.1780	-0.0005	24.4
1232.0	0.8217	0.2559	0.2547	0.2476	0.2594	110	0.1800	-0.0005	24.4
1245.0	0.8197	0.2559	0.2547	0.2476	0.2594	110	0.1820	-0.0005	24.4
1258.0	0.8177	0.2559	0.2547	0.2476	0.2594	110	0.1840	-0.0005	24.4
1271.0	0.8157	0.2558	0.2547	0.2475	0.2594	110	0.1860	-0.0005	24.3
1285.0	0.8137	0.2558	0.2547	0.2475	0.2594	110	0.1880	-0.0005	24.3
1298.0	0.8117	0.2558	0.2547	0.2475	0.2594	110	0.1900	-0.0005	24.4
1311.0	0.8097	0.2558	0.2547	0.2475	0.2594	110	0.1920	-0.0005	24.3
1323.0	0.8077	0.2558	0.2547	0.2475	0.2594	110	0.1940	-0.0005	24.4
1337.0	0.8057	0.2558	0.2547	0.2474	0.2594	110	0.1960	-0.0006	24.4
1350.0	0.8037	0.2558	0.2547	0.2474	0.2594	110	0.1980	-0.0006	24.4
1362.0	0.8017	0.2558	0.2547	0.2474	0.2594	110	0.2000	-0.0006	24.3
1375.0	0.7997	0.2558	0.2547	0.2474	0.2594	110	0.2020	-0.0006	24.4
1388.0	0.7977	0.2558	0.2547	0.2474	0.2594	110	0.2040	-0.0006	24.3
1402.0	0.7957	0.2557	0.2547	0.2474	0.2594	110	0.2060	-0.0006	24.3
1415.0	0.7937	0.2557	0.2547	0.2474	0.2594	110	0.2080	-0.0006	24.3
1428.0	0.7917	0.2557	0.2547	0.2473	0.2594	110	0.2100	-0.0006	24.3
1442.0	0.7897	0.2557	0.2547	0.2473	0.2594	110	0.2120	-0.0006	24.3
1454.0	0.7877	0.2557	0.2546	0.2473	0.2594	110	0.2140	-0.0007	24.3
1467.0	0.7857	0.2557	0.2546	0.2473	0.2594	110	0.2160	-0.0007	24.4
1480.0	0.7837	0.2557	0.2546	0.2473	0.2594	110	0.2180	-0.0007	24.3
1494.0	0.7817	0.2557	0.2547	0.2472	0.2594	110	0.2200	-0.0007	24.3
1507.0	0.7797	0.2557	0.2547	0.2472	0.2594	110	0.2220	-0.0007	24.3
1520.0	0.7777	0.2557	0.2547	0.2472	0.2594	110	0.2240	-0.0007	24.3
1534.0	0.7757	0.2556	0.2547	0.2472	0.2594	110	0.2260	-0.0007	24.3
1547.0	0.7737	0.2556	0.2547	0.2472	0.2594	110	0.2280	-0.0007	24.4
1560.0	0.7717	0.2556	0.2546	0.2471	0.2594	110	0.2300	-0.0007	24.4
1574.0	0.7697	0.2556	0.2546	0.2471	0.2594	110	0.2320	-0.0007	24.4
1587.0	0.7677	0.2556	0.2546	0.2471	0.2594	110	0.2340	-0.0007	24.3
1600.0	0.7657	0.2556	0.2546	0.2471	0.2594	110	0.2360	-0.0007	24.3
1613.0	0.7637	0.2556	0.2546	0.2471	0.2594	110	0.2380	-0.0007	24.3
1626.0	0.7617	0.2556	0.2546	0.2471	0.2594	110	0.2400	-0.0007	24.4
1639.0	0.7597	0.2556	0.2546	0.2470	0.2594	110	0.2420	-0.0008	24.4
1652.0	0.7577	0.2556	0.2546	0.2470	0.2595	110	0.2440	-0.0007	24.4
1665.0	0.7557	0.2555	0.2546	0.2470	0.2595	110	0.2460	-0.0008	24.4
1678.0	0.7537	0.2555	0.2546	0.2470	0.2595	110	0.2480	-0.0008	24.3
1691.0	0.7517	0.2555	0.2546	0.2470	0.2595	110	0.2500	-0.0008	24.4
1704.0	0.7497	0.2555	0.2546	0.2469	0.2595	110	0.2520	-0.0008	24.4
1718.0	0.7477	0.2555	0.2546	0.2469	0.2595	110	0.2540	-0.0008	24.4
1731.0	0.7457	0.2555	0.2546	0.2469	0.2595	110	0.2560	-0.0008	24.4
1744.0	0.7437	0.2555	0.2546	0.2469	0.2595	110	0.2580	-0.0008	24.4
1757.0	0.7417	0.2555	0.2546	0.2469	0.2595	110	0.2600	-0.0008	24.4
1770.0	0.7397	0.2555	0.2546	0.2468	0.2595	110	0.2620	-0.0008	24.4
1783.0	0.7377	0.2555	0.2546	0.2468	0.2595	110	0.2640	-0.0008	24.4
1796.0	0.7357	0.2555	0.2546	0.2468	0.2595	110	0.2660	-0.0008	24.4
1809.0	0.7337	0.2554	0.2546	0.2468	0.2595	110	0.2680	-0.0008	24.4
1822.0	0.7317	0.2554	0.2546	0.2468	0.2595	110	0.2700	-0.0008	24.4
1835.0	0.7297	0.2554	0.2546	0.2467	0.2595	110	0.2720	-0.0009	24.4
1848.0	0.7277	0.2554	0.2546	0.2467	0.2595	110	0.2740	-0.0009	24.4
1861.0	0.7257	0.2554	0.2546	0.2467	0.2595	110	0.2760	-0.0009	24.4
1874.0	0.7237	0.2554	0.2546	0.2467	0.2595	110	0.2780	-0.0009	24.4
1887.0	0.7217	0.2554	0.2546	0.2467	0.2595	110	0.2800	-0.0009	24.4
1900.0	0.7197	0.2554	0.2546	0.2466	0.2595	110	0.2820	-0.0009	24.4
1913.0	0.7177	0.2554	0.2546	0.2466	0.2595	111	0.2840	-0.0009	24.5
1926.0	0.7157	0.2554	0.2546	0.2466	0.2595	110	0.2860	-0.0009	24.4
1939.0	0.7137	0.2554	0.2546	0.2466	0.2595	110	0.2880	-0.0009	24.4
1952.0	0.7117	0.2553	0.2546	0.2466	0.2595	111	0.2900	-0.0009	24.5
1965.0	0.7097	0.2553	0.2546	0.2465	0.2595	111	0.2920	-0.0009	24.5
1978.0	0.7077	0.2553	0.2546	0.2465	0.2595	111	0.2940	-0.0009	24.5
1991.0	0.7057	0.2553	0.2546	0.2465	0.2595	111	0.2960	-0.0009	24.5
2004.0	0.7037	0.2553	0.2546	0.2465	0.2596	111	0.2980	-0.0009	24.5
2017.0	0.7017	0.2553	0.2546	0.2465	0.2596	111	0.3000	-0.0009	24.5
2030.0	0.6997	0.2553	0.2546	0.2464	0.2596	111	0.3020	-0.0009	24.5
2043.0	0.6977	0.2553	0.2546	0.2464	0.2596	111	0.3040	-0.0009	24.5
2056.0	0.6957	0.2553	0.2546	0.2464	0.2596	110	0.3060	-0.0009	24.4
2070.0	0.6937	0.2553	0.2546	0.2464	0.2596	111	0.3080	-0.0009	24.5
2083.0	0.6917	0.2553	0.2546	0.2464	0.2596	110	0.3100	-0.0009	24.4
2096.0	0.6897	0.2552	0.2546	0.2463	0.2596	110	0.3120	-0.0010	24.4
2109.0	0.6877	0.2552	0.2546	0.2463	0.2596	111	0.3140	-0.0010	24.5

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
2122.0	0.6857	0.2552	0.2546	0.2463	0.2596	111	0.3160	-0.0010	24.5
2135.0	0.6837	0.2552	0.2546	0.2463	0.2596	111	0.3180	-0.0010	24.5
2147.0	0.6817	0.2552	0.2546	0.2463	0.2596	111	0.3200	-0.0010	24.5
2161.0	0.6797	0.2552	0.2546	0.2462	0.2596	111	0.3220	-0.0010	24.5
2174.0	0.6777	0.2552	0.2546	0.2462	0.2596	111	0.3240	-0.0010	24.5
2188.0	0.6757	0.2552	0.2546	0.2462	0.2596	111	0.3260	-0.0010	24.5
2201.0	0.6737	0.2552	0.2546	0.2462	0.2596	111	0.3280	-0.0010	24.5
2214.0	0.6717	0.2552	0.2546	0.2461	0.2596	111	0.3300	-0.0010	24.6
2227.0	0.6697	0.2552	0.2546	0.2461	0.2596	111	0.3320	-0.0010	24.5
2240.0	0.6677	0.2551	0.2546	0.2461	0.2596	111	0.3340	-0.0011	24.6
2253.0	0.6657	0.2551	0.2546	0.2461	0.2596	111	0.3360	-0.0011	24.6
2266.0	0.6637	0.2551	0.2546	0.2461	0.2596	111	0.3380	-0.0011	24.6
2279.0	0.6617	0.2551	0.2546	0.2460	0.2596	111	0.3400	-0.0011	24.6
2292.0	0.6597	0.2551	0.2546	0.2460	0.2596	111	0.3420	-0.0011	24.6
2305.0	0.6577	0.2551	0.2546	0.2460	0.2596	111	0.3440	-0.0011	24.6
2319.0	0.6557	0.2551	0.2546	0.2460	0.2596	111	0.3460	-0.0011	24.6
2332.0	0.6537	0.2551	0.2546	0.2459	0.2596	111	0.3480	-0.0011	24.6
2345.0	0.6517	0.2551	0.2546	0.2459	0.2596	111	0.3500	-0.0011	24.6
2359.0	0.6497	0.2551	0.2546	0.2459	0.2597	111	0.3520	-0.0011	24.6
2372.0	0.6477	0.2551	0.2546	0.2459	0.2597	111	0.3540	-0.0011	24.6
2386.0	0.6457	0.2550	0.2546	0.2459	0.2597	111	0.3560	-0.0011	24.6
2398.0	0.6437	0.2550	0.2546	0.2458	0.2597	111	0.3580	-0.0011	24.6
2411.0	0.6417	0.2550	0.2546	0.2458	0.2597	112	0.3600	-0.0011	24.7
2424.0	0.6397	0.2550	0.2546	0.2458	0.2597	112	0.3620	-0.0011	24.7
2437.0	0.6377	0.2550	0.2546	0.2458	0.2597	111	0.3640	-0.0011	24.7
2450.0	0.6357	0.2550	0.2546	0.2457	0.2597	112	0.3660	-0.0011	24.7
2463.0	0.6337	0.2550	0.2546	0.2457	0.2597	112	0.3680	-0.0011	24.7
2477.0	0.6317	0.2550	0.2546	0.2457	0.2597	112	0.3700	-0.0011	24.7
2490.0	0.6297	0.2550	0.2546	0.2457	0.2597	112	0.3720	-0.0011	24.7
2503.0	0.6277	0.2550	0.2546	0.2456	0.2597	112	0.3740	-0.0012	24.7
2516.0	0.6257	0.2550	0.2546	0.2456	0.2597	111	0.3760	-0.0012	24.6
2529.0	0.6237	0.2550	0.2546	0.2456	0.2597	112	0.3780	-0.0012	24.7
2543.0	0.6217	0.2549	0.2546	0.2456	0.2597	111	0.3800	-0.0012	24.7
2556.0	0.6197	0.2549	0.2546	0.2456	0.2597	112	0.3820	-0.0012	24.7
2569.0	0.6177	0.2549	0.2546	0.2455	0.2598	112	0.3840	-0.0012	24.7
2582.0	0.6157	0.2549	0.2546	0.2455	0.2598	112	0.3860	-0.0012	24.7
2595.0	0.6137	0.2549	0.2546	0.2455	0.2598	112	0.3880	-0.0012	24.8
2608.0	0.6117	0.2549	0.2546	0.2455	0.2598	112	0.3900	-0.0012	24.8
2620.0	0.6097	0.2549	0.2546	0.2454	0.2598	112	0.3920	-0.0012	24.8
2634.0	0.6077	0.2549	0.2546	0.2454	0.2598	112	0.3940	-0.0012	24.8
2647.0	0.6057	0.2549	0.2546	0.2454	0.2598	112	0.3960	-0.0012	24.8
2660.0	0.6037	0.2549	0.2546	0.2454	0.2598	112	0.3980	-0.0012	24.8
2672.0	0.6017	0.2549	0.2546	0.2453	0.2598	112	0.4000	-0.0013	24.8
2685.0	0.5997	0.2548	0.2546	0.2453	0.2598	112	0.4020	-0.0013	24.8
2699.0	0.5977	0.2548	0.2546	0.2453	0.2598	112	0.4040	-0.0013	24.8
2712.0	0.5957	0.2548	0.2546	0.2453	0.2598	112	0.4060	-0.0013	24.8
2725.0	0.5937	0.2548	0.2546	0.2452	0.2598	112	0.4080	-0.0013	24.8
2738.0	0.5917	0.2548	0.2546	0.2452	0.2598	112	0.4100	-0.0013	24.8
2752.0	0.5897	0.2548	0.2546	0.2452	0.2598	112	0.4120	-0.0013	24.8
2765.0	0.5877	0.2548	0.2546	0.2452	0.2598	112	0.4140	-0.0013	24.8
2778.0	0.5857	0.2548	0.2546	0.2451	0.2598	112	0.4160	-0.0013	24.8
2791.0	0.5837	0.2548	0.2545	0.2451	0.2598	112	0.4180	-0.0014	24.8
2804.0	0.5817	0.2548	0.2545	0.2451	0.2598	112	0.4200	-0.0014	24.8
2817.0	0.5797	0.2548	0.2545	0.2451	0.2598	112	0.4220	-0.0014	24.8
2830.0	0.5777	0.2547	0.2545	0.2450	0.2599	112	0.4240	-0.0014	24.9
2843.0	0.5757	0.2547	0.2545	0.2450	0.2599	112	0.4260	-0.0014	24.9
2857.0	0.5737	0.2547	0.2545	0.2450	0.2599	112	0.4280	-0.0014	24.9
2869.0	0.5717	0.2547	0.2545	0.2449	0.2599	113	0.4300	-0.0014	24.9
2883.0	0.5697	0.2547	0.2545	0.2449	0.2599	112	0.4320	-0.0014	24.9
2896.0	0.5677	0.2547	0.2545	0.2449	0.2599	112	0.4340	-0.0014	24.9
2909.0	0.5657	0.2547	0.2545	0.2449	0.2599	112	0.4360	-0.0014	24.9
2922.0	0.5637	0.2547	0.2545	0.2448	0.2599	113	0.4380	-0.0014	24.9
2935.0	0.5617	0.2547	0.2545	0.2448	0.2599	113	0.4400	-0.0014	24.9
2948.0	0.5597	0.2547	0.2545	0.2448	0.2599	113	0.4420	-0.0014	24.9
2961.0	0.5577	0.2547	0.2545	0.2448	0.2599	113	0.4440	-0.0014	24.9
2974.0	0.5557	0.2547	0.2545	0.2448	0.2599	113	0.4460	-0.0014	25.0
2987.0	0.5537	0.2546	0.2545	0.2447	0.2600	112	0.4480	-0.0015	24.9
3000.0	0.5517	0.2546	0.2545	0.2447	0.2600	113	0.4500	-0.0015	24.9
3013.0	0.5497	0.2546	0.2545	0.2447	0.2600	113	0.4520	-0.0015	25.0
3026.0	0.5477	0.2546	0.2545	0.2447	0.2600	113	0.4540	-0.0015	25.0
3039.0	0.5457	0.2546	0.2545	0.2446	0.2600	113	0.4560	-0.0015	25.0
3053.0	0.5437	0.2546	0.2545	0.2446	0.2600	113	0.4580	-0.0015	25.0
3066.0	0.5417	0.2546	0.2545	0.2446	0.2600	113	0.4600	-0.0015	25.0
3079.0	0.5397	0.2546	0.2545	0.2446	0.2600	113	0.4620	-0.0015	25.0
3092.0	0.5377	0.2546	0.2545	0.2445	0.2600	113	0.4640	-0.0015	25.0
3105.0	0.5357	0.2546	0.2545	0.2445	0.2600	113	0.4660	-0.0015	25.0
3118.0	0.5337	0.2546	0.2545	0.2445	0.2600	113	0.4680	-0.0015	25.0
3131.0	0.5317	0.2546	0.2545	0.2445	0.2600	113	0.4700	-0.0015	25.0
3144.0	0.5297	0.2546	0.2545	0.2444	0.2601	113	0.4720	-0.0015	25.0

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
3157.0	0.5277	0.2545	0.2545	0.2444	0.2601	113	0.4740	-0.0015	25.0
3169.0	0.5257	0.2545	0.2545	0.2444	0.2601	113	0.4760	-0.0015	25.0
3182.0	0.5237	0.2545	0.2545	0.2443	0.2601	113	0.4780	-0.0016	25.0
3195.0	0.5217	0.2545	0.2545	0.2443	0.2601	113	0.4800	-0.0016	25.0
3209.0	0.5197	0.2545	0.2545	0.2443	0.2601	113	0.4820	-0.0016	25.0
3222.0	0.5177	0.2545	0.2545	0.2442	0.2601	113	0.4840	-0.0016	25.1
3234.0	0.5157	0.2545	0.2545	0.2442	0.2601	113	0.4860	-0.0016	25.0
3248.0	0.5137	0.2545	0.2545	0.2442	0.2601	113	0.4880	-0.0016	25.0
3261.0	0.5117	0.2545	0.2545	0.2442	0.2601	113	0.4900	-0.0016	25.1
3274.0	0.5097	0.2545	0.2545	0.2441	0.2601	113	0.4920	-0.0016	25.1
3286.0	0.5077	0.2544	0.2545	0.2441	0.2602	113	0.4940	-0.0016	25.1
3300.0	0.5057	0.2544	0.2545	0.2441	0.2602	113	0.4960	-0.0016	25.1
3313.0	0.5037	0.2544	0.2545	0.2440	0.2602	113	0.4980	-0.0016	25.1
3326.0	0.5017	0.2544	0.2545	0.2440	0.2602	113	0.5000	-0.0016	25.1
3339.0	0.4997	0.2544	0.2545	0.2440	0.2602	113	0.5020	-0.0016	25.1
3352.0	0.4977	0.2544	0.2545	0.2439	0.2602	114	0.5040	-0.0017	25.1
3366.0	0.4957	0.2544	0.2545	0.2439	0.2602	114	0.5060	-0.0017	25.1
3378.0	0.4937	0.2544	0.2545	0.2439	0.2603	114	0.5080	-0.0016	25.1

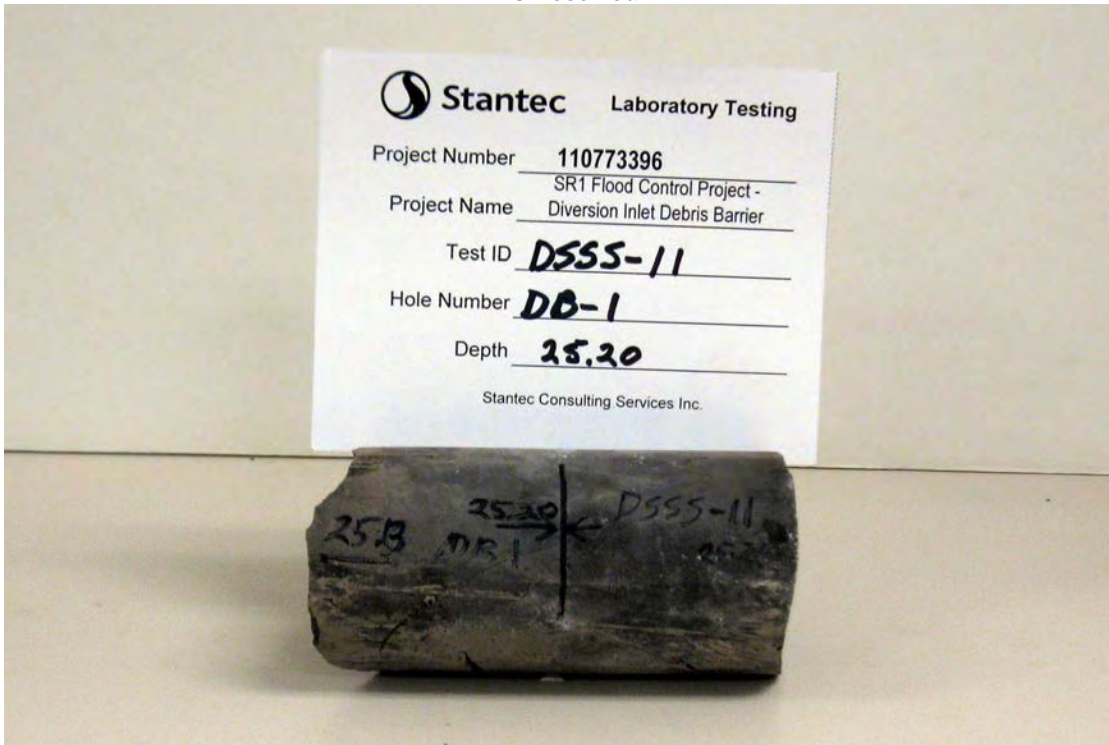


Photo Report

Project Name SR1 Flood Control Project - Inlet Debris Barrier
Lithology Shale, gray, moderately hard
Hole Number DB-1 Depth (m) 25.20
Test Type Direct shear of sawn surface

Project Number 110773396
Lab ID DSSS-11

As Received



Core Preparation





Photo Report

Project Name SR1 Flood Control Project - Inlet Debris Barrier
Lithology Shale, gray, moderately hard
Hole Number DB-1 Depth (m) 25.20
Test Type Direct shear of sawn surface

Project Number 110773396
Lab ID DSSS-11

Core Preparation



Post Test

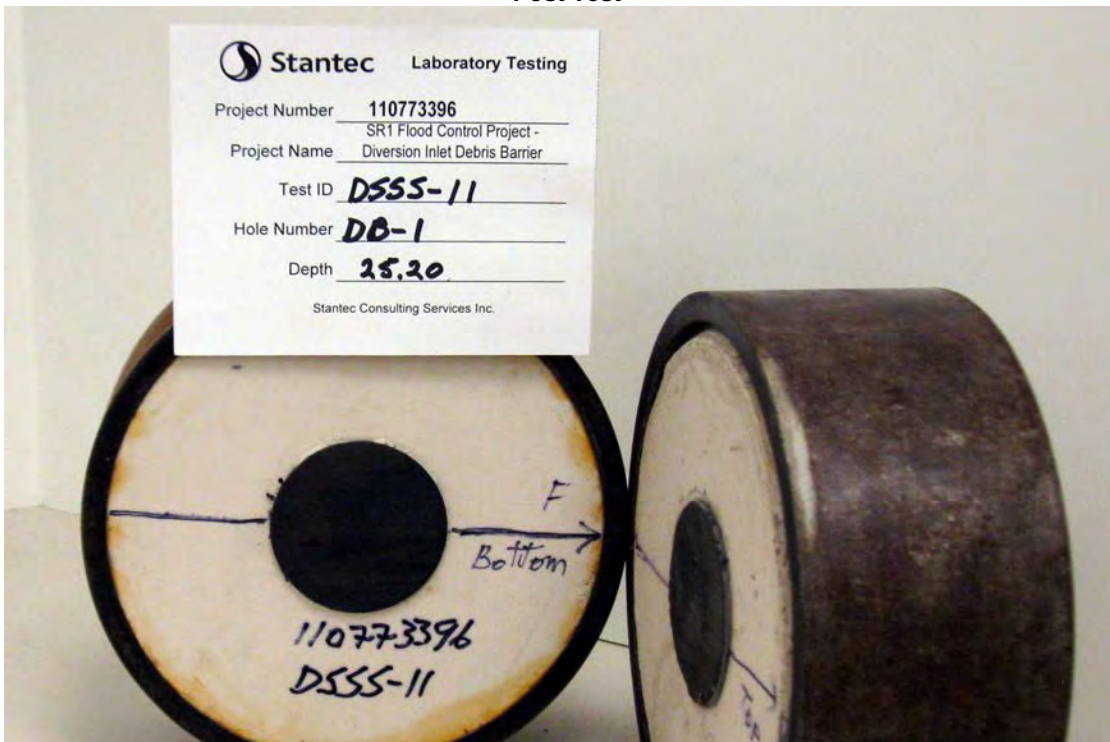


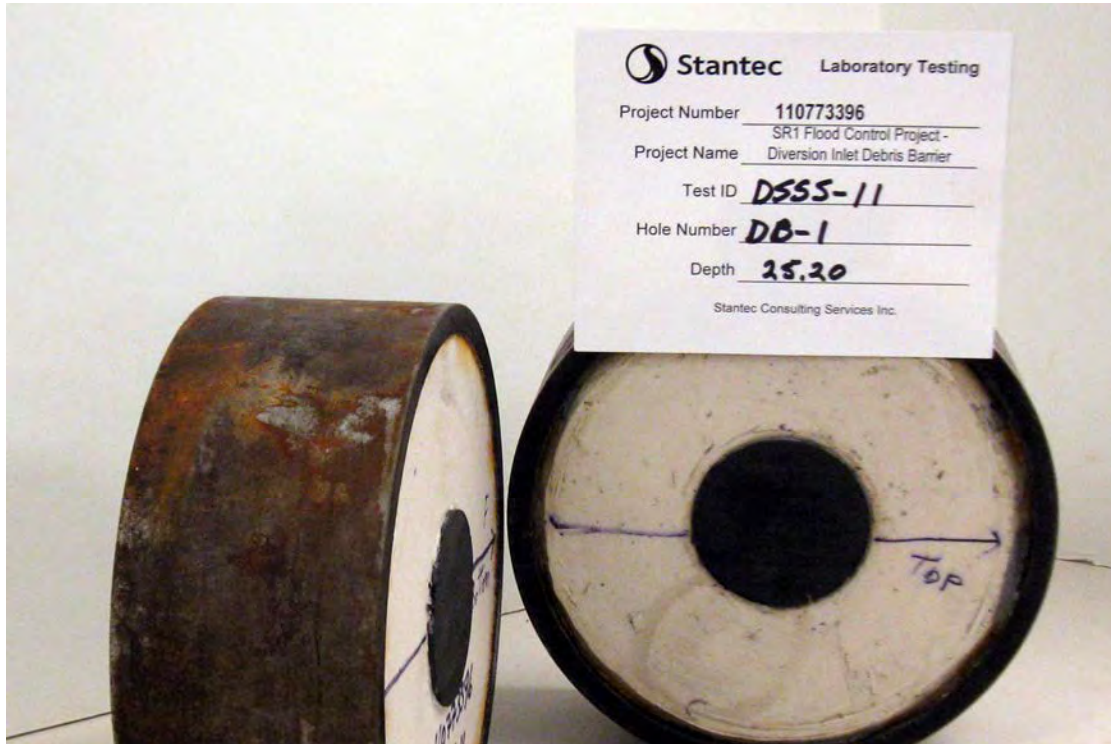


Photo Report

Project Name SR1 Flood Control Project - Inlet Debris Barrier
 Lithology Shale, gray, moderately hard
 Hole Number DB-1 Depth (m) 25.20
 Test Type Direct shear of sawn surface

Project Number 110773396
 Lab ID DSSS-11

Post Test



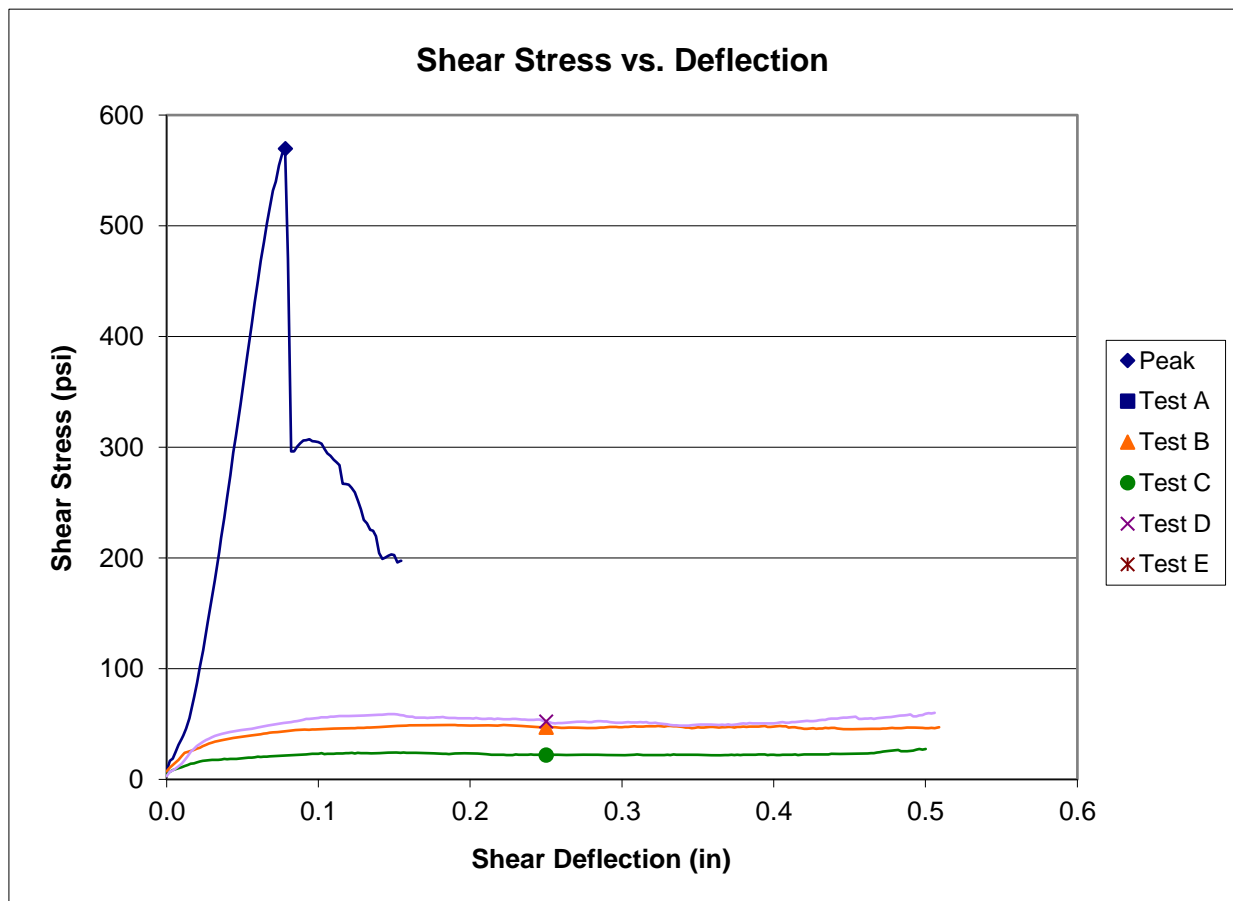


Direct Shear Strength of Rock

ASTM D 5607

Project Name <u>SR1 Flood Control Project - Inlet Debris Barrier</u>	Project Number <u>110773396</u>
Lithology <u>Shale, dark gray, moderately hard</u>	Lab ID <u>DS-16</u>
Hole Number <u>DB-1</u> Depth (m) <u>29.47</u>	Date Received <u>05/15/2018</u>
Test Type <u>Direct shear of intact specimen</u>	
Initial Moisture Condition <u>As received, moist</u>	Diameter (in.) <u>2.401</u>
At Test Moisture Condition <u>Soaked at least 12 hours prior to test.</u>	Angle of Dip (deg.) <u>0.0</u>
Roughness (JRC) <u>16</u>	Area (in ²) <u>4.53</u>

	<u>Test A</u>	<u>Test B</u>	<u>Test C</u>	<u>Test D</u>	<u>Test E</u>
Normal Stress (psi)	80.0	80.0	40.0	120.0	N/A
Peak Shear Stress (psi)	569.7				
Deflection at Peak (in)	0.0781				
Post Peak Stress (psi)	8.0	47.0	22.0	52.2	N/A
Deflection at Residual (in)	N/A	0.2500	0.2500	0.2500	N/A



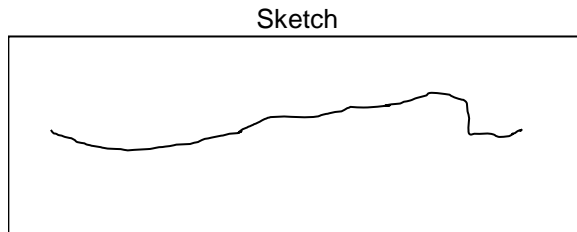
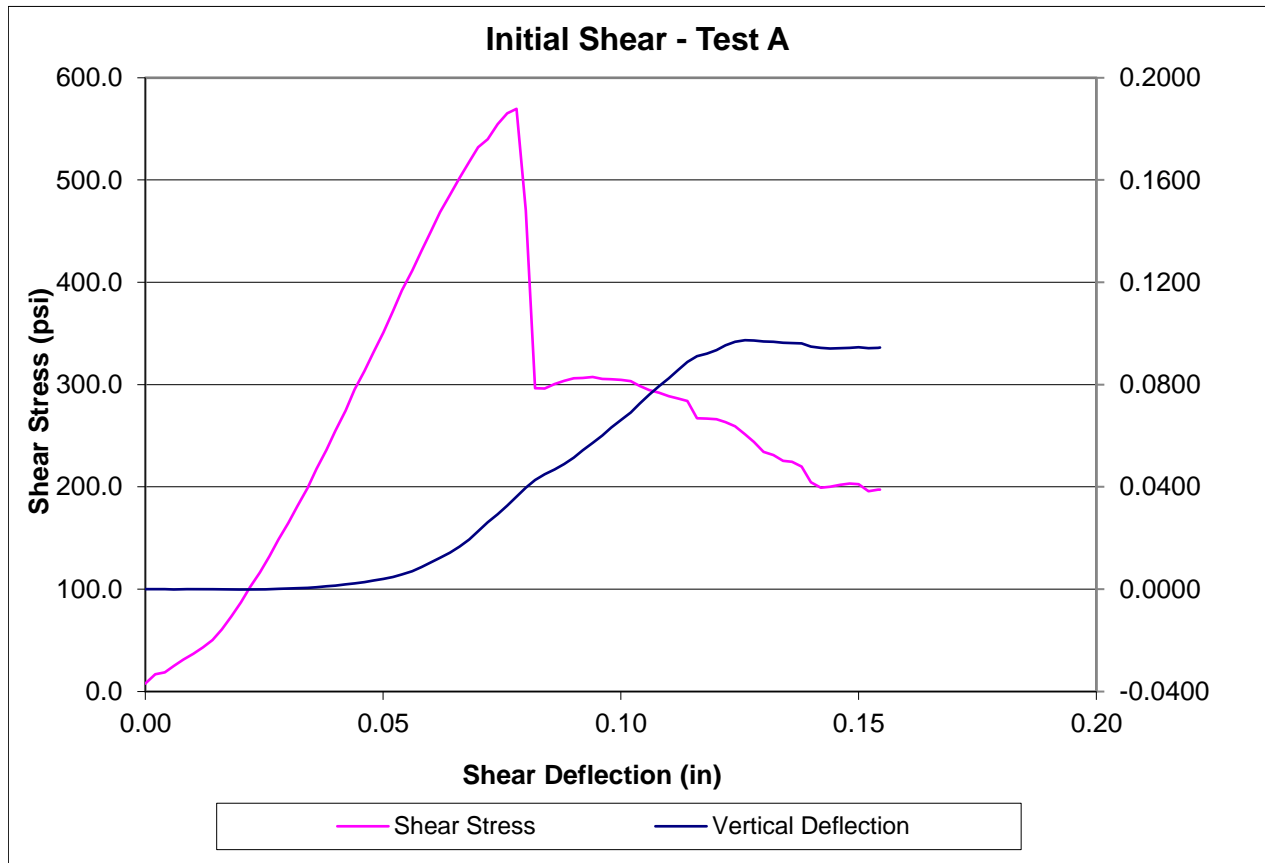
Comments The Test A (intact) shear plane extended slightly into the Hydro-stone encasement.
Accordingly, Test B (post peak) was performed wherein the Hydro-Stone was chipped
away from the shear plane. The resulting post peak stresses differ with Test B lower.

Reviewed By RJ



Direct Shear Strength of Rock
ASTM D 5607

Project Name	<u>SR1 Flood Control Project - Inlet Debris Barrier</u>	Project Number	<u>110773396</u>
Lithology	<u>Shale, dark gray, moderately hard</u>	Lab ID	<u>DS-16</u>
Hole Number	<u>DB-1</u>	Date Received	<u>05/15/2018</u>
Depth (m)	<u>29.47</u>	Diameter (in)	<u>2.401</u>
Test Type	<u>Direct shear of intact specimen</u>	Angle of Dip (deg)	<u>0.0</u>
Initial Moisture Condition	<u>As received, moist</u>	Area(in ²)	<u>4.53</u>
Test Moisture Condition	<u>Soaked at least 12 hours prior to test.</u>	Date Prepared	<u>06/14/2018</u>
Joint Roughness	<u>16</u>	Date Tested	<u>06/25/2018</u>
Normal Stress (psi)	<u>80</u>		



Shear Rate to Peak (in/min) 0.003
Encapsulation Material Hydro-Stone

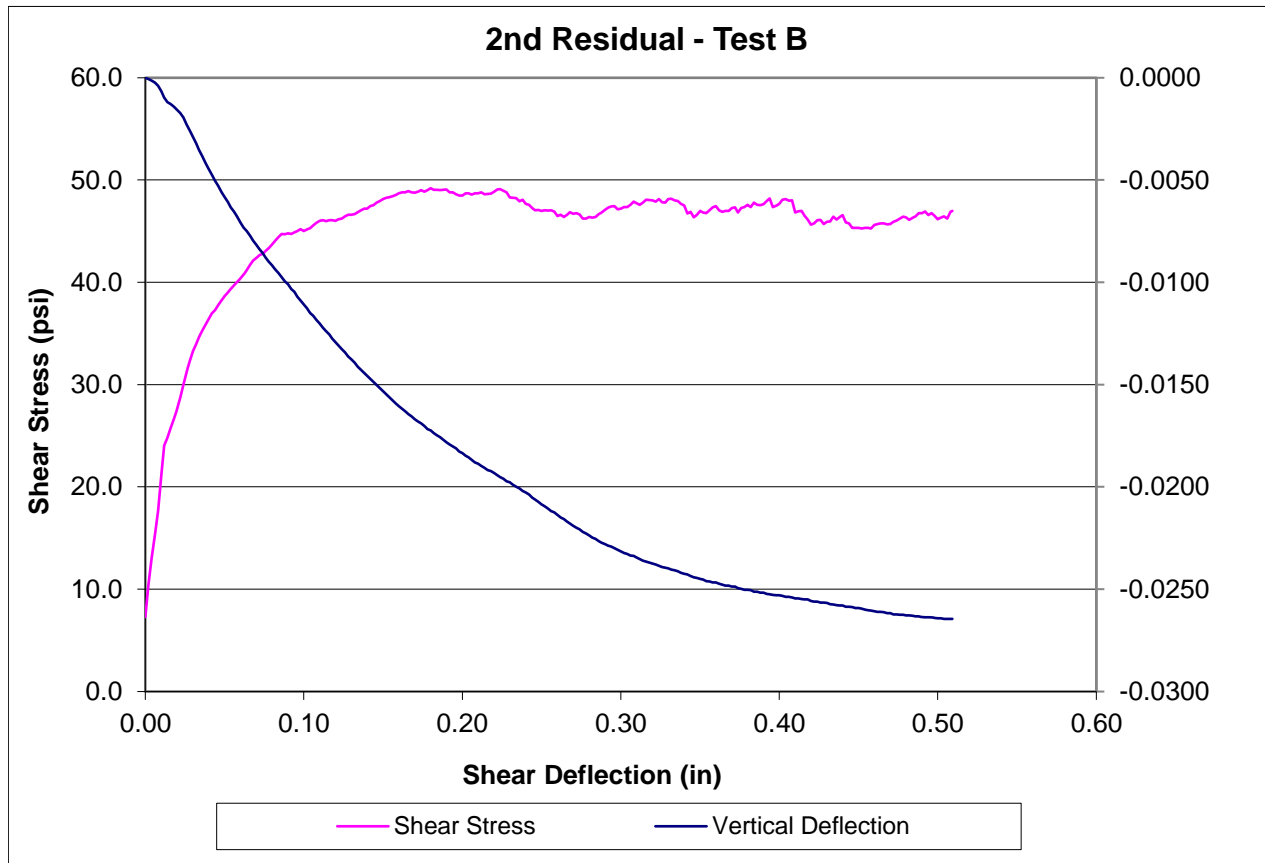
Comments Shear plane extended into the Hydro-stone encasement. No post peak stress obtained for Test A. See Test B for post peak at 80 psi normal load.

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
0.0	0.4844	0.0929	0.0955	0.0894	0.0990	36	0.0000	0.0000	8.0
46.0	0.4823	0.0929	0.0954	0.0892	0.0992	76	0.0021	0.0000	16.8
80.0	0.4803	0.0929	0.0954	0.0890	0.0994	85	0.0041	0.0000	18.8
114.0	0.4784	0.0928	0.0954	0.0887	0.0997	113	0.0060	-0.0001	24.9
147.0	0.4764	0.0928	0.0954	0.0885	0.1000	141	0.0080	0.0000	31.2
180.0	0.4743	0.0929	0.0955	0.0883	0.1002	167	0.0101	0.0000	36.8
216.0	0.4723	0.0928	0.0955	0.0880	0.1004	195	0.0121	0.0000	43.1
250.0	0.4703	0.0928	0.0955	0.0880	0.1004	228	0.0141	0.0000	50.4
282.0	0.4683	0.0927	0.0955	0.0879	0.1004	275	0.0161	-0.0001	60.7
314.0	0.4663	0.0927	0.0955	0.0878	0.1004	332	0.0181	-0.0001	73.3
347.0	0.4643	0.0927	0.0955	0.0877	0.1005	395	0.0201	-0.0001	87.3
381.0	0.4624	0.0927	0.0955	0.0875	0.1007	461	0.0220	-0.0001	101.9
414.0	0.4603	0.0927	0.0956	0.0874	0.1009	527	0.0241	0.0000	116.4
451.0	0.4583	0.0928	0.0956	0.0872	0.1012	599	0.0261	0.0000	132.3
488.0	0.4564	0.0928	0.0958	0.0870	0.1016	672	0.0280	0.0001	148.4
525.0	0.4543	0.0929	0.0959	0.0868	0.1021	746	0.0301	0.0002	164.8
561.0	0.4524	0.0930	0.0961	0.0867	0.1026	820	0.0320	0.0004	181.1
598.0	0.4503	0.0931	0.0963	0.0865	0.1032	900	0.0341	0.0006	198.9
637.0	0.4484	0.0934	0.0965	0.0863	0.1039	986	0.0360	0.0008	217.8
674.0	0.4463	0.0937	0.0968	0.0861	0.1046	1069	0.0381	0.0011	236.2
711.0	0.4444	0.0940	0.0971	0.0860	0.1055	1153	0.0400	0.0014	254.8
750.0	0.4423	0.0944	0.0975	0.0859	0.1064	1243	0.0421	0.0019	274.6
789.0	0.4404	0.0949	0.0978	0.0857	0.1074	1335	0.0440	0.0022	295.1
826.0	0.4383	0.0954	0.0983	0.0856	0.1086	1418	0.0461	0.0028	313.3
863.0	0.4364	0.0961	0.0988	0.0854	0.1099	1500	0.0480	0.0033	331.5
901.0	0.4343	0.0968	0.0994	0.0853	0.1112	1588	0.0501	0.0040	350.8
942.0	0.4323	0.0976	0.1002	0.0852	0.1129	1683	0.0521	0.0048	371.9
980.0	0.4304	0.0986	0.1012	0.0852	0.1147	1774	0.0540	0.0057	392.0
1017.0	0.4283	0.1000	0.1026	0.0854	0.1171	1861	0.0561	0.0071	411.2
1055.0	0.4263	0.1017	0.1041	0.0857	0.1198	1949	0.0581	0.0086	430.6
1094.0	0.4243	0.1037	0.1059	0.0863	0.1228	2036	0.0601	0.0105	450.0
1132.0	0.4224	0.1057	0.1077	0.0869	0.1258	2120	0.0620	0.0123	468.4
1168.0	0.4203	0.1078	0.1096	0.0875	0.1290	2196	0.0641	0.0143	485.3
1206.0	0.4183	0.1104	0.1119	0.0883	0.1329	2271	0.0661	0.0167	501.8
1244.0	0.4163	0.1132	0.1145	0.0893	0.1376	2342	0.0681	0.0195	517.6
1282.0	0.4144	0.1164	0.1174	0.0905	0.1429	2407	0.0700	0.0226	531.8
1319.0	0.4124	0.1203	0.1206	0.0928	0.1476	2443	0.0720	0.0261	539.8
1357.0	0.4103	0.1234	0.1238	0.0948	0.1519	2510	0.0741	0.0293	554.5
1394.0	0.4083	0.1269	0.1270	0.0971	0.1563	2557	0.0761	0.0326	564.9
1428.0	0.4063	0.1305	0.1304	0.0998	0.1607	2578	0.0781	0.0362	569.7
1440.0	0.4044	0.1340	0.1340	0.1050	0.1627	2128	0.0800	0.0397	470.3
1445.0	0.4024	0.1280	0.1462	0.1020	0.1713	1341	0.0820	0.0427	296.3
1479.0	0.4004	0.1294	0.1490	0.1033	0.1749	1341	0.0840	0.0450	296.2
1510.0	0.3983	0.1308	0.1513	0.1046	0.1773	1360	0.0861	0.0468	300.5
1542.0	0.3963	0.1325	0.1540	0.1063	0.1799	1374	0.0881	0.0490	303.5
1576.0	0.3943	0.1344	0.1570	0.1083	0.1828	1385	0.0901	0.0514	306.0
1611.0	0.3924	0.1367	0.1605	0.1108	0.1861	1387	0.0920	0.0543	306.4
1643.0	0.3903	0.1390	0.1638	0.1132	0.1893	1391	0.0941	0.0571	307.3
1676.0	0.3883	0.1415	0.1672	0.1158	0.1926	1383	0.0961	0.0601	305.5
1709.0	0.3864	0.1441	0.1707	0.1184	0.1962	1381	0.0980	0.0632	305.1
1741.0	0.3843	0.1468	0.1741	0.1209	0.1996	1379	0.1001	0.0662	304.7
1771.0	0.3823	0.1494	0.1774	0.1234	0.2031	1372	0.1021	0.0691	303.2
1801.0	0.3804	0.1525	0.1813	0.1262	0.2072	1351	0.1040	0.0726	298.6
1832.0	0.3784	0.1557	0.1850	0.1291	0.2113	1333	0.1060	0.0761	294.6
1864.0	0.3764	0.1587	0.1886	0.1318	0.2151	1322	0.1080	0.0794	292.1
1893.0	0.3743	0.1617	0.1919	0.1344	0.2188	1307	0.1101	0.0825	288.7
1923.0	0.3724	0.1646	0.1952	0.1369	0.2224	1296	0.1120	0.0856	286.4
1955.0	0.3704	0.1676	0.1986	0.1395	0.2262	1284	0.1140	0.0888	283.8
1982.0	0.3684	0.1696	0.2013	0.1416	0.2286	1209	0.1160	0.0911	267.0
2012.0	0.3663	0.1705	0.2024	0.1425	0.2297	1208	0.1181	0.0921	266.8
2042.0	0.3643	0.1718	0.2038	0.1437	0.2312	1204	0.1201	0.0934	266.0
2074.0	0.3624	0.1737	0.2057	0.1455	0.2332	1191	0.1220	0.0953	263.2
2105.0	0.3604	0.1751	0.2072	0.1468	0.2347	1173	0.1240	0.0968	259.1
2133.0	0.3583	0.1755	0.2078	0.1474	0.2352	1138	0.1261	0.0973	251.5
2161.0	0.3564	0.1756	0.2079	0.1475	0.2351	1104	0.1280	0.0973	244.0
2192.0	0.3544	0.1750	0.2073	0.1473	0.2343	1061	0.1300	0.0968	234.3
2222.0	0.3523	0.1750	0.2071	0.1473	0.2341	1046	0.1321	0.0967	231.1
2249.0	0.3503	0.1746	0.2067	0.1471	0.2335	1020	0.1341	0.0963	225.3
2279.0	0.3484	0.1746	0.2066	0.1471	0.2334	1016	0.1360	0.0962	224.5
2311.0	0.3464	0.1745	0.2064	0.1471	0.2331	994	0.1380	0.0961	219.7
2339.0	0.3444	0.1734	0.2051	0.1469	0.2309	925	0.1400	0.0949	204.3
2368.0	0.3423	0.1730	0.2045	0.1468	0.2299	902	0.1421	0.0944	199.2
2400.0	0.3404	0.1728	0.2041	0.1467	0.2295	906	0.1440	0.0941	200.2
2434.0	0.3383	0.1729	0.2042	0.1467	0.2296	915	0.1461	0.0942	202.1
2466.0	0.3363	0.1731	0.2043	0.1468	0.2298	919	0.1481	0.0943	203.1
2495.0	0.3344	0.1734	0.2045	0.1470	0.2300	917	0.1500	0.0945	202.6
2524.0	0.3323	0.1731	0.2041	0.1472	0.2293	887	0.1521	0.0942	195.9
2558.0	0.3303	0.1733	0.2042	0.1473	0.2295	893	0.1541	0.0944	197.2
2566.0	0.3299	0.1734	0.2043	0.1474	0.2296	893	0.1545	0.0945	197.4

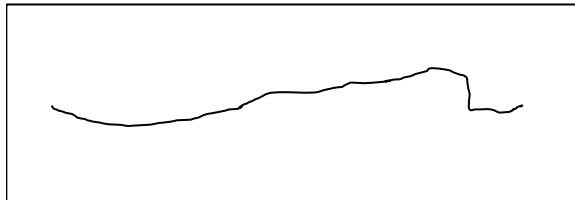


Direct Shear Strength of Rock
ASTM D 5607

Project Name	<u>SR1 Flood Control Project - Inlet Debris Barrier</u>	Project Number	<u>110773396</u>
Lithology	<u>Shale, dark gray, moderately hard</u>	Lab ID	<u>DS-16</u>
Hole Number	<u>DB-1</u>	Date Received	<u>05/15/2018</u>
Depth (m)	<u>29.47</u>	Diameter (in)	<u>2.401</u>
Test Type	<u>Direct shear of intact specimen</u>	Angle of Dip (deg)	<u>0.0</u>
Initial Moisture Condition	<u>As received, moist</u>	Area(in ²)	<u>4.53</u>
Test Moisture Condition	<u>Soaked at least 12 hours prior to test.</u>	Date Prepared	<u>06/14/2018</u>
Joint Roughness	<u>16</u>	Date Tested	<u>06/25/2018</u>
Normal Stress (psi)	<u>80</u>		



Sketch



Shear Rate to Peak (in/min) N/A

Encapsulation Material Hydro-Stone

Comments Post peak was performed wherein the Hydro-Stone was chipped away from the shear zone.

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
0.0	1.0029	0.0851	0.0800	0.0993	0.0669	33	0.0000	0.0000	7.3
24.0	1.0009	0.0850	0.0800	0.0988	0.0672	48	0.0020	-0.0001	10.5
40.0	0.9989	0.0849	0.0800	0.0983	0.0675	59	0.0040	-0.0001	13.1
56.0	0.9969	0.0847	0.0799	0.0978	0.0679	69	0.0060	-0.0003	15.3
65.0	0.9949	0.0845	0.0798	0.0972	0.0682	80	0.0080	-0.0004	17.7
79.0	0.9929	0.0842	0.0796	0.0965	0.0683	96	0.0100	-0.0007	21.1
93.0	0.9909	0.0838	0.0794	0.0959	0.0683	109	0.0120	-0.0010	24.0
112.0	0.9889	0.0836	0.0792	0.0953	0.0684	112	0.0140	-0.0012	24.8
126.0	0.9869	0.0834	0.0792	0.0949	0.0686	117	0.0160	-0.0013	25.7
140.0	0.9849	0.0833	0.0791	0.0944	0.0688	121	0.0180	-0.0014	26.6
154.0	0.9829	0.0831	0.0790	0.0939	0.0690	125	0.0200	-0.0016	27.6
167.0	0.9809	0.0829	0.0789	0.0935	0.0691	130	0.0220	-0.0017	28.7
180.0	0.9789	0.0827	0.0787	0.0930	0.0691	136	0.0240	-0.0020	30.0
194.0	0.9769	0.0823	0.0784	0.0925	0.0689	141	0.0260	-0.0023	31.2
207.0	0.9749	0.0820	0.0781	0.0921	0.0687	146	0.0280	-0.0026	32.3
220.0	0.9729	0.0817	0.0778	0.0917	0.0685	151	0.0300	-0.0029	33.3
232.0	0.9709	0.0814	0.0775	0.0912	0.0683	154	0.0320	-0.0032	34.0
245.0	0.9689	0.0811	0.0772	0.0908	0.0680	157	0.0340	-0.0036	34.6
258.0	0.9669	0.0808	0.0769	0.0904	0.0678	160	0.0360	-0.0039	35.3
271.0	0.9649	0.0805	0.0766	0.0900	0.0675	162	0.0380	-0.0042	35.8
284.0	0.9629	0.0802	0.0762	0.0897	0.0673	165	0.0400	-0.0045	36.4
297.0	0.9609	0.0799	0.0760	0.0893	0.0671	167	0.0420	-0.0048	37.0
310.0	0.9589	0.0796	0.0757	0.0890	0.0668	169	0.0440	-0.0051	37.3
322.0	0.9569	0.0794	0.0754	0.0887	0.0666	171	0.0460	-0.0053	37.8
335.0	0.9549	0.0791	0.0751	0.0883	0.0664	173	0.0480	-0.0056	38.2
348.0	0.9529	0.0789	0.0748	0.0880	0.0662	175	0.0500	-0.0058	38.6
361.0	0.9509	0.0787	0.0746	0.0877	0.0660	177	0.0520	-0.0061	39.0
375.0	0.9489	0.0784	0.0743	0.0874	0.0658	178	0.0540	-0.0063	39.4
387.0	0.9469	0.0782	0.0741	0.0871	0.0657	180	0.0560	-0.0066	39.7
400.0	0.9449	0.0780	0.0738	0.0868	0.0655	181	0.0580	-0.0068	40.0
413.0	0.9429	0.0777	0.0735	0.0865	0.0653	183	0.0600	-0.0071	40.3
426.0	0.9409	0.0775	0.0732	0.0862	0.0651	185	0.0620	-0.0073	40.8
439.0	0.9389	0.0773	0.0730	0.0860	0.0650	186	0.0640	-0.0075	41.2
452.0	0.9369	0.0771	0.0728	0.0857	0.0648	189	0.0660	-0.0077	41.7
465.0	0.9349	0.0769	0.0725	0.0854	0.0646	191	0.0680	-0.0080	42.1
478.0	0.9329	0.0767	0.0723	0.0851	0.0645	192	0.0700	-0.0082	42.4
491.0	0.9309	0.0765	0.0720	0.0849	0.0643	193	0.0720	-0.0084	42.7
504.0	0.9289	0.0764	0.0718	0.0846	0.0642	194	0.0740	-0.0086	42.8
516.0	0.9269	0.0762	0.0715	0.0843	0.0641	195	0.0760	-0.0088	43.1
528.0	0.9249	0.0760	0.0713	0.0841	0.0639	196	0.0780	-0.0090	43.3
542.0	0.9229	0.0759	0.0711	0.0838	0.0638	198	0.0800	-0.0092	43.7
555.0	0.9209	0.0757	0.0708	0.0836	0.0637	199	0.0820	-0.0094	44.1
567.0	0.9189	0.0756	0.0706	0.0834	0.0635	201	0.0840	-0.0095	44.4
580.0	0.9169	0.0754	0.0704	0.0831	0.0634	202	0.0860	-0.0097	44.7
593.0	0.9149	0.0752	0.0702	0.0828	0.0633	202	0.0880	-0.0100	44.7
606.0	0.9129	0.0751	0.0700	0.0826	0.0632	203	0.0900	-0.0101	44.8
618.0	0.9109	0.0749	0.0697	0.0823	0.0631	202	0.0920	-0.0103	44.7
630.0	0.9089	0.0748	0.0695	0.0821	0.0630	203	0.0940	-0.0105	44.9
643.0	0.9069	0.0746	0.0693	0.0818	0.0628	204	0.0960	-0.0107	45.0
656.0	0.9049	0.0744	0.0690	0.0816	0.0627	205	0.0980	-0.0109	45.2
668.0	0.9029	0.0743	0.0688	0.0813	0.0626	204	0.1000	-0.0111	45.0
681.0	0.9009	0.0741	0.0686	0.0811	0.0624	204	0.1020	-0.0113	45.2
694.0	0.8989	0.0739	0.0683	0.0808	0.0623	205	0.1040	-0.0115	45.3
707.0	0.8969	0.0738	0.0681	0.0806	0.0622	206	0.1060	-0.0117	45.6
720.0	0.8949	0.0736	0.0679	0.0803	0.0621	207	0.1080	-0.0119	45.8
733.0	0.8929	0.0735	0.0677	0.0801	0.0619	208	0.1100	-0.0120	46.0
746.0	0.8909	0.0734	0.0674	0.0798	0.0618	208	0.1120	-0.0122	46.0
758.0	0.8889	0.0732	0.0672	0.0796	0.0617	208	0.1140	-0.0124	46.0
771.0	0.8869	0.0731	0.0670	0.0794	0.0616	208	0.1160	-0.0126	46.0
784.0	0.8849	0.0730	0.0667	0.0791	0.0615	209	0.1180	-0.0128	46.1
797.0	0.8829	0.0728	0.0665	0.0789	0.0614	208	0.1200	-0.0129	46.0
810.0	0.8809	0.0727	0.0663	0.0786	0.0613	209	0.1220	-0.0131	46.2
822.0	0.8789	0.0726	0.0661	0.0784	0.0611	209	0.1240	-0.0133	46.2
835.0	0.8769	0.0724	0.0659	0.0782	0.0611	210	0.1260	-0.0134	46.4
847.0	0.8749	0.0723	0.0656	0.0779	0.0610	211	0.1280	-0.0136	46.6
860.0	0.8729	0.0722	0.0654	0.0777	0.0609	211	0.1300	-0.0138	46.6
873.0	0.8709	0.0721	0.0652	0.0775	0.0608	211	0.1320	-0.0139	46.7
886.0	0.8689	0.0720	0.0649	0.0772	0.0607	212	0.1340	-0.0141	46.8
899.0	0.8669	0.0719	0.0647	0.0770	0.0606	213	0.1360	-0.0143	47.0
911.0	0.8649	0.0718	0.0645	0.0768	0.0605	214	0.1380	-0.0144	47.2
924.0	0.8629	0.0717	0.0643	0.0766	0.0604	214	0.1400	-0.0146	47.2
936.0	0.8609	0.0716	0.0641	0.0764	0.0603	215	0.1420	-0.0147	47.4
949.0	0.8589	0.0715	0.0639	0.0762	0.0602	215	0.1440	-0.0149	47.5
962.0	0.8569	0.0714	0.0637	0.0760	0.0601	216	0.1460	-0.0150	47.8
974.0	0.8549	0.0713	0.0635	0.0758	0.0600	217	0.1480	-0.0152	47.9
987.0	0.8529	0.0712	0.0633	0.0756	0.0599	218	0.1500	-0.0153	48.1
999.0	0.8509	0.0711	0.0631	0.0754	0.0598	218	0.1520	-0.0155	48.2
1012.0	0.8489	0.0710	0.0629	0.0752	0.0597	219	0.1540	-0.0156	48.3
1025.0	0.8469	0.0709	0.0627	0.0750	0.0596	219	0.1560	-0.0158	48.4

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
1037.0	0.8449	0.0708	0.0625	0.0748	0.0595	220	0.1580	-0.0159	48.5
1050.0	0.8429	0.0708	0.0623	0.0746	0.0594	220	0.1600	-0.0161	48.7
1063.0	0.8409	0.0707	0.0621	0.0745	0.0593	221	0.1620	-0.0162	48.8
1075.0	0.8389	0.0706	0.0620	0.0743	0.0592	221	0.1640	-0.0163	48.8
1088.0	0.8369	0.0705	0.0618	0.0741	0.0591	221	0.1660	-0.0165	48.9
1101.0	0.8349	0.0705	0.0616	0.0740	0.0590	221	0.1680	-0.0166	48.8
1113.0	0.8329	0.0704	0.0614	0.0738	0.0589	221	0.1700	-0.0167	48.7
1126.0	0.8309	0.0703	0.0612	0.0737	0.0589	221	0.1720	-0.0168	48.8
1138.0	0.8289	0.0703	0.0611	0.0735	0.0588	222	0.1740	-0.0169	49.0
1151.0	0.8269	0.0702	0.0609	0.0734	0.0587	221	0.1760	-0.0170	48.9
1164.0	0.8249	0.0701	0.0607	0.0732	0.0586	222	0.1780	-0.0172	49.0
1176.0	0.8229	0.0701	0.0606	0.0731	0.0585	223	0.1800	-0.0173	49.2
1190.0	0.8209	0.0700	0.0604	0.0730	0.0584	222	0.1820	-0.0174	49.0
1203.0	0.8189	0.0700	0.0602	0.0728	0.0584	222	0.1840	-0.0175	49.0
1215.0	0.8169	0.0699	0.0601	0.0727	0.0583	222	0.1860	-0.0176	49.0
1227.0	0.8149	0.0699	0.0599	0.0725	0.0582	222	0.1880	-0.0177	49.0
1240.0	0.8129	0.0698	0.0597	0.0724	0.0581	222	0.1900	-0.0178	49.1
1253.0	0.8109	0.0698	0.0595	0.0723	0.0580	221	0.1920	-0.0179	48.8
1265.0	0.8089	0.0697	0.0594	0.0721	0.0580	221	0.1940	-0.0180	48.8
1278.0	0.8069	0.0697	0.0592	0.0720	0.0579	220	0.1960	-0.0181	48.6
1291.0	0.8049	0.0696	0.0590	0.0718	0.0578	219	0.1980	-0.0183	48.5
1304.0	0.8029	0.0696	0.0589	0.0717	0.0577	219	0.2000	-0.0184	48.5
1316.0	0.8009	0.0695	0.0587	0.0716	0.0576	220	0.2020	-0.0185	48.7
1328.0	0.7989	0.0695	0.0586	0.0714	0.0576	220	0.2040	-0.0186	48.7
1341.0	0.7969	0.0694	0.0584	0.0713	0.0575	220	0.2060	-0.0187	48.6
1354.0	0.7949	0.0693	0.0582	0.0712	0.0574	220	0.2080	-0.0188	48.7
1367.0	0.7929	0.0693	0.0581	0.0711	0.0573	220	0.2100	-0.0189	48.7
1380.0	0.7909	0.0692	0.0580	0.0709	0.0573	221	0.2120	-0.0190	48.8
1393.0	0.7889	0.0692	0.0578	0.0708	0.0572	220	0.2140	-0.0191	48.6
1405.0	0.7869	0.0691	0.0577	0.0707	0.0571	220	0.2160	-0.0192	48.6
1418.0	0.7849	0.0691	0.0576	0.0706	0.0571	220	0.2180	-0.0192	48.7
1430.0	0.7829	0.0691	0.0574	0.0705	0.0570	221	0.2200	-0.0193	48.9
1443.0	0.7809	0.0690	0.0573	0.0704	0.0569	222	0.2220	-0.0194	49.1
1456.0	0.7789	0.0689	0.0572	0.0702	0.0569	222	0.2240	-0.0195	49.1
1468.0	0.7769	0.0689	0.0571	0.0701	0.0568	222	0.2260	-0.0196	48.9
1481.0	0.7749	0.0688	0.0569	0.0700	0.0567	221	0.2280	-0.0197	48.8
1493.0	0.7729	0.0688	0.0568	0.0699	0.0567	219	0.2300	-0.0198	48.3
1505.0	0.7709	0.0687	0.0567	0.0697	0.0566	218	0.2320	-0.0199	48.3
1518.0	0.7689	0.0687	0.0565	0.0696	0.0565	218	0.2340	-0.0200	48.2
1531.0	0.7669	0.0686	0.0564	0.0695	0.0565	217	0.2360	-0.0201	47.9
1544.0	0.7649	0.0685	0.0563	0.0693	0.0564	218	0.2380	-0.0202	48.1
1556.0	0.7629	0.0685	0.0561	0.0692	0.0564	216	0.2400	-0.0203	47.7
1569.0	0.7609	0.0684	0.0560	0.0691	0.0563	215	0.2420	-0.0204	47.6
1581.0	0.7589	0.0683	0.0558	0.0689	0.0562	214	0.2440	-0.0205	47.3
1594.0	0.7569	0.0683	0.0557	0.0687	0.0561	213	0.2460	-0.0206	47.0
1607.0	0.7549	0.0682	0.0555	0.0686	0.0561	213	0.2480	-0.0207	47.1
1619.0	0.7529	0.0681	0.0554	0.0684	0.0560	213	0.2500	-0.0209	47.0
1632.0	0.7509	0.0681	0.0552	0.0683	0.0559	213	0.2520	-0.0210	47.0
1645.0	0.7489	0.0680	0.0551	0.0681	0.0559	213	0.2540	-0.0211	47.0
1657.0	0.7469	0.0679	0.0549	0.0680	0.0558	213	0.2560	-0.0212	47.0
1669.0	0.7449	0.0679	0.0548	0.0678	0.0558	212	0.2580	-0.0213	46.9
1682.0	0.7429	0.0678	0.0546	0.0677	0.0557	210	0.2600	-0.0214	46.5
1694.0	0.7409	0.0677	0.0545	0.0675	0.0556	211	0.2620	-0.0215	46.6
1707.0	0.7389	0.0677	0.0543	0.0674	0.0556	210	0.2640	-0.0216	46.4
1719.0	0.7369	0.0676	0.0542	0.0672	0.0555	211	0.2660	-0.0217	46.6
1732.0	0.7349	0.0675	0.0540	0.0671	0.0555	212	0.2680	-0.0218	46.8
1744.0	0.7329	0.0675	0.0539	0.0669	0.0554	211	0.2700	-0.0219	46.7
1756.0	0.7309	0.0674	0.0537	0.0668	0.0554	212	0.2720	-0.0220	46.7
1768.0	0.7289	0.0674	0.0536	0.0667	0.0553	211	0.2740	-0.0221	46.6
1781.0	0.7269	0.0673	0.0534	0.0665	0.0553	209	0.2760	-0.0222	46.2
1794.0	0.7249	0.0673	0.0533	0.0664	0.0552	209	0.2780	-0.0223	46.2
1806.0	0.7229	0.0673	0.0531	0.0662	0.0552	210	0.2800	-0.0224	46.4
1819.0	0.7209	0.0672	0.0530	0.0661	0.0551	210	0.2820	-0.0225	46.3
1831.0	0.7189	0.0672	0.0528	0.0660	0.0551	210	0.2840	-0.0226	46.4
1844.0	0.7169	0.0671	0.0527	0.0659	0.0550	211	0.2860	-0.0227	46.7
1856.0	0.7149	0.0671	0.0526	0.0657	0.0550	212	0.2880	-0.0227	46.8
1869.0	0.7129	0.0671	0.0525	0.0656	0.0549	213	0.2900	-0.0228	47.1
1881.0	0.7109	0.0670	0.0524	0.0655	0.0549	214	0.2920	-0.0229	47.3
1894.0	0.7089	0.0670	0.0523	0.0654	0.0549	215	0.2940	-0.0229	47.4
1906.0	0.7069	0.0670	0.0522	0.0653	0.0548	215	0.2960	-0.0230	47.4
1919.0	0.7049	0.0669	0.0521	0.0652	0.0548	213	0.2980	-0.0231	47.1
1932.0	0.7029	0.0669	0.0520	0.0651	0.0547	214	0.3000	-0.0232	47.2
1944.0	0.7009	0.0668	0.0519	0.0650	0.0547	214	0.3020	-0.0232	47.3
1956.0	0.6989	0.0668	0.0518	0.0649	0.0547	214	0.3040	-0.0233	47.3
1969.0	0.6969	0.0668	0.0517	0.0648	0.0546	215	0.3060	-0.0234	47.5
1982.0	0.6949	0.0668	0.0516	0.0648	0.0546	217	0.3080	-0.0234	47.9
1995.0	0.6929	0.0667	0.0515	0.0647	0.0546	216	0.3100	-0.0235	47.7
2008.0	0.6909	0.0667	0.0514	0.0646	0.0545	215	0.3120	-0.0235	47.6
2020.0	0.6889	0.0666	0.0513	0.0645	0.0545	216	0.3140	-0.0236	47.8

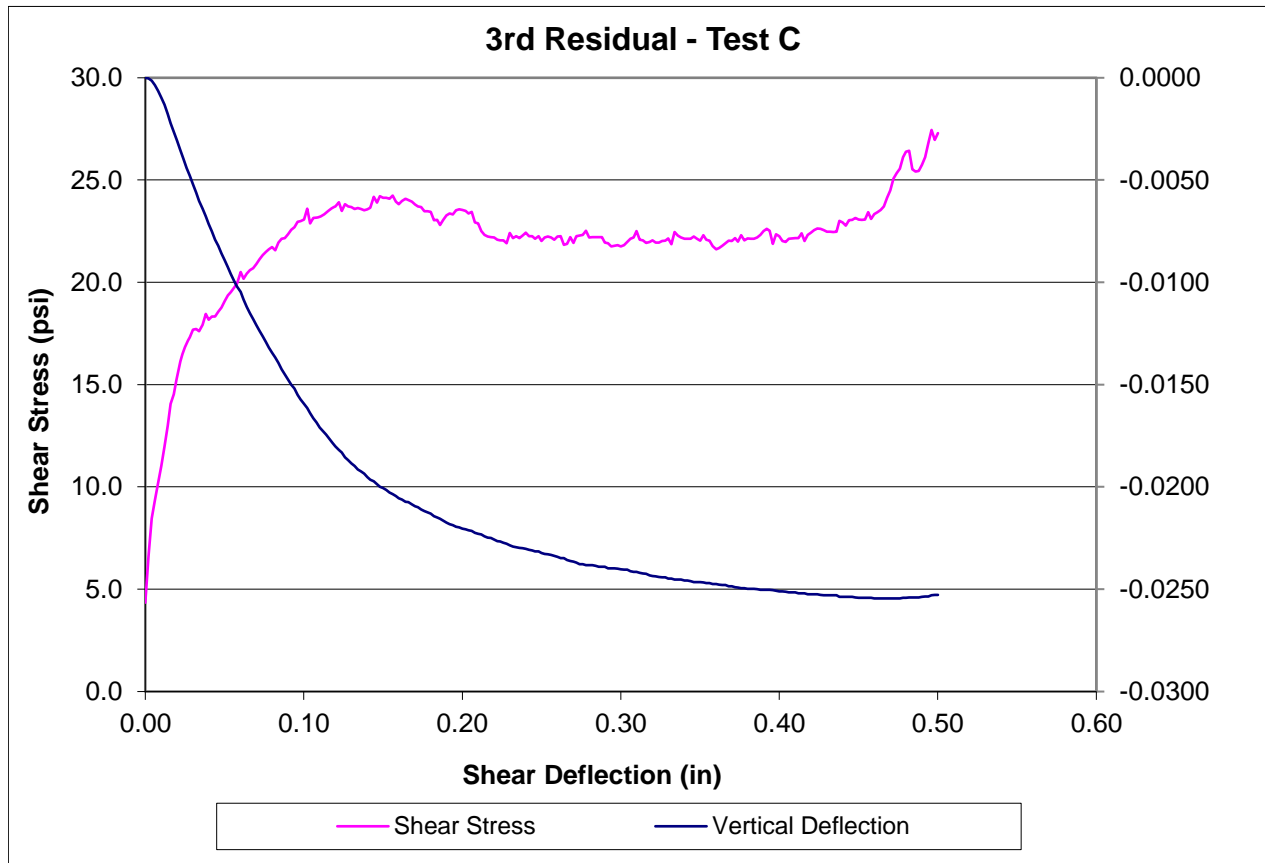
Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
2032.0	0.6869	0.0666	0.0512	0.0644	0.0545	218	0.3160	-0.0237	48.1
2044.0	0.6849	0.0666	0.0512	0.0643	0.0544	217	0.3180	-0.0237	48.0
2057.0	0.6829	0.0665	0.0511	0.0643	0.0544	217	0.3200	-0.0238	48.0
2069.0	0.6809	0.0665	0.0510	0.0642	0.0544	217	0.3220	-0.0238	47.9
2081.0	0.6789	0.0665	0.0510	0.0641	0.0543	218	0.3240	-0.0239	48.1
2094.0	0.6769	0.0664	0.0509	0.0640	0.0543	216	0.3260	-0.0239	47.8
2107.0	0.6749	0.0664	0.0508	0.0640	0.0543	216	0.3280	-0.0240	47.8
2119.0	0.6729	0.0664	0.0508	0.0639	0.0543	218	0.3300	-0.0240	48.1
2132.0	0.6709	0.0663	0.0507	0.0639	0.0542	218	0.3320	-0.0241	48.2
2144.0	0.6689	0.0663	0.0507	0.0638	0.0542	217	0.3340	-0.0241	48.0
2156.0	0.6669	0.0663	0.0506	0.0637	0.0542	217	0.3360	-0.0241	47.9
2169.0	0.6649	0.0663	0.0505	0.0636	0.0541	216	0.3380	-0.0242	47.7
2182.0	0.6629	0.0662	0.0504	0.0636	0.0541	215	0.3400	-0.0243	47.5
2195.0	0.6609	0.0662	0.0504	0.0635	0.0541	211	0.3420	-0.0243	46.7
2207.0	0.6589	0.0662	0.0503	0.0634	0.0540	212	0.3440	-0.0244	46.9
2219.0	0.6569	0.0661	0.0502	0.0633	0.0540	210	0.3460	-0.0244	46.3
2232.0	0.6549	0.0661	0.0501	0.0633	0.0540	211	0.3480	-0.0245	46.6
2245.0	0.6529	0.0661	0.0501	0.0632	0.0539	213	0.3500	-0.0245	47.0
2258.0	0.6509	0.0661	0.0500	0.0632	0.0539	212	0.3520	-0.0245	46.8
2270.0	0.6489	0.0660	0.0499	0.0631	0.0539	212	0.3540	-0.0246	46.7
2283.0	0.6469	0.0660	0.0499	0.0630	0.0539	213	0.3560	-0.0246	47.0
2296.0	0.6449	0.0660	0.0498	0.0630	0.0538	214	0.3580	-0.0247	47.3
2308.0	0.6429	0.0660	0.0498	0.0630	0.0538	215	0.3600	-0.0247	47.4
2320.0	0.6409	0.0660	0.0497	0.0629	0.0538	213	0.3620	-0.0247	47.0
2333.0	0.6389	0.0659	0.0497	0.0628	0.0538	212	0.3640	-0.0248	46.9
2346.0	0.6369	0.0659	0.0496	0.0628	0.0537	213	0.3660	-0.0248	47.0
2358.0	0.6349	0.0659	0.0496	0.0628	0.0537	213	0.3680	-0.0248	47.0
2371.0	0.6329	0.0659	0.0495	0.0627	0.0537	214	0.3700	-0.0249	47.2
2384.0	0.6309	0.0659	0.0495	0.0627	0.0537	214	0.3720	-0.0249	47.3
2397.0	0.6289	0.0659	0.0494	0.0626	0.0536	212	0.3740	-0.0250	46.8
2409.0	0.6269	0.0658	0.0494	0.0626	0.0536	214	0.3760	-0.0250	47.3
2422.0	0.6249	0.0658	0.0493	0.0625	0.0536	214	0.3780	-0.0250	47.4
2434.0	0.6229	0.0658	0.0493	0.0625	0.0536	215	0.3800	-0.0250	47.6
2447.0	0.6209	0.0658	0.0493	0.0624	0.0536	214	0.3820	-0.0251	47.3
2460.0	0.6189	0.0657	0.0492	0.0624	0.0535	216	0.3840	-0.0251	47.8
2473.0	0.6169	0.0657	0.0492	0.0624	0.0535	215	0.3860	-0.0251	47.5
2486.0	0.6149	0.0657	0.0491	0.0623	0.0535	215	0.3880	-0.0252	47.5
2498.0	0.6129	0.0657	0.0491	0.0623	0.0535	216	0.3900	-0.0252	47.6
2511.0	0.6109	0.0656	0.0491	0.0622	0.0535	217	0.3920	-0.0252	47.9
2523.0	0.6089	0.0656	0.0491	0.0622	0.0534	218	0.3940	-0.0253	48.2
2536.0	0.6069	0.0656	0.0490	0.0622	0.0534	214	0.3960	-0.0253	47.4
2548.0	0.6049	0.0656	0.0490	0.0621	0.0534	215	0.3980	-0.0253	47.5
2561.0	0.6029	0.0656	0.0490	0.0621	0.0534	216	0.4000	-0.0253	47.7
2573.0	0.6009	0.0656	0.0489	0.0621	0.0534	218	0.4020	-0.0253	48.1
2586.0	0.5989	0.0655	0.0489	0.0620	0.0534	218	0.4040	-0.0254	48.1
2599.0	0.5969	0.0655	0.0489	0.0620	0.0534	217	0.4060	-0.0254	48.0
2611.0	0.5949	0.0655	0.0489	0.0620	0.0533	217	0.4080	-0.0254	48.0
2624.0	0.5929	0.0655	0.0488	0.0619	0.0533	212	0.4100	-0.0255	46.8
2636.0	0.5909	0.0655	0.0488	0.0619	0.0533	212	0.4120	-0.0255	46.9
2649.0	0.5889	0.0655	0.0487	0.0619	0.0533	213	0.4140	-0.0255	47.0
2662.0	0.5869	0.0655	0.0487	0.0618	0.0533	211	0.4160	-0.0255	46.5
2675.0	0.5849	0.0655	0.0487	0.0618	0.0533	209	0.4180	-0.0255	46.1
2687.0	0.5829	0.0654	0.0486	0.0617	0.0533	207	0.4200	-0.0256	45.6
2700.0	0.5809	0.0654	0.0486	0.0617	0.0532	207	0.4220	-0.0256	45.7
2712.0	0.5789	0.0654	0.0486	0.0617	0.0532	208	0.4240	-0.0256	46.0
2725.0	0.5769	0.0654	0.0485	0.0616	0.0532	209	0.4260	-0.0257	46.1
2738.0	0.5749	0.0654	0.0485	0.0616	0.0532	207	0.4280	-0.0257	45.7
2751.0	0.5729	0.0653	0.0485	0.0616	0.0532	208	0.4300	-0.0257	45.9
2763.0	0.5709	0.0653	0.0484	0.0615	0.0532	208	0.4320	-0.0257	45.9
2776.0	0.5689	0.0653	0.0484	0.0615	0.0531	210	0.4340	-0.0258	46.4
2788.0	0.5669	0.0653	0.0483	0.0615	0.0531	209	0.4360	-0.0258	46.1
2800.0	0.5649	0.0653	0.0483	0.0614	0.0531	210	0.4380	-0.0258	46.4
2812.0	0.5629	0.0653	0.0483	0.0614	0.0531	211	0.4400	-0.0258	46.6
2825.0	0.5609	0.0653	0.0482	0.0613	0.0531	208	0.4420	-0.0259	45.8
2838.0	0.5589	0.0653	0.0482	0.0613	0.0531	207	0.4440	-0.0259	45.8
2850.0	0.5569	0.0653	0.0481	0.0613	0.0531	205	0.4460	-0.0259	45.3
2862.0	0.5549	0.0653	0.0481	0.0612	0.0530	205	0.4480	-0.0259	45.3
2875.0	0.5529	0.0653	0.0481	0.0612	0.0530	205	0.4500	-0.0259	45.3
2888.0	0.5509	0.0653	0.0480	0.0612	0.0530	205	0.4520	-0.0260	45.3
2901.0	0.5489	0.0652	0.0480	0.0611	0.0530	205	0.4540	-0.0260	45.3
2913.0	0.5469	0.0652	0.0479	0.0611	0.0530	205	0.4560	-0.0260	45.3
2926.0	0.5449	0.0652	0.0479	0.0610	0.0530	205	0.4580	-0.0261	45.3
2939.0	0.5429	0.0652	0.0479	0.0610	0.0529	206	0.4600	-0.0261	45.6
2951.0	0.5409	0.0652	0.0478	0.0610	0.0529	207	0.4620	-0.0261	45.7
2964.0	0.5389	0.0652	0.0478	0.0610	0.0529	207	0.4640	-0.0261	45.7
2977.0	0.5369	0.0652	0.0478	0.0609	0.0529	207	0.4660	-0.0261	45.8
2989.0	0.5349	0.0651	0.0477	0.0609	0.0529	207	0.4680	-0.0262	45.6
3001.0	0.5329	0.0651	0.0477	0.0609	0.0529	207	0.4700	-0.0262	45.7
3013.0	0.5309	0.0651	0.0477	0.0608	0.0528	208	0.4720	-0.0262	45.9

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
3026.0	0.5289	0.0651	0.0477	0.0608	0.0528	208	0.4740	-0.0262	46.0
3039.0	0.5269	0.0651	0.0476	0.0608	0.0528	209	0.4760	-0.0263	46.2
3051.0	0.5249	0.0651	0.0476	0.0608	0.0528	210	0.4780	-0.0263	46.4
3063.0	0.5229	0.0651	0.0476	0.0607	0.0528	210	0.4800	-0.0263	46.3
3075.0	0.5209	0.0651	0.0476	0.0607	0.0528	209	0.4820	-0.0263	46.1
3088.0	0.5189	0.0651	0.0475	0.0607	0.0528	210	0.4840	-0.0263	46.3
3101.0	0.5169	0.0650	0.0475	0.0607	0.0528	210	0.4860	-0.0263	46.4
3113.0	0.5149	0.0650	0.0475	0.0607	0.0528	212	0.4880	-0.0263	46.7
3126.0	0.5129	0.0650	0.0475	0.0607	0.0527	212	0.4900	-0.0264	46.8
3139.0	0.5109	0.0650	0.0475	0.0606	0.0527	212	0.4920	-0.0264	46.9
3151.0	0.5089	0.0650	0.0475	0.0606	0.0527	211	0.4940	-0.0264	46.6
3163.0	0.5069	0.0650	0.0475	0.0606	0.0527	212	0.4960	-0.0264	46.8
3176.0	0.5049	0.0649	0.0475	0.0606	0.0527	210	0.4980	-0.0264	46.5
3189.0	0.5029	0.0649	0.0475	0.0605	0.0527	209	0.5000	-0.0264	46.2
3201.0	0.5009	0.0649	0.0475	0.0605	0.0527	210	0.5020	-0.0264	46.3
3214.0	0.4989	0.0649	0.0474	0.0605	0.0527	210	0.5040	-0.0265	46.4
3226.0	0.4969	0.0649	0.0474	0.0605	0.0527	209	0.5060	-0.0265	46.2
3239.0	0.4949	0.0649	0.0474	0.0605	0.0527	212	0.5080	-0.0265	46.9
3246.0	0.4939	0.0649	0.0474	0.0605	0.0527	213	0.5090	-0.0265	47.0

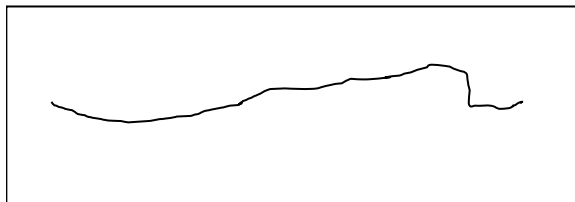


Direct Shear Strength of Rock
ASTM D 5607

Project Name	<u>SR1 Flood Control Project - Inlet Debris Barrier</u>	Project Number	<u>110773396</u>
Lithology	<u>Shale, dark gray, moderately hard</u>	Lab ID	<u>DS-16</u>
Hole Number	<u>DB-1</u>	Date Received	<u>05/15/2018</u>
Depth (m)	<u>29.47</u>	Diameter (in)	<u>2.401</u>
Test Type	<u>Direct shear of intact specimen</u>	Angle of Dip (deg)	<u>0.0</u>
Initial Moisture Condition	<u>As received, moist</u>	Area(in ²)	<u>4.53</u>
Test Moisture Condition	<u>Soaked at least 12 hours prior to test.</u>	Date Prepared	<u>06/14/2018</u>
Joint Roughness	<u>16</u>	Date Tested	<u>06/25/2018</u>
Normal Stress (psi)	<u>40</u>		



Sketch



Shear Rate to Peak (in/min) N/A

Encapsulation Material Hydro-Stone

Comments _____

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
0.0	1.0022	0.1024	0.1036	0.1060	0.1024	20	0.0000	0.0000	4.4
21.0	1.0002	0.1023	0.1036	0.1056	0.1027	30	0.0020	0.0000	6.6
42.0	0.9982	0.1022	0.1035	0.1052	0.1029	38	0.0040	-0.0001	8.5
56.0	0.9962	0.1019	0.1033	0.1047	0.1030	42	0.0060	-0.0004	9.3
69.0	0.9942	0.1016	0.1031	0.1041	0.1030	46	0.0080	-0.0007	10.2
82.0	0.9921	0.1013	0.1028	0.1035	0.1029	50	0.0101	-0.0010	11.0
95.0	0.9901	0.1009	0.1025	0.1029	0.1028	54	0.0121	-0.0013	12.0
108.0	0.9881	0.1005	0.1020	0.1022	0.1026	59	0.0141	-0.0018	13.0
120.0	0.9862	0.1000	0.1016	0.1016	0.1023	64	0.0160	-0.0022	14.1
127.0	0.9842	0.0996	0.1012	0.1010	0.1020	66	0.0180	-0.0027	14.5
140.0	0.9822	0.0992	0.1008	0.1004	0.1017	70	0.0200	-0.0031	15.4
154.0	0.9802	0.0988	0.1003	0.0998	0.1014	73	0.0220	-0.0035	16.0
173.0	0.9782	0.0983	0.0999	0.0992	0.1011	75	0.0240	-0.0040	16.6
187.0	0.9761	0.0979	0.0994	0.0986	0.1008	77	0.0261	-0.0044	17.0
200.0	0.9742	0.0975	0.0990	0.0981	0.1006	78	0.0280	-0.0048	17.3
213.0	0.9722	0.0971	0.0986	0.0975	0.1003	80	0.0300	-0.0052	17.7
226.0	0.9702	0.0967	0.0982	0.0970	0.1000	80	0.0320	-0.0056	17.7
239.0	0.9682	0.0963	0.0978	0.0964	0.0998	80	0.0340	-0.0060	17.6
251.0	0.9661	0.0960	0.0974	0.0959	0.0995	81	0.0361	-0.0064	17.9
263.0	0.9641	0.0956	0.0970	0.0954	0.0993	84	0.0381	-0.0068	18.4
271.0	0.9622	0.0952	0.0966	0.0948	0.0992	82	0.0400	-0.0071	18.2
284.0	0.9602	0.0949	0.0962	0.0943	0.0989	83	0.0420	-0.0075	18.3
303.0	0.9581	0.0945	0.0958	0.0937	0.0987	83	0.0441	-0.0079	18.3
316.0	0.9562	0.0942	0.0955	0.0932	0.0986	84	0.0460	-0.0082	18.6
329.0	0.9542	0.0938	0.0951	0.0927	0.0984	85	0.0480	-0.0086	18.8
342.0	0.9522	0.0935	0.0948	0.0922	0.0982	86	0.0500	-0.0089	19.1
355.0	0.9502	0.0931	0.0945	0.0917	0.0980	88	0.0520	-0.0093	19.4
369.0	0.9482	0.0928	0.0942	0.0912	0.0978	88	0.0540	-0.0096	19.5
382.0	0.9461	0.0924	0.0939	0.0907	0.0976	89	0.0561	-0.0099	19.8
394.0	0.9442	0.0921	0.0936	0.0903	0.0975	90	0.0580	-0.0102	20.0
402.0	0.9421	0.0918	0.0934	0.0899	0.0974	93	0.0601	-0.0105	20.5
414.0	0.9402	0.0914	0.0930	0.0894	0.0972	91	0.0620	-0.0109	20.2
428.0	0.9382	0.0910	0.0927	0.0889	0.0970	92	0.0640	-0.0112	20.4
446.0	0.9361	0.0907	0.0924	0.0884	0.0968	93	0.0661	-0.0115	20.6
459.0	0.9342	0.0904	0.0921	0.0880	0.0967	94	0.0680	-0.0118	20.7
472.0	0.9322	0.0900	0.0919	0.0876	0.0965	95	0.0700	-0.0121	20.9
485.0	0.9302	0.0897	0.0916	0.0872	0.0964	96	0.0720	-0.0124	21.1
497.0	0.9282	0.0894	0.0914	0.0868	0.0962	97	0.0740	-0.0127	21.3
510.0	0.9261	0.0891	0.0911	0.0864	0.0961	97	0.0761	-0.0129	21.5
522.0	0.9242	0.0888	0.0909	0.0860	0.0959	98	0.0780	-0.0132	21.6
535.0	0.9222	0.0886	0.0906	0.0856	0.0958	98	0.0800	-0.0135	21.7
542.0	0.9202	0.0883	0.0904	0.0853	0.0957	98	0.0820	-0.0137	21.6
554.0	0.9182	0.0880	0.0902	0.0849	0.0955	99	0.0840	-0.0140	21.9
573.0	0.9161	0.0877	0.0899	0.0845	0.0953	100	0.0861	-0.0143	22.1
585.0	0.9141	0.0874	0.0897	0.0841	0.0952	100	0.0881	-0.0145	22.2
598.0	0.9122	0.0872	0.0894	0.0838	0.0950	101	0.0900	-0.0148	22.3
611.0	0.9101	0.0869	0.0892	0.0834	0.0949	102	0.0921	-0.0150	22.6
624.0	0.9082	0.0867	0.0890	0.0831	0.0948	103	0.0940	-0.0152	22.7
637.0	0.9061	0.0864	0.0887	0.0827	0.0946	104	0.0961	-0.0155	23.0
649.0	0.9042	0.0861	0.0885	0.0824	0.0945	104	0.0980	-0.0157	23.0
662.0	0.9021	0.0859	0.0883	0.0821	0.0943	104	0.1001	-0.0160	23.1
673.0	0.9001	0.0857	0.0881	0.0818	0.0942	107	0.1021	-0.0162	23.6
683.0	0.8982	0.0854	0.0879	0.0814	0.0941	104	0.1040	-0.0164	22.9
701.0	0.8962	0.0852	0.0876	0.0811	0.0939	105	0.1060	-0.0167	23.1
713.0	0.8942	0.0850	0.0874	0.0808	0.0938	105	0.1080	-0.0169	23.2
726.0	0.8921	0.0847	0.0872	0.0805	0.0936	105	0.1101	-0.0171	23.2
739.0	0.8902	0.0845	0.0870	0.0803	0.0935	105	0.1120	-0.0173	23.3
752.0	0.8882	0.0844	0.0868	0.0800	0.0934	106	0.1140	-0.0175	23.4
764.0	0.8861	0.0842	0.0866	0.0797	0.0933	106	0.1161	-0.0177	23.5
778.0	0.8841	0.0840	0.0864	0.0795	0.0931	107	0.1181	-0.0179	23.6
790.0	0.8822	0.0838	0.0863	0.0792	0.0930	107	0.1200	-0.0180	23.7
802.0	0.8801	0.0836	0.0861	0.0790	0.0929	108	0.1221	-0.0182	23.9
809.0	0.8782	0.0835	0.0860	0.0788	0.0928	106	0.1240	-0.0183	23.5
828.0	0.8762	0.0833	0.0857	0.0785	0.0927	108	0.1260	-0.0186	23.8
841.0	0.8742	0.0831	0.0856	0.0783	0.0926	107	0.1280	-0.0187	23.7
853.0	0.8722	0.0830	0.0854	0.0781	0.0925	107	0.1300	-0.0189	23.7
866.0	0.8702	0.0829	0.0853	0.0779	0.0924	107	0.1320	-0.0190	23.6
879.0	0.8682	0.0827	0.0851	0.0777	0.0923	107	0.1340	-0.0192	23.6
891.0	0.8662	0.0826	0.0850	0.0775	0.0923	107	0.1360	-0.0193	23.6
904.0	0.8642	0.0825	0.0849	0.0774	0.0922	106	0.1380	-0.0194	23.5
917.0	0.8621	0.0823	0.0847	0.0772	0.0921	107	0.1401	-0.0195	23.6
929.0	0.8602	0.0822	0.0846	0.0770	0.0920	107	0.1420	-0.0197	23.6
939.0	0.8581	0.0822	0.0845	0.0769	0.0919	109	0.1441	-0.0197	24.2
949.0	0.8561	0.0820	0.0844	0.0767	0.0918	108	0.1461	-0.0199	23.9
967.0	0.8542	0.0819	0.0842	0.0766	0.0917	110	0.1480	-0.0200	24.2
980.0	0.8522	0.0819	0.0841	0.0765	0.0917	109	0.1500	-0.0201	24.1
993.0	0.8501	0.0818	0.0840	0.0764	0.0916	109	0.1521	-0.0202	24.1
1006.0	0.8481	0.0817	0.0839	0.0762	0.0915	109	0.1541	-0.0203	24.1
1019.0	0.8462	0.0816	0.0838	0.0761	0.0915	110	0.1560	-0.0204	24.2

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
1031.0	0.8441	0.0816	0.0836	0.0760	0.0914	108	0.1581	-0.0205	23.9
1044.0	0.8422	0.0815	0.0835	0.0759	0.0913	108	0.1600	-0.0206	23.8
1056.0	0.8402	0.0815	0.0834	0.0758	0.0912	109	0.1620	-0.0206	24.0
1069.0	0.8381	0.0814	0.0833	0.0757	0.0911	109	0.1641	-0.0207	24.1
1076.0	0.8362	0.0814	0.0832	0.0757	0.0911	109	0.1660	-0.0208	24.0
1094.0	0.8341	0.0813	0.0831	0.0756	0.0910	108	0.1681	-0.0209	23.9
1107.0	0.8321	0.0812	0.0830	0.0755	0.0909	108	0.1701	-0.0210	23.8
1119.0	0.8302	0.0812	0.0829	0.0754	0.0909	107	0.1720	-0.0210	23.7
1132.0	0.8281	0.0811	0.0828	0.0753	0.0908	107	0.1741	-0.0211	23.7
1145.0	0.8262	0.0811	0.0827	0.0752	0.0907	106	0.1760	-0.0212	23.5
1158.0	0.8242	0.0810	0.0826	0.0751	0.0907	106	0.1780	-0.0213	23.5
1171.0	0.8222	0.0810	0.0825	0.0751	0.0906	106	0.1800	-0.0213	23.4
1184.0	0.8201	0.0809	0.0823	0.0750	0.0905	104	0.1821	-0.0214	23.0
1196.0	0.8181	0.0809	0.0822	0.0749	0.0904	104	0.1841	-0.0215	23.0
1203.0	0.8162	0.0808	0.0822	0.0748	0.0904	103	0.1860	-0.0216	22.8
1216.0	0.8142	0.0808	0.0820	0.0747	0.0903	104	0.1880	-0.0217	23.0
1234.0	0.8122	0.0807	0.0819	0.0746	0.0902	105	0.1900	-0.0218	23.3
1247.0	0.8102	0.0807	0.0818	0.0745	0.0901	106	0.1920	-0.0218	23.4
1260.0	0.8082	0.0806	0.0817	0.0745	0.0901	106	0.1940	-0.0219	23.3
1272.0	0.8062	0.0806	0.0816	0.0744	0.0900	106	0.1960	-0.0220	23.5
1285.0	0.8042	0.0806	0.0815	0.0744	0.0900	107	0.1980	-0.0220	23.6
1297.0	0.8022	0.0805	0.0815	0.0743	0.0899	107	0.2000	-0.0221	23.5
1310.0	0.8002	0.0805	0.0814	0.0743	0.0899	106	0.2020	-0.0221	23.5
1322.0	0.7982	0.0805	0.0814	0.0742	0.0898	106	0.2040	-0.0221	23.4
1334.0	0.7962	0.0805	0.0813	0.0742	0.0898	106	0.2060	-0.0222	23.4
1343.0	0.7942	0.0804	0.0812	0.0741	0.0897	104	0.2080	-0.0223	22.9
1361.0	0.7922	0.0804	0.0811	0.0741	0.0896	104	0.2100	-0.0223	22.9
1374.0	0.7902	0.0804	0.0810	0.0741	0.0896	102	0.2120	-0.0223	22.5
1387.0	0.7882	0.0803	0.0809	0.0740	0.0895	101	0.2140	-0.0224	22.3
1400.0	0.7862	0.0803	0.0808	0.0740	0.0894	101	0.2160	-0.0225	22.2
1412.0	0.7842	0.0803	0.0808	0.0739	0.0894	101	0.2180	-0.0225	22.2
1425.0	0.7822	0.0802	0.0807	0.0739	0.0893	100	0.2200	-0.0226	22.2
1437.0	0.7801	0.0802	0.0806	0.0738	0.0892	100	0.2221	-0.0227	22.1
1450.0	0.7782	0.0802	0.0805	0.0738	0.0892	100	0.2240	-0.0227	22.1
1463.0	0.7762	0.0802	0.0805	0.0737	0.0891	100	0.2260	-0.0227	22.1
1470.0	0.7742	0.0801	0.0804	0.0737	0.0891	99	0.2280	-0.0228	21.9
1488.0	0.7722	0.0801	0.0803	0.0736	0.0890	101	0.2300	-0.0229	22.4
1500.0	0.7702	0.0800	0.0802	0.0736	0.0889	100	0.2320	-0.0229	22.2
1513.0	0.7682	0.0800	0.0802	0.0735	0.0889	101	0.2340	-0.0230	22.3
1527.0	0.7661	0.0800	0.0801	0.0735	0.0889	100	0.2361	-0.0230	22.2
1539.0	0.7642	0.0800	0.0801	0.0735	0.0888	101	0.2380	-0.0230	22.3
1551.0	0.7622	0.0800	0.0801	0.0734	0.0888	102	0.2400	-0.0230	22.4
1563.0	0.7602	0.0799	0.0800	0.0734	0.0888	101	0.2420	-0.0231	22.3
1576.0	0.7582	0.0799	0.0800	0.0733	0.0888	101	0.2440	-0.0231	22.3
1589.0	0.7562	0.0799	0.0799	0.0733	0.0887	100	0.2460	-0.0232	22.1
1597.0	0.7541	0.0799	0.0799	0.0733	0.0887	101	0.2481	-0.0232	22.3
1609.0	0.7522	0.0798	0.0798	0.0732	0.0887	100	0.2500	-0.0232	22.0
1627.0	0.7502	0.0798	0.0797	0.0732	0.0886	100	0.2520	-0.0233	22.2
1640.0	0.7482	0.0798	0.0797	0.0731	0.0886	101	0.2540	-0.0233	22.2
1653.0	0.7462	0.0798	0.0796	0.0731	0.0886	100	0.2560	-0.0233	22.2
1665.0	0.7442	0.0797	0.0796	0.0730	0.0886	100	0.2580	-0.0234	22.1
1678.0	0.7422	0.0797	0.0795	0.0730	0.0885	101	0.2600	-0.0234	22.2
1690.0	0.7402	0.0797	0.0794	0.0729	0.0885	101	0.2620	-0.0235	22.3
1703.0	0.7382	0.0797	0.0794	0.0729	0.0885	99	0.2640	-0.0235	21.8
1716.0	0.7362	0.0796	0.0793	0.0728	0.0884	99	0.2660	-0.0236	21.9
1727.0	0.7341	0.0796	0.0792	0.0727	0.0884	101	0.2681	-0.0236	22.2
1735.0	0.7321	0.0796	0.0792	0.0727	0.0883	99	0.2701	-0.0237	21.9
1753.0	0.7302	0.0796	0.0791	0.0726	0.0883	101	0.2720	-0.0237	22.3
1766.0	0.7282	0.0795	0.0790	0.0726	0.0882	101	0.2740	-0.0238	22.3
1778.0	0.7262	0.0795	0.0790	0.0726	0.0882	101	0.2760	-0.0238	22.3
1791.0	0.7242	0.0795	0.0789	0.0725	0.0882	102	0.2780	-0.0238	22.5
1804.0	0.7221	0.0795	0.0789	0.0725	0.0882	100	0.2801	-0.0238	22.2
1816.0	0.7202	0.0795	0.0789	0.0725	0.0882	101	0.2820	-0.0238	22.2
1829.0	0.7182	0.0795	0.0789	0.0724	0.0882	101	0.2840	-0.0239	22.2
1841.0	0.7162	0.0794	0.0788	0.0724	0.0882	101	0.2860	-0.0239	22.2
1853.0	0.7141	0.0794	0.0788	0.0724	0.0882	101	0.2881	-0.0239	22.2
1860.0	0.7122	0.0794	0.0788	0.0724	0.0882	99	0.2900	-0.0239	21.9
1879.0	0.7102	0.0794	0.0787	0.0723	0.0881	99	0.2920	-0.0240	21.9
1891.0	0.7082	0.0794	0.0787	0.0723	0.0881	98	0.2940	-0.0240	21.7
1904.0	0.7062	0.0794	0.0787	0.0723	0.0881	99	0.2960	-0.0240	21.8
1917.0	0.7042	0.0794	0.0787	0.0722	0.0881	99	0.2980	-0.0240	21.8
1930.0	0.7021	0.0794	0.0786	0.0722	0.0881	98	0.3001	-0.0240	21.7
1942.0	0.7002	0.0794	0.0786	0.0721	0.0881	99	0.3020	-0.0241	21.8
1954.0	0.6982	0.0794	0.0786	0.0721	0.0881	99	0.3040	-0.0241	22.0
1967.0	0.6961	0.0793	0.0785	0.0720	0.0881	100	0.3061	-0.0241	22.1
1980.0	0.6942	0.0793	0.0785	0.0720	0.0880	100	0.3080	-0.0242	22.2
1991.0	0.6922	0.0793	0.0785	0.0720	0.0880	102	0.3100	-0.0242	22.5
2000.0	0.6902	0.0793	0.0784	0.0719	0.0880	100	0.3120	-0.0242	22.1
2018.0	0.6882	0.0793	0.0783	0.0719	0.0880	100	0.3140	-0.0242	22.1

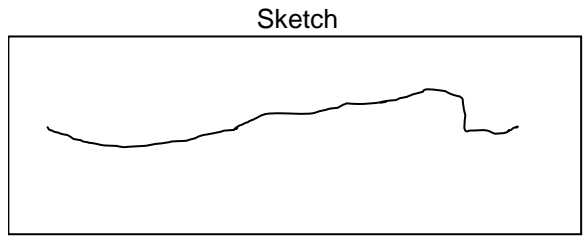
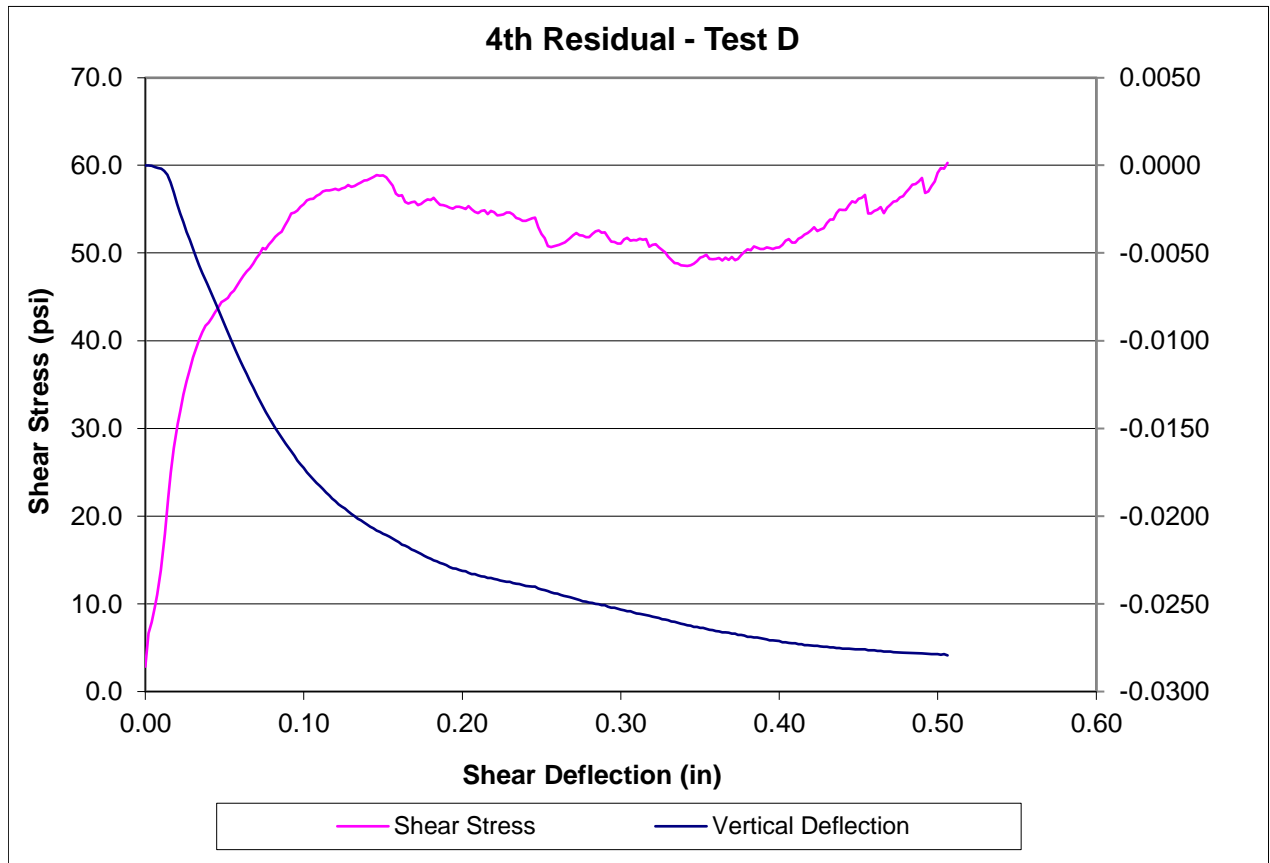
Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
2030.0	0.6862	0.0793	0.0783	0.0718	0.0880	99	0.3160	-0.0243	21.9
2043.0	0.6841	0.0792	0.0782	0.0718	0.0879	99	0.3181	-0.0243	22.0
2055.0	0.6822	0.0792	0.0782	0.0717	0.0879	100	0.3200	-0.0244	22.1
2067.0	0.6801	0.0792	0.0781	0.0717	0.0879	99	0.3221	-0.0244	21.9
2080.0	0.6781	0.0792	0.0781	0.0716	0.0879	99	0.3241	-0.0244	21.9
2093.0	0.6762	0.0792	0.0780	0.0716	0.0879	100	0.3260	-0.0244	22.0
2105.0	0.6742	0.0792	0.0780	0.0716	0.0879	100	0.3280	-0.0244	22.0
2118.0	0.6722	0.0792	0.0779	0.0715	0.0879	100	0.3300	-0.0245	22.1
2125.0	0.6702	0.0792	0.0779	0.0715	0.0879	99	0.3320	-0.0245	21.9
2143.0	0.6682	0.0792	0.0778	0.0714	0.0879	102	0.3340	-0.0245	22.4
2156.0	0.6662	0.0792	0.0778	0.0714	0.0879	101	0.3360	-0.0245	22.3
2168.0	0.6642	0.0792	0.0778	0.0714	0.0879	100	0.3380	-0.0245	22.2
2181.0	0.6621	0.0792	0.0777	0.0713	0.0879	100	0.3401	-0.0246	22.1
2194.0	0.6602	0.0792	0.0777	0.0713	0.0879	100	0.3420	-0.0246	22.1
2206.0	0.6582	0.0792	0.0777	0.0713	0.0878	100	0.3440	-0.0246	22.1
2219.0	0.6562	0.0792	0.0776	0.0712	0.0878	101	0.3460	-0.0247	22.2
2232.0	0.6542	0.0792	0.0776	0.0712	0.0878	100	0.3480	-0.0247	22.1
2245.0	0.6522	0.0792	0.0776	0.0712	0.0878	100	0.3500	-0.0247	22.0
2253.0	0.6501	0.0792	0.0776	0.0711	0.0878	101	0.3521	-0.0247	22.3
2265.0	0.6482	0.0792	0.0775	0.0711	0.0878	100	0.3540	-0.0247	22.1
2283.0	0.6462	0.0792	0.0775	0.0711	0.0878	100	0.3560	-0.0247	22.0
2295.0	0.6442	0.0792	0.0774	0.0710	0.0878	99	0.3580	-0.0248	21.8
2308.0	0.6421	0.0792	0.0774	0.0710	0.0878	98	0.3601	-0.0248	21.6
2320.0	0.6402	0.0792	0.0773	0.0710	0.0878	98	0.3620	-0.0248	21.7
2333.0	0.6382	0.0792	0.0773	0.0709	0.0878	99	0.3640	-0.0248	21.8
2345.0	0.6362	0.0792	0.0773	0.0709	0.0878	99	0.3660	-0.0248	21.9
2357.0	0.6342	0.0792	0.0772	0.0709	0.0877	100	0.3680	-0.0249	22.0
2370.0	0.6321	0.0792	0.0772	0.0709	0.0877	100	0.3701	-0.0249	22.0
2383.0	0.6301	0.0791	0.0772	0.0708	0.0877	100	0.3721	-0.0249	22.2
2391.0	0.6282	0.0791	0.0771	0.0708	0.0877	100	0.3740	-0.0249	22.0
2409.0	0.6262	0.0791	0.0771	0.0707	0.0877	101	0.3760	-0.0250	22.3
2421.0	0.6242	0.0791	0.0771	0.0707	0.0877	100	0.3780	-0.0250	22.1
2435.0	0.6222	0.0791	0.0770	0.0707	0.0877	100	0.3800	-0.0250	22.1
2447.0	0.6202	0.0791	0.0770	0.0707	0.0877	100	0.3820	-0.0250	22.1
2460.0	0.6182	0.0791	0.0770	0.0707	0.0877	100	0.3840	-0.0250	22.1
2473.0	0.6162	0.0791	0.0770	0.0706	0.0877	100	0.3860	-0.0250	22.2
2486.0	0.6142	0.0791	0.0769	0.0706	0.0877	101	0.3880	-0.0250	22.3
2498.0	0.6121	0.0791	0.0769	0.0706	0.0877	102	0.3901	-0.0250	22.5
2510.0	0.6102	0.0791	0.0769	0.0706	0.0877	102	0.3920	-0.0250	22.6
2518.0	0.6082	0.0791	0.0769	0.0706	0.0877	102	0.3940	-0.0250	22.5
2536.0	0.6062	0.0791	0.0769	0.0705	0.0877	99	0.3960	-0.0251	21.9
2549.0	0.6042	0.0791	0.0768	0.0705	0.0877	101	0.3980	-0.0251	22.3
2561.0	0.6022	0.0791	0.0768	0.0705	0.0876	101	0.4000	-0.0251	22.3
2574.0	0.6002	0.0791	0.0768	0.0705	0.0876	100	0.4020	-0.0251	22.0
2587.0	0.5982	0.0791	0.0768	0.0704	0.0876	99	0.4040	-0.0251	22.0
2599.0	0.5962	0.0791	0.0767	0.0704	0.0876	100	0.4060	-0.0252	22.1
2611.0	0.5942	0.0791	0.0767	0.0704	0.0876	100	0.4080	-0.0252	22.1
2624.0	0.5921	0.0791	0.0767	0.0704	0.0876	100	0.4101	-0.0252	22.2
2637.0	0.5902	0.0791	0.0766	0.0703	0.0876	100	0.4120	-0.0252	22.2
2648.0	0.5881	0.0791	0.0766	0.0703	0.0876	101	0.4141	-0.0252	22.4
2657.0	0.5862	0.0791	0.0766	0.0703	0.0876	100	0.4160	-0.0252	22.0
2676.0	0.5842	0.0791	0.0765	0.0702	0.0876	101	0.4180	-0.0253	22.3
2688.0	0.5822	0.0791	0.0765	0.0702	0.0876	102	0.4200	-0.0253	22.4
2701.0	0.5802	0.0791	0.0765	0.0702	0.0876	102	0.4220	-0.0253	22.5
2713.0	0.5782	0.0791	0.0765	0.0702	0.0876	102	0.4240	-0.0253	22.6
2726.0	0.5762	0.0791	0.0764	0.0702	0.0876	102	0.4260	-0.0253	22.6
2739.0	0.5742	0.0791	0.0764	0.0701	0.0876	102	0.4280	-0.0253	22.5
2751.0	0.5722	0.0791	0.0764	0.0701	0.0876	102	0.4300	-0.0253	22.5
2764.0	0.5702	0.0791	0.0764	0.0701	0.0876	102	0.4320	-0.0253	22.5
2776.0	0.5682	0.0791	0.0764	0.0701	0.0876	102	0.4340	-0.0253	22.4
2784.0	0.5662	0.0791	0.0764	0.0701	0.0876	102	0.4360	-0.0253	22.5
2801.0	0.5642	0.0791	0.0763	0.0700	0.0875	104	0.4380	-0.0254	23.0
2813.0	0.5622	0.0791	0.0763	0.0700	0.0875	104	0.4400	-0.0254	22.9
2826.0	0.5602	0.0791	0.0763	0.0700	0.0875	103	0.4420	-0.0254	22.8
2839.0	0.5582	0.0791	0.0763	0.0700	0.0875	104	0.4440	-0.0254	23.0
2852.0	0.5562	0.0791	0.0763	0.0700	0.0875	104	0.4460	-0.0254	23.0
2864.0	0.5542	0.0791	0.0763	0.0699	0.0875	105	0.4480	-0.0254	23.1
2877.0	0.5522	0.0791	0.0762	0.0699	0.0875	104	0.4500	-0.0254	23.1
2890.0	0.5502	0.0791	0.0762	0.0699	0.0875	104	0.4520	-0.0254	23.0
2902.0	0.5482	0.0791	0.0762	0.0699	0.0875	104	0.4540	-0.0254	23.1
2913.0	0.5462	0.0791	0.0762	0.0699	0.0875	106	0.4560	-0.0254	23.4
2922.0	0.5442	0.0791	0.0762	0.0699	0.0875	105	0.4580	-0.0254	23.1
2941.0	0.5422	0.0791	0.0762	0.0698	0.0875	106	0.4600	-0.0255	23.3
2953.0	0.5402	0.0791	0.0762	0.0698	0.0875	106	0.4620	-0.0255	23.4
2966.0	0.5382	0.0791	0.0762	0.0698	0.0875	107	0.4640	-0.0255	23.5
2979.0	0.5362	0.0791	0.0762	0.0698	0.0875	107	0.4660	-0.0255	23.7
2991.0	0.5341	0.0791	0.0762	0.0698	0.0875	109	0.4681	-0.0255	24.1
3003.0	0.5322	0.0791	0.0762	0.0698	0.0875	111	0.4700	-0.0255	24.5
3015.0	0.5302	0.0791	0.0762	0.0698	0.0875	113	0.4720	-0.0255	25.1

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
3028.0	0.5282	0.0791	0.0762	0.0698	0.0875	115	0.4740	-0.0255	25.3
3041.0	0.5262	0.0791	0.0762	0.0698	0.0875	116	0.4760	-0.0255	25.5
3053.0	0.5242	0.0791	0.0762	0.0698	0.0876	118	0.4780	-0.0254	26.1
3066.0	0.5222	0.0791	0.0762	0.0698	0.0876	119	0.4800	-0.0254	26.4
3079.0	0.5202	0.0791	0.0762	0.0699	0.0876	120	0.4820	-0.0254	26.4
3091.0	0.5182	0.0791	0.0762	0.0699	0.0876	116	0.4840	-0.0254	25.5
3104.0	0.5162	0.0791	0.0762	0.0699	0.0876	115	0.4860	-0.0254	25.4
3116.0	0.5142	0.0791	0.0762	0.0699	0.0876	115	0.4880	-0.0254	25.4
3129.0	0.5122	0.0791	0.0763	0.0699	0.0876	117	0.4900	-0.0254	25.7
3142.0	0.5102	0.0791	0.0763	0.0700	0.0876	118	0.4920	-0.0254	26.1
3154.0	0.5082	0.0791	0.0763	0.0700	0.0876	121	0.4940	-0.0254	26.8
3167.0	0.5062	0.0792	0.0763	0.0701	0.0876	124	0.4960	-0.0253	27.4
3180.0	0.5042	0.0792	0.0764	0.0701	0.0876	122	0.4980	-0.0253	27.0
3192.0	0.5022	0.0792	0.0764	0.0701	0.0876	124	0.5000	-0.0253	27.3



Direct Shear Strength of Rock
ASTM D 5607

Project Name	<u>SR1 Flood Control Project - Inlet Debris Barrier</u>	Project Number	<u>110773396</u>
Lithology	<u>Shale, dark gray, moderately hard</u>	Lab ID	<u>DS-16</u>
Hole Number	<u>DB-1</u>	Date Received	<u>05/15/2018</u>
Depth (m)	<u>29.47</u>	Diameter (in)	<u>2.401</u>
Test Type	<u>Direct shear of intact specimen</u>	Angle of Dip (deg)	<u>0.0</u>
Initial Moisture Condition	<u>As received, moist</u>	Area(in ²)	<u>4.53</u>
Test Moisture Condition	<u>Soaked at least 12 hours prior to test.</u>	Date Prepared	<u>06/14/2018</u>
Joint Roughness	<u>16</u>	Date Tested	<u>06/25/2018</u>
Normal Stress (psi)	<u>120</u>		



Shear Rate to Peak (in/min) N/A
Encapsulation Material Hydro-Stone

Comments _____

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
0.0	1.0016	0.1023	0.1045	0.1028	0.1051	13	0.0000	0.0000	2.9
20.0	0.9996	0.1023	0.1045	0.1025	0.1054	30	0.0020	0.0000	6.6
36.0	0.9976	0.1022	0.1045	0.1022	0.1057	36	0.0040	0.0000	7.9
57.0	0.9956	0.1020	0.1045	0.1018	0.1060	44	0.0060	-0.0001	9.7
69.0	0.9936	0.1019	0.1045	0.1015	0.1062	53	0.0080	-0.0001	11.7
80.0	0.9916	0.1018	0.1045	0.1012	0.1064	64	0.0100	-0.0002	14.0
93.0	0.9896	0.1016	0.1045	0.1008	0.1065	79	0.0120	-0.0003	17.3
106.0	0.9876	0.1013	0.1043	0.1002	0.1067	96	0.0140	-0.0005	21.1
121.0	0.9856	0.1008	0.1040	0.0994	0.1066	113	0.0160	-0.0010	24.9
136.0	0.9836	0.1001	0.1035	0.0986	0.1063	125	0.0180	-0.0015	27.5
150.0	0.9816	0.0994	0.1030	0.0977	0.1059	136	0.0200	-0.0022	30.0
165.0	0.9796	0.0988	0.1025	0.0969	0.1055	144	0.0220	-0.0028	31.9
180.0	0.9776	0.0982	0.1021	0.0962	0.1052	153	0.0240	-0.0032	33.9
194.0	0.9756	0.0976	0.1016	0.0954	0.1049	160	0.0260	-0.0038	35.4
208.0	0.9736	0.0971	0.1012	0.0948	0.1046	166	0.0280	-0.0042	36.7
222.0	0.9716	0.0965	0.1008	0.0941	0.1043	172	0.0300	-0.0047	38.1
236.0	0.9696	0.0959	0.1004	0.0934	0.1039	177	0.0320	-0.0053	39.2
249.0	0.9676	0.0954	0.1000	0.0928	0.1037	181	0.0340	-0.0057	40.1
263.0	0.9656	0.0949	0.0996	0.0922	0.1034	185	0.0360	-0.0061	41.0
276.0	0.9636	0.0945	0.0993	0.0917	0.1031	189	0.0380	-0.0065	41.7
290.0	0.9616	0.0940	0.0989	0.0911	0.1028	190	0.0400	-0.0070	42.1
303.0	0.9596	0.0936	0.0985	0.0906	0.1025	193	0.0420	-0.0074	42.6
315.0	0.9576	0.0932	0.0981	0.0900	0.1023	196	0.0440	-0.0078	43.2
329.0	0.9556	0.0927	0.0977	0.0895	0.1019	198	0.0460	-0.0082	43.8
342.0	0.9536	0.0923	0.0973	0.0890	0.1016	201	0.0480	-0.0086	44.4
356.0	0.9516	0.0919	0.0969	0.0884	0.1012	202	0.0500	-0.0091	44.6
369.0	0.9496	0.0914	0.0965	0.0879	0.1008	203	0.0520	-0.0095	44.9
382.0	0.9476	0.0910	0.0960	0.0874	0.1005	205	0.0540	-0.0099	45.4
395.0	0.9456	0.0906	0.0956	0.0869	0.1002	207	0.0560	-0.0104	45.7
408.0	0.9436	0.0902	0.0952	0.0865	0.0998	210	0.0580	-0.0108	46.3
421.0	0.9416	0.0898	0.0948	0.0860	0.0995	212	0.0600	-0.0112	46.9
434.0	0.9396	0.0894	0.0944	0.0855	0.0992	215	0.0620	-0.0116	47.4
448.0	0.9376	0.0891	0.0940	0.0851	0.0989	217	0.0640	-0.0119	47.9
461.0	0.9356	0.0887	0.0936	0.0846	0.0986	219	0.0660	-0.0123	48.3
474.0	0.9336	0.0884	0.0932	0.0842	0.0983	221	0.0680	-0.0127	48.8
488.0	0.9316	0.0880	0.0928	0.0837	0.0980	224	0.0700	-0.0131	49.4
501.0	0.9296	0.0877	0.0924	0.0833	0.0977	226	0.0720	-0.0134	49.9
514.0	0.9276	0.0874	0.0920	0.0829	0.0974	229	0.0740	-0.0138	50.6
526.0	0.9256	0.0871	0.0917	0.0825	0.0972	228	0.0760	-0.0141	50.4
538.0	0.9236	0.0868	0.0914	0.0822	0.0969	231	0.0780	-0.0144	51.0
551.0	0.9216	0.0866	0.0910	0.0818	0.0966	232	0.0800	-0.0147	51.4
563.0	0.9196	0.0863	0.0907	0.0815	0.0964	235	0.0820	-0.0150	51.8
576.0	0.9176	0.0860	0.0904	0.0812	0.0961	236	0.0840	-0.0153	52.2
589.0	0.9156	0.0858	0.0900	0.0808	0.0959	237	0.0860	-0.0156	52.4
602.0	0.9136	0.0856	0.0897	0.0805	0.0956	240	0.0880	-0.0158	53.1
615.0	0.9116	0.0854	0.0894	0.0803	0.0954	243	0.0900	-0.0161	53.7
628.0	0.9096	0.0852	0.0891	0.0800	0.0952	247	0.0920	-0.0163	54.5
641.0	0.9076	0.0850	0.0888	0.0797	0.0950	247	0.0940	-0.0166	54.6
654.0	0.9056	0.0848	0.0885	0.0794	0.0947	248	0.0960	-0.0168	54.8
667.0	0.9036	0.0846	0.0882	0.0792	0.0945	250	0.0980	-0.0171	55.3
680.0	0.9016	0.0844	0.0880	0.0790	0.0943	252	0.1000	-0.0173	55.6
693.0	0.8996	0.0842	0.0877	0.0787	0.0941	253	0.1020	-0.0175	56.0
707.0	0.8976	0.0841	0.0874	0.0785	0.0939	254	0.1040	-0.0177	56.1
719.0	0.8956	0.0839	0.0872	0.0783	0.0937	254	0.1060	-0.0179	56.2
732.0	0.8936	0.0838	0.0869	0.0781	0.0935	256	0.1080	-0.0181	56.5
745.0	0.8916	0.0836	0.0867	0.0779	0.0934	257	0.1100	-0.0183	56.7
758.0	0.8896	0.0835	0.0865	0.0777	0.0932	258	0.1120	-0.0185	57.0
770.0	0.8876	0.0833	0.0863	0.0775	0.0930	259	0.1140	-0.0187	57.1
783.0	0.8856	0.0832	0.0860	0.0773	0.0929	259	0.1160	-0.0188	57.1
796.0	0.8836	0.0831	0.0858	0.0771	0.0927	259	0.1180	-0.0190	57.2
809.0	0.8816	0.0829	0.0856	0.0770	0.0926	259	0.1200	-0.0192	57.3
821.0	0.8796	0.0828	0.0854	0.0768	0.0924	259	0.1220	-0.0193	57.2
834.0	0.8776	0.0827	0.0852	0.0767	0.0923	260	0.1240	-0.0195	57.4
848.0	0.8756	0.0826	0.0851	0.0765	0.0922	260	0.1260	-0.0196	57.5
860.0	0.8736	0.0825	0.0849	0.0764	0.0920	261	0.1280	-0.0197	57.8
873.0	0.8716	0.0824	0.0847	0.0762	0.0919	260	0.1300	-0.0199	57.5
886.0	0.8696	0.0823	0.0845	0.0761	0.0918	261	0.1320	-0.0200	57.6
899.0	0.8676	0.0822	0.0843	0.0759	0.0917	262	0.1340	-0.0202	57.9
911.0	0.8656	0.0821	0.0842	0.0758	0.0916	263	0.1360	-0.0203	58.0
925.0	0.8636	0.0820	0.0840	0.0757	0.0915	264	0.1380	-0.0204	58.2
937.0	0.8616	0.0820	0.0839	0.0755	0.0914	264	0.1400	-0.0205	58.3
950.0	0.8596	0.0819	0.0837	0.0754	0.0913	265	0.1420	-0.0206	58.5
963.0	0.8576	0.0818	0.0836	0.0753	0.0912	266	0.1440	-0.0207	58.7
975.0	0.8556	0.0817	0.0835	0.0751	0.0911	266	0.1460	-0.0208	58.9
988.0	0.8536	0.0816	0.0834	0.0750	0.0911	266	0.1480	-0.0209	58.8
1001.0	0.8516	0.0815	0.0833	0.0749	0.0910	266	0.1500	-0.0210	58.8
1014.0	0.8496	0.0814	0.0832	0.0748	0.0910	265	0.1520	-0.0211	58.6
1027.0	0.8476	0.0813	0.0832	0.0746	0.0909	263	0.1540	-0.0212	58.1
1039.0	0.8456	0.0812	0.0831	0.0745	0.0908	261	0.1560	-0.0213	57.7

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
1052.0	0.8436	0.0810	0.0830	0.0743	0.0908	257	0.1580	-0.0214	56.8
1064.0	0.8416	0.0809	0.0829	0.0742	0.0908	256	0.1600	-0.0215	56.5
1077.0	0.8396	0.0807	0.0828	0.0740	0.0907	256	0.1620	-0.0216	56.6
1089.0	0.8376	0.0806	0.0828	0.0739	0.0907	253	0.1640	-0.0217	55.8
1102.0	0.8356	0.0805	0.0827	0.0737	0.0907	252	0.1660	-0.0218	55.6
1115.0	0.8336	0.0803	0.0826	0.0736	0.0906	253	0.1680	-0.0219	55.8
1127.0	0.8316	0.0802	0.0826	0.0734	0.0906	253	0.1700	-0.0220	55.8
1140.0	0.8296	0.0801	0.0825	0.0732	0.0906	251	0.1720	-0.0221	55.4
1153.0	0.8276	0.0800	0.0825	0.0731	0.0905	252	0.1740	-0.0222	55.6
1166.0	0.8256	0.0798	0.0824	0.0729	0.0905	253	0.1760	-0.0223	55.9
1178.0	0.8236	0.0797	0.0823	0.0728	0.0905	254	0.1780	-0.0224	56.1
1191.0	0.8216	0.0796	0.0823	0.0726	0.0905	254	0.1800	-0.0224	56.0
1204.0	0.8196	0.0795	0.0822	0.0725	0.0904	255	0.1820	-0.0225	56.3
1217.0	0.8176	0.0794	0.0822	0.0724	0.0904	253	0.1840	-0.0226	55.8
1229.0	0.8156	0.0793	0.0821	0.0722	0.0904	251	0.1860	-0.0227	55.5
1242.0	0.8136	0.0792	0.0821	0.0721	0.0904	251	0.1880	-0.0227	55.4
1255.0	0.8116	0.0791	0.0820	0.0720	0.0904	251	0.1900	-0.0228	55.3
1268.0	0.8096	0.0790	0.0820	0.0718	0.0903	250	0.1920	-0.0229	55.2
1280.0	0.8076	0.0789	0.0819	0.0717	0.0903	249	0.1940	-0.0230	55.1
1293.0	0.8056	0.0789	0.0819	0.0716	0.0903	250	0.1960	-0.0230	55.3
1306.0	0.8036	0.0788	0.0818	0.0715	0.0903	250	0.1980	-0.0231	55.3
1319.0	0.8016	0.0787	0.0818	0.0714	0.0903	250	0.2000	-0.0231	55.2
1331.0	0.7996	0.0787	0.0818	0.0713	0.0903	249	0.2020	-0.0232	55.0
1344.0	0.7976	0.0786	0.0817	0.0712	0.0903	250	0.2040	-0.0232	55.3
1356.0	0.7956	0.0785	0.0817	0.0711	0.0902	249	0.2060	-0.0233	55.0
1369.0	0.7936	0.0785	0.0817	0.0711	0.0902	248	0.2080	-0.0233	54.7
1382.0	0.7916	0.0784	0.0816	0.0710	0.0902	247	0.2100	-0.0234	54.5
1395.0	0.7896	0.0783	0.0816	0.0709	0.0902	248	0.2120	-0.0234	54.8
1408.0	0.7876	0.0783	0.0816	0.0708	0.0902	248	0.2140	-0.0235	54.9
1420.0	0.7856	0.0782	0.0815	0.0707	0.0902	246	0.2160	-0.0235	54.4
1432.0	0.7836	0.0782	0.0815	0.0707	0.0902	248	0.2180	-0.0235	54.8
1445.0	0.7816	0.0781	0.0815	0.0706	0.0902	247	0.2200	-0.0236	54.6
1458.0	0.7796	0.0781	0.0814	0.0705	0.0902	246	0.2220	-0.0236	54.3
1471.0	0.7776	0.0780	0.0814	0.0705	0.0901	246	0.2240	-0.0237	54.3
1483.0	0.7756	0.0780	0.0814	0.0704	0.0901	246	0.2260	-0.0237	54.4
1496.0	0.7736	0.0779	0.0814	0.0703	0.0901	247	0.2280	-0.0238	54.6
1508.0	0.7716	0.0779	0.0814	0.0703	0.0901	247	0.2300	-0.0238	54.6
1521.0	0.7696	0.0778	0.0813	0.0702	0.0901	246	0.2320	-0.0238	54.4
1534.0	0.7676	0.0778	0.0813	0.0701	0.0901	244	0.2340	-0.0239	54.0
1547.0	0.7656	0.0777	0.0813	0.0701	0.0901	244	0.2360	-0.0239	53.9
1560.0	0.7636	0.0776	0.0813	0.0700	0.0901	243	0.2380	-0.0239	53.6
1572.0	0.7616	0.0776	0.0812	0.0699	0.0901	243	0.2400	-0.0240	53.6
1585.0	0.7596	0.0775	0.0812	0.0699	0.0901	244	0.2420	-0.0240	53.8
1597.0	0.7576	0.0775	0.0812	0.0698	0.0901	244	0.2440	-0.0240	54.0
1610.0	0.7556	0.0775	0.0812	0.0698	0.0901	245	0.2460	-0.0240	54.0
1622.0	0.7536	0.0774	0.0811	0.0697	0.0900	240	0.2480	-0.0241	52.9
1635.0	0.7516	0.0773	0.0811	0.0696	0.0900	236	0.2500	-0.0242	52.2
1648.0	0.7496	0.0772	0.0811	0.0696	0.0899	234	0.2520	-0.0242	51.7
1660.0	0.7476	0.0771	0.0811	0.0695	0.0899	230	0.2540	-0.0243	50.8
1673.0	0.7456	0.0771	0.0810	0.0694	0.0898	229	0.2560	-0.0244	50.7
1685.0	0.7436	0.0770	0.0810	0.0693	0.0898	230	0.2580	-0.0244	50.8
1698.0	0.7416	0.0769	0.0810	0.0693	0.0898	230	0.2600	-0.0244	50.9
1710.0	0.7396	0.0769	0.0809	0.0692	0.0897	231	0.2620	-0.0245	51.0
1723.0	0.7376	0.0768	0.0809	0.0691	0.0897	231	0.2640	-0.0246	51.1
1736.0	0.7356	0.0767	0.0809	0.0691	0.0897	233	0.2660	-0.0246	51.4
1748.0	0.7336	0.0767	0.0808	0.0690	0.0897	234	0.2680	-0.0246	51.7
1760.0	0.7316	0.0766	0.0808	0.0689	0.0897	236	0.2700	-0.0247	52.0
1773.0	0.7296	0.0765	0.0808	0.0688	0.0897	237	0.2720	-0.0247	52.3
1786.0	0.7276	0.0764	0.0808	0.0687	0.0897	236	0.2740	-0.0248	52.0
1798.0	0.7256	0.0764	0.0807	0.0686	0.0896	235	0.2760	-0.0249	52.0
1811.0	0.7236	0.0763	0.0807	0.0686	0.0896	234	0.2780	-0.0249	51.8
1824.0	0.7216	0.0762	0.0807	0.0685	0.0896	234	0.2800	-0.0249	51.8
1836.0	0.7196	0.0762	0.0807	0.0684	0.0896	236	0.2820	-0.0250	52.2
1849.0	0.7176	0.0761	0.0806	0.0684	0.0896	237	0.2840	-0.0250	52.5
1861.0	0.7156	0.0761	0.0806	0.0683	0.0896	238	0.2860	-0.0250	52.6
1873.0	0.7136	0.0760	0.0806	0.0682	0.0896	237	0.2880	-0.0251	52.3
1886.0	0.7116	0.0760	0.0806	0.0682	0.0896	237	0.2900	-0.0251	52.4
1899.0	0.7096	0.0759	0.0805	0.0681	0.0895	234	0.2920	-0.0252	51.8
1912.0	0.7076	0.0758	0.0805	0.0680	0.0895	232	0.2940	-0.0252	51.3
1924.0	0.7056	0.0758	0.0805	0.0680	0.0895	232	0.2960	-0.0252	51.2
1937.0	0.7036	0.0757	0.0805	0.0679	0.0895	231	0.2980	-0.0253	51.1
1950.0	0.7016	0.0757	0.0804	0.0678	0.0895	231	0.3000	-0.0253	51.1
1962.0	0.6996	0.0756	0.0804	0.0677	0.0895	233	0.3020	-0.0254	51.5
1975.0	0.6976	0.0755	0.0804	0.0676	0.0895	234	0.3040	-0.0254	51.7
1988.0	0.6956	0.0755	0.0804	0.0676	0.0895	233	0.3060	-0.0254	51.4
2001.0	0.6936	0.0754	0.0803	0.0675	0.0895	233	0.3080	-0.0255	51.5
2013.0	0.6916	0.0754	0.0803	0.0674	0.0894	233	0.3100	-0.0255	51.4
2026.0	0.6896	0.0753	0.0803	0.0674	0.0894	234	0.3120	-0.0256	51.6
2038.0	0.6876	0.0753	0.0803	0.0673	0.0894	233	0.3140	-0.0256	51.5

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
2051.0	0.6856	0.0752	0.0802	0.0673	0.0894	234	0.3160	-0.0257	51.6
2063.0	0.6836	0.0752	0.0802	0.0672	0.0894	230	0.3180	-0.0257	50.7
2075.0	0.6816	0.0751	0.0802	0.0671	0.0894	231	0.3200	-0.0257	50.9
2088.0	0.6796	0.0750	0.0802	0.0670	0.0894	231	0.3220	-0.0258	51.0
2101.0	0.6776	0.0750	0.0801	0.0670	0.0894	229	0.3240	-0.0258	50.6
2114.0	0.6756	0.0749	0.0801	0.0669	0.0893	228	0.3260	-0.0259	50.3
2126.0	0.6736	0.0749	0.0801	0.0668	0.0893	227	0.3280	-0.0259	50.0
2139.0	0.6716	0.0748	0.0801	0.0668	0.0893	224	0.3300	-0.0259	49.6
2151.0	0.6696	0.0747	0.0800	0.0667	0.0893	223	0.3320	-0.0260	49.2
2163.0	0.6676	0.0747	0.0800	0.0666	0.0893	221	0.3340	-0.0260	48.8
2176.0	0.6656	0.0746	0.0800	0.0665	0.0893	221	0.3360	-0.0261	48.8
2189.0	0.6636	0.0746	0.0799	0.0664	0.0893	220	0.3380	-0.0261	48.6
2201.0	0.6616	0.0745	0.0799	0.0664	0.0892	220	0.3400	-0.0262	48.6
2214.0	0.6596	0.0744	0.0799	0.0663	0.0892	220	0.3420	-0.0262	48.5
2227.0	0.6576	0.0744	0.0799	0.0662	0.0892	220	0.3440	-0.0263	48.6
2239.0	0.6556	0.0743	0.0798	0.0661	0.0892	221	0.3460	-0.0263	48.8
2252.0	0.6536	0.0743	0.0798	0.0661	0.0892	222	0.3480	-0.0263	49.1
2265.0	0.6516	0.0742	0.0798	0.0660	0.0892	224	0.3500	-0.0264	49.5
2277.0	0.6496	0.0742	0.0798	0.0660	0.0892	224	0.3520	-0.0264	49.6
2290.0	0.6476	0.0742	0.0797	0.0659	0.0892	225	0.3540	-0.0264	49.8
2303.0	0.6456	0.0741	0.0797	0.0658	0.0892	223	0.3560	-0.0265	49.3
2315.0	0.6436	0.0741	0.0797	0.0658	0.0891	223	0.3580	-0.0265	49.3
2327.0	0.6416	0.0740	0.0797	0.0657	0.0891	223	0.3600	-0.0266	49.3
2340.0	0.6396	0.0740	0.0796	0.0657	0.0891	224	0.3620	-0.0266	49.4
2352.0	0.6376	0.0739	0.0796	0.0656	0.0891	222	0.3640	-0.0266	49.1
2365.0	0.6356	0.0739	0.0796	0.0656	0.0891	224	0.3660	-0.0266	49.5
2377.0	0.6336	0.0739	0.0796	0.0655	0.0891	223	0.3680	-0.0267	49.2
2390.0	0.6316	0.0738	0.0796	0.0654	0.0891	224	0.3700	-0.0267	49.5
2403.0	0.6296	0.0738	0.0796	0.0654	0.0891	223	0.3720	-0.0267	49.2
2416.0	0.6276	0.0737	0.0795	0.0653	0.0891	223	0.3740	-0.0268	49.3
2428.0	0.6256	0.0737	0.0795	0.0653	0.0891	225	0.3760	-0.0268	49.8
2441.0	0.6236	0.0737	0.0795	0.0652	0.0891	227	0.3780	-0.0268	50.1
2454.0	0.6216	0.0736	0.0794	0.0651	0.0891	228	0.3800	-0.0269	50.4
2467.0	0.6196	0.0736	0.0794	0.0651	0.0891	228	0.3820	-0.0269	50.3
2480.0	0.6176	0.0735	0.0794	0.0650	0.0891	230	0.3840	-0.0269	50.8
2493.0	0.6156	0.0735	0.0794	0.0650	0.0891	229	0.3860	-0.0269	50.6
2505.0	0.6136	0.0735	0.0794	0.0649	0.0891	228	0.3880	-0.0270	50.5
2517.0	0.6116	0.0734	0.0794	0.0648	0.0891	228	0.3900	-0.0270	50.4
2529.0	0.6096	0.0734	0.0793	0.0648	0.0891	229	0.3920	-0.0270	50.6
2542.0	0.6076	0.0733	0.0793	0.0647	0.0891	229	0.3940	-0.0271	50.6
2555.0	0.6056	0.0733	0.0793	0.0647	0.0891	228	0.3960	-0.0271	50.5
2567.0	0.6036	0.0733	0.0793	0.0646	0.0891	229	0.3980	-0.0271	50.6
2580.0	0.6016	0.0732	0.0793	0.0646	0.0891	229	0.4000	-0.0271	50.6
2593.0	0.5996	0.0732	0.0792	0.0645	0.0890	231	0.4020	-0.0272	50.9
2606.0	0.5976	0.0732	0.0792	0.0645	0.0890	233	0.4040	-0.0272	51.4
2618.0	0.5956	0.0731	0.0792	0.0645	0.0890	234	0.4060	-0.0272	51.6
2631.0	0.5936	0.0731	0.0792	0.0644	0.0890	232	0.4080	-0.0273	51.2
2643.0	0.5916	0.0731	0.0792	0.0644	0.0890	232	0.4100	-0.0273	51.2
2656.0	0.5896	0.0730	0.0792	0.0643	0.0890	234	0.4120	-0.0273	51.6
2669.0	0.5876	0.0730	0.0792	0.0643	0.0890	234	0.4140	-0.0273	51.8
2682.0	0.5856	0.0730	0.0791	0.0642	0.0890	236	0.4160	-0.0274	52.1
2694.0	0.5836	0.0730	0.0791	0.0642	0.0890	237	0.4180	-0.0274	52.3
2707.0	0.5816	0.0729	0.0791	0.0642	0.0890	238	0.4200	-0.0274	52.6
2719.0	0.5796	0.0729	0.0791	0.0641	0.0890	240	0.4220	-0.0274	52.9
2732.0	0.5776	0.0729	0.0791	0.0641	0.0890	238	0.4240	-0.0274	52.5
2745.0	0.5756	0.0728	0.0791	0.0641	0.0890	238	0.4260	-0.0274	52.7
2758.0	0.5736	0.0728	0.0791	0.0640	0.0890	239	0.4280	-0.0275	52.8
2770.0	0.5716	0.0728	0.0791	0.0640	0.0890	242	0.4300	-0.0275	53.4
2783.0	0.5696	0.0728	0.0790	0.0640	0.0890	244	0.4320	-0.0275	53.8
2795.0	0.5676	0.0728	0.0790	0.0640	0.0890	244	0.4340	-0.0275	53.8
2808.0	0.5656	0.0727	0.0790	0.0639	0.0890	247	0.4360	-0.0275	54.5
2820.0	0.5636	0.0727	0.0790	0.0639	0.0890	249	0.4380	-0.0275	55.0
2832.0	0.5616	0.0727	0.0790	0.0638	0.0890	248	0.4400	-0.0276	54.9
2845.0	0.5596	0.0727	0.0790	0.0638	0.0890	248	0.4420	-0.0276	54.9
2858.0	0.5576	0.0727	0.0790	0.0638	0.0890	251	0.4440	-0.0276	55.5
2871.0	0.5556	0.0726	0.0790	0.0638	0.0890	253	0.4460	-0.0276	55.9
2883.0	0.5536	0.0726	0.0790	0.0637	0.0890	252	0.4480	-0.0276	55.7
2896.0	0.5516	0.0726	0.0790	0.0637	0.0890	254	0.4500	-0.0276	56.2
2908.0	0.5496	0.0726	0.0790	0.0637	0.0890	255	0.4520	-0.0276	56.3
2921.0	0.5476	0.0726	0.0790	0.0637	0.0890	256	0.4540	-0.0276	56.6
2933.0	0.5456	0.0725	0.0790	0.0636	0.0890	247	0.4560	-0.0277	54.5
2946.0	0.5436	0.0725	0.0790	0.0636	0.0890	247	0.4580	-0.0277	54.5
2959.0	0.5416	0.0725	0.0790	0.0636	0.0890	248	0.4600	-0.0277	54.8
2971.0	0.5396	0.0725	0.0789	0.0636	0.0890	249	0.4620	-0.0277	54.9
2984.0	0.5376	0.0725	0.0789	0.0636	0.0890	250	0.4640	-0.0277	55.2
2997.0	0.5356	0.0724	0.0789	0.0635	0.0890	247	0.4660	-0.0277	54.6
3009.0	0.5336	0.0724	0.0789	0.0635	0.0890	250	0.4680	-0.0277	55.2
3021.0	0.5316	0.0724	0.0789	0.0635	0.0890	251	0.4700	-0.0277	55.5
3034.0	0.5296	0.0724	0.0789	0.0635	0.0889	253	0.4720	-0.0278	55.9

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
3046.0	0.5276	0.0724	0.0789	0.0634	0.0889	253	0.4740	-0.0278	55.9
3058.0	0.5256	0.0724	0.0789	0.0634	0.0889	255	0.4760	-0.0278	56.3
3071.0	0.5236	0.0723	0.0789	0.0634	0.0889	256	0.4780	-0.0278	56.5
3083.0	0.5216	0.0723	0.0789	0.0634	0.0889	258	0.4800	-0.0278	56.9
3096.0	0.5196	0.0723	0.0789	0.0634	0.0889	259	0.4820	-0.0278	57.3
3109.0	0.5176	0.0723	0.0789	0.0634	0.0889	262	0.4840	-0.0278	57.8
3121.0	0.5156	0.0723	0.0789	0.0634	0.0889	262	0.4860	-0.0278	57.8
3134.0	0.5136	0.0723	0.0789	0.0633	0.0889	263	0.4880	-0.0278	58.2
3147.0	0.5116	0.0723	0.0789	0.0633	0.0889	265	0.4900	-0.0278	58.6
3159.0	0.5096	0.0722	0.0789	0.0633	0.0889	257	0.4920	-0.0279	56.9
3172.0	0.5076	0.0722	0.0789	0.0633	0.0889	258	0.4940	-0.0279	57.0
3184.0	0.5056	0.0722	0.0788	0.0633	0.0889	261	0.4960	-0.0279	57.6
3197.0	0.5036	0.0722	0.0788	0.0633	0.0889	263	0.4980	-0.0279	58.1
3210.0	0.5016	0.0722	0.0788	0.0633	0.0889	268	0.5000	-0.0279	59.2
3223.0	0.4996	0.0722	0.0788	0.0633	0.0888	270	0.5020	-0.0279	59.7
3235.0	0.4976	0.0722	0.0788	0.0633	0.0889	270	0.5040	-0.0279	59.6
3248.0	0.4956	0.0722	0.0788	0.0632	0.0888	273	0.5060	-0.0279	60.3

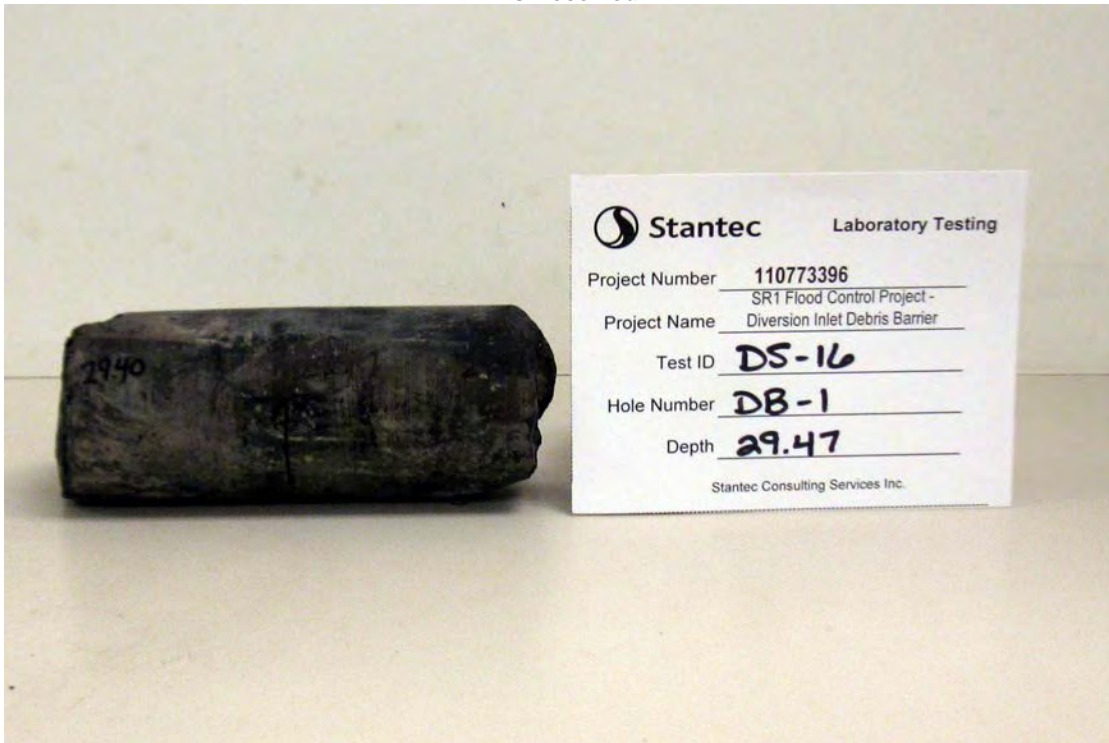


Photo Report

Project Name SR1 Flood Control Project - Inlet Debris Barrier
 Lithology Shale, dark gray, moderately hard
 Hole Number DB-1 Depth (m) 29.47
 Test Type Direct shear of intact specimen

Project Number 110773396
 Lab ID DS-16

As Received



Core Preparation

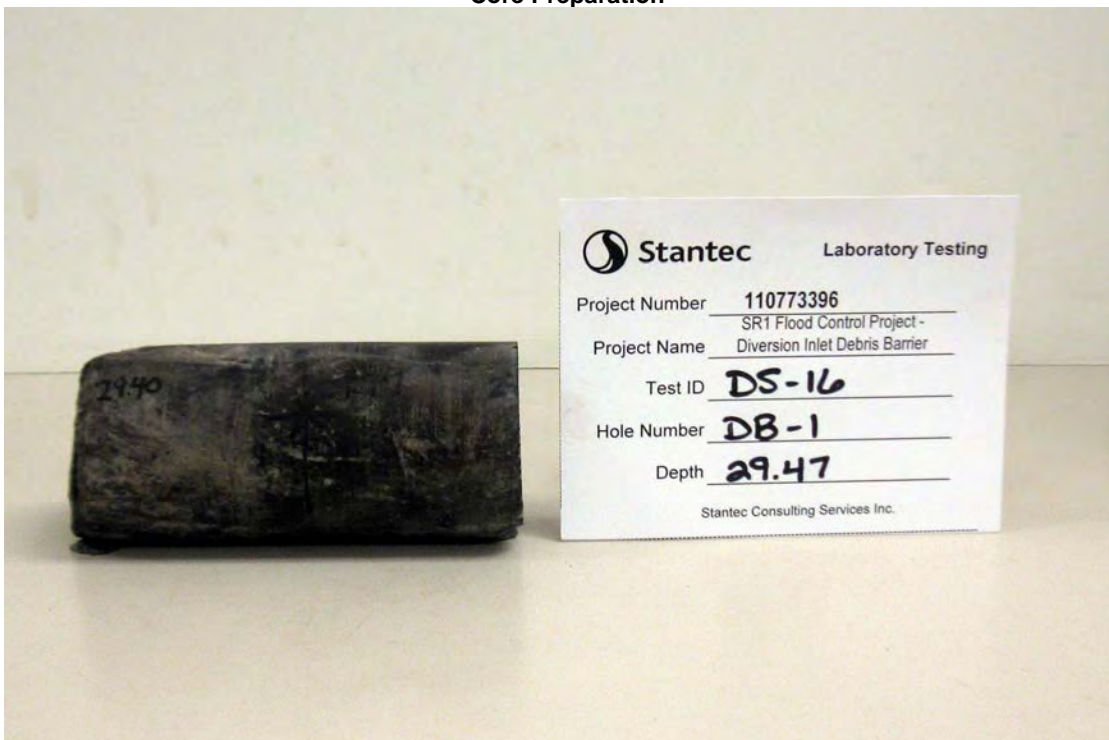




Photo Report

Project Name SR1 Flood Control Project - Inlet Debris Barrier
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 Lab ID DS-16

Post Test



Post Test

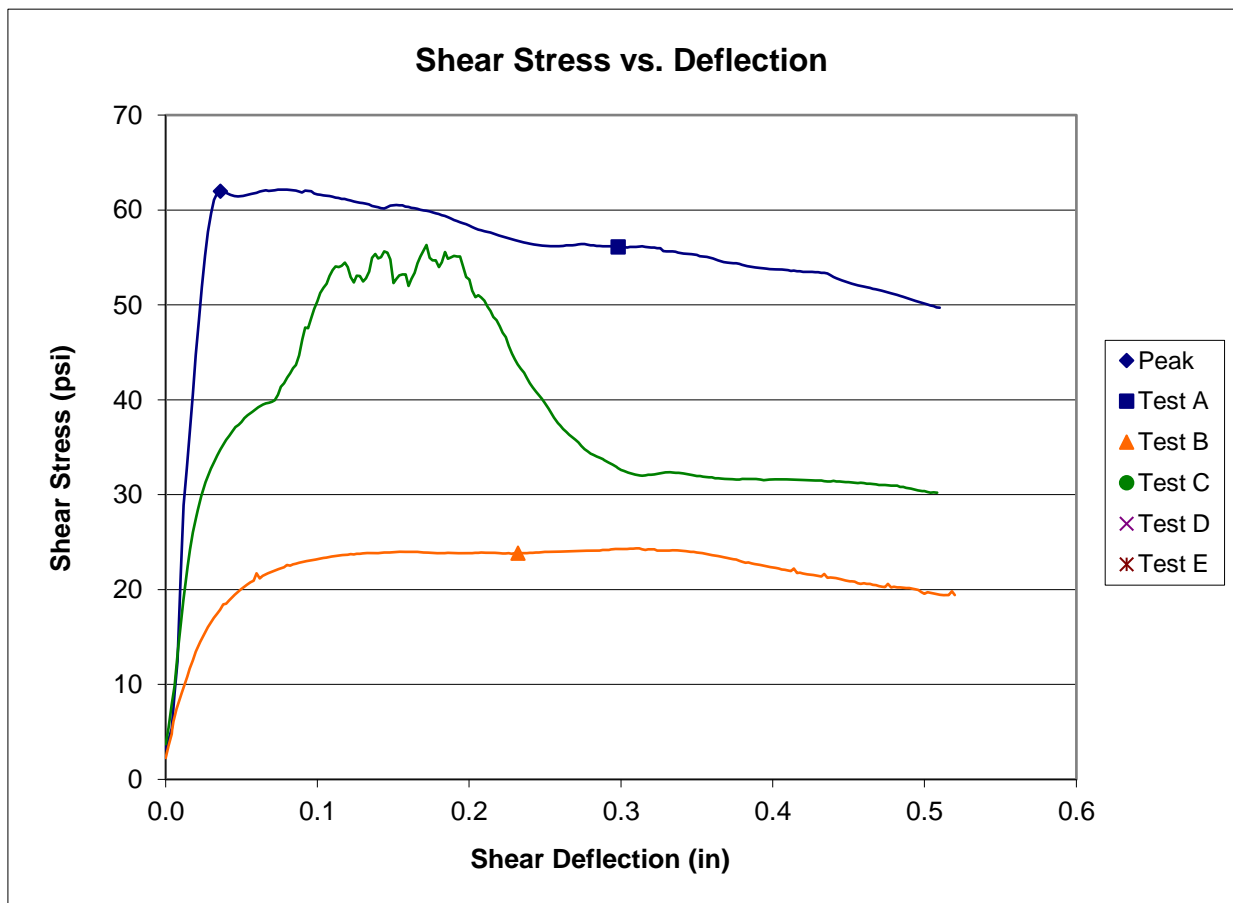




Direct Shear Strength of Rock
ASTM D 5607

Project Name <u>SR1 Flood Control Project - Inlet Debris Barrier</u>	Project Number <u>110773396</u>
Lithology <u>Shale, black, soft</u>	Lab ID <u>DS-26</u>
Hole Number <u>DB-3</u> Depth (m) <u>23.11</u>	Date Received <u>05/15/2018</u>
Test Type <u>Direct shear of intact specimen</u>	
Initial Moisture Condition <u>As received, moist</u>	Diameter (in.) <u>2.405</u>
At Test Moisture Condition <u>Soaked at least 12 hours prior to test.</u>	Angle of Dip (deg.) <u>0.0</u>
Roughness (JRC) <u>4</u>	Area (in ²) <u>4.54</u>

	Test A	Test B	Test C	Test D	Test E
Normal Stress (psi)	62.0	36.0	94.0	N/A	N/A
Peak Shear Stress (psi)	62.0				
Deflection at Peak (in)	0.0360				
Post Peak Stress (psi)	56.1	23.8	N/A	N/A	N/A
Deflection at Residual (in)	0.2980	0.2320	N/A	N/A	N/A



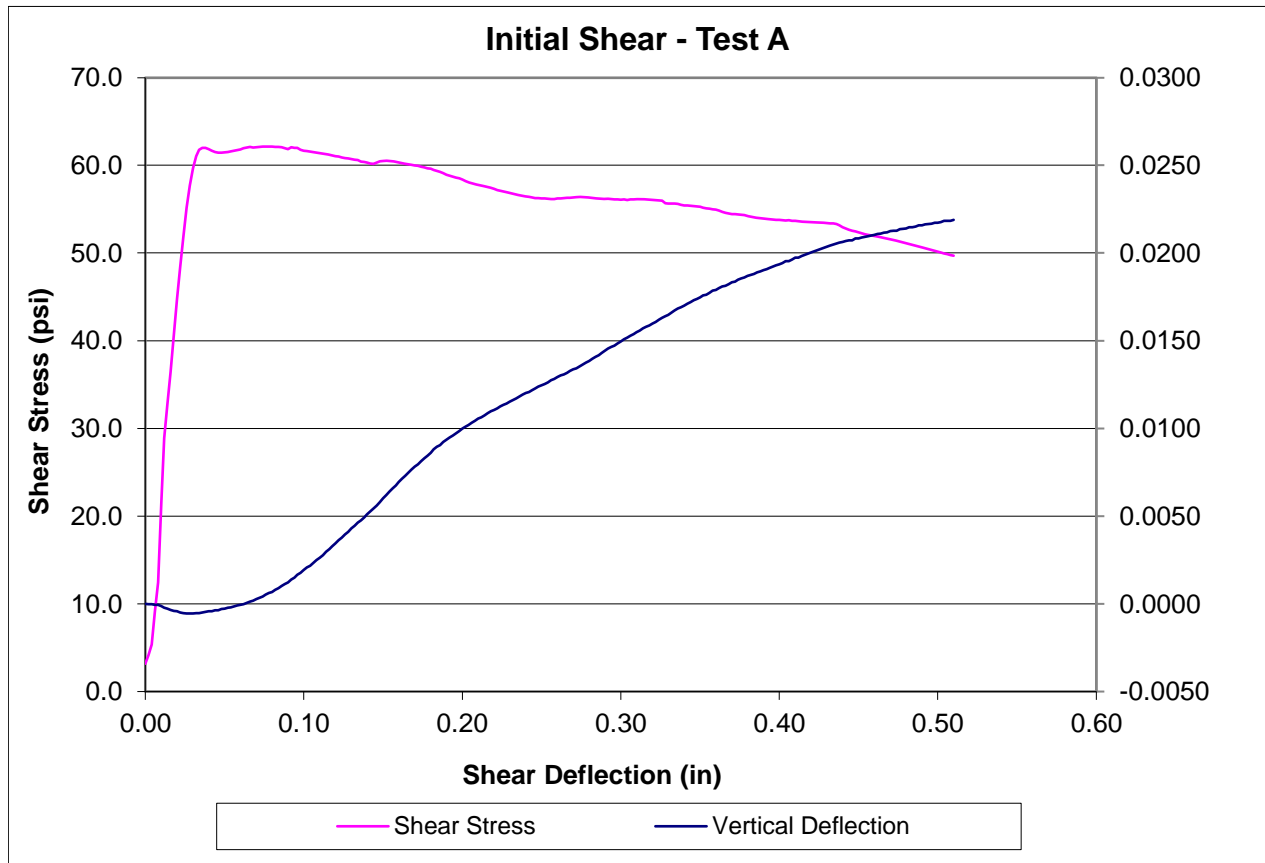
Comments It appeared that specimen shear surface deterioration resulted in significant encapsulation material interference. No post peak shear stress is reported.

Reviewed By RJ



Direct Shear Strength of Rock
ASTM D 5607

Project Name	<u>SR1 Flood Control Project - Inlet Debris Barrier</u>	Project Number	<u>110773396</u>
Lithology	<u>Shale, black, soft</u>	Lab ID	<u>DS-26</u>
Hole Number	<u>DB-3</u>	Date Received	<u>05/15/2018</u>
Depth (m)	<u>23.11</u>	Diameter (in)	<u>2.405</u>
Test Type	<u>Direct shear of intact specimen</u>	Angle of Dip (deg)	<u>0.0</u>
Initial Moisture Condition	<u>As received, moist</u>	Area(in ²)	<u>4.54</u>
Test Moisture Condition	<u>Soaked at least 12 hours prior to test.</u>	Date Prepared	<u>06/25/2018</u>
Joint Roughness	<u>4</u>	Date Tested	<u>06/26/2018</u>
Normal Stress (psi)	<u>62</u>		



Sketch



Shear Rate to Peak (in/min) 0.003

Encapsulation Material Hydro-Stone

Comments _____

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
0.0	1.0066	0.1048	0.1020	0.1075	0.1027	15	0.0000	0.0000	3.2
64.0	1.0046	0.1047	0.1020	0.1074	0.1028	19	0.0020	0.0000	4.2
101.0	1.0026	0.1047	0.1021	0.1072	0.1029	24	0.0040	0.0000	5.4
140.0	1.0006	0.1046	0.1020	0.1071	0.1031	42	0.0060	-0.0001	9.1
167.0	0.9986	0.1046	0.1021	0.1068	0.1033	57	0.0080	0.0000	12.4
205.0	0.9966	0.1045	0.1020	0.1064	0.1036	98	0.0100	-0.0001	21.5
258.0	0.9946	0.1044	0.1019	0.1060	0.1038	131	0.0120	-0.0002	28.9
292.0	0.9926	0.1044	0.1018	0.1058	0.1039	149	0.0140	-0.0003	32.7
326.0	0.9906	0.1044	0.1017	0.1055	0.1040	166	0.0160	-0.0004	36.4
358.0	0.9886	0.1043	0.1016	0.1054	0.1041	184	0.0180	-0.0004	40.6
390.0	0.9866	0.1044	0.1015	0.1052	0.1042	203	0.0200	-0.0004	44.7
421.0	0.9846	0.1043	0.1014	0.1050	0.1043	220	0.0220	-0.0005	48.4
451.0	0.9826	0.1043	0.1014	0.1049	0.1043	236	0.0240	-0.0005	51.9
483.0	0.9806	0.1043	0.1013	0.1048	0.1044	251	0.0260	-0.0005	55.2
514.0	0.9786	0.1043	0.1013	0.1047	0.1045	262	0.0280	-0.0005	57.7
546.0	0.9766	0.1043	0.1013	0.1046	0.1046	271	0.0300	-0.0005	59.6
577.0	0.9746	0.1043	0.1013	0.1046	0.1047	277	0.0320	-0.0005	61.0
609.0	0.9726	0.1044	0.1013	0.1045	0.1047	281	0.0340	-0.0005	61.8
642.0	0.9706	0.1044	0.1013	0.1045	0.1048	281	0.0360	-0.0005	62.0
675.0	0.9686	0.1045	0.1014	0.1045	0.1048	281	0.0380	-0.0004	62.0
706.0	0.9666	0.1045	0.1014	0.1045	0.1049	281	0.0400	-0.0004	61.8
737.0	0.9646	0.1045	0.1014	0.1045	0.1049	280	0.0420	-0.0004	61.7
768.0	0.9626	0.1046	0.1014	0.1045	0.1050	279	0.0440	-0.0004	61.5
800.0	0.9606	0.1046	0.1014	0.1045	0.1050	279	0.0460	-0.0004	61.4
830.0	0.9586	0.1047	0.1015	0.1045	0.1051	279	0.0480	-0.0003	61.4
862.0	0.9566	0.1047	0.1015	0.1046	0.1051	279	0.0500	-0.0003	61.5
894.0	0.9546	0.1048	0.1015	0.1046	0.1052	279	0.0520	-0.0002	61.5
925.0	0.9526	0.1048	0.1016	0.1046	0.1052	280	0.0540	-0.0002	61.6
956.0	0.9506	0.1049	0.1016	0.1046	0.1053	280	0.0560	-0.0001	61.7
988.0	0.9486	0.1049	0.1016	0.1047	0.1054	280	0.0580	-0.0001	61.7
1019.0	0.9466	0.1050	0.1017	0.1047	0.1054	281	0.0600	0.0000	61.8
1052.0	0.9446	0.1050	0.1017	0.1047	0.1055	281	0.0620	0.0000	61.9
1082.0	0.9426	0.1051	0.1018	0.1047	0.1056	282	0.0640	0.0001	62.0
1114.0	0.9406	0.1052	0.1019	0.1048	0.1056	282	0.0660	0.0001	62.1
1147.0	0.9386	0.1053	0.1019	0.1048	0.1057	282	0.0680	0.0002	62.0
1178.0	0.9366	0.1054	0.1020	0.1049	0.1058	282	0.0700	0.0003	62.0
1209.0	0.9346	0.1055	0.1021	0.1049	0.1059	282	0.0720	0.0004	62.1
1239.0	0.9326	0.1056	0.1021	0.1050	0.1060	282	0.0740	0.0004	62.1
1270.0	0.9306	0.1057	0.1022	0.1050	0.1062	282	0.0760	0.0005	62.1
1301.0	0.9286	0.1058	0.1023	0.1051	0.1063	282	0.0780	0.0006	62.1
1332.0	0.9266	0.1059	0.1023	0.1051	0.1064	282	0.0800	0.0007	62.1
1363.0	0.9246	0.1060	0.1024	0.1052	0.1066	282	0.0820	0.0008	62.1
1394.0	0.9226	0.1061	0.1025	0.1053	0.1067	282	0.0840	0.0009	62.1
1426.0	0.9206	0.1063	0.1026	0.1053	0.1069	282	0.0860	0.0010	62.0
1456.0	0.9186	0.1064	0.1027	0.1054	0.1070	281	0.0880	0.0011	61.9
1487.0	0.9166	0.1065	0.1027	0.1055	0.1072	281	0.0900	0.0012	61.8
1513.0	0.9146	0.1067	0.1029	0.1055	0.1074	282	0.0920	0.0014	62.0
1535.0	0.9126	0.1068	0.1030	0.1056	0.1076	282	0.0940	0.0015	62.0
1558.0	0.9106	0.1070	0.1031	0.1057	0.1078	281	0.0960	0.0017	62.0
1581.0	0.9086	0.1071	0.1032	0.1058	0.1080	280	0.0980	0.0018	61.8
1612.0	0.9066	0.1073	0.1033	0.1059	0.1082	280	0.1000	0.0019	61.6
1644.0	0.9046	0.1074	0.1035	0.1060	0.1084	280	0.1020	0.0021	61.6
1674.0	0.9026	0.1075	0.1036	0.1060	0.1086	279	0.1040	0.0022	61.5
1704.0	0.9006	0.1077	0.1037	0.1061	0.1088	279	0.1060	0.0023	61.5
1736.0	0.8986	0.1079	0.1039	0.1062	0.1090	279	0.1080	0.0025	61.5
1767.0	0.8966	0.1080	0.1040	0.1063	0.1092	279	0.1100	0.0026	61.4
1798.0	0.8946	0.1081	0.1042	0.1064	0.1094	278	0.1120	0.0028	61.3
1829.0	0.8926	0.1083	0.1044	0.1065	0.1097	278	0.1140	0.0030	61.3
1860.0	0.8906	0.1085	0.1045	0.1066	0.1099	278	0.1160	0.0031	61.2
1891.0	0.8886	0.1086	0.1047	0.1067	0.1101	278	0.1180	0.0033	61.2
1921.0	0.8866	0.1088	0.1049	0.1068	0.1103	277	0.1200	0.0035	61.0
1952.0	0.8846	0.1089	0.1051	0.1069	0.1106	277	0.1220	0.0036	61.0
1983.0	0.8826	0.1091	0.1052	0.1070	0.1108	277	0.1240	0.0038	60.9
2014.0	0.8806	0.1093	0.1054	0.1071	0.1110	276	0.1260	0.0040	60.8
2045.0	0.8786	0.1094	0.1056	0.1072	0.1112	276	0.1280	0.0041	60.8
2075.0	0.8766	0.1096	0.1058	0.1073	0.1115	276	0.1300	0.0043	60.7
2106.0	0.8746	0.1097	0.1060	0.1074	0.1117	275	0.1320	0.0045	60.6
2136.0	0.8726	0.1099	0.1062	0.1075	0.1119	275	0.1340	0.0046	60.6
2165.0	0.8706	0.1100	0.1063	0.1076	0.1121	274	0.1360	0.0047	60.4
2196.0	0.8686	0.1102	0.1065	0.1077	0.1123	274	0.1380	0.0049	60.4
2226.0	0.8666	0.1103	0.1067	0.1078	0.1126	274	0.1400	0.0051	60.3
2257.0	0.8646	0.1105	0.1069	0.1079	0.1128	273	0.1420	0.0053	60.2
2287.0	0.8626	0.1106	0.1071	0.1080	0.1130	273	0.1440	0.0054	60.1
2317.0	0.8606	0.1108	0.1073	0.1081	0.1132	274	0.1460	0.0056	60.3
2336.0	0.8586	0.1110	0.1075	0.1082	0.1135	275	0.1480	0.0058	60.5
2352.0	0.8566	0.1112	0.1077	0.1084	0.1138	275	0.1500	0.0060	60.5
2365.0	0.8546	0.1113	0.1080	0.1085	0.1140	275	0.1520	0.0062	60.5
2378.0	0.8526	0.1115	0.1082	0.1086	0.1143	275	0.1540	0.0064	60.5
2391.0	0.8506	0.1117	0.1084	0.1087	0.1145	275	0.1560	0.0066	60.5

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
2404.0	0.8486	0.1118	0.1086	0.1088	0.1148	274	0.1580	0.0068	60.4
2417.0	0.8466	0.1120	0.1088	0.1090	0.1150	274	0.1600	0.0070	60.3
2430.0	0.8446	0.1122	0.1090	0.1091	0.1152	274	0.1620	0.0071	60.2
2444.0	0.8426	0.1123	0.1092	0.1092	0.1155	273	0.1640	0.0073	60.2
2456.0	0.8406	0.1125	0.1094	0.1093	0.1157	273	0.1660	0.0075	60.1
2469.0	0.8386	0.1126	0.1096	0.1095	0.1159	273	0.1680	0.0077	60.0
2482.0	0.8366	0.1128	0.1098	0.1096	0.1161	272	0.1700	0.0078	60.0
2495.0	0.8346	0.1129	0.1099	0.1097	0.1163	272	0.1720	0.0080	59.9
2508.0	0.8326	0.1131	0.1101	0.1098	0.1165	272	0.1740	0.0081	59.8
2521.0	0.8306	0.1132	0.1103	0.1100	0.1167	271	0.1760	0.0083	59.7
2534.0	0.8286	0.1134	0.1104	0.1101	0.1169	271	0.1780	0.0085	59.7
2547.0	0.8266	0.1135	0.1106	0.1102	0.1171	271	0.1800	0.0086	59.6
2560.0	0.8246	0.1137	0.1108	0.1104	0.1173	270	0.1820	0.0088	59.5
2573.0	0.8226	0.1138	0.1110	0.1105	0.1175	270	0.1840	0.0090	59.4
2586.0	0.8206	0.1139	0.1111	0.1106	0.1176	269	0.1860	0.0091	59.2
2599.0	0.8186	0.1141	0.1113	0.1107	0.1178	268	0.1880	0.0092	59.1
2612.0	0.8166	0.1142	0.1114	0.1108	0.1180	268	0.1900	0.0094	58.9
2624.0	0.8146	0.1143	0.1115	0.1110	0.1181	267	0.1920	0.0095	58.8
2638.0	0.8126	0.1144	0.1117	0.1111	0.1182	267	0.1940	0.0096	58.7
2650.0	0.8106	0.1145	0.1118	0.1112	0.1184	266	0.1960	0.0097	58.6
2663.0	0.8086	0.1147	0.1119	0.1113	0.1185	266	0.1980	0.0099	58.5
2676.0	0.8066	0.1148	0.1121	0.1114	0.1187	265	0.2000	0.0100	58.4
2689.0	0.8046	0.1149	0.1122	0.1115	0.1188	264	0.2020	0.0101	58.2
2702.0	0.8026	0.1150	0.1123	0.1116	0.1189	264	0.2040	0.0102	58.1
2715.0	0.8006	0.1151	0.1124	0.1117	0.1191	263	0.2060	0.0103	57.9
2727.0	0.7986	0.1152	0.1125	0.1118	0.1192	263	0.2080	0.0104	57.9
2741.0	0.7966	0.1153	0.1127	0.1119	0.1193	262	0.2100	0.0106	57.8
2754.0	0.7946	0.1154	0.1127	0.1120	0.1194	262	0.2120	0.0106	57.7
2767.0	0.7926	0.1155	0.1129	0.1121	0.1195	262	0.2140	0.0108	57.6
2780.0	0.7906	0.1156	0.1130	0.1122	0.1197	261	0.2160	0.0109	57.5
2794.0	0.7886	0.1157	0.1131	0.1123	0.1198	261	0.2180	0.0110	57.4
2806.0	0.7866	0.1158	0.1132	0.1123	0.1199	260	0.2200	0.0111	57.3
2819.0	0.7846	0.1159	0.1133	0.1124	0.1200	260	0.2220	0.0112	57.2
2832.0	0.7826	0.1160	0.1134	0.1125	0.1201	259	0.2240	0.0113	57.1
2845.0	0.7806	0.1161	0.1135	0.1126	0.1202	259	0.2260	0.0114	57.0
2858.0	0.7786	0.1161	0.1136	0.1127	0.1203	259	0.2280	0.0114	56.9
2872.0	0.7766	0.1162	0.1137	0.1128	0.1204	258	0.2300	0.0115	56.8
2885.0	0.7746	0.1163	0.1138	0.1129	0.1205	258	0.2320	0.0116	56.8
2897.0	0.7726	0.1164	0.1139	0.1129	0.1206	257	0.2340	0.0117	56.6
2910.0	0.7706	0.1165	0.1140	0.1130	0.1208	257	0.2360	0.0118	56.6
2923.0	0.7686	0.1166	0.1141	0.1131	0.1209	257	0.2380	0.0119	56.5
2936.0	0.7666	0.1167	0.1142	0.1132	0.1210	256	0.2400	0.0120	56.4
2949.0	0.7646	0.1167	0.1143	0.1132	0.1211	256	0.2420	0.0121	56.4
2962.0	0.7626	0.1168	0.1144	0.1133	0.1212	256	0.2440	0.0122	56.3
2975.0	0.7606	0.1169	0.1145	0.1134	0.1213	256	0.2460	0.0123	56.3
2988.0	0.7586	0.1170	0.1146	0.1135	0.1214	256	0.2480	0.0124	56.3
3001.0	0.7566	0.1171	0.1147	0.1135	0.1215	255	0.2500	0.0125	56.2
3013.0	0.7546	0.1171	0.1148	0.1136	0.1216	255	0.2520	0.0125	56.2
3026.0	0.7526	0.1172	0.1149	0.1137	0.1217	255	0.2540	0.0126	56.2
3039.0	0.7506	0.1173	0.1150	0.1138	0.1219	255	0.2560	0.0128	56.2
3053.0	0.7486	0.1174	0.1151	0.1138	0.1220	255	0.2580	0.0128	56.2
3066.0	0.7466	0.1175	0.1152	0.1139	0.1221	255	0.2600	0.0129	56.2
3078.0	0.7446	0.1176	0.1153	0.1140	0.1222	255	0.2620	0.0130	56.2
3091.0	0.7426	0.1176	0.1154	0.1140	0.1223	256	0.2640	0.0131	56.3
3104.0	0.7406	0.1177	0.1155	0.1141	0.1224	256	0.2660	0.0132	56.3
3117.0	0.7386	0.1178	0.1156	0.1142	0.1225	256	0.2680	0.0133	56.3
3130.0	0.7366	0.1179	0.1157	0.1143	0.1226	256	0.2700	0.0134	56.3
3143.0	0.7346	0.1179	0.1158	0.1143	0.1227	256	0.2720	0.0134	56.4
3155.0	0.7326	0.1180	0.1159	0.1144	0.1228	256	0.2740	0.0135	56.4
3168.0	0.7306	0.1181	0.1160	0.1145	0.1230	256	0.2760	0.0137	56.4
3181.0	0.7286	0.1182	0.1161	0.1146	0.1231	256	0.2780	0.0138	56.4
3194.0	0.7266	0.1183	0.1162	0.1147	0.1232	256	0.2800	0.0139	56.3
3207.0	0.7246	0.1184	0.1164	0.1147	0.1234	256	0.2820	0.0140	56.3
3220.0	0.7226	0.1185	0.1165	0.1148	0.1235	255	0.2840	0.0141	56.2
3232.0	0.7206	0.1186	0.1166	0.1149	0.1236	255	0.2860	0.0142	56.2
3246.0	0.7186	0.1187	0.1167	0.1150	0.1238	255	0.2880	0.0143	56.2
3258.0	0.7166	0.1188	0.1169	0.1151	0.1239	255	0.2900	0.0144	56.2
3271.0	0.7146	0.1189	0.1170	0.1152	0.1241	255	0.2920	0.0146	56.2
3284.0	0.7126	0.1190	0.1171	0.1153	0.1242	255	0.2940	0.0147	56.2
3297.0	0.7106	0.1191	0.1172	0.1153	0.1243	255	0.2960	0.0147	56.1
3310.0	0.7086	0.1192	0.1173	0.1154	0.1245	255	0.2980	0.0149	56.1
3322.0	0.7066	0.1193	0.1174	0.1155	0.1246	255	0.3000	0.0150	56.1
3335.0	0.7046	0.1194	0.1176	0.1156	0.1247	255	0.3020	0.0151	56.1
3349.0	0.7026	0.1195	0.1177	0.1157	0.1248	255	0.3040	0.0152	56.0
3362.0	0.7006	0.1196	0.1178	0.1157	0.1250	255	0.3060	0.0153	56.1
3375.0	0.6986	0.1197	0.1179	0.1158	0.1251	255	0.3080	0.0154	56.1
3387.0	0.6966	0.1198	0.1180	0.1159	0.1252	255	0.3100	0.0155	56.1
3401.0	0.6946	0.1199	0.1181	0.1160	0.1253	255	0.3120	0.0156	56.1
3414.0	0.6926	0.1200	0.1182	0.1161	0.1255	255	0.3140	0.0157	56.2

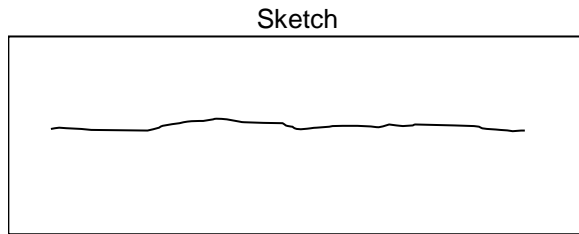
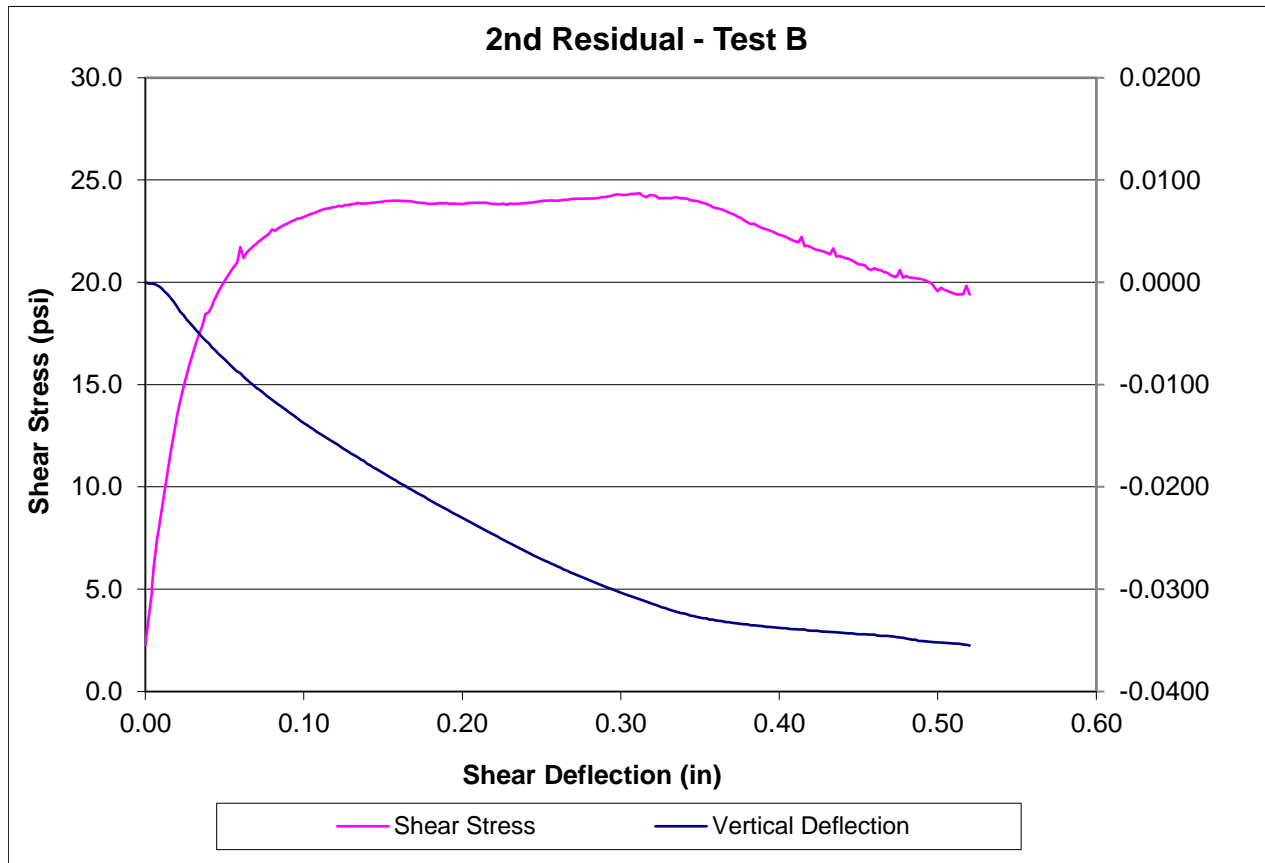
Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
3427.0	0.6906	0.1201	0.1183	0.1162	0.1256	255	0.3160	0.0158	56.1
3439.0	0.6886	0.1202	0.1184	0.1162	0.1257	255	0.3180	0.0159	56.1
3452.0	0.6866	0.1203	0.1185	0.1163	0.1258	254	0.3200	0.0160	56.0
3465.0	0.6846	0.1204	0.1186	0.1164	0.1259	254	0.3220	0.0161	56.0
3478.0	0.6826	0.1205	0.1187	0.1165	0.1261	254	0.3240	0.0162	56.0
3490.0	0.6806	0.1206	0.1188	0.1166	0.1262	254	0.3260	0.0163	56.0
3503.0	0.6786	0.1207	0.1189	0.1167	0.1263	253	0.3280	0.0164	55.7
3517.0	0.6766	0.1208	0.1190	0.1167	0.1264	253	0.3300	0.0165	55.7
3530.0	0.6746	0.1209	0.1192	0.1168	0.1265	253	0.3320	0.0166	55.6
3542.0	0.6726	0.1210	0.1193	0.1169	0.1267	253	0.3340	0.0167	55.6
3555.0	0.6706	0.1211	0.1194	0.1170	0.1268	252	0.3360	0.0168	55.6
3568.0	0.6686	0.1212	0.1195	0.1170	0.1269	252	0.3380	0.0169	55.5
3581.0	0.6666	0.1213	0.1196	0.1171	0.1270	252	0.3400	0.0170	55.4
3594.0	0.6646	0.1214	0.1197	0.1172	0.1271	252	0.3420	0.0171	55.4
3607.0	0.6626	0.1214	0.1198	0.1173	0.1273	251	0.3440	0.0172	55.4
3621.0	0.6606	0.1215	0.1199	0.1174	0.1274	251	0.3460	0.0173	55.3
3633.0	0.6586	0.1216	0.1200	0.1174	0.1275	251	0.3480	0.0174	55.3
3646.0	0.6566	0.1217	0.1201	0.1175	0.1276	251	0.3500	0.0175	55.3
3659.0	0.6546	0.1218	0.1202	0.1176	0.1277	250	0.3520	0.0176	55.1
3672.0	0.6526	0.1218	0.1203	0.1176	0.1278	250	0.3540	0.0176	55.1
3684.0	0.6506	0.1219	0.1204	0.1177	0.1279	250	0.3560	0.0177	55.1
3697.0	0.6486	0.1220	0.1205	0.1178	0.1281	250	0.3580	0.0179	55.0
3711.0	0.6466	0.1220	0.1206	0.1178	0.1282	249	0.3600	0.0179	54.9
3723.0	0.6446	0.1221	0.1207	0.1179	0.1283	249	0.3620	0.0180	54.8
3736.0	0.6426	0.1222	0.1208	0.1180	0.1284	248	0.3640	0.0181	54.7
3749.0	0.6406	0.1222	0.1209	0.1180	0.1284	248	0.3660	0.0181	54.6
3762.0	0.6386	0.1223	0.1210	0.1181	0.1285	248	0.3680	0.0182	54.5
3775.0	0.6366	0.1224	0.1211	0.1182	0.1286	247	0.3700	0.0183	54.4
3788.0	0.6346	0.1224	0.1212	0.1182	0.1287	247	0.3720	0.0184	54.4
3801.0	0.6326	0.1225	0.1213	0.1183	0.1288	247	0.3740	0.0185	54.4
3814.0	0.6306	0.1226	0.1213	0.1184	0.1289	247	0.3760	0.0186	54.4
3827.0	0.6286	0.1226	0.1214	0.1184	0.1290	247	0.3780	0.0186	54.3
3840.0	0.6266	0.1227	0.1215	0.1185	0.1291	246	0.3800	0.0187	54.2
3853.0	0.6246	0.1228	0.1216	0.1185	0.1291	246	0.3820	0.0188	54.1
3866.0	0.6226	0.1228	0.1216	0.1186	0.1292	246	0.3840	0.0188	54.1
3879.0	0.6206	0.1229	0.1217	0.1187	0.1293	245	0.3860	0.0189	54.0
3893.0	0.6186	0.1229	0.1218	0.1187	0.1294	245	0.3880	0.0190	54.0
3906.0	0.6166	0.1230	0.1219	0.1188	0.1294	245	0.3900	0.0190	53.9
3919.0	0.6146	0.1231	0.1219	0.1188	0.1295	245	0.3920	0.0191	53.9
3932.0	0.6126	0.1231	0.1220	0.1189	0.1296	245	0.3940	0.0192	53.8
3945.0	0.6106	0.1232	0.1221	0.1189	0.1297	244	0.3960	0.0192	53.8
3957.0	0.6086	0.1233	0.1222	0.1190	0.1297	244	0.3980	0.0193	53.8
3970.0	0.6066	0.1233	0.1222	0.1191	0.1298	244	0.4000	0.0194	53.8
3983.0	0.6046	0.1234	0.1223	0.1191	0.1299	244	0.4020	0.0194	53.7
3996.0	0.6026	0.1235	0.1224	0.1192	0.1300	244	0.4040	0.0195	53.7
4009.0	0.6006	0.1235	0.1224	0.1192	0.1300	244	0.4060	0.0195	53.7
4022.0	0.5986	0.1236	0.1225	0.1193	0.1301	244	0.4080	0.0196	53.7
4035.0	0.5966	0.1237	0.1226	0.1194	0.1302	244	0.4100	0.0197	53.7
4048.0	0.5946	0.1237	0.1226	0.1194	0.1302	243	0.4120	0.0197	53.6
4061.0	0.5926	0.1238	0.1227	0.1195	0.1303	243	0.4140	0.0198	53.6
4075.0	0.5906	0.1239	0.1227	0.1195	0.1304	243	0.4160	0.0199	53.6
4088.0	0.5886	0.1240	0.1228	0.1196	0.1305	243	0.4180	0.0200	53.5
4100.0	0.5866	0.1240	0.1229	0.1197	0.1305	243	0.4200	0.0200	53.5
4113.0	0.5846	0.1241	0.1229	0.1197	0.1306	243	0.4220	0.0201	53.5
4126.0	0.5826	0.1242	0.1230	0.1198	0.1307	243	0.4240	0.0202	53.5
4139.0	0.5806	0.1242	0.1231	0.1199	0.1307	243	0.4260	0.0202	53.5
4152.0	0.5786	0.1243	0.1231	0.1199	0.1308	243	0.4280	0.0203	53.4
4165.0	0.5766	0.1244	0.1232	0.1200	0.1309	243	0.4300	0.0204	53.4
4178.0	0.5746	0.1245	0.1232	0.1200	0.1309	242	0.4320	0.0204	53.4
4192.0	0.5726	0.1245	0.1233	0.1201	0.1310	242	0.4340	0.0205	53.4
4204.0	0.5706	0.1246	0.1234	0.1201	0.1311	242	0.4360	0.0206	53.3
4217.0	0.5686	0.1247	0.1234	0.1202	0.1311	241	0.4380	0.0206	53.1
4230.0	0.5666	0.1247	0.1235	0.1202	0.1311	240	0.4400	0.0206	52.9
4242.0	0.5646	0.1247	0.1235	0.1203	0.1312	240	0.4420	0.0207	52.8
4255.0	0.5626	0.1248	0.1235	0.1204	0.1312	239	0.4440	0.0207	52.7
4268.0	0.5606	0.1248	0.1235	0.1204	0.1312	239	0.4460	0.0207	52.5
4281.0	0.5586	0.1249	0.1236	0.1205	0.1313	238	0.4480	0.0208	52.5
4294.0	0.5566	0.1249	0.1236	0.1205	0.1313	238	0.4500	0.0208	52.3
4306.0	0.5546	0.1250	0.1237	0.1205	0.1313	237	0.4520	0.0209	52.2
4320.0	0.5526	0.1250	0.1237	0.1206	0.1314	237	0.4540	0.0209	52.1
4333.0	0.5506	0.1251	0.1237	0.1206	0.1314	236	0.4560	0.0210	52.1
4346.0	0.5486	0.1251	0.1238	0.1207	0.1314	236	0.4580	0.0210	52.0
4359.0	0.5466	0.1251	0.1238	0.1207	0.1315	236	0.4600	0.0210	51.9
4371.0	0.5446	0.1252	0.1238	0.1208	0.1315	236	0.4620	0.0211	51.9
4385.0	0.5426	0.1252	0.1239	0.1208	0.1315	235	0.4640	0.0211	51.8
4397.0	0.5406	0.1253	0.1239	0.1208	0.1316	235	0.4660	0.0212	51.7
4410.0	0.5386	0.1253	0.1239	0.1209	0.1316	235	0.4680	0.0212	51.6
4423.0	0.5366	0.1254	0.1240	0.1209	0.1317	234	0.4700	0.0213	51.6
4436.0	0.5346	0.1254	0.1240	0.1210	0.1317	234	0.4720	0.0213	51.5

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
4449.0	0.5326	0.1254	0.1240	0.1210	0.1317	233	0.4740	0.0213	51.4
4461.0	0.5306	0.1255	0.1241	0.1210	0.1318	233	0.4760	0.0214	51.3
4474.0	0.5286	0.1255	0.1241	0.1211	0.1318	233	0.4780	0.0214	51.2
4487.0	0.5266	0.1256	0.1241	0.1211	0.1318	232	0.4800	0.0214	51.1
4499.0	0.5246	0.1256	0.1242	0.1212	0.1319	232	0.4820	0.0215	51.0
4512.0	0.5226	0.1256	0.1242	0.1212	0.1319	231	0.4840	0.0215	50.9
4525.0	0.5206	0.1257	0.1242	0.1212	0.1319	231	0.4860	0.0215	50.8
4538.0	0.5186	0.1257	0.1243	0.1213	0.1320	230	0.4880	0.0216	50.7
4551.0	0.5166	0.1257	0.1243	0.1213	0.1320	230	0.4900	0.0216	50.7
4564.0	0.5146	0.1258	0.1243	0.1214	0.1320	230	0.4920	0.0216	50.5
4577.0	0.5126	0.1258	0.1244	0.1214	0.1320	229	0.4940	0.0217	50.4
4590.0	0.5106	0.1258	0.1244	0.1214	0.1321	228	0.4960	0.0217	50.3
4603.0	0.5086	0.1259	0.1244	0.1215	0.1321	228	0.4980	0.0217	50.2
4616.0	0.5066	0.1259	0.1244	0.1215	0.1321	228	0.5000	0.0217	50.1
4629.0	0.5046	0.1259	0.1245	0.1215	0.1321	227	0.5020	0.0218	50.0
4642.0	0.5026	0.1260	0.1245	0.1216	0.1322	227	0.5040	0.0218	49.9
4654.0	0.5006	0.1260	0.1245	0.1216	0.1322	226	0.5060	0.0218	49.9
4667.0	0.4986	0.1260	0.1245	0.1216	0.1322	226	0.5080	0.0218	49.7
4681.0	0.4966	0.1261	0.1246	0.1217	0.1322	226	0.5100	0.0219	49.7



Direct Shear Strength of Rock
ASTM D 5607

Project Name	<u>SR1 Flood Control Project - Inlet Debris Barrier</u>	Project Number	<u>110773396</u>
Lithology	<u>Shale, black, soft</u>	Lab ID	<u>DS-26</u>
Hole Number	<u>DB-3</u>	Date Received	<u>05/15/2018</u>
Depth (m)	<u>23.11</u>	Diameter (in)	<u>2.405</u>
Test Type	<u>Direct shear of intact specimen</u>	Angle of Dip (deg)	<u>0.0</u>
Initial Moisture Condition	<u>As received, moist</u>	Area(in ²)	<u>4.54</u>
Test Moisture Condition	<u>Soaked at least 12 hours prior to test.</u>	Date Prepared	<u>06/25/2018</u>
Joint Roughness	<u>4</u>	Date Tested	<u>06/26/2018</u>
Normal Stress (psi)	<u>36</u>		



Shear Rate to Peak (in/min) N/A

Encapsulation Material Hydro-Stone

Comments _____

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
0.0	1.0061	0.1050	0.1015	0.1003	0.1025	10	0.0000	0.0000	2.3
45.0	1.0041	0.1048	0.1014	0.0999	0.1027	16	0.0020	-0.0001	3.5
71.0	1.0021	0.1048	0.1014	0.0996	0.1030	22	0.0040	-0.0001	4.8
88.0	1.0001	0.1047	0.1013	0.0993	0.1032	30	0.0060	-0.0002	6.7
104.0	0.9981	0.1046	0.1012	0.0989	0.1032	35	0.0080	-0.0004	7.8
119.0	0.9961	0.1044	0.1009	0.0985	0.1032	40	0.0100	-0.0006	8.7
133.0	0.9941	0.1041	0.1006	0.0980	0.1031	44	0.0120	-0.0009	9.7
148.0	0.9921	0.1038	0.1003	0.0976	0.1029	49	0.0140	-0.0012	10.7
163.0	0.9901	0.1035	0.0999	0.0971	0.1027	53	0.0160	-0.0015	11.7
172.0	0.9881	0.1031	0.0995	0.0967	0.1024	57	0.0180	-0.0019	12.6
187.0	0.9861	0.1027	0.0990	0.0961	0.1020	61	0.0200	-0.0024	13.5
207.0	0.9841	0.1022	0.0985	0.0956	0.1015	65	0.0220	-0.0029	14.2
221.0	0.9821	0.1019	0.0982	0.0952	0.1012	67	0.0240	-0.0032	14.8
235.0	0.9801	0.1015	0.0978	0.0947	0.1008	70	0.0260	-0.0036	15.5
250.0	0.9781	0.1012	0.0974	0.0943	0.1005	73	0.0280	-0.0040	16.0
264.0	0.9761	0.1009	0.0970	0.0939	0.1002	75	0.0300	-0.0043	16.6
277.0	0.9741	0.1005	0.0967	0.0935	0.0998	77	0.0320	-0.0047	17.0
290.0	0.9721	0.1002	0.0963	0.0931	0.0996	79	0.0340	-0.0050	17.5
303.0	0.9701	0.0999	0.0960	0.0926	0.0993	81	0.0360	-0.0054	17.9
316.0	0.9681	0.0996	0.0957	0.0922	0.0990	84	0.0380	-0.0057	18.5
323.0	0.9661	0.0994	0.0954	0.0919	0.0988	84	0.0400	-0.0060	18.5
343.0	0.9641	0.0990	0.0950	0.0915	0.0984	86	0.0420	-0.0064	18.8
356.0	0.9621	0.0987	0.0947	0.0911	0.0982	87	0.0440	-0.0066	19.2
370.0	0.9601	0.0984	0.0943	0.0908	0.0979	89	0.0460	-0.0070	19.5
383.0	0.9581	0.0982	0.0940	0.0904	0.0977	90	0.0480	-0.0073	19.8
396.0	0.9561	0.0979	0.0936	0.0901	0.0975	91	0.0500	-0.0076	20.1
410.0	0.9541	0.0976	0.0933	0.0898	0.0972	92	0.0520	-0.0079	20.3
423.0	0.9521	0.0973	0.0930	0.0895	0.0969	93	0.0540	-0.0082	20.5
437.0	0.9501	0.0970	0.0927	0.0891	0.0967	94	0.0560	-0.0085	20.8
450.0	0.9481	0.0967	0.0924	0.0888	0.0965	95	0.0580	-0.0087	20.9
459.0	0.9461	0.0966	0.0922	0.0886	0.0963	99	0.0600	-0.0089	21.7
472.0	0.9441	0.0963	0.0918	0.0883	0.0960	96	0.0620	-0.0092	21.2
490.0	0.9421	0.0960	0.0915	0.0880	0.0957	97	0.0640	-0.0095	21.4
504.0	0.9401	0.0957	0.0912	0.0877	0.0955	98	0.0660	-0.0098	21.6
517.0	0.9381	0.0955	0.0909	0.0874	0.0953	99	0.0680	-0.0101	21.8
530.0	0.9361	0.0953	0.0906	0.0871	0.0950	99	0.0700	-0.0103	21.9
543.0	0.9341	0.0951	0.0904	0.0869	0.0948	100	0.0720	-0.0105	22.0
555.0	0.9321	0.0949	0.0901	0.0866	0.0946	101	0.0740	-0.0108	22.1
569.0	0.9301	0.0946	0.0899	0.0863	0.0944	101	0.0760	-0.0110	22.2
582.0	0.9281	0.0944	0.0896	0.0860	0.0942	102	0.0780	-0.0113	22.4
595.0	0.9261	0.0942	0.0894	0.0858	0.0940	103	0.0800	-0.0115	22.6
604.0	0.9241	0.0940	0.0891	0.0855	0.0938	102	0.0820	-0.0117	22.5
621.0	0.9221	0.0938	0.0889	0.0852	0.0936	103	0.0840	-0.0120	22.6
634.0	0.9201	0.0936	0.0886	0.0850	0.0934	103	0.0860	-0.0122	22.7
647.0	0.9181	0.0934	0.0884	0.0847	0.0932	104	0.0880	-0.0124	22.8
660.0	0.9161	0.0932	0.0881	0.0844	0.0930	104	0.0900	-0.0127	22.9
674.0	0.9141	0.0930	0.0879	0.0842	0.0928	104	0.0920	-0.0129	23.0
687.0	0.9121	0.0928	0.0876	0.0839	0.0927	105	0.0940	-0.0131	23.0
700.0	0.9101	0.0926	0.0874	0.0836	0.0925	105	0.0960	-0.0133	23.1
713.0	0.9081	0.0924	0.0871	0.0832	0.0924	105	0.0980	-0.0136	23.1
726.0	0.9061	0.0922	0.0869	0.0829	0.0923	105	0.1000	-0.0138	23.2
738.0	0.9041	0.0921	0.0866	0.0826	0.0922	106	0.1020	-0.0140	23.3
753.0	0.9021	0.0919	0.0864	0.0823	0.0920	106	0.1040	-0.0142	23.3
766.0	0.9001	0.0917	0.0862	0.0821	0.0918	106	0.1060	-0.0144	23.4
779.0	0.8981	0.0915	0.0859	0.0818	0.0917	106	0.1080	-0.0146	23.4
792.0	0.8961	0.0913	0.0857	0.0816	0.0915	107	0.1100	-0.0148	23.5
805.0	0.8941	0.0912	0.0855	0.0813	0.0914	107	0.1120	-0.0150	23.5
818.0	0.8921	0.0910	0.0853	0.0810	0.0912	107	0.1140	-0.0152	23.6
831.0	0.8901	0.0908	0.0851	0.0808	0.0911	107	0.1160	-0.0154	23.6
844.0	0.8881	0.0906	0.0849	0.0806	0.0910	107	0.1180	-0.0156	23.7
857.0	0.8861	0.0905	0.0847	0.0803	0.0908	108	0.1200	-0.0158	23.7
870.0	0.8841	0.0903	0.0845	0.0801	0.0907	108	0.1220	-0.0159	23.7
883.0	0.8821	0.0901	0.0842	0.0798	0.0905	108	0.1240	-0.0162	23.7
896.0	0.8801	0.0899	0.0840	0.0796	0.0904	108	0.1260	-0.0164	23.8
910.0	0.8781	0.0897	0.0838	0.0793	0.0903	108	0.1280	-0.0166	23.8
923.0	0.8761	0.0895	0.0836	0.0790	0.0901	108	0.1300	-0.0168	23.8
936.0	0.8741	0.0894	0.0834	0.0788	0.0900	108	0.1320	-0.0169	23.8
948.0	0.8721	0.0892	0.0832	0.0786	0.0899	108	0.1340	-0.0171	23.9
961.0	0.8701	0.0890	0.0830	0.0783	0.0897	108	0.1360	-0.0173	23.9
974.0	0.8681	0.0888	0.0828	0.0781	0.0896	108	0.1380	-0.0175	23.9
987.0	0.8661	0.0886	0.0826	0.0778	0.0894	108	0.1400	-0.0177	23.9
1000.0	0.8641	0.0884	0.0824	0.0776	0.0893	108	0.1420	-0.0179	23.9
1013.0	0.8621	0.0882	0.0822	0.0773	0.0892	109	0.1440	-0.0181	23.9
1027.0	0.8601	0.0880	0.0821	0.0771	0.0890	109	0.1460	-0.0183	23.9
1039.0	0.8581	0.0878	0.0819	0.0769	0.0889	109	0.1480	-0.0185	23.9
1052.0	0.8561	0.0876	0.0817	0.0766	0.0888	109	0.1500	-0.0187	23.9
1065.0	0.8541	0.0875	0.0815	0.0764	0.0886	109	0.1520	-0.0188	24.0
1078.0	0.8521	0.0873	0.0813	0.0761	0.0885	109	0.1540	-0.0190	24.0
1091.0	0.8501	0.0871	0.0811	0.0759	0.0884	109	0.1560	-0.0192	24.0

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
1104.0	0.8481	0.0869	0.0809	0.0757	0.0883	109	0.1580	-0.0194	24.0
1117.0	0.8461	0.0867	0.0808	0.0754	0.0881	109	0.1600	-0.0196	24.0
1130.0	0.8441	0.0866	0.0806	0.0752	0.0880	109	0.1620	-0.0197	24.0
1143.0	0.8421	0.0864	0.0804	0.0750	0.0879	109	0.1640	-0.0199	24.0
1155.0	0.8401	0.0862	0.0802	0.0747	0.0878	109	0.1660	-0.0201	24.0
1168.0	0.8381	0.0860	0.0800	0.0745	0.0877	109	0.1680	-0.0203	23.9
1181.0	0.8361	0.0858	0.0799	0.0743	0.0875	109	0.1700	-0.0205	23.9
1195.0	0.8341	0.0856	0.0797	0.0740	0.0874	109	0.1720	-0.0207	23.9
1207.0	0.8321	0.0855	0.0795	0.0738	0.0873	108	0.1740	-0.0208	23.9
1220.0	0.8301	0.0853	0.0794	0.0736	0.0872	108	0.1760	-0.0210	23.9
1233.0	0.8281	0.0851	0.0792	0.0733	0.0870	108	0.1780	-0.0212	23.8
1246.0	0.8261	0.0849	0.0790	0.0731	0.0869	108	0.1800	-0.0214	23.8
1259.0	0.8241	0.0847	0.0788	0.0729	0.0868	108	0.1820	-0.0215	23.8
1272.0	0.8221	0.0846	0.0787	0.0726	0.0867	108	0.1840	-0.0217	23.9
1285.0	0.8201	0.0844	0.0785	0.0724	0.0866	108	0.1860	-0.0219	23.9
1299.0	0.8181	0.0842	0.0783	0.0722	0.0865	108	0.1880	-0.0220	23.9
1311.0	0.8161	0.0840	0.0782	0.0720	0.0864	108	0.1900	-0.0222	23.9
1324.0	0.8141	0.0839	0.0780	0.0717	0.0862	108	0.1920	-0.0224	23.8
1337.0	0.8121	0.0837	0.0778	0.0715	0.0861	108	0.1940	-0.0226	23.9
1350.0	0.8101	0.0835	0.0777	0.0713	0.0860	108	0.1960	-0.0227	23.9
1363.0	0.8081	0.0833	0.0775	0.0711	0.0859	108	0.1980	-0.0229	23.8
1375.0	0.8061	0.0832	0.0773	0.0709	0.0858	108	0.2000	-0.0230	23.8
1389.0	0.8041	0.0830	0.0772	0.0706	0.0857	108	0.2020	-0.0232	23.9
1402.0	0.8021	0.0828	0.0770	0.0704	0.0856	108	0.2040	-0.0234	23.9
1414.0	0.8001	0.0827	0.0768	0.0702	0.0855	108	0.2060	-0.0235	23.9
1427.0	0.7981	0.0825	0.0767	0.0700	0.0854	109	0.2080	-0.0237	23.9
1441.0	0.7961	0.0823	0.0765	0.0697	0.0853	108	0.2100	-0.0239	23.9
1454.0	0.7941	0.0822	0.0764	0.0695	0.0851	108	0.2120	-0.0240	23.9
1467.0	0.7921	0.0820	0.0762	0.0693	0.0850	109	0.2140	-0.0242	23.9
1480.0	0.7901	0.0818	0.0760	0.0691	0.0849	108	0.2160	-0.0244	23.9
1493.0	0.7881	0.0816	0.0759	0.0689	0.0848	108	0.2180	-0.0245	23.8
1506.0	0.7861	0.0815	0.0757	0.0687	0.0847	108	0.2200	-0.0247	23.8
1518.0	0.7841	0.0813	0.0756	0.0684	0.0846	108	0.2220	-0.0249	23.8
1531.0	0.7821	0.0811	0.0754	0.0682	0.0845	108	0.2240	-0.0250	23.8
1545.0	0.7801	0.0809	0.0753	0.0680	0.0844	108	0.2260	-0.0252	23.9
1558.0	0.7781	0.0808	0.0751	0.0678	0.0842	108	0.2280	-0.0254	23.8
1571.0	0.7761	0.0806	0.0749	0.0676	0.0841	108	0.2300	-0.0255	23.9
1584.0	0.7741	0.0804	0.0748	0.0674	0.0840	108	0.2320	-0.0257	23.8
1597.0	0.7721	0.0802	0.0746	0.0672	0.0839	108	0.2340	-0.0259	23.8
1610.0	0.7701	0.0801	0.0745	0.0670	0.0838	108	0.2360	-0.0260	23.9
1623.0	0.7681	0.0799	0.0743	0.0668	0.0837	108	0.2380	-0.0262	23.9
1637.0	0.7661	0.0797	0.0742	0.0666	0.0836	108	0.2400	-0.0263	23.9
1650.0	0.7641	0.0796	0.0740	0.0664	0.0834	108	0.2420	-0.0265	23.9
1662.0	0.7621	0.0794	0.0739	0.0662	0.0833	109	0.2440	-0.0266	23.9
1675.0	0.7601	0.0793	0.0737	0.0660	0.0832	109	0.2460	-0.0268	23.9
1688.0	0.7581	0.0791	0.0736	0.0658	0.0831	109	0.2480	-0.0269	23.9
1701.0	0.7561	0.0790	0.0734	0.0656	0.0830	109	0.2500	-0.0271	24.0
1713.0	0.7541	0.0788	0.0733	0.0655	0.0829	109	0.2520	-0.0272	24.0
1727.0	0.7521	0.0787	0.0732	0.0653	0.0828	109	0.2540	-0.0273	24.0
1739.0	0.7501	0.0785	0.0730	0.0651	0.0827	109	0.2560	-0.0275	24.0
1753.0	0.7481	0.0784	0.0729	0.0649	0.0826	109	0.2580	-0.0276	24.0
1765.0	0.7461	0.0782	0.0728	0.0647	0.0825	109	0.2600	-0.0278	24.0
1778.0	0.7441	0.0781	0.0727	0.0645	0.0824	109	0.2620	-0.0279	24.0
1791.0	0.7421	0.0779	0.0725	0.0644	0.0822	109	0.2640	-0.0281	24.0
1804.0	0.7401	0.0778	0.0724	0.0642	0.0822	109	0.2660	-0.0282	24.0
1816.0	0.7381	0.0776	0.0723	0.0640	0.0821	109	0.2680	-0.0283	24.0
1830.0	0.7361	0.0775	0.0722	0.0638	0.0820	109	0.2700	-0.0285	24.1
1843.0	0.7341	0.0773	0.0720	0.0637	0.0819	109	0.2720	-0.0286	24.1
1855.0	0.7321	0.0772	0.0719	0.0635	0.0818	109	0.2740	-0.0287	24.1
1868.0	0.7301	0.0770	0.0718	0.0633	0.0817	109	0.2760	-0.0289	24.1
1881.0	0.7281	0.0769	0.0717	0.0632	0.0816	109	0.2780	-0.0290	24.1
1894.0	0.7261	0.0767	0.0716	0.0630	0.0815	109	0.2800	-0.0291	24.1
1906.0	0.7241	0.0766	0.0714	0.0629	0.0814	109	0.2820	-0.0293	24.1
1919.0	0.7221	0.0765	0.0713	0.0627	0.0813	110	0.2840	-0.0294	24.1
1932.0	0.7201	0.0763	0.0712	0.0626	0.0812	110	0.2860	-0.0295	24.1
1945.0	0.7181	0.0762	0.0711	0.0624	0.0811	110	0.2880	-0.0296	24.2
1958.0	0.7161	0.0761	0.0710	0.0623	0.0810	110	0.2900	-0.0297	24.2
1971.0	0.7141	0.0759	0.0709	0.0621	0.0809	110	0.2920	-0.0299	24.2
1983.0	0.7121	0.0758	0.0708	0.0620	0.0808	110	0.2940	-0.0300	24.2
1997.0	0.7101	0.0757	0.0707	0.0618	0.0807	110	0.2960	-0.0301	24.3
2009.0	0.7081	0.0756	0.0705	0.0617	0.0806	110	0.2980	-0.0302	24.3
2022.0	0.7061	0.0755	0.0704	0.0616	0.0806	110	0.3000	-0.0303	24.3
2035.0	0.7041	0.0753	0.0703	0.0614	0.0805	110	0.3020	-0.0305	24.3
2048.0	0.7021	0.0752	0.0702	0.0612	0.0804	110	0.3040	-0.0306	24.3
2060.0	0.7001	0.0751	0.0701	0.0611	0.0803	110	0.3060	-0.0307	24.3
2073.0	0.6981	0.0750	0.0700	0.0610	0.0802	110	0.3080	-0.0308	24.3
2086.0	0.6961	0.0749	0.0699	0.0609	0.0801	111	0.3100	-0.0309	24.3
2099.0	0.6941	0.0748	0.0698	0.0608	0.0800	111	0.3120	-0.0310	24.4
2113.0	0.6921	0.0747	0.0697	0.0606	0.0800	110	0.3140	-0.0311	24.2

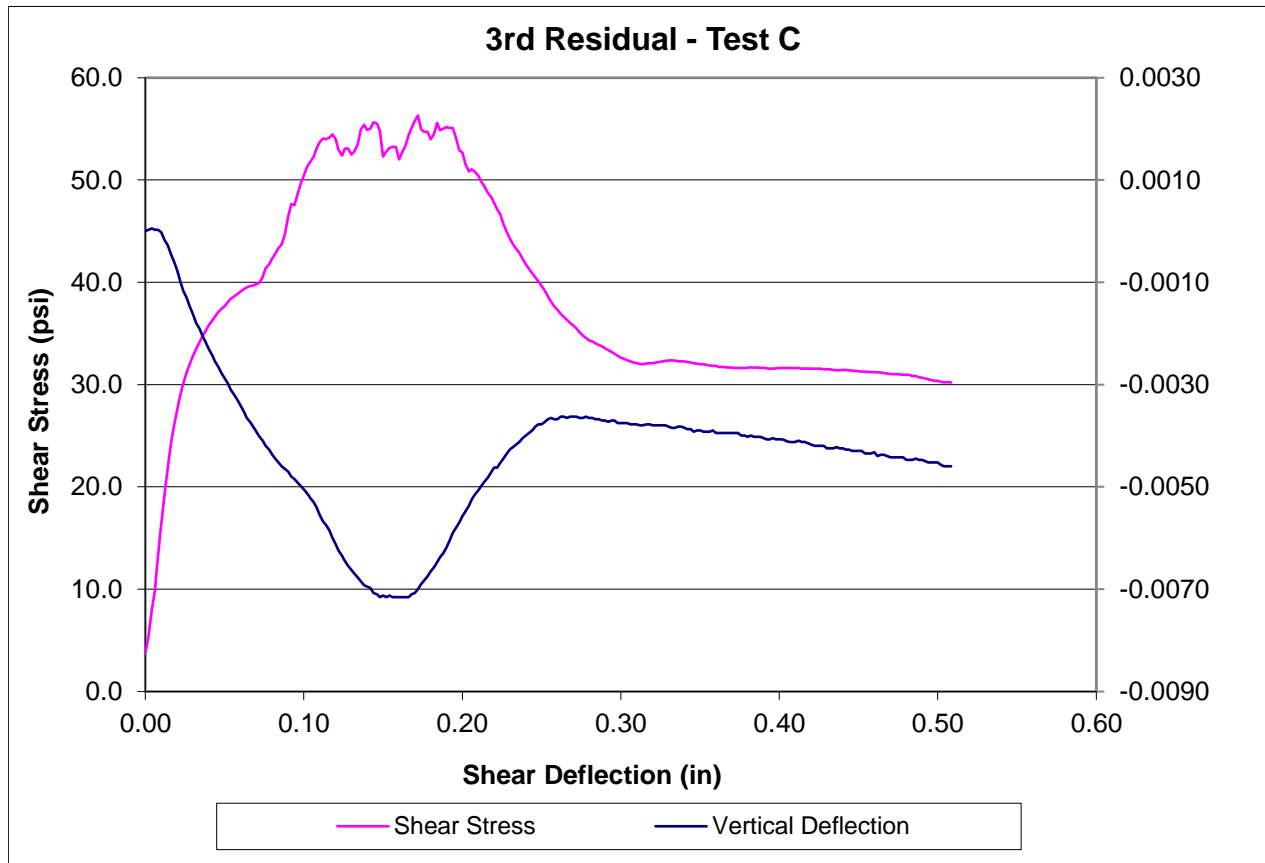
Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
2126.0	0.6901	0.0745	0.0696	0.0605	0.0799	110	0.3160	-0.0312	24.2
2138.0	0.6881	0.0744	0.0695	0.0603	0.0798	110	0.3180	-0.0313	24.2
2151.0	0.6861	0.0743	0.0694	0.0602	0.0797	110	0.3200	-0.0314	24.2
2163.0	0.6841	0.0742	0.0693	0.0601	0.0796	110	0.3220	-0.0315	24.2
2176.0	0.6821	0.0741	0.0692	0.0599	0.0795	109	0.3240	-0.0317	24.1
2189.0	0.6801	0.0739	0.0691	0.0598	0.0794	110	0.3260	-0.0318	24.1
2202.0	0.6781	0.0738	0.0690	0.0597	0.0794	110	0.3280	-0.0319	24.1
2215.0	0.6761	0.0737	0.0689	0.0596	0.0793	110	0.3300	-0.0320	24.1
2228.0	0.6741	0.0736	0.0688	0.0595	0.0792	110	0.3320	-0.0321	24.1
2241.0	0.6721	0.0735	0.0687	0.0594	0.0791	110	0.3340	-0.0322	24.1
2254.0	0.6701	0.0734	0.0686	0.0593	0.0790	110	0.3360	-0.0323	24.1
2267.0	0.6681	0.0734	0.0685	0.0591	0.0790	109	0.3380	-0.0323	24.1
2280.0	0.6661	0.0733	0.0685	0.0591	0.0789	109	0.3400	-0.0324	24.1
2293.0	0.6641	0.0732	0.0684	0.0590	0.0788	109	0.3420	-0.0325	24.1
2306.0	0.6621	0.0731	0.0683	0.0589	0.0787	109	0.3440	-0.0326	24.0
2319.0	0.6601	0.0730	0.0683	0.0588	0.0787	109	0.3460	-0.0326	24.0
2332.0	0.6581	0.0729	0.0682	0.0588	0.0786	109	0.3480	-0.0327	24.0
2345.0	0.6561	0.0728	0.0682	0.0587	0.0785	109	0.3500	-0.0328	23.9
2358.0	0.6541	0.0728	0.0681	0.0587	0.0784	108	0.3520	-0.0328	23.9
2371.0	0.6521	0.0727	0.0681	0.0587	0.0784	108	0.3540	-0.0329	23.8
2383.0	0.6501	0.0726	0.0680	0.0586	0.0783	108	0.3560	-0.0330	23.8
2396.0	0.6481	0.0726	0.0680	0.0586	0.0782	108	0.3580	-0.0330	23.7
2410.0	0.6461	0.0725	0.0679	0.0585	0.0782	107	0.3600	-0.0331	23.6
2423.0	0.6441	0.0724	0.0679	0.0585	0.0781	107	0.3620	-0.0331	23.6
2435.0	0.6421	0.0724	0.0679	0.0585	0.0780	107	0.3640	-0.0331	23.5
2448.0	0.6401	0.0723	0.0678	0.0584	0.0780	107	0.3660	-0.0332	23.5
2461.0	0.6381	0.0723	0.0678	0.0584	0.0779	106	0.3680	-0.0332	23.4
2475.0	0.6361	0.0722	0.0678	0.0584	0.0778	106	0.3700	-0.0333	23.3
2487.0	0.6341	0.0722	0.0677	0.0584	0.0778	106	0.3720	-0.0333	23.3
2500.0	0.6321	0.0721	0.0677	0.0583	0.0777	105	0.3740	-0.0334	23.2
2514.0	0.6301	0.0721	0.0677	0.0583	0.0777	105	0.3760	-0.0334	23.1
2527.0	0.6281	0.0720	0.0676	0.0583	0.0776	105	0.3780	-0.0335	23.0
2540.0	0.6261	0.0720	0.0676	0.0583	0.0776	104	0.3800	-0.0335	22.9
2553.0	0.6241	0.0719	0.0676	0.0582	0.0775	104	0.3820	-0.0335	22.8
2566.0	0.6221	0.0719	0.0676	0.0582	0.0775	104	0.3840	-0.0335	22.9
2579.0	0.6201	0.0719	0.0675	0.0582	0.0774	103	0.3860	-0.0336	22.8
2592.0	0.6181	0.0718	0.0675	0.0582	0.0774	103	0.3880	-0.0336	22.7
2605.0	0.6161	0.0718	0.0675	0.0582	0.0773	103	0.3900	-0.0336	22.6
2619.0	0.6141	0.0717	0.0675	0.0581	0.0773	103	0.3920	-0.0337	22.6
2631.0	0.6121	0.0717	0.0674	0.0581	0.0773	102	0.3940	-0.0337	22.5
2644.0	0.6101	0.0717	0.0674	0.0581	0.0772	102	0.3960	-0.0337	22.5
2658.0	0.6081	0.0716	0.0674	0.0581	0.0772	102	0.3980	-0.0338	22.4
2671.0	0.6061	0.0716	0.0674	0.0581	0.0771	101	0.4000	-0.0338	22.3
2683.0	0.6041	0.0715	0.0674	0.0581	0.0771	101	0.4020	-0.0338	22.3
2696.0	0.6021	0.0715	0.0674	0.0580	0.0771	101	0.4040	-0.0338	22.2
2709.0	0.6001	0.0715	0.0673	0.0580	0.0770	101	0.4060	-0.0339	22.1
2722.0	0.5981	0.0714	0.0673	0.0580	0.0770	100	0.4080	-0.0339	22.1
2735.0	0.5961	0.0714	0.0673	0.0580	0.0770	100	0.4100	-0.0339	22.0
2748.0	0.5941	0.0714	0.0673	0.0580	0.0769	100	0.4120	-0.0339	22.0
2758.0	0.5921	0.0714	0.0673	0.0580	0.0769	101	0.4140	-0.0339	22.2
2770.0	0.5901	0.0713	0.0673	0.0580	0.0769	99	0.4160	-0.0340	21.8
2788.0	0.5881	0.0713	0.0672	0.0579	0.0768	99	0.4180	-0.0340	21.8
2801.0	0.5861	0.0712	0.0672	0.0579	0.0768	99	0.4200	-0.0341	21.7
2814.0	0.5841	0.0712	0.0672	0.0579	0.0767	98	0.4220	-0.0341	21.6
2827.0	0.5821	0.0712	0.0672	0.0579	0.0767	98	0.4240	-0.0341	21.6
2840.0	0.5801	0.0711	0.0671	0.0579	0.0767	98	0.4260	-0.0341	21.5
2853.0	0.5781	0.0711	0.0671	0.0579	0.0766	98	0.4280	-0.0342	21.5
2866.0	0.5761	0.0711	0.0671	0.0579	0.0766	97	0.4300	-0.0342	21.4
2880.0	0.5741	0.0711	0.0671	0.0578	0.0766	97	0.4320	-0.0342	21.4
2891.0	0.5721	0.0710	0.0671	0.0578	0.0766	98	0.4340	-0.0342	21.6
2900.0	0.5701	0.0710	0.0671	0.0578	0.0765	97	0.4360	-0.0342	21.3
2919.0	0.5681	0.0710	0.0670	0.0578	0.0765	97	0.4380	-0.0343	21.3
2932.0	0.5661	0.0710	0.0670	0.0578	0.0765	96	0.4400	-0.0343	21.2
2944.0	0.5641	0.0709	0.0670	0.0578	0.0764	96	0.4420	-0.0343	21.2
2957.0	0.5621	0.0709	0.0670	0.0578	0.0764	96	0.4440	-0.0343	21.1
2970.0	0.5601	0.0709	0.0670	0.0577	0.0764	96	0.4460	-0.0343	21.1
2983.0	0.5581	0.0709	0.0669	0.0577	0.0763	95	0.4480	-0.0344	21.0
2996.0	0.5561	0.0708	0.0669	0.0577	0.0763	95	0.4500	-0.0344	20.9
3010.0	0.5541	0.0708	0.0669	0.0577	0.0763	95	0.4520	-0.0344	20.9
3023.0	0.5521	0.0708	0.0669	0.0577	0.0763	95	0.4540	-0.0344	20.8
3031.0	0.5501	0.0708	0.0669	0.0577	0.0762	94	0.4560	-0.0344	20.7
3049.0	0.5481	0.0707	0.0669	0.0577	0.0762	94	0.4580	-0.0345	20.6
3062.0	0.5461	0.0707	0.0669	0.0577	0.0762	94	0.4600	-0.0345	20.7
3075.0	0.5441	0.0706	0.0668	0.0577	0.0761	94	0.4620	-0.0345	20.6
3088.0	0.5421	0.0706	0.0668	0.0576	0.0761	94	0.4640	-0.0346	20.6
3101.0	0.5401	0.0706	0.0668	0.0576	0.0761	93	0.4660	-0.0346	20.5
3114.0	0.5381	0.0706	0.0668	0.0576	0.0760	93	0.4680	-0.0346	20.5
3127.0	0.5361	0.0705	0.0668	0.0576	0.0760	92	0.4700	-0.0346	20.3
3140.0	0.5341	0.0705	0.0668	0.0576	0.0759	92	0.4720	-0.0346	20.3

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
3153.0	0.5321	0.0704	0.0667	0.0576	0.0759	92	0.4740	-0.0347	20.3
3164.0	0.5301	0.0704	0.0667	0.0575	0.0758	94	0.4760	-0.0347	20.6
3174.0	0.5281	0.0703	0.0667	0.0575	0.0758	92	0.4780	-0.0348	20.2
3192.0	0.5261	0.0703	0.0666	0.0575	0.0757	92	0.4800	-0.0348	20.3
3204.0	0.5241	0.0702	0.0666	0.0574	0.0756	92	0.4820	-0.0349	20.2
3217.0	0.5221	0.0701	0.0665	0.0574	0.0756	92	0.4840	-0.0349	20.2
3230.0	0.5201	0.0701	0.0665	0.0574	0.0755	92	0.4860	-0.0350	20.2
3244.0	0.5181	0.0700	0.0664	0.0573	0.0754	92	0.4880	-0.0351	20.2
3256.0	0.5161	0.0700	0.0664	0.0573	0.0754	92	0.4900	-0.0351	20.2
3269.0	0.5141	0.0699	0.0664	0.0573	0.0753	91	0.4920	-0.0351	20.1
3282.0	0.5121	0.0699	0.0663	0.0573	0.0753	91	0.4940	-0.0351	20.0
3295.0	0.5101	0.0699	0.0663	0.0573	0.0752	91	0.4960	-0.0352	20.0
3302.0	0.5081	0.0698	0.0663	0.0573	0.0752	90	0.4980	-0.0352	19.7
3320.0	0.5061	0.0698	0.0663	0.0572	0.0752	89	0.5000	-0.0352	19.6
3334.0	0.5041	0.0698	0.0663	0.0572	0.0751	90	0.5020	-0.0352	19.7
3347.0	0.5021	0.0697	0.0663	0.0572	0.0751	89	0.5040	-0.0353	19.6
3359.0	0.5001	0.0697	0.0663	0.0572	0.0751	89	0.5060	-0.0353	19.6
3373.0	0.4981	0.0697	0.0662	0.0572	0.0751	89	0.5080	-0.0353	19.5
3386.0	0.4961	0.0697	0.0662	0.0572	0.0750	88	0.5100	-0.0353	19.4
3399.0	0.4941	0.0696	0.0662	0.0572	0.0750	88	0.5120	-0.0353	19.4
3412.0	0.4921	0.0696	0.0662	0.0571	0.0750	88	0.5140	-0.0354	19.4
3425.0	0.4901	0.0696	0.0661	0.0571	0.0749	88	0.5160	-0.0354	19.4
3434.0	0.4881	0.0695	0.0661	0.0571	0.0749	90	0.5180	-0.0354	19.8
3445.0	0.4862	0.0695	0.0661	0.0570	0.0748	88	0.5199	-0.0355	19.4

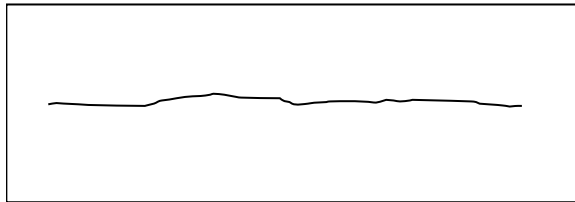


Direct Shear Strength of Rock
ASTM D 5607

Project Name	<u>SR1 Flood Control Project - Inlet Debris Barrier</u>	Project Number	<u>110773396</u>
Lithology	<u>Shale, black, soft</u>	Lab ID	<u>DS-26</u>
Hole Number	<u>DB-3</u>	Date Received	<u>05/15/2018</u>
Depth (m)	<u>23.11</u>	Diameter (in)	<u>2.405</u>
Test Type	<u>Direct shear of intact specimen</u>	Angle of Dip (deg)	<u>0.0</u>
Initial Moisture Condition	<u>As received, moist</u>	Area(in ²)	<u>4.54</u>
Test Moisture Condition	<u>Soaked at least 12 hours prior to test.</u>	Date Prepared	<u>06/25/2018</u>
Joint Roughness	<u>4</u>	Date Tested	<u>06/26/2018</u>
Normal Stress (psi)	<u>94</u>		



Sketch



Shear Rate to Peak (in/min) N/A

Encapsulation Material Hydro-Stone

Comments _____

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
0.0	1.0022	0.2545	0.2563	0.2536	0.2528	17	0.0000	0.0000	3.7
31.0	1.0002	0.2545	0.2563	0.2534	0.2531	25	0.0020	0.0000	5.4
47.0	0.9982	0.2546	0.2563	0.2532	0.2533	36	0.0040	0.0000	7.9
62.0	0.9962	0.2546	0.2562	0.2530	0.2535	45	0.0060	0.0000	9.9
77.0	0.9941	0.2546	0.2562	0.2527	0.2538	60	0.0081	0.0000	13.2
90.0	0.9922	0.2546	0.2561	0.2525	0.2539	75	0.0100	0.0000	16.6
105.0	0.9901	0.2545	0.2559	0.2522	0.2539	88	0.0121	-0.0002	19.3
119.0	0.9881	0.2545	0.2557	0.2520	0.2539	99	0.0141	-0.0003	21.7
133.0	0.9861	0.2543	0.2555	0.2518	0.2538	110	0.0161	-0.0004	24.2
147.0	0.9841	0.2542	0.2553	0.2516	0.2537	118	0.0181	-0.0006	26.0
160.0	0.9821	0.2541	0.2551	0.2514	0.2535	125	0.0201	-0.0008	27.6
174.0	0.9801	0.2539	0.2549	0.2512	0.2533	131	0.0221	-0.0010	28.8
188.0	0.9781	0.2538	0.2546	0.2510	0.2531	137	0.0241	-0.0012	30.2
202.0	0.9761	0.2537	0.2545	0.2509	0.2529	142	0.0261	-0.0013	31.2
215.0	0.9741	0.2535	0.2543	0.2507	0.2528	145	0.0281	-0.0015	32.0
229.0	0.9721	0.2534	0.2541	0.2506	0.2526	149	0.0301	-0.0016	32.8
242.0	0.9701	0.2533	0.2539	0.2504	0.2524	152	0.0321	-0.0018	33.5
256.0	0.9681	0.2532	0.2538	0.2503	0.2523	155	0.0341	-0.0019	34.1
269.0	0.9661	0.2531	0.2536	0.2502	0.2521	158	0.0361	-0.0021	34.8
283.0	0.9641	0.2530	0.2535	0.2500	0.2520	160	0.0381	-0.0022	35.3
297.0	0.9622	0.2529	0.2533	0.2499	0.2519	162	0.0400	-0.0023	35.8
311.0	0.9601	0.2528	0.2532	0.2498	0.2517	165	0.0421	-0.0024	36.2
324.0	0.9582	0.2527	0.2530	0.2497	0.2516	166	0.0440	-0.0025	36.6
337.0	0.9561	0.2526	0.2529	0.2496	0.2515	169	0.0461	-0.0026	37.1
351.0	0.9541	0.2525	0.2527	0.2495	0.2514	170	0.0481	-0.0028	37.4
364.0	0.9521	0.2524	0.2526	0.2494	0.2513	171	0.0501	-0.0029	37.7
377.0	0.9502	0.2523	0.2525	0.2493	0.2512	173	0.0520	-0.0030	38.1
391.0	0.9482	0.2522	0.2524	0.2492	0.2510	174	0.0540	-0.0031	38.4
405.0	0.9461	0.2522	0.2522	0.2491	0.2509	175	0.0561	-0.0032	38.6
419.0	0.9441	0.2521	0.2521	0.2490	0.2508	176	0.0581	-0.0033	38.8
432.0	0.9422	0.2520	0.2520	0.2489	0.2507	178	0.0600	-0.0034	39.1
446.0	0.9401	0.2519	0.2518	0.2488	0.2506	179	0.0621	-0.0035	39.3
460.0	0.9381	0.2518	0.2517	0.2487	0.2504	179	0.0641	-0.0036	39.5
473.0	0.9362	0.2518	0.2516	0.2486	0.2503	180	0.0660	-0.0037	39.6
486.0	0.9341	0.2517	0.2515	0.2485	0.2502	180	0.0681	-0.0038	39.7
499.0	0.9322	0.2516	0.2513	0.2485	0.2501	181	0.0700	-0.0039	39.8
513.0	0.9302	0.2515	0.2512	0.2484	0.2500	181	0.0720	-0.0040	39.9
527.0	0.9281	0.2515	0.2511	0.2483	0.2499	184	0.0741	-0.0041	40.5
540.0	0.9262	0.2514	0.2510	0.2482	0.2498	188	0.0760	-0.0042	41.4
554.0	0.9241	0.2514	0.2508	0.2481	0.2498	190	0.0781	-0.0043	41.7
567.0	0.9221	0.2513	0.2507	0.2480	0.2497	192	0.0801	-0.0044	42.3
580.0	0.9202	0.2513	0.2506	0.2479	0.2496	194	0.0820	-0.0044	42.8
593.0	0.9182	0.2512	0.2505	0.2479	0.2495	197	0.0840	-0.0045	43.3
606.0	0.9162	0.2512	0.2504	0.2478	0.2494	198	0.0860	-0.0046	43.7
620.0	0.9142	0.2512	0.2503	0.2477	0.2494	203	0.0880	-0.0046	44.7
633.0	0.9121	0.2512	0.2502	0.2476	0.2494	211	0.0901	-0.0047	46.4
646.0	0.9101	0.2512	0.2500	0.2475	0.2493	216	0.0921	-0.0048	47.6
660.0	0.9082	0.2512	0.2499	0.2475	0.2492	216	0.0940	-0.0048	47.5
674.0	0.9061	0.2512	0.2497	0.2474	0.2492	221	0.0961	-0.0049	48.6
687.0	0.9042	0.2512	0.2496	0.2474	0.2491	225	0.0980	-0.0050	49.6
700.0	0.9022	0.2512	0.2494	0.2473	0.2491	229	0.1000	-0.0051	50.4
714.0	0.9002	0.2512	0.2492	0.2473	0.2490	233	0.1020	-0.0051	51.2
727.0	0.8981	0.2513	0.2490	0.2472	0.2488	235	0.1041	-0.0052	51.8
741.0	0.8961	0.2513	0.2488	0.2472	0.2487	237	0.1061	-0.0053	52.2
753.0	0.8941	0.2514	0.2485	0.2472	0.2485	241	0.1081	-0.0054	53.1
767.0	0.8921	0.2514	0.2482	0.2471	0.2483	244	0.1101	-0.0055	53.7
781.0	0.8902	0.2514	0.2479	0.2471	0.2481	245	0.1120	-0.0057	54.0
794.0	0.8881	0.2515	0.2477	0.2471	0.2479	245	0.1141	-0.0057	54.0
806.0	0.8861	0.2516	0.2474	0.2471	0.2477	246	0.1161	-0.0058	54.1
820.0	0.8841	0.2516	0.2471	0.2471	0.2474	247	0.1181	-0.0060	54.4
833.0	0.8821	0.2517	0.2468	0.2470	0.2472	245	0.1201	-0.0061	54.0
846.0	0.8802	0.2517	0.2465	0.2470	0.2470	240	0.1220	-0.0062	52.9
860.0	0.8781	0.2517	0.2463	0.2470	0.2468	238	0.1241	-0.0063	52.4
873.0	0.8762	0.2517	0.2461	0.2470	0.2466	241	0.1260	-0.0064	53.1
886.0	0.8742	0.2518	0.2458	0.2470	0.2464	241	0.1280	-0.0065	53.1
898.0	0.8721	0.2518	0.2457	0.2470	0.2462	238	0.1301	-0.0066	52.5
911.0	0.8701	0.2518	0.2455	0.2470	0.2461	240	0.1321	-0.0067	52.8
924.0	0.8681	0.2518	0.2454	0.2470	0.2459	243	0.1341	-0.0068	53.5
938.0	0.8661	0.2517	0.2453	0.2471	0.2457	250	0.1361	-0.0068	55.0
951.0	0.8641	0.2517	0.2452	0.2471	0.2455	251	0.1381	-0.0069	55.4
964.0	0.8622	0.2517	0.2452	0.2472	0.2453	249	0.1400	-0.0069	54.9
977.0	0.8602	0.2517	0.2451	0.2473	0.2452	250	0.1420	-0.0070	55.0
991.0	0.8582	0.2516	0.2450	0.2473	0.2450	253	0.1440	-0.0071	55.6
1004.0	0.8561	0.2516	0.2450	0.2474	0.2448	252	0.1461	-0.0071	55.5
1017.0	0.8542	0.2516	0.2449	0.2475	0.2446	249	0.1480	-0.0071	54.8
1030.0	0.8521	0.2516	0.2449	0.2477	0.2445	237	0.1501	-0.0071	52.3
1043.0	0.8502	0.2516	0.2449	0.2477	0.2444	240	0.1520	-0.0071	52.7
1056.0	0.8482	0.2517	0.2449	0.2478	0.2443	241	0.1540	-0.0071	53.1
1069.0	0.8461	0.2517	0.2448	0.2479	0.2442	242	0.1561	-0.0071	53.2

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
1082.0	0.8441	0.2517	0.2448	0.2480	0.2441	242	0.1581	-0.0071	53.2
1096.0	0.8421	0.2517	0.2448	0.2481	0.2440	236	0.1601	-0.0071	52.0
1108.0	0.8401	0.2518	0.2447	0.2482	0.2439	239	0.1621	-0.0071	52.7
1122.0	0.8381	0.2518	0.2447	0.2483	0.2438	242	0.1641	-0.0071	53.4
1135.0	0.8361	0.2519	0.2446	0.2484	0.2437	247	0.1661	-0.0071	54.4
1148.0	0.8342	0.2519	0.2447	0.2486	0.2436	250	0.1680	-0.0071	55.1
1161.0	0.8322	0.2519	0.2447	0.2488	0.2435	253	0.1700	-0.0071	55.7
1174.0	0.8302	0.2520	0.2447	0.2490	0.2435	256	0.1720	-0.0070	56.3
1187.0	0.8282	0.2521	0.2448	0.2492	0.2435	250	0.1740	-0.0069	54.9
1201.0	0.8262	0.2522	0.2449	0.2494	0.2434	248	0.1760	-0.0068	54.7
1214.0	0.8241	0.2523	0.2450	0.2495	0.2434	248	0.1781	-0.0067	54.7
1227.0	0.8221	0.2524	0.2451	0.2497	0.2434	245	0.1801	-0.0066	54.0
1241.0	0.8201	0.2525	0.2451	0.2499	0.2434	247	0.1821	-0.0066	54.5
1255.0	0.8181	0.2526	0.2452	0.2501	0.2434	252	0.1841	-0.0065	55.6
1267.0	0.8162	0.2527	0.2453	0.2503	0.2434	249	0.1860	-0.0064	54.9
1280.0	0.8142	0.2528	0.2453	0.2505	0.2434	250	0.1880	-0.0063	55.0
1293.0	0.8121	0.2529	0.2455	0.2507	0.2434	251	0.1901	-0.0062	55.2
1306.0	0.8101	0.2531	0.2456	0.2509	0.2434	250	0.1921	-0.0060	55.1
1319.0	0.8081	0.2533	0.2456	0.2512	0.2435	250	0.1941	-0.0059	55.1
1332.0	0.8062	0.2534	0.2457	0.2515	0.2434	246	0.1960	-0.0058	54.1
1345.0	0.8042	0.2536	0.2457	0.2517	0.2434	240	0.1980	-0.0057	52.9
1358.0	0.8021	0.2538	0.2458	0.2519	0.2434	239	0.2001	-0.0056	52.7
1371.0	0.8002	0.2539	0.2458	0.2522	0.2434	234	0.2020	-0.0055	51.5
1384.0	0.7981	0.2541	0.2458	0.2524	0.2434	231	0.2041	-0.0054	50.8
1397.0	0.7962	0.2543	0.2459	0.2526	0.2434	232	0.2060	-0.0052	51.0
1411.0	0.7942	0.2545	0.2459	0.2528	0.2434	231	0.2080	-0.0051	50.8
1424.0	0.7922	0.2546	0.2459	0.2530	0.2434	229	0.2100	-0.0051	50.5
1438.0	0.7901	0.2548	0.2459	0.2533	0.2433	226	0.2121	-0.0050	49.8
1451.0	0.7882	0.2550	0.2458	0.2535	0.2433	224	0.2140	-0.0049	49.4
1464.0	0.7862	0.2552	0.2458	0.2537	0.2432	221	0.2160	-0.0048	48.7
1476.0	0.7841	0.2554	0.2458	0.2539	0.2432	220	0.2181	-0.0047	48.4
1490.0	0.7821	0.2556	0.2458	0.2541	0.2432	217	0.2201	-0.0046	47.7
1502.0	0.7802	0.2557	0.2457	0.2542	0.2431	214	0.2220	-0.0046	47.1
1516.0	0.7781	0.2559	0.2457	0.2544	0.2431	212	0.2241	-0.0045	46.6
1529.0	0.7762	0.2560	0.2457	0.2546	0.2431	207	0.2260	-0.0044	45.7
1542.0	0.7741	0.2562	0.2457	0.2548	0.2431	204	0.2281	-0.0043	44.9
1555.0	0.7722	0.2564	0.2457	0.2549	0.2431	201	0.2300	-0.0043	44.3
1568.0	0.7702	0.2565	0.2457	0.2551	0.2430	199	0.2320	-0.0042	43.7
1581.0	0.7682	0.2566	0.2457	0.2552	0.2430	196	0.2340	-0.0042	43.3
1595.0	0.7661	0.2567	0.2457	0.2553	0.2430	195	0.2361	-0.0041	42.9
1608.0	0.7642	0.2569	0.2457	0.2554	0.2430	192	0.2380	-0.0041	42.3
1620.0	0.7622	0.2569	0.2457	0.2556	0.2430	190	0.2400	-0.0040	41.7
1633.0	0.7602	0.2570	0.2457	0.2557	0.2430	188	0.2420	-0.0040	41.3
1647.0	0.7582	0.2571	0.2457	0.2558	0.2430	186	0.2440	-0.0039	40.9
1660.0	0.7561	0.2572	0.2458	0.2559	0.2430	184	0.2461	-0.0038	40.5
1672.0	0.7542	0.2573	0.2458	0.2560	0.2430	182	0.2480	-0.0038	40.1
1686.0	0.7522	0.2573	0.2458	0.2560	0.2430	180	0.2500	-0.0038	39.7
1699.0	0.7501	0.2574	0.2458	0.2561	0.2430	178	0.2521	-0.0037	39.2
1712.0	0.7482	0.2574	0.2459	0.2562	0.2430	175	0.2540	-0.0037	38.6
1725.0	0.7462	0.2575	0.2459	0.2562	0.2430	173	0.2560	-0.0036	38.1
1738.0	0.7442	0.2575	0.2458	0.2563	0.2429	171	0.2580	-0.0037	37.7
1751.0	0.7421	0.2575	0.2458	0.2563	0.2429	169	0.2601	-0.0037	37.3
1764.0	0.7402	0.2576	0.2458	0.2564	0.2429	168	0.2620	-0.0036	36.9
1777.0	0.7382	0.2576	0.2458	0.2564	0.2429	166	0.2640	-0.0036	36.6
1790.0	0.7362	0.2576	0.2458	0.2564	0.2428	165	0.2660	-0.0036	36.3
1803.0	0.7342	0.2576	0.2458	0.2565	0.2428	164	0.2680	-0.0036	36.0
1816.0	0.7321	0.2576	0.2458	0.2565	0.2428	162	0.2701	-0.0036	35.8
1828.0	0.7302	0.2576	0.2458	0.2565	0.2428	161	0.2720	-0.0036	35.5
1842.0	0.7282	0.2576	0.2458	0.2565	0.2427	160	0.2740	-0.0036	35.1
1855.0	0.7262	0.2576	0.2458	0.2565	0.2427	158	0.2760	-0.0036	34.8
1868.0	0.7241	0.2576	0.2458	0.2566	0.2427	157	0.2781	-0.0036	34.6
1881.0	0.7221	0.2576	0.2458	0.2566	0.2426	156	0.2801	-0.0036	34.3
1894.0	0.7202	0.2576	0.2458	0.2566	0.2426	155	0.2820	-0.0036	34.2
1907.0	0.7181	0.2576	0.2457	0.2566	0.2426	155	0.2841	-0.0037	34.0
1920.0	0.7161	0.2576	0.2457	0.2566	0.2426	154	0.2861	-0.0037	33.9
1933.0	0.7141	0.2576	0.2457	0.2566	0.2425	153	0.2881	-0.0037	33.7
1946.0	0.7122	0.2576	0.2457	0.2566	0.2425	152	0.2900	-0.0037	33.5
1959.0	0.7101	0.2576	0.2456	0.2566	0.2425	152	0.2921	-0.0037	33.4
1972.0	0.7081	0.2577	0.2456	0.2566	0.2425	151	0.2941	-0.0037	33.2
1985.0	0.7062	0.2577	0.2456	0.2566	0.2425	150	0.2960	-0.0037	33.0
1998.0	0.7042	0.2577	0.2455	0.2566	0.2424	149	0.2980	-0.0037	32.8
2012.0	0.7022	0.2577	0.2455	0.2566	0.2424	148	0.3000	-0.0037	32.6
2025.0	0.7002	0.2577	0.2455	0.2566	0.2424	148	0.3020	-0.0037	32.5
2038.0	0.6982	0.2577	0.2455	0.2566	0.2424	147	0.3040	-0.0037	32.4
2051.0	0.6962	0.2577	0.2454	0.2566	0.2424	147	0.3060	-0.0038	32.3
2064.0	0.6941	0.2578	0.2454	0.2566	0.2423	146	0.3081	-0.0038	32.2
2078.0	0.6922	0.2578	0.2454	0.2566	0.2423	146	0.3100	-0.0038	32.1
2091.0	0.6901	0.2578	0.2453	0.2566	0.2423	145	0.3121	-0.0038	32.0
2104.0	0.6882	0.2578	0.2453	0.2566	0.2423	145	0.3140	-0.0038	32.0

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
2117.0	0.6861	0.2579	0.2453	0.2566	0.2423	146	0.3161	-0.0038	32.0
2130.0	0.6841	0.2579	0.2453	0.2566	0.2423	146	0.3181	-0.0038	32.1
2142.0	0.6822	0.2579	0.2452	0.2566	0.2423	146	0.3200	-0.0038	32.1
2155.0	0.6802	0.2579	0.2452	0.2566	0.2423	146	0.3220	-0.0038	32.1
2169.0	0.6782	0.2579	0.2452	0.2566	0.2423	146	0.3240	-0.0038	32.2
2182.0	0.6762	0.2580	0.2451	0.2566	0.2423	147	0.3260	-0.0038	32.3
2195.0	0.6742	0.2580	0.2451	0.2566	0.2423	147	0.3280	-0.0038	32.3
2208.0	0.6721	0.2580	0.2451	0.2565	0.2423	147	0.3301	-0.0038	32.3
2222.0	0.6701	0.2580	0.2450	0.2565	0.2423	147	0.3321	-0.0038	32.4
2235.0	0.6681	0.2580	0.2450	0.2565	0.2423	147	0.3341	-0.0038	32.3
2248.0	0.6661	0.2581	0.2450	0.2565	0.2423	147	0.3361	-0.0038	32.3
2261.0	0.6642	0.2581	0.2450	0.2565	0.2423	147	0.3380	-0.0038	32.3
2274.0	0.6621	0.2581	0.2449	0.2565	0.2423	147	0.3401	-0.0038	32.3
2287.0	0.6602	0.2581	0.2449	0.2565	0.2422	146	0.3420	-0.0039	32.2
2300.0	0.6582	0.2581	0.2449	0.2565	0.2422	146	0.3440	-0.0039	32.2
2313.0	0.6562	0.2581	0.2448	0.2564	0.2422	146	0.3460	-0.0039	32.1
2327.0	0.6542	0.2582	0.2448	0.2564	0.2422	146	0.3480	-0.0039	32.0
2340.0	0.6521	0.2582	0.2448	0.2564	0.2422	145	0.3501	-0.0039	32.0
2352.0	0.6501	0.2582	0.2447	0.2564	0.2422	145	0.3521	-0.0039	32.0
2365.0	0.6482	0.2582	0.2447	0.2564	0.2422	145	0.3540	-0.0039	31.9
2379.0	0.6462	0.2582	0.2447	0.2564	0.2422	145	0.3560	-0.0039	31.9
2392.0	0.6441	0.2583	0.2447	0.2564	0.2422	145	0.3581	-0.0039	31.8
2405.0	0.6422	0.2583	0.2446	0.2563	0.2422	145	0.3600	-0.0039	31.8
2418.0	0.6402	0.2583	0.2446	0.2563	0.2422	144	0.3620	-0.0039	31.7
2432.0	0.6381	0.2583	0.2446	0.2563	0.2422	144	0.3641	-0.0039	31.7
2445.0	0.6361	0.2583	0.2446	0.2563	0.2422	144	0.3661	-0.0039	31.7
2458.0	0.6341	0.2584	0.2445	0.2563	0.2422	144	0.3681	-0.0039	31.6
2471.0	0.6322	0.2584	0.2445	0.2563	0.2422	144	0.3700	-0.0039	31.7
2484.0	0.6301	0.2584	0.2445	0.2563	0.2422	144	0.3721	-0.0039	31.6
2498.0	0.6282	0.2584	0.2445	0.2563	0.2422	144	0.3740	-0.0039	31.6
2511.0	0.6262	0.2584	0.2444	0.2562	0.2422	144	0.3760	-0.0040	31.6
2524.0	0.6241	0.2584	0.2444	0.2562	0.2422	144	0.3781	-0.0040	31.6
2537.0	0.6222	0.2584	0.2444	0.2562	0.2421	144	0.3800	-0.0040	31.6
2551.0	0.6202	0.2585	0.2444	0.2562	0.2421	144	0.3820	-0.0040	31.7
2564.0	0.6182	0.2585	0.2443	0.2562	0.2421	144	0.3840	-0.0040	31.6
2577.0	0.6161	0.2585	0.2443	0.2562	0.2421	144	0.3861	-0.0040	31.7
2590.0	0.6142	0.2585	0.2443	0.2562	0.2421	144	0.3880	-0.0040	31.6
2603.0	0.6121	0.2585	0.2443	0.2561	0.2421	144	0.3901	-0.0040	31.6
2616.0	0.6102	0.2585	0.2442	0.2561	0.2421	143	0.3920	-0.0041	31.6
2629.0	0.6082	0.2585	0.2442	0.2561	0.2421	143	0.3940	-0.0041	31.5
2642.0	0.6062	0.2586	0.2442	0.2561	0.2421	143	0.3960	-0.0040	31.6
2655.0	0.6042	0.2586	0.2441	0.2561	0.2421	143	0.3980	-0.0041	31.6
2668.0	0.6021	0.2586	0.2441	0.2561	0.2421	144	0.4001	-0.0041	31.6
2681.0	0.6002	0.2586	0.2441	0.2561	0.2421	144	0.4020	-0.0041	31.6
2695.0	0.5982	0.2586	0.2441	0.2560	0.2421	144	0.4040	-0.0041	31.6
2708.0	0.5962	0.2586	0.2440	0.2560	0.2421	144	0.4060	-0.0041	31.6
2721.0	0.5941	0.2586	0.2440	0.2560	0.2421	144	0.4081	-0.0041	31.6
2734.0	0.5922	0.2586	0.2440	0.2560	0.2421	144	0.4100	-0.0041	31.6
2748.0	0.5902	0.2587	0.2440	0.2560	0.2421	144	0.4120	-0.0041	31.6
2761.0	0.5882	0.2587	0.2439	0.2560	0.2421	143	0.4140	-0.0041	31.6
2774.0	0.5861	0.2587	0.2439	0.2560	0.2421	143	0.4161	-0.0041	31.6
2787.0	0.5841	0.2587	0.2439	0.2559	0.2421	143	0.4181	-0.0041	31.6
2800.0	0.5822	0.2587	0.2439	0.2559	0.2420	143	0.4200	-0.0042	31.5
2813.0	0.5801	0.2587	0.2438	0.2559	0.2420	143	0.4221	-0.0042	31.5
2826.0	0.5782	0.2587	0.2438	0.2559	0.2420	143	0.4240	-0.0042	31.5
2839.0	0.5762	0.2587	0.2438	0.2559	0.2420	143	0.4260	-0.0042	31.5
2853.0	0.5741	0.2587	0.2438	0.2559	0.2420	143	0.4281	-0.0042	31.5
2866.0	0.5722	0.2587	0.2437	0.2558	0.2420	143	0.4300	-0.0042	31.5
2879.0	0.5702	0.2587	0.2437	0.2558	0.2420	143	0.4320	-0.0042	31.5
2892.0	0.5682	0.2587	0.2437	0.2558	0.2420	143	0.4340	-0.0042	31.4
2905.0	0.5661	0.2588	0.2437	0.2558	0.2420	143	0.4361	-0.0042	31.4
2917.0	0.5641	0.2588	0.2436	0.2558	0.2420	143	0.4381	-0.0042	31.4
2930.0	0.5621	0.2588	0.2436	0.2558	0.2420	143	0.4401	-0.0042	31.4
2944.0	0.5602	0.2588	0.2436	0.2557	0.2420	143	0.4420	-0.0043	31.4
2957.0	0.5582	0.2588	0.2436	0.2557	0.2420	143	0.4440	-0.0043	31.4
2970.0	0.5562	0.2588	0.2435	0.2557	0.2420	142	0.4460	-0.0043	31.4
2983.0	0.5541	0.2588	0.2435	0.2557	0.2420	142	0.4481	-0.0043	31.3
2997.0	0.5522	0.2588	0.2435	0.2557	0.2420	142	0.4500	-0.0043	31.3
3010.0	0.5502	0.2588	0.2435	0.2557	0.2420	142	0.4520	-0.0043	31.3
3023.0	0.5482	0.2588	0.2434	0.2556	0.2420	142	0.4540	-0.0043	31.2
3036.0	0.5461	0.2588	0.2434	0.2556	0.2420	142	0.4561	-0.0043	31.2
3049.0	0.5442	0.2588	0.2434	0.2556	0.2420	142	0.4580	-0.0043	31.2
3063.0	0.5422	0.2589	0.2434	0.2556	0.2420	142	0.4600	-0.0043	31.2
3075.0	0.5402	0.2588	0.2433	0.2556	0.2419	142	0.4620	-0.0044	31.2
3088.0	0.5381	0.2589	0.2433	0.2556	0.2419	142	0.4641	-0.0044	31.2
3102.0	0.5362	0.2589	0.2433	0.2556	0.2419	141	0.4660	-0.0044	31.1
3115.0	0.5342	0.2589	0.2433	0.2555	0.2419	141	0.4680	-0.0044	31.1
3127.0	0.5322	0.2589	0.2432	0.2555	0.2419	141	0.4700	-0.0044	31.0
3141.0	0.5302	0.2589	0.2432	0.2555	0.2419	141	0.4720	-0.0044	31.0

Test Time (sec)	Horiz. Reading (in)	Vert. 1 Reading (in)	Vert. 2 Reading (in)	Vert. 3 Reading (in)	Vert. 4 Reading (in)	Shear Load (lbf)	Horiz. Deflection (in)	Avg. Vert. Deflection (in)	Shear Stress (psi)
3154.0	0.5282	0.2589	0.2432	0.2555	0.2419	141	0.4740	-0.0044	31.0
3167.0	0.5261	0.2589	0.2432	0.2555	0.2419	141	0.4761	-0.0044	31.0
3179.0	0.5242	0.2589	0.2432	0.2555	0.2419	141	0.4780	-0.0044	31.0
3192.0	0.5221	0.2589	0.2431	0.2554	0.2419	141	0.4801	-0.0045	31.0
3206.0	0.5202	0.2589	0.2431	0.2554	0.2419	141	0.4820	-0.0045	30.9
3219.0	0.5182	0.2589	0.2431	0.2554	0.2419	140	0.4840	-0.0045	30.8
3232.0	0.5161	0.2590	0.2431	0.2554	0.2419	140	0.4861	-0.0044	30.8
3245.0	0.5142	0.2590	0.2430	0.2554	0.2419	140	0.4880	-0.0045	30.7
3259.0	0.5122	0.2590	0.2430	0.2554	0.2419	139	0.4900	-0.0045	30.7
3272.0	0.5102	0.2590	0.2430	0.2553	0.2419	139	0.4920	-0.0045	30.6
3285.0	0.5081	0.2590	0.2429	0.2553	0.2419	139	0.4941	-0.0045	30.5
3298.0	0.5062	0.2590	0.2429	0.2553	0.2419	138	0.4960	-0.0045	30.4
3312.0	0.5042	0.2590	0.2429	0.2553	0.2419	138	0.4980	-0.0045	30.4
3325.0	0.5022	0.2590	0.2429	0.2553	0.2419	138	0.5000	-0.0045	30.4
3338.0	0.5001	0.2590	0.2428	0.2552	0.2419	138	0.5021	-0.0046	30.3
3351.0	0.4982	0.2590	0.2428	0.2552	0.2418	137	0.5040	-0.0046	30.2
3365.0	0.4962	0.2590	0.2428	0.2552	0.2418	137	0.5060	-0.0046	30.2
3378.0	0.4942	0.2591	0.2427	0.2552	0.2418	137	0.5080	-0.0046	30.2
3379.0	0.4940	0.2591	0.2427	0.2552	0.2418	137	0.5082	-0.0046	30.2



Photo Report

Project Name SR1 Flood Control Project - Inlet Debris Barrier
 Lithology Shale, black, soft
 Hole Number DB-3 Depth (m) 23.11
 Test Type Direct shear of intact specimen

Project Number 110773396
 Lab ID DS-26

As Received



Core Preparation

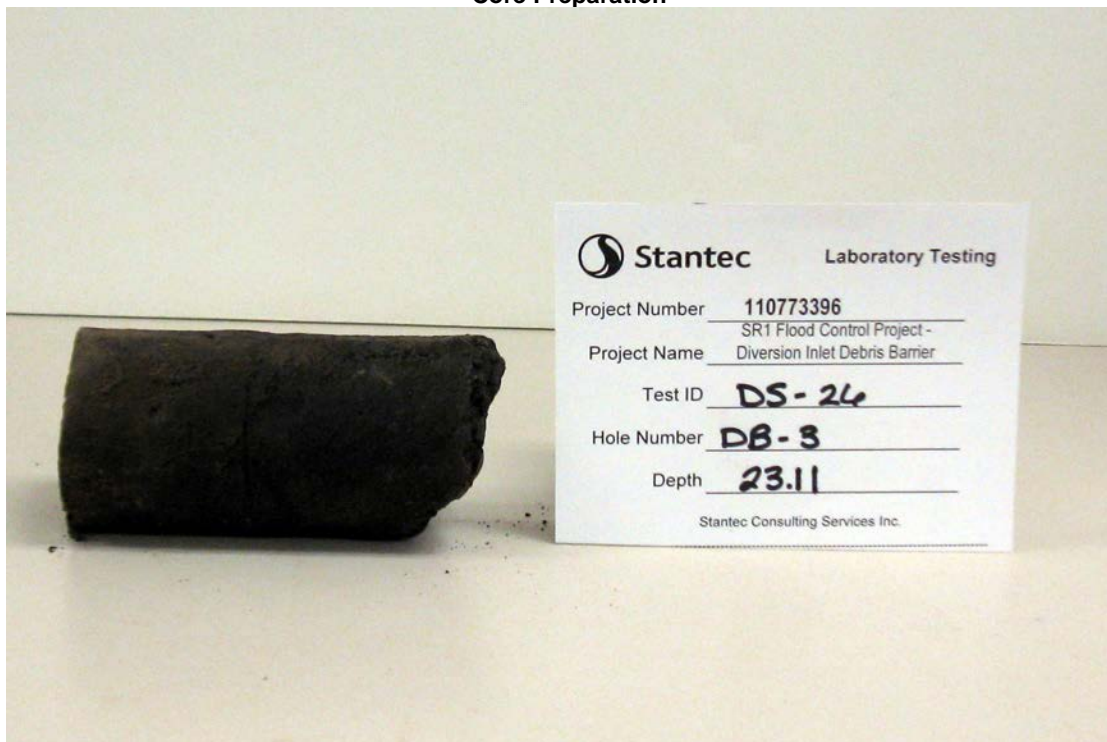




Photo Report

Project Name SR1 Flood Control Project - Inlet Debris Barrier
 Lithology Shale, black, soft
 Hole Number DB-3 Depth (m) 23.11
 Test Type Direct shear of intact specimen

Project Number 110773396
 Lab ID DS-26

Post Test



Post Test



2018 Rock Testing Results
SDI's



Slake Durability Index

ASTM D 4644

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier

Project Number 110773396

Lab ID	Source	Depth	Material Description	Fragment Description	MC (%)	Testing Dates	Temp Range (°C)	Temp Avg. (°C)	Initial Wet Wt. (g)	Initial Dry Wt. (g)	Final Dry Wt. (g)	SDI (%)
7	DB-1	20.40'-20.62'	Limestone, gray, very hard	Type I - Virtually unchanged.	1.3	05/23/2018 - 05/30/2018	19.6-25.5	22.3	547.27	540.02	535.48	99.2
8	DB-1	21.38'-21.58'	Shale, dark gray, hard	Type II - Large and small fragments.	4.3	05/23/2018 - 05/30/2018	19.4-25.6	22.4	518.54	497.19	466.07	93.7
12	DB-1	25.26'-25.50'	Shale, dark gray, soft	Type III - Exclusively small fragments.	5.3	05/23/2018 - 05/30/2018	19.3-25.5	22.2	519.60	493.36	211.49	42.9
14	DB-1	28.82'-29.12'	Shale, dark gray, moderately hard	Type III - Exclusively small fragments.	4.5	05/23/2018 - 05/30/2018	19.3-25.6	22.5	516.14	493.79	339.38	68.7
15	DB-1	29.26'-29.38'	Shale, dark gray, moderately hard	Type III - Exclusively small fragments.	11.0	05/23/2018 - 05/30/2018	19.5-25.8	22.4	521.44	469.83	382.21	81.4
24	DB-3	21.99'-22.17'	Shale, dark gray, moderately hard	Type III - Exclusively small fragments.	7.2	05/23/2018 - 05/30/2018	19.5-26	22.5	460.45	429.63	262.84	61.2
28	DB-3	26.50'-26.70'	Claystone, dark gray, soft	Type III - Exclusively small fragments.	9.5	05/23/2018 - 05/30/2018	19.5-25.5	22.2	454.69	415.11	35.65	8.6
32	DB-3	30.24'-30.42'	Shale, dark gray, hard	Type II - Large and small fragments.	4.7	05/23/2018 - 05/30/2018	19.5-25.8	22.3	494.97	472.63	451.23	95.5

Comments _____

Reviewed By _____

2018 Rock Testing Results Unconfined Compression



Elastic Moduli of Intact Rock Core Specimens in Uniaxial Compression

ASTM D 7012, Method D

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
 Hole Number DB-1 Depth (m) 10.58-10.71
 Material Claystone, brown, soft

Project Number 110773396
 Lab ID EP-1
 Date Received 05/15/2018

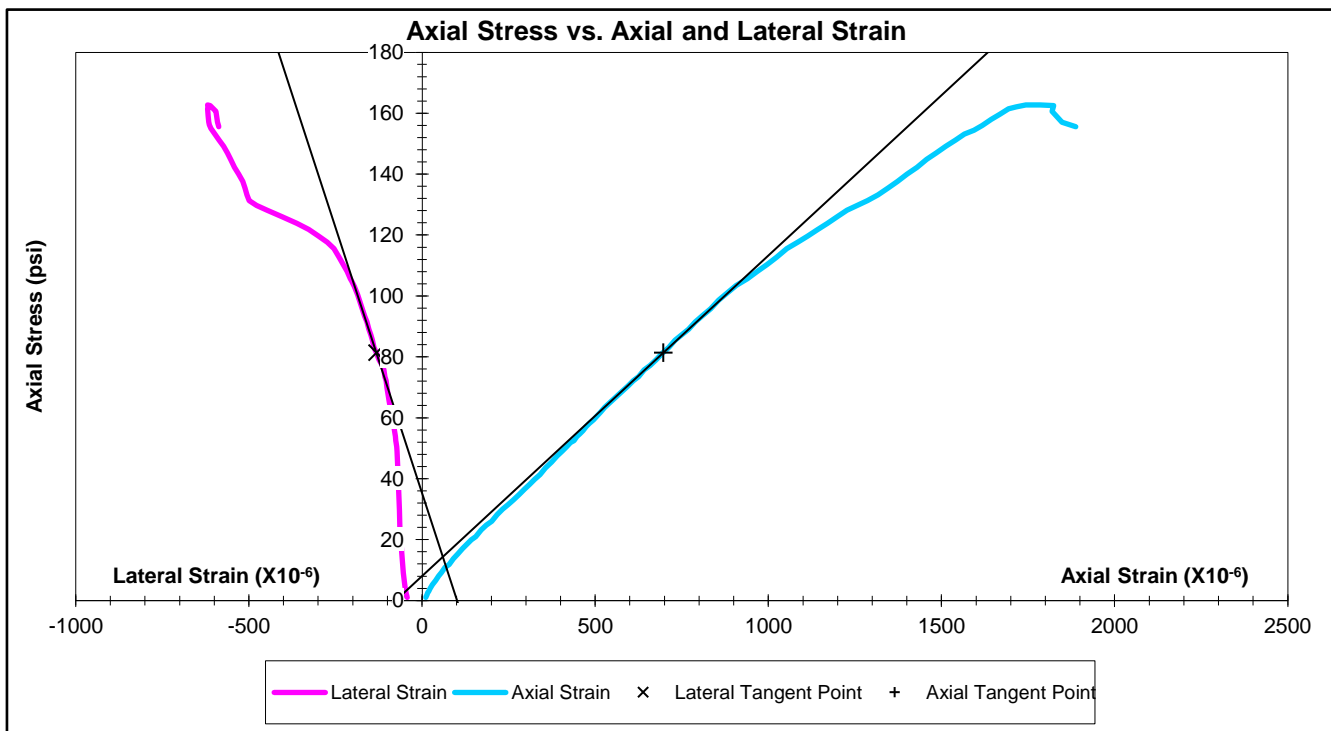
Temperature (°C) 21 Moisture Condition Moist

Date Tested 05/29/2018

Side Planeness Fail
 Perpendicularity Pass
 End Planeness Pass
 Parallelism Pass

Height (in.) 5.065
 Diameter (in.) 2.413
 Area(in²) 4.572

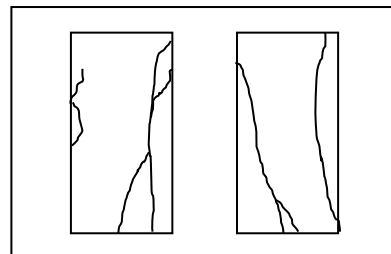
Wet Unit Weight (pcf) 142
 Dry Unit Weight (pcf) N/A
 Moisture Content (%) N/A



Elastic Moduli Results at 50% Unconfined Compressive Strength

Young's Modulus, Axial Tangent Modulus 0.11 x10⁶ psi
 Lateral Tangent Modulus -0.35 x10⁶ psi
 Poisson's Ratio 0.30

Unconfined Compressive Strength 160 psi
 50% Unconfined Compressive Strength 80 psi
 Load Rate 8 lbf/sec
 Type of Failure Shear



Failure Sketch

Comments _____

Reviewed By RJ

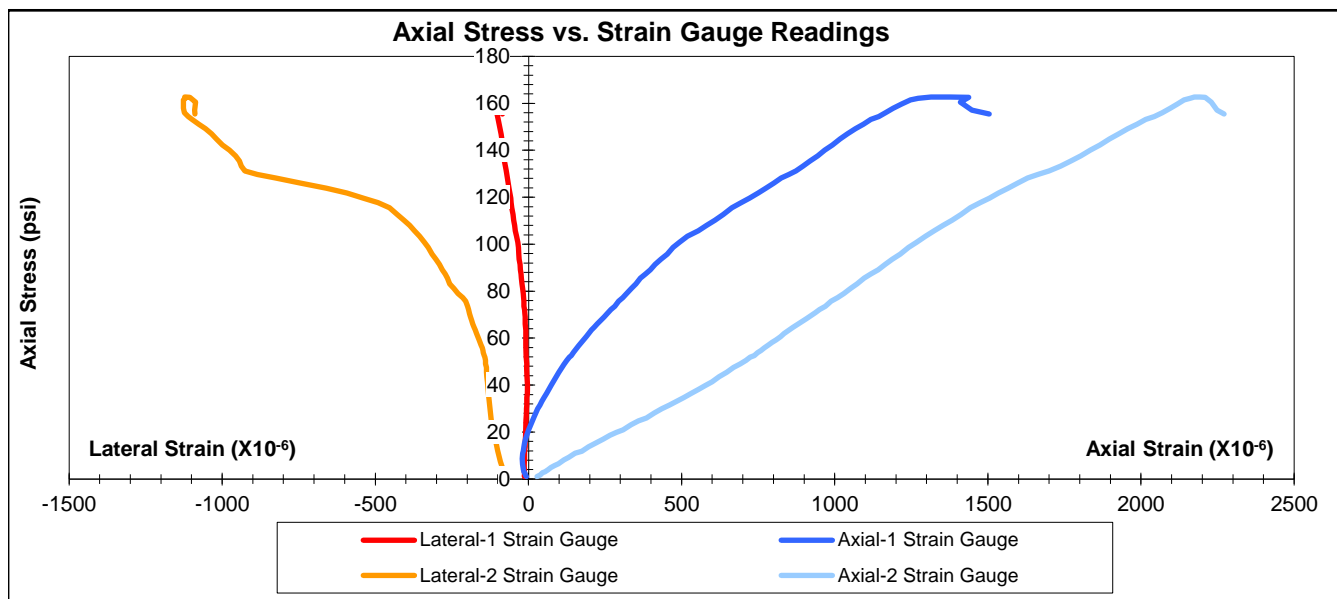
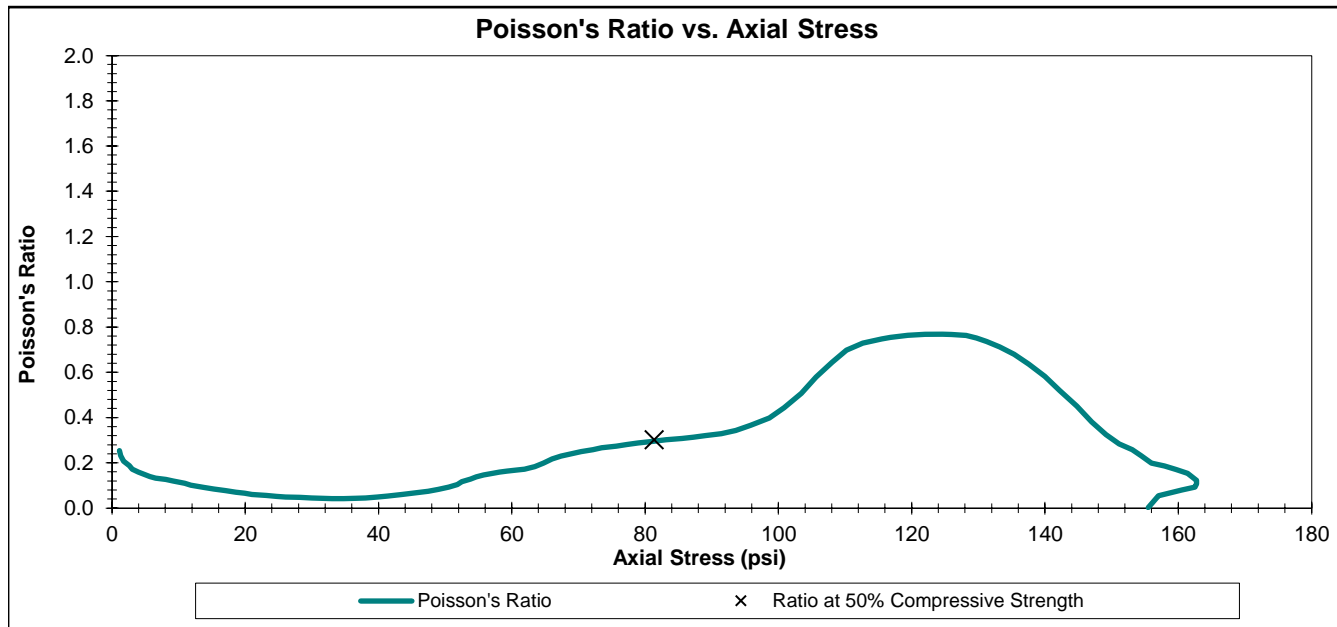


Elastic Moduli of Intact Rock Core Specimens in Uniaxial Compression

ASTM D 7012, Method D

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
 Hole Number DB-1 Depth (m) 10.58-10.71
 Material Claystone, brown, soft

Project Number 110773396
 Lab ID EP-1
 Date Received 05/15/2018



Note 1: A compression-positive sign convention is applied and consistently used throughout this application.
 Note 2: The tangent moduli slope is calculated using a linear regression technique.



Elastic Moduli of Intact Rock Core Specimens in Uniaxial Compression

ASTM D 7012, Method D

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
 Hole Number DB-1 Depth (m) 10.58-10.71
 Lithology Claystone, brown, soft

Project Number 110773396
 Lab ID EP-1
 Date Received 05/15/2018

Time (sec)	Load (lbf)	Axial Strain (x10 ⁻⁶ strain)		Lateral Strain (x10 ⁻⁶ strain)		Average Strain (x10 ⁻⁶ strain)		Stress (psi)	Poisson's Ratio
		Axial ₁	Axial ₂	Lateral ₁	Lateral ₂	Axial	Lateral		
0	5	-6	28	-13	-73	11	-43	1.1	0.25
1	6	-8	32	-14	-74	12	-44	1.3	0.23
2	8	-10	38	-13	-75	14	-44	1.7	0.21
3	12	-13	46	-13	-79	17	-46	2.6	0.19
4	14	-15	54	-14	-80	20	-47	3.1	0.17
5	18	-16	64	-13	-83	24	-48	3.9	0.16
6	22	-18	73	-14	-85	28	-50	4.8	0.15
7	26	-19	84	-14	-87	33	-51	5.7	0.14
8	30	-19	98	-14	-90	40	-52	6.6	0.13
9	37	-20	116	-13	-93	48	-53	8.1	0.13
10	42	-20	132	-13	-95	56	-54	9.2	0.12
11	50	-19	152	-13	-98	67	-56	10.9	0.11
12	54	-17	174	-13	-100	79	-57	11.8	0.10
13	63	-15	196	-11	-103	91	-57	13.8	0.09
14	70	-13	220	-11	-106	104	-59	15.3	0.08
15	78	-9	244	-11	-108	118	-60	17.1	0.08
16	85	-6	266	-10	-111	130	-61	18.6	0.07
17	91	-2	287	-9	-113	143	-61	19.9	0.07
18	96	1	309	-8	-116	155	-62	21.0	0.06
19	106	7	335	-8	-119	171	-64	23.2	0.06
20	113	12	359	-8	-120	186	-64	24.7	0.05
21	119	18	385	-7	-122	202	-65	26.0	0.05
22	129	24	411	-6	-124	218	-65	28.2	0.05
23	137	30	436	-6	-126	233	-66	30.0	0.04
24	144	37	460	-5	-127	249	-66	31.5	0.04
25	151	44	484	-5	-129	264	-67	33.0	0.04
26	159	51	508	-5	-129	280	-67	34.8	0.04
27	167	59	532	-4	-131	296	-68	36.5	0.04
28	174	66	555	-4	-132	311	-68	38.1	0.05
29	182	74	577	-4	-133	326	-69	39.8	0.05
30	189	81	600	-4	-134	341	-69	41.3	0.05
31	199	90	623	-5	-136	357	-71	43.5	0.06
32	208	100	648	-5	-137	374	-71	45.5	0.07
33	217	109	670	-5	-137	390	-71	47.5	0.07
34	224	118	692	-5	-140	405	-73	49.0	0.08
35	231	125	710	-6	-140	418	-73	50.5	0.09
36	237	134	724	-7	-142	429	-75	51.8	0.10
37	240	140	737	-7	-144	439	-76	52.5	0.12
38	246	146	748	-7	-147	447	-77	53.8	0.13
39	250	152	759	-8	-149	456	-79	54.7	0.14
40	255	159	770	-8	-151	465	-80	55.8	0.15
41	261	165	783	-8	-155	474	-82	57.1	0.15
42	266	172	795	-8	-158	484	-83	58.2	0.16
43	271	181	809	-8	-161	495	-85	59.3	0.16
44	277	188	823	-9	-165	506	-87	60.6	0.17
45	283	197	835	-9	-169	516	-89	61.9	0.17
46	290	206	850	-9	-174	528	-92	63.4	0.18
47	296	215	866	-10	-178	541	-94	64.7	0.20
48	302	224	881	-11	-182	553	-97	66.1	0.22
49	308	235	898	-11	-185	567	-98	67.4	0.23
50	316	247	915	-11	-189	581	-100	69.1	0.24
51	322	257	933	-12	-192	595	-102	70.4	0.25
52	330	269	951	-13	-195	610	-104	72.2	0.26
53	336	282	969	-15	-199	626	-107	73.5	0.27
54	346	294	988	-15	-205	641	-110	75.7	0.27
55	353	308	1009	-16	-214	659	-115	77.2	0.28
56	361	321	1030	-17	-230	676	-124	79.0	0.29
57	371	336	1052	-19	-244	694	-132	81.2	0.29
58	380	351	1073	-21	-257	712	-139	83.1	0.30
59	391	366	1096	-23	-264	731	-144	85.5	0.31
60	399	382	1118	-24	-272	750	-148	87.3	0.31
61	407	398	1142	-26	-281	770	-154	89.0	0.32
62	418	414	1165	-27	-291	790	-159	91.4	0.33
63	428	432	1188	-30	-302	810	-166	93.6	0.34
64	438	453	1214	-31	-315	834	-173	95.8	0.37
65	451	472	1241	-33	-327	857	-180	98.6	0.40
66	461	493	1267	-35	-340	880	-188	100.8	0.44
67	473	519	1296	-39	-355	908	-197	103.5	0.51
68	483	555	1325	-43	-372	940	-208	105.6	0.58
69	494	582	1354	-45	-388	968	-217	108.1	0.64
70	504	609	1383	-48	-407	996	-228	110.2	0.70

Time (sec)	Load (lbf)	Axial Strain (x10 ⁻⁶ strain)		Lateral Strain (x10 ⁻⁶ strain)		Average Strain (x10 ⁻⁶ strain)		Stress (psi)	Poisson's Ratio
		Axial ₁	Axial ₂	Lateral ₁	Lateral ₂	Axial	Lateral		
71	515	636	1412	-50	-428	1024	-239	112.6	0.73
72	528	664	1443	-54	-454	1054	-254	115.5	0.75
73	538	695	1475	-57	-491	1085	-274	117.7	0.76
74	547	722	1505	-58	-539	1114	-299	119.6	0.76
75	557	750	1535	-61	-593	1143	-327	121.8	0.77
76	566	775	1566	-64	-659	1171	-362	123.8	0.77
77	576	801	1597	-66	-744	1199	-405	126.0	0.77
78	586	825	1630	-68	-826	1228	-447	128.2	0.76
79	593	850	1663	-70	-885	1257	-478	129.7	0.75
80	600	873	1700	-73	-926	1287	-500	131.2	0.74
81	609	896	1737	-75	-937	1317	-506	133.2	0.71
82	619	919	1771	-78	-944	1345	-511	135.4	0.68
83	629	944	1803	-80	-956	1374	-518	137.6	0.64
84	640	967	1835	-83	-976	1401	-530	140.0	0.58
85	650	992	1866	-84	-999	1429	-542	142.2	0.52
86	662	1017	1897	-87	-1019	1457	-553	144.8	0.45
87	672	1041	1928	-90	-1034	1485	-562	147.0	0.38
88	682	1068	1957	-92	-1054	1513	-573	149.2	0.33
89	691	1094	1987	-95	-1076	1541	-586	151.1	0.28
90	700	1118	2015	-98	-1098	1567	-598	153.1	0.26
91	706	1144	2043	-101	-1111	1594	-606	154.4	0.23
92	713	1166	2070	-104	-1123	1618	-614	156.0	0.20
93	722	1191	2096	-107	-1126	1644	-617	157.9	0.19
94	730	1218	2119	-109	-1127	1669	-618	159.7	0.17
95	738	1247	2141	-113	-1127	1694	-620	161.4	0.15
96	741	1272	2160	-115	-1120	1716	-618	162.1	0.14
97	744	1314	2174	-118	-1122	1744	-620	162.7	0.12
98	744	1378	2193	-119	-1119	1786	-619	162.7	0.11
99	743	1438	2210	-118	-1105	1824	-612	162.5	0.09
100	734	1410	2229	-104	-1087	1820	-596	160.6	0.08
101	718	1448	2248	-92	-1090	1848	-591	157.1	0.05
102	711	1504	2271	-85	-1089	1888	-587	155.5	0.00



Photo Report

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
 Lithology Claystone, brown, soft
 Hole Number DB-1 Depth (m) 10.58-10.71
 Test Type Elastic Moduli of Intact Rock Core in Uniaxial Compression
As Received

Project Number 110773396
 Lab ID EP-1



Core Preparation

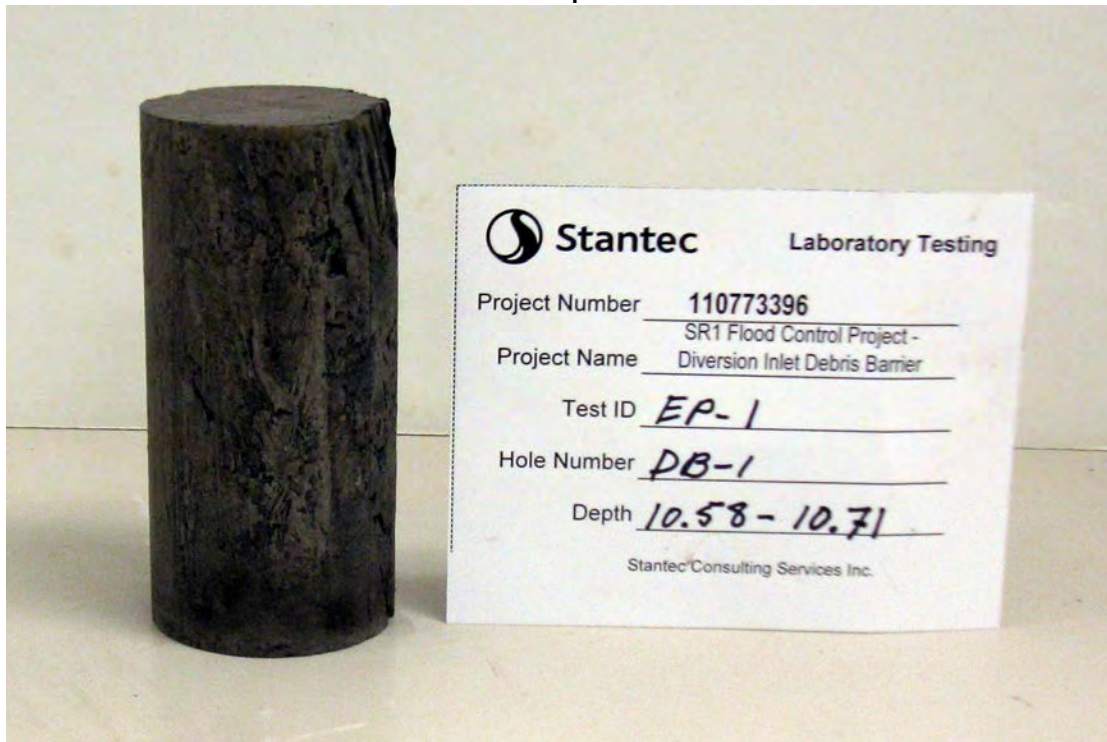




Photo Report

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
 Lithology Claystone, brown, soft
 Hole Number DB-1 Depth (m) 10.58-10.71
 Test Type Elastic Moduli of Intact Rock Core in Uniaxial Compression
Core Preparation

Project Number 110773396
 Lab ID EP-1



Post Test

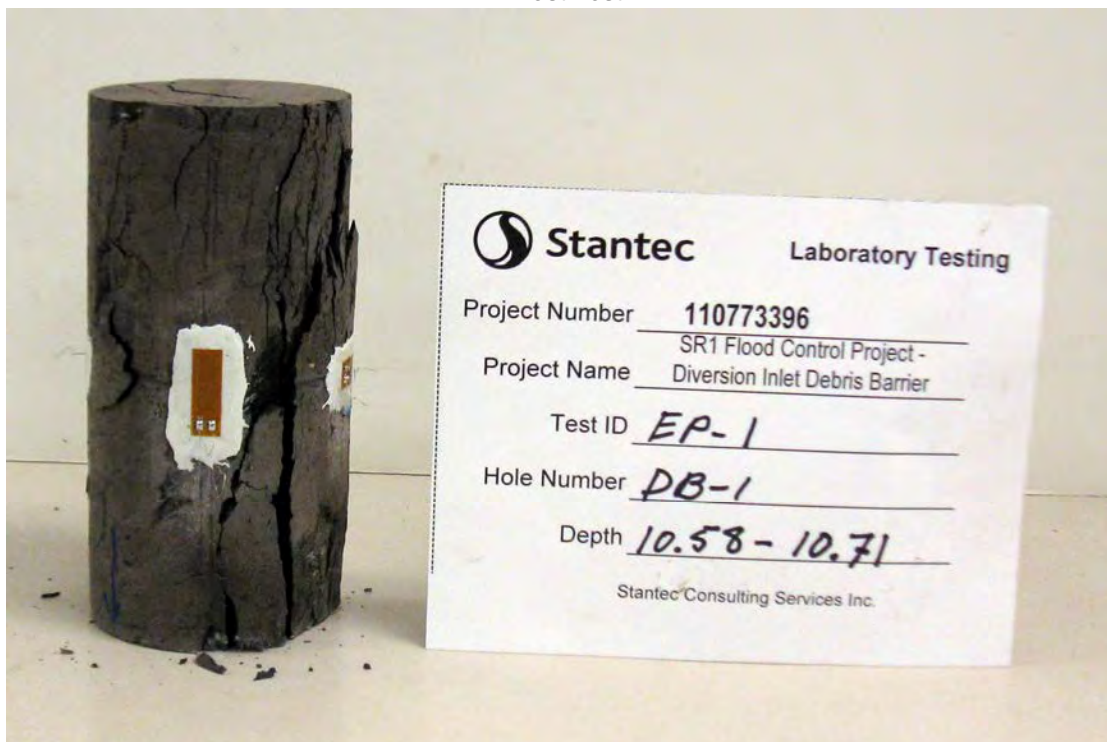


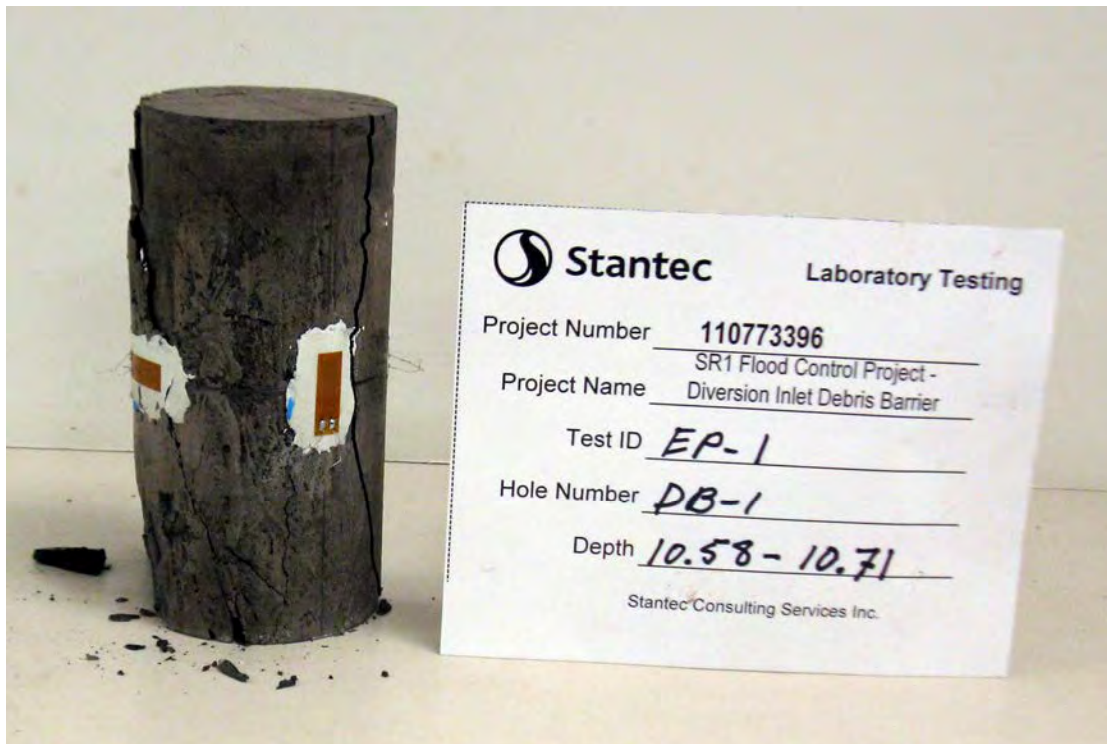


Photo Report

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
Lithology Claystone, brown, soft
Hole Number DB-1 Depth (m) 10.58-10.71
Test Type Elastic Moduli of Intact Rock Core in Uniaxial Compression

Project Number 110773396
Lab ID EP-1

Post Test





Elastic Moduli of Intact Rock Core Specimens in Uniaxial Compression

ASTM D 7012, Method D

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
 Hole Number DB-1 Depth (m) 18.07-18.22
 Material Siltstone, dark gray, moderately hard

Project Number 110773396
 Lab ID EP-3
 Date Received 05/15/2018

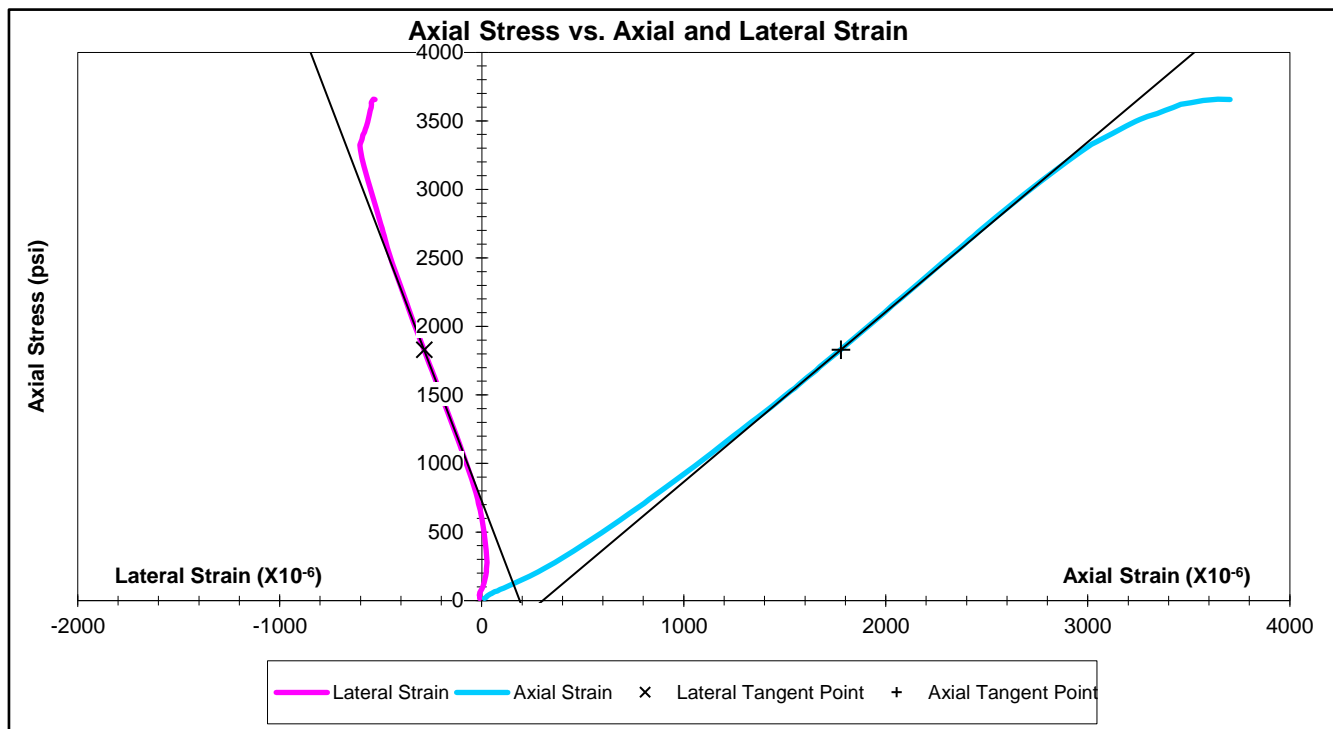
Temperature (°C) 22 Moisture Condition Moist

Date Tested 05/29/2018

Side Planeness Pass
 Perpendicularity Pass
 End Planeness Pass
 Parallelism Pass

Height (in.) 5.785
 Diameter (in.) 2.403
 Area(in²) 4.535

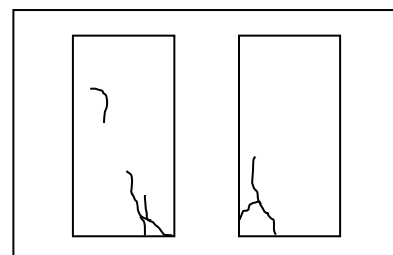
Wet Unit Weight (pcf) 160
 Dry Unit Weight (pcf) N/A
 Moisture Content (%) N/A



Elastic Moduli Results at 50% Unconfined Compressive Strength

Young's Modulus, Axial Tangent Modulus 1.24 x10⁶ psi
 Lateral Tangent Modulus -3.86 x10⁶ psi
 Poisson's Ratio 0.32

Unconfined Compressive Strength 3660 psi
 50% Unconfined Compressive Strength 1830 psi
 Load Rate 58 lbf/sec
 Type of Failure Undetermined



Failure Sketch

Comments _____

Reviewed By RJ

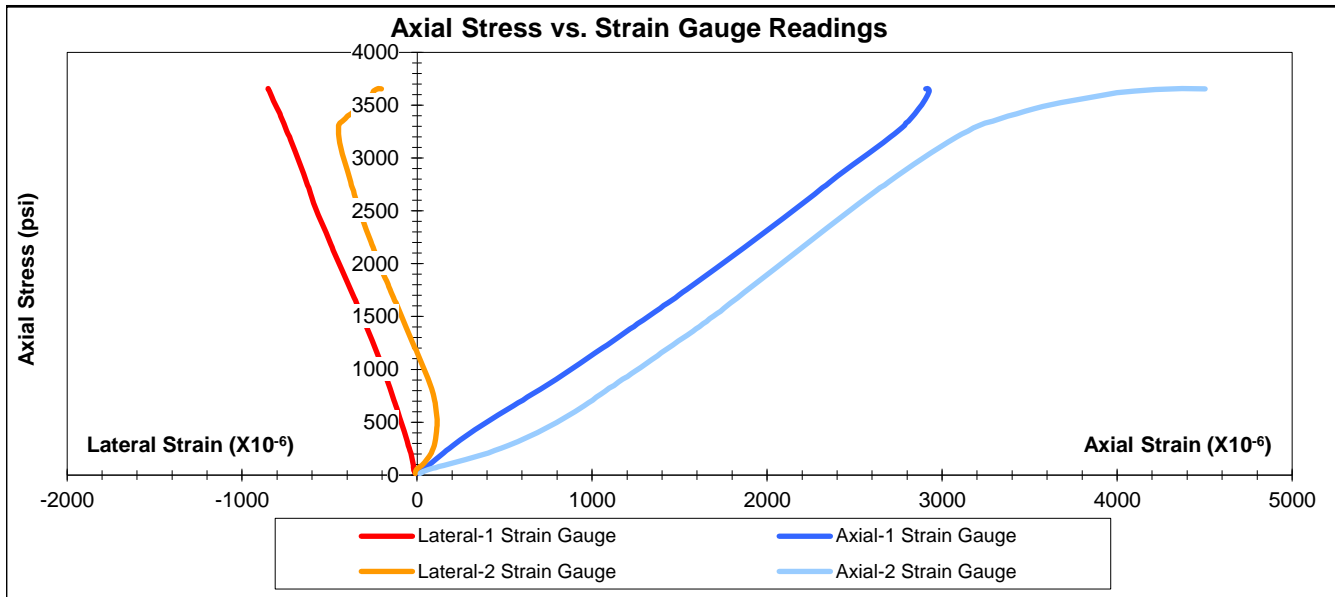
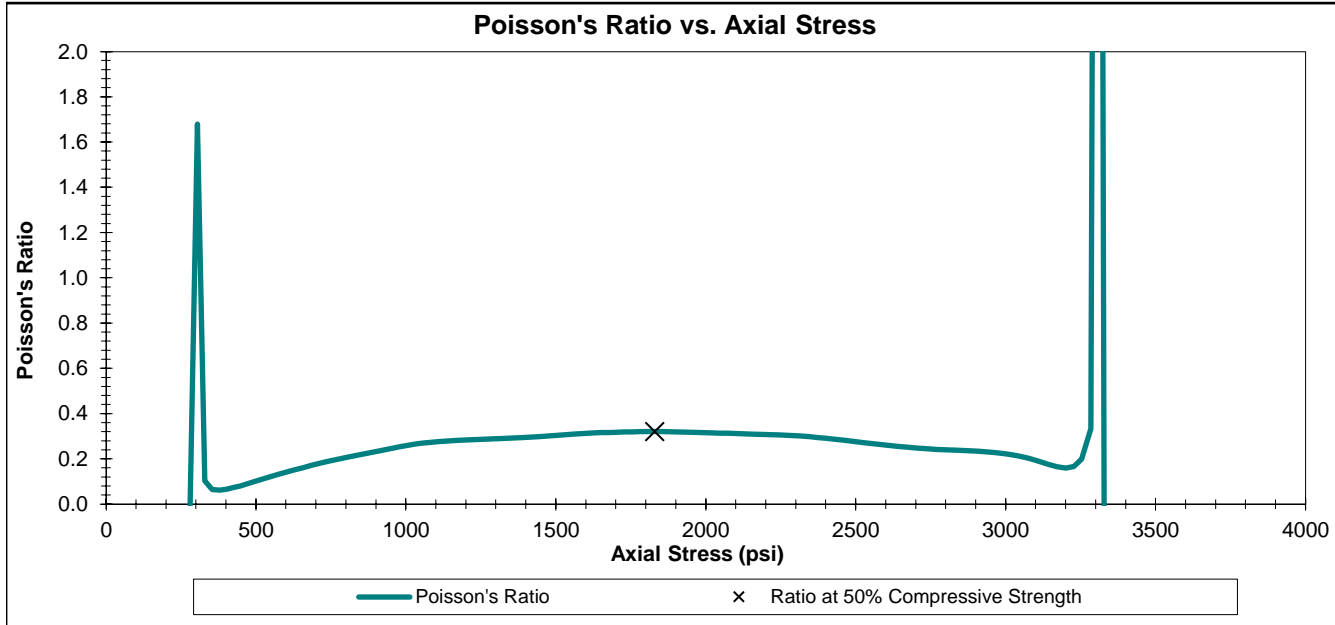


Elastic Moduli of Intact Rock Core Specimens in Uniaxial Compression

ASTM D 7012, Method D

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
 Hole Number DB-1 Depth (m) 18.07-18.22
 Material Siltstone, dark gray, moderately hard

Project Number 110773396
 Lab ID EP-3
 Date Received 05/15/2018



Note 1: A compression-positive sign convention is applied and consistently used throughout this application.

Note 2: The tangent moduli slope is calculated using a linear regression technique.



Elastic Moduli of Intact Rock Core Specimens in Uniaxial Compression

ASTM D 7012, Method D

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
 Hole Number DB-1 Depth (m) 18.07-18.22
 Lithology Siltstone, dark gray, moderately hard

Project Number 110773396
 Lab ID EP-3
 Date Received 05/15/2018

Time (sec)	Load (lbf)	Axial Strain (x10 ⁻⁶ strain)		Lateral Strain (x10 ⁻⁶ strain)		Average Strain (x10 ⁻⁶ strain)		Stress (psi)	Poisson's Ratio
		Axial ₁	Axial ₂	Lateral ₁	Lateral ₂	Axial	Lateral		
0	75	11	16	-10	-10	14	-10	16.5	-0.15
1	97	14	21	-12	-8	18	-10	21.4	-0.16
2	103	15	28	-13	-8	22	-11	22.7	-0.18
3	143	18	33	-14	-8	26	-11	31.5	-0.18
4	166	21	40	-15	-8	31	-12	36.6	-0.17
5	183	24	48	-17	-6	36	-12	40.4	-0.17
6	217	28	58	-17	-5	43	-11	47.8	-0.16
8	234	31	66	-18	-2	49	-10	51.6	-0.15
10	251	34	73	-19	0	54	-10	55.3	-0.15
12	291	41	87	-19	4	64	-8	64.2	-0.14
14	314	48	105	-20	10	77	-5	69.2	-0.14
16	371	56	126	-20	18	91	-1	81.8	-0.13
18	411	65	151	-21	26	108	3	90.6	-0.13
20	479	77	187	-22	37	132	8	105.6	-0.12
22	604	96	245	-26	49	171	12	133.2	-0.12
24	718	115	304	-28	62	210	17	158.3	-0.11
26	792	126	338	-32	70	232	19	174.6	-0.10
28	861	138	370	-33	75	254	21	189.8	-0.10
30	946	152	407	-36	82	280	23	208.6	-0.10
32	1049	167	443	-41	88	305	24	231.3	-0.10
34	1151	186	481	-44	93	334	25	253.8	-0.11
36	1260	204	519	-49	99	362	25	277.8	-0.16
38	1385	225	558	-53	102	392	25	305.4	1.68
40	1493	245	593	-57	105	419	24	329.2	0.10
42	1608	266	628	-63	107	447	22	354.6	0.07
44	1716	287	660	-67	108	474	21	378.4	0.06
46	1830	308	689	-71	111	499	20	403.5	0.07
48	1921	326	713	-76	112	520	18	423.6	0.07
50	2030	348	741	-80	112	545	16	447.6	0.08
52	2127	367	767	-85	113	567	14	469.0	0.09
54	2218	388	790	-88	113	589	13	489.1	0.10
56	2315	409	813	-93	113	611	10	510.5	0.11
58	2424	431	836	-98	113	634	8	534.5	0.12
60	2526	453	860	-102	112	657	5	557.0	0.12
62	2641	478	884	-106	111	681	3	582.3	0.13
64	2749	501	908	-112	109	705	-2	606.1	0.14
66	2863	525	932	-116	107	729	-5	631.3	0.15
68	2978	551	955	-121	106	753	-8	656.6	0.16
70	3098	577	979	-126	103	778	-12	683.1	0.17
72	3212	604	1003	-132	100	804	-16	708.2	0.18
74	3344	630	1026	-137	97	828	-20	737.3	0.19
76	3475	658	1050	-143	92	854	-26	766.2	0.20
78	3595	686	1074	-148	88	880	-30	792.7	0.20
80	3727	714	1099	-154	83	907	-36	821.8	0.21
82	3847	742	1125	-161	77	934	-42	848.3	0.22
84	3990	769	1151	-166	71	960	-48	879.8	0.23
86	4116	796	1176	-172	64	986	-54	907.6	0.23
88	4230	820	1202	-178	58	1011	-60	932.7	0.24
90	4350	844	1224	-184	51	1034	-67	959.2	0.25
92	4453	866	1247	-190	45	1057	-73	981.9	0.25
94	4562	887	1268	-195	39	1078	-78	1005.9	0.26
96	4676	908	1289	-199	33	1099	-83	1031.0	0.26
98	4785	930	1310	-206	27	1120	-90	1055.1	0.27
100	4894	951	1332	-211	21	1142	-95	1079.1	0.27
102	5003	973	1352	-216	14	1163	-101	1103.1	0.28
104	5123	995	1374	-222	7	1185	-108	1129.6	0.28
106	5238	1017	1395	-228	1	1206	-114	1155.0	0.28
108	5358	1040	1417	-234	-5	1229	-120	1181.4	0.28
110	5467	1062	1438	-240	-13	1250	-127	1205.5	0.28
112	5575	1085	1460	-246	-20	1273	-133	1229.3	0.29
114	5702	1108	1483	-253	-26	1296	-140	1257.3	0.29
116	5810	1131	1505	-259	-33	1318	-146	1281.1	0.29
118	5936	1153	1529	-265	-40	1341	-153	1308.9	0.29
120	6057	1176	1553	-271	-44	1365	-158	1335.5	0.29
122	6160	1197	1575	-277	-52	1386	-165	1358.3	0.29
124	6269	1218	1594	-284	-58	1406	-171	1382.3	0.29
126	6372	1239	1614	-289	-64	1427	-177	1405.0	0.30
128	6487	1260	1634	-296	-70	1447	-183	1430.4	0.30
130	6590	1282	1655	-302	-77	1469	-190	1453.1	0.30
132	6710	1304	1673	-308	-83	1489	-196	1479.5	0.30
134	6825	1324	1694	-313	-90	1509	-202	1504.9	0.30

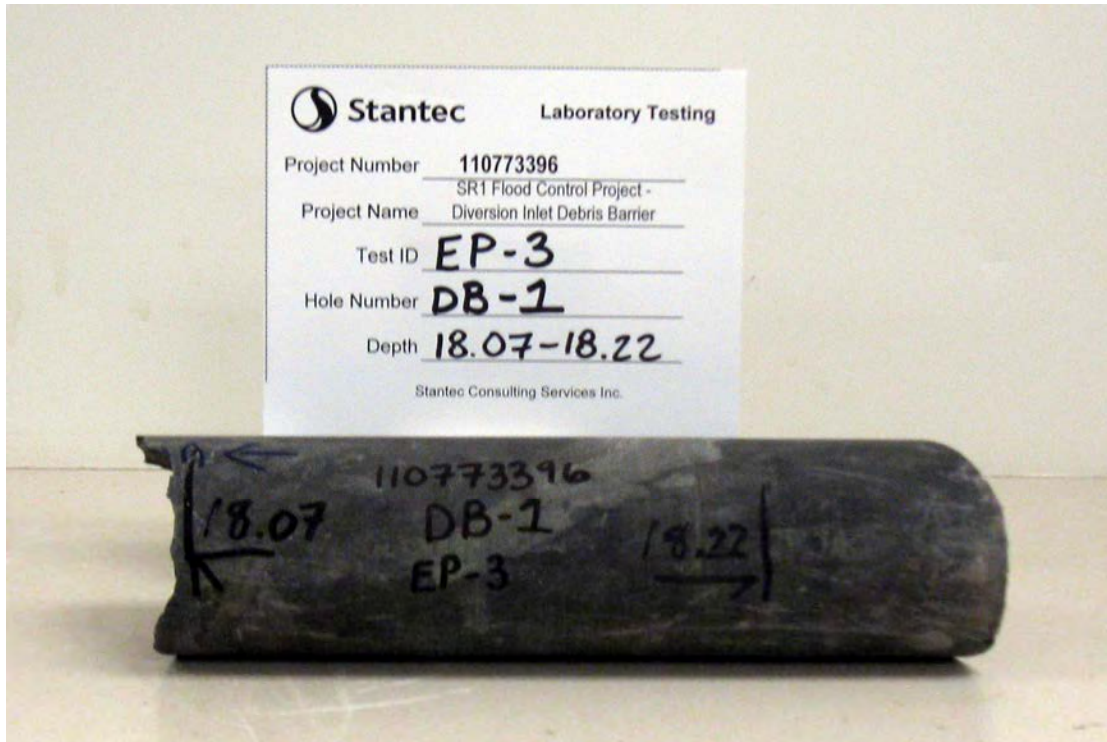
Time (sec)	Load (lbf)	Axial Strain (x10 ⁻⁶ strain)		Lateral Strain (x10 ⁻⁶ strain)		Average Strain (x10 ⁻⁶ strain)		Stress (psi)	Poisson's Ratio
		Axial ₁	Axial ₂	Lateral ₁	Lateral ₂	Axial	Lateral		
136	6928	1346	1714	-320	-96	1530	-208	1527.6	0.31
138	7032	1367	1734	-327	-102	1551	-215	1550.5	0.31
140	7152	1389	1753	-333	-108	1571	-221	1577.0	0.31
142	7273	1410	1773	-340	-114	1592	-227	1603.7	0.31
144	7382	1432	1792	-346	-120	1612	-233	1627.7	0.31
146	7491	1454	1812	-352	-128	1633	-240	1651.7	0.32
148	7611	1476	1832	-359	-134	1654	-247	1678.2	0.32
150	7732	1496	1852	-366	-141	1674	-254	1704.9	0.32
152	7847	1518	1871	-373	-148	1695	-261	1730.2	0.32
154	7961	1541	1891	-380	-154	1716	-267	1755.4	0.32
156	8082	1563	1911	-386	-161	1737	-274	1782.1	0.32
158	8197	1584	1932	-393	-167	1758	-280	1807.4	0.32
160	8317	1607	1952	-401	-173	1780	-287	1833.9	0.32
162	8444	1628	1973	-407	-181	1801	-294	1861.9	0.32
164	8553	1649	1994	-415	-188	1822	-302	1885.9	0.32
166	8679	1672	2015	-422	-194	1844	-308	1913.7	0.32
168	8800	1694	2036	-429	-200	1865	-315	1940.4	0.32
170	8915	1715	2056	-436	-206	1886	-321	1965.7	0.32
172	9047	1738	2077	-443	-213	1908	-328	1994.8	0.32
174	9156	1760	2097	-450	-220	1929	-335	2018.9	0.32
176	9282	1784	2117	-458	-226	1951	-342	2046.7	0.31
178	9409	1806	2137	-465	-233	1972	-349	2074.7	0.31
180	9524	1828	2158	-472	-239	1993	-356	2100.0	0.31
182	9656	1849	2179	-479	-245	2014	-362	2129.1	0.31
184	9776	1871	2200	-485	-251	2036	-368	2155.6	0.31
186	9897	1893	2222	-492	-258	2058	-375	2182.3	0.31
188	10024	1915	2243	-499	-264	2079	-382	2210.3	0.31
190	10144	1938	2264	-506	-270	2101	-388	2236.7	0.31
192	10277	1960	2286	-513	-277	2123	-395	2266.0	0.30
194	10397	1982	2307	-520	-284	2145	-402	2292.5	0.30
196	10518	2004	2329	-527	-289	2167	-408	2319.2	0.30
198	10650	2027	2350	-534	-297	2189	-416	2348.3	0.30
200	10777	2049	2372	-541	-302	2211	-422	2376.3	0.29
202	10898	2072	2395	-549	-308	2234	-429	2403.0	0.29
204	11024	2094	2417	-556	-314	2256	-435	2430.8	0.29
206	11162	2116	2438	-564	-320	2277	-442	2461.2	0.28
208	11277	2138	2461	-571	-326	2300	-449	2486.5	0.28
210	11421	2161	2483	-579	-331	2322	-455	2518.3	0.27
212	11542	2183	2505	-586	-337	2344	-462	2545.0	0.27
214	11669	2205	2529	-591	-342	2367	-467	2573.0	0.26
216	11795	2228	2552	-596	-348	2390	-472	2600.8	0.26
218	11933	2250	2575	-602	-353	2413	-478	2631.2	0.26
220	12060	2272	2598	-607	-359	2435	-483	2659.2	0.25
222	12198	2294	2622	-613	-363	2458	-488	2689.6	0.25
224	12325	2316	2646	-619	-369	2481	-494	2717.6	0.25
226	12445	2338	2670	-625	-375	2504	-500	2744.1	0.24
228	12578	2360	2695	-632	-379	2528	-506	2773.4	0.24
230	12710	2382	2719	-638	-384	2551	-511	2802.5	0.24
232	12843	2404	2744	-644	-388	2574	-516	2831.8	0.24
234	12975	2427	2768	-650	-395	2598	-523	2860.9	0.24
236	13102	2451	2793	-657	-400	2622	-529	2889.0	0.24
238	13234	2474	2818	-663	-405	2646	-534	2918.1	0.23
240	13361	2499	2842	-669	-410	2671	-540	2946.1	0.23
242	13482	2522	2868	-675	-416	2695	-546	2972.7	0.23
244	13620	2545	2893	-682	-420	2719	-551	3003.2	0.22
246	13747	2569	2920	-689	-426	2745	-558	3031.2	0.22
248	13873	2593	2946	-695	-430	2770	-563	3059.0	0.21
250	14000	2615	2973	-702	-435	2794	-569	3087.0	0.20
252	14127	2639	2999	-708	-438	2819	-573	3115.0	0.19
254	14259	2661	3027	-715	-441	2844	-578	3144.1	0.17
256	14386	2684	3055	-722	-445	2870	-584	3172.1	0.16
258	14518	2706	3083	-729	-447	2895	-588	3201.2	0.16
260	14639	2728	3114	-737	-448	2921	-593	3227.9	0.17
262	14755	2748	3147	-744	-448	2948	-596	3253.4	0.20
264	14893	2769	3179	-751	-449	2974	-600	3283.9	0.33
266	15008	2786	3213	-758	-449	3000	-604	3309.2	9.56
268	15100	2793	3245	-763	-441	3019	-602	3329.5	-0.34
270	15193	2807	3288	-767	-426	3048	-597	3350.0	-0.18
272	15296	2821	3332	-773	-410	3077	-592	3372.7	-0.14
274	15400	2834	3377	-780	-397	3106	-589	3395.7	-0.12
276	15498	2844	3426	-784	-377	3135	-581	3417.3	-0.12
278	15607	2855	3474	-791	-359	3165	-575	3441.3	-0.11
280	15717	2866	3526	-798	-341	3196	-570	3465.6	-0.11
282	15821	2876	3578	-805	-325	3227	-565	3488.5	-0.10
284	15919	2886	3634	-811	-312	3260	-562	3510.1	-0.11
286	16017	2896	3695	-817	-300	3296	-559	3531.7	-0.11
288	16115	2903	3783	-823	-287	3343	-555	3553.3	-0.10
290	16218	2911	3856	-829	-275	3384	-552	3576.0	-0.10
292	16316	2918	3926	-835	-261	3422	-548	3597.6	-0.09
294	16414	2923	3999	-840	-251	3461	-546	3619.2	-0.09
296	16472	2925	4096	-844	-249	3511	-547	3632.0	-0.08
298	16547	2924	4220	-848	-235	3572	-542	3648.6	-0.08
300	16593	2918	4371	-851	-222	3645	-537	3658.7	-0.07
301	16576	2907	4501	-851	-204	3704	-528	3655.0	-0.07



Photo Report

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
 Lithology Siltstone, dark gray, moderately hard
 Hole Number DB-1 Depth (m) 18.07-18.22
 Test Type Elastic Moduli of Intact Rock Core in Uniaxial Compression
As Received

Project Number 110773396
 Lab ID EP-3



Core Preparation

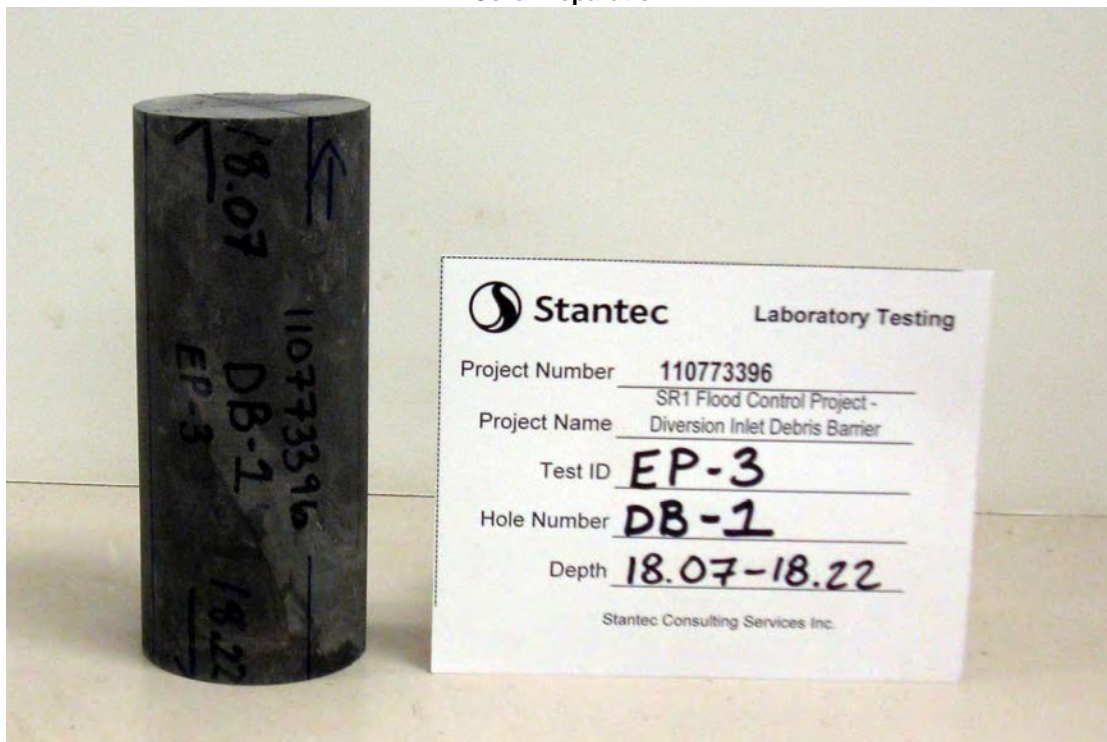




Photo Report

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
 Lithology Siltstone, dark gray, moderately hard
 Hole Number DB-1 Depth (m) 18.07-18.22
 Test Type Elastic Moduli of Intact Rock Core in Uniaxial Compression

Project Number 110773396
 Lab ID EP-3

Core Preparation



Post Test





Photo Report

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
Lithology Siltstone, dark gray, moderately hard
Hole Number DB-1 Depth (m) 18.07-18.22
Test Type Elastic Moduli of Intact Rock Core in Uniaxial Compression

Project Number 110773396
Lab ID EP-3

Post Test





Elastic Moduli of Intact Rock Core Specimens in Uniaxial Compression

ASTM D 7012, Method D

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
 Hole Number DB-1 Depth (m) 19.55-19.70
 Material Siltstone, gray, moderately hard

Project Number 110773396
 Lab ID EP-5
 Date Received 05/15/2018

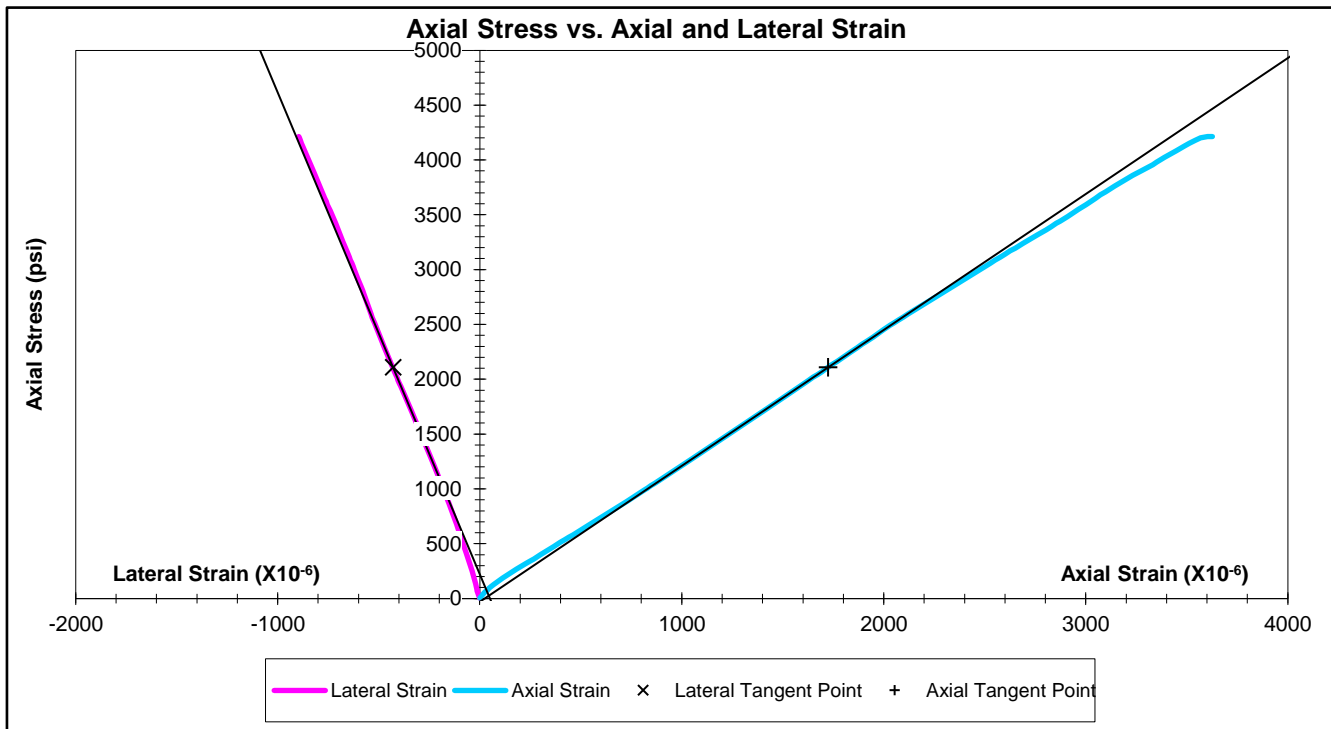
Temperature (°C) 22 Moisture Condition Moist

Date Tested 05/29/2018

Side Planeness Pass
 Perpendicularity Pass
 End Planeness Pass
 Parallelism Pass

Height (in.) 5.705
 Diameter (in.) 2.404
 Area(in²) 4.538

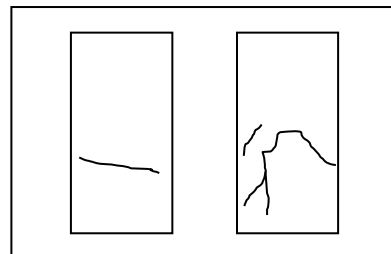
Wet Unit Weight (pcf) 156
 Dry Unit Weight (pcf) N/A
 Moisture Content (%) N/A



Elastic Moduli Results at 50% Unconfined Compressive Strength

Young's Modulus, Axial Tangent Modulus 1.24 x10⁶ psi
 Lateral Tangent Modulus -4.39 x10⁶ psi
 Poisson's Ratio 0.28

Unconfined Compressive Strength 4220 psi
 50% Unconfined Compressive Strength 2110 psi
 Load Rate 59 lbf/sec
 Type of Failure Undetermined



Failure Sketch

Comments Did not use Lateral-2 strain gauge data in calculations.

Reviewed By RJ

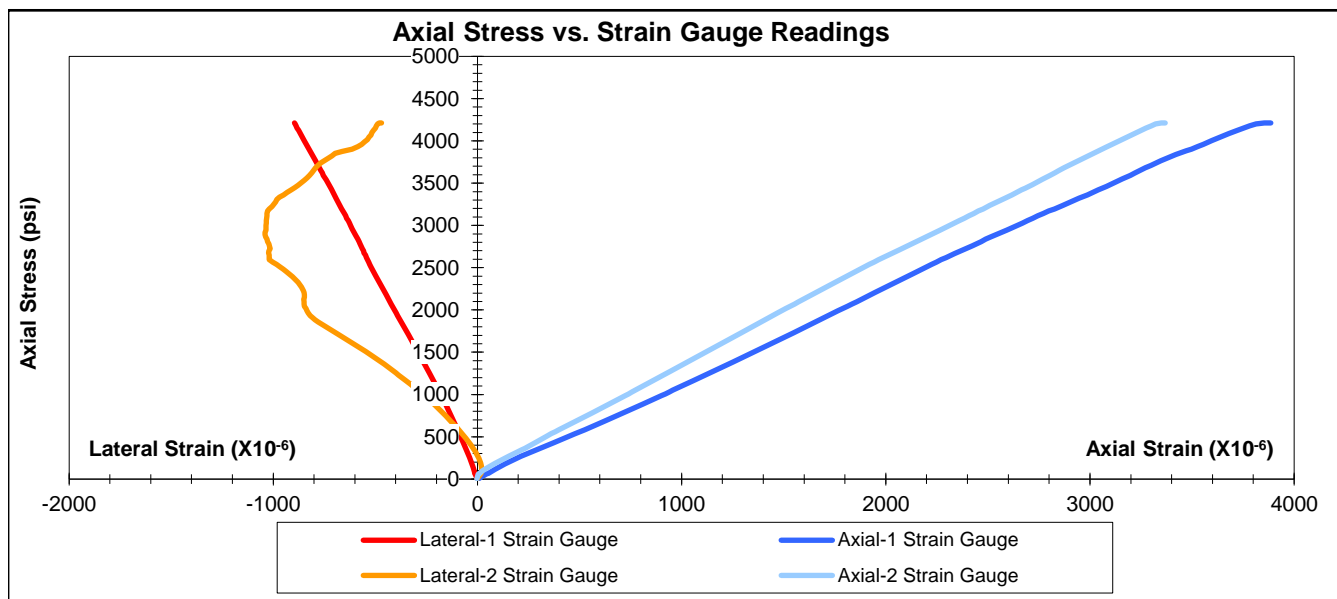
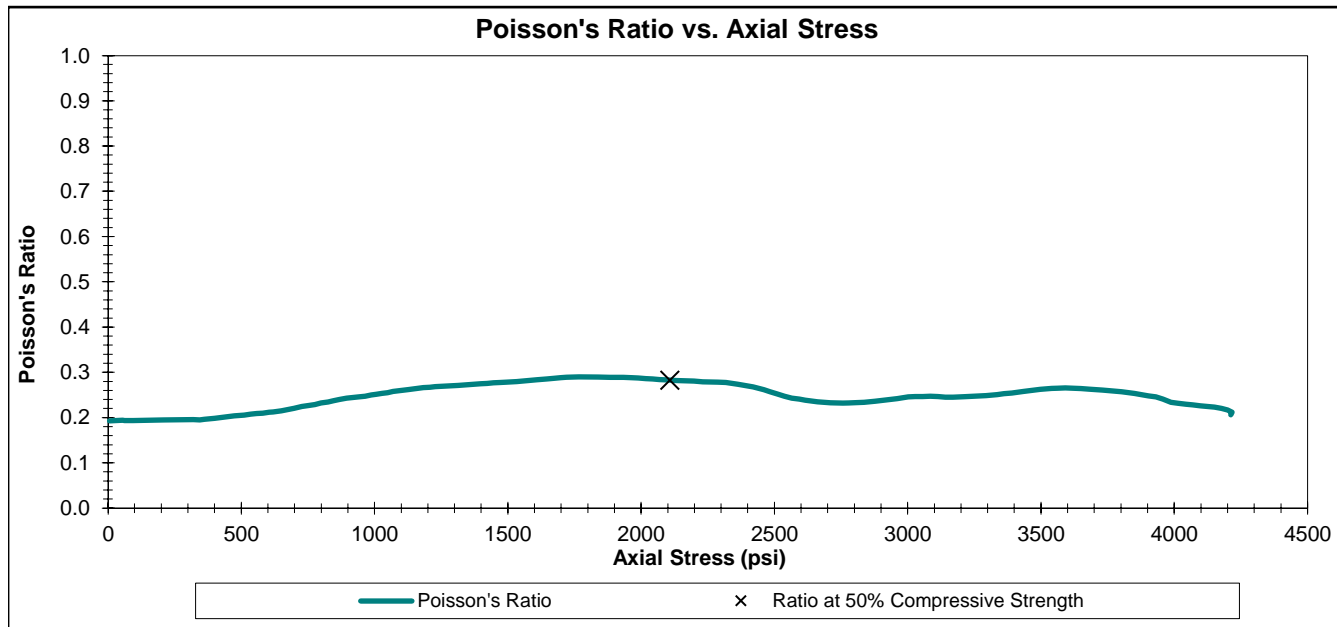


Elastic Moduli of Intact Rock Core Specimens in Uniaxial Compression

ASTM D 7012, Method D

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
 Hole Number DB-1 Depth (m) 19.55-19.70
 Material Siltstone, gray, moderately hard

Project Number 110773396
 Lab ID EP-5
 Date Received 05/15/2018



Note 1: A compression-positive sign convention is applied and consistently used throughout this application.
 Note 2: The tangent moduli slope is calculated using a linear regression technique.



Elastic Moduli of Intact Rock Core Specimens in Uniaxial Compression

ASTM D 7012, Method D

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
 Hole Number DB-1 Depth (m) 19.55-19.70
 Lithology Siltstone, gray, moderately hard

Project Number 110773396
 Lab ID EP-5
 Date Received 05/15/2018

Time (sec)	Load (lbf)	Axial Strain (x10 ⁻⁶ strain)		Lateral Strain (x10 ⁻⁶ strain)		Average Strain (x10 ⁻⁶ strain)		Stress (psi)	Poisson's Ratio
		Axial ₁	Axial ₂	Lateral ₁	Lateral ₂	Axial	Lateral		
0	23	5	-4	-2	-1	1	-2	5.1	0.19
4	251	42	4	-11	14	23	-11	55.3	0.19
6	285	48	7	-12	16	28	-12	62.8	0.19
8	308	54	11	-13	18	33	-13	67.9	0.19
10	354	62	16	-14	19	39	-14	78.0	0.19
12	428	70	23	-15	20	47	-15	94.3	0.19
14	507	85	36	-18	21	61	-18	111.7	0.19
16	758	125	71	-25	19	98	-25	167.0	0.19
18	1083	187	128	-36	9	158	-36	238.7	0.19
20	1305	231	168	-43	-1	200	-43	287.6	0.20
22	1454	263	196	-50	-9	230	-50	320.4	0.20
24	1562	286	216	-55	-15	251	-55	344.2	0.19
26	1642	305	232	-57	-21	269	-57	361.9	0.20
28	1733	323	246	-61	-26	285	-61	381.9	0.20
30	1813	343	260	-64	-31	302	-64	399.5	0.20
32	1910	363	276	-67	-37	320	-67	420.9	0.20
34	2007	384	291	-72	-44	338	-72	442.3	0.20
36	2098	408	306	-75	-50	357	-75	462.3	0.20
40	2321	456	342	-84	-66	399	-84	511.5	0.21
42	2429	479	361	-89	-74	420	-89	535.3	0.21
44	2532	502	381	-92	-83	442	-92	558.0	0.21
46	2635	525	399	-97	-91	462	-97	580.7	0.21
48	2744	548	419	-102	-99	484	-102	604.7	0.21
50	2869	570	438	-106	-109	504	-106	632.3	0.21
52	2966	594	458	-110	-118	526	-110	653.6	0.22
54	3075	617	479	-115	-128	548	-115	677.7	0.22
56	3189	640	498	-120	-137	569	-120	702.8	0.22
58	3298	663	517	-124	-147	590	-124	726.8	0.22
60	3412	685	537	-129	-157	611	-129	751.9	0.23
62	3526	709	557	-134	-166	633	-134	777.0	0.23
64	3629	729	576	-139	-176	653	-139	799.7	0.23
66	3744	753	595	-143	-187	674	-143	825.1	0.23
68	3841	775	615	-148	-196	695	-148	846.5	0.24
70	3944	797	633	-153	-207	715	-153	869.2	0.24
72	4064	819	652	-158	-218	736	-158	895.6	0.24
76	4270	861	688	-168	-239	775	-168	941.0	0.25
78	4379	881	706	-173	-249	794	-173	965.0	0.25
80	4482	902	724	-178	-260	813	-178	987.7	0.25
82	4562	920	740	-181	-270	830	-181	1005.3	0.25
84	4665	939	756	-186	-280	848	-186	1028.0	0.25
86	4762	957	773	-191	-291	865	-191	1049.4	0.26
88	4854	977	790	-196	-300	884	-196	1069.7	0.26
90	4957	996	806	-200	-312	901	-200	1092.4	0.26
92	5060	1017	823	-205	-325	920	-205	1115.1	0.26
94	5157	1036	840	-210	-337	938	-210	1136.5	0.26
96	5266	1055	858	-216	-349	957	-216	1160.5	0.26
98	5369	1076	876	-219	-362	976	-219	1183.2	0.27
100	5478	1097	894	-225	-374	996	-225	1207.2	0.27
102	5570	1117	911	-229	-386	1014	-229	1227.5	0.27
104	5690	1138	929	-235	-399	1034	-235	1253.9	0.27
106	5793	1158	947	-240	-412	1053	-240	1276.6	0.27
108	5902	1179	964	-246	-425	1072	-246	1300.7	0.27
112	6126	1221	1002	-256	-453	1112	-256	1350.0	0.27
114	6229	1242	1021	-262	-466	1132	-262	1372.7	0.27
116	6343	1263	1040	-267	-479	1152	-267	1397.8	0.27
118	6452	1284	1057	-273	-494	1171	-273	1421.9	0.28
120	6561	1305	1077	-279	-509	1191	-279	1445.9	0.28
122	6682	1327	1096	-283	-523	1212	-283	1472.5	0.28
124	6785	1348	1114	-289	-538	1231	-289	1495.2	0.28
126	6900	1369	1133	-295	-554	1251	-295	1520.6	0.28
128	7014	1391	1153	-301	-570	1272	-301	1545.7	0.28
130	7123	1412	1171	-306	-587	1292	-306	1569.7	0.28
132	7244	1435	1191	-312	-603	1313	-312	1596.4	0.28
134	7359	1457	1211	-319	-620	1334	-319	1621.7	0.28
136	7473	1479	1229	-324	-639	1354	-324	1646.9	0.29
138	7594	1501	1250	-330	-656	1376	-330	1673.5	0.29
140	7709	1522	1269	-335	-673	1396	-335	1698.9	0.29
142	7824	1544	1289	-342	-691	1417	-342	1724.2	0.29
144	7950	1566	1308	-347	-709	1437	-347	1752.0	0.29
148	8179	1610	1348	-360	-744	1479	-360	1802.4	0.29
150	8306	1633	1368	-366	-762	1501	-366	1830.4	0.29

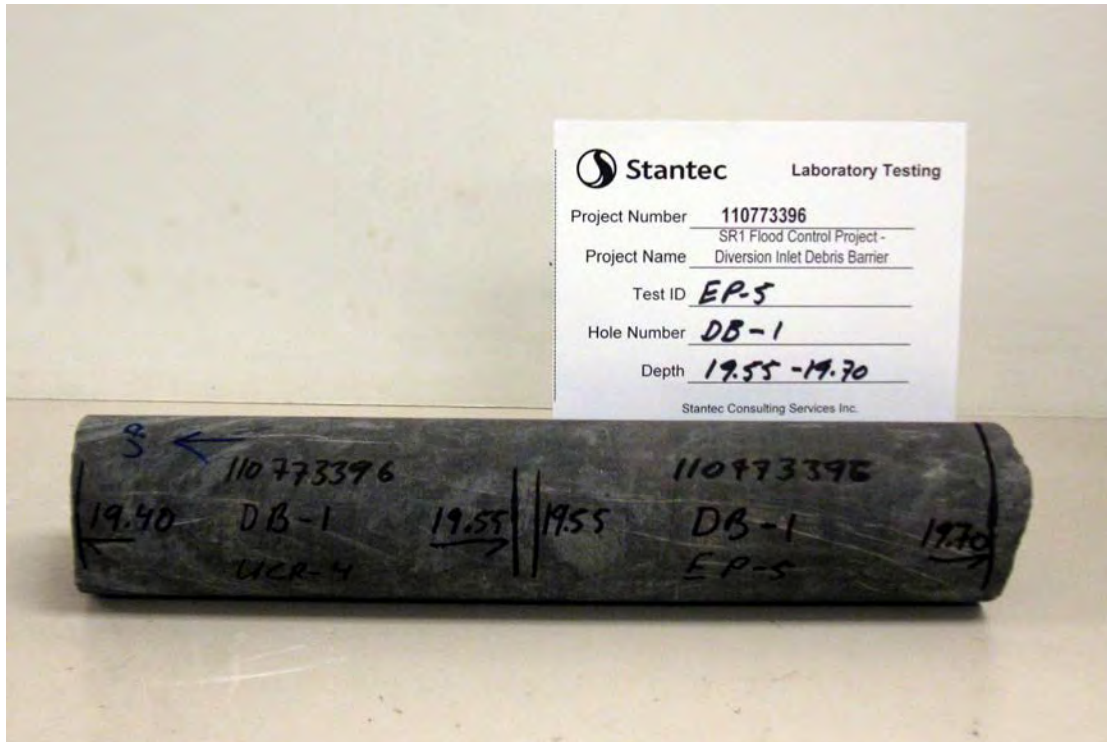
Time (sec)	Load (lbf)	Axial Strain ($\times 10^{-6}$ strain)		Lateral Strain ($\times 10^{-6}$ strain)		Average Strain ($\times 10^{-6}$ strain)		Stress (psi)	Poisson's Ratio
		Axial ₁	Axial ₂	Lateral ₁	Lateral ₂	Axial	Lateral		
152	8426	1655	1388	-372	-780	1522	-372	1856.9	0.29
154	8547	1677	1407	-379	-796	1542	-379	1883.5	0.29
156	8673	1700	1429	-385	-808	1565	-385	1911.3	0.29
158	8777	1721	1449	-391	-819	1585	-391	1934.2	0.29
160	8903	1744	1469	-398	-829	1607	-398	1962.0	0.29
162	9024	1766	1490	-404	-835	1628	-404	1988.7	0.29
164	9156	1789	1510	-410	-840	1650	-410	2017.8	0.29
166	9271	1812	1531	-416	-848	1672	-416	2043.1	0.29
168	9391	1834	1553	-422	-849	1694	-422	2069.5	0.28
170	9518	1857	1573	-428	-849	1715	-428	2097.5	0.28
172	9644	1879	1595	-434	-850	1737	-434	2125.3	0.28
174	9759	1902	1617	-440	-847	1760	-440	2150.6	0.28
176	9891	1924	1638	-447	-848	1781	-447	2179.7	0.28
178	10012	1947	1659	-453	-849	1803	-453	2206.4	0.28
180	10127	1970	1679	-458	-854	1825	-458	2231.7	0.28
184	10380	2016	1722	-472	-867	1869	-472	2287.5	0.28
186	10518	2039	1745	-477	-875	1892	-477	2317.9	0.28
188	10633	2061	1766	-484	-884	1914	-484	2343.2	0.28
190	10748	2085	1787	-490	-895	1936	-490	2368.6	0.27
192	10892	2107	1809	-497	-909	1958	-497	2400.3	0.27
194	11007	2130	1830	-502	-923	1980	-502	2425.7	0.27
196	11145	2154	1852	-509	-936	2003	-509	2456.1	0.26
198	11272	2178	1874	-515	-950	2026	-515	2484.1	0.26
200	11392	2201	1897	-521	-966	2049	-521	2510.5	0.25
202	11513	2224	1919	-527	-983	2072	-527	2537.2	0.25
204	11640	2248	1942	-533	-1002	2095	-533	2565.2	0.24
206	11772	2271	1966	-538	-1019	2119	-538	2594.3	0.24
208	11881	2295	1988	-543	-1019	2142	-543	2618.3	0.24
210	12014	2320	2011	-548	-1020	2166	-548	2647.6	0.24
212	12135	2344	2033	-555	-1023	2189	-555	2674.2	0.23
214	12244	2368	2057	-558	-1021	2213	-558	2698.3	0.23
216	12359	2392	2080	-563	-1015	2236	-563	2723.6	0.23
220	12612	2442	2128	-574	-1021	2285	-574	2779.4	0.23
222	12733	2467	2150	-579	-1028	2309	-579	2806.0	0.23
224	12871	2490	2174	-585	-1031	2332	-585	2836.4	0.23
226	12998	2515	2197	-592	-1037	2356	-592	2864.4	0.24
228	13119	2541	2220	-598	-1041	2381	-598	2891.1	0.24
230	13246	2566	2244	-604	-1041	2405	-604	2919.1	0.24
232	13367	2592	2267	-610	-1036	2430	-610	2945.7	0.24
234	13487	2618	2290	-615	-1036	2454	-615	2972.2	0.24
236	13620	2643	2314	-621	-1036	2479	-621	3001.5	0.25
238	13741	2669	2338	-627	-1033	2504	-627	3028.2	0.25
240	13868	2695	2361	-633	-1033	2528	-633	3056.2	0.25
242	14000	2720	2384	-640	-1032	2552	-640	3085.2	0.25
244	14127	2745	2408	-645	-1030	2577	-645	3113.2	0.25
246	14253	2772	2431	-652	-1031	2602	-652	3141.0	0.25
248	14386	2798	2454	-658	-1028	2626	-658	3170.3	0.24
250	14501	2826	2477	-664	-1019	2652	-664	3195.7	0.25
252	14628	2854	2499	-670	-1006	2677	-670	3223.6	0.25
256	14876	2906	2546	-684	-989	2726	-684	3278.3	0.25
258	15002	2931	2570	-689	-982	2751	-689	3306.1	0.25
260	15135	2960	2594	-695	-969	2777	-695	3335.4	0.25
262	15250	2988	2618	-701	-949	2803	-701	3360.7	0.25
264	15388	3015	2642	-708	-932	2829	-708	3391.1	0.25
266	15527	3041	2665	-713	-912	2853	-713	3421.8	0.26
268	15636	3067	2688	-718	-895	2878	-718	3445.8	0.26
270	15763	3093	2713	-725	-878	2903	-725	3473.8	0.26
272	15896	3118	2735	-732	-863	2927	-732	3503.1	0.26
274	16034	3144	2758	-739	-848	2951	-739	3533.5	0.26
276	16161	3170	2781	-746	-834	2976	-746	3561.5	0.26
278	16299	3197	2804	-754	-822	3001	-754	3591.9	0.27
280	16426	3221	2828	-760	-811	3025	-760	3619.9	0.26
282	16564	3247	2850	-767	-801	3049	-767	3650.3	0.26
284	16703	3272	2873	-773	-792	3073	-773	3680.9	0.26
286	16829	3298	2896	-780	-782	3097	-780	3708.7	0.26
288	16962	3323	2919	-788	-768	3121	-788	3738.0	0.26
292	17221	3378	2968	-799	-730	3173	-799	3795.1	0.26
294	17348	3405	2993	-806	-713	3199	-806	3823.1	0.26
296	17481	3432	3015	-813	-697	3224	-813	3852.4	0.25
298	17590	3464	3039	-819	-663	3252	-819	3876.4	0.25
300	17711	3497	3061	-825	-613	3279	-825	3903.1	0.25
302	17838	3526	3085	-831	-585	3306	-831	3931.0	0.25
304	17959	3555	3110	-838	-566	3333	-838	3957.7	0.24
306	18092	3583	3133	-844	-552	3358	-844	3987.0	0.23
308	18213	3609	3156	-851	-539	3383	-851	4013.7	0.23
310	18352	3637	3180	-857	-531	3409	-857	4044.3	0.23
312	18467	3665	3204	-864	-522	3435	-864	4069.7	0.23
314	18594	3692	3228	-870	-516	3460	-870	4097.6	0.23
316	18715	3723	3251	-876	-508	3487	-876	4124.3	0.22
318	18836	3752	3275	-883	-500	3514	-883	4151.0	0.22
320	18957	3782	3301	-888	-494	3542	-888	4177.6	0.22
322	19061	3814	3322	-893	-488	3568	-893	4200.6	0.22
324	19130	3855	3350	-896	-480	3603	-896	4215.8	0.21
325	19113	3885	3368	-897	-470	3627	-897	4212.0	0.21



Photo Report

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
 Lithology Siltstone, gray, moderately hard
 Hole Number DB-1 Depth (m) 19.55-19.70
 Test Type Elastic Moduli of Intact Rock Core in Uniaxial Compression
As Received

Project Number 110773396
 Lab ID EP-5



Core Preparation

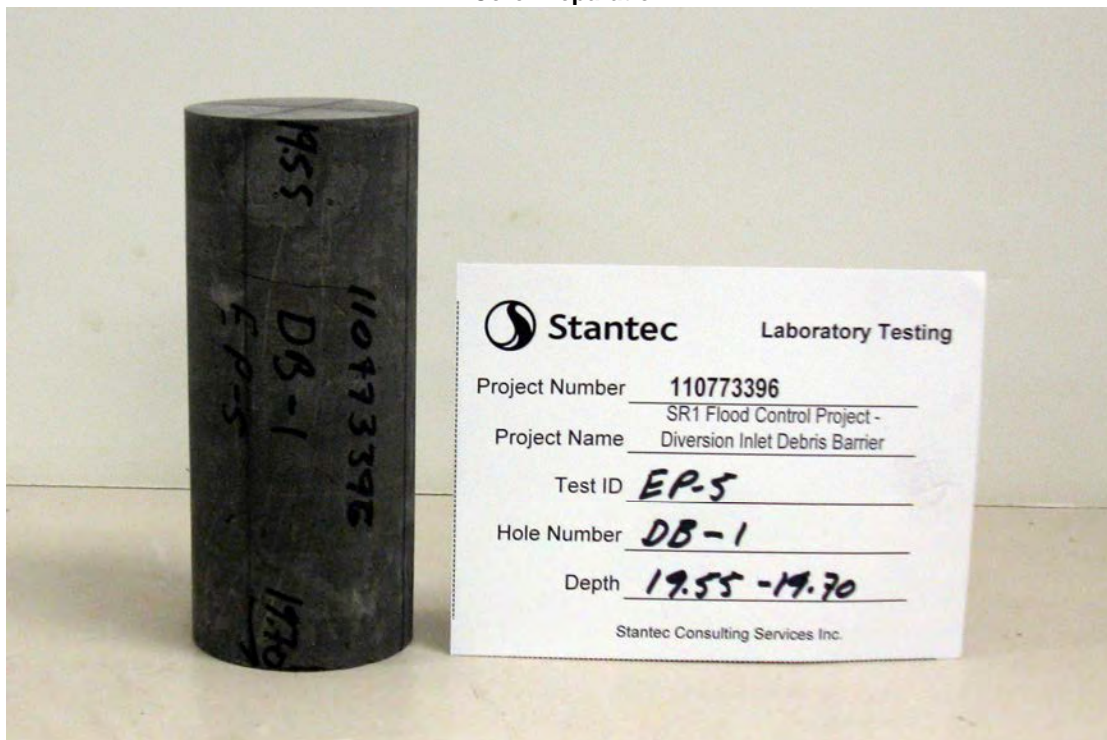




Photo Report

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
 Lithology Siltstone, gray, moderately hard
 Hole Number DB-1 Depth (m) 19.55-19.70
 Test Type Elastic Moduli of Intact Rock Core in Uniaxial Compression

Project Number 110773396
 Lab ID EP-5

Core Preparation



Post Test





Photo Report

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
Lithology Siltstone, gray, moderately hard
Hole Number DB-1 Depth (m) 19.55-19.70
Test Type Elastic Moduli of Intact Rock Core in Uniaxial Compression

Project Number 110773396
Lab ID EP-5

Post Test





Elastic Moduli of Intact Rock Core Specimens in Uniaxial Compression

ASTM D 7012, Method D

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
 Hole Number DB-1 Depth (m) 24.20-24.33
 Material Shale, dark gray, moderately hard

Project Number 110773396
 Lab ID EP-10
 Date Received 05/15/2018

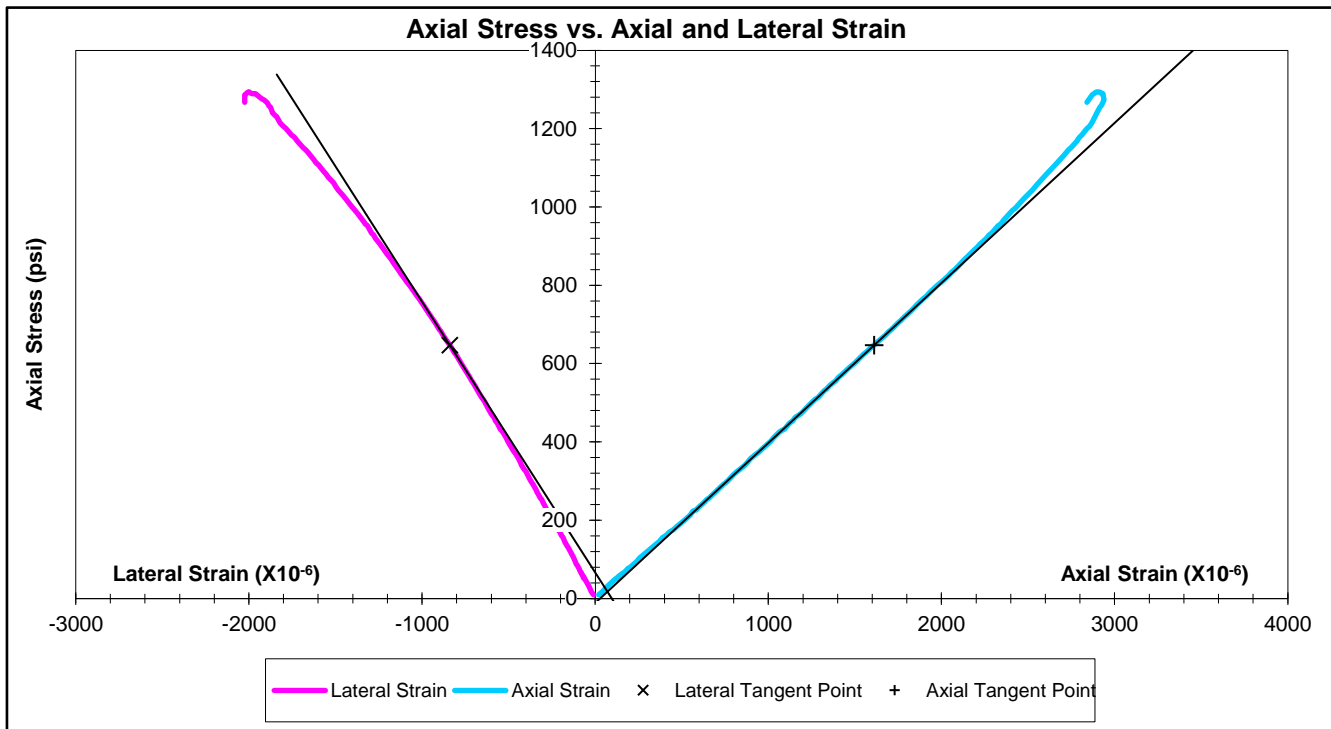
Temperature (°C) 22 Moisture Condition Moist

Date Tested 05/29/2018

Side Planeness Pass
 Perpendicularity Pass
 End Planeness Pass
 Parallelism Pass

Height (in.) 5.372
 Diameter (in.) 2.405
 Area(in²) 4.542

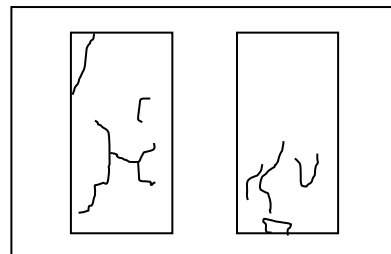
Wet Unit Weight (pcf) 153
 Dry Unit Weight (pcf) N/A
 Moisture Content (%) N/A



Elastic Moduli Results at 50% Unconfined Compressive Strength

Young's Modulus, Axial Tangent Modulus 0.41 x10⁶ psi
 Lateral Tangent Modulus -0.69 x10⁶ psi
 Poisson's Ratio 0.59

Unconfined Compressive Strength 1290 psi
 50% Unconfined Compressive Strength 650 psi
 Load Rate 16 lbf/sec
 Type of Failure Undetermined



Failure Sketch

Comments _____

Reviewed By RJ

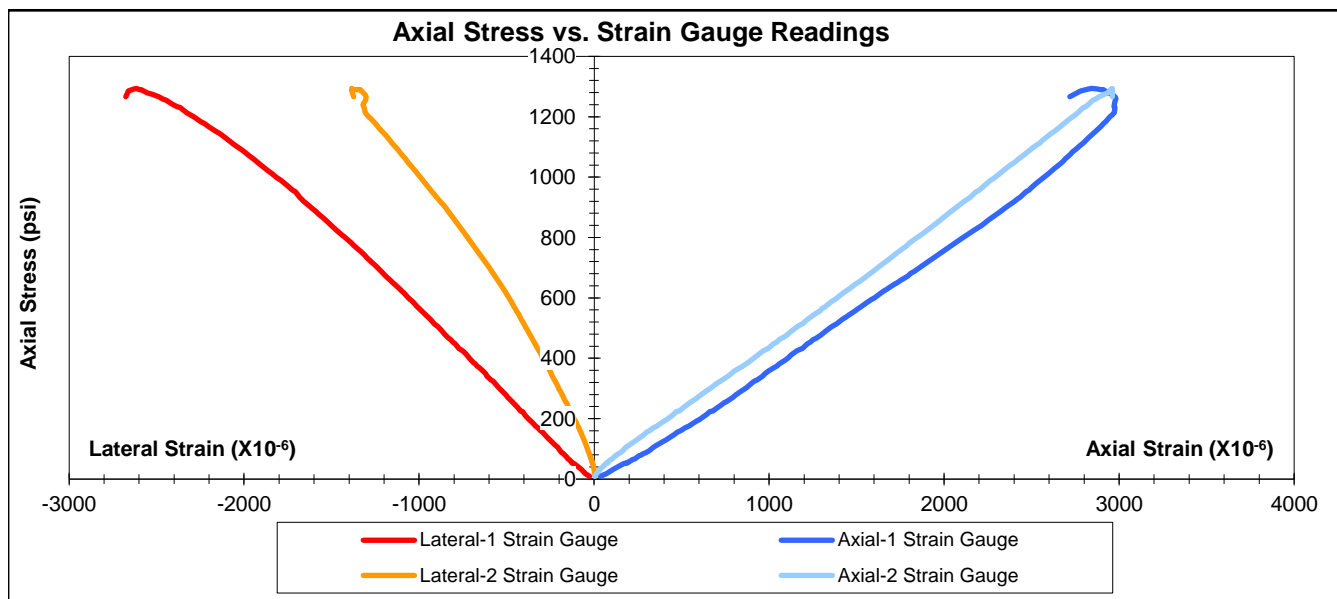
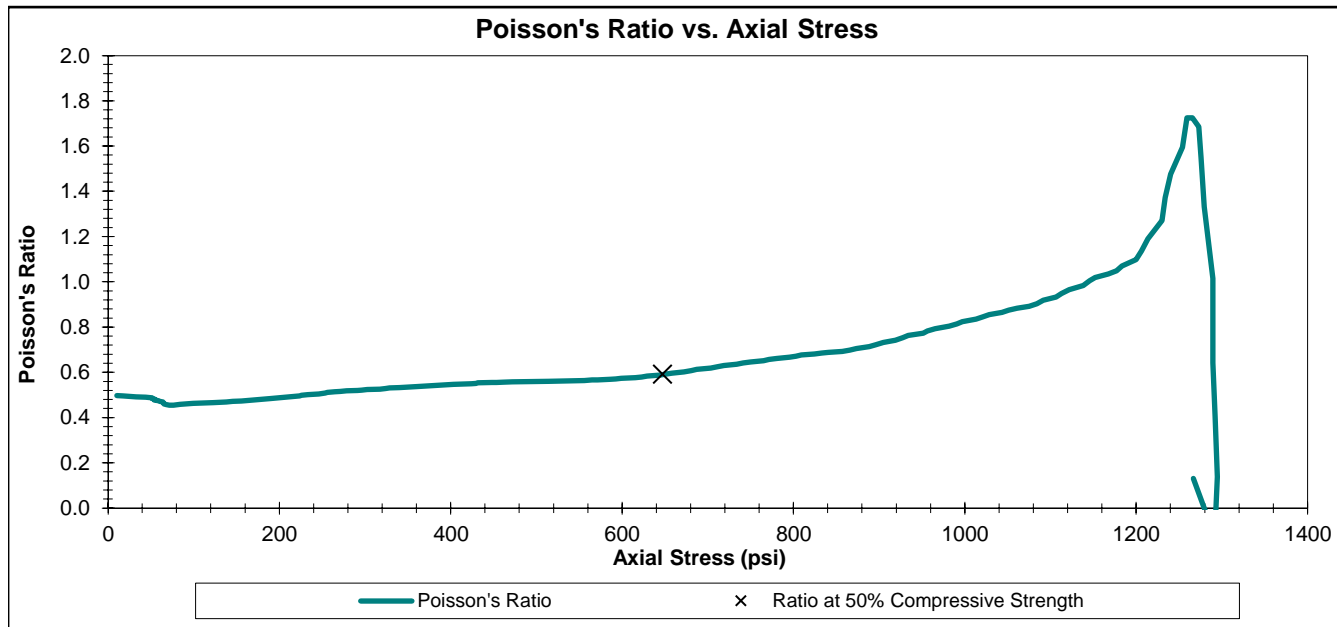


Elastic Moduli of Intact Rock Core Specimens in Uniaxial Compression

ASTM D 7012, Method D

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
 Hole Number DB-1 Depth (m) 24.20-24.33
 Material Shale, dark gray, moderately hard

Project Number 110773396
 Lab ID EP-10
 Date Received 05/15/2018



Note 1: A compression-positive sign convention is applied and consistently used throughout this application.
 Note 2: The tangent moduli slope is calculated using a linear regression technique.



Elastic Moduli of Intact Rock Core Specimens in Uniaxial Compression

ASTM D 7012, Method D

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
 Hole Number DB-1 Depth (m) 24.20-24.33
 Lithology Shale, dark gray, moderately hard

Project Number 110773396
 Lab ID EP-10
 Date Received 05/15/2018

Time (sec)	Load (lbf)	Axial Strain (x10 ⁻⁶ strain)		Lateral Strain (x10 ⁻⁶ strain)		Average Strain (x10 ⁻⁶ strain)		Stress (psi)	Poisson's Ratio
		Axial ₁	Axial ₂	Lateral ₁	Lateral ₂	Axial	Lateral		
0	46	35	3	-26	6	19	-10	10.1	0.50
2	80	70	15	-49	4	43	-23	17.6	0.50
4	149	111	35	-74	0	73	-37	32.8	0.49
6	200	148	56	-100	-4	102	-52	44.0	0.49
8	234	172	69	-116	-7	121	-62	51.5	0.49
10	234	180	73	-120	-8	127	-64	51.5	0.48
12	251	187	75	-125	-10	131	-68	55.3	0.48
14	245	194	79	-127	-11	137	-69	53.9	0.48
16	268	202	83	-132	-12	143	-72	59.0	0.47
18	274	210	88	-136	-13	149	-75	60.3	0.47
20	291	219	94	-141	-15	157	-78	64.1	0.47
22	297	226	100	-145	-17	163	-81	65.4	0.46
24	308	235	106	-150	-18	171	-84	67.8	0.46
26	325	245	113	-156	-21	179	-89	71.6	0.45
28	348	257	120	-162	-23	189	-93	76.6	0.45
30	359	269	130	-169	-25	200	-97	79.0	0.46
32	382	283	140	-176	-28	212	-102	84.1	0.46
34	399	297	151	-185	-32	224	-109	87.9	0.46
36	428	316	165	-195	-36	241	-116	94.2	0.46
38	473	337	181	-207	-41	259	-124	104.2	0.46
40	507	358	201	-221	-45	280	-133	111.6	0.46
42	547	384	221	-237	-51	303	-144	120.4	0.47
44	593	412	245	-255	-58	329	-157	130.6	0.47
46	627	434	265	-268	-64	350	-166	138.1	0.47
48	661	455	283	-281	-70	369	-176	145.5	0.47
50	707	476	302	-295	-75	389	-185	155.7	0.47
52	730	497	319	-307	-81	408	-194	160.7	0.47
54	769	519	338	-321	-87	429	-204	169.3	0.48
56	798	542	360	-335	-94	451	-215	175.7	0.48
58	838	564	380	-348	-100	472	-224	184.5	0.48
60	872	585	400	-361	-107	493	-234	192.0	0.48
62	901	605	419	-374	-113	512	-244	198.4	0.49
64	935	624	437	-386	-119	531	-253	205.9	0.49
66	969	643	453	-398	-125	548	-262	213.4	0.49
68	1015	662	470	-409	-131	566	-270	223.5	0.50
70	1026	680	487	-421	-136	584	-279	225.9	0.50
72	1060	696	502	-431	-142	599	-287	233.4	0.50
76	1117	728	532	-452	-153	630	-303	246.0	0.50
78	1151	743	546	-461	-158	645	-310	253.4	0.51
80	1163	756	558	-469	-164	657	-317	256.1	0.51
84	1203	778	579	-483	-171	679	-327	264.9	0.51
86	1231	794	593	-494	-176	694	-335	271.1	0.52
88	1265	809	610	-504	-182	710	-343	278.5	0.52
92	1322	840	640	-525	-192	740	-359	291.1	0.52
94	1345	855	655	-535	-199	755	-367	296.2	0.52
96	1374	871	671	-546	-204	771	-375	302.5	0.52
100	1442	901	703	-567	-216	802	-392	317.5	0.53
102	1471	916	719	-577	-222	818	-400	323.9	0.53
104	1493	932	735	-589	-228	834	-409	328.7	0.53
108	1545	962	766	-611	-238	864	-425	340.2	0.53
110	1585	978	783	-621	-245	881	-433	349.0	0.53
112	1619	994	799	-633	-250	897	-442	356.5	0.54
116	1676	1027	833	-655	-263	930	-459	369.0	0.54
118	1699	1043	849	-667	-268	946	-468	374.1	0.54
120	1733	1059	867	-679	-275	963	-477	381.6	0.54
124	1790	1093	900	-703	-288	997	-496	394.1	0.54
126	1824	1110	917	-715	-294	1014	-505	401.6	0.55
128	1864	1126	934	-727	-301	1030	-514	410.4	0.55
132	1927	1159	967	-751	-314	1063	-533	424.3	0.55
134	1950	1176	983	-762	-320	1080	-541	429.4	0.55
136	1961	1189	995	-772	-324	1092	-548	431.8	0.55
140	2035	1220	1026	-794	-337	1123	-566	448.1	0.55
142	2058	1236	1043	-806	-343	1140	-575	453.2	0.56
144	2098	1252	1059	-819	-349	1156	-584	462.0	0.56
148	2144	1286	1091	-841	-362	1189	-602	472.1	0.56
150	2178	1302	1107	-854	-368	1205	-611	479.6	0.56
152	2212	1318	1122	-865	-375	1220	-620	487.1	0.56
156	2281	1352	1156	-888	-389	1254	-639	502.3	0.56
158	2309	1369	1172	-900	-395	1271	-648	508.4	0.56
160	2332	1386	1189	-913	-401	1288	-657	513.5	0.56
164	2407	1421	1221	-937	-415	1321	-676	530.0	0.56

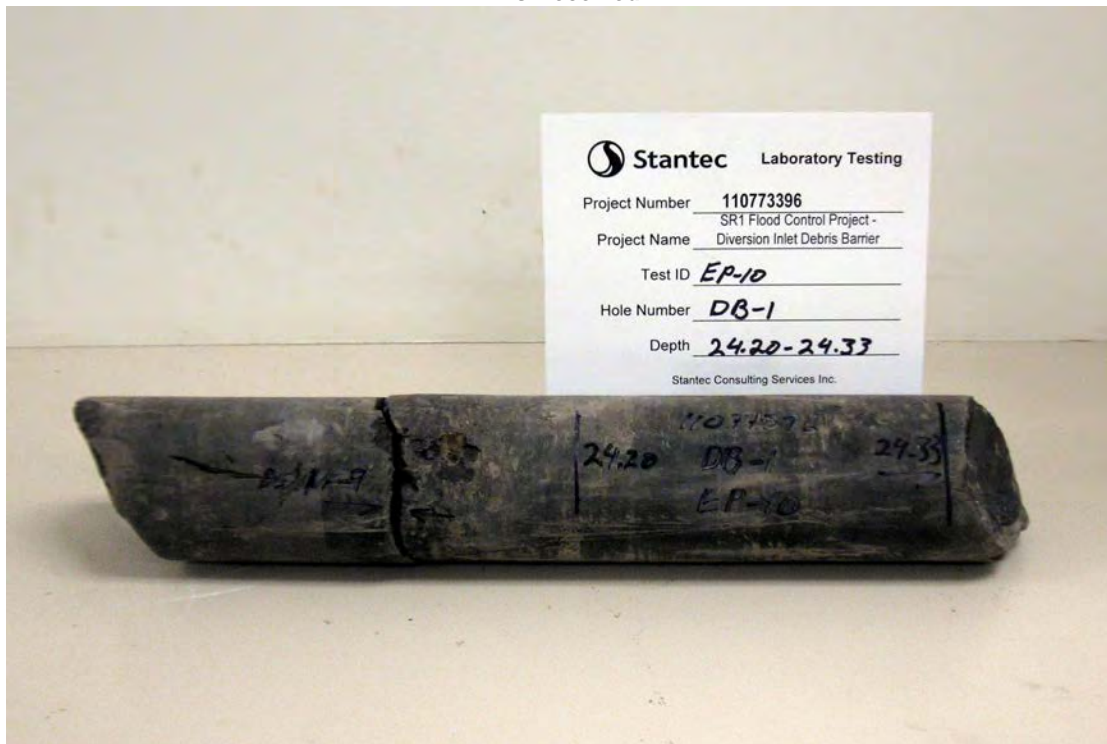
Time (sec)	Load (lbf)	Axial Strain (x10 ⁻⁶ strain)		Lateral Strain (x10 ⁻⁶ strain)		Average Strain (x10 ⁻⁶ strain)		Stress (psi)	Poisson's Ratio
		Axial ₁	Axial ₂	Lateral ₁	Lateral ₂	Axial	Lateral		
166	2435	1439	1237	-949	-422	1338	-686	536.2	0.56
168	2469	1456	1254	-961	-429	1355	-695	543.7	0.56
172	2526	1490	1288	-986	-443	1389	-715	556.2	0.56
174	2566	1509	1304	-998	-450	1407	-724	565.0	0.57
176	2595	1527	1321	-1011	-458	1424	-735	571.4	0.57
180	2664	1564	1354	-1035	-472	1459	-754	586.6	0.57
182	2692	1582	1372	-1048	-479	1477	-764	592.8	0.57
184	2721	1601	1388	-1060	-486	1495	-773	599.1	0.57
188	2795	1637	1422	-1085	-502	1530	-794	615.4	0.58
190	2829	1656	1440	-1099	-510	1548	-805	622.9	0.58
192	2858	1675	1456	-1111	-518	1566	-815	629.3	0.58
196	2926	1713	1490	-1138	-534	1602	-836	644.3	0.59
198	2955	1732	1508	-1150	-541	1620	-846	650.7	0.59
200	2989	1752	1525	-1164	-551	1639	-858	658.2	0.60
204	3052	1791	1559	-1190	-566	1675	-878	672.0	0.60
206	3092	1810	1577	-1203	-576	1694	-890	680.8	0.61
208	3121	1829	1593	-1217	-584	1711	-901	687.2	0.61
212	3195	1868	1628	-1243	-602	1748	-923	703.5	0.62
214	3229	1887	1645	-1257	-611	1766	-934	711.0	0.62
216	3264	1907	1662	-1271	-621	1785	-946	718.7	0.63
220	3332	1944	1698	-1298	-639	1821	-969	733.7	0.64
222	3366	1963	1714	-1312	-649	1839	-981	741.2	0.64
224	3406	1983	1732	-1326	-658	1858	-992	750.0	0.65
228	3475	2020	1767	-1355	-677	1894	-1016	765.2	0.65
230	3504	2039	1784	-1369	-687	1912	-1028	771.6	0.66
232	3544	2058	1801	-1384	-697	1930	-1041	780.4	0.66
236	3612	2097	1836	-1413	-717	1967	-1065	795.3	0.67
238	3647	2116	1853	-1428	-726	1985	-1077	803.0	0.67
240	3675	2136	1871	-1443	-736	2004	-1090	809.2	0.68
244	3744	2174	1906	-1473	-755	2040	-1114	824.4	0.68
246	3784	2194	1923	-1488	-765	2059	-1127	833.2	0.69
248	3818	2215	1941	-1502	-776	2078	-1139	840.7	0.69
252	3892	2253	1976	-1533	-795	2115	-1164	857.0	0.69
254	3932	2272	1993	-1549	-805	2133	-1177	865.8	0.70
256	3967	2291	2010	-1565	-816	2151	-1191	873.5	0.70
260	4035	2328	2045	-1595	-836	2187	-1216	888.5	0.71
262	4070	2346	2063	-1612	-846	2205	-1229	896.2	0.72
264	4110	2365	2080	-1627	-857	2223	-1242	905.0	0.73
268	4173	2401	2115	-1657	-878	2258	-1268	918.9	0.74
270	4213	2419	2131	-1671	-889	2275	-1280	927.7	0.75
272	4241	2435	2149	-1682	-901	2292	-1292	933.8	0.76
276	4322	2468	2183	-1706	-923	2326	-1315	951.7	0.77
278	4344	2484	2201	-1722	-934	2343	-1328	956.5	0.78
280	4384	2500	2217	-1740	-945	2359	-1343	965.3	0.79
284	4459	2532	2251	-1774	-967	2392	-1371	981.8	0.80
286	4499	2550	2268	-1792	-979	2409	-1386	990.6	0.81
288	4528	2567	2286	-1810	-989	2427	-1400	997.0	0.82
292	4602	2599	2320	-1844	-1011	2460	-1428	1013.3	0.83
294	4636	2614	2337	-1861	-1022	2476	-1442	1020.8	0.85
296	4671	2631	2354	-1878	-1033	2493	-1456	1028.5	0.85
300	4739	2663	2390	-1912	-1056	2527	-1484	1043.5	0.86
302	4774	2678	2408	-1928	-1067	2543	-1498	1051.2	0.87
304	4819	2693	2425	-1945	-1077	2559	-1511	1061.1	0.88
308	4882	2721	2459	-1979	-1100	2590	-1540	1075.0	0.89
310	4923	2735	2477	-1998	-1112	2606	-1555	1084.0	0.90
312	4957	2751	2495	-2015	-1122	2623	-1569	1091.5	0.92
316	5026	2780	2529	-2051	-1145	2655	-1598	1106.7	0.93
318	5054	2796	2546	-2070	-1155	2671	-1613	1112.8	0.95
320	5094	2811	2563	-2087	-1167	2687	-1627	1121.7	0.96
324	5169	2839	2598	-2125	-1189	2719	-1657	1138.2	0.98
326	5203	2853	2614	-2142	-1201	2734	-1672	1145.7	1.00
328	5232	2867	2631	-2162	-1213	2749	-1688	1152.0	1.02
332	5301	2895	2666	-2204	-1236	2781	-1720	1167.2	1.03
334	5346	2910	2683	-2225	-1248	2797	-1737	1177.1	1.05
336	5375	2924	2699	-2247	-1260	2812	-1754	1183.5	1.07
340	5449	2947	2733	-2286	-1287	2840	-1787	1199.8	1.10
342	5478	2960	2749	-2306	-1296	2855	-1801	1206.2	1.14
344	5512	2972	2764	-2328	-1308	2868	-1818	1213.7	1.19
348	5587	2976	2795	-2365	-1314	2886	-1840	1230.2	1.27
350	5604	2970	2809	-2382	-1316	2890	-1849	1234.0	1.37
352	5633	2973	2823	-2404	-1321	2898	-1863	1240.3	1.48
356	5696	2978	2850	-2445	-1305	2914	-1875	1254.2	1.59
358	5719	2980	2867	-2465	-1304	2924	-1885	1259.3	1.72
360	5747	2978	2883	-2484	-1302	2931	-1893	1265.4	1.72
364	5782	2963	2911	-2516	-1307	2937	-1912	1273.1	1.68
366	5793	2952	2922	-2532	-1314	2937	-1923	1275.6	1.55
368	5810	2937	2935	-2553	-1319	2936	-1936	1279.3	1.33
372	5856	2910	2955	-2587	-1335	2933	-1961	1289.4	1.01
374	5856	2894	2956	-2596	-1371	2925	-1984	1289.4	0.64
376	5868	2877	2961	-2606	-1382	2919	-1994	1292.1	0.40
379	5879	2842	2961	-2615	-1385	2902	-2000	1294.5	0.14
380	5868	2824	2955	-2629	-1385	2890	-2007	1292.1	-0.08
382	5839	2780	2961	-2661	-1386	2871	-2024	1285.7	-0.07
383	5753	2718	2961	-2676	-1374	2840	-2025	1266.8	0.13



Photo Report

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
 Lithology Shale, dark gray, moderately hard
 Hole Number DB-1 Depth (m) 24.20-24.33
 Test Type Elastic Moduli of Intact Rock Core in Uniaxial Compression
As Received

Project Number 110773396
 Lab ID EP-10



Core Preparation

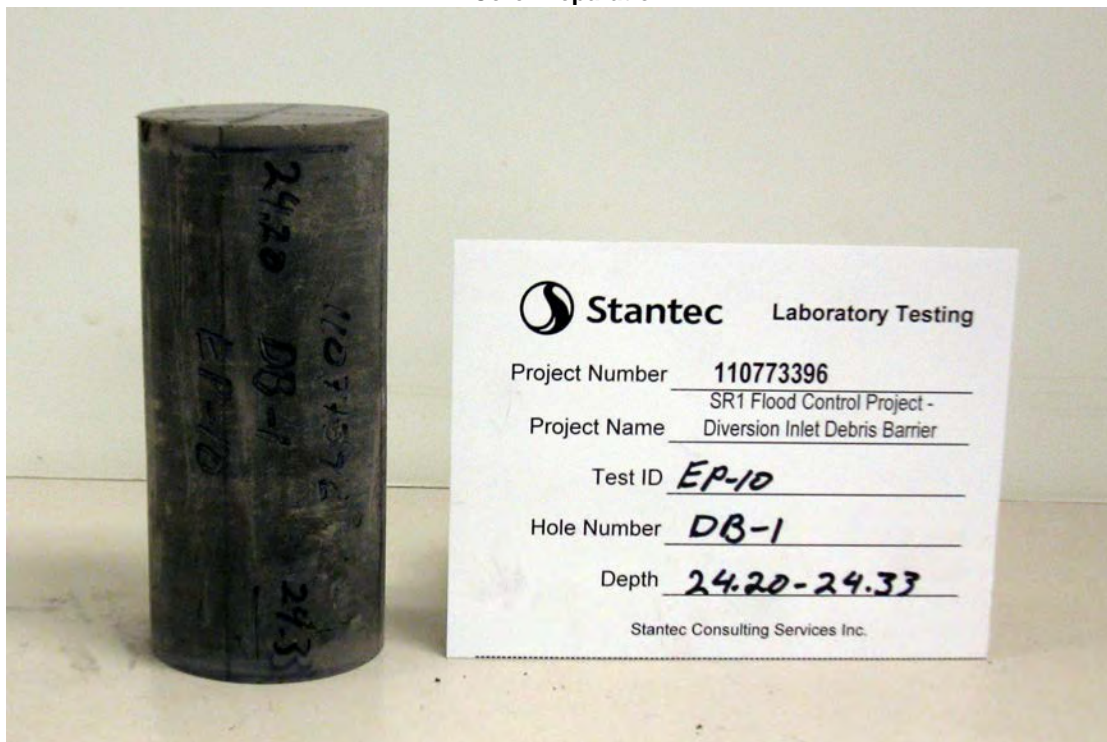




Photo Report

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
 Lithology Shale, dark gray, moderately hard
 Hole Number DB-1 Depth (m) 24.20-24.33
 Test Type Elastic Moduli of Intact Rock Core in Uniaxial Compression

Project Number 110773396
 Lab ID EP-10

Core Preparation



Post Test

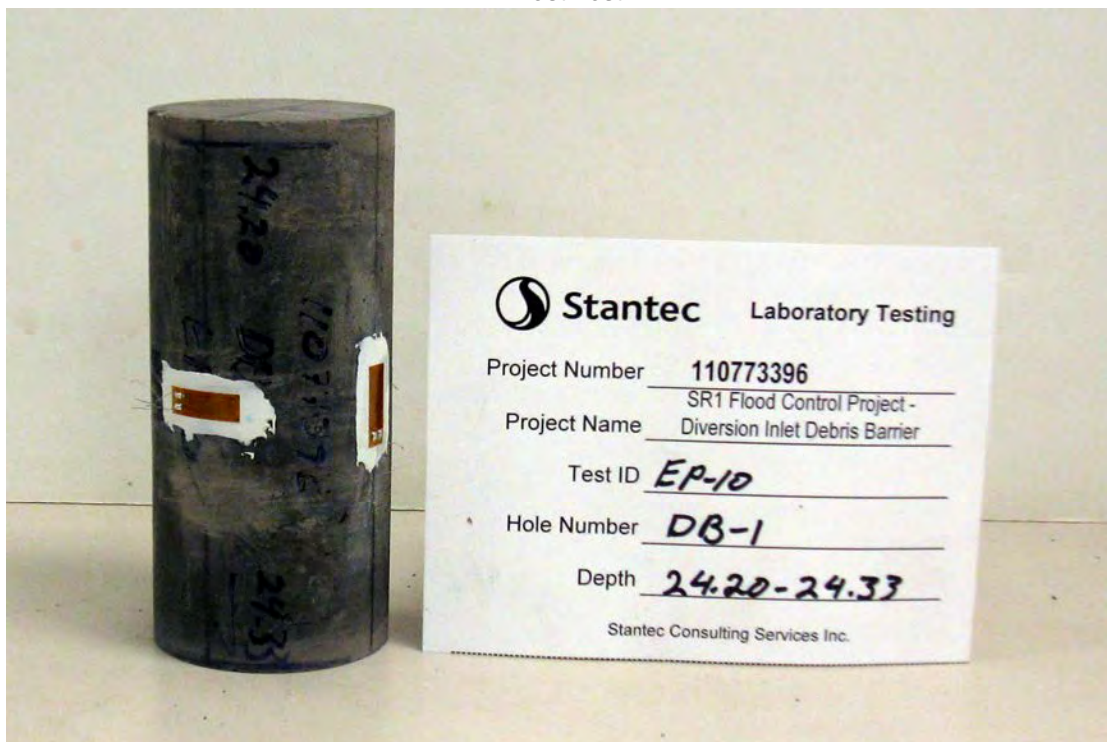




Photo Report

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
Lithology Shale, dark gray, moderately hard
Hole Number DB-1 Depth (m) 24.20-24.33
Test Type Elastic Moduli of Intact Rock Core in Uniaxial Compression

Project Number 110773396
Lab ID EP-10

Post Test





Elastic Moduli of Intact Rock Core Specimens in Uniaxial Compression

ASTM D 7012, Method D

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
 Hole Number DB-1 Depth (m) 29.67-29.82
 Material Siltstone, dark gray, moderately hard

Project Number 110773396
 Lab ID EP-17
 Date Received 05/15/2018

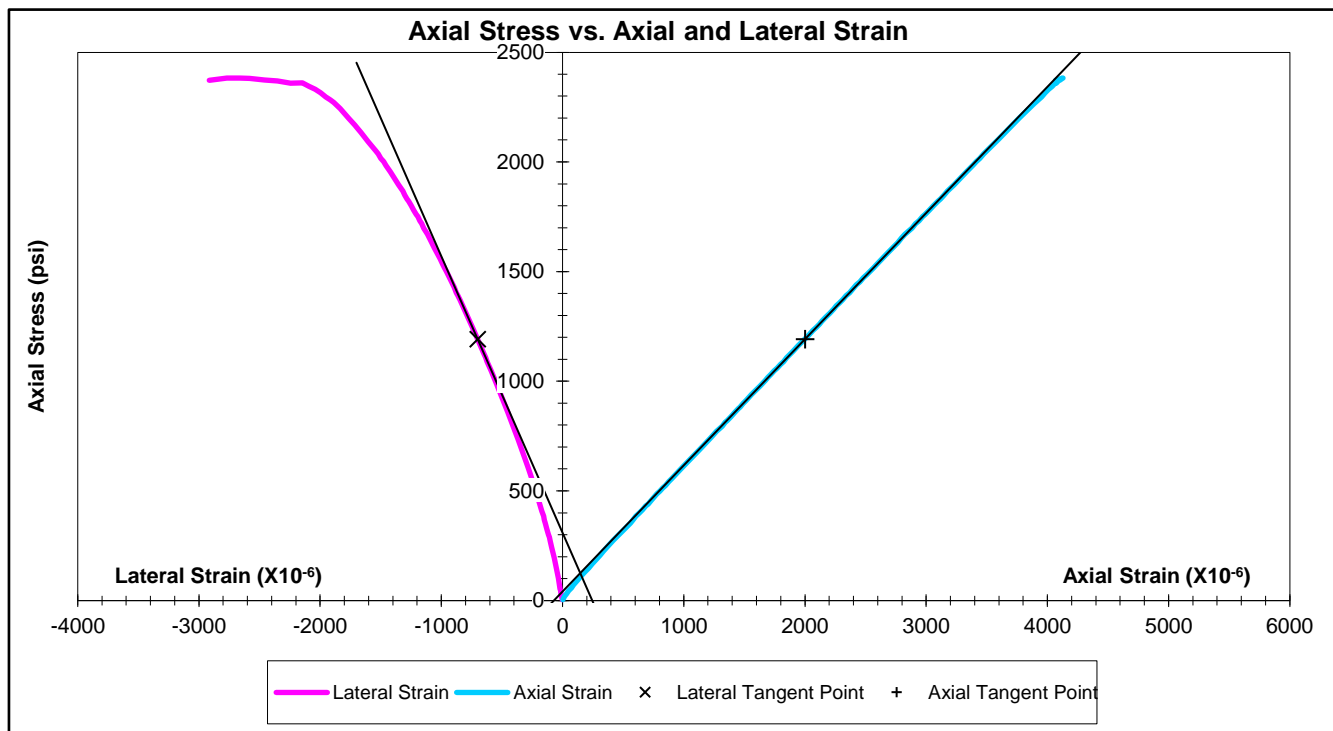
Temperature (°C) 22 Moisture Condition Moist

Date Tested 05/29/2018

Side Planeness Pass
 Perpendicularity Pass
 End Planeness Pass
 Parallelism Pass

Height (in.) 5.756
 Diameter (in.) 2.401
 Area(in²) 4.527

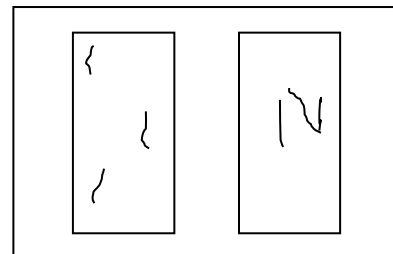
Wet Unit Weight (pcf) 153
 Dry Unit Weight (pcf) N/A
 Moisture Content (%) N/A



Elastic Moduli Results at 50% Unconfined Compressive Strength

Young's Modulus, Axial Tangent Modulus 0.58 x10⁶ psi
 Lateral Tangent Modulus -1.26 x10⁶ psi
 Poisson's Ratio 0.46

Unconfined Compressive Strength 2380 psi
 50% Unconfined Compressive Strength 1190 psi
 Load Rate 35 lbf/sec
 Type of Failure Undetermined



Failure Sketch

Comments _____

Reviewed By RJ

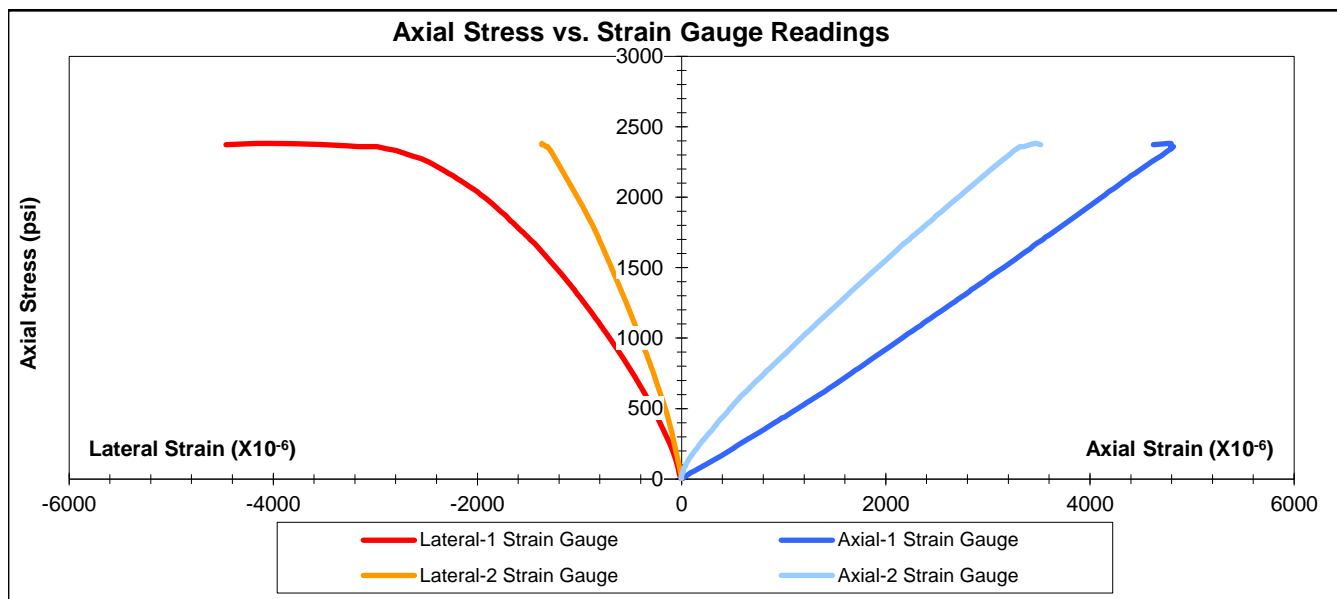
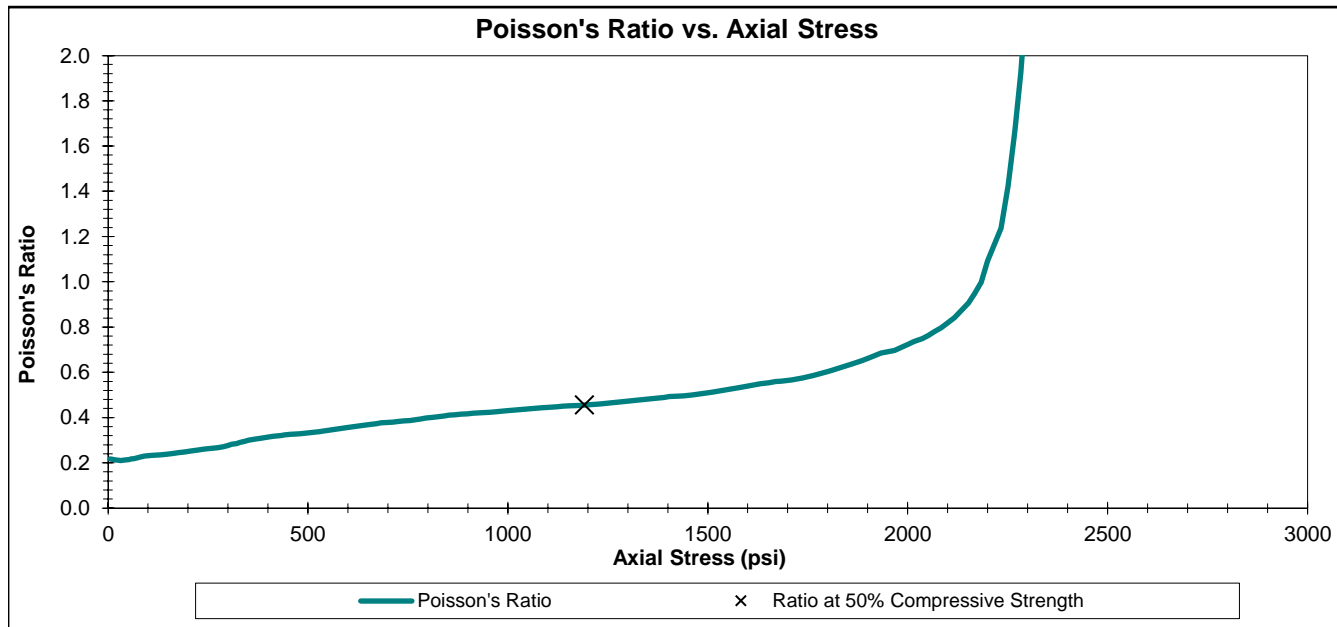


Elastic Moduli of Intact Rock Core Specimens in Uniaxial Compression

ASTM D 7012, Method D

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
 Hole Number DB-1 Depth (m) 29.67-29.82
 Material Siltstone, dark gray, moderately hard

Project Number 110773396
 Lab ID EP-17
 Date Received 05/15/2018



Note 1: A compression-positive sign convention is applied and consistently used throughout this application.
 Note 2: The tangent moduli slope is calculated using a linear regression technique.



Elastic Moduli of Intact Rock Core Specimens in Uniaxial Compression

ASTM D 7012, Method D

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
 Hole Number DB-1 Depth (m) 29.67-29.82
 Lithology Siltstone, dark gray, moderately hard

Project Number 110773396
 Lab ID EP-17
 Date Received 05/15/2018

Time (sec)	Load (lbf)	Axial Strain (x10 ⁻⁶ strain)		Lateral Strain (x10 ⁻⁶ strain)		Average Strain (x10 ⁻⁶ strain)		Stress (psi)	Poisson's Ratio
		Axial ₁	Axial ₂	Lateral ₁	Lateral ₂	Axial	Lateral		
0	23	11	-7	-8	-1	2	-5	5.1	0.22
2	86	37	-3	-14	-3	17	-9	19.0	0.21
4	143	64	4	-20	-5	34	-13	31.6	0.21
6	200	89	9	-25	-9	49	-17	44.2	0.21
10	240	118	16	-28	-12	67	-20	53.0	0.21
12	262	130	17	-30	-13	74	-22	57.9	0.22
14	297	144	21	-31	-16	83	-24	65.6	0.22
16	325	161	24	-33	-18	93	-26	71.8	0.22
18	365	182	29	-35	-21	106	-28	80.6	0.23
20	411	209	36	-38	-24	123	-31	90.8	0.23
22	490	249	46	-44	-29	148	-37	108.2	0.23
24	604	314	67	-55	-36	191	-46	133.4	0.24
26	673	351	80	-61	-40	216	-51	148.7	0.24
28	730	380	93	-68	-44	237	-56	161.3	0.24
30	809	417	108	-76	-49	263	-63	178.7	0.25
32	872	451	123	-84	-53	287	-69	192.6	0.25
34	940	486	139	-91	-58	313	-75	207.6	0.25
36	1020	521	157	-101	-63	339	-82	225.3	0.26
38	1094	556	173	-110	-68	365	-89	241.7	0.26
42	1237	628	209	-128	-78	419	-103	273.2	0.27
44	1305	660	226	-137	-82	443	-110	288.3	0.27
46	1357	687	240	-145	-85	464	-115	299.8	0.28
48	1402	714	253	-152	-90	484	-121	309.7	0.28
50	1454	738	265	-159	-93	502	-126	321.2	0.29
52	1499	762	277	-166	-97	520	-132	331.1	0.29
54	1545	787	291	-174	-100	539	-137	341.3	0.30
56	1596	813	304	-182	-105	559	-144	352.5	0.30
58	1665	842	318	-190	-109	580	-150	367.8	0.30
60	1739	874	335	-200	-113	605	-157	384.1	0.31
62	1802	910	353	-212	-120	632	-166	398.1	0.31
64	1876	947	372	-222	-125	660	-174	414.4	0.32
66	1956	981	390	-233	-132	686	-183	432.1	0.32
68	1996	1009	405	-242	-137	707	-190	440.9	0.32
70	2064	1041	423	-252	-142	732	-197	455.9	0.33
74	2201	1103	457	-271	-154	780	-213	486.2	0.33
76	2258	1134	472	-281	-160	803	-221	498.8	0.33
78	2321	1164	490	-292	-166	827	-229	512.7	0.33
80	2378	1195	507	-301	-172	851	-237	525.3	0.34
82	2452	1226	525	-312	-178	876	-245	541.6	0.34
84	2515	1259	544	-322	-185	902	-254	555.6	0.34
86	2589	1292	563	-334	-192	928	-263	571.9	0.35
88	2658	1326	582	-345	-199	954	-272	587.1	0.35
90	2721	1355	601	-356	-206	978	-281	601.1	0.36
92	2778	1386	620	-368	-212	1003	-290	613.6	0.36
94	2846	1416	640	-379	-219	1028	-299	628.7	0.36
96	2915	1445	661	-390	-226	1053	-308	643.9	0.37
98	2972	1472	678	-400	-231	1075	-316	656.5	0.37
100	3035	1499	698	-411	-237	1099	-324	670.4	0.37
102	3092	1527	717	-423	-244	1122	-334	683.0	0.38
106	3223	1584	757	-446	-257	1171	-352	711.9	0.38
108	3281	1612	777	-458	-264	1195	-361	724.8	0.38
110	3349	1641	798	-470	-271	1220	-371	739.8	0.38
112	3418	1670	818	-482	-278	1244	-380	755.0	0.39
114	3492	1699	839	-494	-285	1269	-390	771.4	0.39
116	3544	1727	860	-507	-292	1294	-400	782.9	0.39
118	3601	1755	879	-519	-299	1317	-409	795.4	0.40
120	3675	1783	900	-531	-306	1342	-419	811.8	0.40
122	3738	1812	921	-545	-313	1367	-429	825.7	0.40
124	3801	1841	942	-558	-320	1392	-439	839.6	0.41
126	3864	1869	962	-570	-327	1416	-449	853.5	0.41
128	3932	1897	983	-582	-334	1440	-458	868.6	0.41
130	3995	1926	1004	-595	-342	1465	-469	882.5	0.41
132	4070	1955	1025	-609	-349	1490	-479	899.0	0.42
134	4133	1985	1046	-622	-358	1516	-490	913.0	0.42
138	4264	2043	1088	-649	-373	1566	-511	941.9	0.42
140	4333	2072	1109	-663	-381	1591	-522	957.1	0.42
142	4396	2103	1131	-677	-389	1617	-533	971.1	0.43
144	4459	2132	1152	-691	-396	1642	-544	985.0	0.43
146	4522	2160	1174	-705	-405	1667	-555	998.9	0.43
148	4602	2191	1196	-720	-412	1694	-566	1016.6	0.43
150	4671	2221	1218	-733	-420	1720	-577	1031.8	0.44

Time (sec)	Load (lbf)	Axial Strain (x10 ⁻⁶ strain)		Lateral Strain (x10 ⁻⁶ strain)		Average Strain (x10 ⁻⁶ strain)		Stress (psi)	Poisson's Ratio
		Axial ₁	Axial ₂	Lateral ₁	Lateral ₂	Axial	Lateral		
152	4739	2251	1240	-748	-428	1746	-588	1046.8	0.44
154	4802	2281	1262	-763	-437	1772	-600	1060.7	0.44
156	4871	2310	1284	-777	-446	1797	-612	1076.0	0.44
158	4934	2341	1306	-792	-453	1824	-623	1089.9	0.44
160	5014	2370	1328	-807	-462	1849	-635	1107.6	0.45
162	5083	2401	1351	-823	-470	1876	-647	1122.8	0.45
164	5152	2432	1374	-838	-478	1903	-658	1138.1	0.45
166	5220	2462	1397	-854	-487	1930	-671	1153.1	0.45
170	5352	2523	1442	-884	-504	1983	-694	1182.2	0.45
172	5427	2554	1466	-900	-513	2010	-707	1198.8	0.46
174	5495	2586	1489	-917	-521	2038	-719	1213.8	0.46
176	5575	2617	1512	-934	-531	2065	-733	1231.5	0.46
178	5639	2649	1536	-949	-539	2093	-744	1245.6	0.46
180	5707	2680	1559	-965	-548	2120	-757	1260.6	0.47
182	5782	2711	1582	-982	-557	2147	-770	1277.2	0.47
184	5856	2742	1606	-999	-566	2174	-783	1293.6	0.47
186	5919	2774	1629	-1016	-575	2202	-796	1307.5	0.47
188	5994	2805	1653	-1033	-584	2229	-809	1324.0	0.48
190	6080	2837	1677	-1050	-594	2257	-822	1343.0	0.48
192	6143	2869	1701	-1068	-602	2285	-835	1357.0	0.48
194	6217	2900	1726	-1085	-612	2313	-849	1373.3	0.49
196	6292	2932	1749	-1103	-621	2341	-862	1389.9	0.49
198	6355	2964	1773	-1121	-630	2369	-876	1403.8	0.49
202	6515	3026	1823	-1158	-650	2425	-904	1439.1	0.50
204	6579	3058	1847	-1175	-658	2453	-917	1453.3	0.50
206	6665	3090	1872	-1195	-669	2481	-932	1472.3	0.50
208	6728	3123	1897	-1213	-678	2510	-946	1486.2	0.51
210	6796	3154	1922	-1232	-687	2538	-960	1501.2	0.51
212	6865	3186	1947	-1252	-698	2567	-975	1516.4	0.51
214	6946	3219	1972	-1271	-708	2596	-990	1534.3	0.52
216	7020	3250	1997	-1291	-717	2624	-1004	1550.7	0.52
218	7095	3283	2021	-1311	-727	2652	-1019	1567.3	0.53
220	7169	3314	2048	-1332	-737	2681	-1035	1583.6	0.53
222	7244	3346	2073	-1351	-747	2710	-1049	1600.2	0.54
224	7313	3378	2099	-1374	-757	2739	-1066	1615.4	0.54
226	7387	3411	2124	-1394	-768	2768	-1081	1631.8	0.55
228	7479	3443	2149	-1416	-778	2796	-1097	1652.1	0.55
230	7560	3474	2176	-1438	-789	2825	-1114	1670.0	0.56
234	7686	3538	2229	-1483	-807	2884	-1145	1697.8	0.56
236	7778	3569	2255	-1506	-817	2912	-1162	1718.1	0.57
238	7841	3602	2281	-1528	-828	2942	-1178	1732.0	0.57
240	7927	3634	2307	-1551	-838	2971	-1195	1751.0	0.58
242	7990	3666	2334	-1576	-849	3000	-1213	1765.0	0.59
244	8065	3699	2360	-1600	-860	3030	-1230	1781.5	0.59
246	8145	3730	2387	-1623	-870	3059	-1247	1799.2	0.60
248	8225	3763	2413	-1648	-881	3088	-1265	1816.9	0.61
250	8289	3795	2440	-1672	-893	3118	-1283	1831.0	0.62
252	8369	3828	2467	-1696	-905	3148	-1301	1848.7	0.63
254	8455	3861	2493	-1721	-916	3177	-1319	1867.7	0.64
256	8524	3893	2521	-1746	-929	3207	-1338	1882.9	0.65
258	8599	3924	2548	-1772	-942	3236	-1357	1899.5	0.66
260	8673	3956	2575	-1797	-956	3266	-1377	1915.8	0.67
262	8754	3989	2602	-1823	-969	3296	-1396	1933.7	0.68
266	8903	4052	2657	-1878	-994	3355	-1436	1966.6	0.70
268	8984	4083	2684	-1906	-1007	3384	-1457	1984.5	0.71
270	9058	4116	2711	-1934	-1020	3414	-1477	2000.9	0.72
272	9127	4148	2739	-1965	-1033	3444	-1499	2016.1	0.74
274	9219	4180	2767	-1995	-1047	3474	-1521	2036.4	0.75
276	9288	4212	2793	-2026	-1059	3503	-1543	2051.7	0.76
278	9357	4244	2820	-2059	-1074	3532	-1567	2066.9	0.78
280	9432	4276	2847	-2093	-1087	3562	-1590	2083.5	0.80
282	9506	4307	2875	-2129	-1100	3591	-1615	2099.8	0.82
284	9587	4339	2902	-2166	-1114	3621	-1640	2117.7	0.84
286	9662	4372	2929	-2202	-1126	3651	-1664	2134.3	0.87
288	9742	4403	2956	-2238	-1140	3680	-1689	2152.0	0.91
290	9811	4436	2983	-2275	-1152	3710	-1714	2167.2	0.95
292	9886	4470	3011	-2314	-1165	3741	-1740	2183.8	1.00
294	9960	4503	3039	-2352	-1178	3771	-1765	2200.1	1.09
298	10110	4571	3093	-2433	-1204	3832	-1819	2233.2	1.24
300	10190	4603	3121	-2478	-1218	3862	-1848	2250.9	1.42
302	10265	4637	3148	-2529	-1231	3893	-1880	2267.5	1.66
304	10334	4670	3175	-2589	-1244	3923	-1917	2282.7	1.93
306	10397	4703	3202	-2652	-1257	3953	-1955	2296.6	2.25
308	10478	4735	3230	-2722	-1270	3983	-1996	2314.5	2.76
310	10553	4767	3256	-2799	-1284	4012	-2042	2331.1	2.94
312	10610	4796	3283	-2885	-1297	4040	-2091	2343.7	3.16
314	10685	4818	3313	-2983	-1312	4066	-2148	2360.3	3.43
316	10679	4795	3352	-3158	-1328	4074	-2243	2358.9	3.77
318	10725	4787	3391	-3362	-1341	4089	-2352	2369.1	4.21
320	10748	4789	3422	-3564	-1355	4106	-2460	2374.2	4.63
322	10777	4797	3450	-3798	-1366	4124	-2582	2380.6	5.17
323	10788	4794	3463	-3961	-1368	4129	-2665	2383.0	5.84
324	10783	4769	3478	-4171	-1368	4124	-2770	2381.9	6.71
325	10737	4622	3517	-4463	-1370	4070	-2917	2371.8	7.77



Photo Report

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
 Lithology Siltstone, dark gray, moderately hard
 Hole Number DB-1 Depth (m) 29.67-29.82
 Test Type Elastic Moduli of Intact Rock Core in Uniaxial Compression
As Received

Project Number 110773396
 Lab ID EP-17



Core Preparation

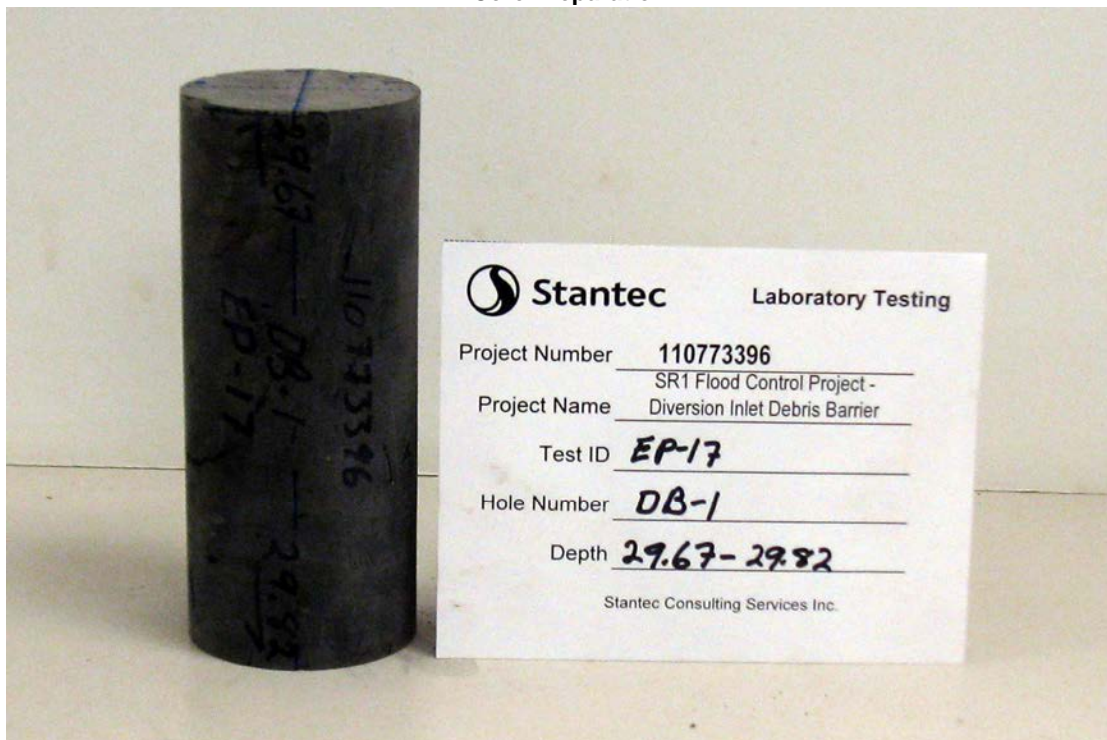




Photo Report

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Core Preparation



Post Test





Photo Report

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
Lithology Siltstone, dark gray, moderately hard
Hole Number DB-1 Depth (m) 29.67-29.82
Test Type Elastic Moduli of Intact Rock Core in Uniaxial Compression

Project Number 110773396
Lab ID EP-17

Post Test





Elastic Moduli of Intact Rock Core Specimens in Uniaxial Compression

ASTM D 7012, Method D

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
 Hole Number DB-3 Depth (m) 11.11-11.26
 Material Sandstone, gray, moderately hard

Project Number 110773396
 Lab ID EP-19
 Date Received 05/15/2018

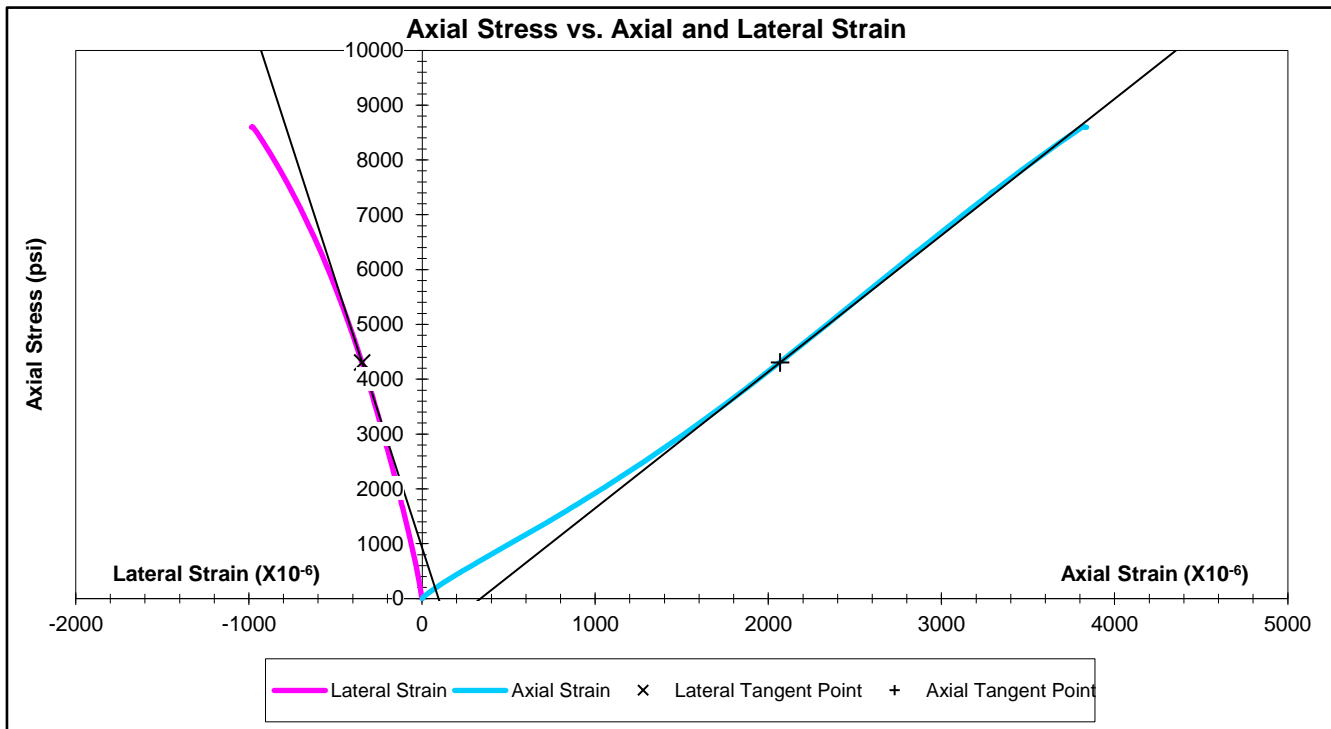
Temperature (°C) 22 Moisture Condition Moist

Date Tested 05/29/2018

Side Planeness Pass
 Perpendicularity Pass
 End Planeness Pass
 Parallelism Pass

Height (in.) 5.915
 Diameter (in.) 2.401
 Area(in²) 4.528

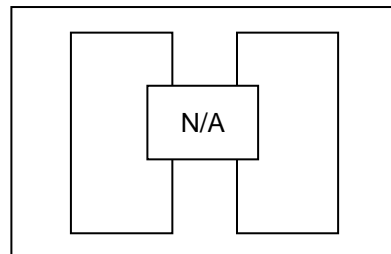
Wet Unit Weight (pcf) 158
 Dry Unit Weight (pcf) N/A
 Moisture Content (%) N/A



Elastic Moduli Results at 50% Unconfined Compressive Strength

Young's Modulus, Axial Tangent Modulus 2.49 x10⁶ psi
 Lateral Tangent Modulus -9.75 x10⁶ psi
 Poisson's Ratio 0.26

Unconfined Compressive Strength 8610 psi
 50% Unconfined Compressive Strength 4310 psi
 Load Rate 115 lbf/sec
 Type of Failure Undetermined



Failure Sketch

Comments Testing load indicated compressive failure of specimen, no external visual sign of failure was observed.

Reviewed By RJ

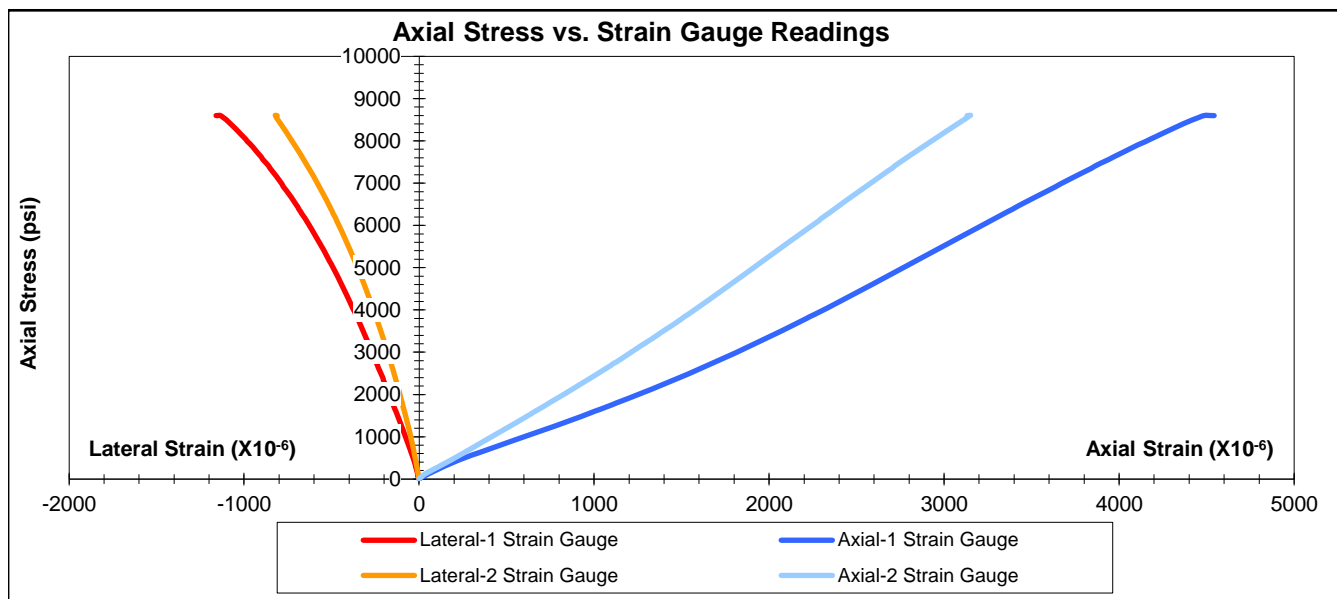
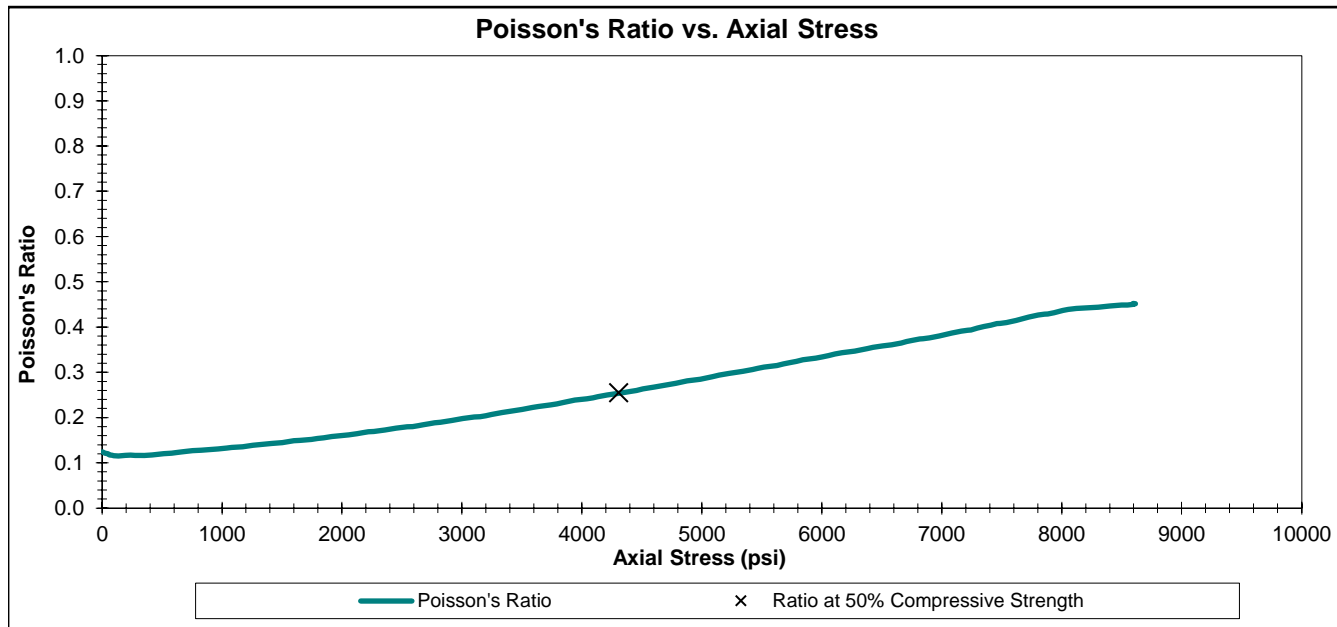


Elastic Moduli of Intact Rock Core Specimens in Uniaxial Compression

ASTM D 7012, Method D

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
 Hole Number DB-3 Depth (m) 11.11-11.26
 Material Sandstone, gray, moderately hard

Project Number 110773396
 Lab ID EP-19
 Date Received 05/15/2018



Note 1: A compression-positive sign convention is applied and consistently used throughout this application.
 Note 2: The tangent moduli slope is calculated using a linear regression technique.



Elastic Moduli of Intact Rock Core Specimens in Uniaxial Compression

ASTM D 7012, Method D

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
 Hole Number DB-3 Depth (m) 11.11-11.26
 Lithology Sandstone, gray, moderately hard

Project Number 110773396
 Lab ID EP-19
 Date Received 05/15/2018

Time (sec)	Load (lbf)	Axial Strain (x10 ⁻⁶ strain)		Lateral Strain (x10 ⁻⁶ strain)		Average Strain (x10 ⁻⁶ strain)		Stress (psi)	Poisson's Ratio
		Axial ₁	Axial ₂	Lateral ₁	Lateral ₂	Axial	Lateral		
0	12	1	-1	0	0	0	0	2.7	0.12
2	114	10	5	-3	0	8	-2	25.2	0.12
4	234	21	13	-5	-2	17	-4	51.7	0.12
6	274	27	15	-6	-1	21	-4	60.5	0.12
8	319	30	19	-6	-3	25	-5	70.5	0.12
10	359	35	22	-7	-2	29	-5	79.3	0.12
12	428	43	27	-7	-4	35	-6	94.5	0.12
14	524	54	35	-8	-4	45	-6	115.7	0.12
16	798	81	59	-12	-8	70	-10	176.2	0.12
18	946	97	74	-14	-9	86	-12	208.9	0.12
20	1083	112	88	-15	-10	100	-13	239.2	0.12
22	1254	133	105	-18	-12	119	-15	277.0	0.12
24	1454	155	125	-21	-14	140	-18	321.1	0.12
26	1687	182	148	-24	-16	165	-20	372.6	0.12
28	1910	212	172	-28	-19	192	-24	421.9	0.12
30	2087	238	188	-31	-21	213	-26	460.9	0.12
32	2275	261	206	-34	-22	234	-28	502.5	0.12
34	2447	287	222	-37	-23	255	-30	540.5	0.12
36	2624	313	239	-41	-26	276	-34	579.5	0.12
38	2801	339	256	-44	-28	298	-36	618.6	0.12
40	3001	370	274	-48	-30	322	-39	662.8	0.12
42	3206	401	293	-51	-32	347	-42	708.1	0.13
44	3424	433	312	-55	-35	373	-45	756.2	0.13
46	3664	468	334	-59	-37	401	-48	809.2	0.13
50	4058	530	371	-68	-42	451	-55	896.3	0.13
52	4287	563	392	-73	-44	478	-59	946.8	0.13
54	4499	595	411	-77	-47	503	-62	993.7	0.13
56	4699	628	431	-80	-49	530	-65	1037.8	0.13
58	4900	658	450	-85	-52	554	-69	1082.2	0.13
62	5312	720	487	-93	-57	604	-75	1173.2	0.14
64	5518	750	506	-97	-61	628	-79	1218.7	0.14
66	5730	782	525	-102	-63	654	-83	1265.6	0.14
68	5931	814	544	-105	-65	679	-85	1309.9	0.14
70	6154	846	564	-110	-68	705	-89	1359.2	0.14
74	6584	909	603	-118	-74	756	-96	1454.2	0.14
76	6802	941	624	-123	-77	783	-100	1502.3	0.14
78	7020	972	643	-127	-80	808	-104	1550.5	0.15
80	7244	1004	663	-132	-83	834	-108	1599.9	0.15
82	7468	1035	684	-137	-86	860	-112	1649.4	0.15
86	7904	1096	723	-146	-93	910	-120	1745.7	0.15
88	8134	1128	743	-150	-95	936	-123	1796.5	0.15
90	8357	1158	764	-156	-99	961	-128	1845.8	0.16
92	8570	1190	784	-160	-102	987	-131	1892.8	0.16
94	8794	1219	803	-165	-104	1011	-135	1942.3	0.16
98	9208	1274	839	-173	-111	1057	-142	2033.7	0.16
100	9409	1302	858	-178	-114	1080	-146	2078.1	0.16
102	9633	1330	876	-182	-118	1103	-150	2127.6	0.16
104	9840	1358	895	-187	-121	1127	-154	2173.3	0.17
106	10052	1384	913	-191	-123	1149	-157	2220.1	0.17
110	10472	1438	950	-201	-130	1194	-166	2312.9	0.17
112	10685	1465	968	-205	-134	1217	-170	2359.9	0.17
114	10886	1491	987	-208	-136	1239	-172	2404.3	0.17
116	11110	1518	1004	-213	-140	1261	-177	2453.8	0.18
118	11312	1543	1023	-218	-143	1283	-181	2498.4	0.18
122	11726	1594	1059	-227	-149	1327	-188	2589.9	0.18
124	11933	1620	1075	-232	-153	1348	-193	2635.6	0.18
126	12135	1644	1093	-236	-156	1369	-196	2680.2	0.18
128	12353	1670	1110	-241	-160	1390	-201	2728.3	0.19
130	12549	1695	1127	-246	-163	1411	-205	2771.6	0.19
134	12981	1745	1162	-254	-170	1454	-212	2867.0	0.19
136	13188	1770	1180	-260	-173	1475	-217	2912.8	0.19
138	13407	1795	1197	-263	-176	1496	-220	2961.1	0.20
140	13614	1819	1215	-268	-180	1517	-224	3006.8	0.20
142	13833	1843	1232	-274	-184	1538	-229	3055.2	0.20
146	14271	1893	1269	-283	-190	1581	-237	3152.0	0.20
148	14484	1917	1286	-288	-195	1602	-242	3199.0	0.20
150	14703	1943	1303	-293	-199	1623	-246	3247.4	0.21
152	14916	1966	1322	-298	-202	1644	-250	3294.4	0.21
154	15141	1991	1340	-303	-206	1666	-255	3344.1	0.21
158	15590	2040	1375	-313	-214	1708	-264	3443.3	0.22
160	15809	2065	1393	-318	-218	1729	-268	3491.6	0.22

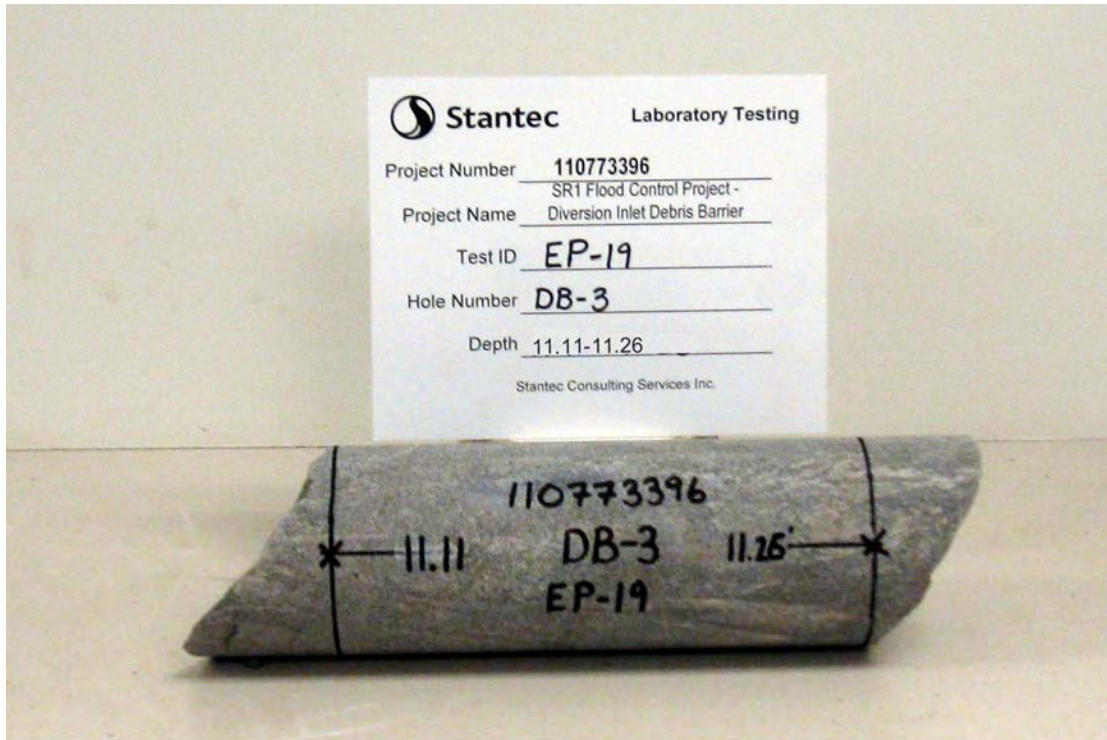
Time (sec)	Load (lbf)	Axial Strain (x10 ⁻⁶ strain)		Lateral Strain (x10 ⁻⁶ strain)		Average Strain (x10 ⁻⁶ strain)		Stress (psi)	Poisson's Ratio
		Axial ₁	Axial ₂	Lateral ₁	Lateral ₂	Axial	Lateral		
162	16034	2088	1410	-324	-222	1749	-273	3541.3	0.22
164	16253	2112	1428	-329	-225	1770	-277	3589.7	0.22
166	16483	2138	1447	-334	-230	1793	-282	3640.5	0.22
170	16939	2186	1482	-345	-237	1834	-291	3741.2	0.23
172	17169	2210	1500	-351	-242	1855	-297	3792.0	0.23
174	17389	2234	1517	-356	-247	1876	-302	3840.6	0.23
176	17613	2258	1535	-361	-251	1897	-306	3890.1	0.24
178	17844	2283	1553	-367	-255	1918	-311	3941.1	0.24
182	18305	2331	1588	-379	-264	1960	-322	4042.9	0.24
184	18536	2354	1606	-384	-268	1980	-326	4093.9	0.24
186	18778	2378	1624	-390	-272	2001	-331	4147.4	0.25
188	19015	2402	1641	-396	-277	2022	-337	4199.7	0.25
190	19245	2426	1659	-402	-281	2043	-342	4250.5	0.25
194	19707	2475	1695	-413	-291	2085	-352	4352.6	0.26
196	19949	2498	1712	-420	-296	2105	-358	4406.0	0.26
198	20180	2521	1730	-426	-300	2126	-363	4457.0	0.26
200	20416	2545	1748	-432	-305	2147	-369	4509.2	0.26
202	20653	2570	1766	-438	-310	2168	-374	4561.5	0.27
206	21132	2618	1801	-450	-319	2210	-385	4667.3	0.27
208	21368	2641	1818	-456	-324	2230	-390	4719.4	0.27
210	21610	2665	1835	-462	-330	2250	-396	4772.9	0.28
212	21847	2689	1854	-470	-334	2272	-402	4825.2	0.28
214	22078	2713	1871	-476	-339	2292	-408	4876.2	0.28
218	22574	2761	1907	-490	-350	2334	-420	4985.8	0.28
220	22805	2784	1926	-496	-355	2355	-426	5036.8	0.29
222	23041	2808	1943	-502	-360	2376	-431	5088.9	0.29
224	23295	2832	1960	-510	-366	2396	-438	5145.0	0.29
226	23532	2856	1978	-517	-371	2417	-444	5197.4	0.30
230	24010	2904	2013	-530	-382	2459	-456	5303.0	0.30
232	24253	2928	2031	-537	-388	2480	-463	5356.6	0.30
234	24501	2952	2050	-545	-393	2501	-469	5411.4	0.31
236	24743	2976	2067	-552	-399	2522	-476	5464.8	0.31
238	24986	3001	2085	-559	-404	2543	-482	5518.5	0.31
242	25482	3049	2121	-574	-416	2585	-495	5628.1	0.32
244	25718	3073	2139	-581	-422	2606	-502	5680.2	0.32
246	25961	3097	2156	-589	-427	2627	-508	5733.9	0.32
248	26209	3121	2175	-596	-434	2648	-515	5788.6	0.32
250	26451	3145	2192	-604	-439	2669	-522	5842.1	0.33
254	26936	3193	2229	-619	-452	2711	-536	5949.2	0.33
256	27190	3218	2246	-628	-459	2732	-544	6005.3	0.33
258	27420	3242	2265	-636	-465	2754	-551	6056.1	0.34
260	27668	3267	2283	-643	-470	2775	-557	6110.9	0.34
262	27928	3291	2300	-651	-476	2796	-564	6168.3	0.34
266	28413	3340	2336	-669	-490	2838	-580	6275.4	0.35
268	28655	3364	2354	-677	-496	2859	-587	6328.9	0.35
270	28897	3390	2371	-686	-502	2881	-594	6382.3	0.35
272	29151	3414	2390	-693	-509	2902	-601	6438.4	0.36
274	29387	3439	2407	-702	-516	2923	-609	6490.5	0.36
278	29878	3488	2444	-720	-529	2966	-625	6599.0	0.36
280	30120	3513	2462	-728	-536	2988	-632	6652.4	0.36
282	30368	3538	2481	-737	-543	3010	-640	6707.2	0.37
284	30610	3563	2498	-746	-550	3031	-648	6760.7	0.37
286	30858	3588	2517	-755	-556	3053	-656	6815.4	0.37
290	31337	3638	2553	-775	-570	3096	-673	6921.2	0.38
292	31585	3663	2572	-783	-578	3118	-681	6976.0	0.38
294	31833	3687	2590	-792	-585	3139	-689	7030.8	0.38
296	32069	3713	2608	-802	-592	3161	-697	7082.9	0.39
298	32323	3738	2627	-811	-599	3183	-705	7139.0	0.39
302	32802	3789	2663	-830	-614	3226	-722	7244.8	0.39
304	33038	3815	2682	-841	-622	3249	-732	7296.9	0.40
306	33292	3840	2702	-851	-630	3271	-741	7353.0	0.40
308	33540	3865	2719	-860	-637	3292	-749	7407.8	0.40
310	33776	3891	2738	-871	-644	3315	-758	7459.9	0.41
314	34243	3942	2774	-892	-660	3358	-776	7563.1	0.41
316	34497	3968	2793	-902	-667	3381	-785	7619.2	0.41
318	34739	3994	2812	-912	-676	3403	-794	7672.6	0.42
320	34976	4020	2831	-924	-683	3426	-804	7725.0	0.42
322	35218	4047	2849	-935	-692	3448	-814	7778.4	0.43
326	35696	4099	2887	-956	-708	3493	-832	7884.0	0.43
328	35932	4125	2906	-968	-717	3516	-843	7936.1	0.43
330	36169	4151	2925	-980	-724	3538	-852	7988.4	0.44
332	36399	4177	2944	-990	-733	3561	-862	8039.2	0.44
334	36630	4205	2963	-1003	-740	3584	-872	8090.3	0.44
338	37097	4257	3001	-1027	-757	3629	-892	8193.4	0.44
340	37339	4284	3020	-1039	-765	3652	-902	8246.9	0.44
342	37581	4310	3039	-1050	-775	3675	-913	8300.3	0.44
344	37806	4338	3059	-1064	-782	3699	-923	8350.0	0.45
346	38036	4365	3077	-1077	-790	3721	-934	8400.8	0.45
350	38486	4420	3114	-1102	-807	3767	-955	8500.2	0.45
352	38699	4449	3130	-1116	-814	3790	-965	8547.2	0.45
354	38912	4478	3145	-1131	-820	3812	-976	8594.3	0.45
355	38993	4495	3151	-1139	-822	3823	-981	8612.2	0.45
356	38918	4527	3134	-1151	-812	3831	-982	8595.6	0.45
357	38918	4542	3132	-1160	-811	3837	-986	8595.6	0.45



Photo Report

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
 Lithology Sandstone, gray, moderately hard
 Hole Number DB-3 Depth (m) 11.11-11.26
 Test Type Elastic Moduli of Intact Rock Core in Uniaxial Compression
As Received

Project Number 110773396
 Lab ID EP-19



Core Preparation

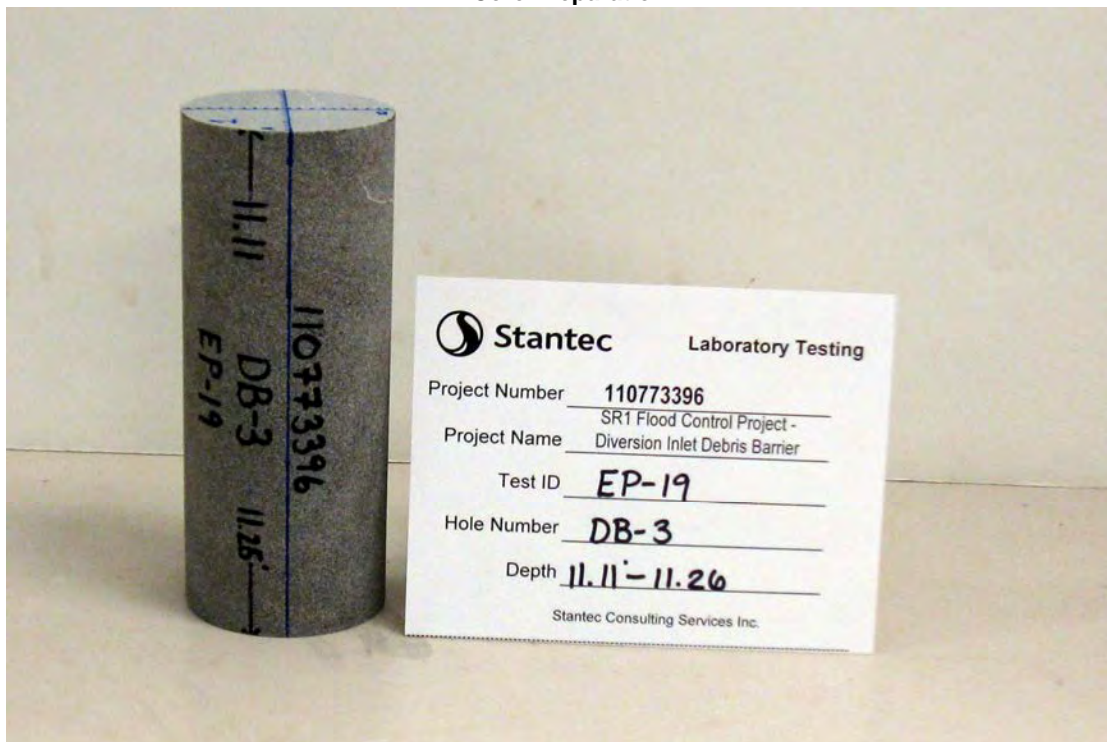


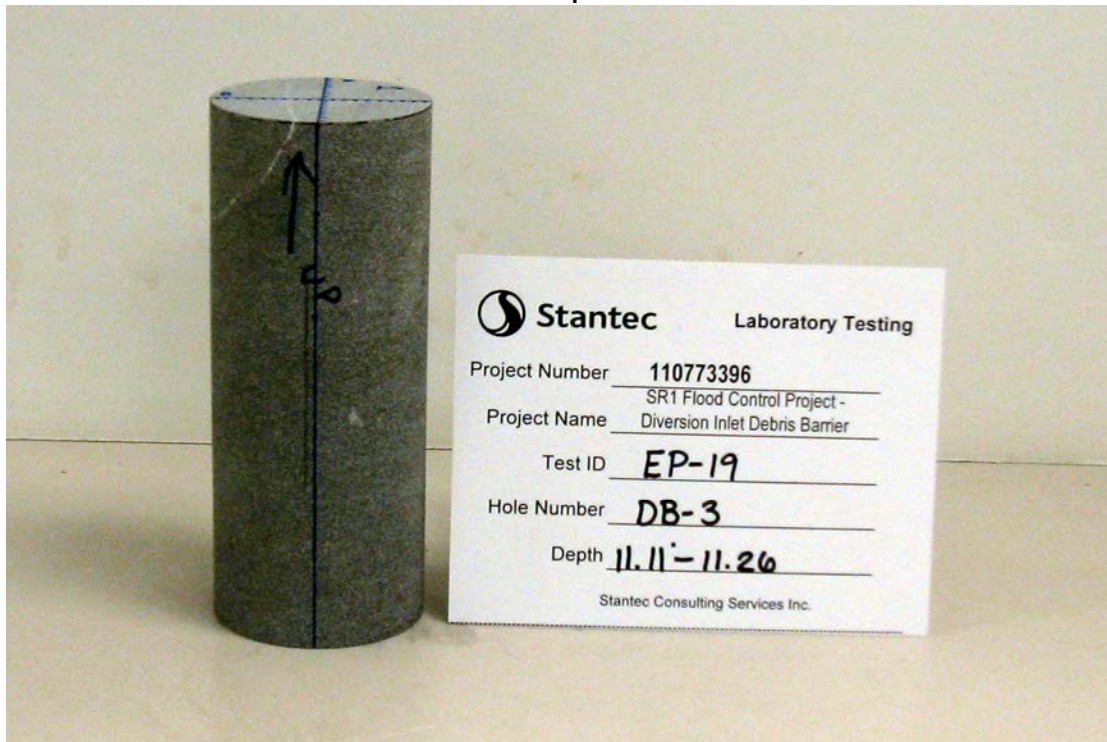


Photo Report

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
 Lithology Sandstone, gray, moderately hard
 Hole Number DB-3 Depth (m) 11.11-11.26
 Test Type Elastic Moduli of Intact Rock Core in Uniaxial Compression

Project Number 110773396
 Lab ID EP-19

Core Preparation



Post Test

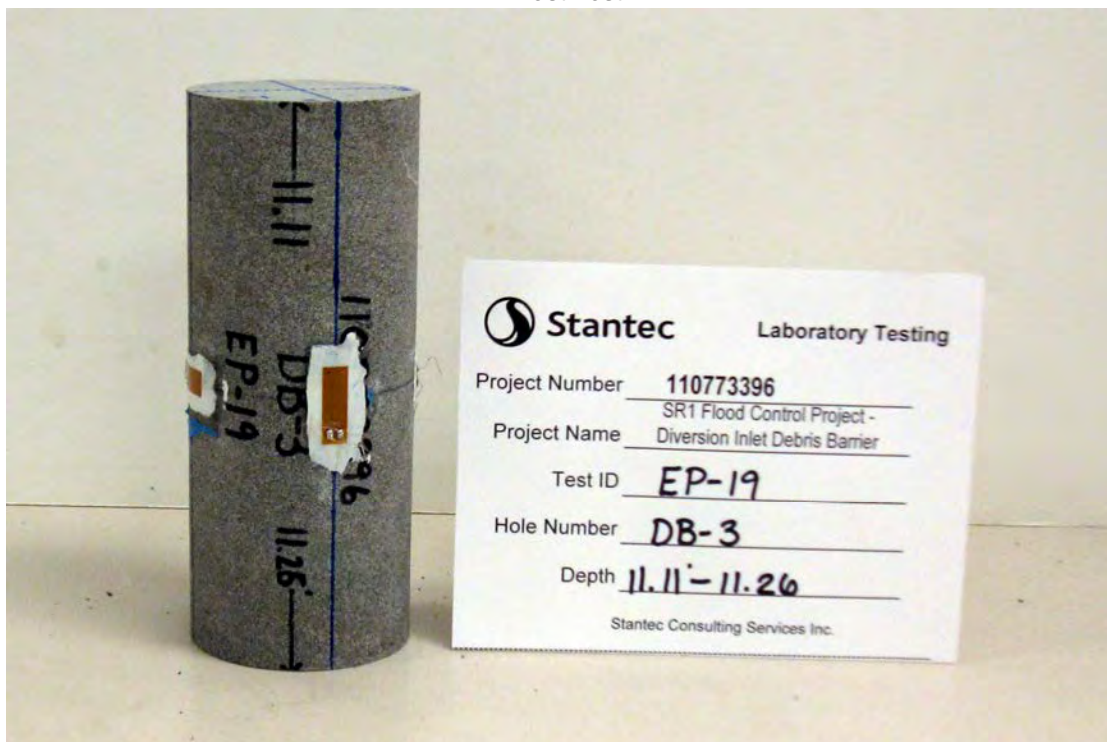


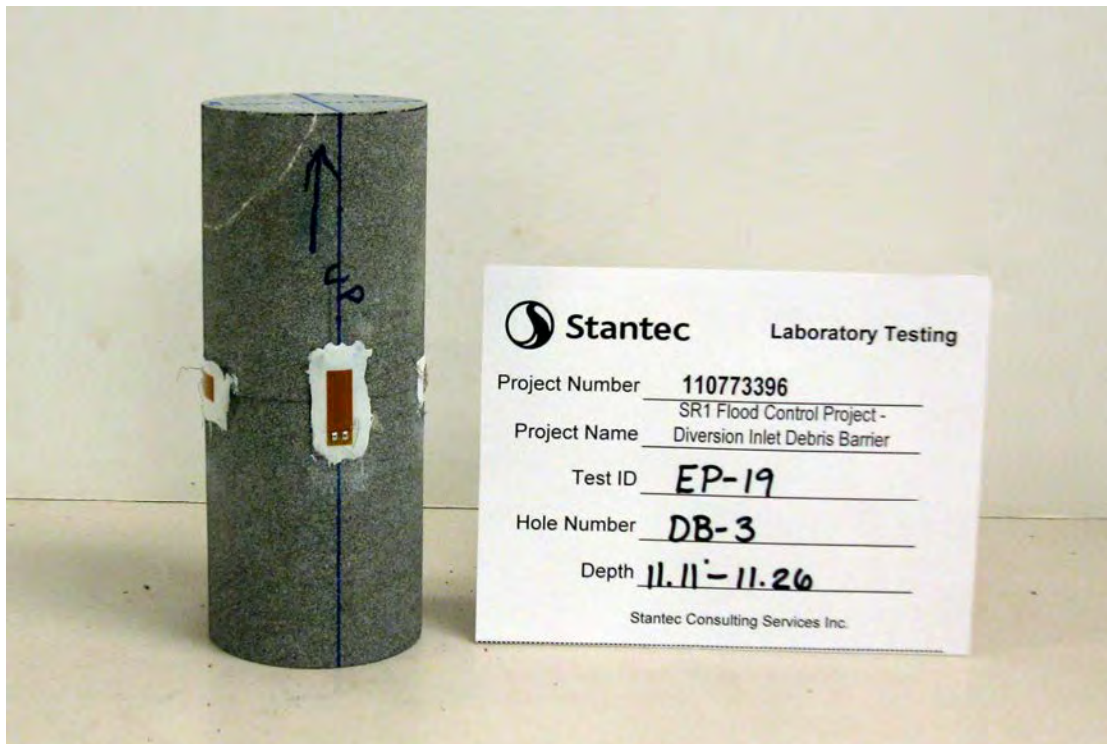


Photo Report

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
Lithology Sandstone, gray, moderately hard
Hole Number DB-3 Depth (m) 11.11-11.26
Test Type Elastic Moduli of Intact Rock Core in Uniaxial Compression

Project Number 110773396
Lab ID EP-19

Post Test





Elastic Moduli of Intact Rock Core Specimens in Uniaxial Compression

ASTM D 7012, Method D

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
 Hole Number DB-3 Depth (m) 30.62-30.77
 Material Siltstone, dark gray, moderately hard

Project Number 110773396
 Lab ID EP-33
 Date Received 05/15/2018

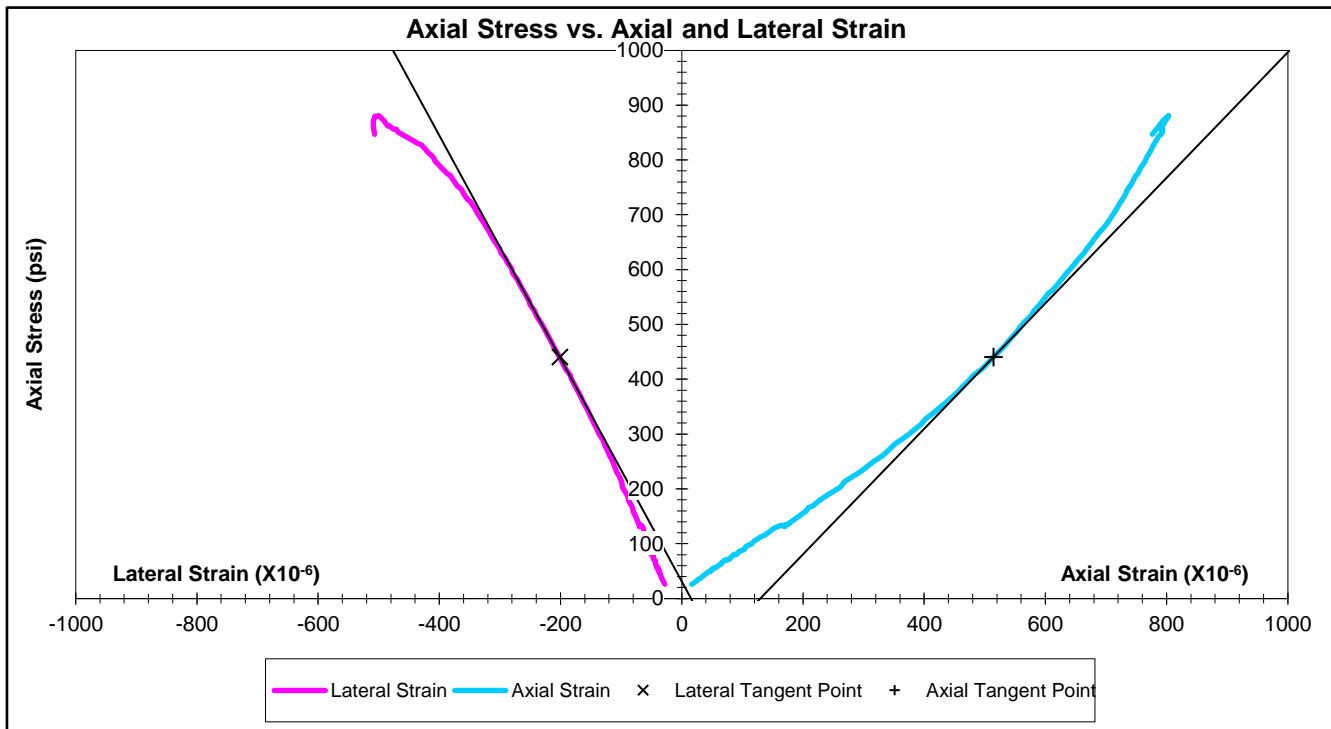
Temperature (°C) 23 Moisture Condition Moist

Date Tested 06/06/2018

Side Planeness Pass
 Perpendicularity Pass
 End Planeness Pass
 Parallelism Pass

Height (in.) 5.796
 Diameter (in.) 2.398
 Area(in²) 4.515

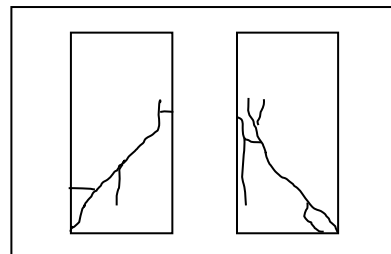
Wet Unit Weight (pcf) 154
 Dry Unit Weight (pcf) N/A
 Moisture Content (%) N/A



Elastic Moduli Results at 50% Unconfined Compressive Strength

Young's Modulus, Axial Tangent Modulus 1.14 x10⁶ psi
 Lateral Tangent Modulus -2.03 x10⁶ psi
 Poisson's Ratio 0.56

Unconfined Compressive Strength 880 psi
 50% Unconfined Compressive Strength 440 psi
 Load Rate 19 lbf/sec
 Type of Failure Shear



Failure Sketch

Comments Did not use Lateral-2 strain gauge data in calculations.
Primary failure occurred along pre-existing healed natural fracture.

Reviewed By RJ

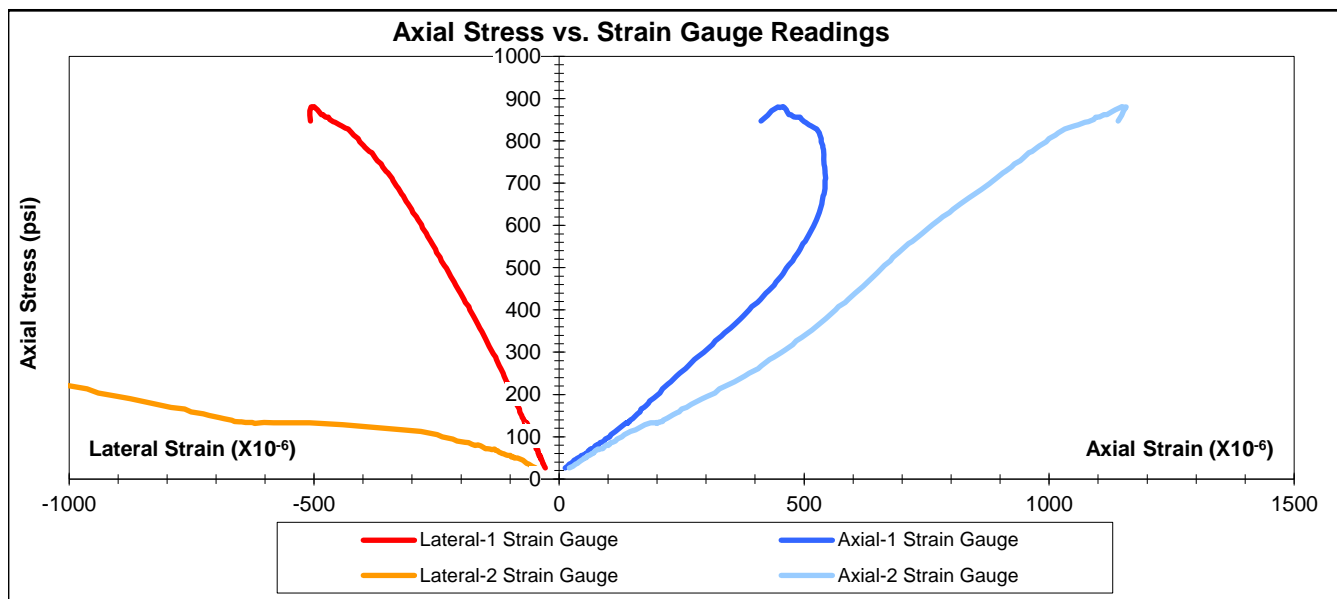
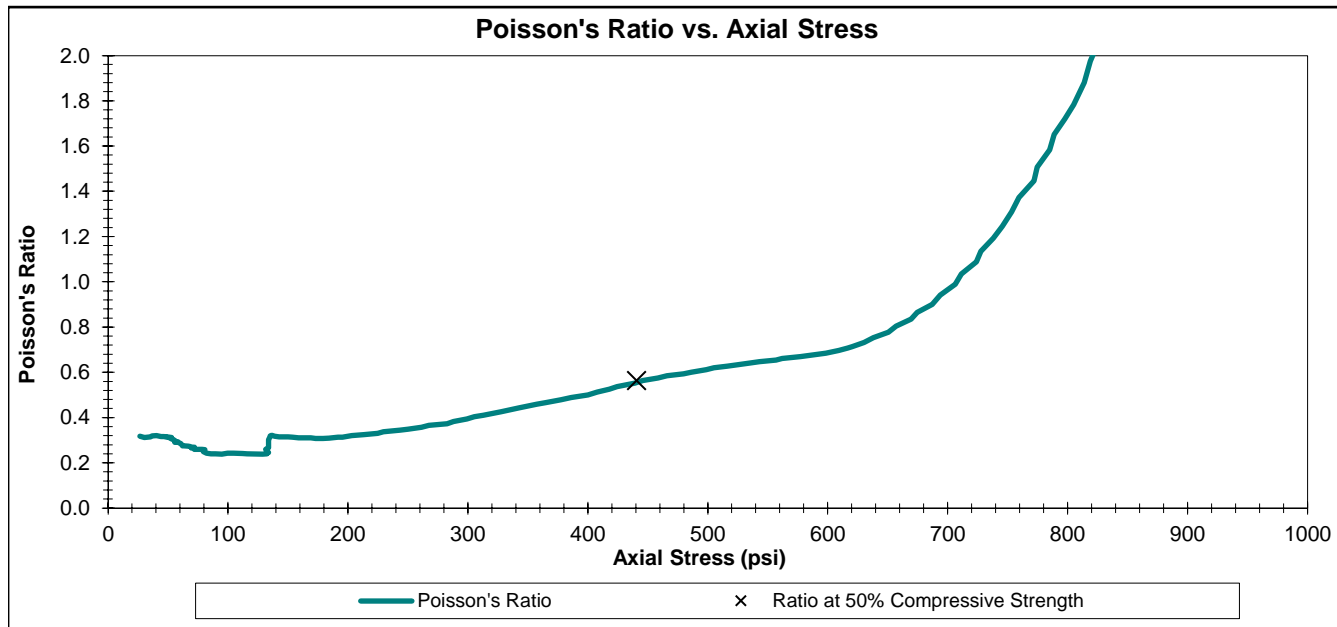


Elastic Moduli of Intact Rock Core Specimens in Uniaxial Compression

ASTM D 7012, Method D

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
 Hole Number DB-3 Depth (m) 30.62-30.77
 Material Siltstone, dark gray, moderately hard

Project Number 110773396
 Lab ID EP-33
 Date Received 05/15/2018



Note 1: A compression-positive sign convention is applied and consistently used throughout this application.
 Note 2: The tangent moduli slope is calculated using a linear regression technique.



Elastic Moduli of Intact Rock Core Specimens in Uniaxial Compression

ASTM D 7012, Method D

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
 Hole Number DB-3 Depth (m) 30.62-30.77
 Lithology Siltstone, dark gray, moderately hard

Project Number 110773396
 Lab ID EP-33
 Date Received 05/15/2018

Time (sec)	Load (lbf)	Axial Strain (x10 ⁻⁶ strain)		Lateral Strain (x10 ⁻⁶ strain)		Average Strain (x10 ⁻⁶ strain)		Stress (psi)	Poisson's Ratio
		Axial ₁	Axial ₂	Lateral ₁	Lateral ₂	Axial	Lateral		
0	120	12	21	-28	-48	17	-28	26.6	0.32
1	137	17	28	-30	-55	23	-30	30.3	0.31
2	160	21	34	-32	-62	28	-32	35.4	0.32
3	166	24	37	-33	-66	31	-33	36.8	0.32
4	183	28	41	-34	-70	35	-34	40.5	0.32
5	200	31	46	-35	-74	39	-35	44.3	0.32
6	211	35	49	-37	-78	42	-37	46.7	0.32
7	223	38	52	-37	-85	45	-37	49.4	0.31
8	223	41	54	-38	-91	48	-38	49.4	0.31
9	240	43	56	-38	-94	50	-38	53.2	0.31
10	234	43	57	-39	-97	50	-39	51.8	0.31
11	251	46	59	-39	-99	53	-39	55.6	0.30
12	251	47	59	-40	-102	53	-40	55.6	0.29
13	251	49	62	-41	-104	56	-41	55.6	0.29
14	257	50	63	-41	-107	57	-41	56.9	0.29
15	262	52	65	-41	-110	59	-41	58.0	0.29
16	268	54	66	-42	-113	60	-42	59.4	0.29
17	274	54	69	-42	-116	62	-42	60.7	0.29
18	280	57	69	-43	-119	63	-43	62.0	0.28
19	285	58	72	-43	-122	65	-43	63.1	0.28
20	302	60	74	-43	-126	67	-43	66.9	0.27
21	308	62	76	-43	-130	69	-43	68.2	0.27
22	319	64	79	-45	-132	72	-45	70.7	0.27
23	314	65	81	-45	-137	73	-45	69.5	0.27
24	319	67	84	-46	-141	76	-46	70.7	0.27
25	325	69	86	-47	-146	78	-47	72.0	0.27
26	325	70	89	-47	-150	80	-47	72.0	0.26
27	342	72	92	-47	-155	82	-47	75.7	0.26
28	354	74	94	-47	-160	84	-47	78.4	0.26
29	365	77	97	-49	-166	87	-49	80.8	0.26
30	359	79	100	-50	-171	90	-50	79.5	0.25
31	371	81	103	-50	-178	92	-50	82.2	0.24
32	388	84	105	-51	-185	95	-51	85.9	0.24
33	393	86	109	-51	-192	98	-51	87.0	0.24
35	405	92	115	-53	-208	104	-53	89.7	0.24
36	428	94	118	-54	-217	106	-54	94.8	0.24
38	450	103	128	-55	-238	116	-55	99.7	0.24
39	473	106	133	-57	-249	120	-57	104.8	0.24
41	507	115	146	-60	-282	131	-60	112.3	0.24
42	524	119	156	-61	-319	138	-61	116.1	0.24
44	581	132	175	-64	-441	154	-64	128.7	0.24
45	599	137	187	-66	-509	162	-66	132.7	0.24
47	599	139	194	-68	-567	167	-68	132.7	0.24
48	599	139	196	-68	-583	168	-68	132.7	0.24
50	604	140	199	-69	-602	170	-69	133.8	0.24
51	599	139	199	-68	-609	169	-68	132.7	0.25
53	593	140	200	-70	-621	170	-70	131.3	0.26
54	604	140	201	-69	-626	171	-69	133.8	0.27
56	604	141	203	-69	-635	172	-69	133.8	0.28
57	604	141	204	-70	-640	173	-70	133.8	0.30
59	610	142	206	-69	-648	174	-69	135.1	0.32
60	610	143	207	-70	-652	175	-70	135.1	0.32
62	616	144	211	-71	-662	178	-71	136.4	0.32
63	627	145	212	-72	-668	179	-72	138.9	0.32
65	644	150	219	-73	-684	185	-73	142.6	0.31
66	655	152	222	-75	-693	187	-75	145.1	0.31
68	678	157	231	-76	-714	194	-76	150.2	0.31
69	695	160	235	-78	-726	198	-78	153.9	0.31
71	718	165	245	-80	-751	205	-80	159.0	0.31
72	747	167	250	-81	-764	209	-81	165.4	0.31
74	764	173	260	-83	-792	217	-83	169.2	0.31
75	781	177	264	-85	-805	221	-85	173.0	0.31
77	809	182	275	-88	-834	229	-88	179.2	0.31
78	832	185	282	-88	-851	234	-88	184.3	0.31
80	866	194	296	-92	-885	245	-92	191.8	0.31
81	883	198	303	-94	-903	251	-94	195.6	0.31
83	918	206	318	-98	-940	262	-98	203.3	0.32
84	963	211	327	-99	-963	269	-99	213.3	0.32
86	1015	222	348	-104	-1020	285	-104	224.8	0.33
87	1037	228	358	-107	-1051	293	-107	229.7	0.34
89	1100	240	379	-112	-1109	310	-112	243.6	0.34

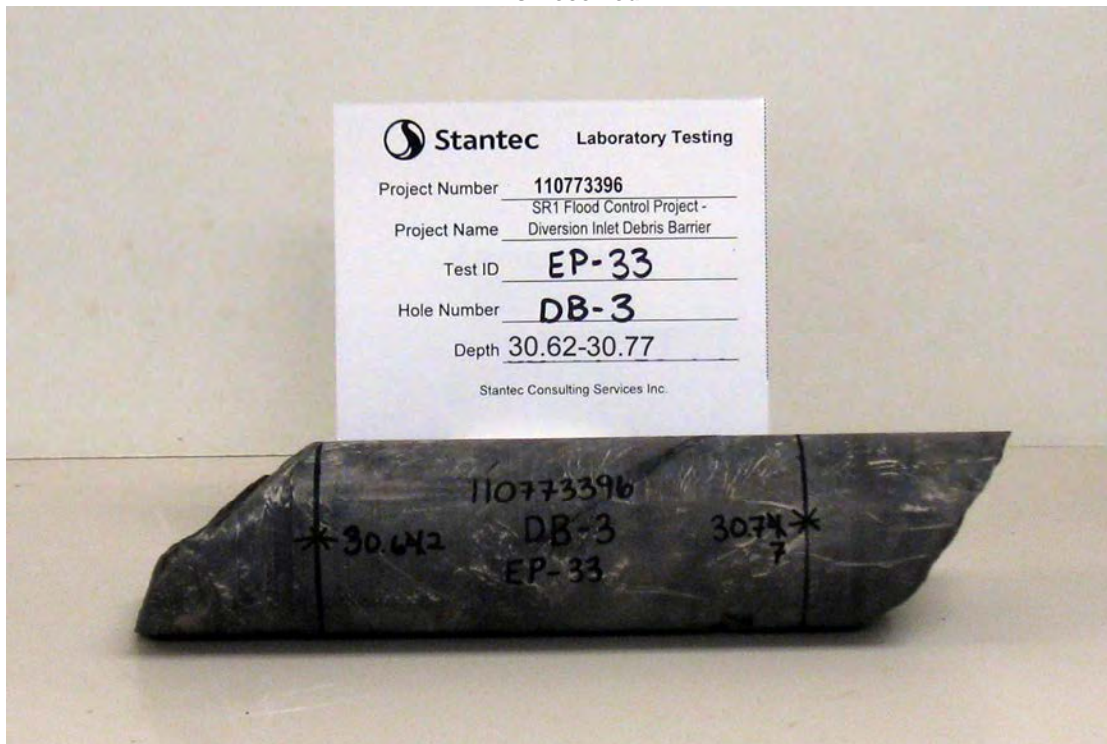
Time (sec)	Load (lbf)	Axial Strain (x10 ⁻⁶ strain)		Lateral Strain (x10 ⁻⁶ strain)		Average Strain (x10 ⁻⁶ strain)		Stress (psi)	Poisson's Ratio
		Axial ₁	Axial ₂	Lateral ₁	Lateral ₂	Axial	Lateral		
90	1129	246	388	-114	-1137	317	-114	250.0	0.35
92	1180	258	406	-119	-1184	332	-119	261.3	0.36
93	1208	264	413	-122	-1207	339	-122	267.5	0.37
95	1277	276	430	-128	-1250	353	-128	282.8	0.37
96	1300	282	438	-129	-1271	360	-129	287.9	0.38
98	1351	295	454	-136	-1313	375	-136	299.2	0.39
99	1379	301	462	-139	-1337	382	-139	305.4	0.40
101	1436	313	477	-144	-1385	395	-144	318.0	0.42
102	1476	319	484	-148	-1408	402	-148	326.9	0.43
104	1528	331	499	-153	-1452	415	-153	338.4	0.44
105	1562	338	508	-156	-1477	423	-156	346.0	0.45
107	1613	350	522	-162	-1521	436	-162	357.2	0.46
108	1647	357	529	-165	-1545	443	-165	364.8	0.47
110	1705	369	543	-171	-1592	456	-171	377.6	0.48
111	1744	376	550	-175	-1616	463	-175	386.3	0.49
113	1807	388	564	-182	-1663	476	-182	400.2	0.50
114	1841	393	570	-184	-1688	482	-184	407.7	0.51
116	1887	405	584	-191	-1742	495	-191	417.9	0.53
117	1916	411	590	-194	-1769	501	-194	424.4	0.54
119	1984	422	604	-201	-1824	513	-201	439.4	0.55
120	2013	428	610	-204	-1849	519	-204	445.8	0.56
122	2070	439	623	-211	-1904	531	-211	458.5	0.58
123	2104	443	630	-214	-1930	537	-214	466.0	0.58
125	2167	453	642	-221	-1984	548	-221	479.9	0.59
126	2195	457	648	-224	-2010	553	-224	486.1	0.60
128	2252	464	658	-230	-2063	561	-230	498.8	0.61
129	2281	468	664	-234	-2090	566	-234	505.2	0.62
131	2332	477	676	-240	-2154	577	-240	516.5	0.63
132	2367	481	681	-243	-2186	581	-243	524.2	0.63
134	2418	488	693	-250	-2241	591	-250	535.5	0.64
135	2452	492	700	-252	-2268	596	-252	543.1	0.65
137	2515	498	713	-259	-2327	606	-259	557.0	0.65
138	2538	502	721	-262	-2356	612	-262	562.1	0.66
140	2595	509	734	-268	-2414	622	-268	574.7	0.67
141	2624	511	741	-271	-2444	626	-271	581.2	0.67
143	2681	517	754	-279	-2506	636	-279	593.8	0.68
144	2715	521	762	-281	-2536	642	-281	601.3	0.69
146	2772	525	776	-288	-2599	651	-288	613.9	0.70
147	2801	528	783	-291	-2632	656	-291	620.4	0.71
149	2846	531	797	-298	-2700	664	-298	630.3	0.73
150	2881	533	804	-301	-2735	669	-301	638.1	0.75
152	2938	536	819	-308	-2808	678	-308	650.7	0.78
153	2966	537	826	-312	-2845	682	-312	656.9	0.80
155	3023	539	842	-318	-2931	691	-318	669.5	0.84
156	3046	541	849	-321	-2974	695	-321	674.6	0.87
158	3103	543	865	-328	-3059	704	-328	687.2	0.90
159	3132	543	872	-332	-3104	708	-332	693.7	0.94
161	3189	543	886	-339	-3202	715	-339	706.3	0.99
162	3212	544	892	-341	-3251	718	-341	711.4	1.03
164	3269	543	906	-349	-3382	725	-349	724.0	1.09
165	3286	543	911	-353	-3457	727	-353	727.8	1.13
167	3332	542	923	-360	-3598	733	-360	738.0	1.19
168	3366	541	929	-363	-3669	735	-363	745.5	1.25
170	3401	540	941	-371	-3812	741	-371	753.2	1.31
171	3429	540	947	-375	-3881	744	-375	759.5	1.37
173	3486	540	959	-382	-3999	750	-382	772.1	1.45
174	3498	540	965	-387	-4071	753	-387	774.7	1.51
176	3544	538	976	-396	-4212	757	-396	784.9	1.58
177	3561	538	981	-399	-4288	760	-399	788.7	1.65
179	3601	535	994	-407	-4449	765	-407	797.5	1.72
180	3635	535	1000	-410	-4528	768	-410	805.1	1.78
182	3675	532	1013	-419	-4704	773	-419	813.9	1.88
183	3698	531	1019	-423	-4812	775	-423	819.0	1.97
185	3738	526	1032	-430	-4983	779	-430	827.9	2.09
186	3749	522	1038	-436	-5075	780	-436	830.3	2.21
188	3772	514	1052	-444	-5241	783	-444	835.4	2.33
189	3784	510	1059	-448	-5328	785	-448	838.1	2.42
191	3812	503	1073	-457	-5493	788	-457	844.3	2.50
192	3818	500	1080	-461	-5569	790	-461	845.6	2.60
194	3841	495	1091	-468	-5773	793	-468	850.7	2.74
195	3864	492	1095	-471	-5835	794	-471	855.8	2.87
197	3864	483	1098	-475	-5990	791	-475	855.8	3.11
198	3870	479	1103	-477	-6075	791	-477	857.1	3.34
200	3892	473	1112	-482	-6285	793	-482	862.0	3.30
201	3892	469	1118	-485	-6378	794	-485	862.0	3.23
203	3927	465	1129	-490	-6542	797	-490	869.7	3.18
204	3944	464	1135	-493	-6618	800	-493	873.5	3.12
206	3967	460	1145	-498	-6767	803	-498	878.6	3.09
207	3978	457	1149	-500	-6836	803	-500	881.0	3.11
209	3967	450	1155	-505	-6982	803	-505	878.6	3.33
210	3973	447	1157	-506	-7051	802	-506	879.9	3.76
212	3932	434	1152	-509	-7268	793	-509	870.9	4.16
213	3887	426	1148	-509	-7386	787	-509	860.9	5.43
214	3824	412	1141	-507	-7496	777	-507	846.9	14.29



Photo Report

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
 Lithology Siltstone, dark gray, moderately hard
 Hole Number DB-3 Depth (m) 30.62-30.77
 Test Type Elastic Moduli of Intact Rock Core in Uniaxial Compression
As Received

Project Number 110773396
 Lab ID EP-33



Core Preparation

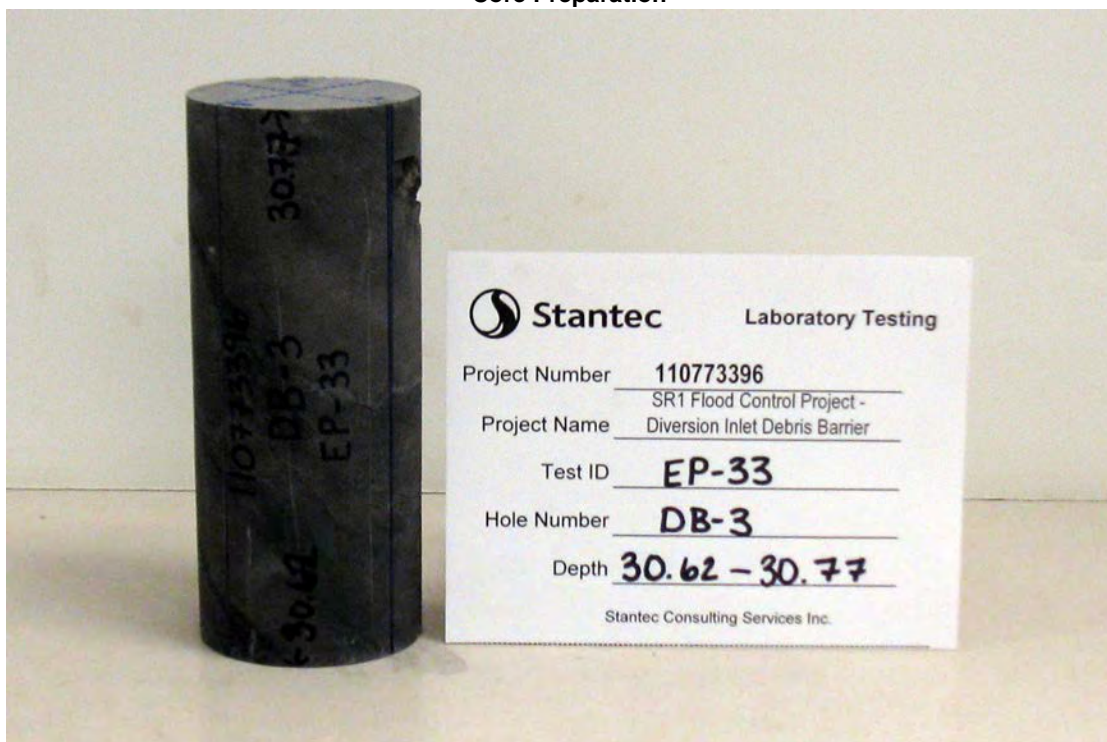




Photo Report

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
Lithology Siltstone, dark gray, moderately hard
Hole Number DB-3 Depth (m) 30.62-30.77
Test Type Elastic Moduli of Intact Rock Core in Uniaxial Compression

Project Number 110773396
Lab ID EP-33

Core Preparation



Post Test





Photo Report

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
Lithology Siltstone, dark gray, moderately hard
Hole Number DB-3 Depth (m) 30.62-30.77
Test Type Elastic Moduli of Intact Rock Core in Uniaxial Compression

Project Number 110773396
Lab ID EP-33

Post Test





Uniaxial Compressive Strength of Intact Rock Core Specimens

ASTM D 7012, Method C

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
 Lithology Siltstone, dark gray, moderately hard
 Hole Number DB-1 Depth (m) 17.27-17.41

Project Number 110773396
 Lab ID UCR-2
 Date Received 05/15/2018

Temperature (°C) 21 Moisture Condition As Prepared, Moist

Date Tested 05/25/2018

Side Planeness Pass
 Perpendicularity Pass
 End Planeness Pass
 Parallelism Pass

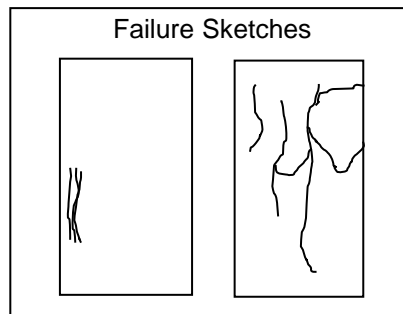
Height (in) 5.838
 Diameter (in) 2.406
 Area (in²) 4.548

Wet Unit Weight (pcf) 164.2
 Dry Unit Weight (pcf) N/A
 Moisture Content (%) N/A

Loading Rate (lbf/sec) 129
 Peak Load (lbf) 16107

Failure Type Undetermined

Compressive Strength (psi) 3540
 Compressive Strength (psf) 509760
 Compressive Strength (tsf) 255



Comments _____

Reviewed By RJ



Photo Report

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
Lithology Siltstone, dark gray, moderately hard
Hole Number DB-1 Depth (m) 17.27-17.41
Test Type Uniaxial Compressive Strength of Intact Rock Core

Project Number 110773396
Lab ID UCR-2

As Received



Core Preparation





Photo Report

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
 Lithology Siltstone, dark gray, moderately hard
 Hole Number DB-1 Depth (m) 17.27-17.41
 Test Type Uniaxial Compressive Strength of Intact Rock Core

Project Number 110773396
 Lab ID UCR-2

Core Preparation



Post Test





Photo Report

Project Name SR1 Flood Control Project - Diversion Inlet Debris Barrier
Lithology Siltstone, dark gray, moderately hard
Hole Number DB-1 Depth (m) 17.27-17.41
Test Type Uniaxial Compressive Strength of Intact Rock Core

Project Number 110773396
Lab ID UCR-2

Post Test



**APPENDIX F:
TETRA TECH DIRECT SIMPLE
SHEAR TESTING RESULTS**

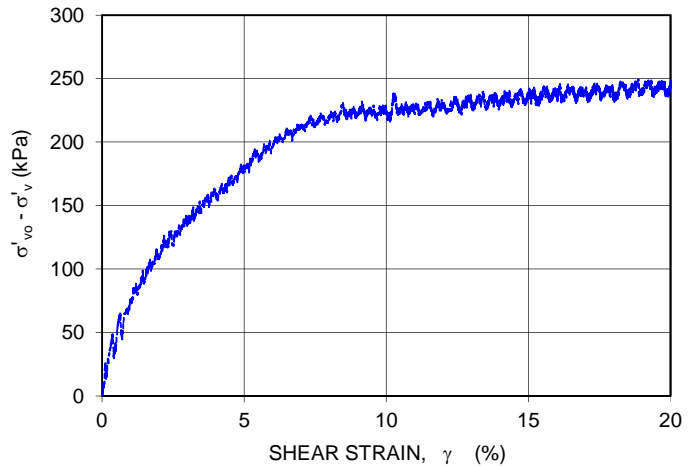
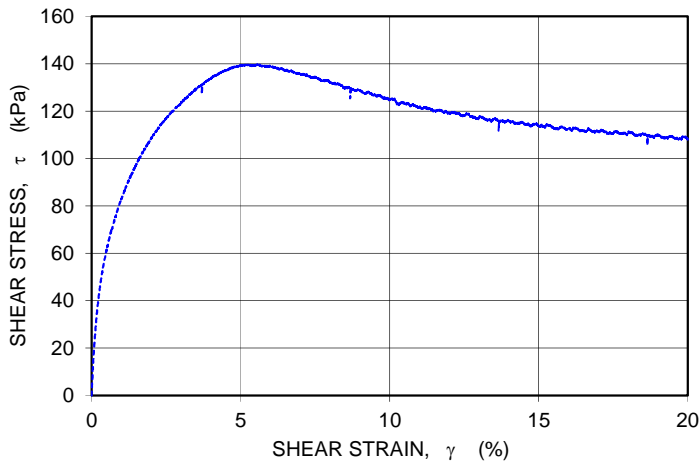
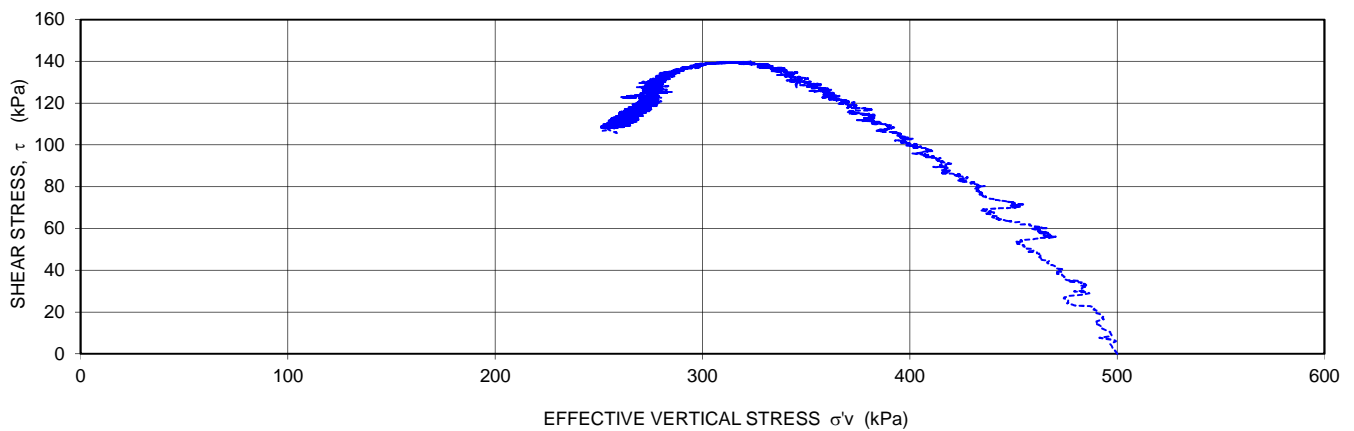
OCR = 1.0 Tests

Direct Simple Shear Laboratory Results

Project:	Stantec - SR1	Project No.:	704-ENG.VMEG03070-01
Location:	Alberta	Date:	October 3, 2018
Borehole:	D14	Depth (m):	3.20
Sample No.:	ST8		

Direct Simple Shear (ASTM D6528)

Initial Height (mm):	23.6	Weight of Specimen (g):	190.63	Initial Void Ratio, e_v :	0.82
Diameter of Ring (mm):	73.4	Total Unit Weight (kN/m^3):	18.68	Final Void Ratio, e_v :	0.71
Specific Gravity, G_s :	2.72	Dry Unit Weight (kN/m^3):	14.70	Natural Water Content (%):	27.1
Final Water Content (%):	26.5	Initial Degree of Saturation, S_r (%):	90.4	Final Degree of Saturation, S_r (%):	102.3



Type of Test: Constant Volume					
Sample No.	Depth (m)	Total Unit Weight (kN/m^3)	Effective Vertical Stress, σ'_v (kPa)	Strain Rate (%/hour)	Test OCR
ST8	3.20	18.7	500	1	-

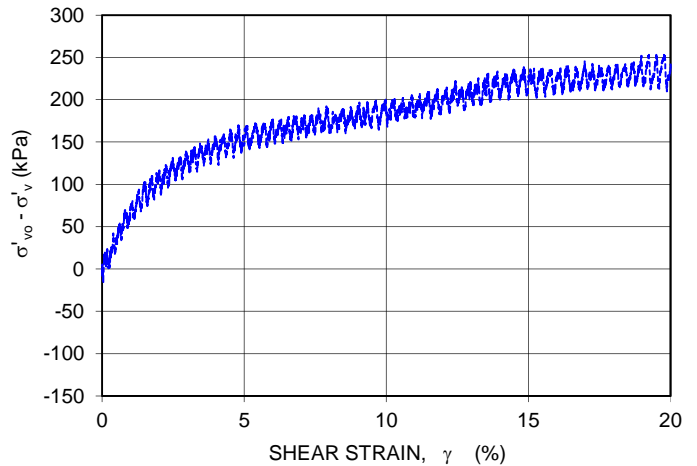
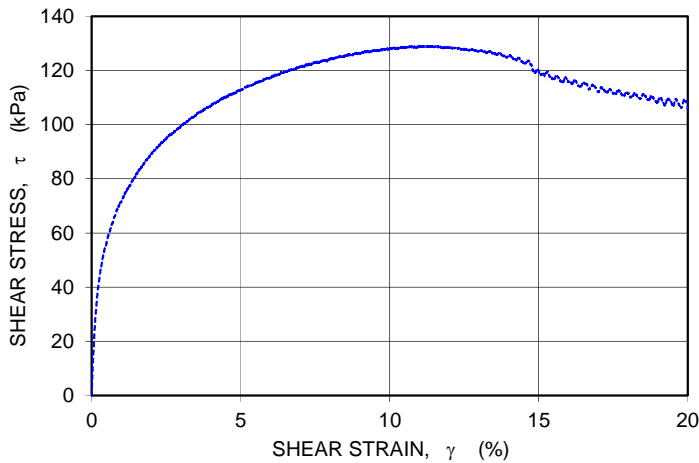
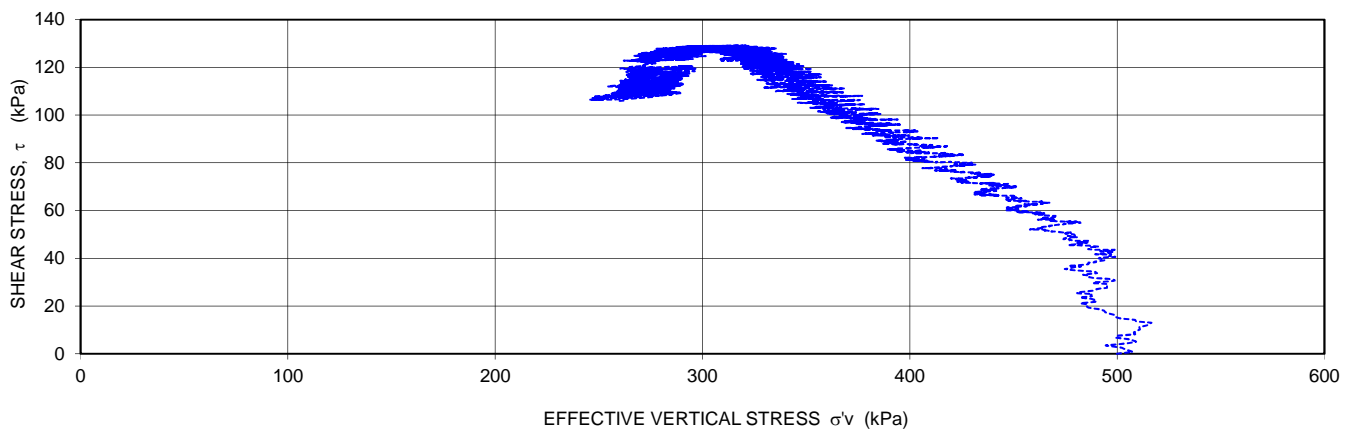
Comments: G_s of 2.72 provided by Stantec
After completion of test, some sample slip was observed along the interface between the sample and the bottom porous stone

Prepared By:	PS	Checked By:	PS	Approved By:	JPS
Date:	October 3, 2018	Date:	October 3, 2018	Date:	October 5, 2018

Project:	Stantec - SR1	Project No.:	704-ENG.VMEG03070-01
Location:	Alberta	Date:	September 20, 2018
Borehole:	D60	Depth (m):	0.8-1.25
Sample No.:	ST2		

Direct Simple Shear (ASTM D6528)

Initial Height (mm):	23.6	Weight of Specimen (g):	184.75	Initial Void Ratio, e_o :	0.89
Diameter of Ring (mm):	73.5	Total Unit Weight (kN/m^3):	18.13	Final Void Ratio, e_f :	0.72
Specific Gravity, G_s :	2.72	Dry Unit Weight (kN/m^3):	14.09	Natural Water Content (%):	28.7
Final Water Content (%):	28.1	Initial Degree of Saturation, S_r (%):	87.3	Final Degree of Saturation, S_r (%):	>100



Type of Test: Constant Volume					
Sample No.	Depth (m)	Total Unit Weight (kN/m^3)	Effective Vertical Stress, σ'_v (kPa)	Strain Rate (%/hour)	Test OCR
ST2	0.8-1.25	18.1	500	1	-

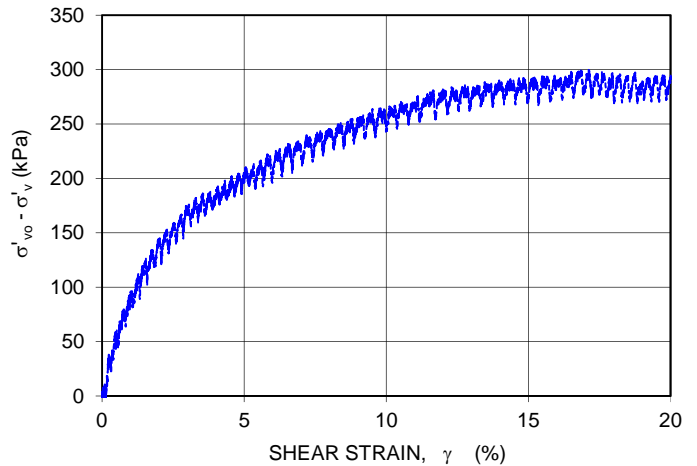
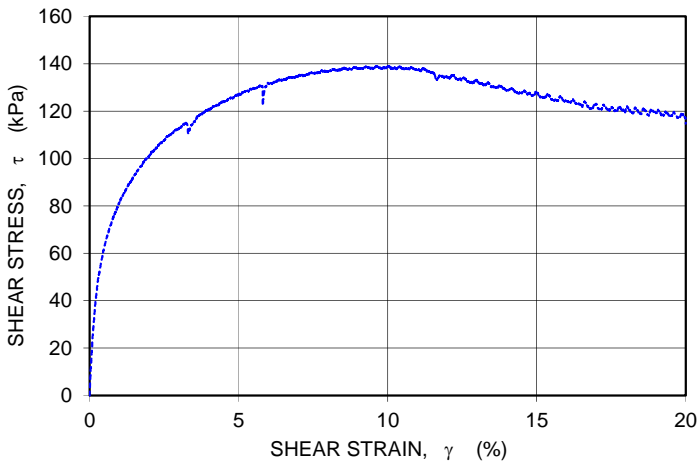
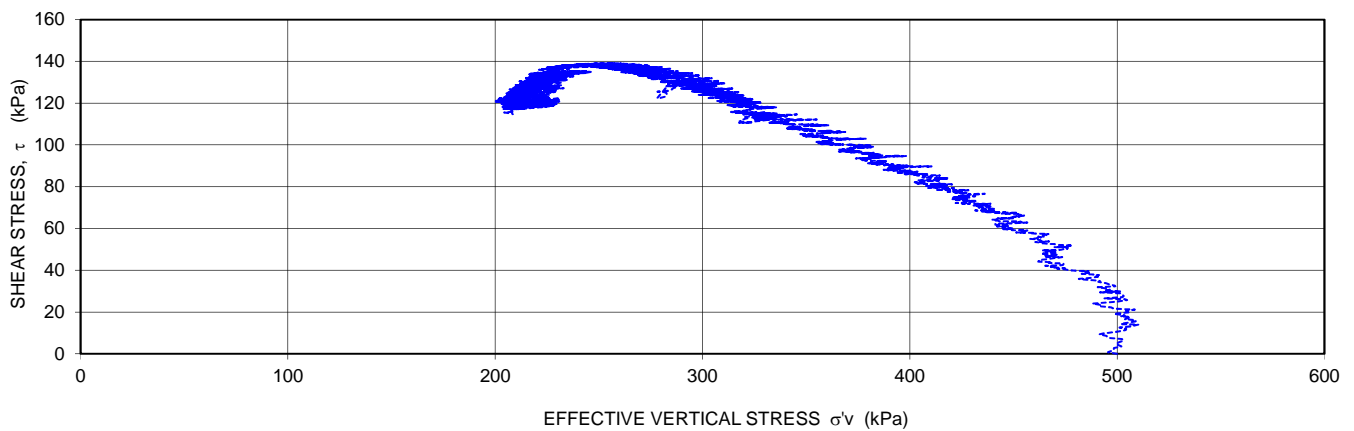
Comments: Gs of 2.72 provided by Stantec

Prepared By:	PC	Checked By:	PS	Approved By:	JPS
Date:	September 28, 2018	Date:	September 28, 2018	Date:	October 1, 2018

Project:	Stantec - SR1	Project No.:	704-ENG.VMEG03070-01
Location:	Alberta	Date:	November 9, 2018
Borehole:	GL1A	Depth (m):	1.37
Sample No.:	ST2		

Direct Simple Shear (ASTM D6528)

Initial Height (mm):	23.7	Weight of Specimen (g):	189.54	Initial Void Ratio, e_o :	0.71
Diameter of Ring (mm):	73.5	Total Unit Weight (kN/m^3):	18.49	Final Void Ratio, e_f :	0.52
Specific Gravity, G_s :	2.72	Dry Unit Weight (kN/m^3):	15.65	Natural Water Content (%):	18.2
Final Water Content (%):	19.3	Initial Degree of Saturation, S_r (%):	70.2	Final Degree of Saturation, S_r (%):	101.1



Type of Test: Constant Volume					
Sample No.	Depth (m)	Total Unit Weight (kN/m^3)	Effective Vertical Stress, σ'_v (kPa)	Strain Rate (%/hour)	Test OCR
ST2	1.37	18.5	500	1	-

Comments: Gs of 2.72 provided by Stantec

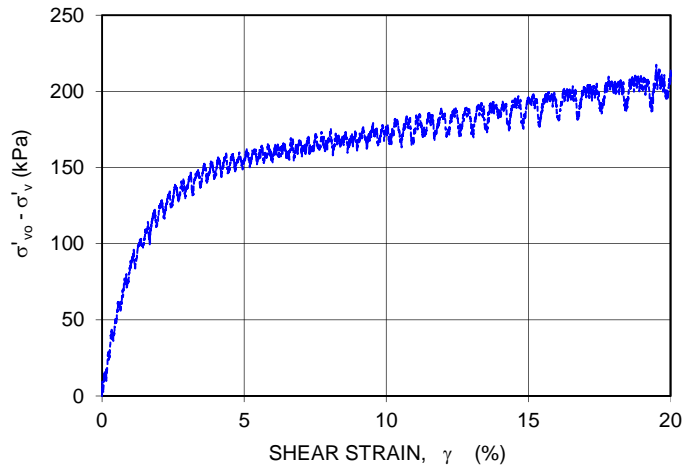
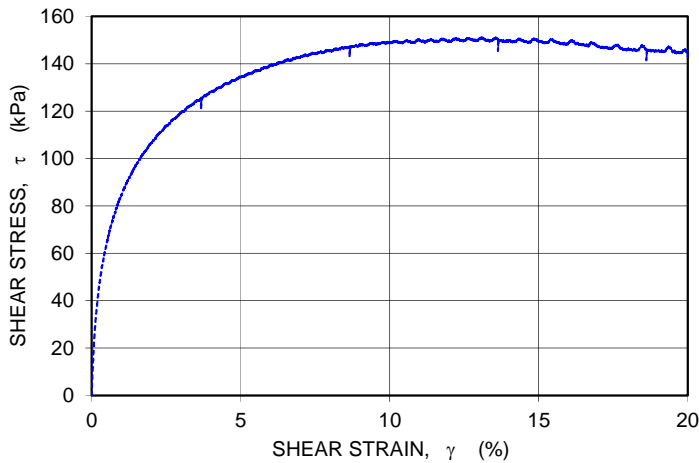
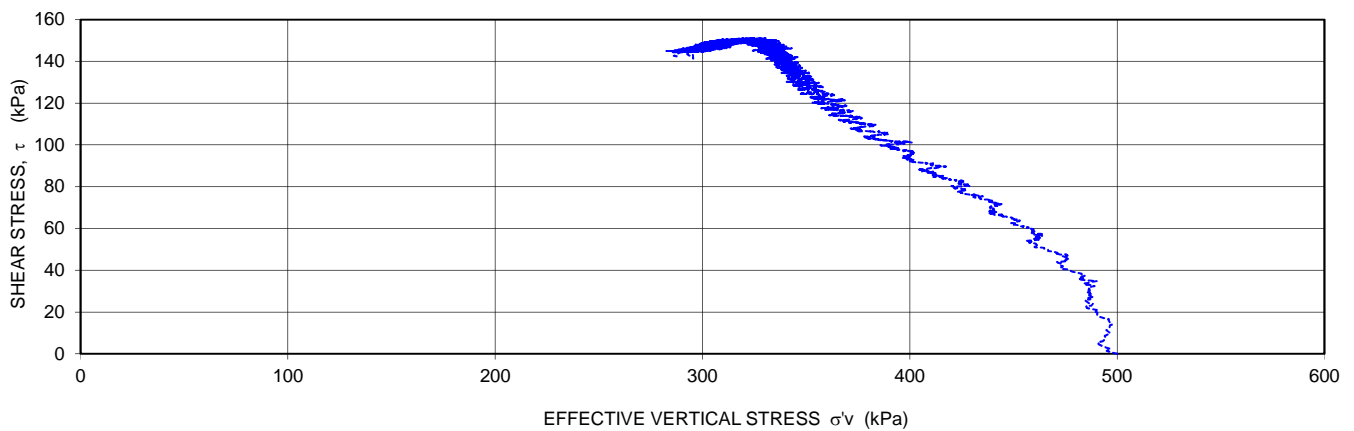
Prepared By:	PC	Checked By:	PS	Approved By:	JPS
Date:	November 9, 2018	Date:	November 9, 2018	Date:	November 13, 2018

TETRA TECH CANADA INC.

Project:	Stantec - SR1	Project No.:	704-ENG.VMEG03070-01
Location:	Alberta	Date:	November 1, 2018
Borehole:	GL1A	Depth (m):	2.72
Sample No.:	ST5		

Direct Simple Shear (ASTM D6528)

Initial Height (mm):	23.6	Weight of Specimen (g):	207.17	Initial Void Ratio, e_v :	0.61
Diameter of Ring (mm):	73.5	Total Unit Weight (kN/m^3):	20.24	Final Void Ratio, e_v :	0.53
Specific Gravity, G_s :	2.72	Dry Unit Weight (kN/m^3):	16.57	Natural Water Content (%):	22.1
Final Water Content (%):	20.2	Initial Degree of Saturation, S_r (%):	98.5	Final Degree of Saturation, S_r (%):	104.5



Type of Test: Constant Volume					
Sample No.	Depth (m)	Total Unit Weight (kN/m^3)	Effective Vertical Stress, σ'_v (kPa)	Strain Rate (%/hour)	Test OCR
ST5	2.72	20.2	500	1	-

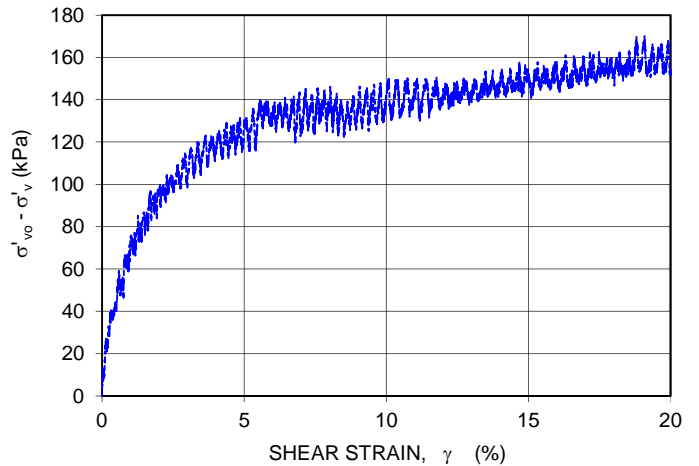
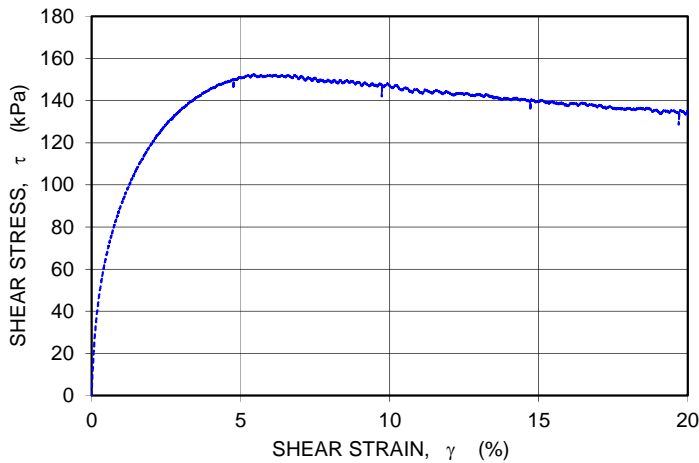
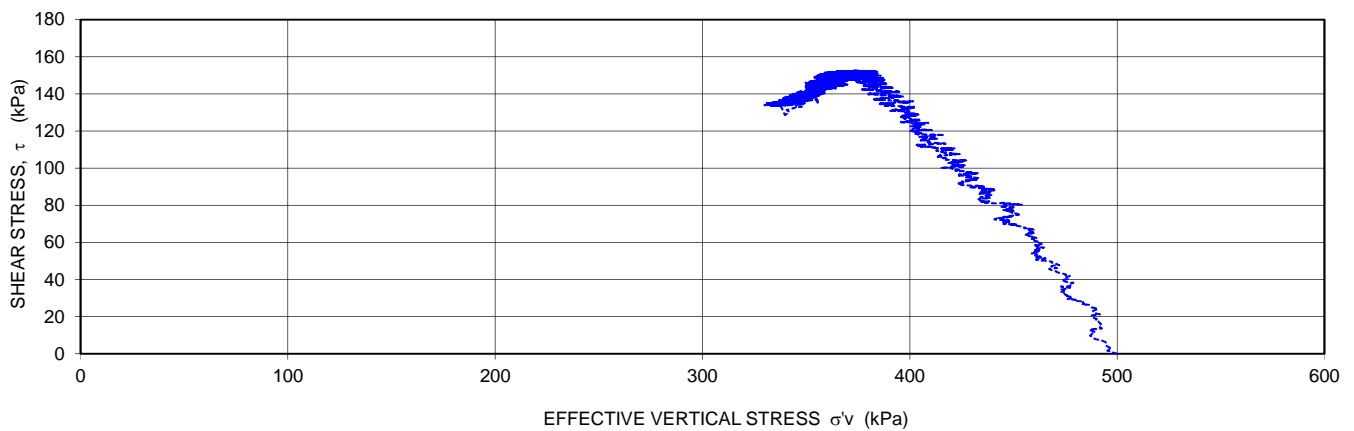
Comments: _____

Prepared By:	PC	Checked By:	PS	Approved By:	JPS
Date:	November 1, 2018	Date:	November 1, 2018	Date:	November 2, 2018

Project:	Stantec - SR1	Project No.:	704-ENG.VMEG03070-01
Location:	Alberta	Date:	November 9, 2018
Borehole:	GL1A	Depth (m):	3.92
Sample No.:	ST8		

Direct Simple Shear (ASTM D6528)

Initial Height (mm):	23.7	Weight of Specimen (g):	207.16	Initial Void Ratio, e_o :	0.60
Diameter of Ring (mm):	73.5	Total Unit Weight (kN/m^3):	20.22	Final Void Ratio, e_f :	0.54
Specific Gravity, G_s :	2.72	Dry Unit Weight (kN/m^3):	16.67	Natural Water Content (%):	21.3
Final Water Content (%):	22.2	Initial Degree of Saturation, S_r (%):	96.5	Final Degree of Saturation, S_r (%):	111.3



Type of Test: Constant Volume					
Sample No.	Depth (m)	Total Unit Weight (kN/m^3)	Effective Vertical Stress, σ'_v (kPa)	Strain Rate (%/hour)	Test OCR
ST8	3.92	20.2	500	1	-

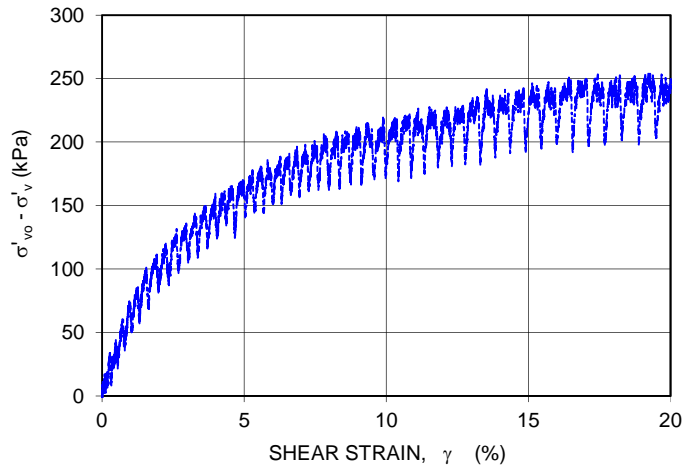
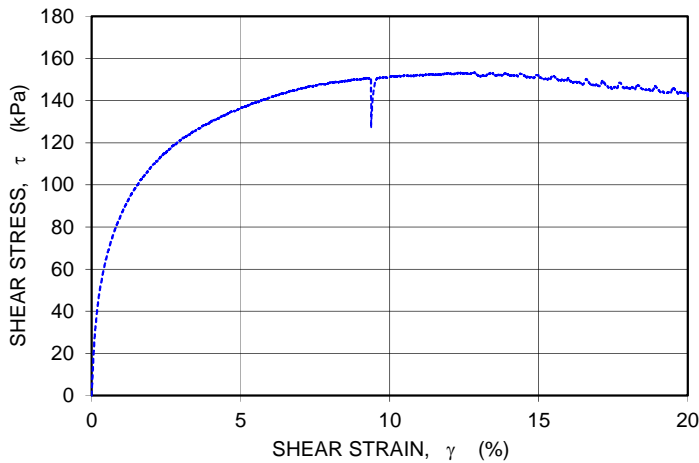
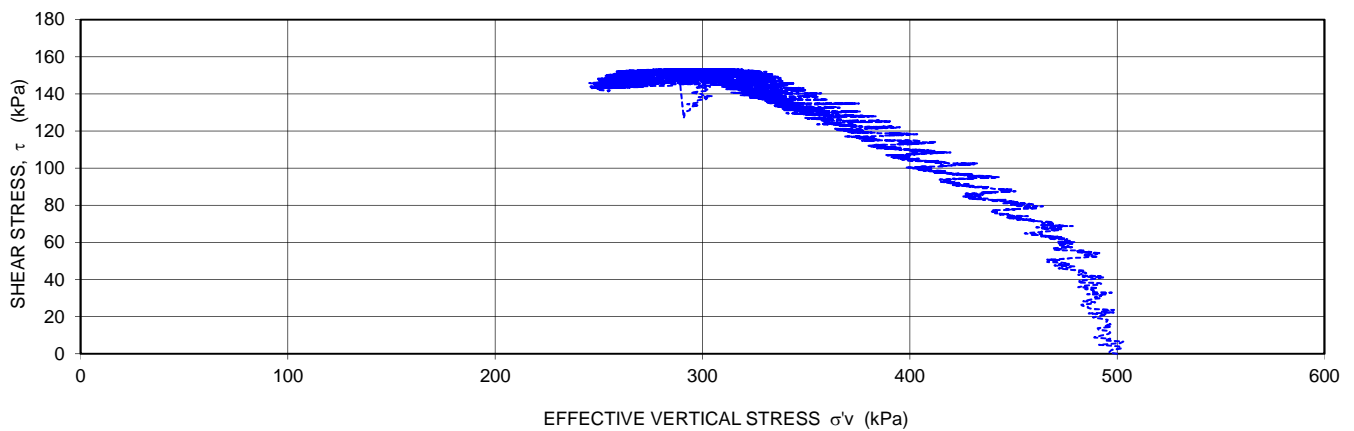
Comments: Gs of 2.72 provided by Stantec

Prepared By:	PC	Checked By:	PS	Approved By:	JPS
Date:	November 9, 2018	Date:	November 9, 2018	Date:	November 13, 2018

Project:	Stantec - SR1	Project No.:	704-ENG.VMEG03070-01
Location:	Alberta	Date:	November 9, 2018
Borehole:	GL1A	Depth (m):	5.27
Sample No.:	ST11		

Direct Simple Shear (ASTM D6528)

Initial Height (mm):	23.7	Weight of Specimen (g):	205.55	Initial Void Ratio, e_s :	0.63
Diameter of Ring (mm):	73.5	Total Unit Weight (kN/m^3):	20.07	Final Void Ratio, e_f :	0.53
Specific Gravity, G_s :	2.72	Dry Unit Weight (kN/m^3):	16.40	Natural Water Content (%):	22.3
Final Water Content (%):	21.7	Initial Degree of Saturation, S_r (%):	97.0	Final Degree of Saturation, S_r (%):	111.0



Type of Test: Constant Volume					
Sample No.	Depth (m)	Total Unit Weight (kN/m^3)	Effective Vertical Stress, σ'_v (kPa)	Strain Rate (%/hour)	Test OCR
ST11	5.27	20.1			-

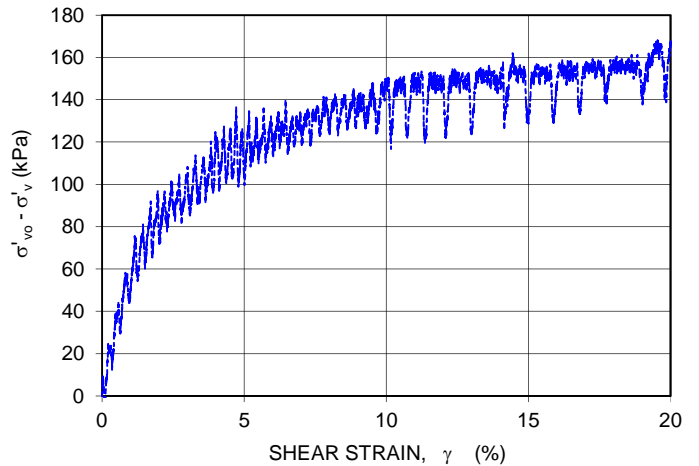
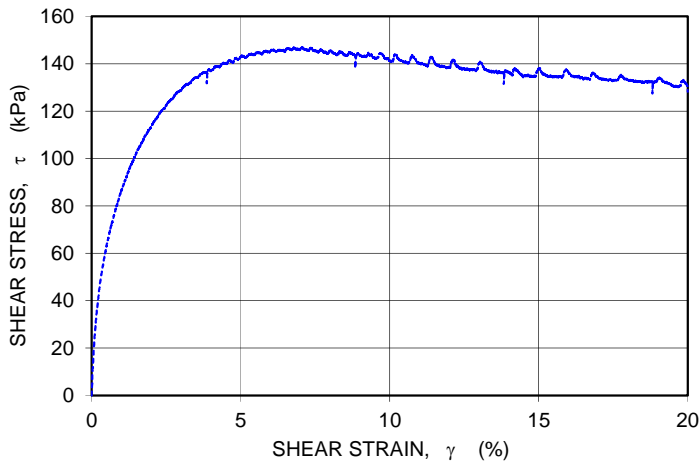
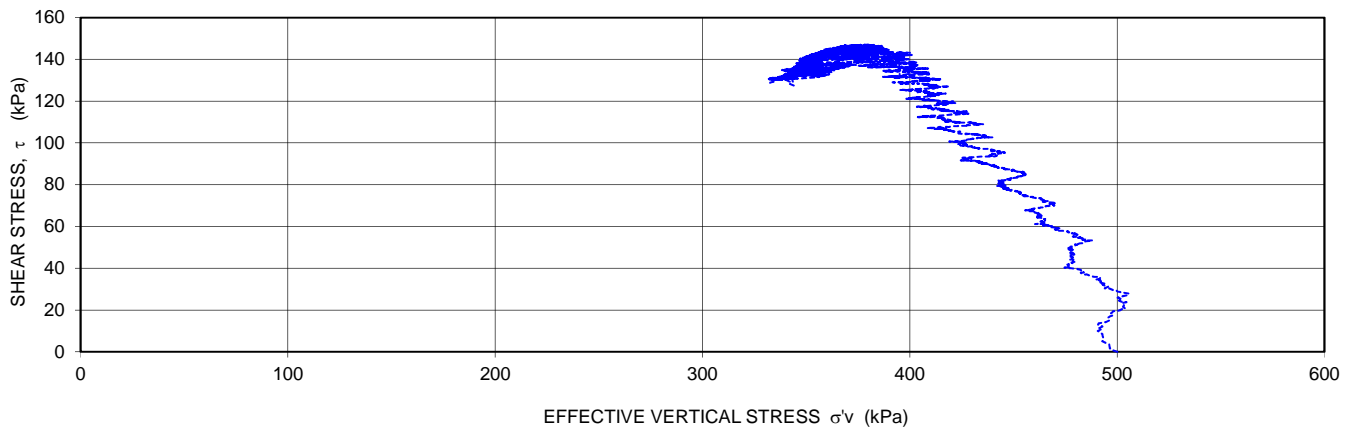
Comments: Gs of 2.72 provided by Stantec

Prepared By:	PC	Checked By:	PS	Approved By:	JPS
Date:	November 9, 2018	Date:	November 9, 2018	Date:	November 13, 2018

Project:	Stantec - SR1	Project No.:	704-ENG.VMEG03070-01
Location:	Alberta	Date:	November 9, 2018
Borehole:	GL1A	Depth (m):	6.70
Sample No.:	ST14		

Direct Simple Shear (ASTM D6528)

Initial Height (mm):	23.5	Weight of Specimen (g):	206.45	Initial Void Ratio, e_o :	0.60
Diameter of Ring (mm):	73.5	Total Unit Weight (kN/m^3):	20.32	Final Void Ratio, e_f :	0.54
Specific Gravity, G_s :	2.72	Dry Unit Weight (kN/m^3):	16.66	Natural Water Content (%):	22.0
Final Water Content (%):	22.4	Initial Degree of Saturation, S_r (%):	99.4	Final Degree of Saturation, S_r (%):	111.6



Type of Test: Constant Volume					
Sample No.	Depth (m)	Total Unit Weight (kN/m^3)	Effective Vertical Stress, σ'_v (kPa)	Strain Rate (%/hour)	Test OCR
ST14	6.70	20.3	500	1	-

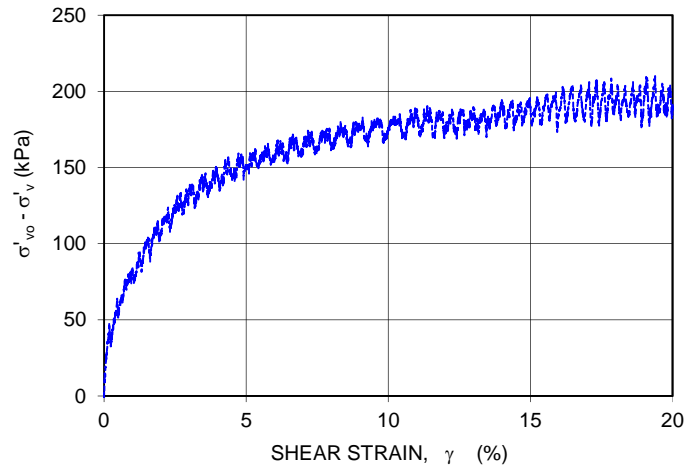
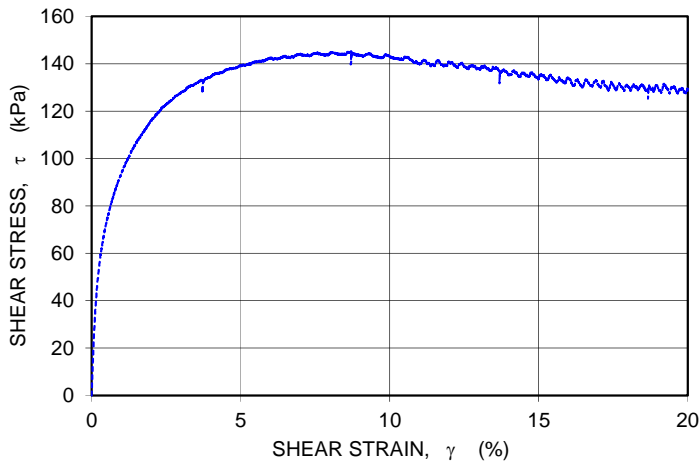
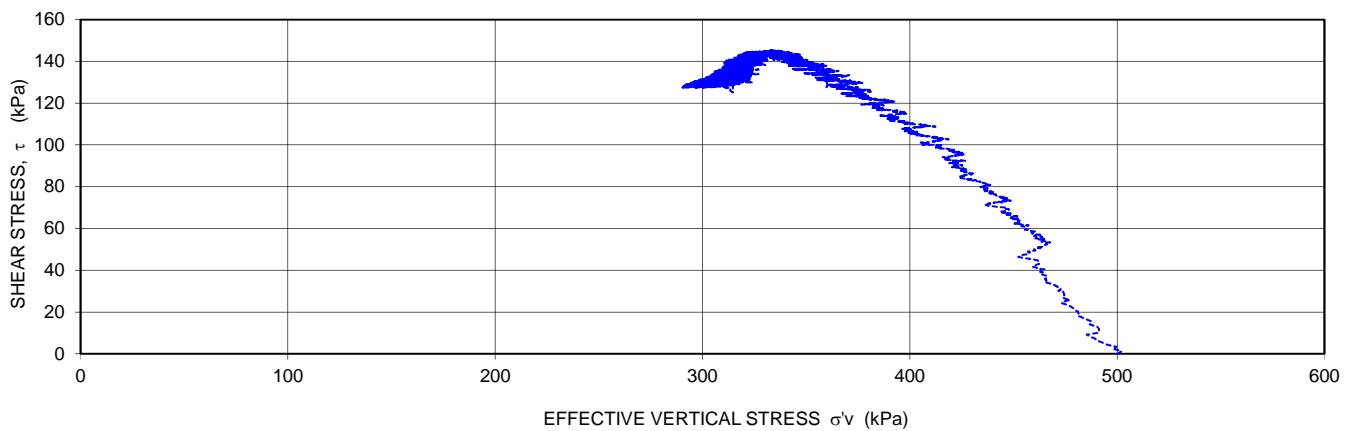
Comments: Gs of 2.72 provided by Stantec

Prepared By:	PC	Checked By:	PS	Approved By:	JPS
Date:	November 9, 2018	Date:	November 9, 2018	Date:	November 13, 2018

Project:	Stantec - SR1	Project No.:	704-ENG.VMEG03070-01
Location:	Alberta	Date:	November 9, 2018
Borehole:	GL1A	Depth (m):	8.06
Sample No.:	ST17		

Direct Simple Shear (ASTM D6528)

Initial Height (mm):	23.7	Weight of Specimen (g):	211.50	Initial Void Ratio, e_o :	0.51
Diameter of Ring (mm):	73.6	Total Unit Weight (kN/m^3):	20.62	Final Void Ratio, e_f :	0.45
Specific Gravity, G_s :	2.72	Dry Unit Weight (kN/m^3):	17.62	Natural Water Content (%):	17.0
Final Water Content (%):	18.7	Initial Degree of Saturation, S_r (%):	90.1	Final Degree of Saturation, S_r (%):	113.4



Type of Test: Constant Volume					
Sample No.	Depth (m)	Total Unit Weight (kN/m^3)	Effective Vertical Stress, σ'_v (kPa)	Strain Rate (%/hour)	Test OCR
ST17	8.06	20.6	500	1	-

Comments: Gs of 2.72 provided by Stantec

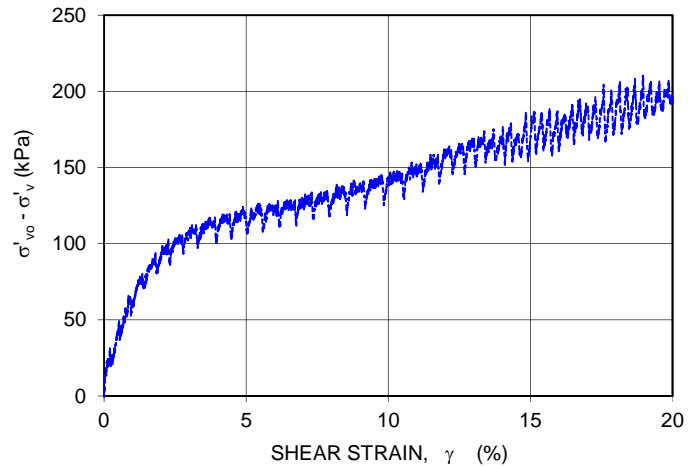
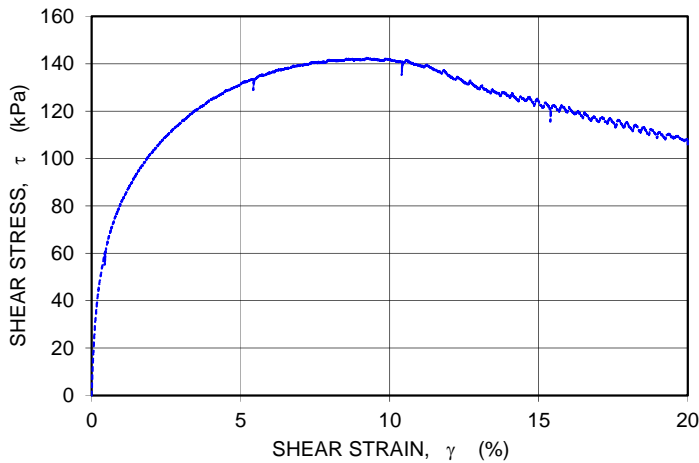
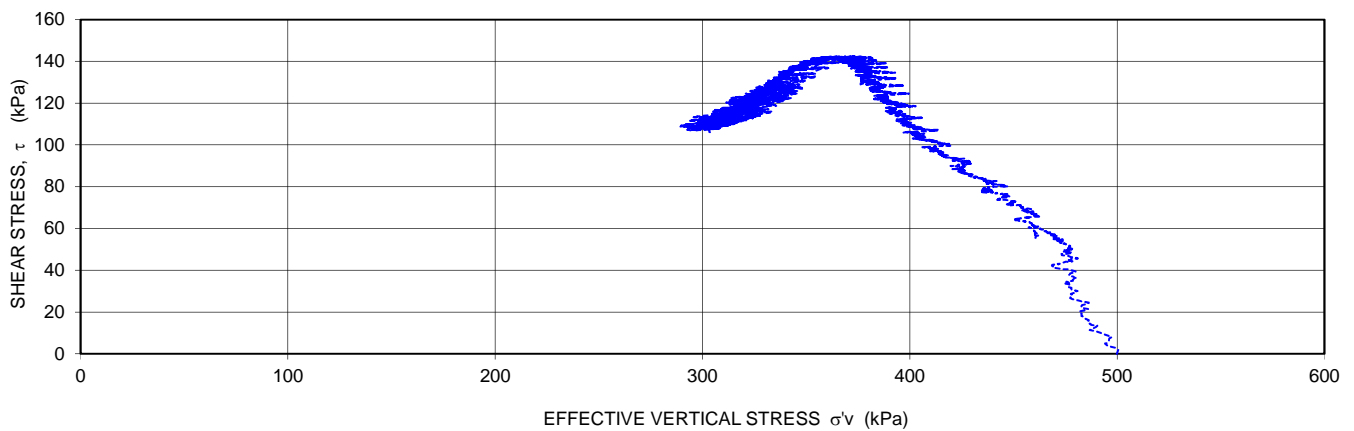
Prepared By:	PC	Checked By:	PS	Approved By:	JPS
Date:	November 9, 2018	Date:	November 9, 2018	Date:	November 13, 2018

TETRA TECH CANADA INC.

Project:	Stantec - SR1	Project No.:	704-ENG.VMEG03070-01
Location:	Alberta	Date:	November 19, 2018
Borehole:	GL2	Depth (m):	1.82
Sample No.:	ST3		

Direct Simple Shear (ASTM D6528)

Initial Height (mm):	23.6	Weight of Specimen (g):	200.45	Initial Void Ratio, e_o :	0.71
Diameter of Ring (mm):	73.5	Total Unit Weight (kN/m^3):	19.65	Final Void Ratio, e_f :	0.61
Specific Gravity, G_s :	2.72	Dry Unit Weight (kN/m^3):	15.60	Natural Water Content (%):	25.9
Final Water Content (%):	22.7	Initial Degree of Saturation, S_r (%):	99.3	Final Degree of Saturation, S_r (%):	100.5



Type of Test: Constant Volume					
Sample No.	Depth (m)	Total Unit Weight (kN/m^3)	Effective Vertical Stress, σ'_v (kPa)	Strain Rate (%/hour)	Test OCR
ST3	1.82	19.6	500	1	-

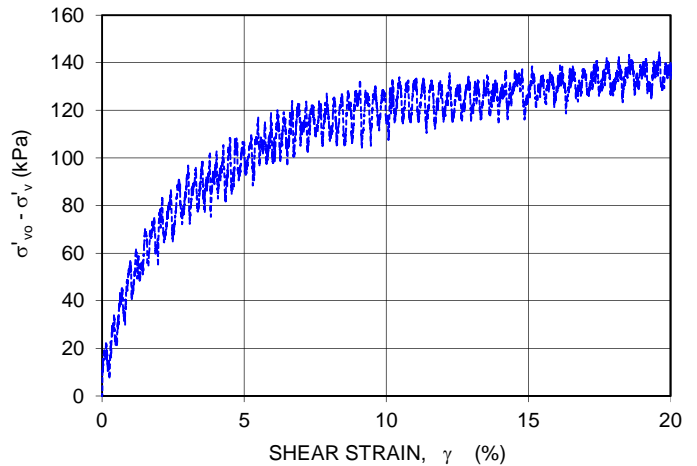
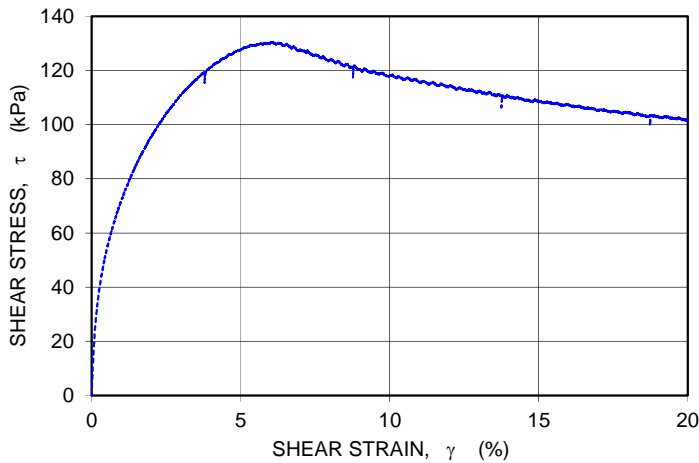
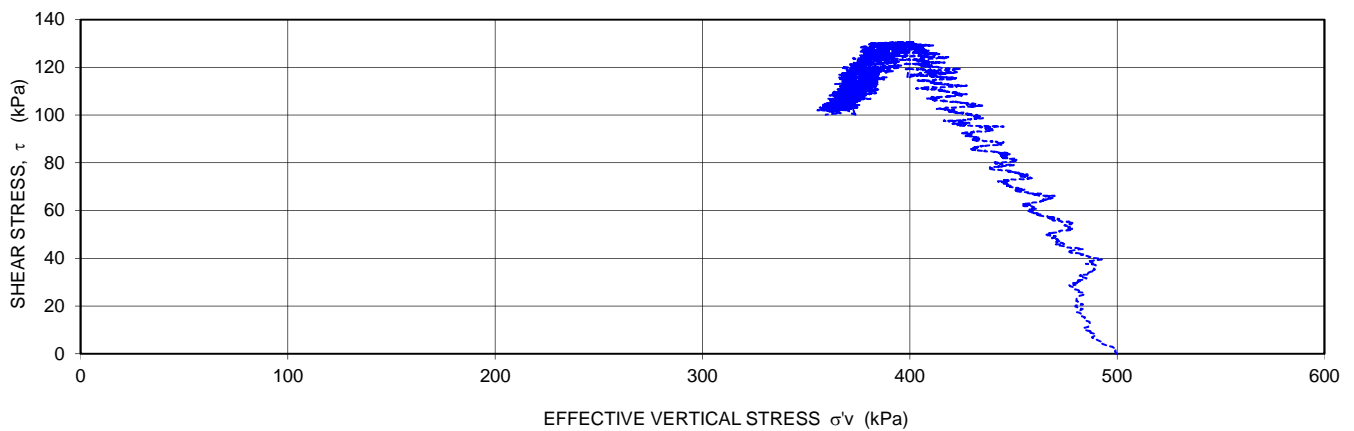
Comments: Gs of 2.72 provided by Stantec

Prepared By:	PC	Checked By:	PS	Approved By:	JPS
Date:	November 19, 2018	Date:	November 19, 2018	Date:	November 20, 2018

Project:	Stantec - SR1	Project No.:	704-ENG.VMEG03070-01
Location:	Alberta	Date:	October 26, 2018
Borehole:	GL2	Depth (m):	3.15 - 3.18
Sample No.:	ST6		

Direct Simple Shear (ASTM D6528)

Initial Height (mm):	23.6	Weight of Specimen (g):	195.03	Initial Void Ratio, e_o :	0.77
Diameter of Ring (mm):	73.5	Total Unit Weight (kN/m^3):	19.13	Final Void Ratio, e_f :	0.68
Specific Gravity, G_s :	2.72	Dry Unit Weight (kN/m^3):	15.10	Natural Water Content (%):	26.6
Final Water Content (%):	27.1	Initial Degree of Saturation, S_r (%):	94.5	Final Degree of Saturation, S_r (%):	108.0



Type of Test: Constant Volume					
Sample No.	Depth (m)	Total Unit Weight (kN/m^3)	Effective Vertical Stress, σ'_v (kPa)	Strain Rate (%/hour)	Test OCR
ST6	3.15 - 3.18	19.1	500	1	-

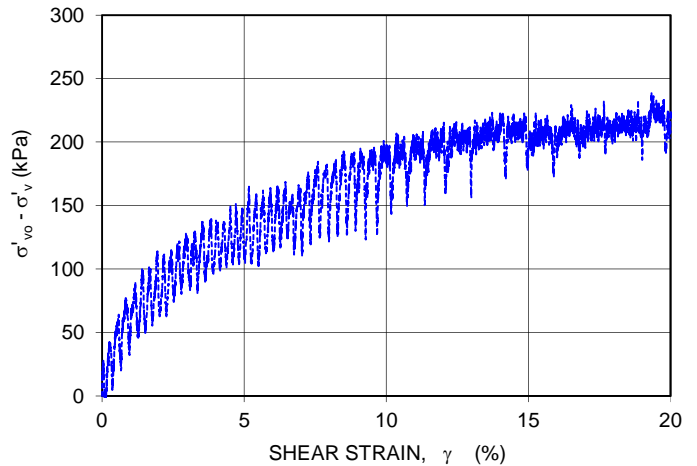
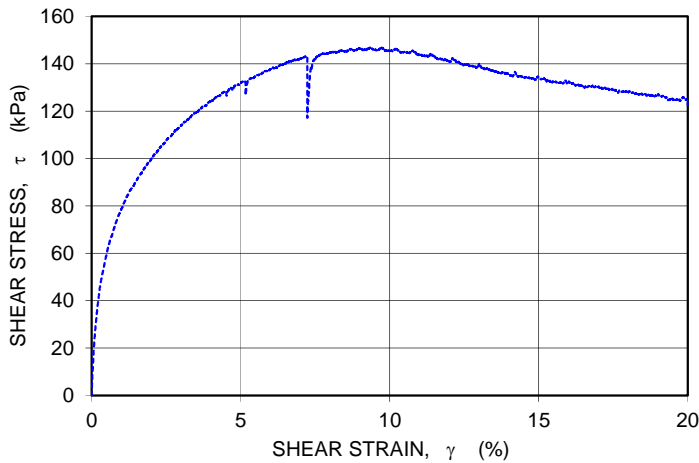
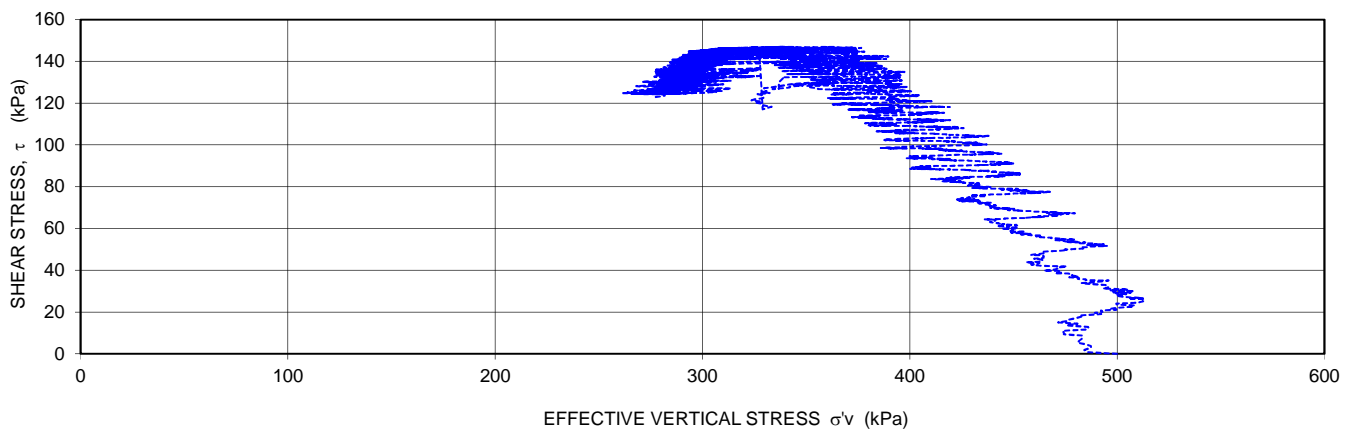
Comments: Gs of 2.72 provided by Stantec

Prepared By:	PC	Checked By:	SR	Approved By:	JPS
Date:	October 26, 2018	Date:	October 26, 2018	Date:	October 31, 2018

Project:	Stantec - SR1	Project No.:	704-ENG.VMEG03070-01
Location:	Alberta	Date:	November 9, 2018
Borehole:	GL2	Depth (m):	4.97
Sample No.:	ST10		

Direct Simple Shear (ASTM D6528)

Initial Height (mm):	23.7	Weight of Specimen (g):	198.00	Initial Void Ratio, e_o :	0.74
Diameter of Ring (mm):	73.6	Total Unit Weight (kN/m^3):	19.31	Final Void Ratio, e_f :	0.63
Specific Gravity, G_s :	2.72	Dry Unit Weight (kN/m^3):	15.30	Natural Water Content (%):	26.2
Final Water Content (%):	24.7	Initial Degree of Saturation, S_r (%):	95.7	Final Degree of Saturation, S_r (%):	107.5



Type of Test: Constant Volume					
Sample No.	Depth (m)	Total Unit Weight (kN/m^3)	Effective Vertical Stress, σ'_v (kPa)	Strain Rate (%/hour)	Test OCR
ST10	4.97	19.3	500	1	-

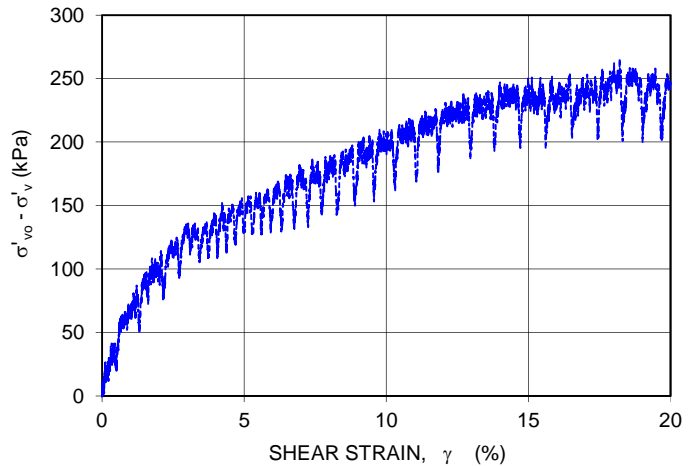
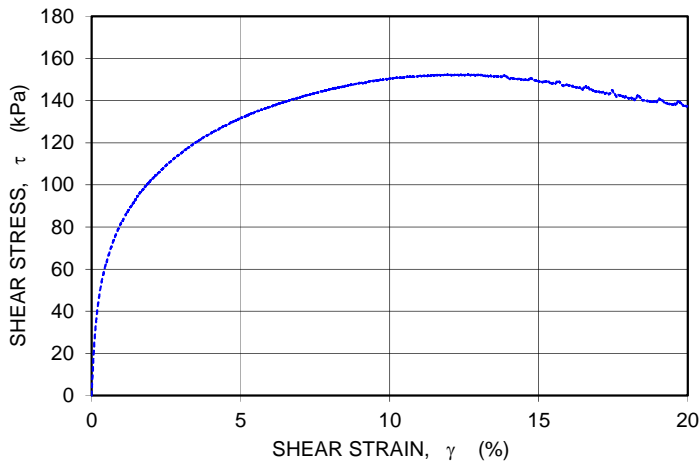
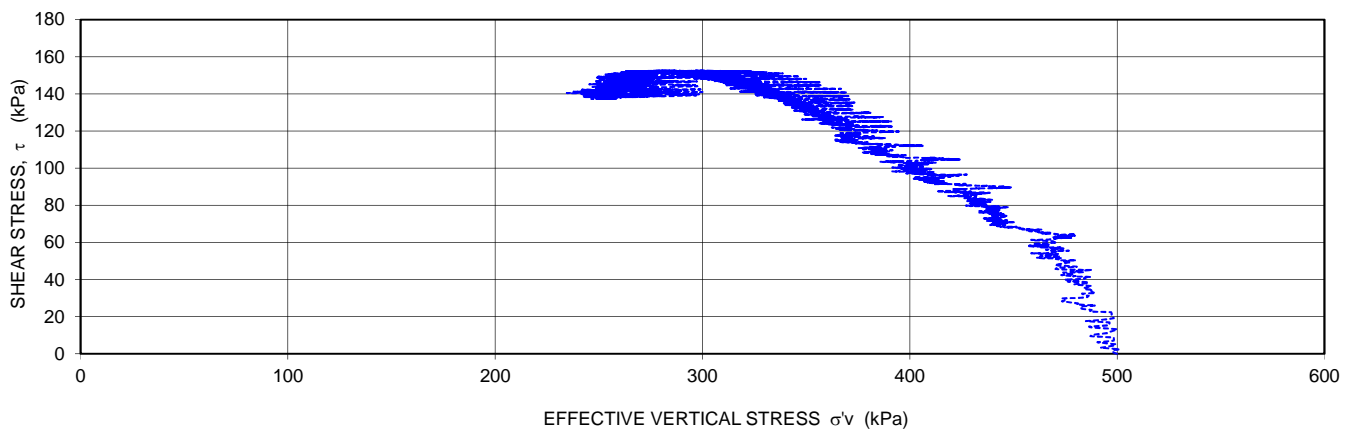
Comments: Gs of 2.72 provided by Stantec

Prepared By:	PC	Checked By:	PS	Approved By:	JPS
Date:	November 9, 2018	Date:	November 9, 2018	Date:	November 13, 2018

Project:	Stantec - SR1	Project No.:	704-ENG.VMEG03070-01
Location:	Alberta	Date:	October 31, 2018
Borehole:	GL2	Depth (m):	6.32
Sample No.:	ST13		

Direct Simple Shear (ASTM D6528)

Initial Height (mm):	23.7	Weight of Specimen (g):	201.54	Initial Void Ratio, e_o :	0.68
Diameter of Ring (mm):	73.6	Total Unit Weight (kN/m^3):	19.66	Final Void Ratio, e_f :	0.58
Specific Gravity, G_s :	2.72	Dry Unit Weight (kN/m^3):	15.87	Natural Water Content (%):	23.9
Final Water Content (%):	23.8	Initial Degree of Saturation, S_r (%):	95.4	Final Degree of Saturation, S_r (%):	111.0



Type of Test: Constant Volume					
Sample No.	Depth (m)	Total Unit Weight (kN/m^3)	Effective Vertical Stress, σ'_v (kPa)	Strain Rate (%/hour)	Test OCR
ST13	6.32	19.7	500	1	-

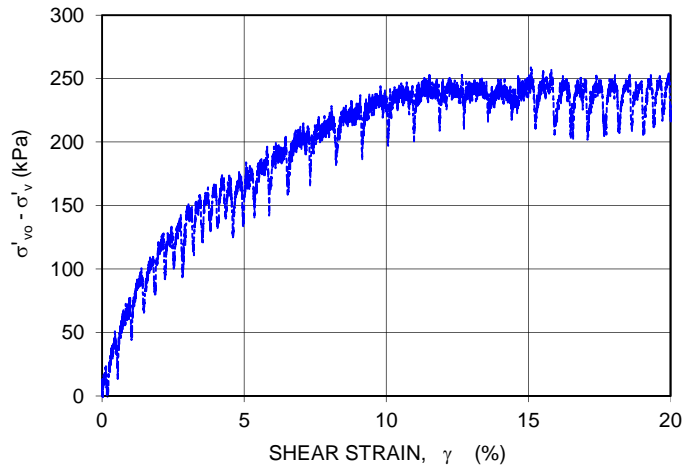
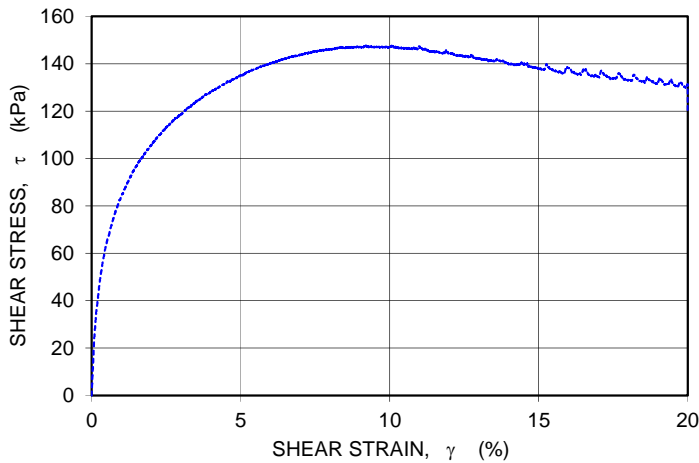
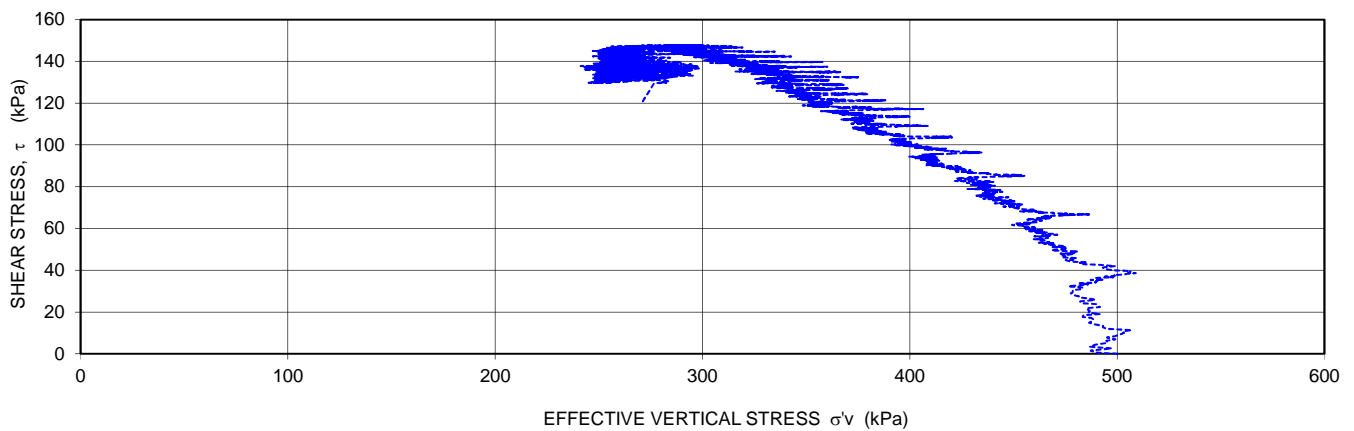
Comments: Gs of 2.72 provided by Stantec

Prepared By:	PC	Checked By:	PS	Approved By:	JPS
Date:	October 31, 2018	Date:	October 31, 2018	Date:	October 31, 2018

Project:	Stantec - SR1	Project No.:	704-ENG.VMEG03070-01
Location:	Alberta	Date:	November 19, 2018
Borehole:	GL2	Depth (m):	8.12
Sample No.:	ST16		

Direct Simple Shear (ASTM D6528)

Initial Height (mm):	23.6	Weight of Specimen (g):	200.45	Initial Void Ratio, e_s :	0.67
Diameter of Ring (mm):	73.5	Total Unit Weight (kN/m^3):	19.63	Final Void Ratio, e_f :	0.55
Specific Gravity, G_s :	2.72	Dry Unit Weight (kN/m^3):	16.02	Natural Water Content (%):	22.5
Final Water Content (%):	21.5	Initial Degree of Saturation, S_r (%):	92.1	Final Degree of Saturation, S_r (%):	106.0



Type of Test: Constant Volume					
Sample No.	Depth (m)	Total Unit Weight (kN/m^3)	Effective Vertical Stress, σ'_v (kPa)	Strain Rate (%/hour)	Test OCR
ST16	8.12	19.6	500	1	-

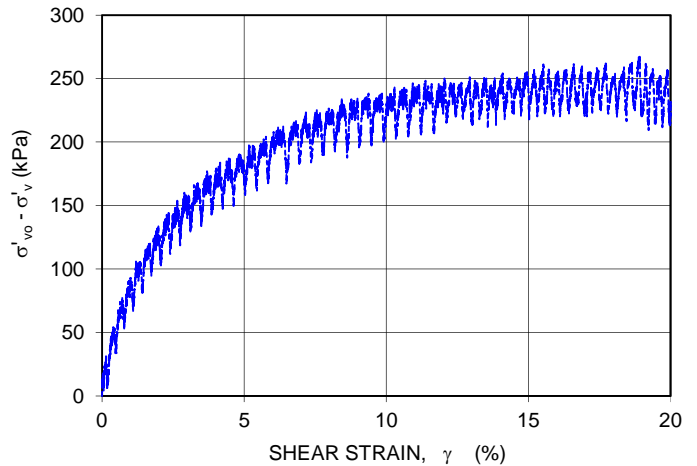
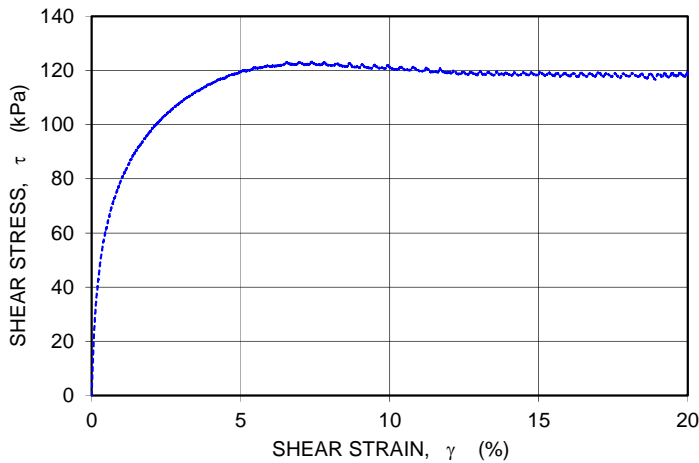
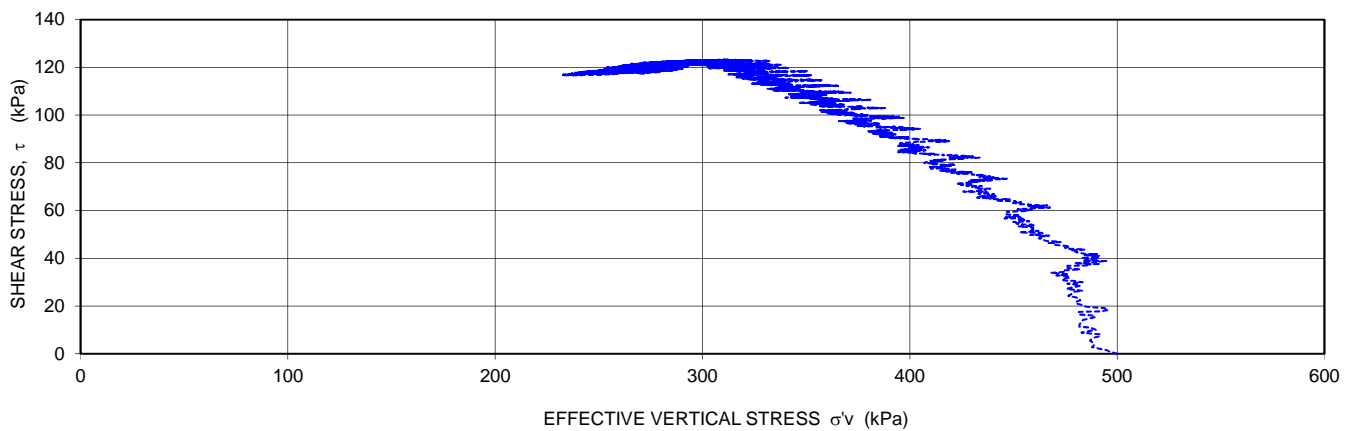
Comments: Gs of 2.72 provided by Stantec

Prepared By:	PC	Checked By:	PS	Approved By:	0
Date:	November 19, 2018	Date:	November 19, 2018	Date:	January 0, 1900

Project:	Stantec - SR1	Project No.:	704-ENG.VMEG03070-01
Location:	Alberta	Date:	October 26, 2018
Borehole:	GL2	Depth (m):	9.45 - 9.48
Sample No.:	ST19		

Direct Simple Shear (ASTM D6528)

Initial Height (mm):	23.6	Weight of Specimen (g):	198.83	Initial Void Ratio, e_o :	0.68
Diameter of Ring (mm):	73.5	Total Unit Weight (kN/m^3):	19.43	Final Void Ratio, e_f :	0.54
Specific Gravity, G_s :	2.72	Dry Unit Weight (kN/m^3):	15.93	Natural Water Content (%):	22.0
Final Water Content (%):	19.8	Initial Degree of Saturation, S_r (%):	88.5	Final Degree of Saturation, S_r (%):	99.9



Type of Test: Constant Volume					
Sample No.	Depth (m)	Total Unit Weight (kN/m^3)	Effective Vertical Stress, σ'_v (kPa)	Strain Rate (%/hour)	Test OCR
ST19	9.45 - 9.48	19.4	500	1	-

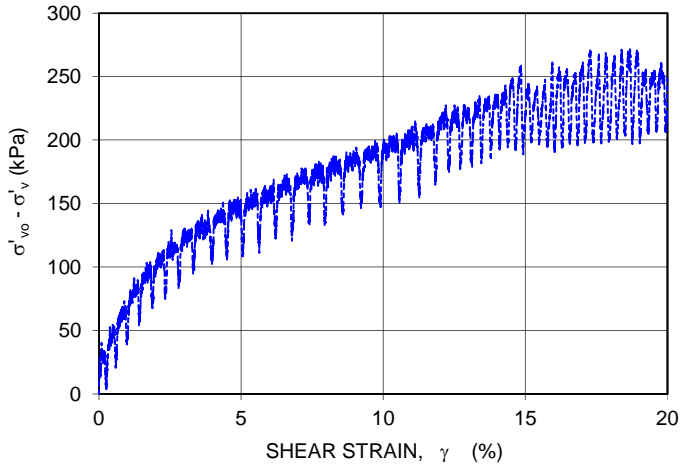
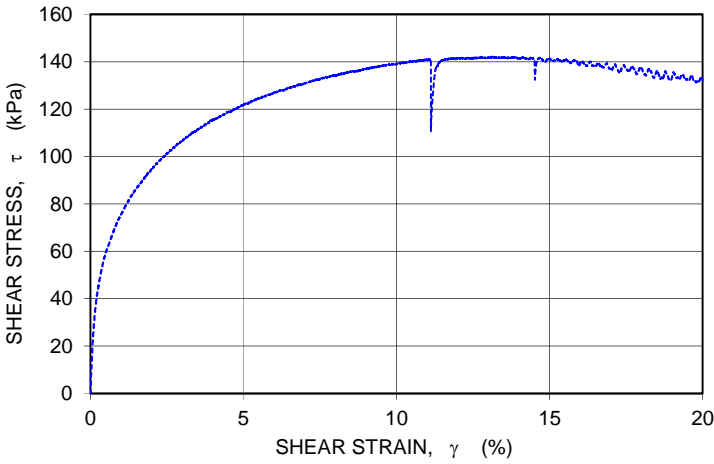
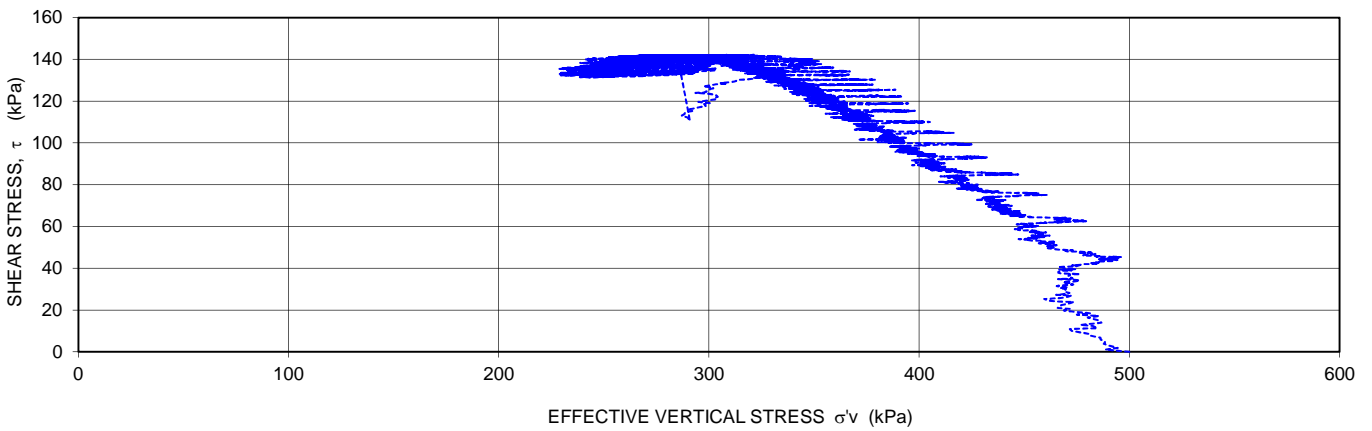
Comments: Gs of 2.72 provided by Stantec

Prepared By:	PC	Checked By:	SR	Approved By:	JPS
Date:	October 26, 2018	Date:	October 26, 2018	Date:	October 31, 2018

Project:	Stantec - SR1	Project No.:	704-ENG.VMEG03070-01
Location:	Alberta	Date:	November 19, 2018
Borehole:	GL3A	Depth (m):	3.12
Sample No.:	ST5		

Direct Simple Shear (ASTM D6528)

Initial Height (mm):	23.7	Weight of Specimen (g):	202.35	Initial Void Ratio, e_o :	0.77
Diameter of Ring (mm):	73.5	Total Unit Weight (kN/m^3):	19.75	Final Void Ratio, e_f :	0.67
Specific Gravity, G_s :	2.92	Dry Unit Weight (kN/m^3):	16.21	Natural Water Content (%):	21.8
Final Water Content (%):	21.9	Initial Degree of Saturation, S_r (%):	83.1	Final Degree of Saturation, S_r (%):	95.3



Type of Test: Constant Volume					
Sample No.	Depth (m)	Total Unit Weight (kN/m^3)	Effective Vertical Stress, σ'_v (kPa)	Strain Rate (%/hour)	Test OCR
ST5	3.12	19.7	500	1	-

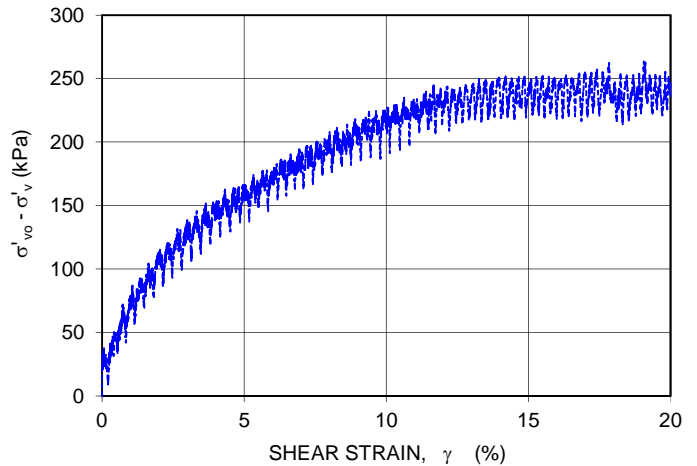
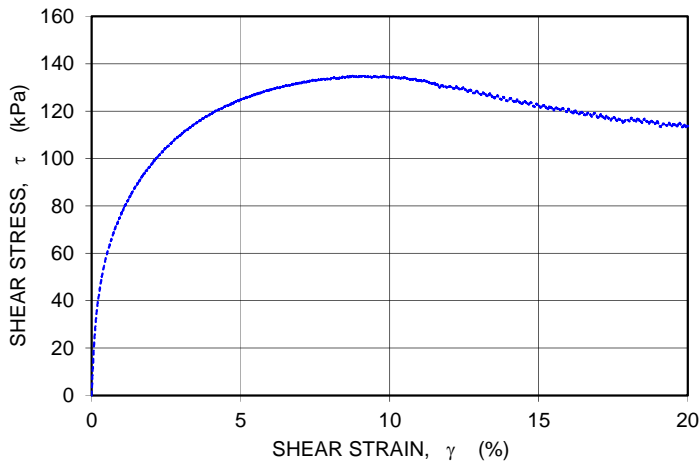
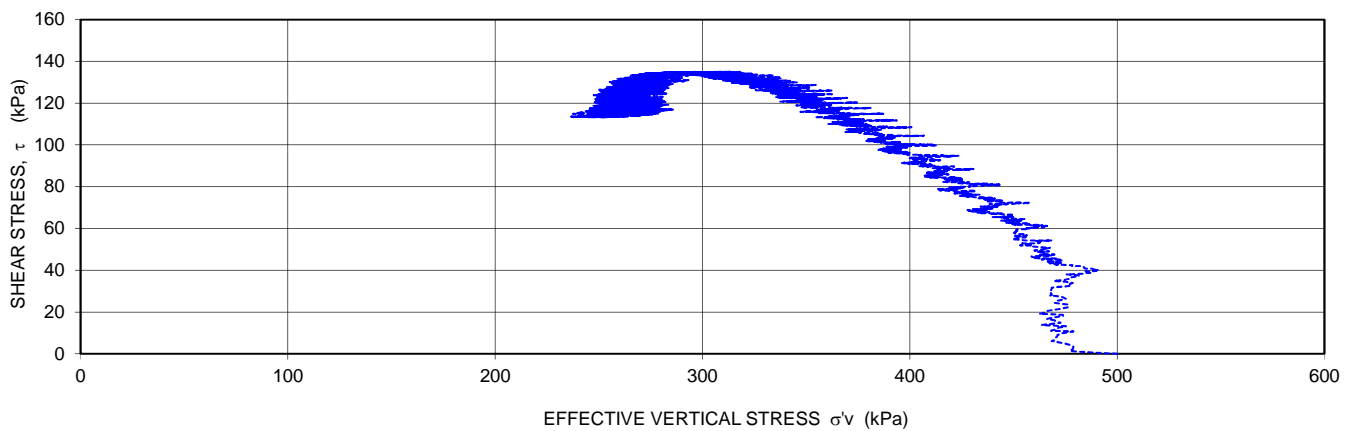
Comments: Gs of 2.72 provided by Stantec

Prepared By:	PC	Checked By:	PS	Approved By:	JPS
Date:	November 19, 2018	Date:	November 19, 2018	Date:	November 20, 2018

Project:	Stantec - SR1	Project No.:	704-ENG.VMEG03070-01
Location:	Alberta	Date:	October 31, 2018
Borehole:	GL4	Depth (m):	2.27
Sample No.:	ST4		

Direct Simple Shear (ASTM D6528)

Initial Height (mm):	23.7	Weight of Specimen (g):	201.15	Initial Void Ratio, e_o :	0.67
Diameter of Ring (mm):	73.6	Total Unit Weight (kN/m^3):	19.61	Final Void Ratio, e_f :	0.56
Specific Gravity, G_s :	2.72	Dry Unit Weight (kN/m^3):	15.95	Natural Water Content (%):	22.9
Final Water Content (%):	23.3	Initial Degree of Saturation, S_r (%):	92.6	Final Degree of Saturation, S_r (%):	113.2



Type of Test: Constant Volume					
Sample No.	Depth (m)	Total Unit Weight (kN/m^3)	Effective Vertical Stress, σ'_v (kPa)	Strain Rate (%/hour)	Test OCR
ST4	2.27	19.6	500	1	-

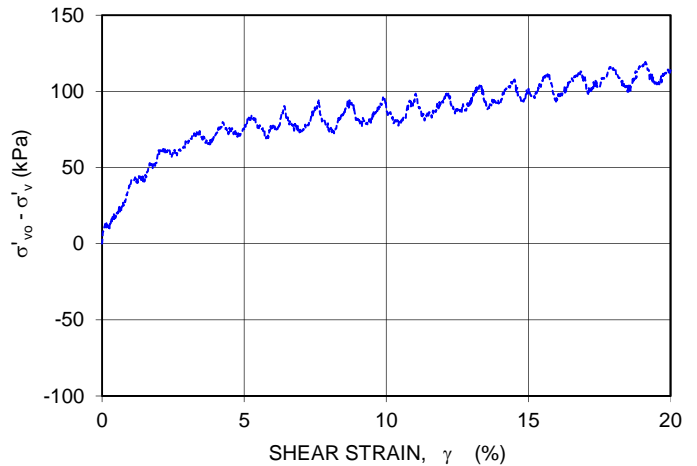
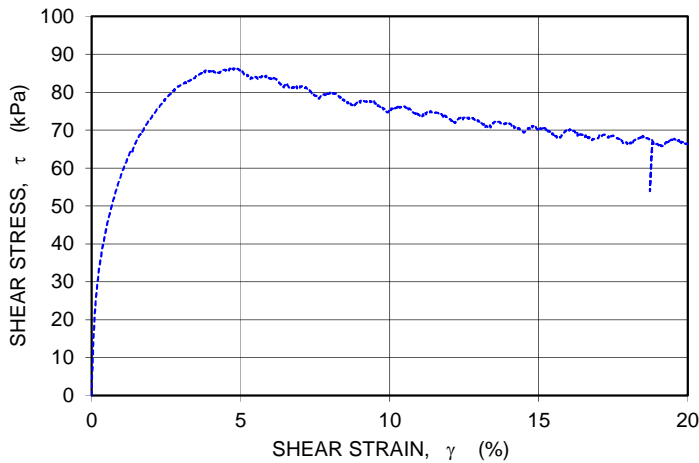
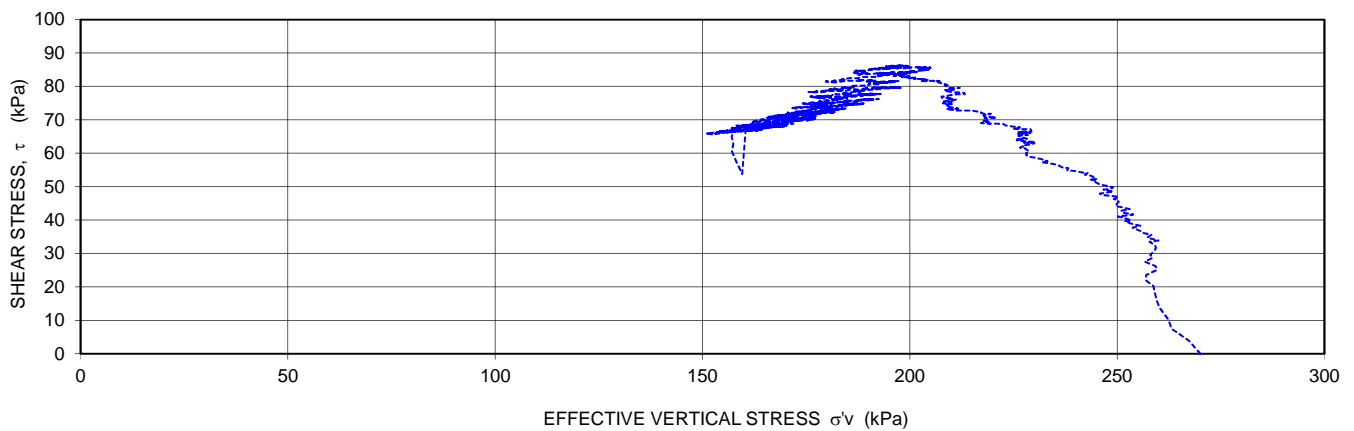
Comments: Gs of 2.72 provided by Stantec

Prepared By:	PC	Checked By:	PS	Approved By:	JPS
Date:	October 31, 2018	Date:	October 31, 2018	Date:	October 31, 2018

Project:	Stantec - SR1	Project No.:	704-ENG.VMEG03055-01
Location:	Calgary, AB	Date:	June 19, 2018
Borehole:	LLO1	Depth (m):	3.34
Sample No.:	ST4		

Direct Simple Shear (ASTM D6528)

Initial Height (mm):	23.7	Weight of Specimen (g):	198.66	Initial Void Ratio, e_o :	0.73
Diameter of Ring (mm):	73.6	Total Unit Weight (kN/m^3):	19.34	Final Void Ratio, e_f :	0.68
Specific Gravity, G_s :	2.70	Dry Unit Weight (kN/m^3):	15.32	Natural Water Content (%):	26.3
Final Water Content (%):	27.5	Initial Degree of Saturation, S_r (%):	97.3	Final Degree of Saturation, S_r (%):	109.1



Type of Test: Constant Volume					
Sample No.	Depth (m)	Total Unit Weight (kN/m^3)	Effective Vertical Stress, σ'_v (kPa)	Strain Rate (%/hour)	Test OCR
ST4	3.34	19.3	270	5	-

Comments: Used a G_s of 2.70 as requested by Stantec

Prepared By:	PC	Checked By:	PS	Approved By:	JPS
Date:	June 19, 2018	Date:	June 19, 2018	Date:	June 19, 2018

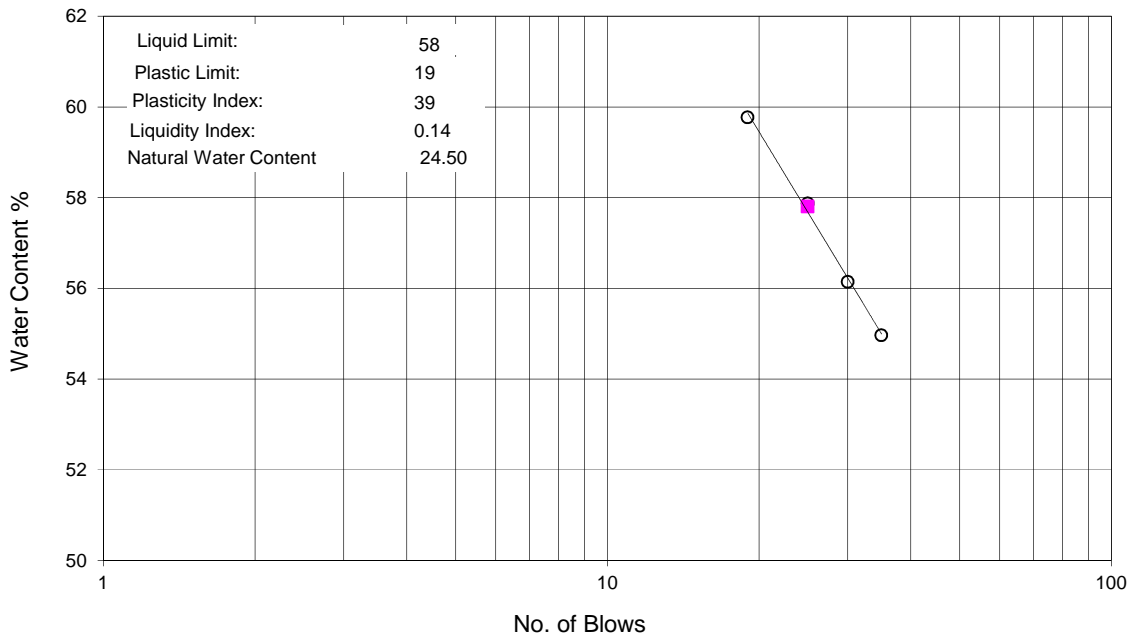
TETRA TECH CANADA INC.

Form N° TT104

Project: Stantec - SR1	Project No.: 704-ENG.VMEG03055-01
Location: Calgary, AB	Date: June 13, 2018
Borehole: LLO1	Sample No.: ST4
	Depth (m): 3.40

Liquid Limit, Plastic Limit and Plasticity Index of Soils (ASTM D4318)

TIN No.	LIQUID LIMIT							PLASTIC LIMIT						
	Tare + Weight of Wet Soil (g)	Tare + Weight of Dry Soil (g)	Weight of Tin (g)	Weight of Water (g)	Weight of Dry Soil (g)	Water Content (%)	No. of Blows	TIN No.	Tare + Weight of Wet Soil (g)	Tare + Weight of Dry Soil (g)	Weight of Tin (g)	Weight of Water (g)	Weight of Dry Soil (g)	Water Content (%)
14A	33.93	30.72	24.88	3.21	5.84	55.0	35	7	37.25	35.97	29.19	1.28	6.78	18.9
9	32.85	29.97	24.84	2.88	5.13	56.1	30	8	38.21	36.94	30.02	1.27	6.92	18.4
89A	41.54	38.23	32.51	3.31	5.72	57.9	25							
13	35.87	31.74	24.83	4.13	6.91	59.8	19							

 Classification of the material : CH
99.0 % with respect to the total of the material smaller than sieve No. 40

 Observations: _____

Prepared by: PC	Checked by: PS	Approved by: PS
Date: June 13, 2018	Date: June 14, 2018	Date: June 14, 2018

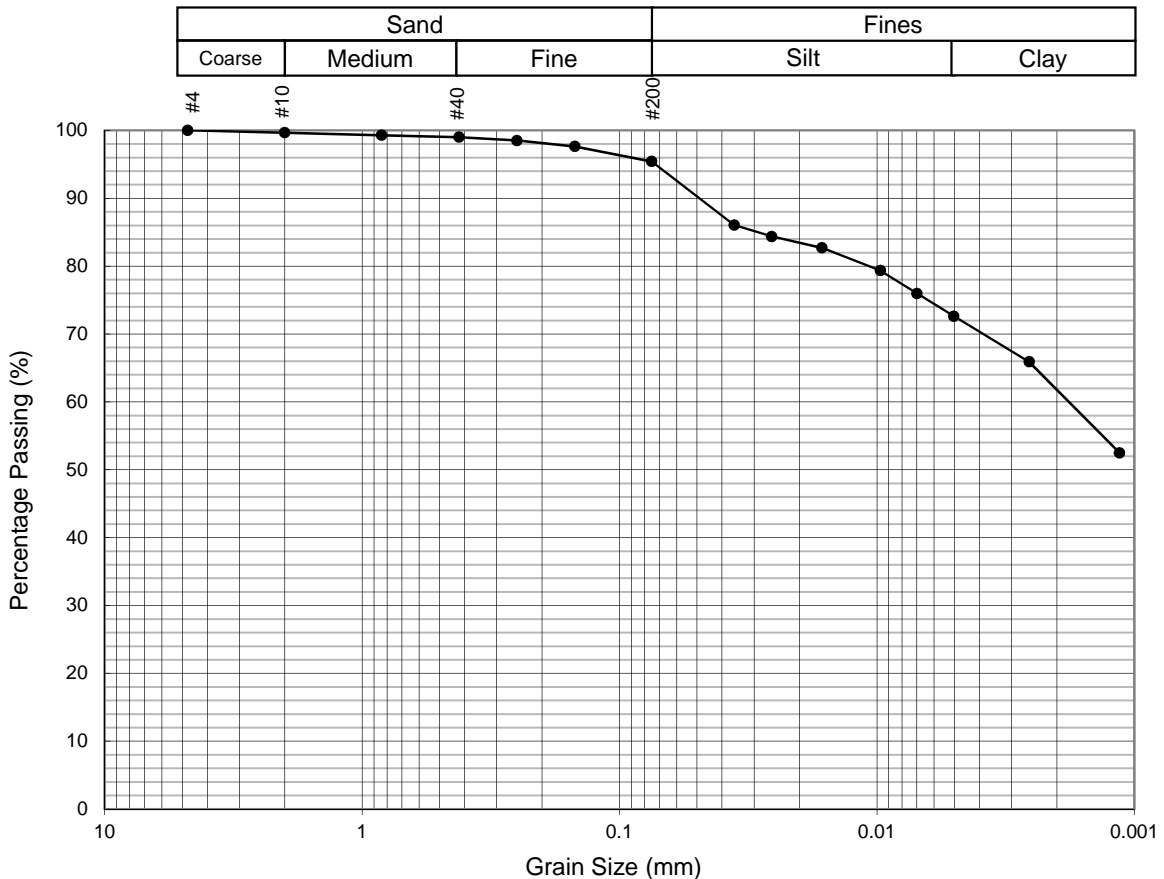
TETRA TECH CANADA INC.

Form N° TTS106-107

Project:	Stantec - SR1	Project No.:	704-ENG.VMEG03055-01
Location:	Calgary, AB	Date:	June 13, 2018
Borehole:	LLO1	Sample No.:	ST4
		Depth (m):	3.40

Particle Size Distribution (ASTM D422)

Unified Soil Classification System (ASTM D 2487)

 Description of Material: Olive brown fat CLAY


Sample No.	Depth (m)	Percentage of Material by Weight (%)					
		Gravel	Sand			Fines	
			Coarse	Medium	Fine	Silt	Clay
ST4	3.40	0	0	1	4	23	72

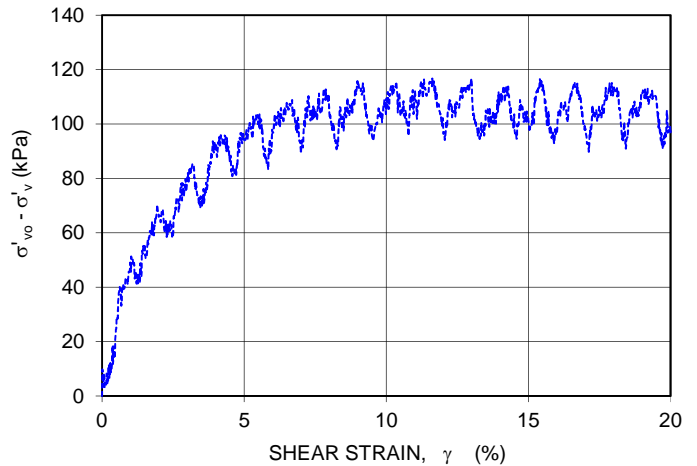
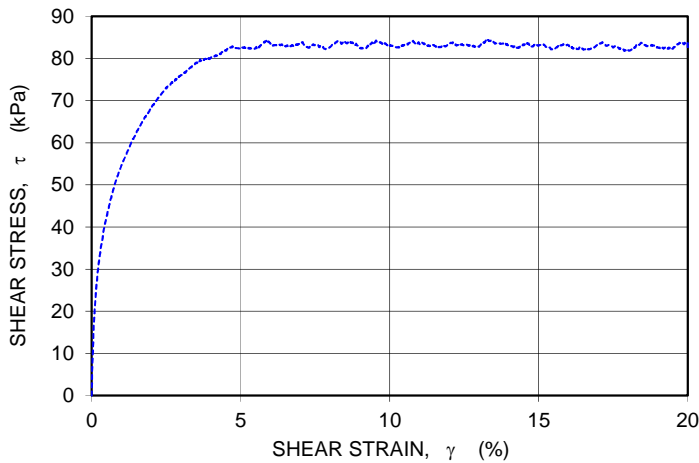
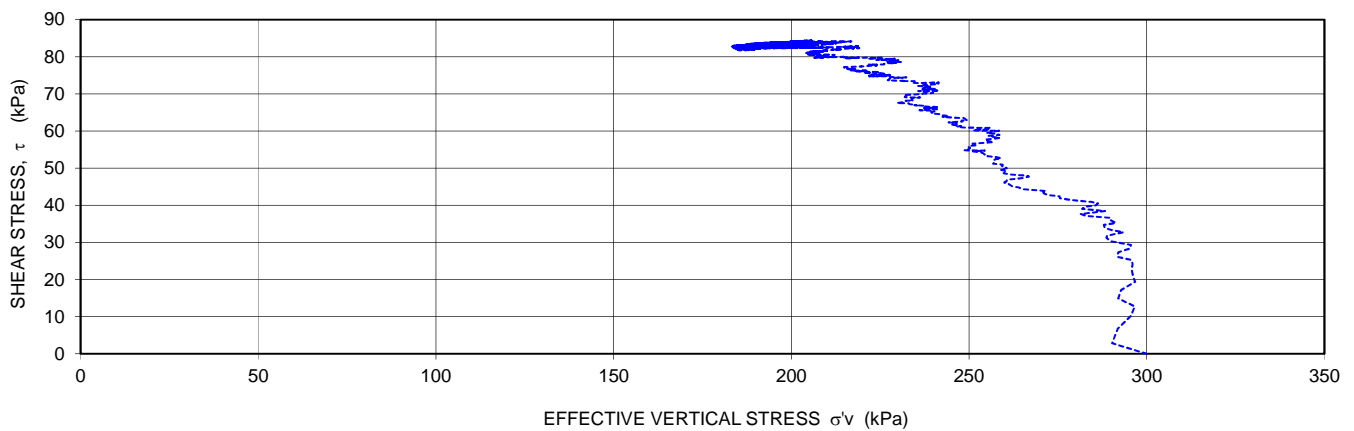
 Comments: Used a Gs of 2.70 as requested by Stantec

Prepared by:	PC	Checked by:	PS	Approved by:	PS
Date:	June 13, 2018	Date:	June 14, 2018	Date:	June 14, 2018

Project:	Stantec - SR1	Project No.:	704-ENG.VMEG03055-01
Location:	Calgary, AB	Date:	June 15, 2018
Borehole:	LLO1	Depth (m):	4.94
Sample No.:	ST7		

Direct Simple Shear (ASTM D6528)

Initial Height (mm):	23.4	Weight of Specimen (g):	193.93	Initial Void Ratio, e_v :	0.71
Diameter of Ring (mm):	73.5	Total Unit Weight (kN/m^3):	19.13	Final Void Ratio, e_v :	0.62
Specific Gravity, G_s :	2.70	Dry Unit Weight (kN/m^3):	15.46	Natural Water Content (%):	23.7
Final Water Content (%):	24.6	Initial Degree of Saturation, S_r (%):	89.9	Final Degree of Saturation, S_r (%):	106.8



Type of Test: Constant Volume					
Sample No.	Depth (m)	Total Unit Weight (kN/m^3)	Effective Vertical Stress, σ'_v (kPa)	Strain Rate (%/hour)	Test OCR
ST7	4.94	19.1	300	5	-

Comments: Used a G_s of 2.70 as requested by Stantec

Prepared By:	PC	Checked By:	PS	Approved By:	JPS
Date:	June 15, 2018	Date:	June 15, 2018	Date:	June 15, 2018

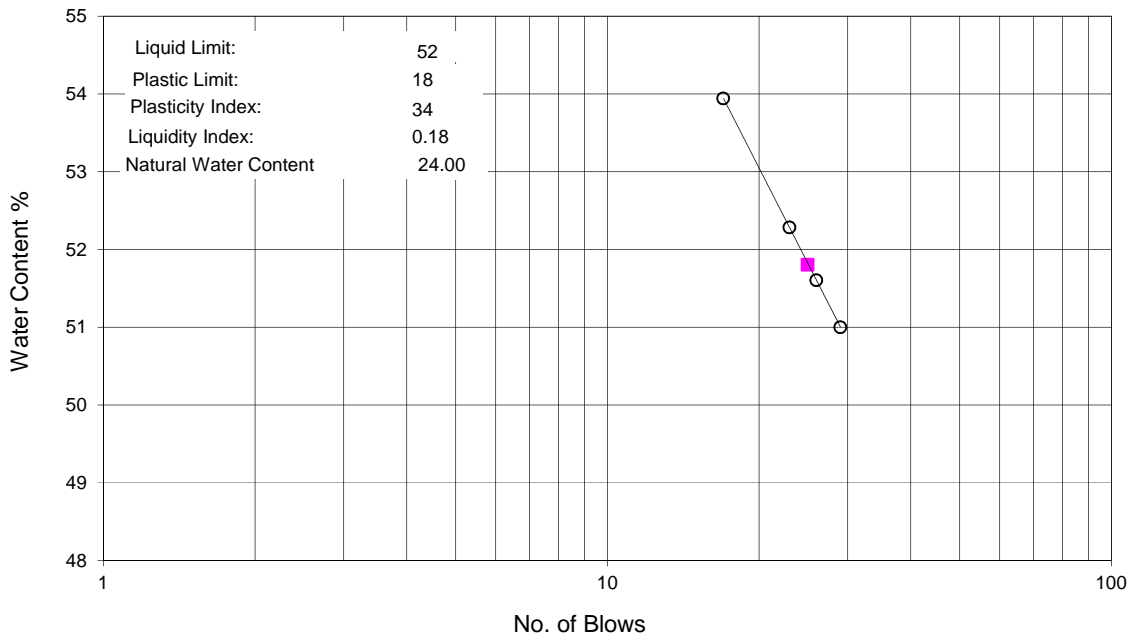
TETRA TECH CANADA INC.

Form N° TT104

Project: Stantec - SR1	Project No.: 704-ENG.VMEG03055-01
Location: Calgary, AB	Date: June 13, 2018
Borehole: LLO1	Sample No.: ST7
	Depth (m): 5.00

Liquid Limit, Plastic Limit and Plasticity Index of Soils (ASTM D4318)

TIN No.	LIQUID LIMIT							PLASTIC LIMIT						
	Tare + Weight of Wet Soil (g)	Tare + Weight of Dry Soil (g)	Weight of Tin (g)	Weight of Water (g)	Weight of Dry Soil (g)	Water Content (%)	No. of Blows	TIN No.	Tare + Weight of Wet Soil (g)	Tare + Weight of Dry Soil (g)	Weight of Tin (g)	Weight of Water (g)	Weight of Dry Soil (g)	Water Content (%)
84	45.09	41.51	34.49	3.58	7.02	51.0	29	12	36.46	35.48	29.84	0.98	5.64	17.4
32A	42.55	39.01	32.15	3.54	6.86	51.6	26	13	36.87	35.86	30.14	1.01	5.72	17.7
11	42.25	39.04	32.90	3.21	6.14	52.3	23							
64	42.36	39.21	33.37	3.15	5.84	53.9	17							

 Classification of the material : CH
97.3 % with respect to the total of the material smaller than sieve No. 40

 Observations: _____

Prepared by: PC	Checked by: PS	Approved by: PS
Date: June 13, 2018	Date: June 14, 2018	Date: June 14, 2018

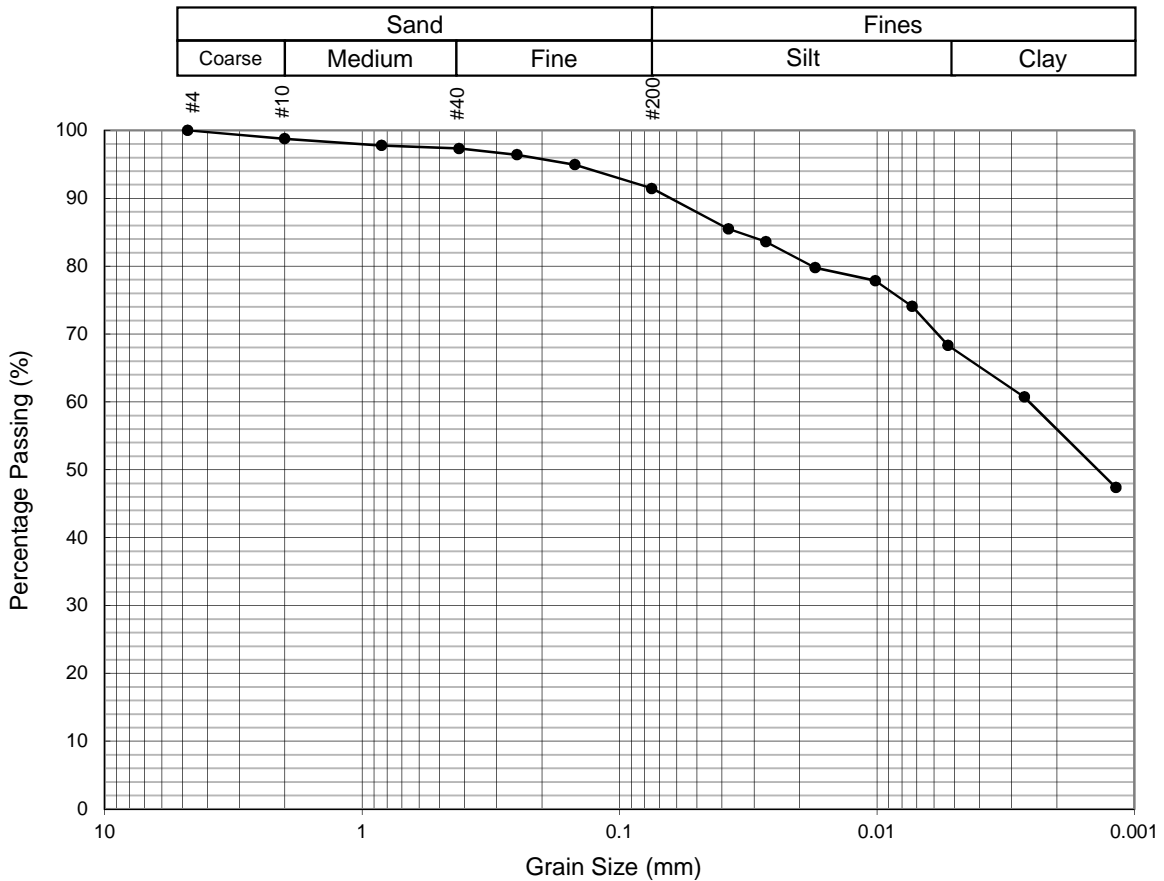
TETRA TECH CANADA INC.

Form N° TTS106-107

Project:	Stantec - SR1	Project No.:	704-ENG.VMEG03055-01
Location:	Calgary, AB	Date:	June 13, 2018
Borehole:	LLO1	Sample No.:	S7
		Depth (m):	5.00

Particle Size Distribution (ASTM D422)

Unified Soil Classification System (ASTM D 2487)

 Description of Material: Olive brown fat CLAY


Sample No.	Depth (m)	Percentage of Material by Weight (%)					
		Gravel	Sand			Fines	
			Coarse	Medium	Fine	Silt	Clay
S7	5.00	0	1	1	6	24	68

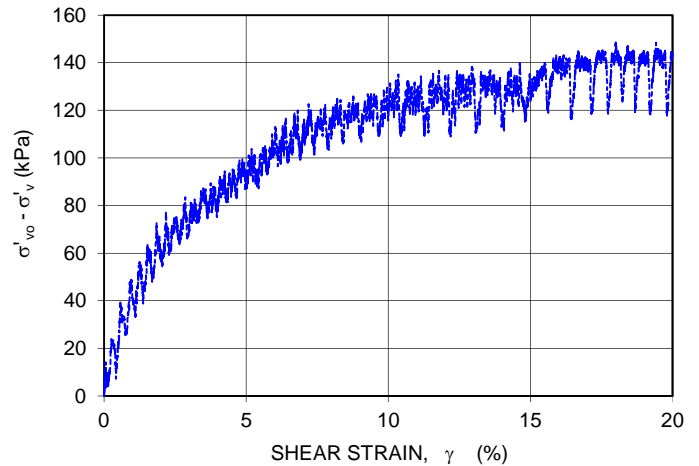
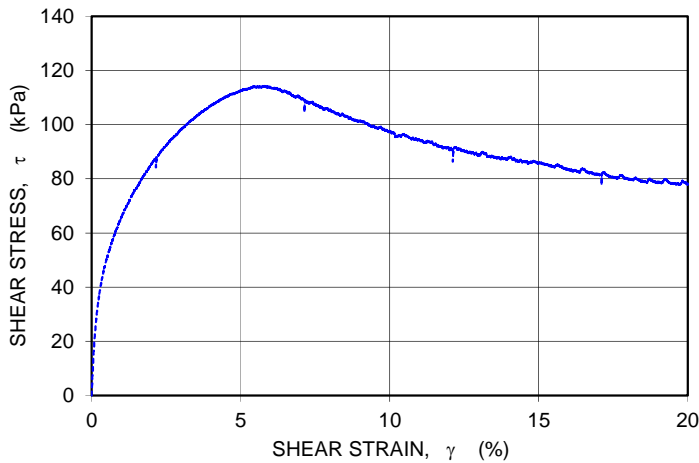
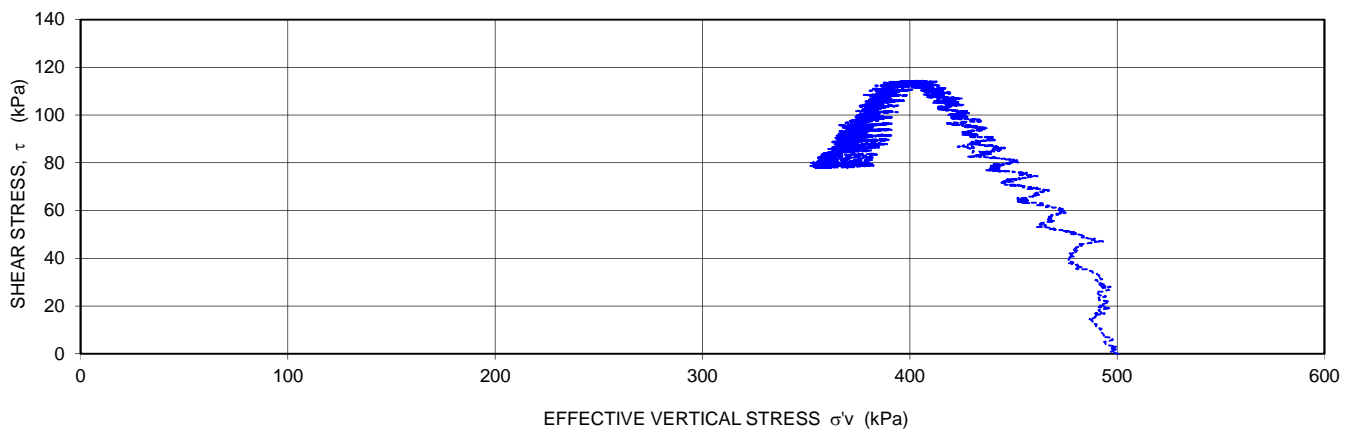
 Comments: Used a Gs of 2.70 as requested by Stantec

Prepared by:	PC	Checked by:	PS	Approved by:	PS
Date:	June 13, 2018	Date:	June 14, 2018	Date:	June 14, 2018

Project:	Stantec - SR1	Project No.:	704-ENG.VMEG03070-01
Location:	Alberta	Date:	October 31, 2018
Borehole:	LL017A	Depth (m):	2.12
Sample No.:	ST4		

Direct Simple Shear (ASTM D6528)

Initial Height (mm):	23.5	Weight of Specimen (g):	197.00	Initial Void Ratio, e_o :	0.75
Diameter of Ring (mm):	73.5	Total Unit Weight (kN/m^3):	19.34	Final Void Ratio, e_f :	0.64
Specific Gravity, G_s :	2.72	Dry Unit Weight (kN/m^3):	15.28	Natural Water Content (%):	26.6
Final Water Content (%):	26.0	Initial Degree of Saturation, S_r (%):	96.8	Final Degree of Saturation, S_r (%):	110.6



Type of Test: Constant Volume					
Sample No.	Depth (m)	Total Unit Weight (kN/m^3)	Effective Vertical Stress, σ'_v (kPa)	Strain Rate (%/hour)	Test OCR
ST4	2.12	19.3	500	1	-

Comments: _____

Prepared By:	PC	Checked By:	PS	Approved By:	JPS
Date:	October 31, 2018	Date:	October 31, 2018	Date:	October 31, 2018

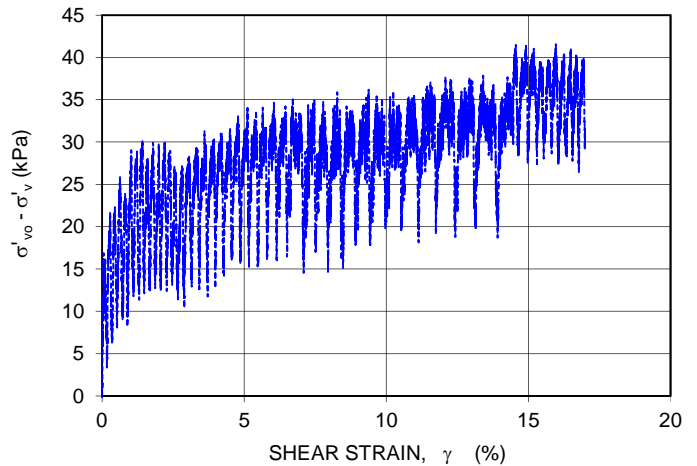
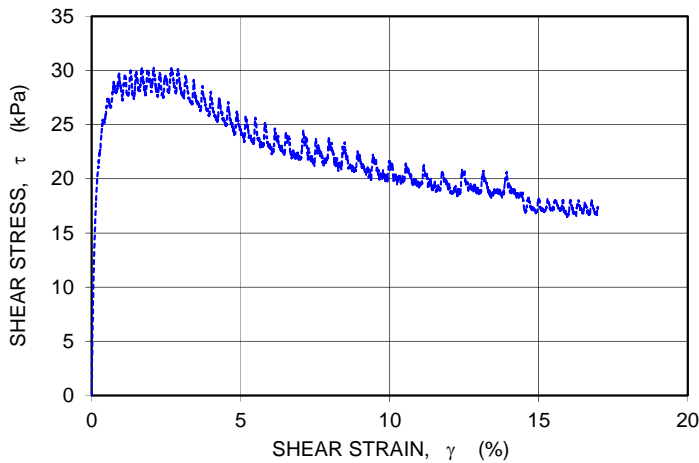
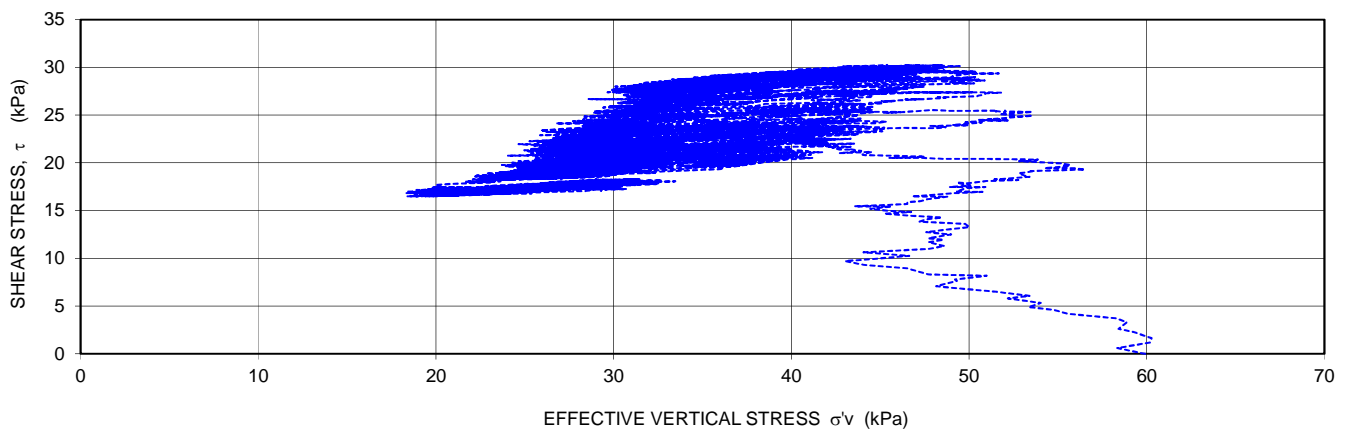
OCR = 2.0 Tests

Direct Simple Shear Laboratory Results

Project:	Stantec - SR1	Project No.:	704-ENG.VMEG03070-01
Location:	Alberta	Date:	October 16, 2018
Borehole:	D14	Depth (m):	3.20
Sample No.:	ST8		

Direct Simple Shear (ASTM D6528)

Initial Height (mm):	23.6	Weight of Specimen (g):	195.28	Initial Void Ratio, e_o :	0.76
Diameter of Ring (mm):	73.4	Total Unit Weight (kN/m^3):	19.13	Final Void Ratio, e_f :	0.75
Specific Gravity, G_s :	2.72	Dry Unit Weight (kN/m^3):	15.13	Natural Water Content (%):	26.5
Final Water Content (%):	25.7	Initial Degree of Saturation, S_r (%):	94.3	Final Degree of Saturation, S_r (%):	93.2



Type of Test: Constant Volume					
Sample No.	Depth (m)	Total Unit Weight (kN/m^3)	Effective Vertical Stress, σ'_v (kPa)	Strain Rate (%/hour)	Test OCR
ST8	3.20	19.1	60	1	-

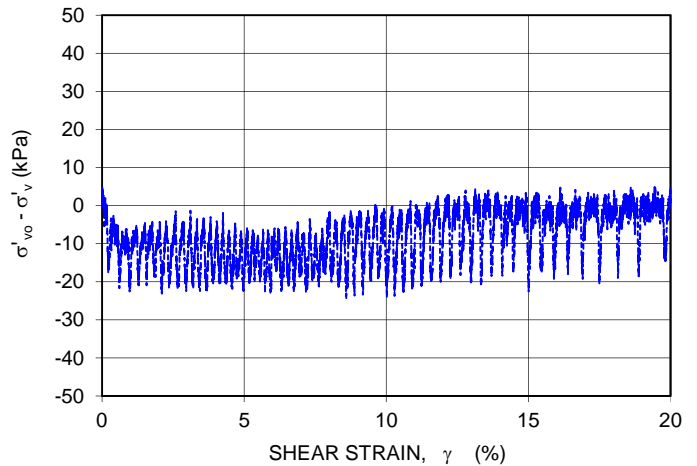
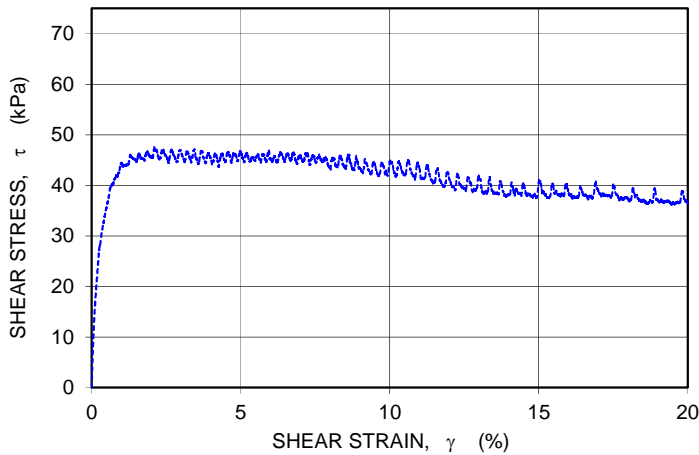
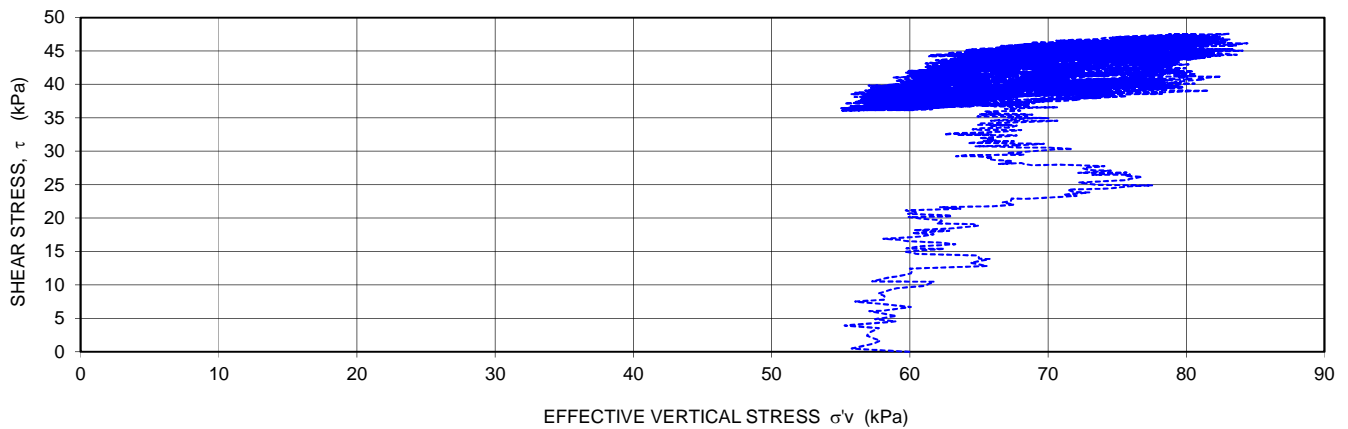
Comments: Gs of 2.72 provided by Stantec
After completion of test, sample slip was observed along the interface between
the sample and the top porous stone

Prepared By:	PC	Checked By:	PS	Approved By:	JPS
Date:	October 16, 2018	Date:	October 16, 2018	Date:	October 18, 2018

Project:	Stantec - SR1	Project No.:	704-ENG.VMEG03070-01
Location:	Alberta	Date:	October 18, 2018
Borehole:	D14	Depth (m):	1.8-2.25
Sample No.:	ST8		

Direct Simple Shear (ASTM D6528)

Initial Height (mm):	23.5	Weight of Specimen (g):	193.40	Initial Void Ratio, e_o :	0.78
Diameter of Ring (mm):	73.5	Total Unit Weight (kN/m^3):	19.00	Final Void Ratio, e_f :	0.75
Specific Gravity, G_s :	2.72	Dry Unit Weight (kN/m^3):	14.99	Natural Water Content (%):	26.7
Final Water Content (%):	26.7	Initial Degree of Saturation, S_r (%):	93.3	Final Degree of Saturation, S_r (%):	96.2



Type of Test: Constant Volume					
Sample No.	Depth (m)	Total Unit Weight (kN/m^3)	Effective Vertical Stress, σ'_v (kPa)	Strain Rate (%/hour)	Test OCR
ST8	1.8-2.25	19.0	60	1	2.08

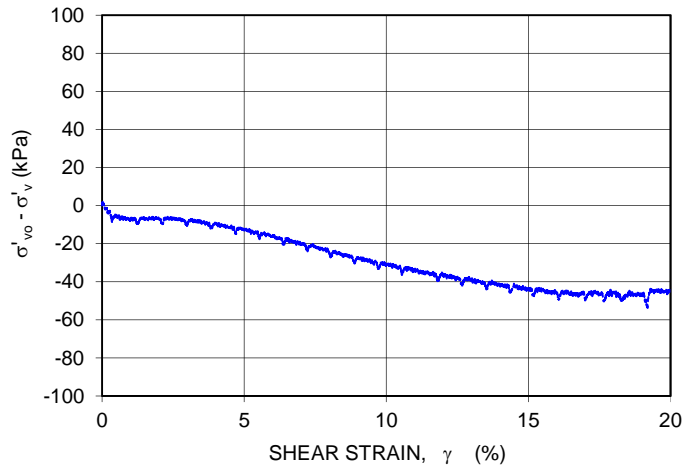
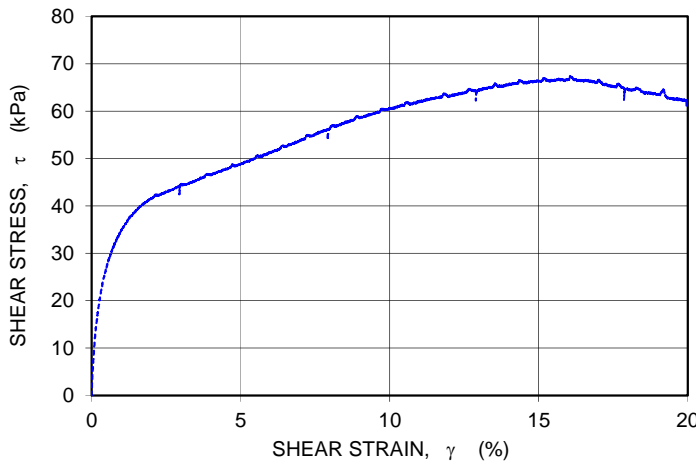
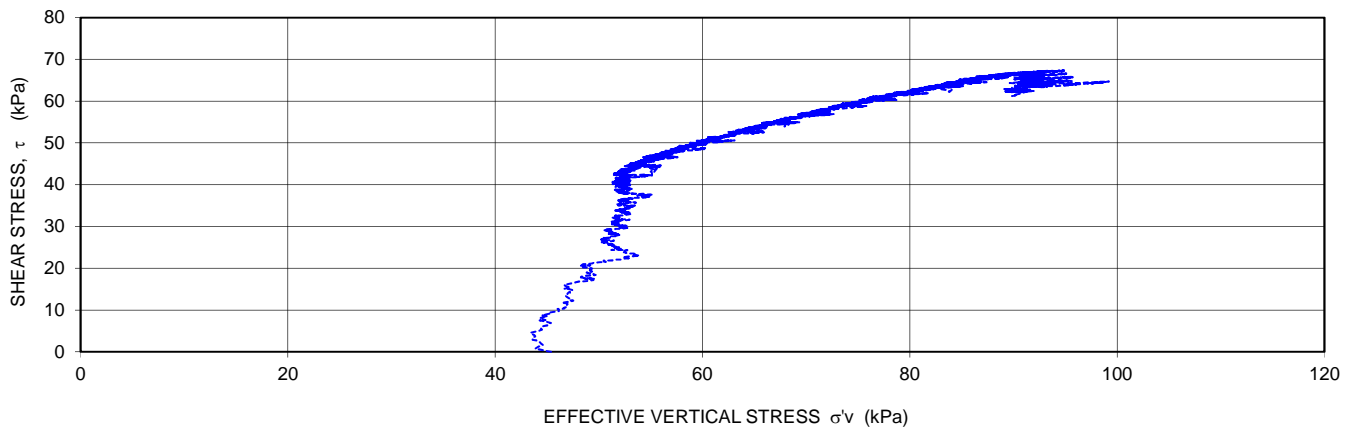
Comments: Gs of 2.72 provided by Stantec
Sample consolidated to 125 kPa and unloaded to 60kPa
After completion of test, some sample slip was observed along the interface between the sample and the bottom porous stone

Prepared By:	PC	Checked By:	PS	Approved By:	JPS
Date:	October 17, 2018	Date:	October 17, 2018	Date:	October 17, 2018

Project:	Stantec - SR1	Project No.:	704-ENG.VMEG03070-01
Location:	Alberta	Date:	December 19, 2018
Borehole:	GL1A	Depth (m):	1.30
Sample No.:	ST2		

Direct Simple Shear (ASTM D6528)

Initial Height (mm):	23.6	Weight of Specimen (g):	191.37	Initial Void Ratio, e_o :	0.72
Diameter of Ring (mm):	73.5	Total Unit Weight (kN/m^3):	18.75	Final Void Ratio, e_f :	0.70
Specific Gravity, G_s :	2.72	Dry Unit Weight (kN/m^3):	15.55	Natural Water Content (%):	20.6
Final Water Content (%):	27.8	Initial Degree of Saturation, S_r (%):	78.2	Final Degree of Saturation, S_r (%):	108.4



Type of Test: Constant Volume					
Sample No.	Depth (m)	Total Unit Weight (kN/m^3)	Effective Vertical Stress, σ'_v (kPa)	Strain Rate (%/hour)	Test OCR
ST2	1.30	18.8	45	1	2

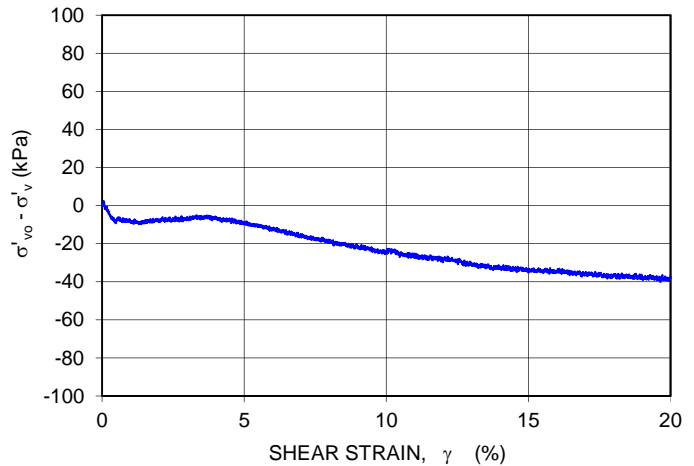
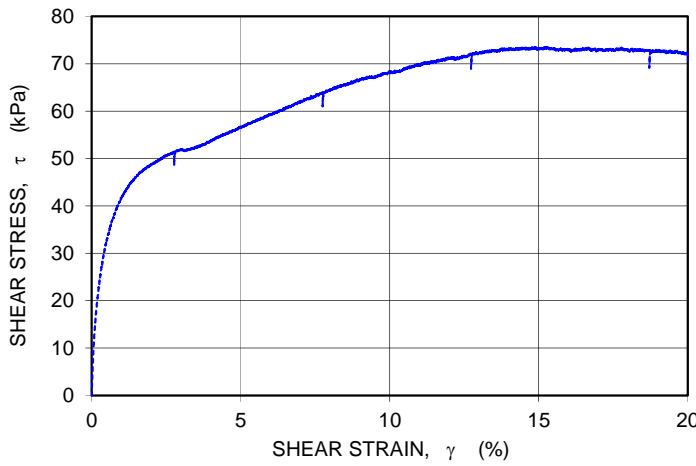
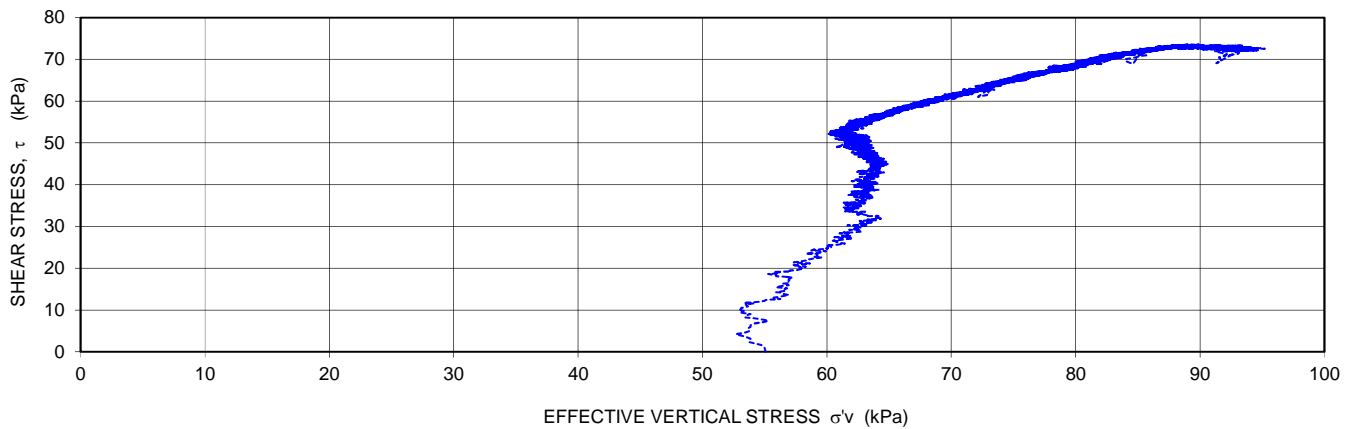
Comments: Gs of 2.72 provided by Stantec
Sample consolidated to 90kPa and unloaded to 45kPa
Sample slipped along the bottom sample-platen interface

Prepared By:	PC	Checked By:	PS	Approved By:	JPS
Date:	December 19, 2018	Date:	December 19, 2018	Date:	December 21, 2018

Project:	Stantec - SR1	Project No.:	704-ENG.VMEG03070-01
Location:	Alberta	Date:	January 7, 2019
Borehole:	GL1A	Depth (m):	2.69
Sample No.:	ST5		

Direct Simple Shear (ASTM D6528)

Initial Height (mm):	23.5	Weight of Specimen (g):	201.17	Initial Void Ratio, e_v :	0.62
Diameter of Ring (mm):	73.5	Total Unit Weight (kN/m^3):	19.77	Final Void Ratio, e_v :	0.59
Specific Gravity, G_s :	2.72	Dry Unit Weight (kN/m^3):	16.52	Natural Water Content (%):	19.7
Final Water Content (%):	22.3	Initial Degree of Saturation, S_r (%):	87.1	Final Degree of Saturation, S_r (%):	102.1



Type of Test: Constant Volume					
Sample No.	Depth (m)	Total Unit Weight (kN/m^3)	Effective Vertical Stress, σ'_v (kPa)	Strain Rate (%/hour)	Test OCR
ST5	2.69	19.8	55	1	2

Comments: Gs of 2.72 provided by Stantec
Sample consolidated to 110kPa and unloaded to 55kPa
Sample slipped along the bottom sample-platen interface

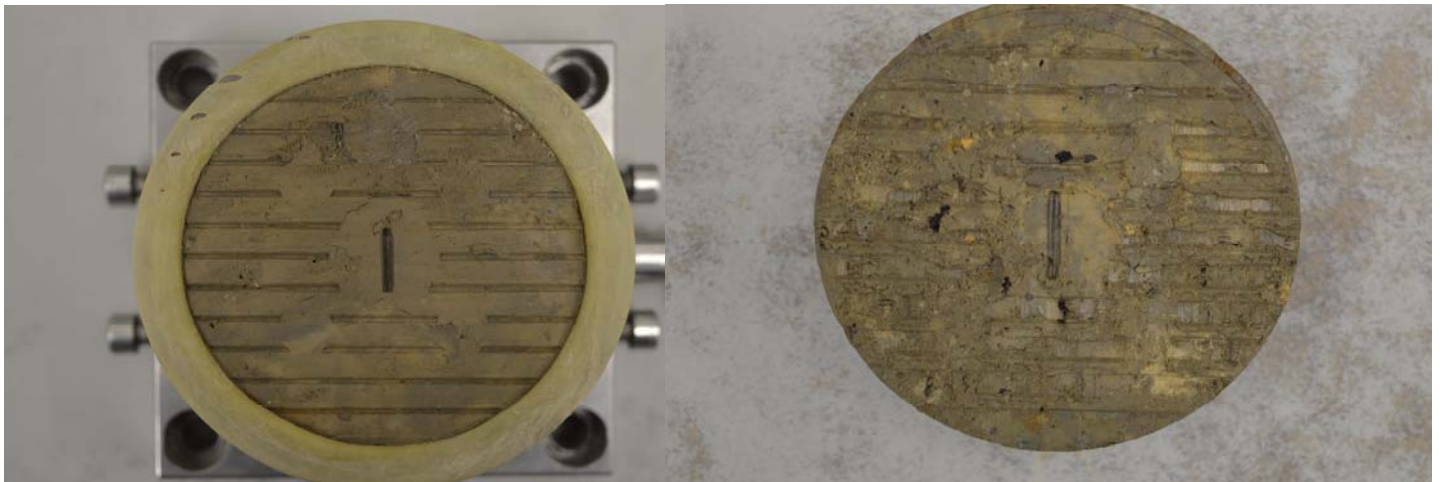
Prepared By:	PC	Checked By:	PS	Approved By:	JPS
Date:	January 7, 2019	Date:	January 7, 2019	Date:	January 9, 2019

Project:	Stantec - SR1	Project No.:	704-ENG.VMEG03070-01
Location:	Alberta	Date:	January 7, 2019
Borehole:	GL1A	Depth (m):	2.69
Sample No.:	ST5		

Direct Simple Shear (ASTM D6528)



Ring alignment after completion of the test. Porous stones are at level with the slipped ring.



Top of sample showing groove indentations from top platten with raised fins

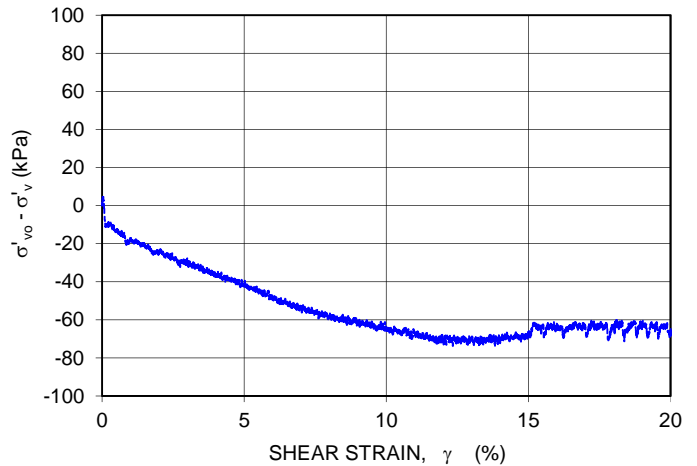
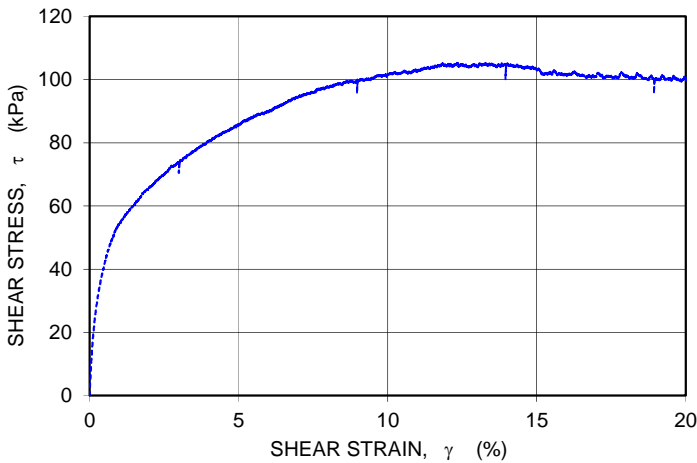
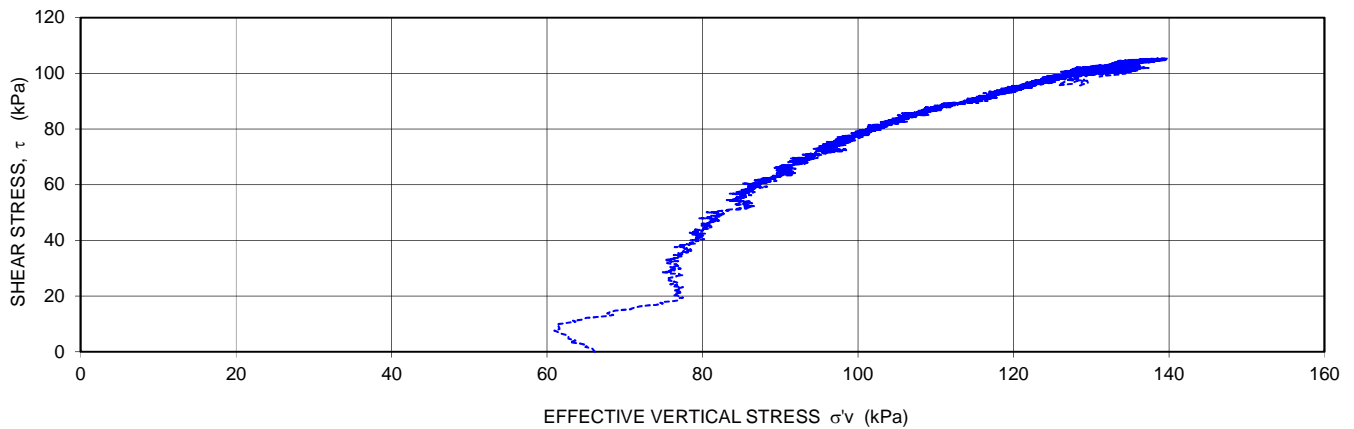
Bottom of sample showing groove indentations from bottom platten with raised fins. Picture also shows slip along bottom interface

Prepared By:	PC	Checked By:	PS	Approved By:	0
Date:	January 7, 2019	Date:	January 7, 2019	Date:	January 0, 1900

Project:	Stantec - SR1	Project No.:	704-ENG.VMEG03070-01
Location:	Alberta	Date:	January 7, 2019
Borehole:	GL1A	Depth (m):	3.88
Sample No.:	ST8		

Direct Simple Shear (ASTM D6528)

Initial Height (mm):	23.5	Weight of Specimen (g):	206.21	Initial Void Ratio, e_o :	0.60
Diameter of Ring (mm):	73.5	Total Unit Weight (kN/m^3):	20.29	Final Void Ratio, e_f :	0.57
Specific Gravity, G_s :	2.72	Dry Unit Weight (kN/m^3):	16.72	Natural Water Content (%):	21.3
Final Water Content (%):	21.1	Initial Degree of Saturation, S_r (%):	97.4	Final Degree of Saturation, S_r (%):	100.9



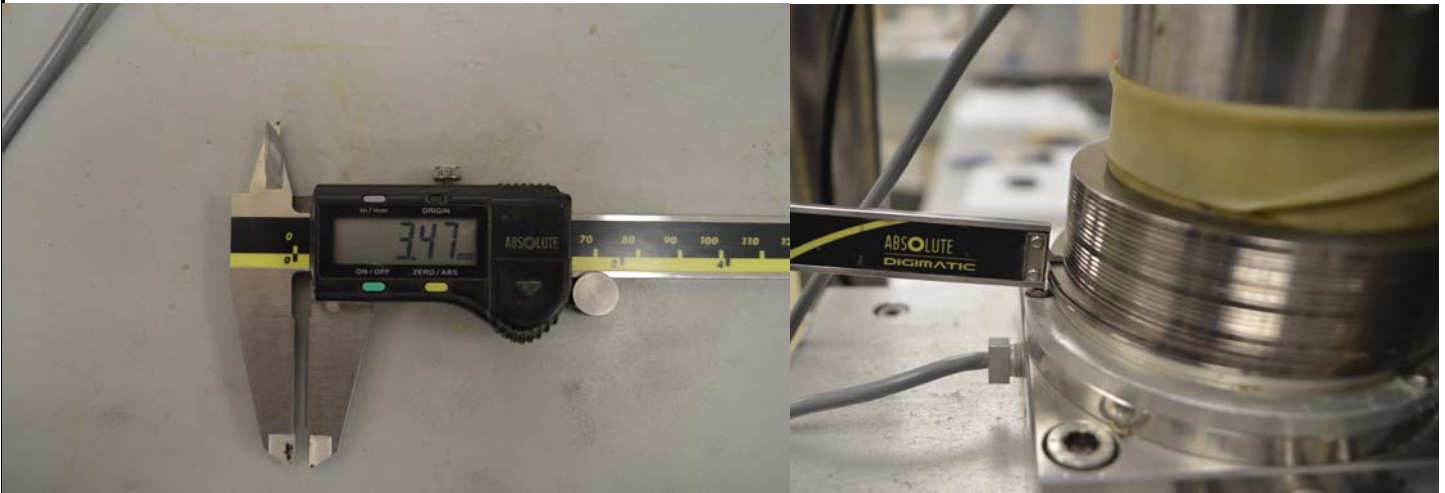
Type of Test: Constant Volume					
Sample No.	Depth (m)	Total Unit Weight (kN/m^3)	Effective Vertical Stress, σ'_v (kPa)	Strain Rate (%/hour)	Test OCR
ST8	3.88	20.3	66	1	2

Comments: Gs of 2.72 provided by Stantec
Sample consolidated to 132kPa and unloaded to 66kPa
Sample slipped along the bottom sample-platen interface

Prepared By:	PC	Checked By:	PS	Approved By:	JPS
Date:	January 7, 2019	Date:	January 7, 2019	Date:	January 0, 1900

Project:	Stantec - SR1	Project No.:	704-ENG.VMEG03070-01
Location:	Alberta	Date:	January 7, 2019
Borehole:	GL1A	Depth (m):	3.88
Sample No.:	ST8		

Direct Simple Shear (ASTM D6528)



Ring alignment after completion of the test. Porous stones are at level with the slipped ring.



Top of sample showing groove indentations from top platten with raised fins



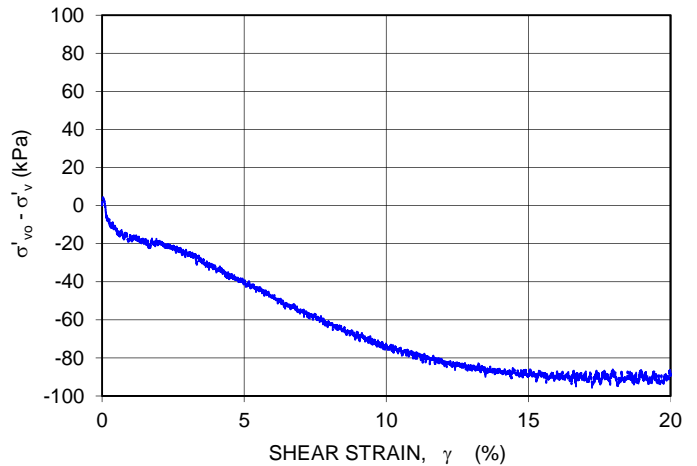
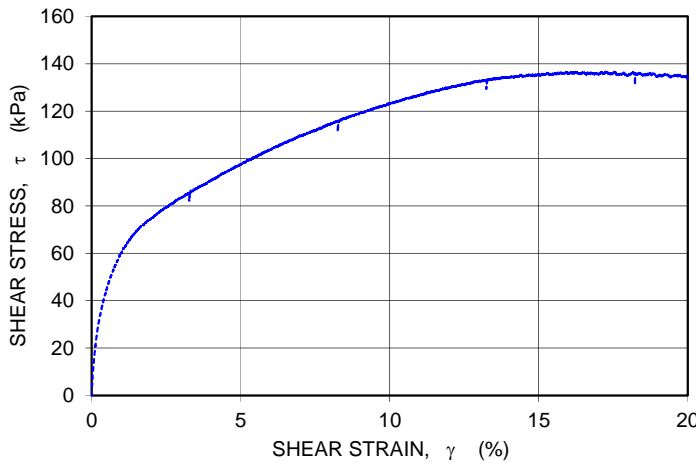
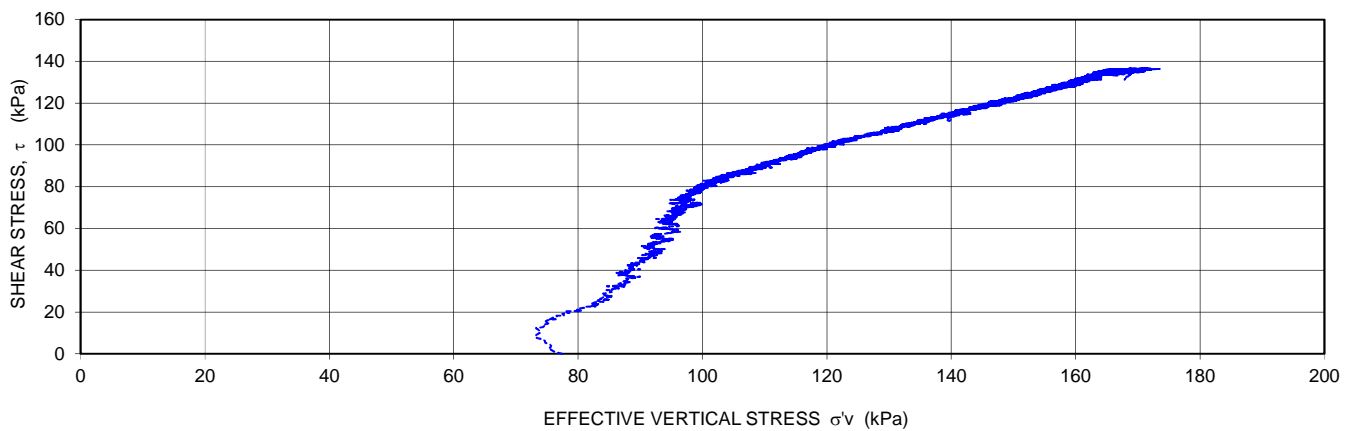
Bottom of sample showing groove indentations from bottom platten with raised fins. Picture also shows slip along bottom interface

Prepared By:	PC	Checked By:	PS	Approved By:	JPS
Date:	January 7, 2019	Date:	January 7, 2019	Date:	January 0, 1900

Project:	Stantec - SR1	Project No.:	704-ENG.VMEG03070-01
Location:	Alberta	Date:	January 7, 2019
Borehole:	GL1A	Depth (m):	5.24
Sample No.:	ST11		

Direct Simple Shear (ASTM D6528)

Initial Height (mm):	23.5	Weight of Specimen (g):	205.64	Initial Void Ratio, e_v :	0.60
Diameter of Ring (mm):	73.5	Total Unit Weight (kN/m^3):	20.23	Final Void Ratio, e_v :	0.58
Specific Gravity, G_s :	2.72	Dry Unit Weight (kN/m^3):	16.64	Natural Water Content (%):	21.6
Final Water Content (%):	21.2	Initial Degree of Saturation, S_r (%):	97.3	Final Degree of Saturation, S_r (%):	100.1



Type of Test: Constant Volume					
Sample No.	Depth (m)	Total Unit Weight (kN/m^3)	Effective Vertical Stress, σ'_v (kPa)	Strain Rate (%/hour)	Test OCR
ST11	5.24	20.2	77	1	2

Comments: Gs of 2.72 provided by Stantec
Sample consolidated to 154kPa and unloaded to 77kPa
Sample slipped along the bottom sample-platen interface

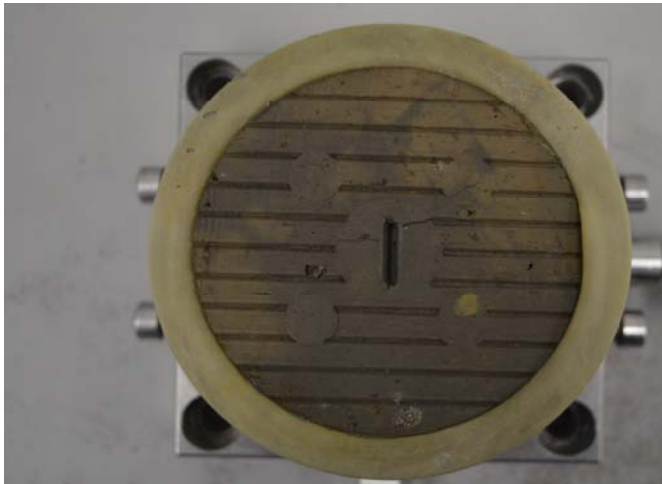
Prepared By:	PC	Checked By:	PS	Approved By:	JPS
Date:	January 7, 2019	Date:	January 7, 2019	Date:	January 9, 2019

Project:	Stantec - SR1	Project No.:	704-ENG.VMEG03070-01
Location:	Alberta	Date:	January 7, 2019
Borehole:	GL1A	Depth (m):	5.24
Sample No.:	ST11		

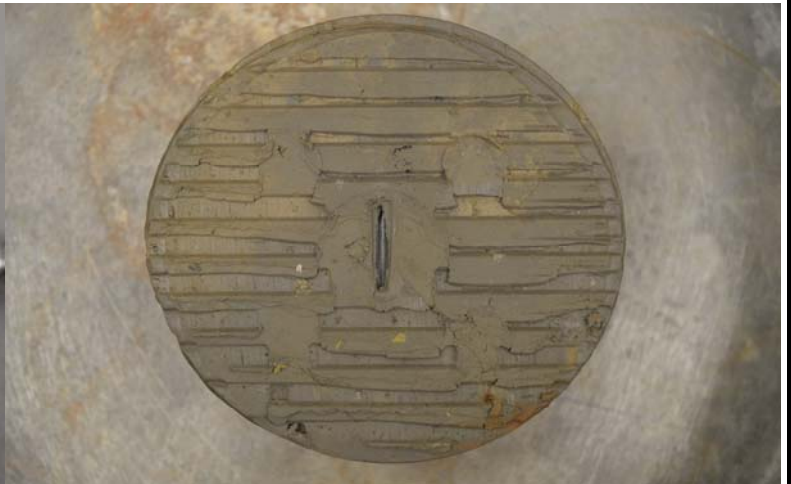
Direct Simple Shear (ASTM D6528)



Ring alignment after completion of the test. Porous stones are at level with the slipped ring.



Top of sample showing groove indentations from top platten with raised fins



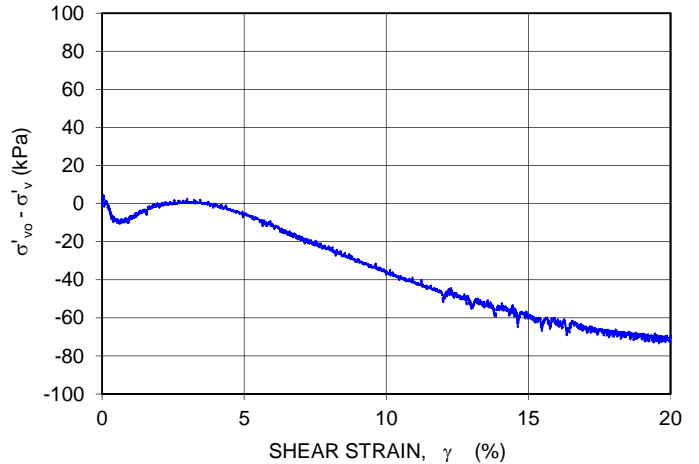
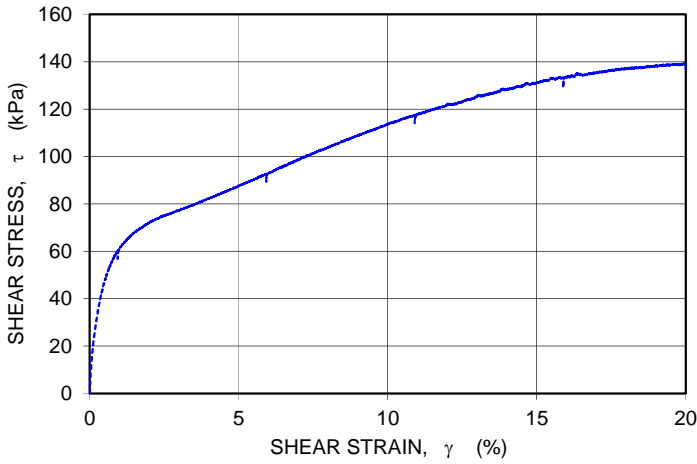
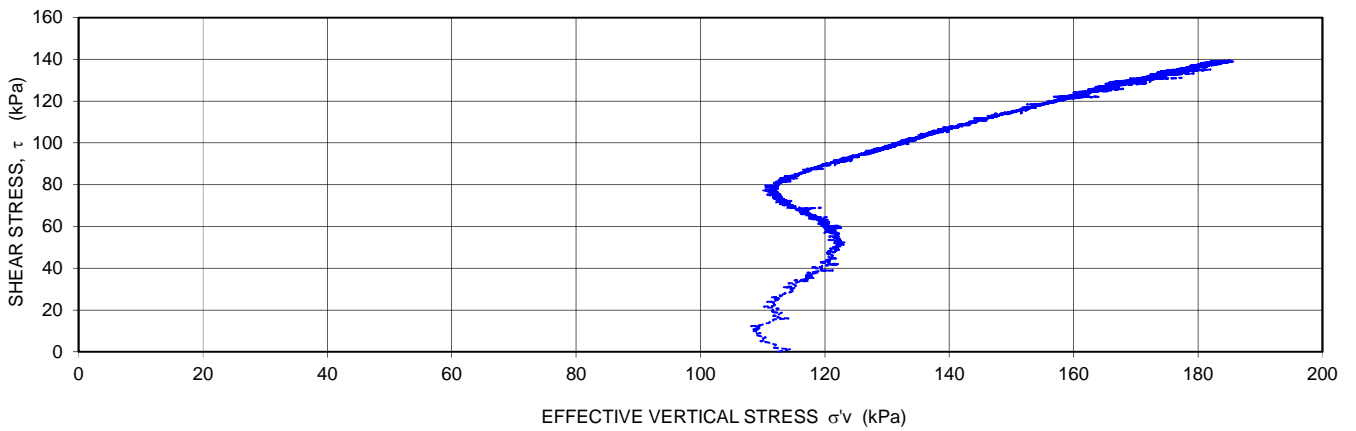
Bottom of sample showing groove indentations from bottom platten with raised fins. Picture also shows slip along bottom interface

Prepared By:	PC	Checked By:	PS	Approved By:	JPS
Date:	January 7, 2019	Date:	January 7, 2019	Date:	January 0, 1900

Project:	Stantec - SR1	Project No.:	704-ENG.VMEG03070-01
Location:	Alberta	Date:	January 7, 2019
Borehole:	GL1A	Depth (m):	6.67
Sample No.:	ST14		

Direct Simple Shear (ASTM D6528)

Initial Height (mm):	23.6	Weight of Specimen (g):	202.11	Initial Void Ratio, e_o :	0.64
Diameter of Ring (mm):	73.5	Total Unit Weight (kN/m^3):	19.82	Final Void Ratio, e_f :	0.60
Specific Gravity, G_s :	2.72	Dry Unit Weight (kN/m^3):	16.25	Natural Water Content (%):	21.9
Final Water Content (%):	21.9	Initial Degree of Saturation, S_r (%):	93.0	Final Degree of Saturation, S_r (%):	99.3



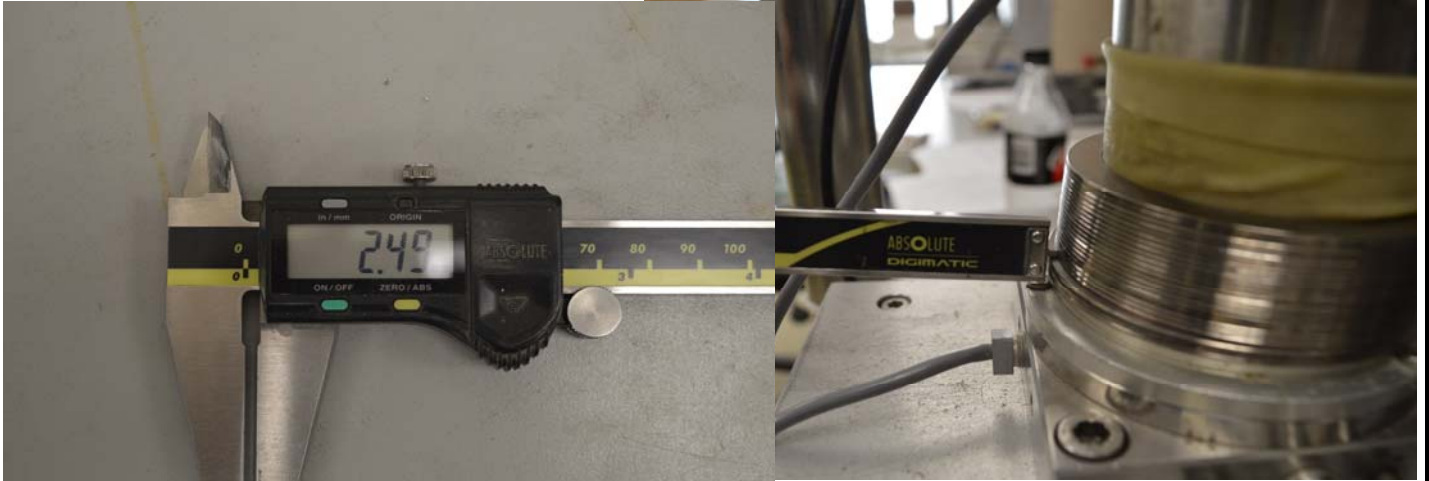
Type of Test: Constant Volume					
Sample No.	Depth (m)	Total Unit Weight (kN/m^3)	Effective Vertical Stress, σ'_v (kPa)	Strain Rate (%/hour)	Test OCR
ST14	6.67	19.8	112	1	2

Comments: Gs of 2.72 provided by Stantec
Sample consolidated to 224kPa and unloaded to 112kPa
Sample slipped along the bottom sample-platen interface

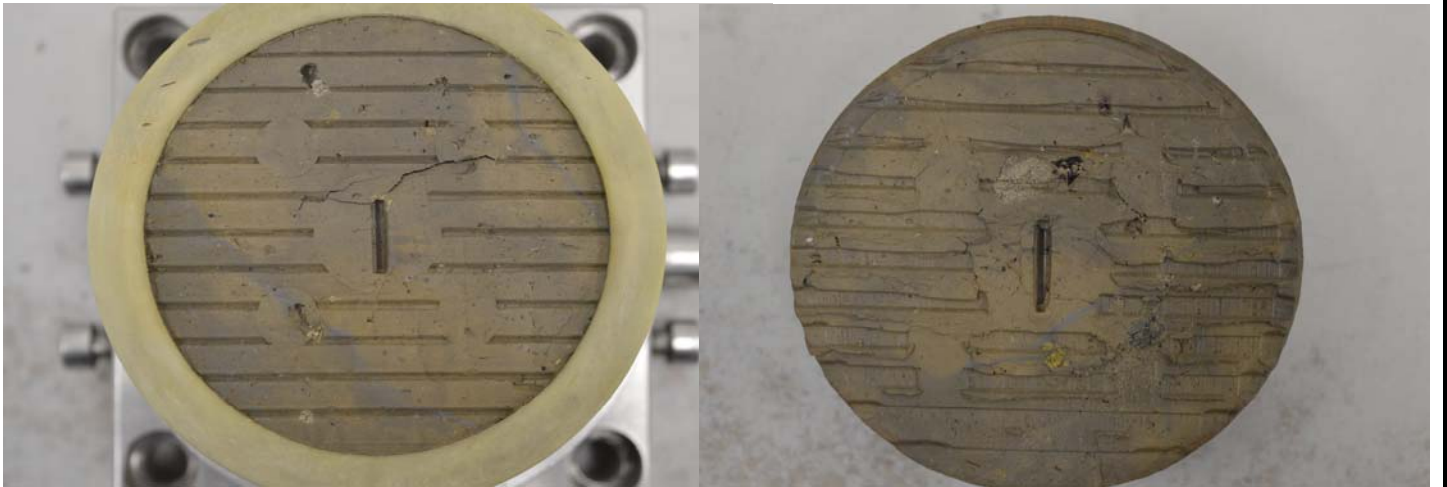
Prepared By:	PC	Checked By:	PS	Approved By:	JPS
Date:	January 7, 2019	Date:	January 7, 2019	Date:	January 0, 1900

Project:	Stantec - SR1	Project No.:	704-ENG.VMEG03070-01
Location:	Alberta	Date:	January 7, 2019
Borehole:	GL1A	Depth (m):	6.67
Sample No.:	ST14		

Direct Simple Shear (ASTM D6528)



Ring alignment after completion of the test. Porous stones are at level with the slipped ring.



Top of sample showing groove indentations from top platten with raised fins

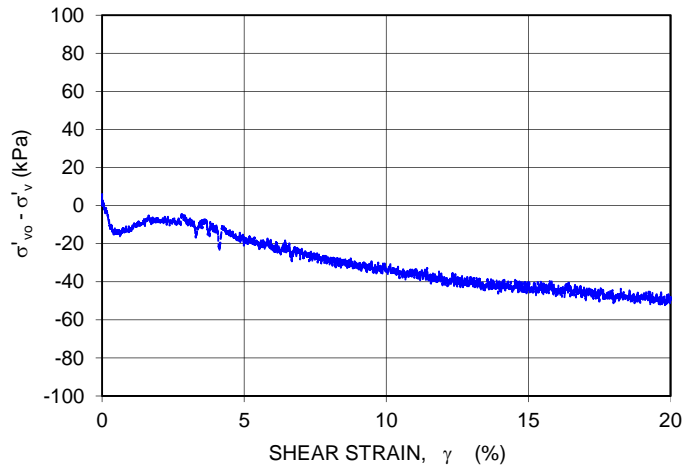
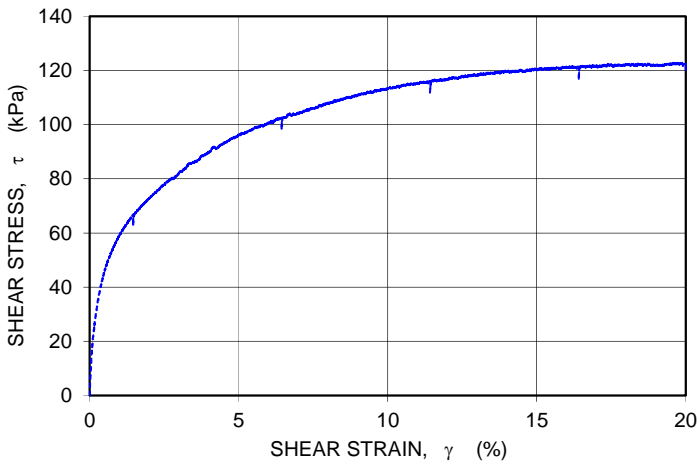
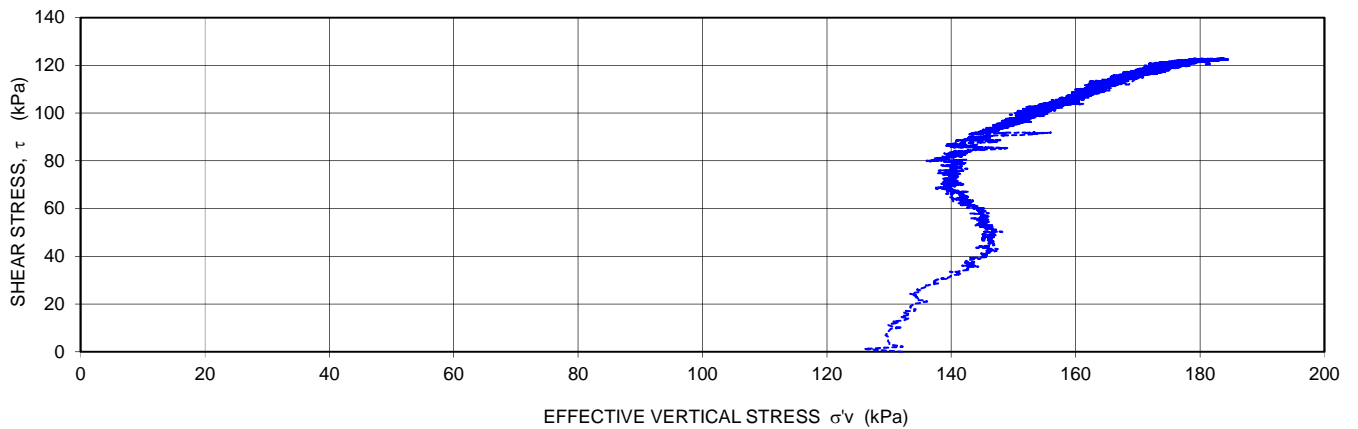
Bottom of sample showing groove indentations from bottom platten with raised fins. Picture also shows slip along bottom interface

Prepared By:	PC	Checked By:	PS	Approved By:	JPS
Date:	January 7, 2019	Date:	January 7, 2019	Date:	January 0, 1900

Project:	Stantec - SR1	Project No.:	704-ENG.VMEG03070-01
Location:	Alberta	Date:	January 7, 2019
Borehole:	GL1A	Depth (m):	8.03
Sample No.:	ST17		

Direct Simple Shear (ASTM D6528)

Initial Height (mm):	23.6	Weight of Specimen (g):	209.67	Initial Void Ratio, e_o :	0.55
Diameter of Ring (mm):	73.5	Total Unit Weight (kN/m^3):	20.55	Final Void Ratio, e_f :	0.51
Specific Gravity, G_s :	2.72	Dry Unit Weight (kN/m^3):	17.18	Natural Water Content (%):	19.6
Final Water Content (%):	19.1	Initial Degree of Saturation, S_r (%):	96.6	Final Degree of Saturation, S_r (%):	102.7



Type of Test: Constant Volume					
Sample No.	Depth (m)	Total Unit Weight (kN/m^3)	Effective Vertical Stress, σ'_v (kPa)	Strain Rate (%/hour)	Test OCR
ST17	8.03	20.6	132	1	2

Comments: Gs of 2.72 provided by Stantec
Sample consolidated to 264kPa and unloaded to 132kPa
Sample slipped along the bottom sample-platen interface

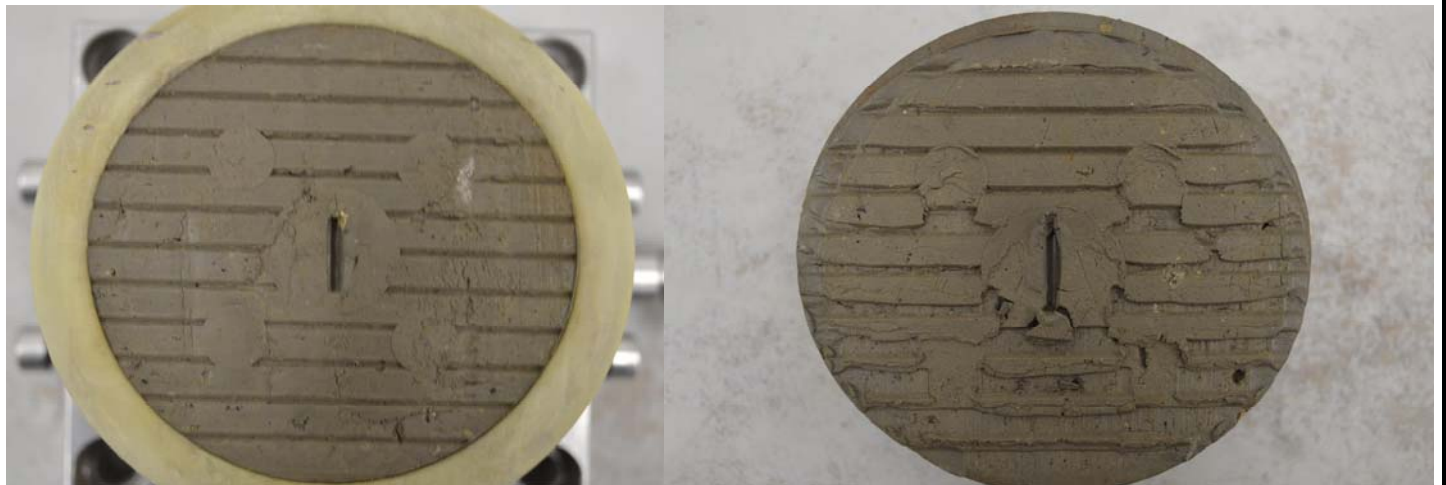
Prepared By:	PC	Checked By:	PS	Approved By:	JPS
Date:	January 7, 2019	Date:	January 7, 2019	Date:	January 9, 2019

Project:	Stantec - SR1	Project No.:	704-ENG.VMEG03070-01
Location:	Alberta	Date:	January 7, 2019
Borehole:	GL1A	Depth (m):	8.03
Sample No.:	ST17		

Direct Simple Shear (ASTM D6528)



Ring alignment after completion of the test. Porous stones are at level with the slipped ring.



Top of sample showing groove indentations from top platten with raised fins

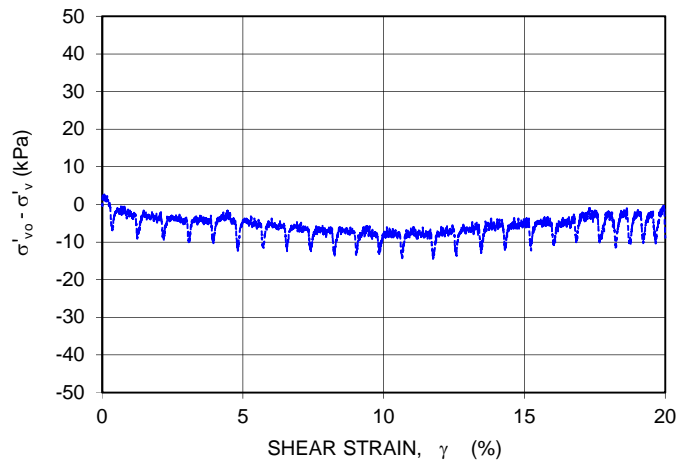
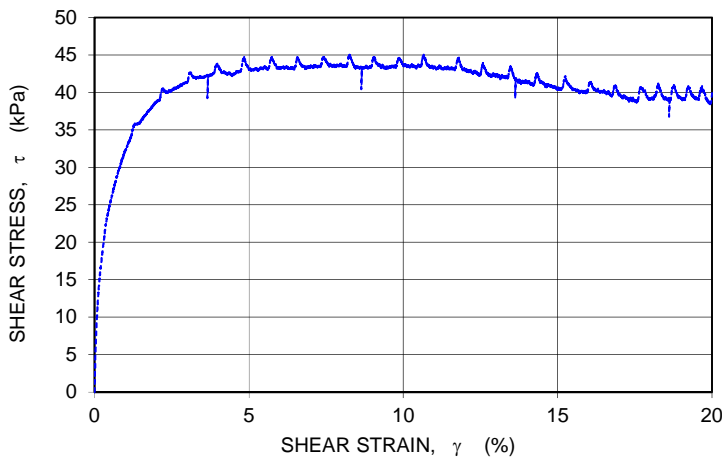
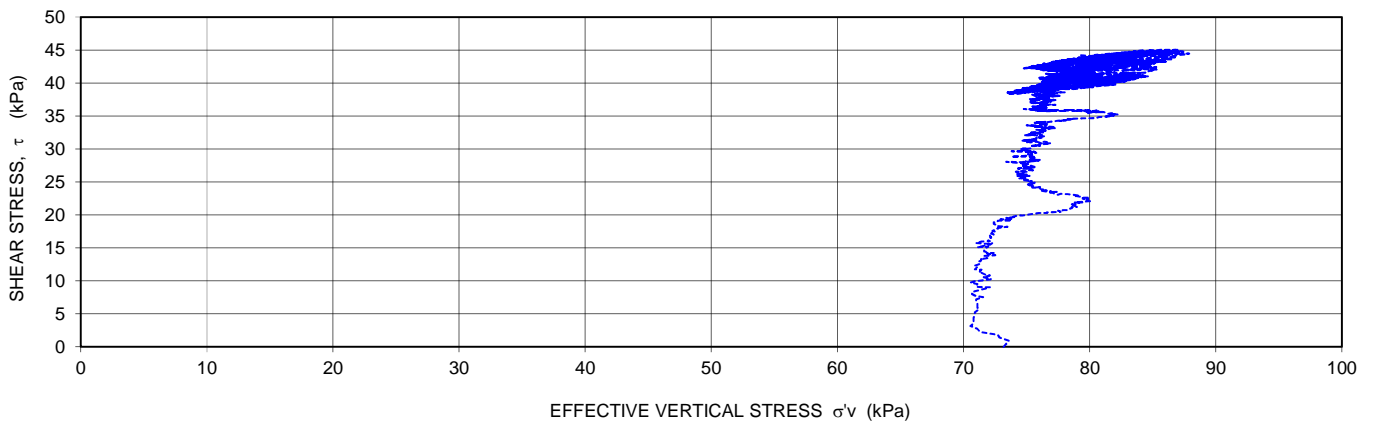
Bottom of sample showing groove indentations from bottom platten with raised fins. Picture also shows slip along bottom interface

Prepared By:	PC	Checked By:	PS	Approved By:	JPS
Date:	January 7, 2019	Date:	January 7, 2019	Date:	January 0, 1900

Project:	Stantec - SR1	Project No.:	704-ENG.VMEG03070-01
Location:	Alberta	Date:	November 26, 2018
Borehole:	GL2	Depth (m):	1.79
Sample No.:	ST3		

Direct Simple Shear (ASTM D6528)

Initial Height (mm):	23.5	Weight of Specimen (g):	190.92	Initial Void Ratio, e_0 :	0.77
Diameter of Ring (mm):	73.5	Total Unit Weight (kN/m^3):	18.78	Final Void Ratio, e_f :	0.72
Specific Gravity, G_s :	2.72	Dry Unit Weight (kN/m^3):	15.11	Natural Water Content (%):	24.3
Final Water Content (%):	25.1	Initial Degree of Saturation, S_r (%):	86.3	Final Degree of Saturation, S_r (%):	94.4



Type of Test: Constant Volume					
Sample No.	Depth (m)	Total Unit Weight (kN/m^3)	Effective Vertical Stress, $\sigma'v$ (kPa)	Strain Rate (%/hour)	Test OCR
ST3	1.79	18.8	73	1	2

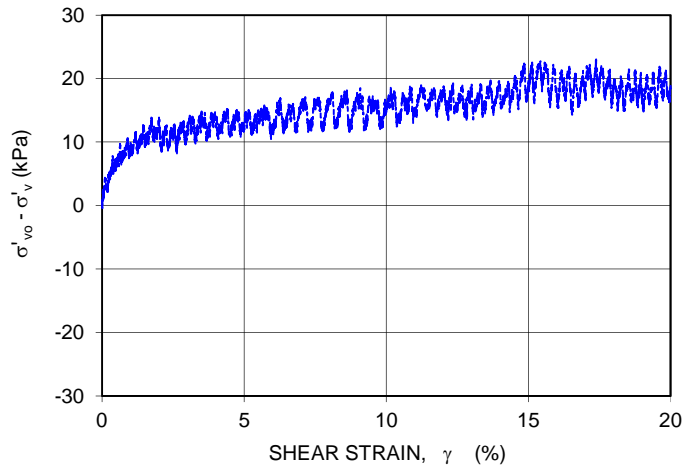
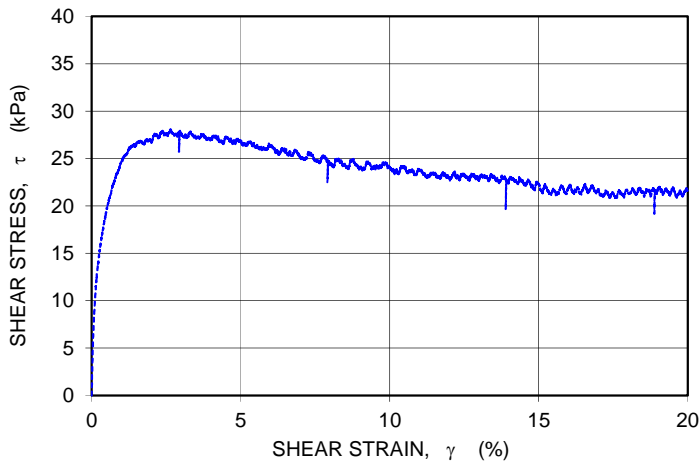
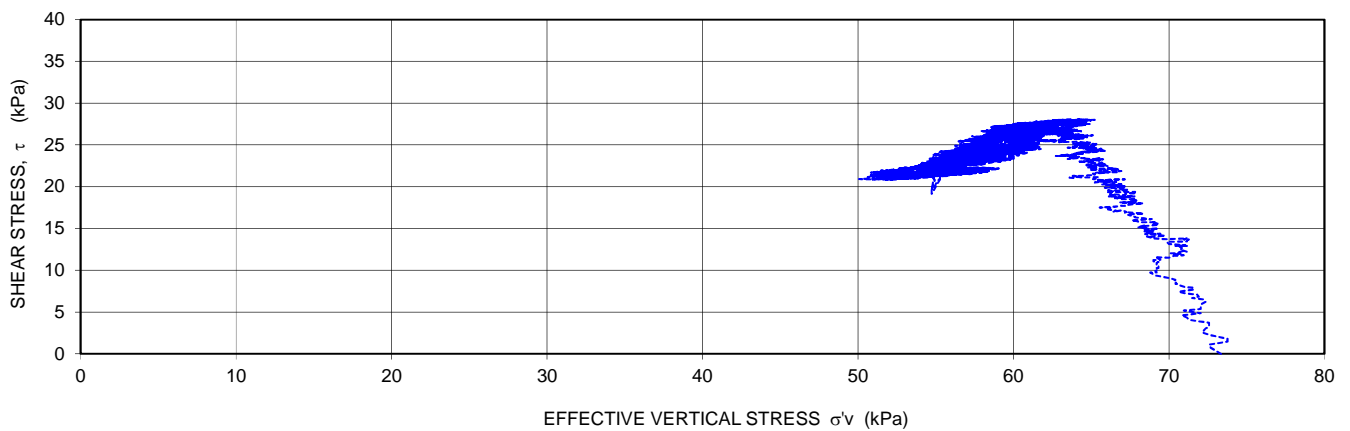
Comments: Gs of 2.72 provided by Stantec
Sample consolidated to 145kPa and unloaded to 73kPa
Sample slipped along the bottom sample-platen interface

Prepared By:	PC	Checked By:	PS	Approved By:	JPS
Date:	November 26, 2018	Date:	November 26, 2018	Date:	November 27, 2018

Project:	Stantec - SR1	Project No.:	704-ENG.VMEG03070-01
Location:	Alberta	Date:	November 19, 2018
Borehole:	GL2	Depth (m):	3.12
Sample No.:	ST6		

Direct Simple Shear (ASTM D6528)

Initial Height (mm):	23.5	Weight of Specimen (g):	193.45	Initial Void Ratio, e_o :	0.93
Diameter of Ring (mm):	73.5	Total Unit Weight (kN/m^3):	19.02	Final Void Ratio, e_f :	0.90
Specific Gravity, G_s :	2.92	Dry Unit Weight (kN/m^3):	14.88	Natural Water Content (%):	27.9
Final Water Content (%):	27.9	Initial Degree of Saturation, S_r (%):	87.9	Final Degree of Saturation, S_r (%):	90.6



Type of Test: Constant Volume					
Sample No.	Depth (m)	Total Unit Weight (kN/m^3)	Effective Vertical Stress, σ'_v (kPa)	Strain Rate (%/hour)	Test OCR
ST6	3.12	19.0	73	1	-

Comments: Gs of 2.72 provided by Stantec
Sample slipped along the bottom sample-platen interface

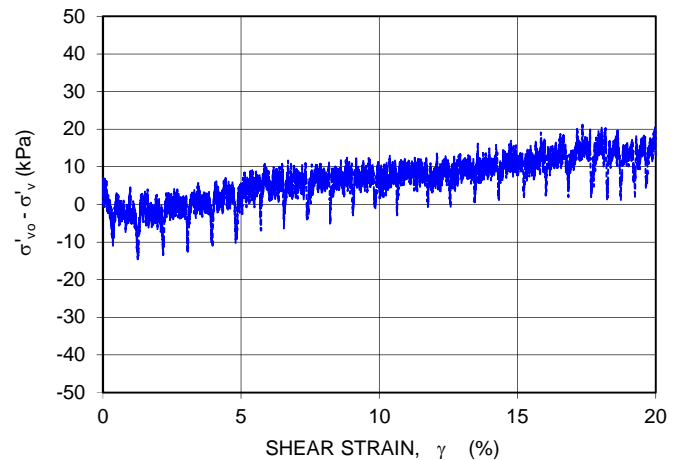
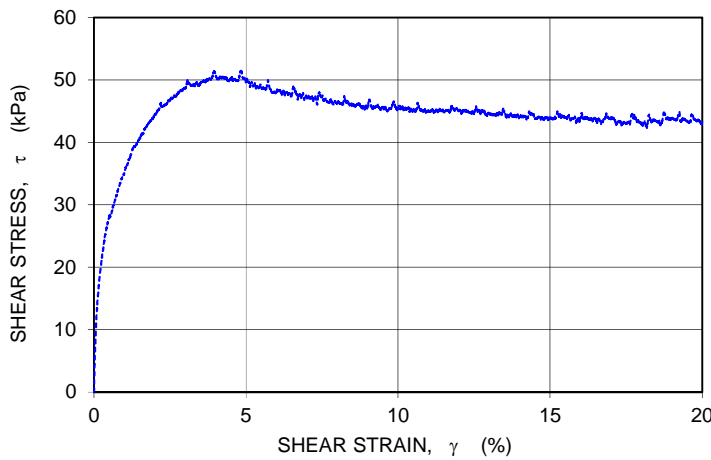
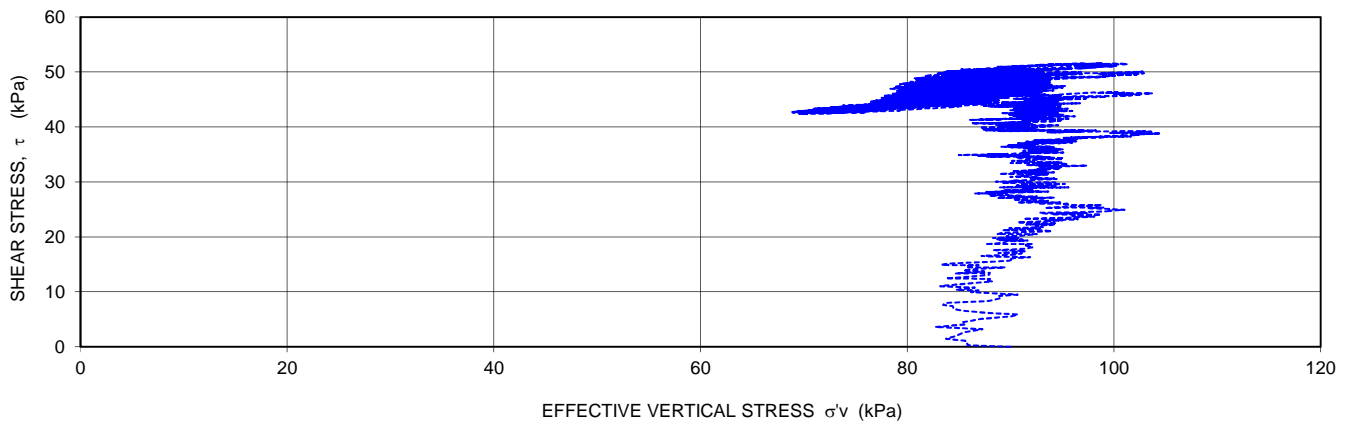
Prepared By:	PC	Checked By:	PS	Approved By:	JPS
Date:	November 19, 2018	Date:	November 19, 2018	Date:	November 20, 2018

TETRA TECH CANADA INC.

Project:	Stantec - SR1	Project No.:	704-ENG.VMEG03070-01
Location:	Alberta	Date:	November 26, 2018
Borehole:	GL2	Depth (m):	4.95
Sample No.:	ST10		

Direct Simple Shear (ASTM D6528)

Initial Height (mm):	23.6	Weight of Specimen (g):	191.30	Initial Void Ratio, e_0 :	0.81
Diameter of Ring (mm):	73.5	Total Unit Weight (kN/m^3):	18.75	Final Void Ratio, e_f :	0.75
Specific Gravity, G_s :	2.72	Dry Unit Weight (kN/m^3):	14.74	Natural Water Content (%):	27.2
Final Water Content (%):	25.9	Initial Degree of Saturation, S_r (%):	91.2	Final Degree of Saturation, S_r (%):	94.3



Type of Test: Constant Volume					
Sample No.	Depth (m)	Total Unit Weight (kN/m^3)	Effective Vertical Stress, σ'_v (kPa)	Strain Rate (%/hour)	Test OCR
ST10	4.95	18.7	90	1	2

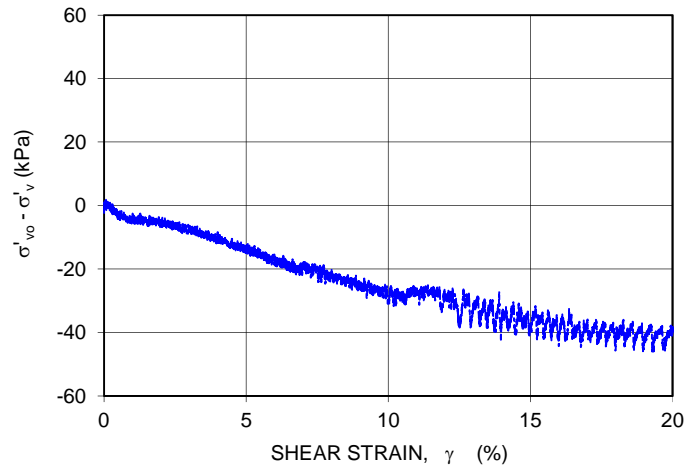
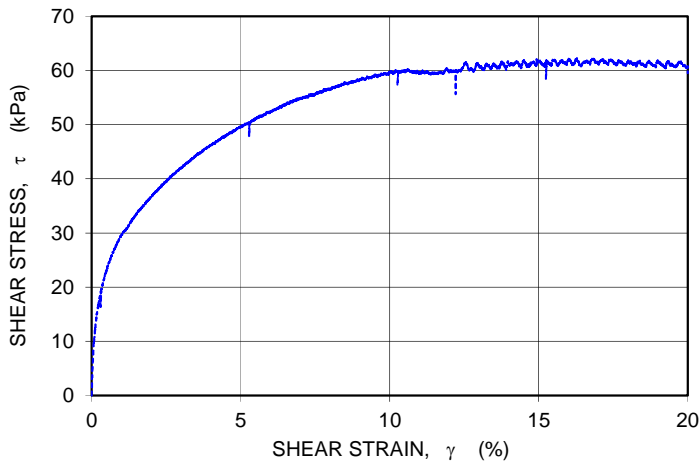
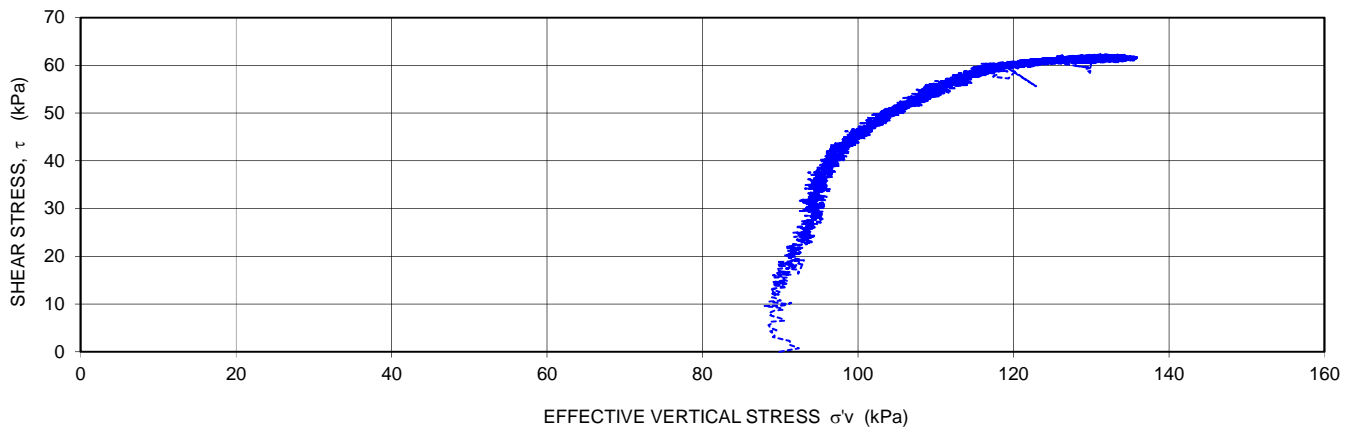
Comments: Gs of 2.72 provided by Stantec
Sample consolidated to 180kPa and unloaded to 90kPa
Sample slipped along the bottom sample-platten interface

Prepared By:	PC	Checked By:	PS	Approved By:	JPS
Date:	November 26, 2018	Date:	November 26, 2018	Date:	November 27, 2018

Project:	Stantec - SR1	Project No.:	704-ENG.VMEG03070-01
Location:	Alberta	Date:	December 4, 2018
Borehole:	GL2	Depth (m):	4.92
Sample No.:	ST10		

Direct Simple Shear (ASTM D6528)

Initial Height (mm):	23.6	Weight of Specimen (g):	197.28	Initial Void Ratio, e_o :	0.67
Diameter of Ring (mm):	73.5	Total Unit Weight (kN/m^3):	19.34	Final Void Ratio, e_f :	0.60
Specific Gravity, G_s :	2.72	Dry Unit Weight (kN/m^3):	15.93	Natural Water Content (%):	21.4
Final Water Content (%):	24.5	Initial Degree of Saturation, S_r (%):	86.1	Final Degree of Saturation, S_r (%):	111.0



Type of Test: Constant Volume					
Sample No.	Depth (m)	Total Unit Weight (kN/m^3)	Effective Vertical Stress, σ'_v (kPa)	Strain Rate (%/hour)	Test OCR
ST10	4.92	19.3	90	1	2

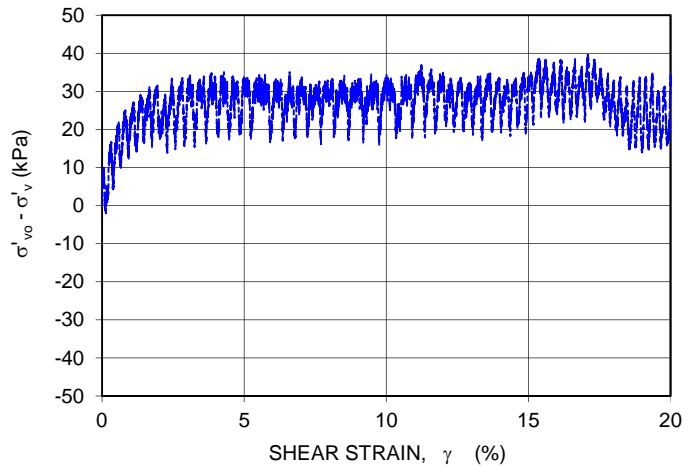
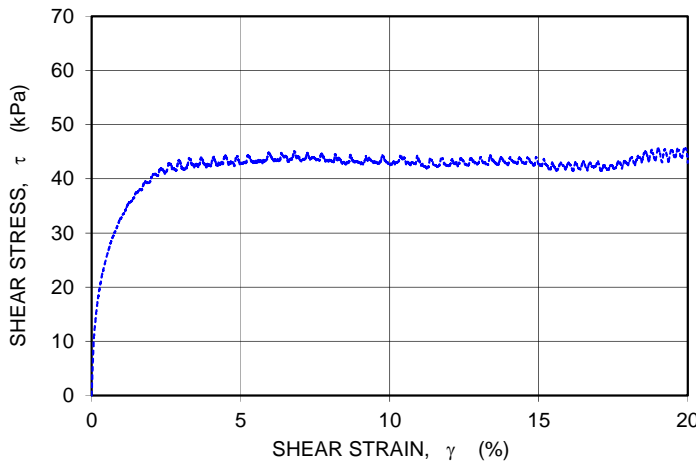
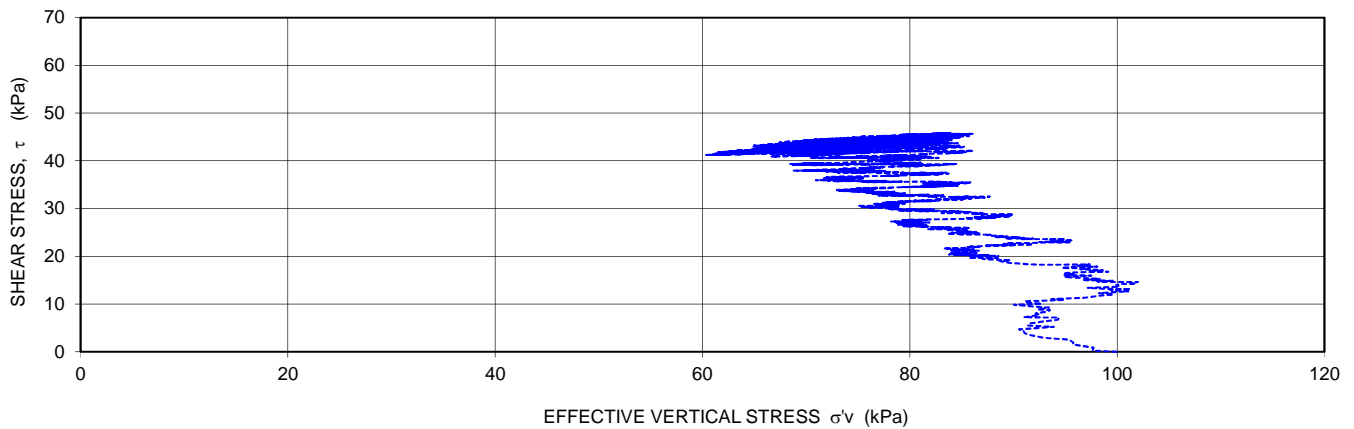
Comments: Gs of 2.72 provided by Stantec
Sample consolidated to 180kPa and unloaded to 90kPa
Sample slipped along the bottom sample-platen interface

Prepared By:	PC	Checked By:	PS	Approved By:	JPS
Date:	December 4, 2018	Date:	December 4, 2018	Date:	December 6, 2018

Project:	Stantec - SR1	Project No.:	704-ENG.VMEG03070-01
Location:	Alberta	Date:	November 19, 2018
Borehole:	GL2	Depth (m):	6.29
Sample No.:	ST13		

Direct Simple Shear (ASTM D6528)

Initial Height (mm):	23.5	Weight of Specimen (g):	199.96	Initial Void Ratio, e_o :	0.81
Diameter of Ring (mm):	73.5	Total Unit Weight (kN/m^3):	19.61	Final Void Ratio, e_f :	0.79
Specific Gravity, G_s :	2.92	Dry Unit Weight (kN/m^3):	15.79	Natural Water Content (%):	24.2
Final Water Content (%):	25.8	Initial Degree of Saturation, S_r (%):	86.8	Final Degree of Saturation, S_r (%):	95.6



Type of Test: Constant Volume					
Sample No.	Depth (m)	Total Unit Weight (kN/m^3)	Effective Vertical Stress, σ'_v (kPa)	Strain Rate (%/hour)	Test OCR
ST13	6.29	19.6	100	1	-

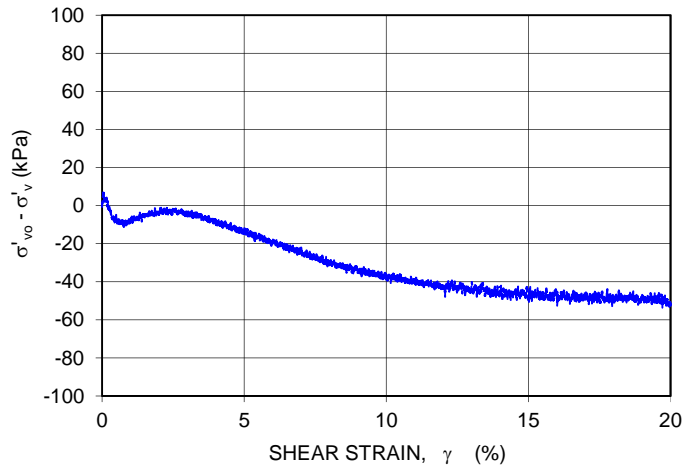
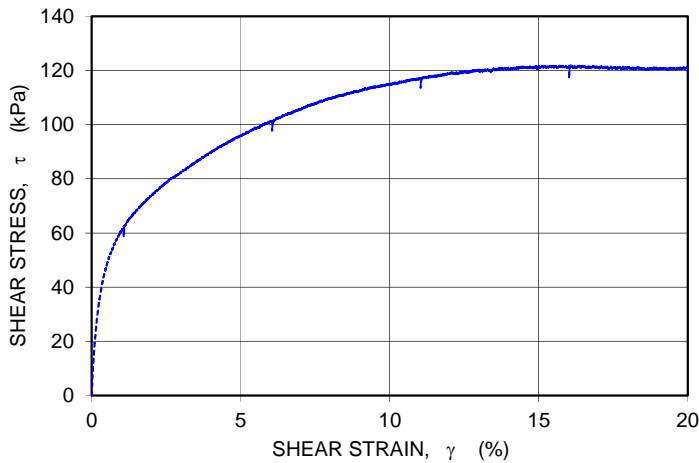
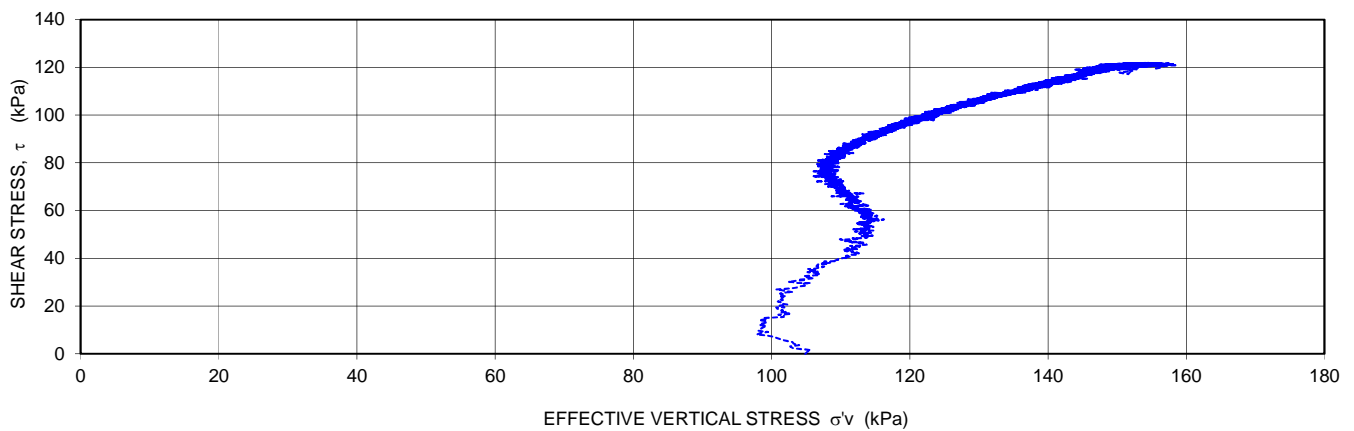
Comments: Gs of 2.72 provided by Stantec
Sample slipped along the bottom sample-platen interface

Prepared By:	PC	Checked By:	PS	Approved By:	JPS
Date:	November 19, 2018	Date:	November 19, 2018	Date:	November 20, 2018

Project:	Stantec - SR1	Project No.:	704-ENG.VMEG03070-01
Location:	Alberta	Date:	January 7, 2019
Borehole:	GL2	Depth (m):	8.09
Sample No.:	ST16		

Direct Simple Shear (ASTM D6528)

Initial Height (mm):	23.6	Weight of Specimen (g):	206.82	Initial Void Ratio, e_o :	0.60
Diameter of Ring (mm):	73.5	Total Unit Weight (kN/m^3):	20.32	Final Void Ratio, e_f :	0.56
Specific Gravity, G_s :	2.72	Dry Unit Weight (kN/m^3):	16.63	Natural Water Content (%):	22.2
Final Water Content (%):	22.3	Initial Degree of Saturation, S_r (%):	99.9	Final Degree of Saturation, S_r (%):	107.2



Type of Test: Constant Volume					
Sample No.	Depth (m)	Total Unit Weight (kN/m^3)	Effective Vertical Stress, σ'_v (kPa)	Strain Rate (%/hour)	Test OCR
ST16	8.09	20.3	105	1	2

Comments: Gs of 2.72 provided by Stantec
Sample consolidated to 210kPa and unloaded to 105kPa
Sample slipped along the bottom sample-platen interface

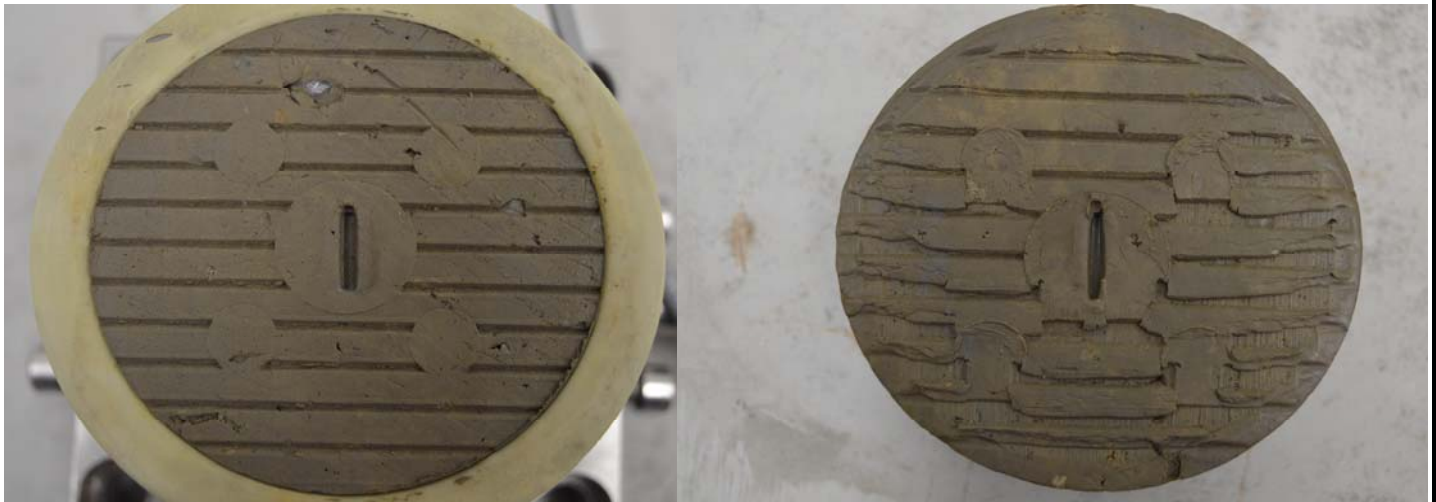
Prepared By:	PC	Checked By:	PS	Approved By:	JPS
Date:	January 7, 2019	Date:	January 7, 2019	Date:	January 9, 2019

Project:	Stantec - SR1	Project No.:	704-ENG.VMEG03070-01
Location:	Alberta	Date:	January 7, 2019
Borehole:	GL2	Depth (m):	8.09
Sample No.:	ST16		

Direct Simple Shear (ASTM D6528)



Ring alignment after completion of the test. Porous stones are at level with the slipped ring.



Top of sample showing groove indentations from top platten with raised fins

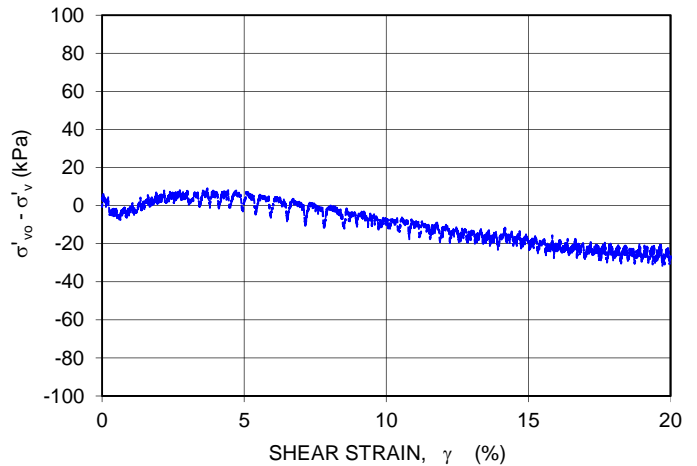
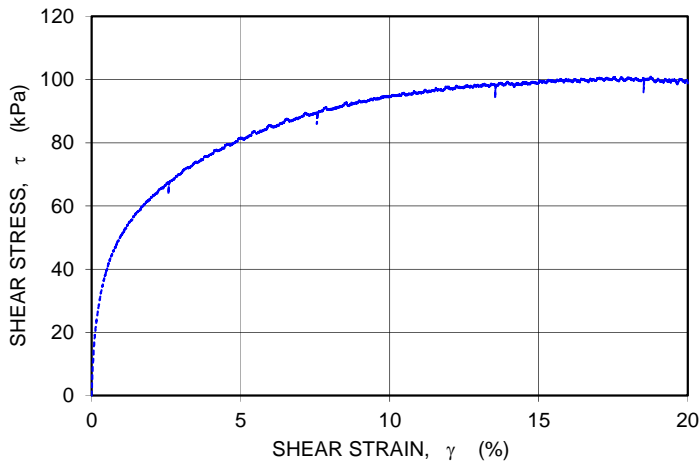
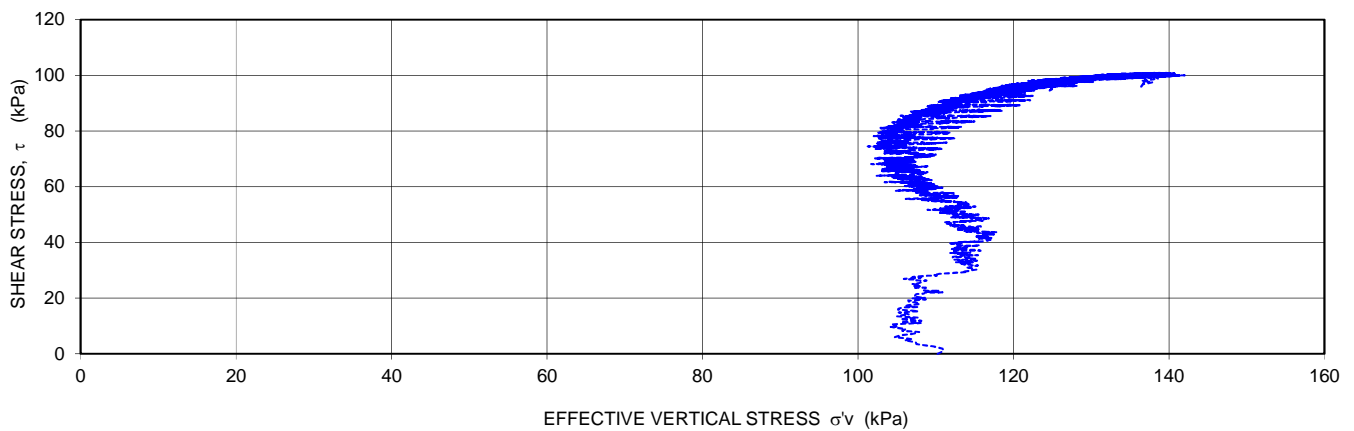
Bottom of sample showing groove indentations from bottom platten with raised fins. Picture also shows slip along bottom interface

Prepared By:	PC	Checked By:	PS	Approved By:	JPS
Date:	January 7, 2019	Date:	January 7, 2019	Date:	January 0, 1900

Project:	Stantec - SR1	Project No.:	704-ENG.VMEG03070-01
Location:	Alberta	Date:	December 21, 2018
Borehole:	GL2	Depth (m):	9.40
Sample No.:	ST19		

Direct Simple Shear (ASTM D6528)

Initial Height (mm):	23.6	Weight of Specimen (g):	208.88	Initial Void Ratio, e_o :	0.60
Diameter of Ring (mm):	73.5	Total Unit Weight (kN/m^3):	20.48	Final Void Ratio, e_f :	0.53
Specific Gravity, G_s :	2.72	Dry Unit Weight (kN/m^3):	16.73	Natural Water Content (%):	22.4
Final Water Content (%):	18.4	Initial Degree of Saturation, S_r (%):	102.6	Final Degree of Saturation, S_r (%):	93.8



Type of Test: Constant Volume					
Sample No.	Depth (m)	Total Unit Weight (kN/m^3)	Effective Vertical Stress, σ'_v (kPa)	Strain Rate (%/hour)	Test OCR
ST19	9.40	20.5	110	1	2

Comments: Gs of 2.72 provided by Stantec
Sample consolidated to 220kPa and unloaded to 110kPa
Sample slipped along the bottom sample-platen interface

Prepared By:	PC	Checked By:	PS	Approved By:	JPS
Date:	December 21, 2018	Date:	December 21, 2018	Date:	21/20/2018

Project:	Stantec - SR1	Project No.:	704-ENG.VMEG03070-01
Location:	Alberta	Date:	December 21, 2018
Borehole:	GL2	Depth (m):	9.40
Sample No.:	ST19		

Direct Simple Shear (ASTM D6528)



Ring alignment after completion of the test. Porous stones are at level with the slipped ring.



Top of sample showing groove indentations from top platten with raised fins



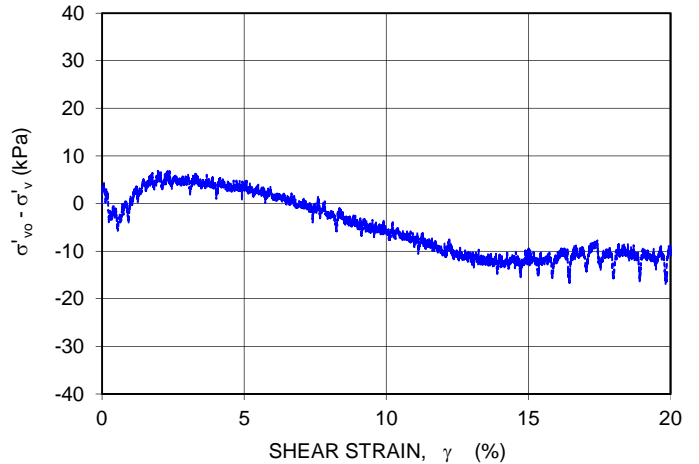
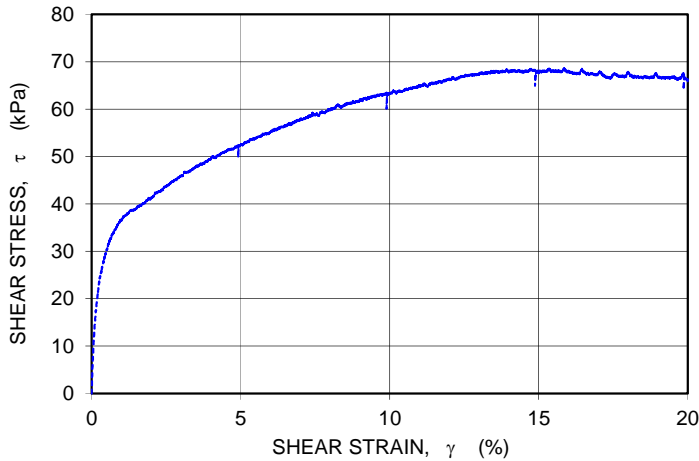
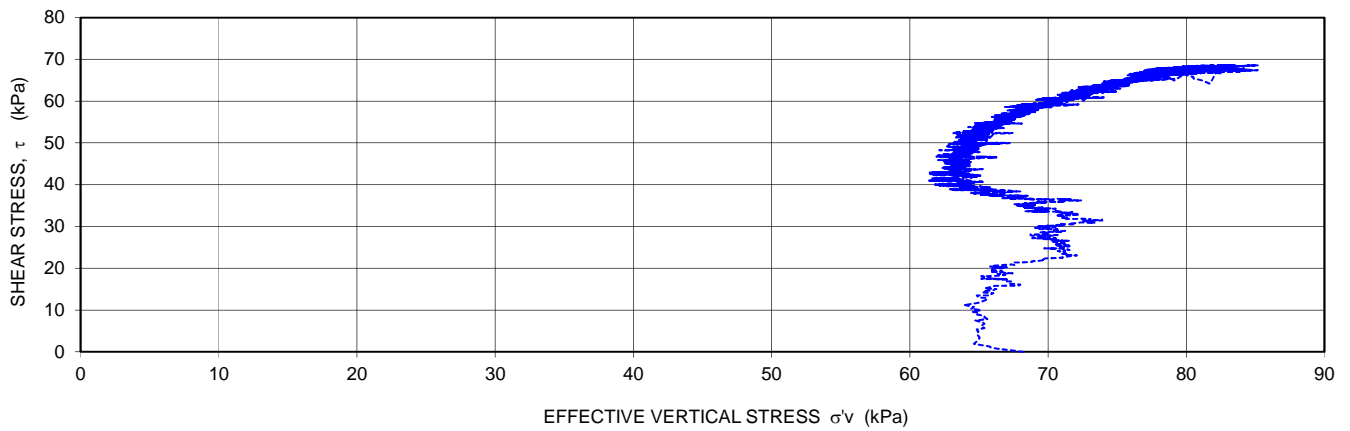
Bottom of sample showing groove indentations from bottom platten with raised fins. Picture also shows slip along bottom interface

Prepared By:	PC	Checked By:	PS	Approved By:	JPS
Date:	December 21, 2018	Date:	December 21, 2018	Date:	21/20/2018

Project:	Stantec - SR1	Project No.:	704-ENG.VMEG03070-01
Location:	Alberta	Date:	December 13, 2018
Borehole:	GL3A	Depth (m):	3.08
Sample No.:	ST5		

Direct Simple Shear (ASTM D6528)

Initial Height (mm):	23.5	Weight of Specimen (g):	200.56	Initial Void Ratio, e_o :	0.67
Diameter of Ring (mm):	73.5	Total Unit Weight (kN/m^3):	19.75	Final Void Ratio, e_f :	0.61
Specific Gravity, G_s :	2.72	Dry Unit Weight (kN/m^3):	16.00	Natural Water Content (%):	23.4
Final Water Content (%):	21.9	Initial Degree of Saturation, S_r (%):	95.5	Final Degree of Saturation, S_r (%):	97.7



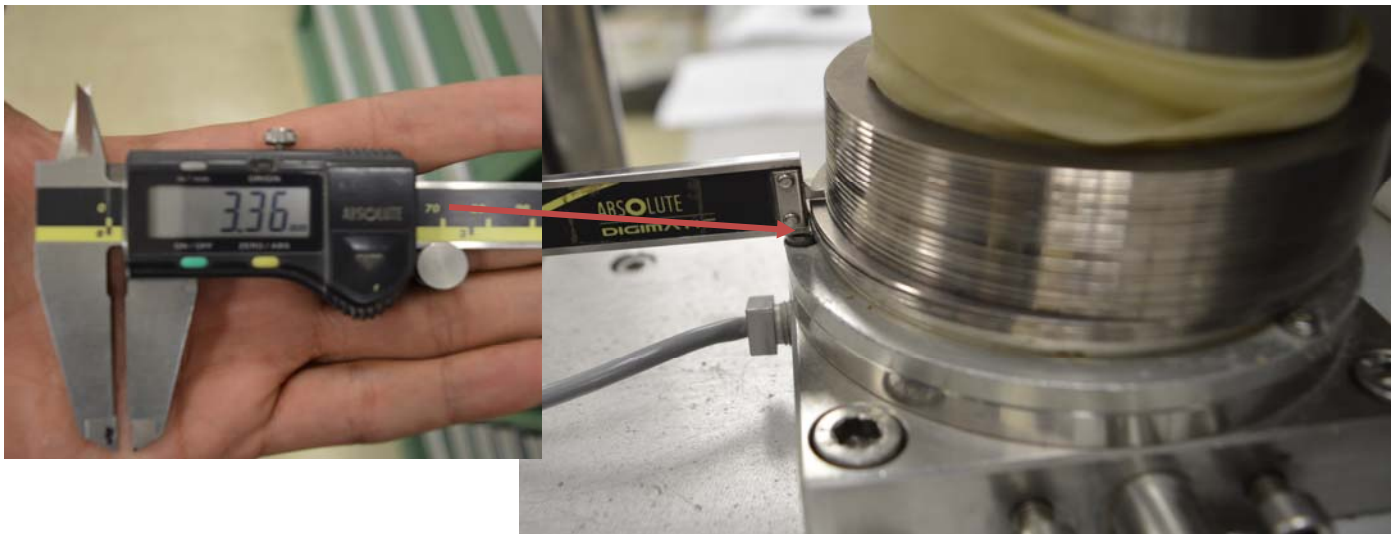
Type of Test: Constant Volume					
Sample No.	Depth (m)	Total Unit Weight (kN/m^3)	Effective Vertical Stress, σ'_v (kPa)	Strain Rate (%/hour)	Test OCR
ST5	3.08	19.8	68	1	2

Comments: Gs of 2.72 provided by Stantec
Sample consolidated to 135kPa and unloaded to 68kPa
Sample slipped along the bottom sample-platen interface

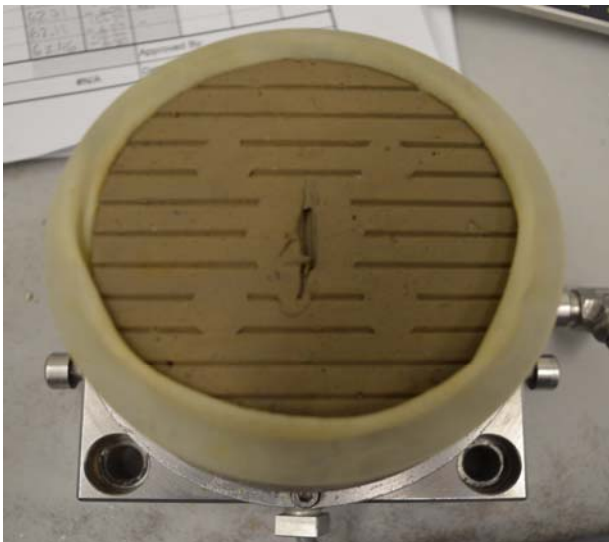
Prepared By:	PC	Checked By:	PS	Approved By:	JPS
Date:	December 13, 2018	Date:	December 13, 2018	Date:	December 14, 2018

Project:	Stantec - SR1	Project No.:	704-ENG.VMEG03070-01
Location:	Alberta	Date:	December 13, 2018
Borehole:	GL3A	Depth (m):	3.08
Sample No.:	ST5		

Direct Simple Shear (ASTM D6528)



Ring alignment after completion of the test. Porous stones are at level with the slipped ring.



Top of sample showing groove indentations from top platten with raised fines



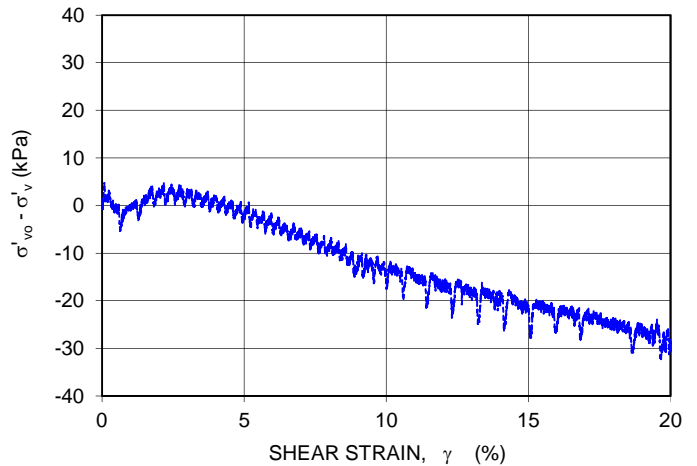
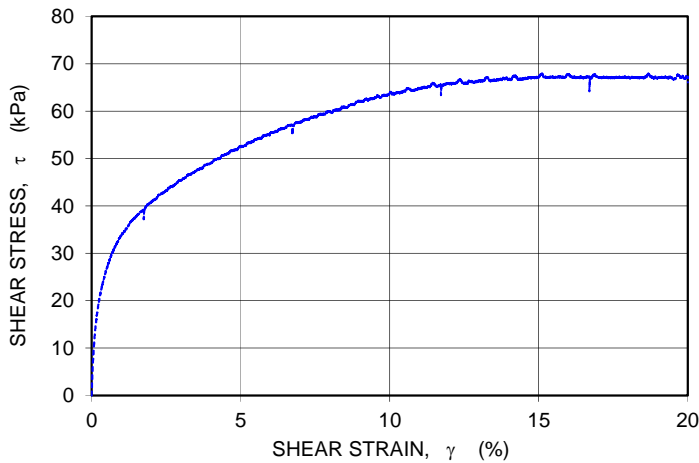
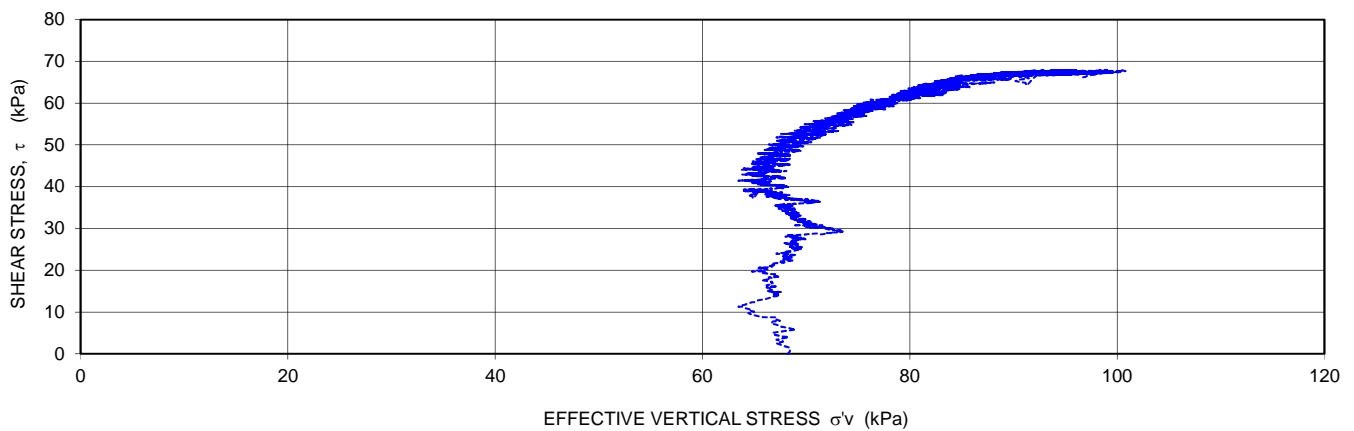
Bottom of sample showing groove indentations from bottom platten with raised fines. Picture also shows slip along bottom interface

Prepared By:	PC	Checked By:	PS	Approved By:	JPS
Date:	December 13, 2018	Date:	December 13, 2018	Date:	December 14, 2018

Project:	Stantec - SR1	Project No.:	704-ENG.VMEG03070-01
Location:	Alberta	Date:	December 13, 2018
Borehole:	GL4	Depth (m):	2.24
Sample No.:	ST4		

Direct Simple Shear (ASTM D6528)

Initial Height (mm):	23.6	Weight of Specimen (g):	201.07	Initial Void Ratio, e_o :	0.65
Diameter of Ring (mm):	73.5	Total Unit Weight (kN/m^3):	19.70	Final Void Ratio, e_f :	0.59
Specific Gravity, G_s :	2.72	Dry Unit Weight (kN/m^3):	16.14	Natural Water Content (%):	22.1
Final Water Content (%):	22.3	Initial Degree of Saturation, S_r (%):	91.9	Final Degree of Saturation, S_r (%):	103.6



Type of Test: Constant Volume					
Sample No.	Depth (m)	Total Unit Weight (kN/m^3)	Effective Vertical Stress, σ'_v (kPa)	Strain Rate (%/hour)	Test OCR
ST4	2.24	19.7	68	1	2

Comments: Gs of 2.72 provided by Stantec
Sample consolidated to 135kPa and unloaded to 68kPa
Sample slipped along the bottom sample-platen interface

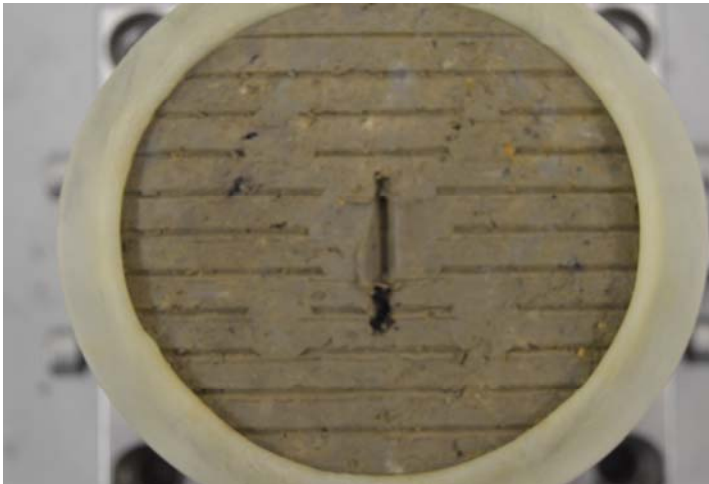
Prepared By:	PC	Checked By:	PS	Approved By:	JPS
Date:	December 13, 2018	Date:	December 13, 2018	Date:	December 14, 2018

Project:	Stantec - SR1	Project No.:	704-ENG.VMEG03070-01
Location:	Alberta	Date:	December 13, 2018
Borehole:	GL4	Depth (m):	2.24
Sample No.:	ST4		

Direct Simple Shear (ASTM D6528)



Ring alignment after completion of the test. Porous stones are at level with the slipped ring.



Top of sample showing groove indentations from top platten with raised fines



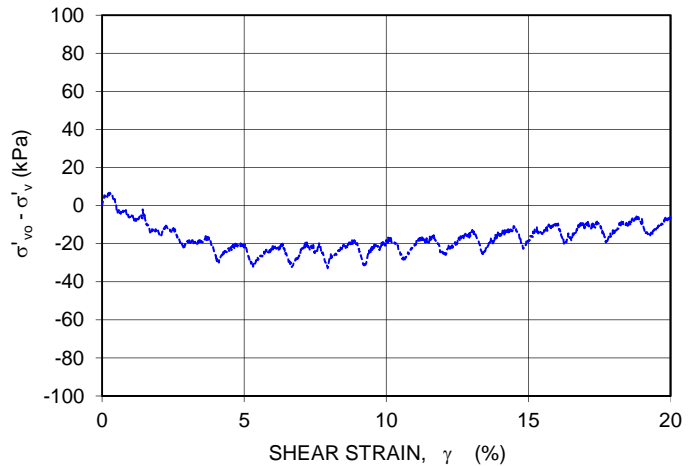
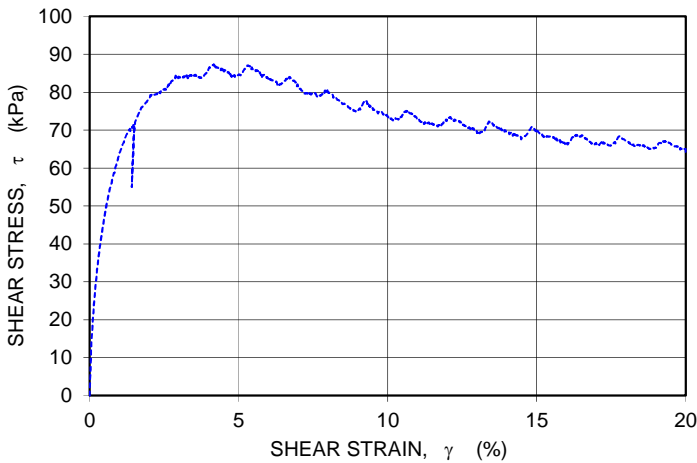
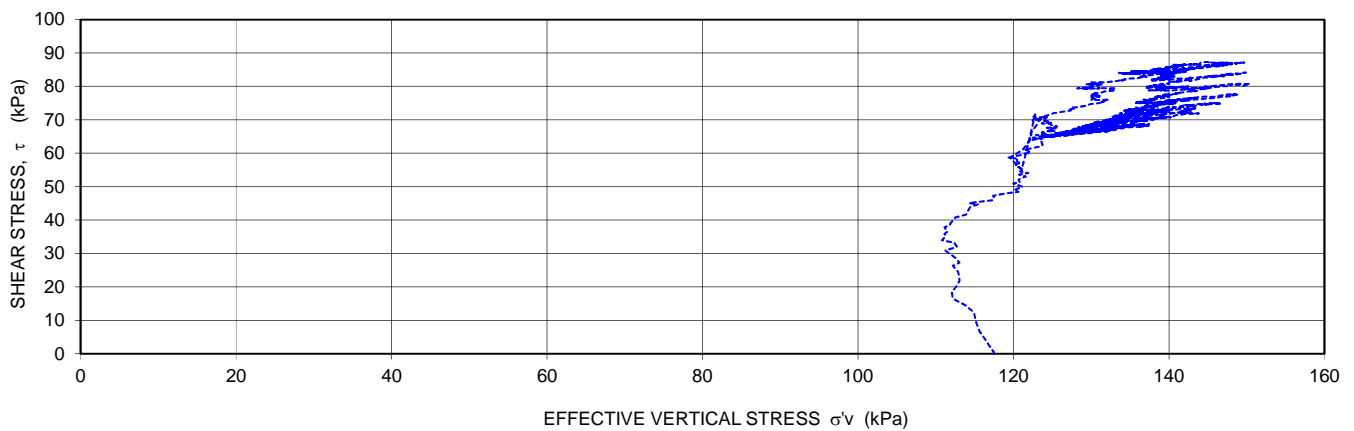
Bottom of sample showing groove indentations from bottom platten with raised fines. Picture also shows slip along bottom interface

Prepared By:	PC	Checked By:	PS	Approved By:	JPS
Date:	December 13, 2018	Date:	December 13, 2018	Date:	December 14, 2018

Project:	Stantec - SR1	Project No.:	704-ENG.VMEG03055-01
Location:	Calgary, AB	Date:	June 14, 2018
Borehole:	LLO1	Depth (m):	3.32
Sample No.:	ST4		

Direct Simple Shear (ASTM D6528)

Initial Height (mm):	23.7	Weight of Specimen (g):	199.20	Initial Void Ratio, e_o :	0.70
Diameter of Ring (mm):	73.6	Total Unit Weight (kN/m^3):	19.40	Final Void Ratio, e_f :	0.65
Specific Gravity, G_s :	2.70	Dry Unit Weight (kN/m^3):	15.58	Natural Water Content (%):	24.5
Final Water Content (%):	24.8	Initial Degree of Saturation, S_r (%):	94.4	Final Degree of Saturation, S_r (%):	103.7



Type of Test: Constant Volume					
Sample No.	Depth (m)	Total Unit Weight (kN/m^3)	Effective Vertical Stress, σ'_v (kPa)	Strain Rate (%/hour)	Test OCR
ST4	3.32	19.4	120	5	-

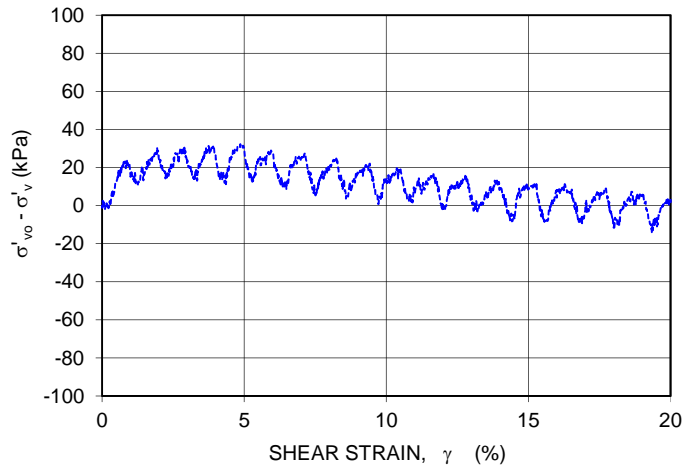
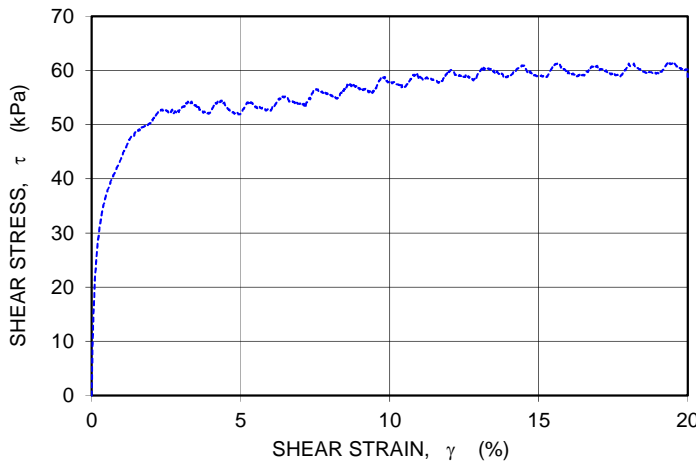
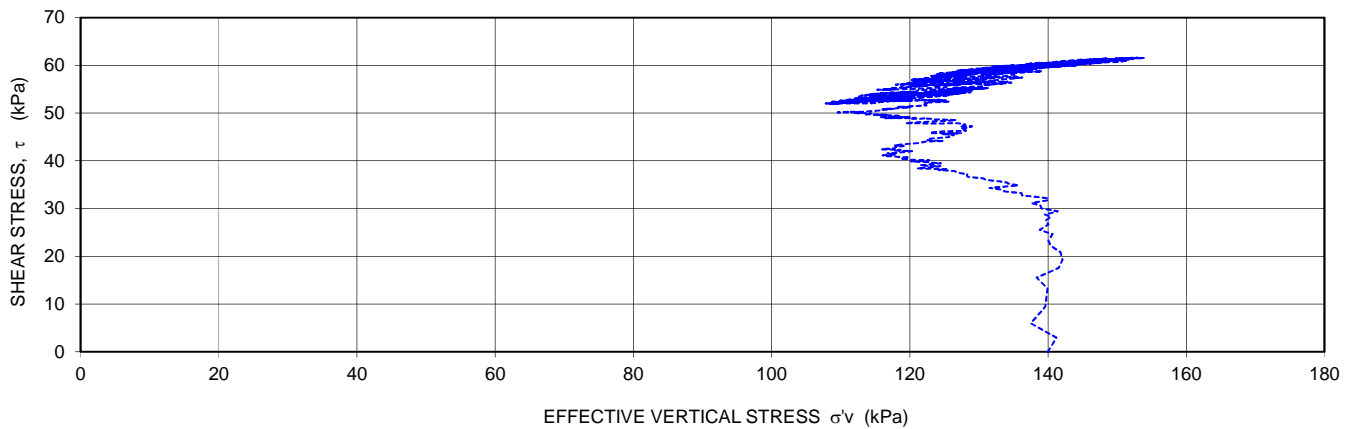
Comments: Used a G_s of 2.70 as requested by Stantec

Prepared By:	PC	Checked By:	PS	Approved By:	JPS
Date:	June 14, 2018	Date:	June 14, 2018	Date:	June 15, 2018

Project:	Stantec - SR1	Project No.:	704-ENG.VMEG03055-01
Location:	Calgary, AB	Date:	June 14, 2018
Borehole:	LLO1	Depth (m):	4.92
Sample No.:	ST7		

Direct Simple Shear (ASTM D6528)

Initial Height (mm):	23.4	Weight of Specimen (g):	199.62	Initial Void Ratio, e_o :	0.67
Diameter of Ring (mm):	73.5	Total Unit Weight (kN/m^3):	19.70	Final Void Ratio, e_f :	0.61
Specific Gravity, G_s :	2.70	Dry Unit Weight (kN/m^3):	15.88	Natural Water Content (%):	24.0
Final Water Content (%):	23.2	Initial Degree of Saturation, S_r (%):	97.2	Final Degree of Saturation, S_r (%):	102.9



Type of Test: Constant Volume					
Sample No.	Depth (m)	Total Unit Weight (kN/m^3)	Effective Vertical Stress, σ'_v (kPa)	Strain Rate (%/hour)	Test OCR
ST7	4.92	19.7	140	5	-

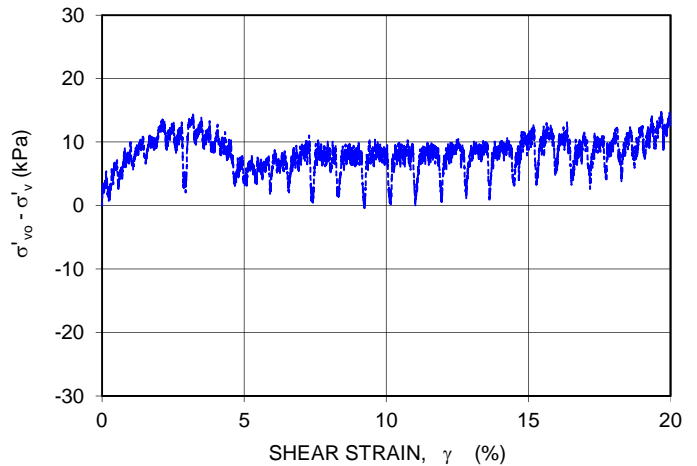
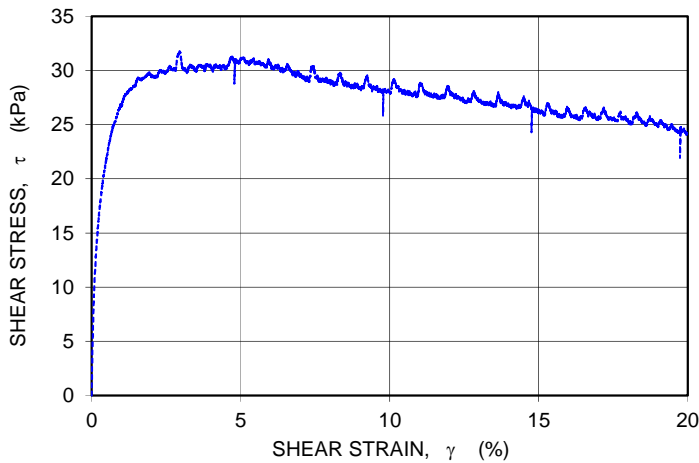
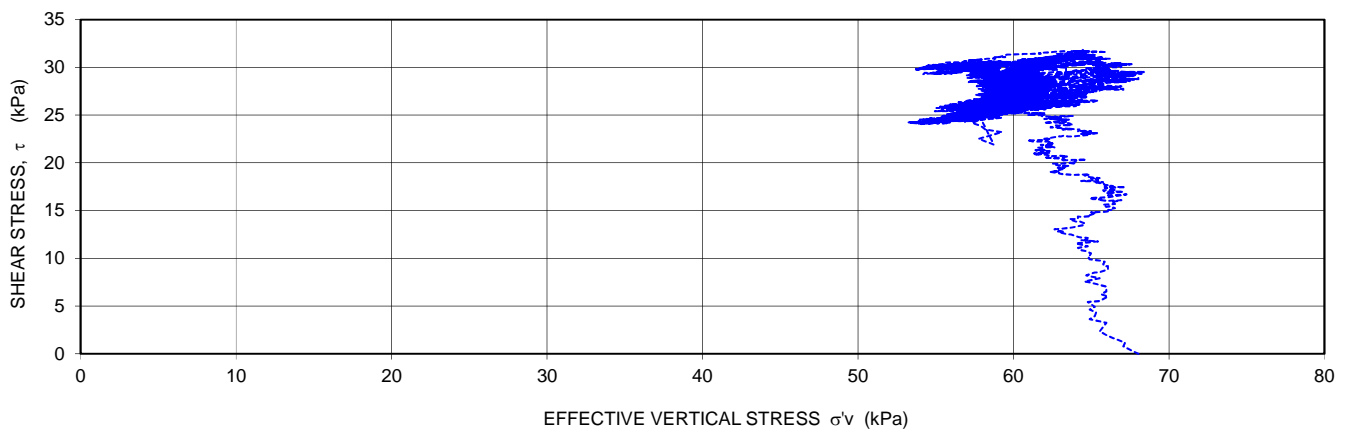
Comments: Used a G_s of 2.70 as requested by Stantec

Prepared By:	PC	Checked By:	PS	Approved By:	JPS
Date:	June 14, 2018	Date:	June 14, 2018	Date:	June 15, 2018

Project:	Stantec - SR1	Project No.:	704-ENG.VMEG03070-01
Location:	Alberta	Date:	November 19, 2018
Borehole:	LL017A	Depth (m):	2.12
Sample No.:	ST4		

Direct Simple Shear (ASTM D6528)

Initial Height (mm):	23.5	Weight of Specimen (g):	194.79	Initial Void Ratio, e_o :	0.84
Diameter of Ring (mm):	73.5	Total Unit Weight (kN/m^3):	19.13	Final Void Ratio, e_f :	0.83
Specific Gravity, G_s :	2.92	Dry Unit Weight (kN/m^3):	15.58	Natural Water Content (%):	22.8
Final Water Content (%):	26.0	Initial Degree of Saturation, S_r (%):	79.4	Final Degree of Saturation, S_r (%):	91.4



Type of Test: Constant Volume					
Sample No.	Depth (m)	Total Unit Weight (kN/m^3)	Effective Vertical Stress, σ'_v (kPa)	Strain Rate (%/hour)	Test OCR
ST4	2.12	19.1	68	1	-

Comments: Gs of 2.72 provided by Stantec
Sample slipped along the bottom sample-platen interface

Prepared By:	PC	Checked By:	PS	Approved By:	JPS
Date:	November 19, 2018	Date:	November 19, 2018	Date:	November 20, 2018

APPENDIX G: CONETEC CONE PENETRATION TESTING

PRESENTATION OF SITE INVESTIGATION RESULTS

Val Vista Ranch, Spring Bank, AB

Prepared for:

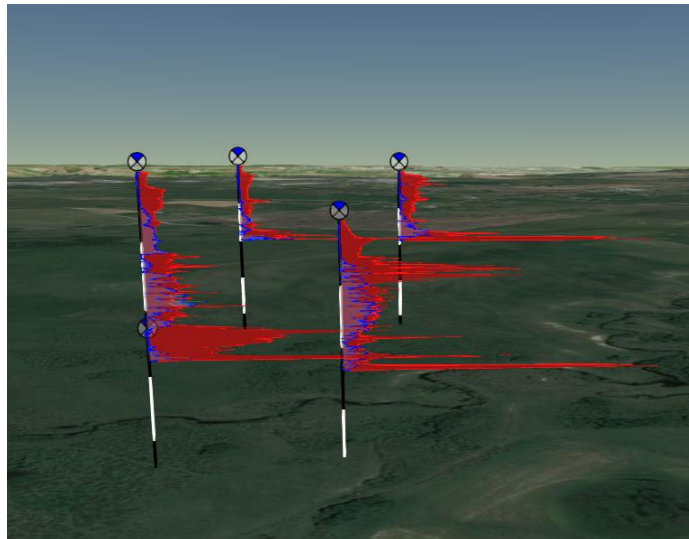
Stantec Consulting Ltd.

ConeTec Job No: 18-03010

Project Start Date: 01-May-2018

Project End Date: 03-May-2018

Report Date: 08-May-2018



Prepared by:

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Introduction

The enclosed report presents the results of the site investigation program conducted by ConeTec Investigations Ltd. for Stantec Consulting Ltd. at the Val Vista Ranch, Springbank, AB. The program consisted of six seismic cone penetration tests (SCPT).

Project Information

Project	
Client	Stantec Consulting Ltd.
Project	Val Vista Ranch, Springbank, AB
ConeTec project number	18-03010

An aerial overview from Google Earth including the SCPT locations is presented below.



Rig Description	Deployment System	Test Type
CPT track rig (TC5)	30 ton rig cylinder	SCPT

Coordinates		
Test Type	Collection Method	EPSG Number
SCPT	Consumer grade GPS	32611

Cone Penetration Test (CPT)	
Depth reference	Depths are referenced to the existing ground surface at the time of each test.
Tip and sleeve data offset	0.1 meter This has been accounted for in the SCPT data files.
Additional plots	Expanded range standard, advanced plots with I_c , S_u , ϕ and N_{160} and Soil Behaviour Type (SBT) scatter plots are provided in the release folder.

Cone Penetrometers Used for this Project						
Cone Description	Cone Number	Cross Sectional Area (cm ²)	Sleeve Area (cm ²)	Tip Capacity (bar)	Sleeve Capacity (bar)	Pore Pressure Capacity (psi)
316:T1500F15U500	316	15	225	1500	15	500
329:T1500F15U500	329	15	225	1500	15	500

The CPT summary indicates which cone was used for each sounding.

Calculated Geotechnical Parameter Tables	
Additional information	<p>The Normalized Soil Behavior Type Chart based on Q_{tn} (SBT Q_{tn}) (Robertson, 2009) was used to classify the soil for this project. A detailed set of calculated CPT parameters have been generated and are provided in Excel format files in the release folder. The CPT parameter calculations are based on values of corrected tip resistance (q_t) sleeve friction (f_s), and pore pressure (u_2).</p> <p>Soils were classified as either drained or undrained based on the Q_{tn} Normalized Soil Behavior Type Chart (Robertson, 2009). Calculations for both drained and undrained parameters were included for materials that classified as silt mixtures (zone 4).</p>

Limitations

This report has been prepared for the exclusive use of Stantec Consulting Ltd. (Client) for the project titled "Val Vista Ranch, Springbank, AB". The report's contents may not be relied upon by any other party without the express written permission of ConeTec Investigations Ltd. (ConeTec). ConeTec has provided site investigation services, prepared the factual data reporting and provided geotechnical parameter calculations consistent with current best practices. No other warranty, expressed or implied, is made.

The information presented in the report document and the accompanying data set pertain to the specific project, site conditions and objectives described to ConeTec by the Client. In order to properly understand the factual data, assumptions and calculations, reference must be made to the documents provided and their accompanying data sets, in their entirety.

The cone penetration tests (CPTu) are conducted using an integrated electronic piezocone penetrometer and data acquisition system manufactured by Adara Systems Ltd. of Richmond, British Columbia, Canada.

ConeTec's piezocone penetrometers are compression type designs in which the tip and friction sleeve load cells are independent and have separate load capacities. The piezocones use strain gauged load cells for tip and sleeve friction and a strain gauged diaphragm type transducer for recording pore pressure. The piezocones also have a platinum resistive temperature device (RTD) for monitoring the temperature of the sensors, an accelerometer type dual axis inclinometer and a geophone sensor for recording seismic signals. All signals are amplified down hole within the cone body and the analog signals are sent to the surface through a shielded cable.

ConeTec penetrometers are manufactured with various tip, friction and pore pressure capacities in both 10 cm² and 15 cm² tip base area configurations in order to maximize signal resolution for various soil conditions. The specific piezocone used for each test is described in the CPT summary table presented in the first Appendix. The 15 cm² penetrometers do not require friction reducers as they have a diameter larger than the deployment rods. The 10 cm² piezocones use a friction reducer consisting of a rod adapter extension behind the main cone body with an enlarged cross sectional area (typically 44 mm diameter over a length of 32 mm with tapered leading and trailing edges) located at a distance of 585 mm above the cone tip.

The penetrometers are designed with equal end area friction sleeves, a net end area ratio of 0.8 and cone tips with a 60 degree apex angle.

All ConeTec piezocones can record pore pressure at various locations. Unless otherwise noted, the pore pressure filter is located directly behind the cone tip in the "u₂" position (ASTM Type 2). The filter is 6 mm thick, made of porous plastic (polyethylene) having an average pore size of 125 microns (90-160 microns). The function of the filter is to allow rapid movements of extremely small volumes of water needed to activate the pressure transducer while preventing soil ingress or blockage.

The piezocone penetrometers are manufactured with dimensions, tolerances and sensor characteristics that are in general accordance with the current ASTM D5778 standard. ConeTec's calibration criteria also meets or exceeds those of the current ASTM D5778 standard. An illustration of the piezocone penetrometer is presented in Figure CPTu.

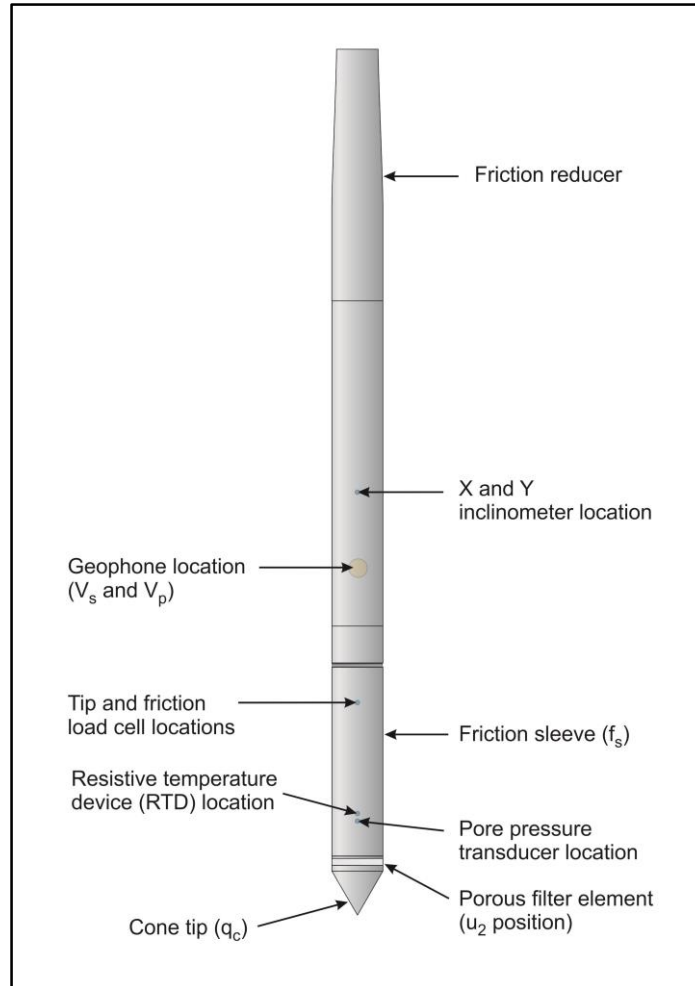


Figure CPTu. Piezocone Penetrometer (15 cm²)

The ConeTec data acquisition systems consist of a Windows based computer and a signal conditioner and power supply interface box with a 16 bit (or greater) analog to digital (A/D) converter. The data is recorded at fixed depth increments using a depth wheel attached to the push cylinders or by using a spring loaded rubber depth wheel that is held against the cone rods. The typical recording intervals are either 2.5 cm or 5.0 cm depending on project requirements; custom recording intervals are possible. The system displays the CPTu data in real time and records the following parameters to a storage media during penetration:

- Depth
- Uncorrected tip resistance (q_c)
- Sleeve friction (f_s)
- Dynamic pore pressure (u)
- Additional sensors such as resistivity, passive gamma, ultra violet induced fluorescence, if applicable

All testing is performed in accordance to ConeTec's CPT operating procedures which are in general accordance with the current ASTM D5778 standard.

Prior to the start of a CPTu sounding a suitable cone is selected, the cone and data acquisition system are powered on, the pore pressure system is saturated with either glycerine or silicone oil and the baseline readings are recorded with the cone hanging freely in a vertical position.

The CPTu is conducted at a steady rate of 2 cm/s, within acceptable tolerances. Typically one meter length rods with an outer diameter of 1.5 inches are added to advance the cone to the sounding termination depth. After cone retraction final baselines are recorded.

Additional information pertaining to ConeTec's cone penetration testing procedures:

- Each filter is saturated in silicone oil or glycerine under vacuum pressure prior to use
- Recorded baselines are checked with an independent multi-meter
- Baseline readings are compared to previous readings
- Soundings are terminated at the client's target depth or at a depth where an obstruction is encountered, excessive rod flex occurs, excessive inclination occurs, equipment damage is likely to take place, or a dangerous working environment arises
- Differences between initial and final baselines are calculated to ensure zero load offsets have not occurred and to ensure compliance with ASTM standards

The interpretation of piezocone data for this report is based on the corrected tip resistance (q_t), sleeve friction (f_s) and pore water pressure (u). The interpretation of soil type is based on the correlations developed by Robertson (1990) and Robertson (2009). It should be noted that it is not always possible to accurately identify a soil type based on these parameters. In these situations, experience, judgment and an assessment of other parameters may be used to infer soil behaviour type.

The recorded tip resistance (q_c) is the total force acting on the piezocone tip divided by its base area. The tip resistance is corrected for pore pressure effects and termed corrected tip resistance (q_t) according to the following expression presented in Robertson et al, 1986:

$$q_t = q_c + (1-a) \cdot u_2$$

where: q_t is the corrected tip resistance

q_c is the recorded tip resistance

u_2 is the recorded dynamic pore pressure behind the tip (u_2 position)

a is the Net Area Ratio for the piezocone (0.8 for ConeTec probes)

The sleeve friction (f_s) is the frictional force on the sleeve divided by its surface area. As all ConeTec piezocones have equal end area friction sleeves, pore pressure corrections to the sleeve data are not required.

The dynamic pore pressure (u) is a measure of the pore pressures generated during cone penetration. To record equilibrium pore pressure, the penetration must be stopped to allow the dynamic pore pressures to stabilize. The rate at which this occurs is predominantly a function of the permeability of the soil and the diameter of the cone.

The friction ratio (R_f) is a calculated parameter. It is defined as the ratio of sleeve friction to the tip resistance expressed as a percentage. Generally, saturated cohesive soils have low tip resistance, high friction ratios and generate large excess pore water pressures. Cohesionless soils have higher tip resistances, lower friction ratios and do not generate significant excess pore water pressure.

A summary of the CPTu soundings along with test details and individual plots are provided in the appendices. A set of interpretation files were generated for each sounding based on published correlations and are provided in Excel format in the data release folder. Information regarding the interpretation methods used is also included in the data release folder.

For additional information on CPTu interpretations, refer to Robertson et al. (1986), Lunne et al. (1997), Robertson (2009), Mayne (2013, 2014) and Mayne and Peuchen (2012).

References

ASTM D5778-12, 2012, "Standard Test Method for Performing Electronic Friction Cone and Piezocone Penetration Testing of Soils", ASTM, West Conshohocken, US.

Lunne, T., Robertson, P.K. and Powell, J. J. M., 1997, "Cone Penetration Testing in Geotechnical Practice", Blackie Academic and Professional.

Mayne, P.W., 2013, "Evaluating yield stress of soils from laboratory consolidation and in-situ cone penetration tests", Sound Geotechnical Research to Practice (Holtz Volume) GSP 230, ASCE, Reston/VA: 406-420.

Mayne, P.W. and Peuchen, J., 2012, "Unit weight trends with cone resistance in soft to firm clays", Geotechnical and Geophysical Site Characterization 4, Vol. 1 (Proc. ISC-4, Pernambuco), CRC Press, London: 903-910.

Mayne, P.W., 2014, "Interpretation of geotechnical parameters from seismic piezocone tests", CPT'14 Keynote Address, Las Vegas, NV, May 2014.

Robertson, P.K., Campanella, R.G., Gillespie, D. and Greig, J., 1986, "Use of Piezometer Cone Data", Proceedings of InSitu 86, ASCE Specialty Conference, Blacksburg, Virginia.

Robertson, P.K., 1990, "Soil Classification Using the Cone Penetration Test", Canadian Geotechnical Journal, Volume 27: 151-158.

Robertson, P.K., 2009, "Interpretation of cone penetration tests – a unified approach", Canadian Geotechnical Journal, Volume 46: 1337-1355.

Shear wave velocity testing is performed in conjunction with the piezocone penetration test (SCPTu) in order to collect interval velocities. For some projects seismic compression wave (V_p) velocity is also determined.

ConeTec's piezocone penetrometers are manufactured with a horizontally active geophone (28 hertz) that is rigidly mounted in the body of the cone penetrometer, 0.2 meters behind the cone tip.

Shear waves are typically generated by using an impact hammer horizontally striking a beam that is held in place by a normal load. In some instances an auger source or an imbedded impulsive source maybe used for both shear waves and compression waves. The hammer and beam act as a contact trigger that triggers the recording of the seismic wave traces. For impulsive devices an accelerometer trigger may be used. The traces are recorded using an up-hole integrated digital oscilloscope which is part of the SCPTu data acquisition system. An illustration of the shear wave testing configuration is presented in Figure SCPTu-1.

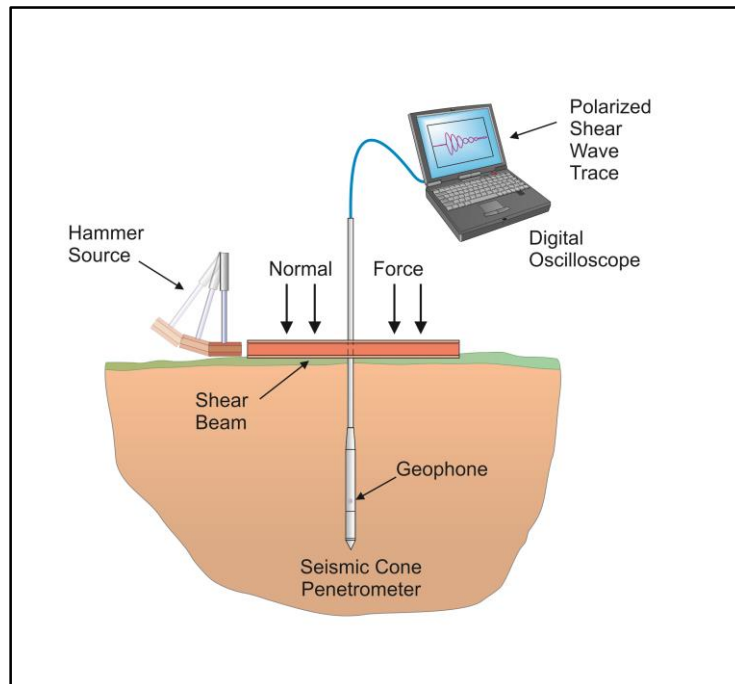


Figure SCPTu-1. Illustration of the SCPTu system

All testing is performed in accordance to ConeTec's SCPTu operating procedures.

Prior to the start of a SCPTu sounding, the procedures described in the Cone Penetration Test section are followed. In addition, the active axis of the geophone is aligned parallel to the beam (or source) and the horizontal offset between the cone and the source is measured and recorded.

Prior to recording seismic waves at each test depth, cone penetration is stopped and the rods are decoupled from the rig to avoid transmission of rig energy down the rods. Multiple wave traces are recorded for quality control purposes. After reviewing wave traces for consistency the cone is pushed to the next test depth (typically one meter intervals or as requested by the client). Figure SCPTu-2 presents an illustration of a SCPTu test.

For additional information on seismic cone penetration testing refer to Robertson et.al. (1986).

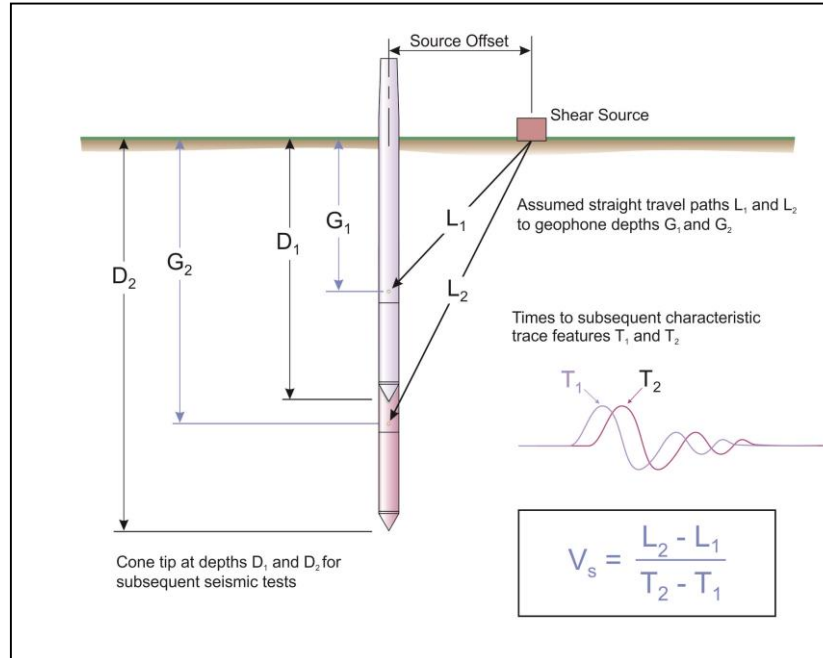


Figure SCPTu-2. Illustration of a seismic cone penetration test

Calculation of the interval velocities are performed by visually picking a common feature (e.g. the first characteristic peak, trough, or crossover) on all of the recorded wave sets and taking the difference in ray path divided by the time difference between subsequent features. Ray path is defined as the straight line distance from the seismic source to the geophone, accounting for beam offset, source depth and geophone offset from the cone tip.

The average shear wave velocity to a depth of 30 meters (V_{s30}) has been calculated and provided for all applicable soundings using an equation presented in Crow et al., 2012.

$$V_{s30} = \frac{\text{total thickness of all layers (30m)}}{\sum(\text{layer traveltimes})}$$

The layer travel times refers to the travel times propagating in the vertical direction, not the measured travel times from an offset source.

Tabular results and SCPTu plots are presented in the relevant appendix.

References

Crow, H.L., Hunter, J.A., Bobrowsky, P.T., 2012, "National shear wave measurement guidelines for Canadian seismic site assessment", GeoManitoba 2012, Sept 30 to Oct 2, Winnipeg, Manitoba.

Robertson, P.K., Campanella, R.G., Gillespie D and Rice, A., 1986, "Seismic CPT to Measure In-Situ Shear Wave Velocity", Journal of Geotechnical Engineering ASCE, Vol. 112, No. 8: 791-803.

The cone penetration test is halted at specific depths to carry out pore pressure dissipation (PPD) tests, shown in Figure PPD-1. For each dissipation test the cone and rods are decoupled from the rig and the data acquisition system measures and records the variation of the pore pressure (u) with time (t).

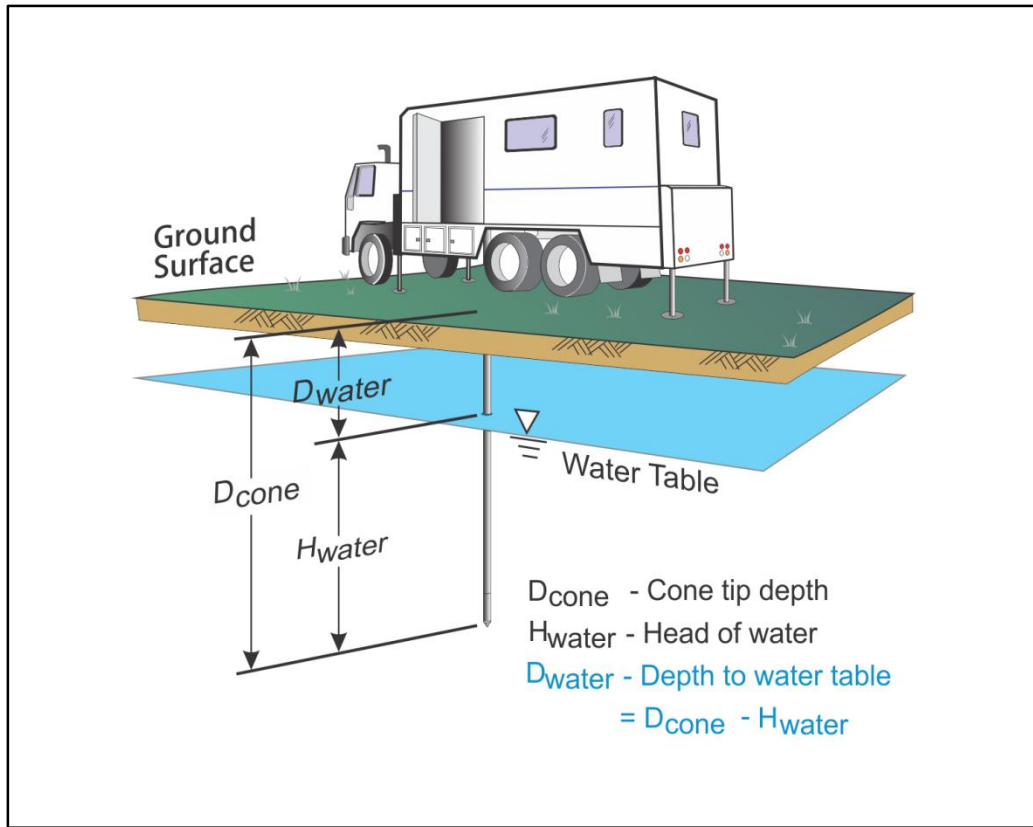


Figure PPD-1. Pore pressure dissipation test setup

Pore pressure dissipation data can be interpreted to provide estimates of ground water conditions, permeability, consolidation characteristics and soil behaviour.

The typical shapes of dissipation curves shown in Figure PPD-2 are very useful in assessing soil type, drainage, in situ pore pressure and soil properties. A flat curve that stabilizes quickly is typical of a freely draining sand. Undrained soils such as clays will typically show positive excess pore pressure and have long dissipation times. Dilative soils will often exhibit dynamic pore pressures below equilibrium that then rise over time. Overconsolidated fine-grained soils will often exhibit an initial dilatory response where there is an initial rise in pore pressure before reaching a peak and dissipating.

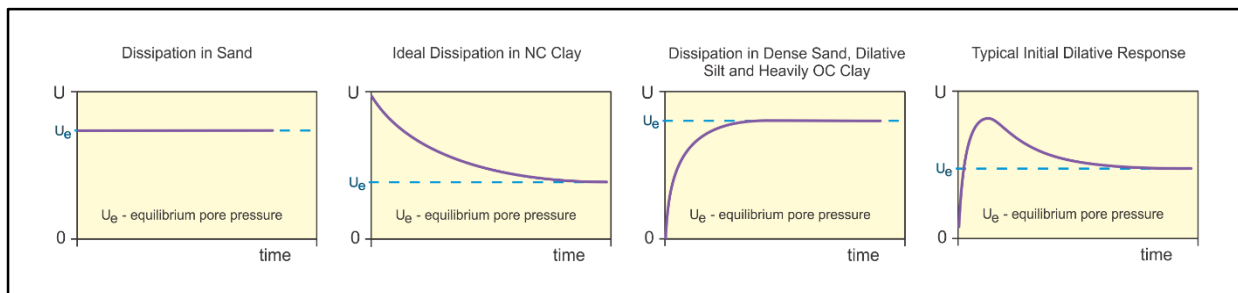


Figure PPD-2. Pore pressure dissipation curve examples

In order to interpret the equilibrium pore pressure (u_{eq}) and the apparent phreatic surface, the pore pressure should be monitored until such time as there is no variation in pore pressure with time as shown for each curve of Figure PPD-2.

In fine grained deposits the point at which 100% of the excess pore pressure has dissipated is known as t_{100} . In some cases this can take an excessive amount of time and it may be impractical to take the dissipation to t_{100} . A theoretical analysis of pore pressure dissipations by Teh and Houlsby (1991) showed that a single curve relating degree of dissipation versus theoretical time factor (T^*) may be used to calculate the coefficient of consolidation (c_h) at various degrees of dissipation resulting in the expression for c_h shown below.

$$c_h = \frac{T^* \cdot a^2 \cdot \sqrt{I_r}}{t}$$

Where:

- T^* is the dimensionless time factor (Table Time Factor)
- a is the radius of the cone
- I_r is the rigidity index
- t is the time at the degree of consolidation

Table Time Factor. T^* versus degree of dissipation (Teh and Houlsby, 1991)

Degree of Dissipation (%)	20	30	40	50	60	70	80
$T^* (u_2)$	0.038	0.078	0.142	0.245	0.439	0.804	1.60

The coefficient of consolidation is typically analyzed using the time (t_{50}) corresponding to a degree of dissipation of 50% (u_{50}). In order to determine t_{50} , dissipation tests must be taken to a pressure less than u_{50} . The u_{50} value is half way between the initial maximum pore pressure and the equilibrium pore pressure value, known as u_{100} . To estimate u_{50} , both the initial maximum pore pressure and u_{100} must be known or estimated. Other degrees of dissipations may be considered, particularly for extremely long dissipations.

At any specific degree of dissipation the equilibrium pore pressure (u at t_{100}) must be estimated at the depth of interest. The equilibrium value may be determined from one or more sources such as measuring the value directly (u_{100}), estimating it from other dissipations in the same profile, estimating the phreatic surface and assuming hydrostatic conditions, from nearby soundings, from client provided information, from site observations and/or past experience, or from other site instrumentation.

For calculations of c_h (Teh and Houlsby, 1991), t_{50} values are estimated from the corresponding pore pressure dissipation curve and a rigidity index (I_r) is assumed. For curves having an initial dilatatory response in which an initial rise in pore pressure occurs before reaching a peak, the relative time from the peak value is used in determining t_{50} . In cases where the time to peak is excessive, t_{50} values are not calculated.

Due to possible inherent uncertainties in estimating I_r , the equilibrium pore pressure and the effect of an initial dilatatory response on calculating t_{50} , other methods should be applied to confirm the results for c_h .

Additional published methods for estimating the coefficient of consolidation from a piezocone test are described in Burns and Mayne (1998, 2002), Jones and Van Zyl (1981), Robertson et al. (1992) and Sully et al. (1999).

A summary of the pore pressure dissipation tests and dissipation plots are presented in the relevant appendix.

References

Burns, S.E. and Mayne, P.W., 1998, "Monotonic and dilatatory pore pressure decay during piezocone tests", Canadian Geotechnical Journal 26 (4): 1063-1073.

Burns, S.E. and Mayne, P.W., 2002, "Analytical cavity expansion-critical state model cone dissipation in fine-grained soils", Soils & Foundations, Vol. 42(2): 131-137.

Jones, G.A. and Van Zyl, D.J.A., 1981, "The piezometer probe: a useful investigation tool", Proceedings, 10th International Conference on Soil Mechanics and Foundation Engineering, Vol. 3, Stockholm: 489-495.

Robertson, P.K., Sully, J.P., Woeller, D.J., Lunne, T., Powell, J.J.M. and Gillespie, D.G., 1992, "Estimating coefficient of consolidation from piezocone tests", Canadian Geotechnical Journal, 29(4): 551-557.

Sully, J.P., Robertson, P.K., Campanella, R.G. and Woeller, D.J., 1999, "An approach to evaluation of field CPTU dissipation data in overconsolidated fine-grained soils", Canadian Geotechnical Journal, 36(2): 369-381.

Teh, C.I., and Houlsby, G.T., 1991, "An analytical study of the cone penetration test in clay", Geotechnique, 41(1): 17-34.

The appendices listed below are included in the report:

- Cone Penetration Test Summary and Standard Cone Penetration Test Plots
- Expanded Range Cone Penetration Test Plots
- Advanced Cone Penetration Test Plots
- Seismic Cone Penetration Test Plots
- Seismic Cone Penetration Test Tabular Results
- Seismic Cone Penetration Test Time Domain Traces
- Soil Behaviour Type (SBT) Scatter Plots
- Pore Pressure Dissipation Summary and Pore Pressure Dissipation Plots

Cone Penetration Test Summary and Standard Cone Penetration Test Plots

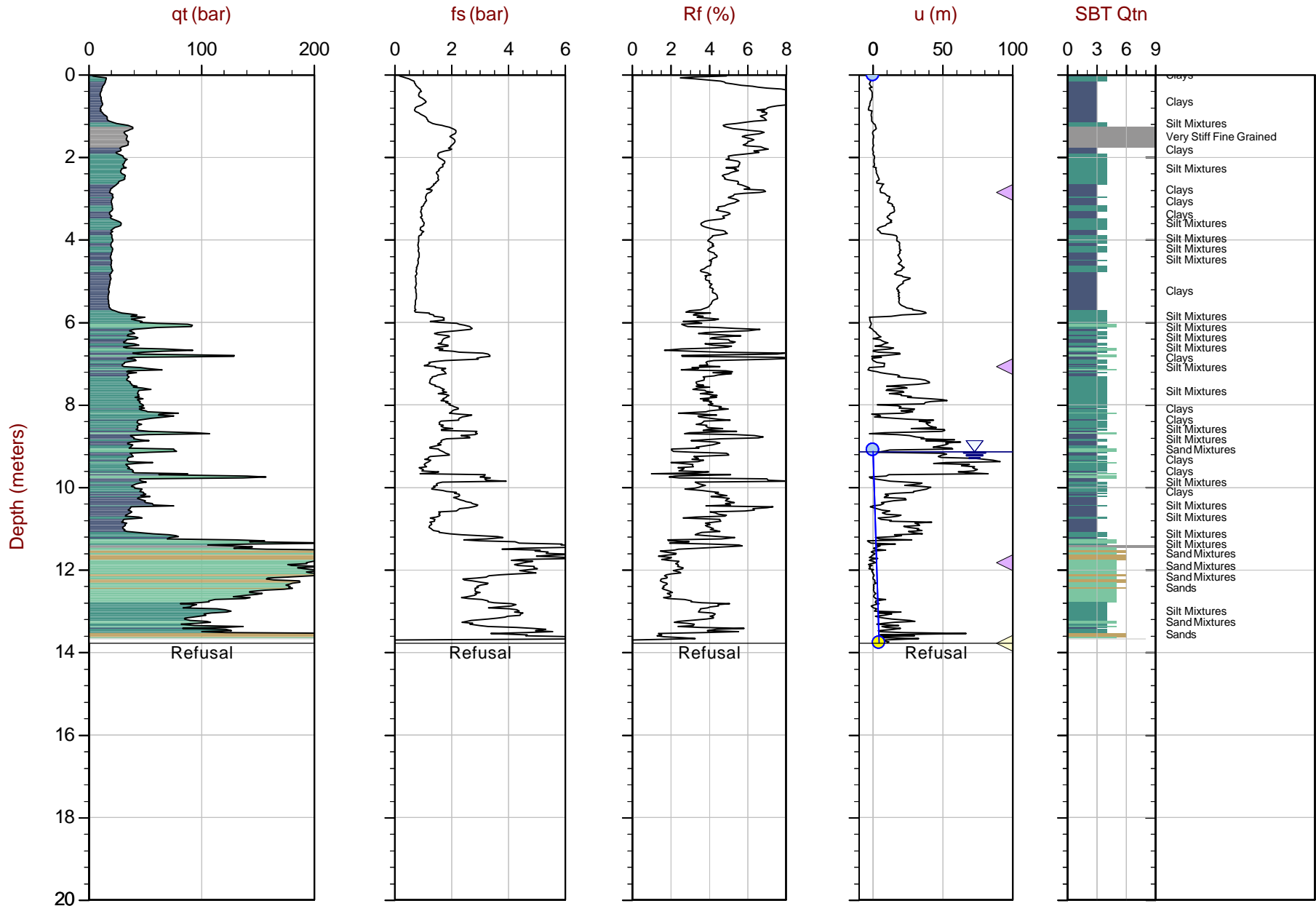


Job No: 18-03010
Client: Stantec Consulting Ltd.
Project: Val Vista Ranch, Springbank, AB
Start Date: 01-May-2018
End Date: 03-May-2018

CONE PENETRATION TEST SUMMARY

Sounding ID	File Name	Date	Cone	Assumed Phreatic Surface ¹ (m)	Final Depth (m)	Northing ² (m)	Easting (m)	Refer to Notation Number
SCPT18-01	18-03010_SP01	02-May-2018	329:T1500F15U500	9.1	13.775	5658948	681169	
SCPT18-03	18-03010_SP03	01-May-2018	329:T1500F15U500	7.0	11.775	5658895	681239	
SCPT18-05	18-03010_SP05	01-May-2018	316:T1500F15U500	12.0	16.425	5658729	681401	3
SCPT18-10	18-03010_SP10	03-May-2018	329:T1500F15U500	6.6	17.725	5659199	681359	
SCPT18-12	18-03010_SP12	02-May-2018	329:T1500F15U500	8.8	9.775	5659173	681437	
SCPT18-15	18-03010_SP15	02-May-2018	329:T1500F15U500		9.500	5659078	681526	4

1. The assumed phreatic surface was based on pore pressure dissipation tests, unless otherwise noted. Hydrostatic conditions were assumed for the calculated parameters.
2. Coordinates were acquired using consumer grade GPS equipment in datum WGS1984/UTM Zone 11 North.
3. The assumed phreatic surface was based dynamic pore pressure.
4. No phreatic surface detected



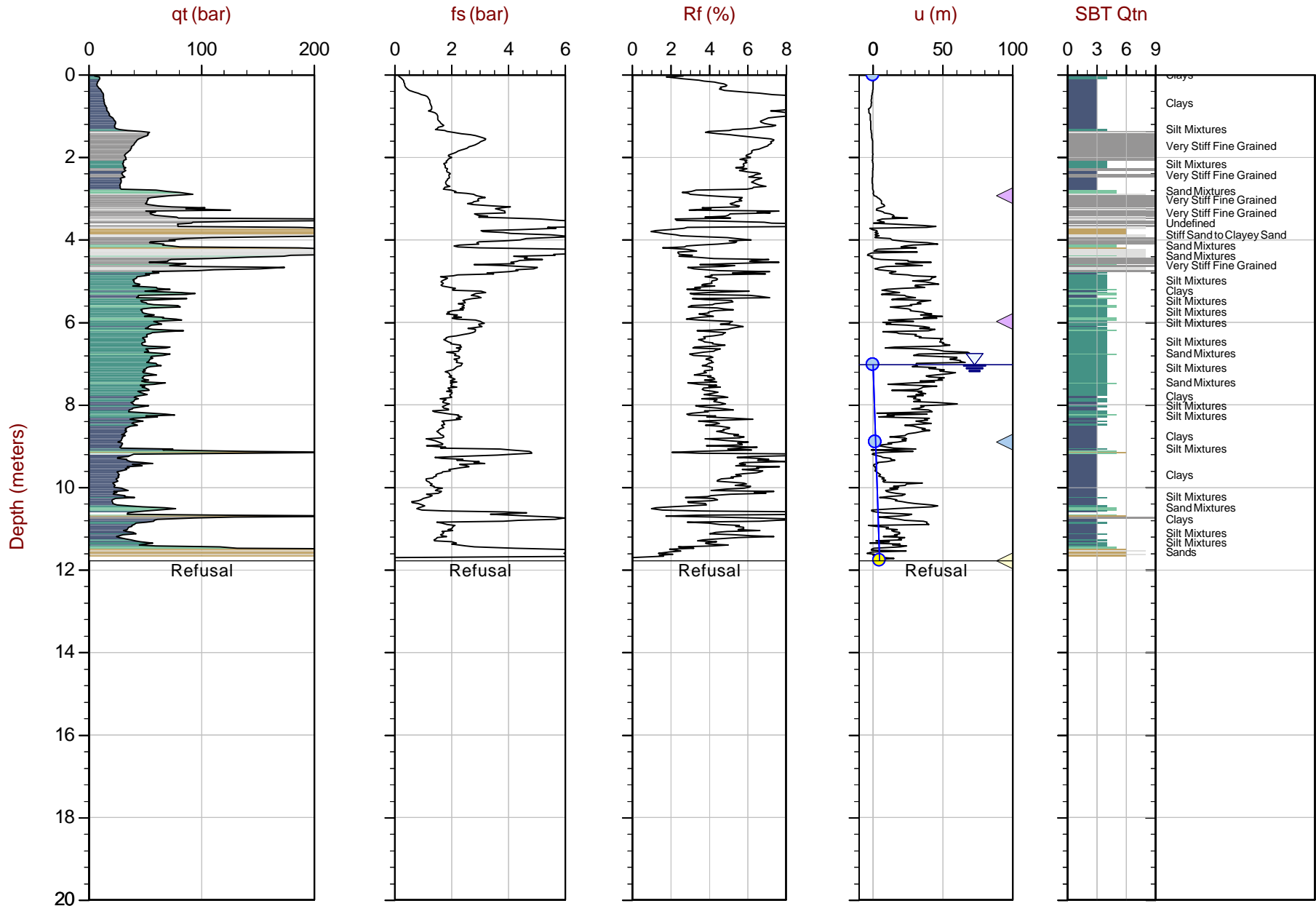
Max Depth: 13.775 m / 45.19 ft
 Depth Inc: 0.025 m / 0.082 ft
 Avg Int: Every Point

File: 18-03010_SP01.COR
 Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
 Coords: UTM Zone 11 N: 5658948m E: 681169m
 Sheet No: 1 of 1

Overplot Item: ● Ueq ● Assumed Ueq ▲ Dissipation, Ueq not achieved — Hydrostatic Line

The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



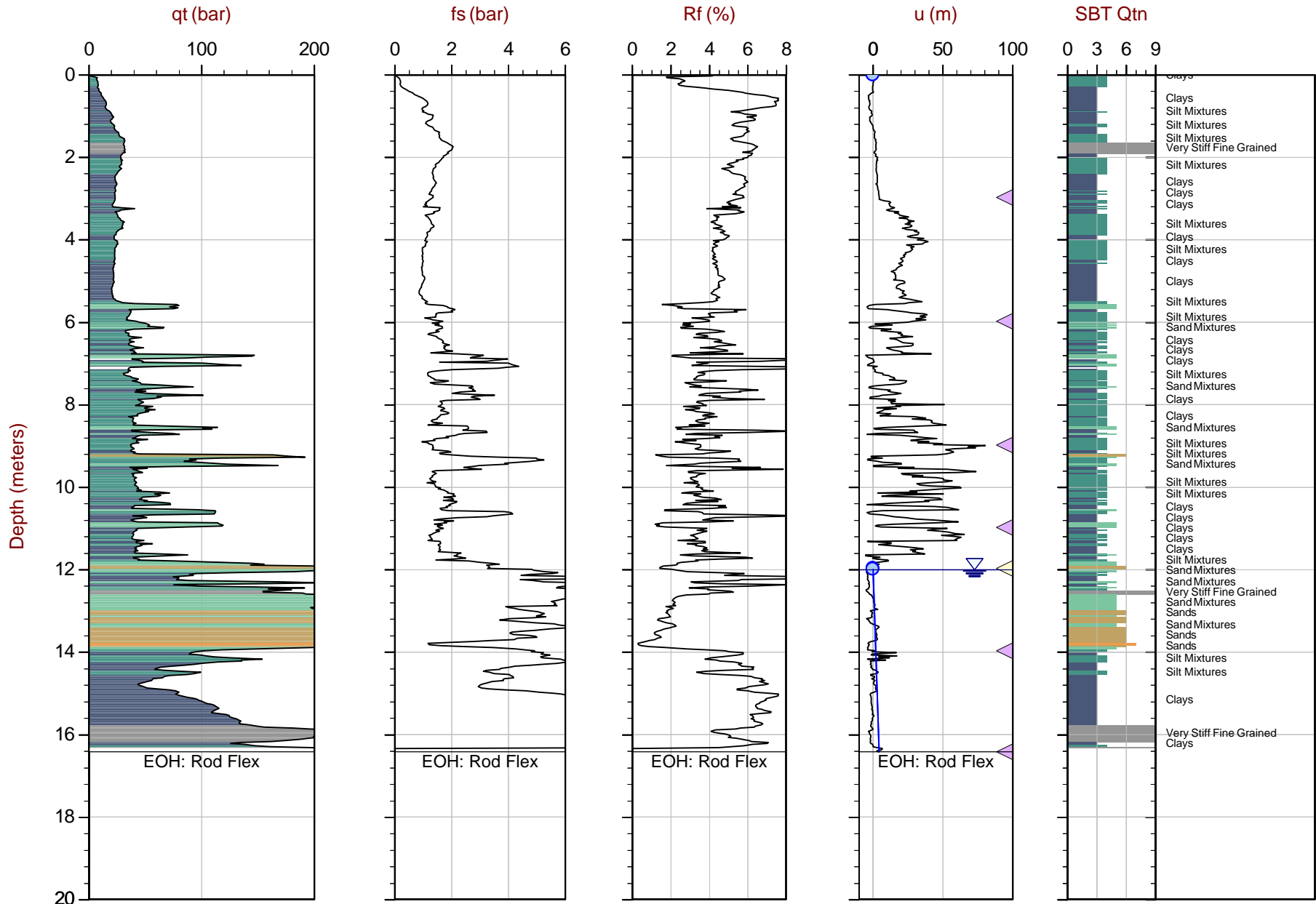
Max Depth: 11.775 m / 38.63 ft
 Depth Inc: 0.025 m / 0.082 ft
 Avg Int: EveryPoint

File: 18-03010_SP03.COR
 Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
 Coords: UTM Zone 11 N: 5658895m E: 681239m
 Sheet No: 1 of 1

Overplot Item: ● Ueq ● Assumed Ueq ▲ Dissipation, Ueq not achieved — Hydrostatic Line

The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



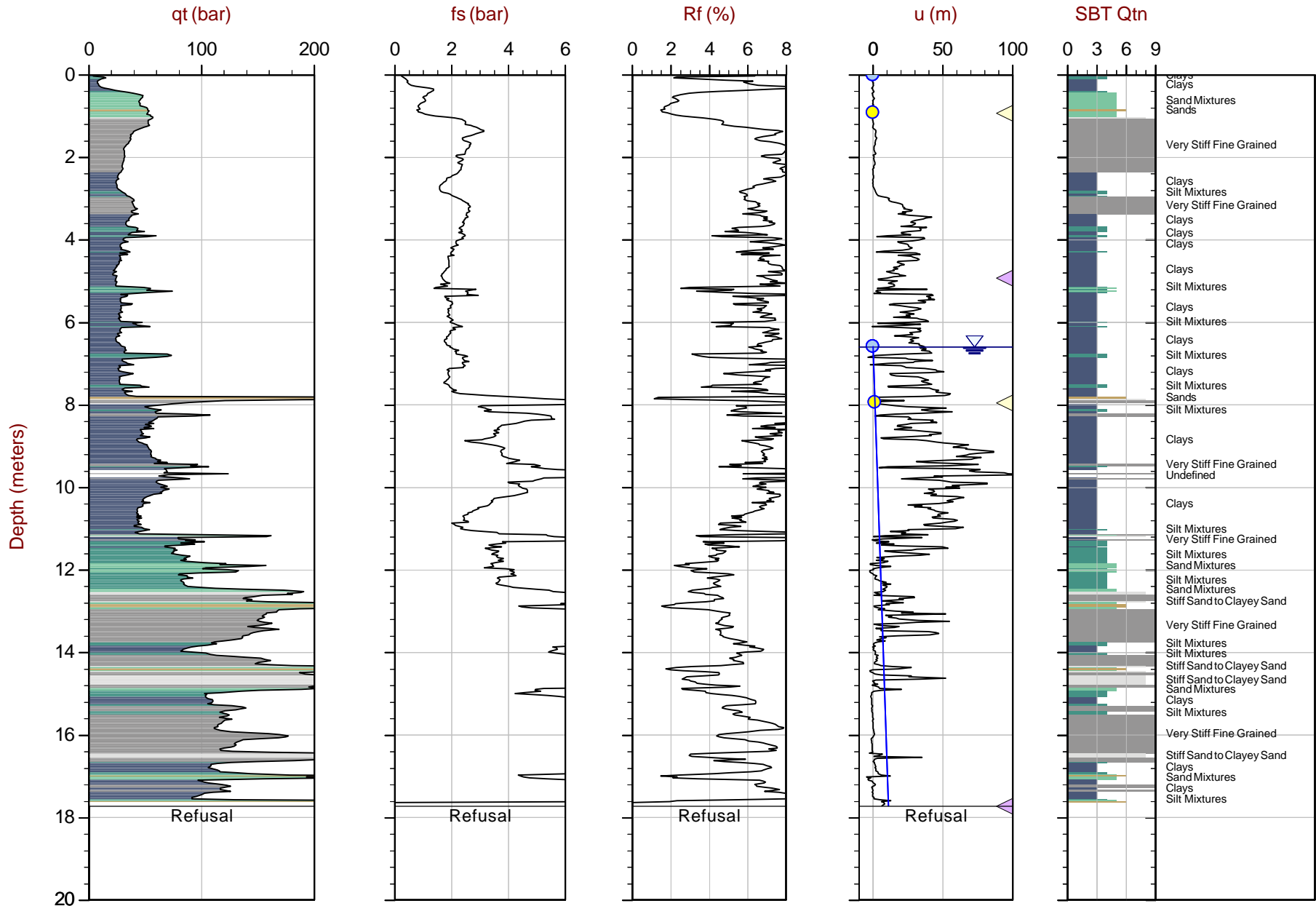
Max Depth: 16.425 m / 53.89 ft
 Depth Inc: 0.025 m / 0.082 ft
 Avg Int: EveryPoint

File: 18-03010_SP05.COR
 Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
 Coords: UTM Zone 11 N: 5658729m E: 681401m
 Sheet No: 1 of 1

Overplot Item: ● Ueq ● Assumed Ueq ▲ Dissipation, Ueq not achieved — Hydrostatic Line

The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Max Depth: 17.725 m / 58.15 ft

Depth Inc: 0.025 m / 0.082 ft

Avg Int: EveryPoint

Overplot Item: ● Ueq ● Assumed Ueq ▲ Dissipation, Ueq not achieved — Hydrostatic Line

File: 18-03010_SP10.COR

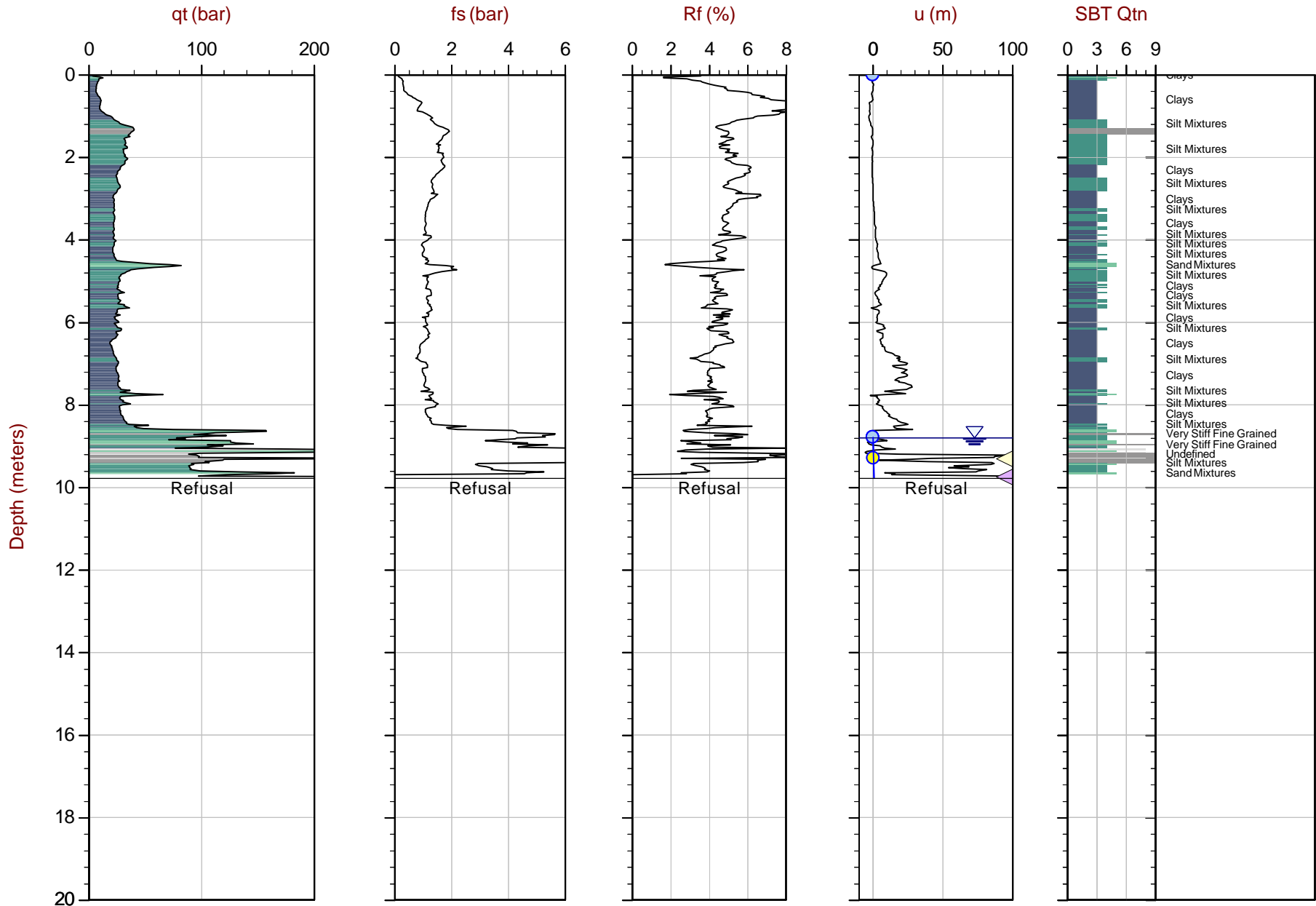
Unit Wt: SBTQtn(PKR2009)

SBT: Robertson, 2009 and 2010

Coords: UTM Zone 11 N: 5659199m E: 681359m

Sheet No: 1 of 1

The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



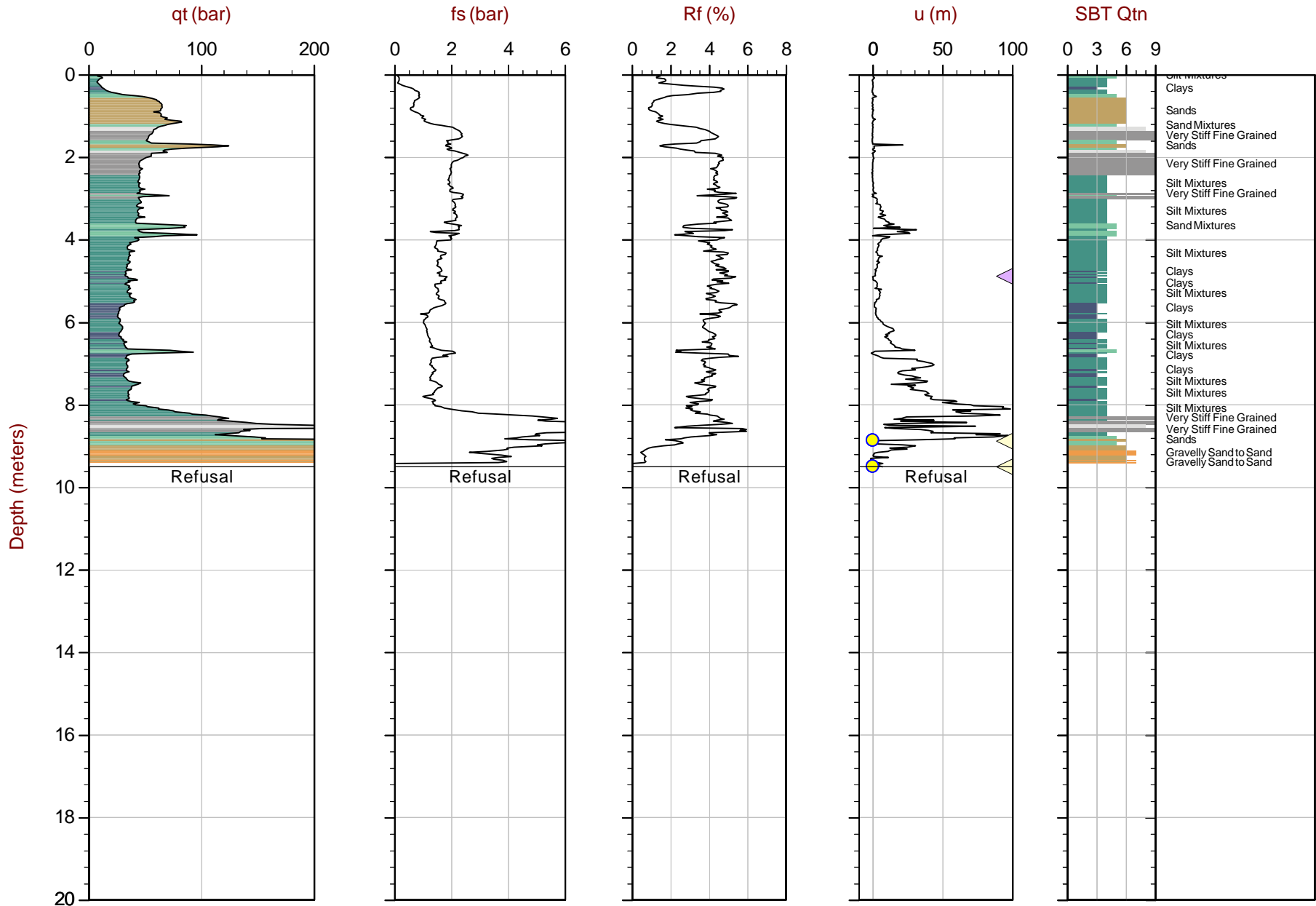
Max Depth: 9.775 m / 32.07 ft
 Depth Inc: 0.025 m / 0.082 ft
 Avg Int: Every Point

File: 18-03010_SP12.COR
 Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
 Coords: UTM Zone 11 N: 5659173m E: 681437m
 Sheet No: 1 of 1

Overplot Item: ● Ueq ● Assumed Ueq ▲ Dissipation, Ueq not achieved — Hydrostatic Line

The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Max Depth: 9.500 m / 31.17 ft
 Depth Inc: 0.025 m / 0.082 ft
 Avg Int: Every Point

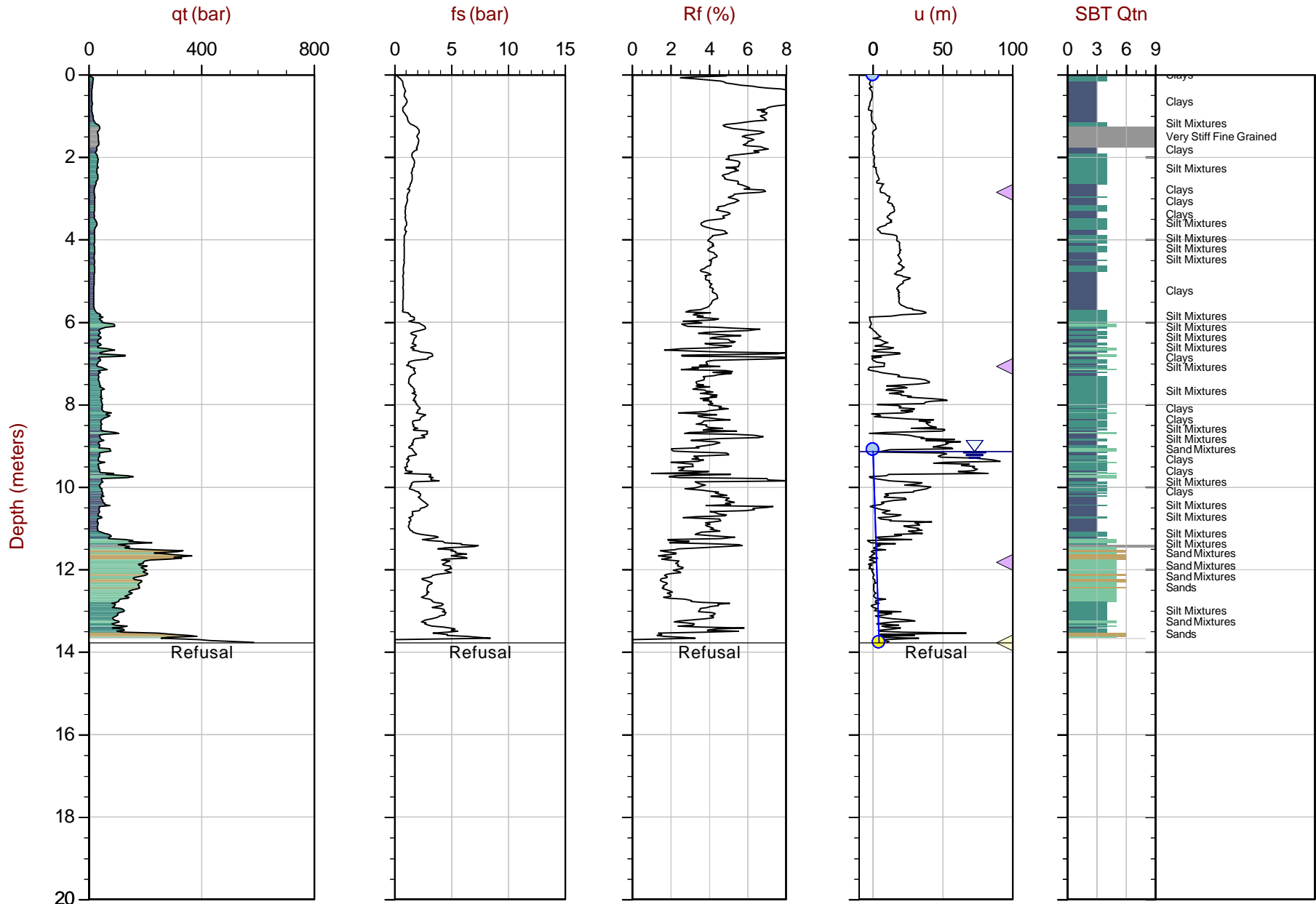
File: 18-03010_SP15.COR
 Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
 Coords: UTM Zone 11 N: 5659078m E: 681526m
 Sheet No: 1 of 1

Overplot Item: ● Ueq ● Assumed Ueq ▲ Dissipation, Ueq not achieved — Hydrostatic Line

The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

Expanded Range Cone Penetration Test Plots



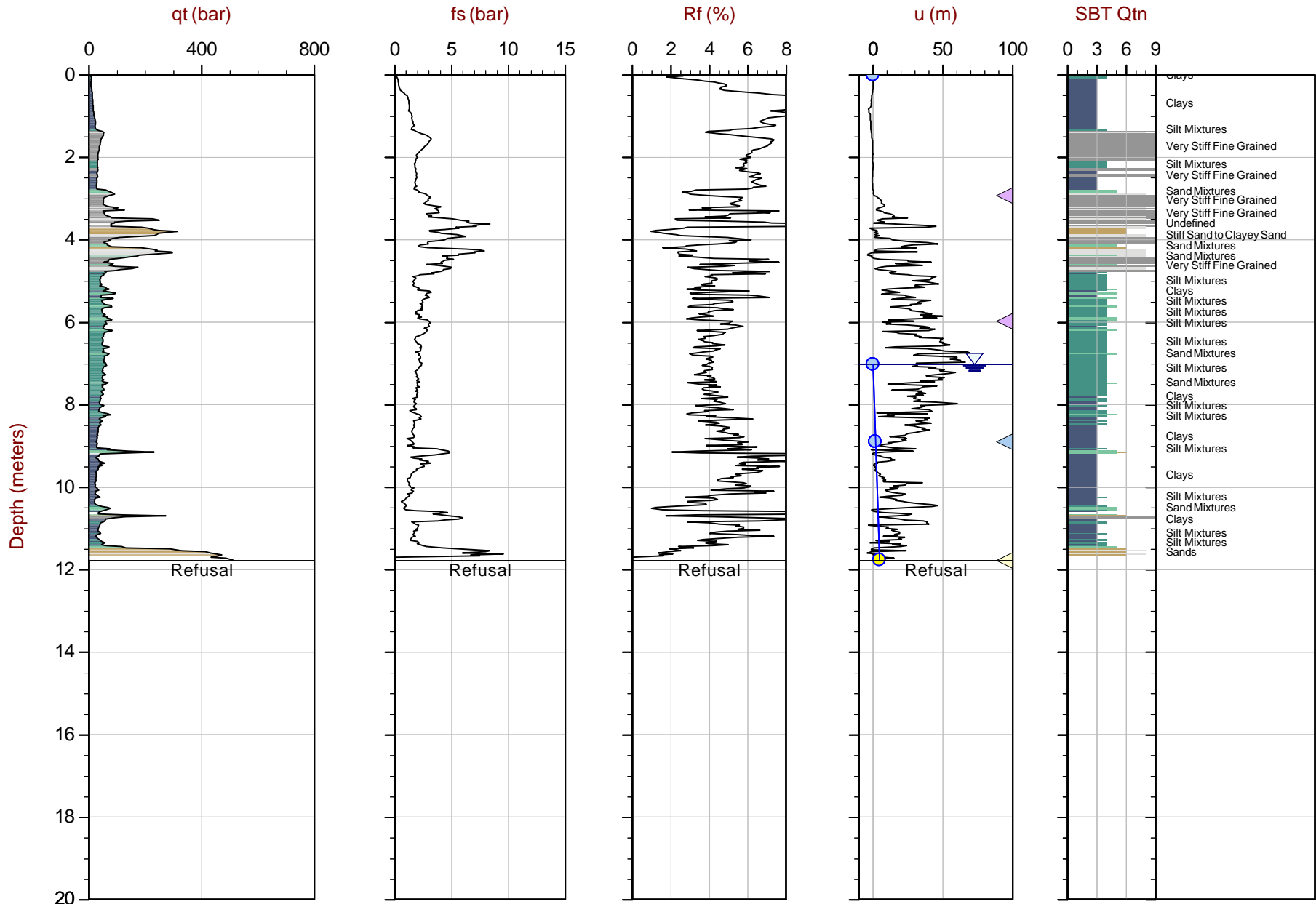
Max Depth: 13.775 m / 45.19 ft
 Depth Inc: 0.025 m / 0.082 ft
 Avg Int: Every Point

File: 18-03010_SP01.COR
 Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
 Coords: UTM Zone 11 N: 5658948m E: 681169m
 Sheet No: 1 of 1

Overplot Item: ● Ueq ● Assumed Ueq ▲ Dissipation, Ueq not achieved — Hydrostatic Line

The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



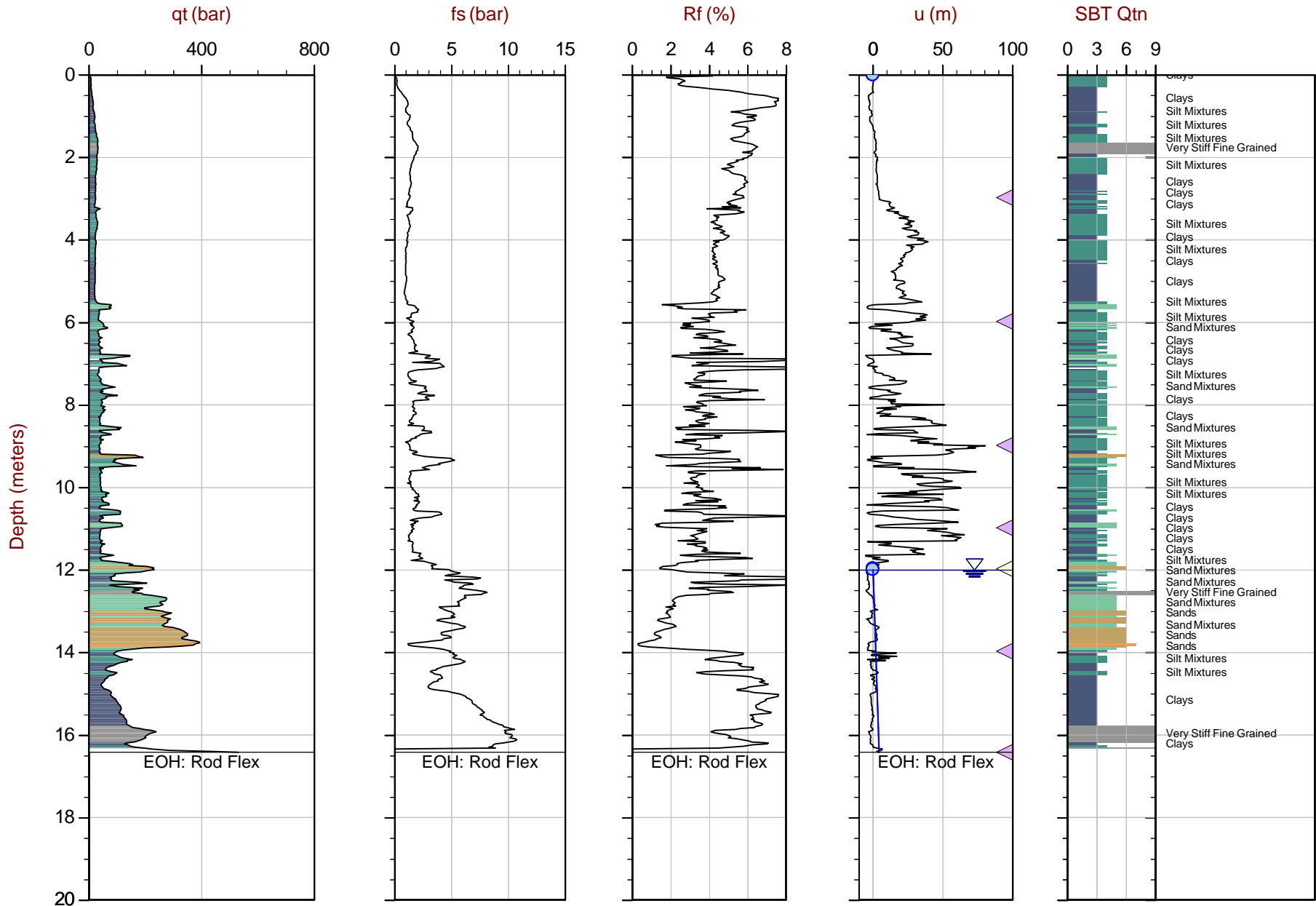
Max Depth: 11.775 m / 38.63 ft
 Depth Inc: 0.025 m / 0.082 ft
 Avg Int: Every Point

File: 18-03010_SP03.COR
 Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
 Coords: UTM Zone 11 N: 5658895m E: 681239m
 Sheet No: 1 of 1

Overplot Item: ● Ueq ● Assumed Ueq ▲ Dissipation, Ueq not achieved — Hydrostatic Line

The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



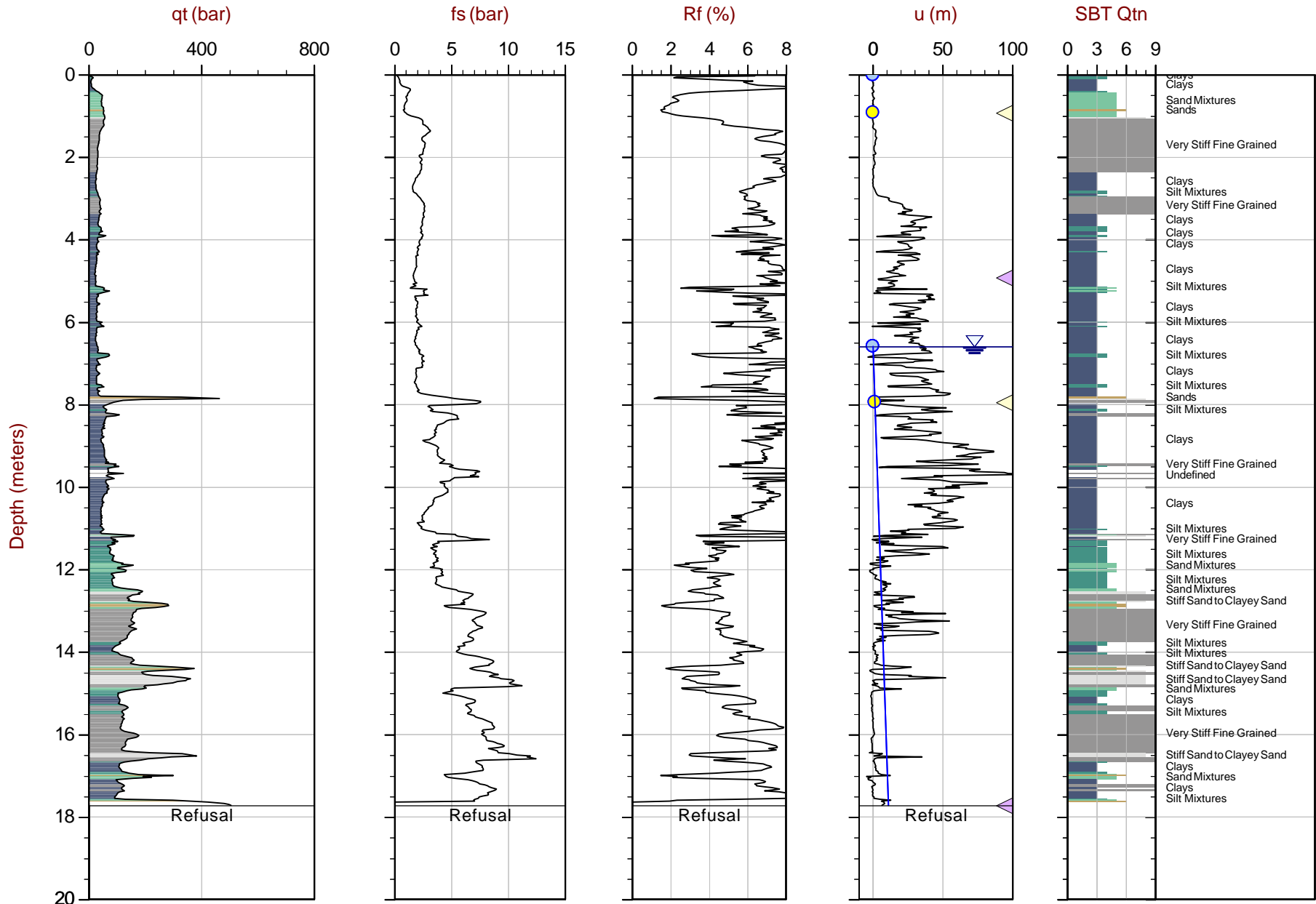
Max Depth: 16.425 m / 53.89 ft
 Depth Inc: 0.025 m / 0.082 ft
 Avg Int: Every Point

File: 18-03010_SP05.COR
 Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
 Coords: UTM Zone 11 N: 5658729m E: 681401m
 Sheet No: 1 of 1

Overplot Item: ● Ueq ● Assumed Ueq ▲ Dissipation, Ueq not achieved — Hydrostatic Line

The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



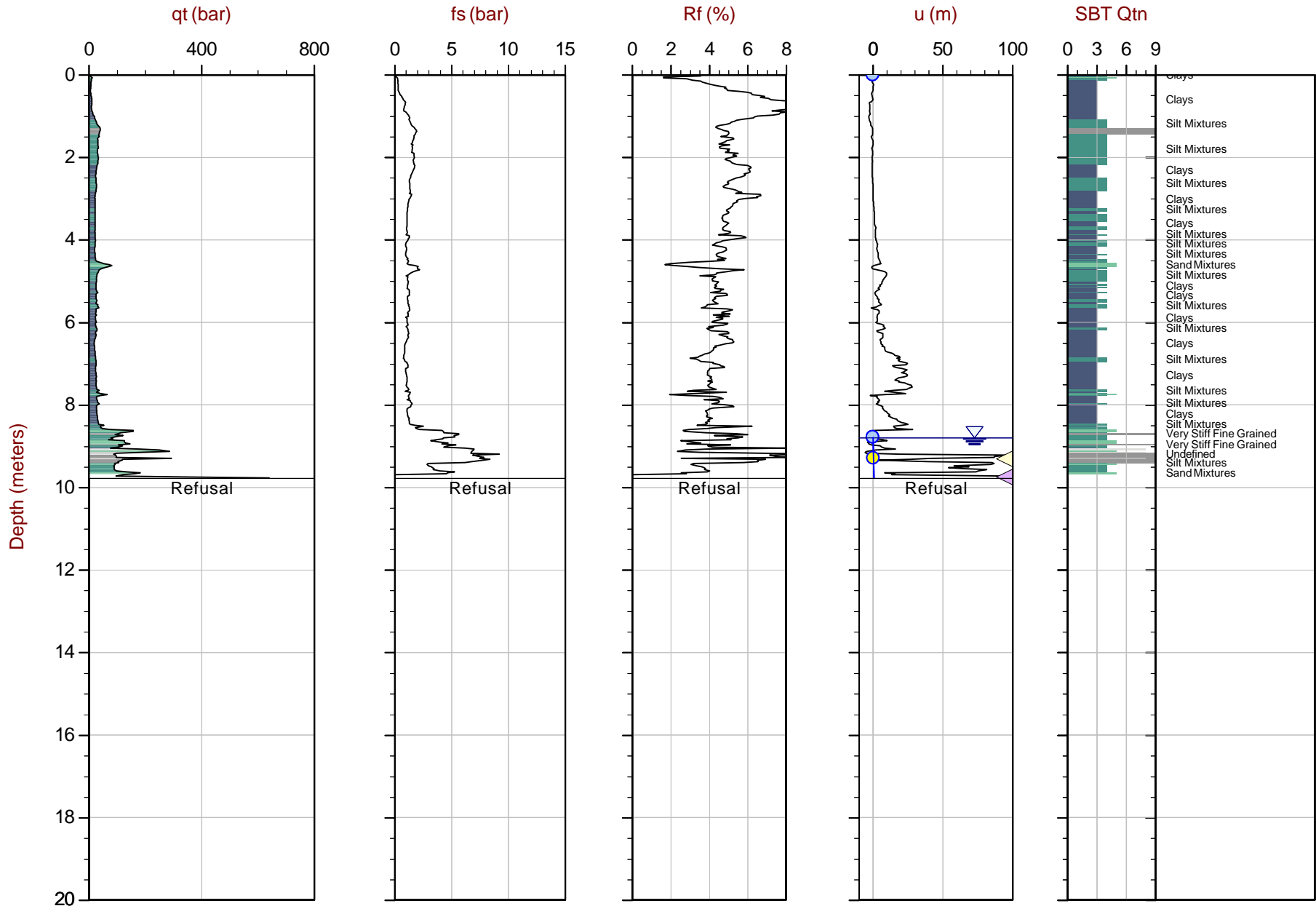
Max Depth: 17.725 m / 58.15 ft
 Depth Inc: 0.025 m / 0.082 ft
 Avg Int: Every Point

File: 18-03010_SP10.COR
 Unit Wt: SBTQtn(PKR2009)

SBT: Robertson, 2009 and 2010
 Coords: UTM Zone 11 N: 5659199m E: 681359m
 Sheet No: 1 of 1

Overplot Item: ● Ueq ● Assumed Ueq ▲ Dissipation, Ueq not achieved — Hydrostatic Line

The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



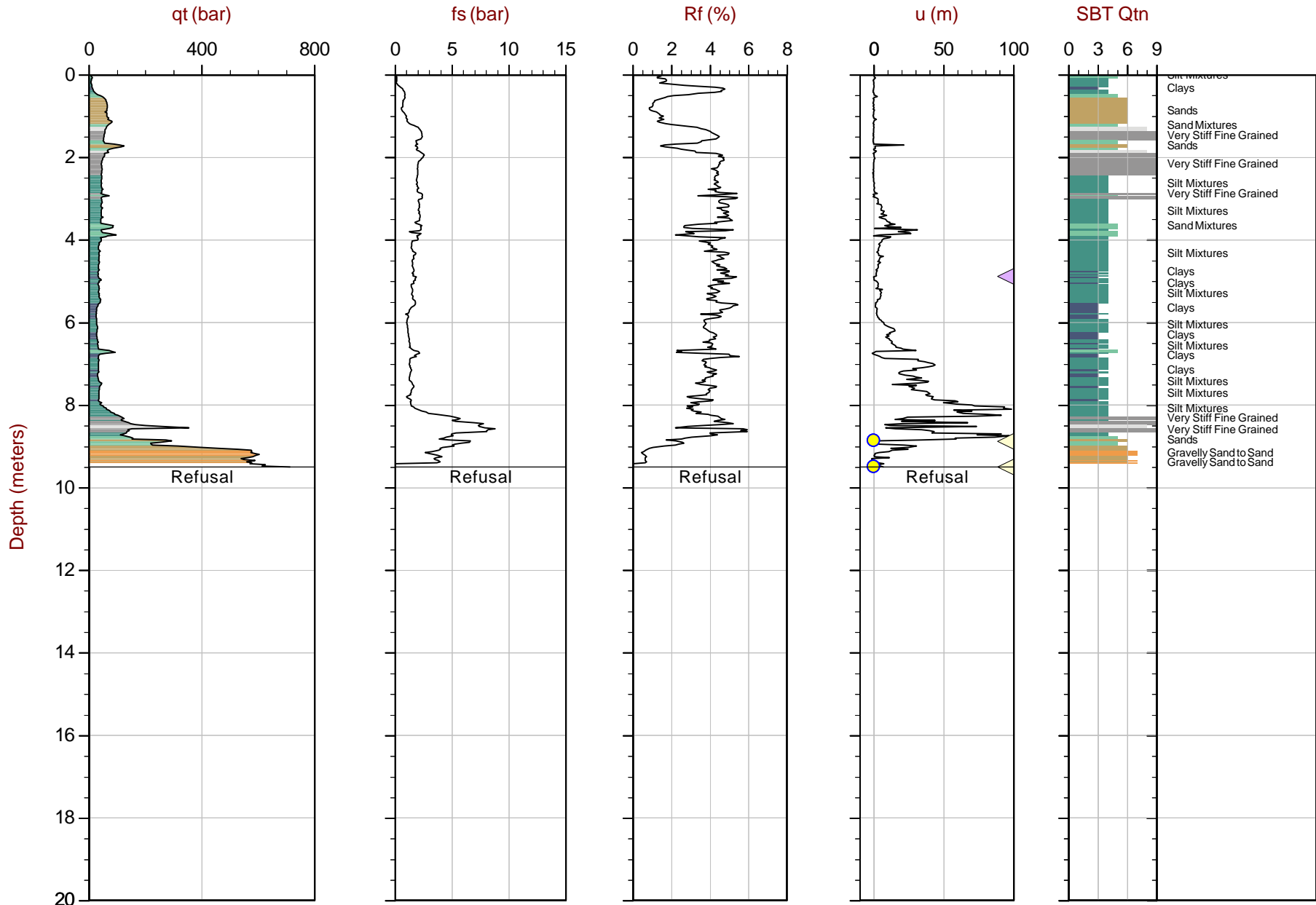
Max Depth: 9.775 m / 32.07 ft
 Depth Inc: 0.025 m / 0.082 ft
 Avg Int: Every Point

File: 18-03010_SP12.COR
 Unit Wt: SBTQtn(PKR2009)

SBT: Robertson, 2009 and 2010
 Coords: UTM Zone 11 N: 5659173m E: 681437m
 Sheet No: 1 of 1

Overplot Item: ● Ueq ● Assumed Ueq ▲ Dissipation, Ueq not achieved — Hydrostatic Line

The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Max Depth: 9.500 m / 31.17 ft
 Depth Inc: 0.025 m / 0.082 ft
 Avg Int: Every Point

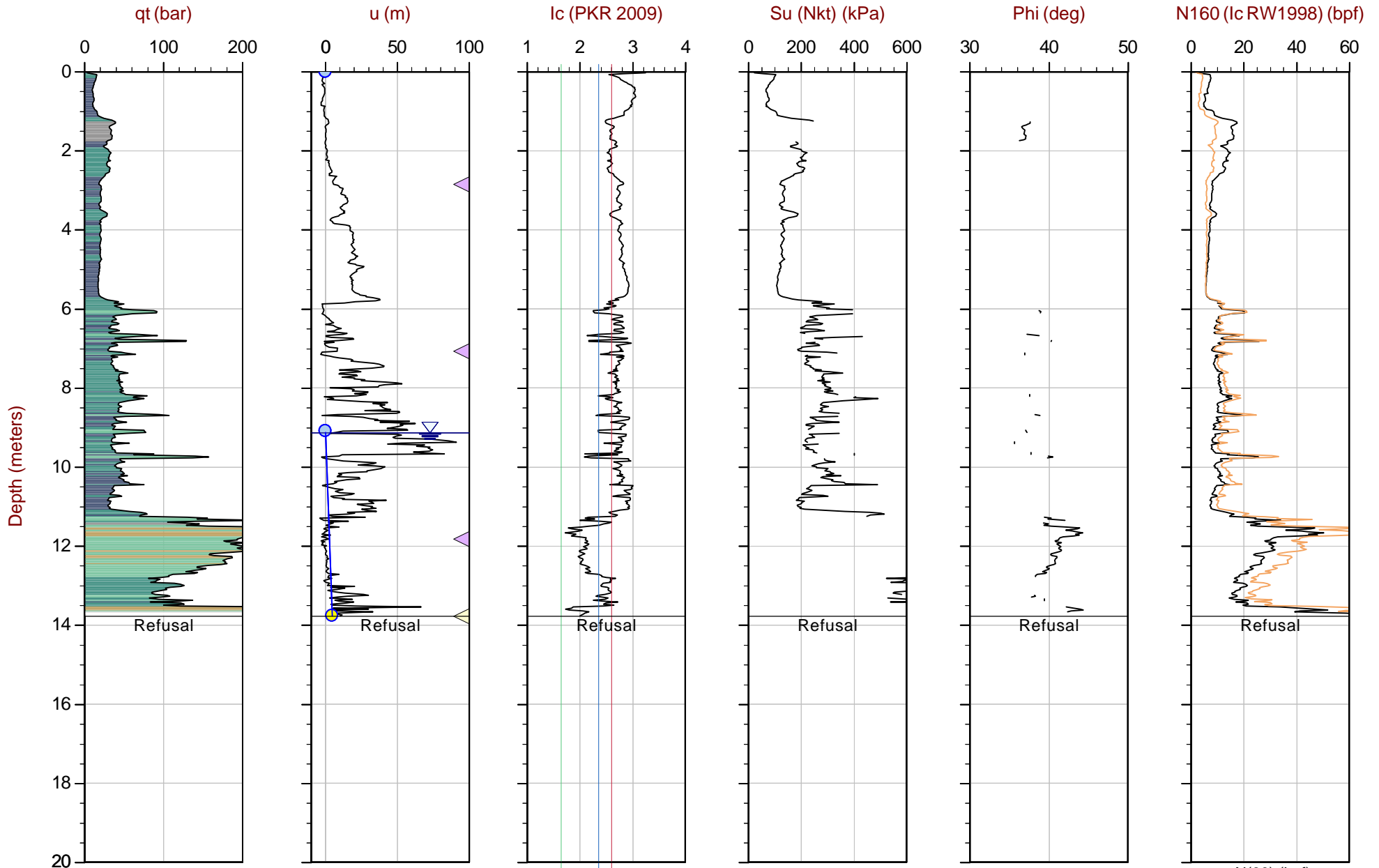
File: 18-03010_SP15.COR
 Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
 Coords: UTM Zone 11 N: 5659078m E: 681526m
 Sheet No: 1 of 1

Overplot Item: ● Ueq ● Assumed Ueq ◀ Dissipation, Ueq not achieved — Hydrostatic Line

The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

Advanced Cone Penetration Test Plots



Max Depth: 13.775 m / 45.19 ft

Depth Inc: 0.025 m / 0.082 ft

Avg Int: EveryPoint

Overplot Item: ● Ueq ● Assumed Ueq

File: 18-03010_SP01.COR

Unit Wt: SBTQtn(PKR2009)

Su Nkt: 15.0

▲ Dissipation, Ueq not achieved

— Hydrostatic Line

SBT: Robertson, 2009 and 2010

Coords: UTM Zone 11 N: 5658948m E: 681169m

Sheet No: 1 of 1

The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Stantec

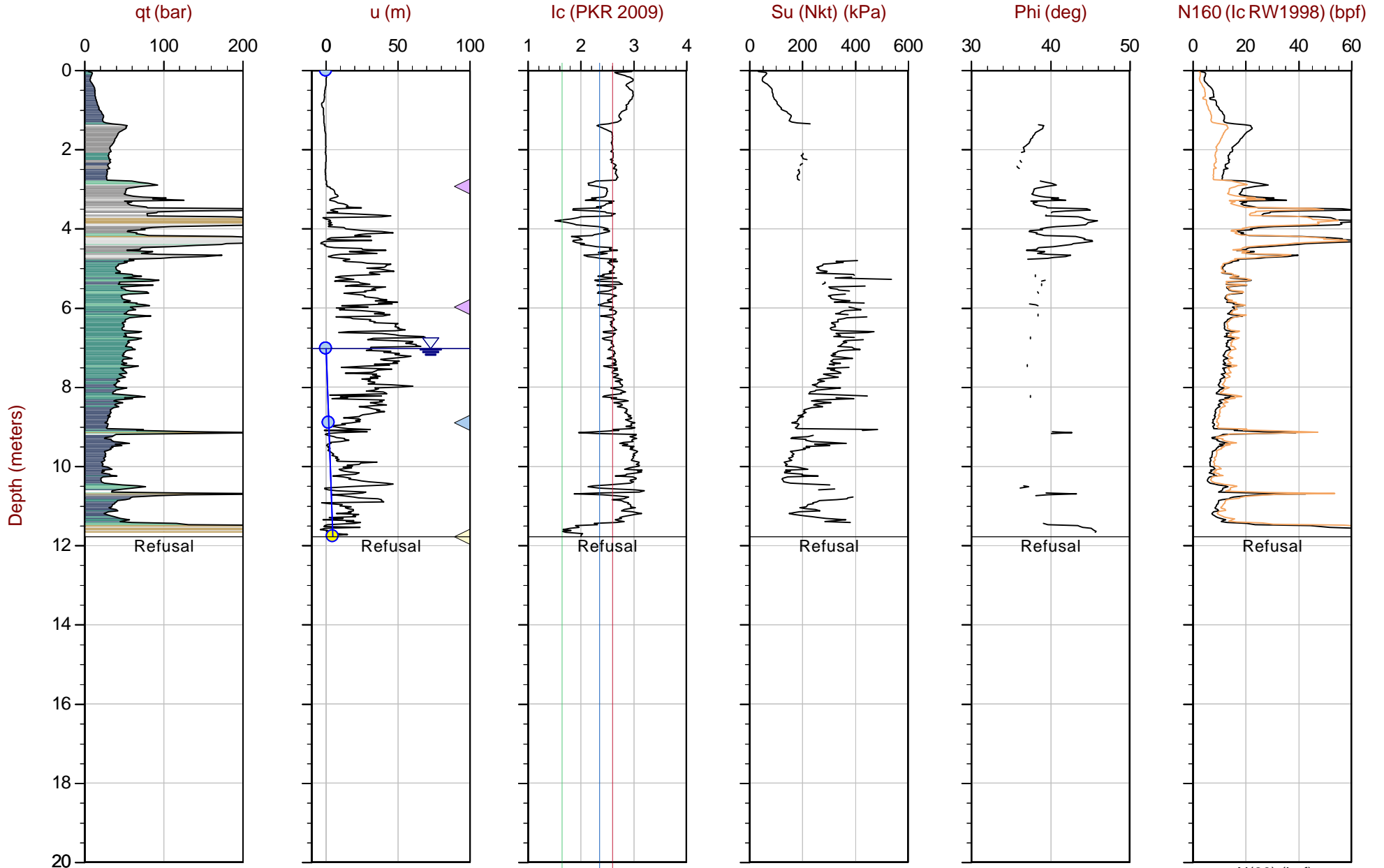
Job No: 18-03010

Date: 2018-05-01 14:45

Site: Val Vista Ranch, Springbank, AB

Sounding: SCPT18-03

Cone: 329:T1500F15U500



Max Depth: 11.775 m / 38.63 ft

Depth Inc: 0.025 m / 0.082 ft

Avg Int: EveryPoint

Overplot Item: ● Ueq ● Assumed Ueq

File: 18-03010_SP03.COR

Unit Wt: SBTQtn(PKR2009)

Su Nkt: 15.0

▲ Dissipation, Ueq not achieved

— Hydrostatic Line

SBT: Robertson, 2009 and 2010

Coords: UTM Zone 11 N: 5658895m E: 681239m

Sheet No: 1 of 1

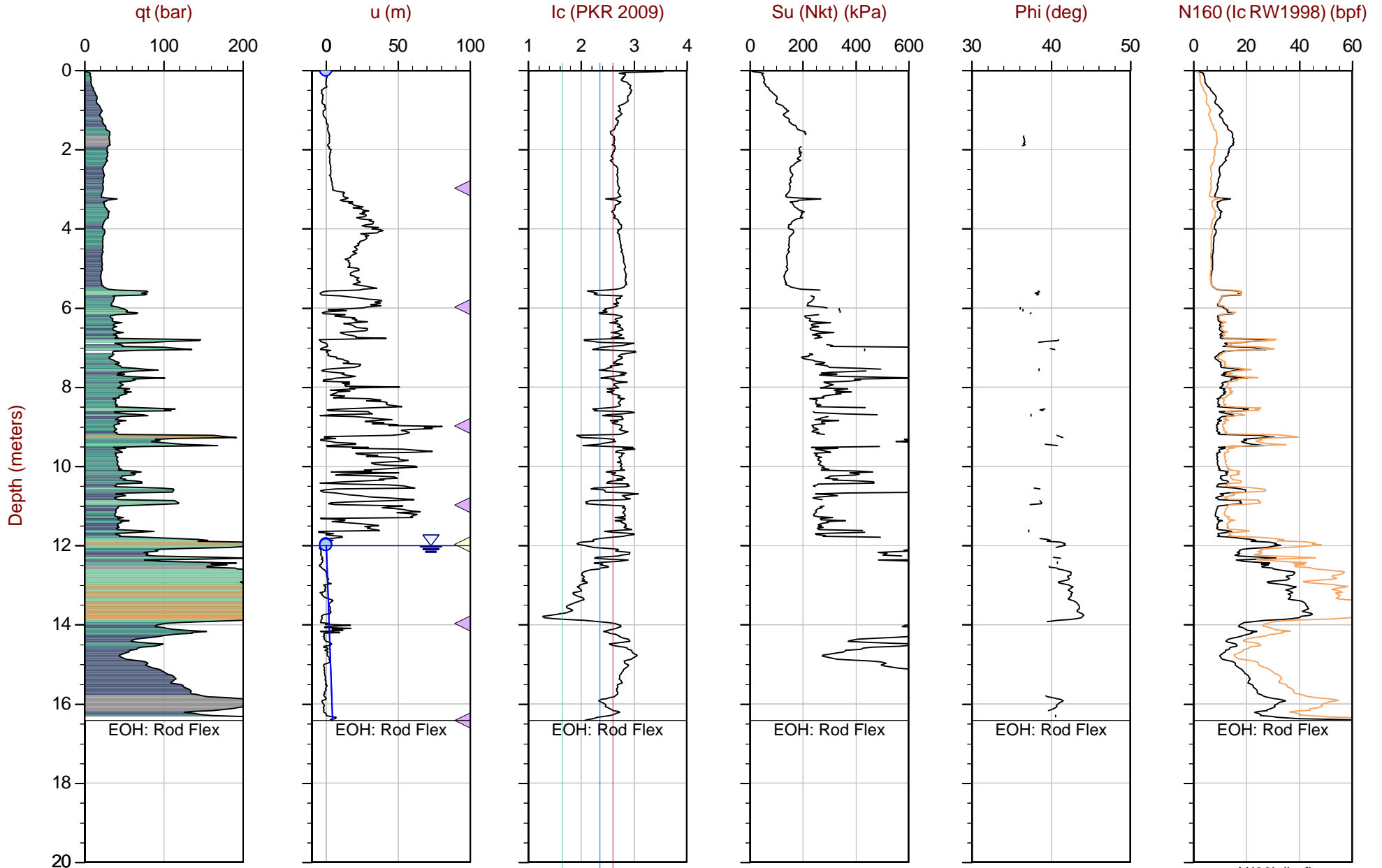
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Stantec

Job No: 18-03010
Date: 2018-05-01 10:46
Site: Val Vista Ranch, Springbank, AB

Sounding: SCPT18-05
Cone: 316:T1500F15U500



Max Depth: 16.425 m / 53.89 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: EveryPoint

File: 18-03010_SP05.COR
Unit Wt: SBTQtn(PKR2009)
Su Nkt: 15.0

SBT: Robertson, 2009 and 2010
Coords: UTM Zone 11 N: 5658729m E: 681401m
Sheet No: 1 of 1

Overplot Item: ● Ueq ● Assumed Ueq ▲ Dissipation, Ueq not achieved — Hydrostatic Line

The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Stantec

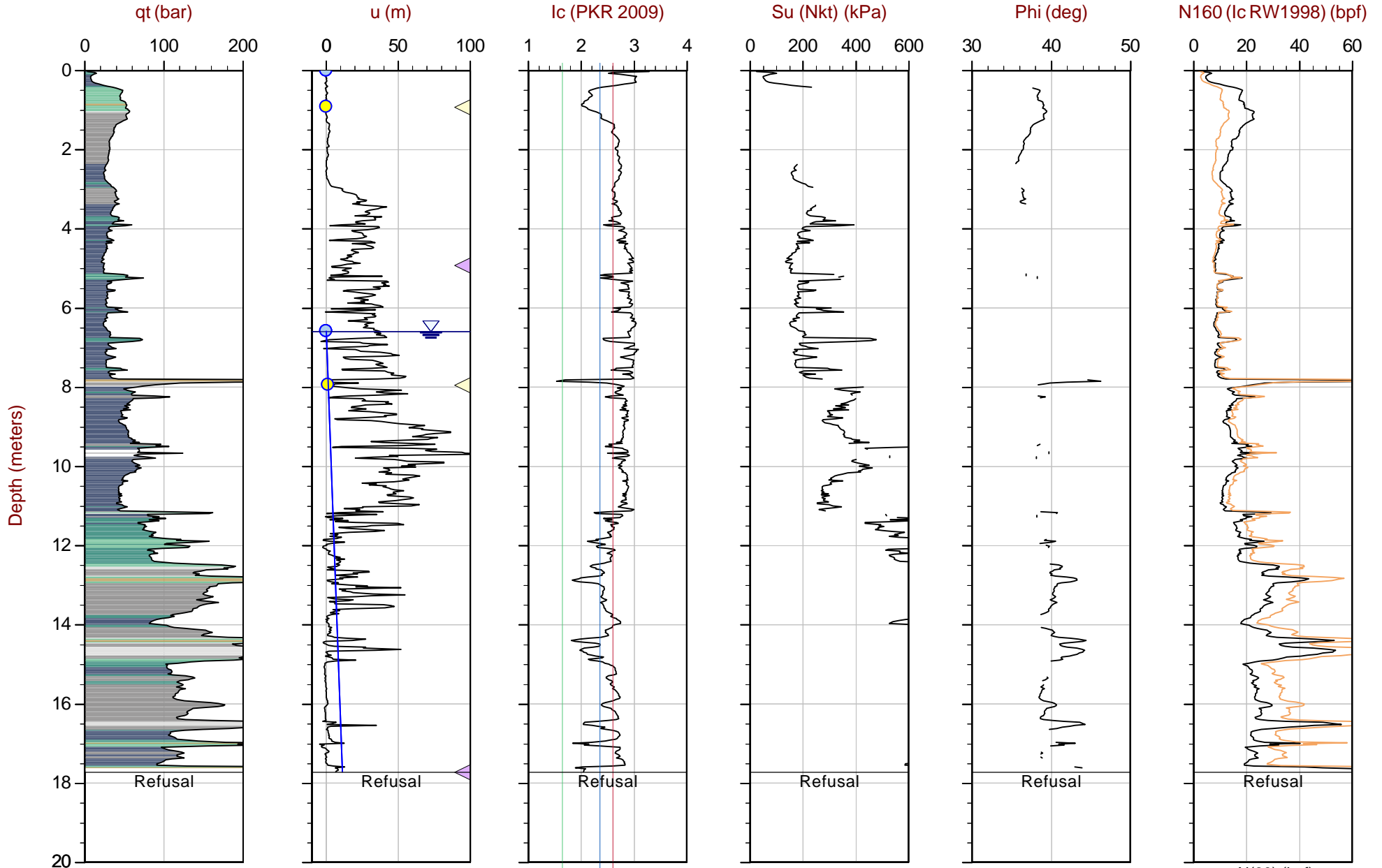
Job No: 18-03010

Date: 2018-05-03 08:49

Site: Val Vista Ranch, Springbank, AB

Sounding: SCPT18-10

Cone: 329:T1500F15U500



Max Depth: 17.725 m / 58.15 ft

Depth Inc: 0.025 m / 0.082 ft

Avg Int: EveryPoint

Overplot Item: ● Ueq ● Assumed Ueq

File: 18-03010_SP10.COR

Unit Wt: SBTQtn(PKR2009)

Su Nkt: 15.0

▲ Dissipation, Ueq not achieved — Hydrostatic Line

SBT: Robertson, 2009 and 2010

Coords: UTM Zone 11 N: 5659199m E: 681359m

Sheet No: 1 of 1

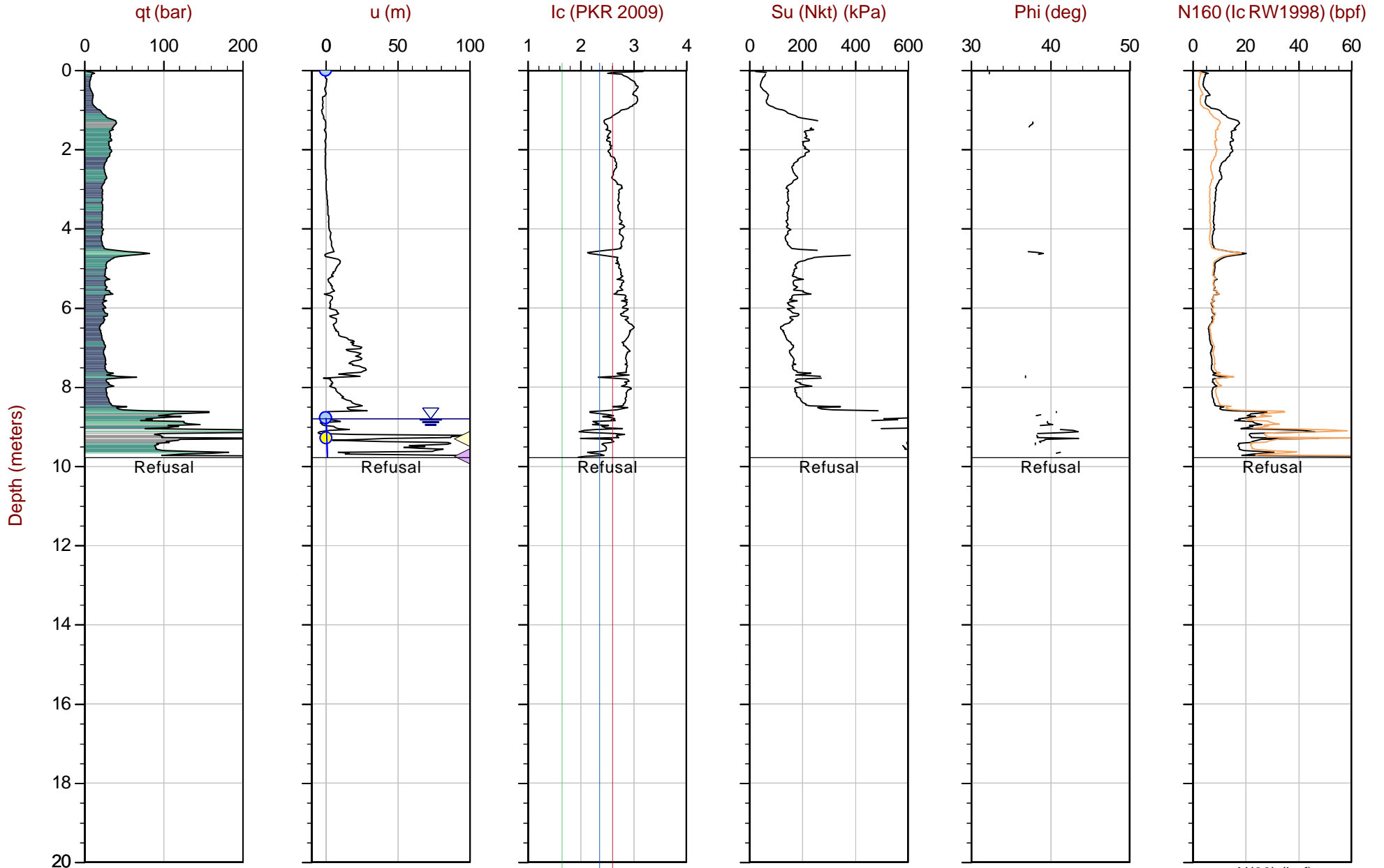
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Stantec

Job No: 18-03010
Date: 2018-05-02 12:40
Site: Val Vista Ranch, Springbank, AB

Sounding: SCPT18-12
Cone: 329:T1500F15U500



Max Depth: 9.775 m / 32.07 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: EveryPoint

File: 18-03010_SP12.COR
Unit Wt: SBTQtn(PKR2009)
Su Nkt: 15.0

SBT: Robertson, 2009 and 2010
Coords: UTM Zone 11 N: 5659173m E: 681437m
Sheet No: 1 of 1

Overplot Item: ● Ueq ● Assumed Ueq ▲ Dissipation, Ueq not achieved — Hydrostatic Line

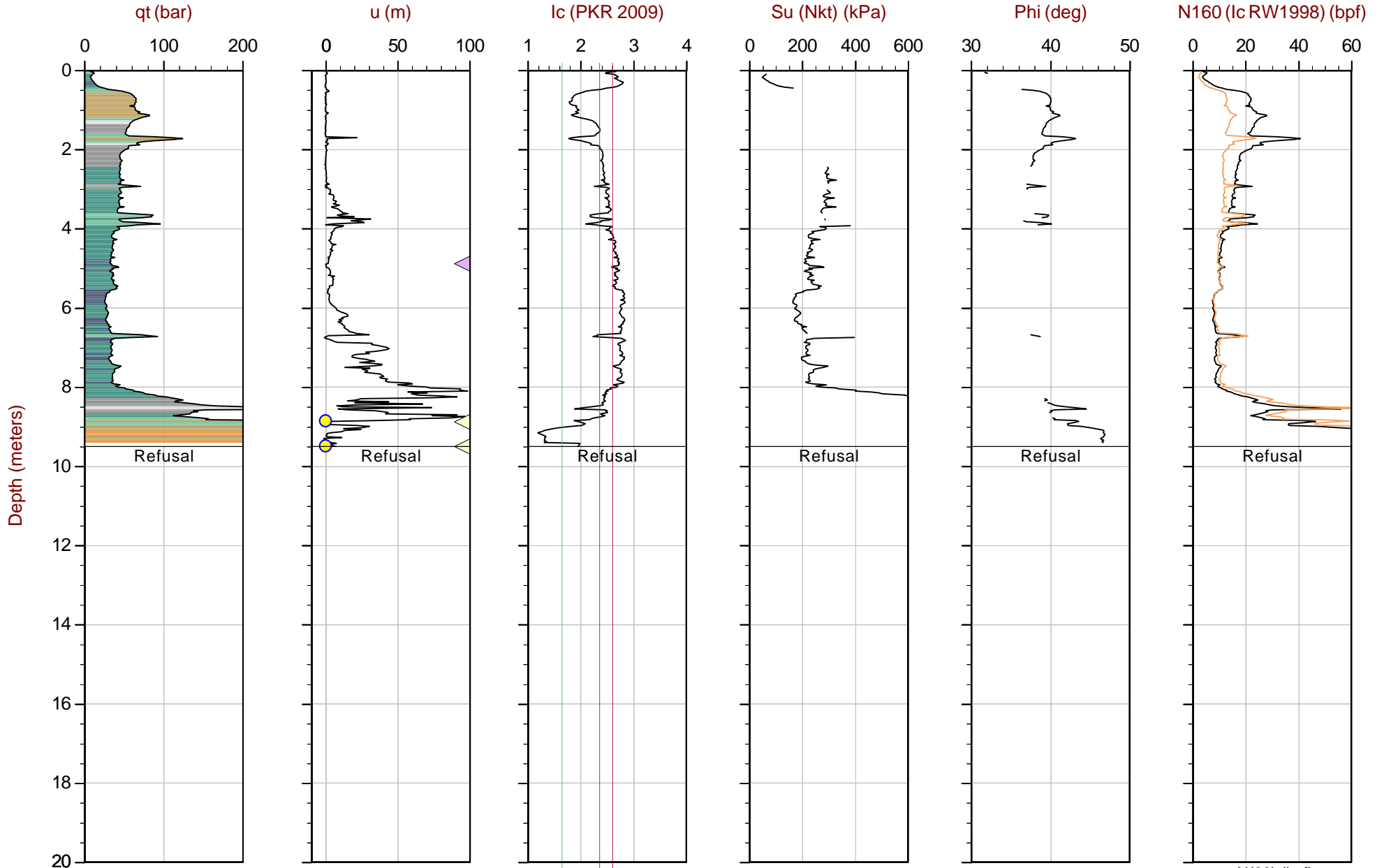
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Stantec

Job No: 18-03010
Date: 2018-05-02 14:18
Site: Val Vista Ranch, Springbank, AB

Sounding: SCPT18-15
Cone: 329:T1500F15U500



Max Depth: 9.500 m / 31.17 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: EveryPoint

File: 18-03010_SP15.COR
Unit Wt: SBTQtn(PKR2009)
Su Nkt: 15.0

SBT: Robertson, 2009 and 2010
Coords: UTM Zone 11 N: 5659078m E: 681526m
Sheet No: 1 of 1

Overplot Item: ● Ueq ● Assumed Ueq ▲ Dissipation, Ueq not achieved — Hydrostatic Line

The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

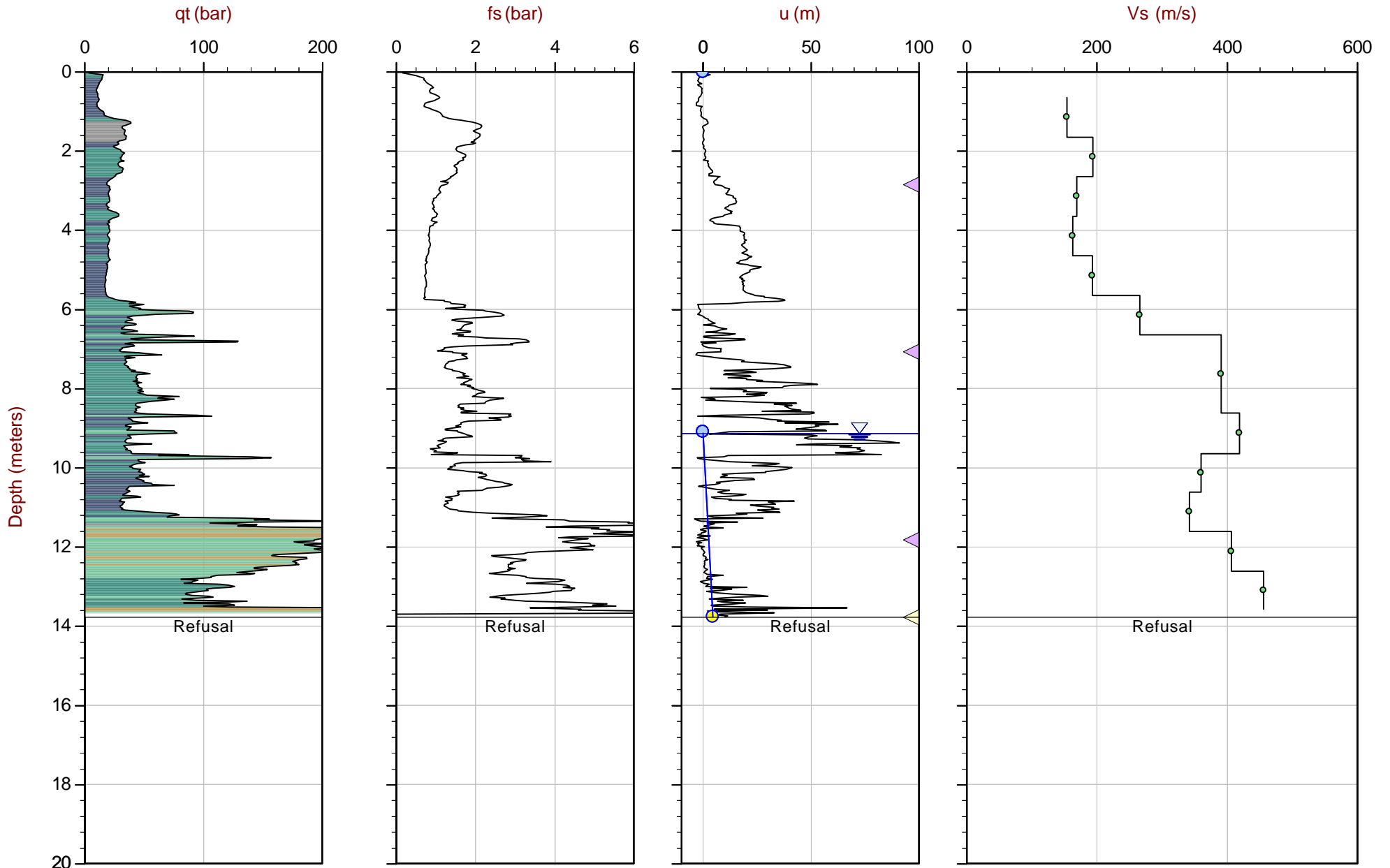
Seismic Cone Penetration Test Plots



Stantec

Job No: 18-03010
Date: 2018-05-02 08:26
Site: Val Vista Ranch, Springbank, AB

Sounding: SCPT18-01
Cone: 329:T1500F15U500



Max Depth: 13.775 m / 45.19 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: EveryPoint

File: 18-03010_SP01.COR
Unit Wt: SBTQtn(PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM Zone 11 N: 5658948m E: 681169m
Sheet No: 1 of 1

Overplot Item: ● Ueq ● Assumed Ueq ▲ Dissipation, Ueq not achieved — Hydrostatic Line

The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Stantec

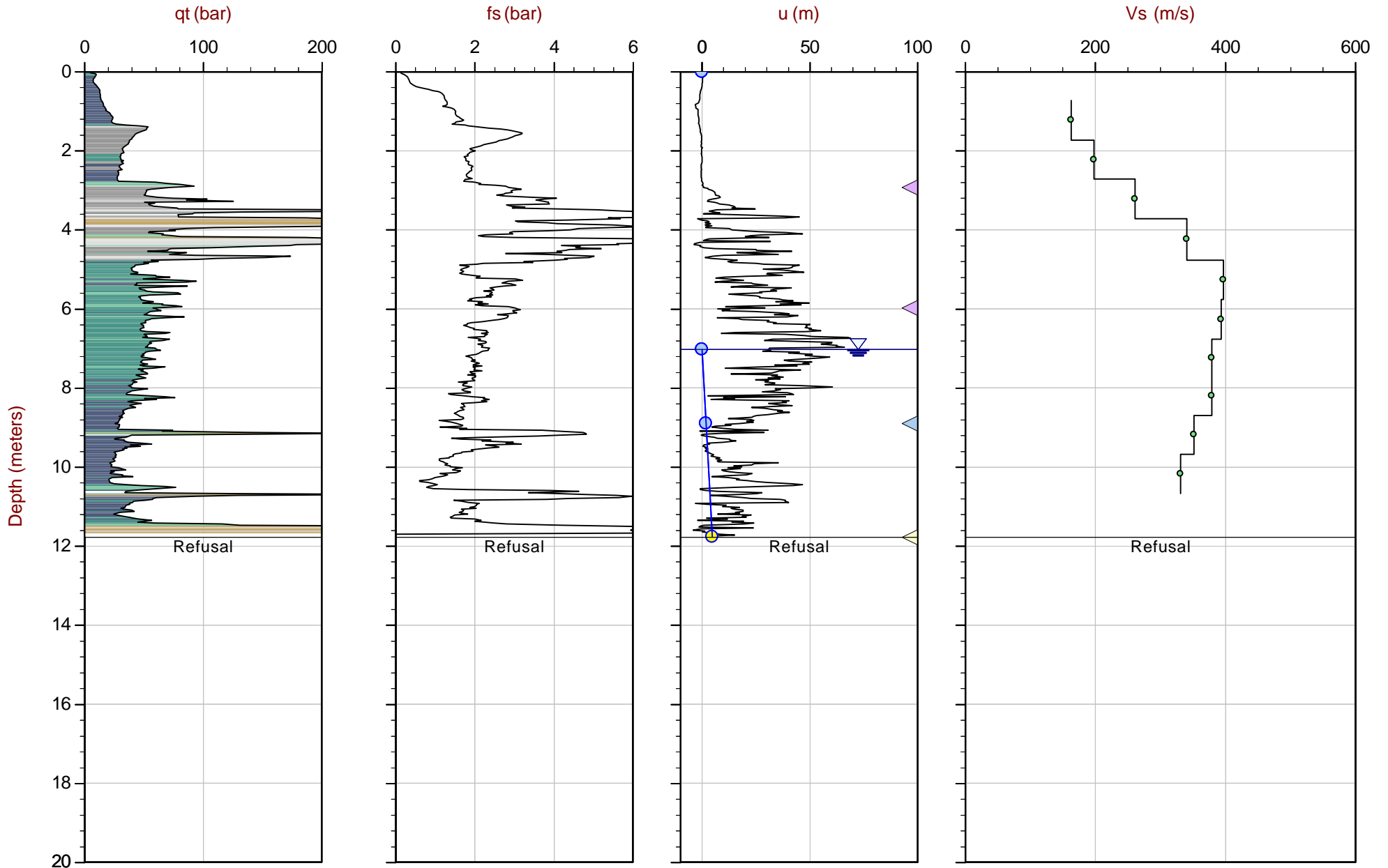
Job No: 18-03010

Date: 2018-05-01 14:45

Site: Val Vista Ranch, Springbank, AB

Sounding: SCPT18-03

Cone: 329:T1500F15U500



Max Depth: 11.775 m / 38.63 ft

Depth Inc: 0.025 m / 0.082 ft

Avg Int: EveryPoint

Overplot Item: ● Ueq ● Assumed Ueq ▲ Dissipation, Ueq not achieved — Hydrostatic Line

The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

File: 18-03010_SP03.COR

Unit Wt: SBTQtn(PKR2009)

SBT: Robertson, 2009 and 2010

Coords: UTM Zone 11 N: 5658895m E: 681239m

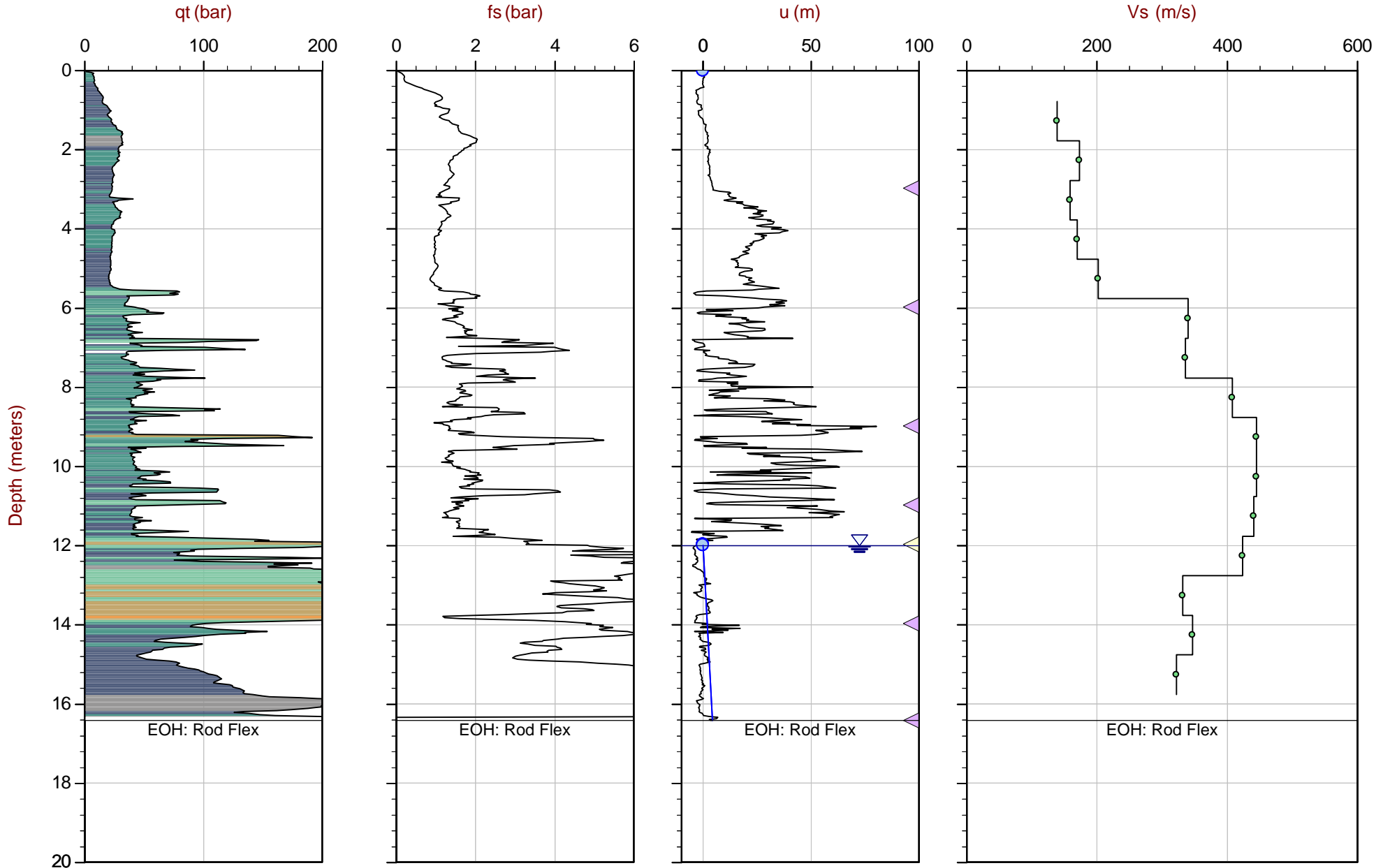
Sheet No: 1 of 1



Stantec

Job No: 18-03010
Date: 2018-05-01 10:46
Site: Val Vista Ranch, Springbank, AB

Sounding: SCPT18-05
Cone: 316:T1500F15U500



Max Depth: 16.425 m / 53.89 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: EveryPoint

File: 18-03010_SP05.COR
Unit Wt: SBTQtn(PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM Zone 11 N: 5658729m E: 681401m
Sheet No: 1 of 1

Overplot Item: ● Ueq ● Assumed Ueq ▲ Dissipation, Ueq not achieved — Hydrostatic Line

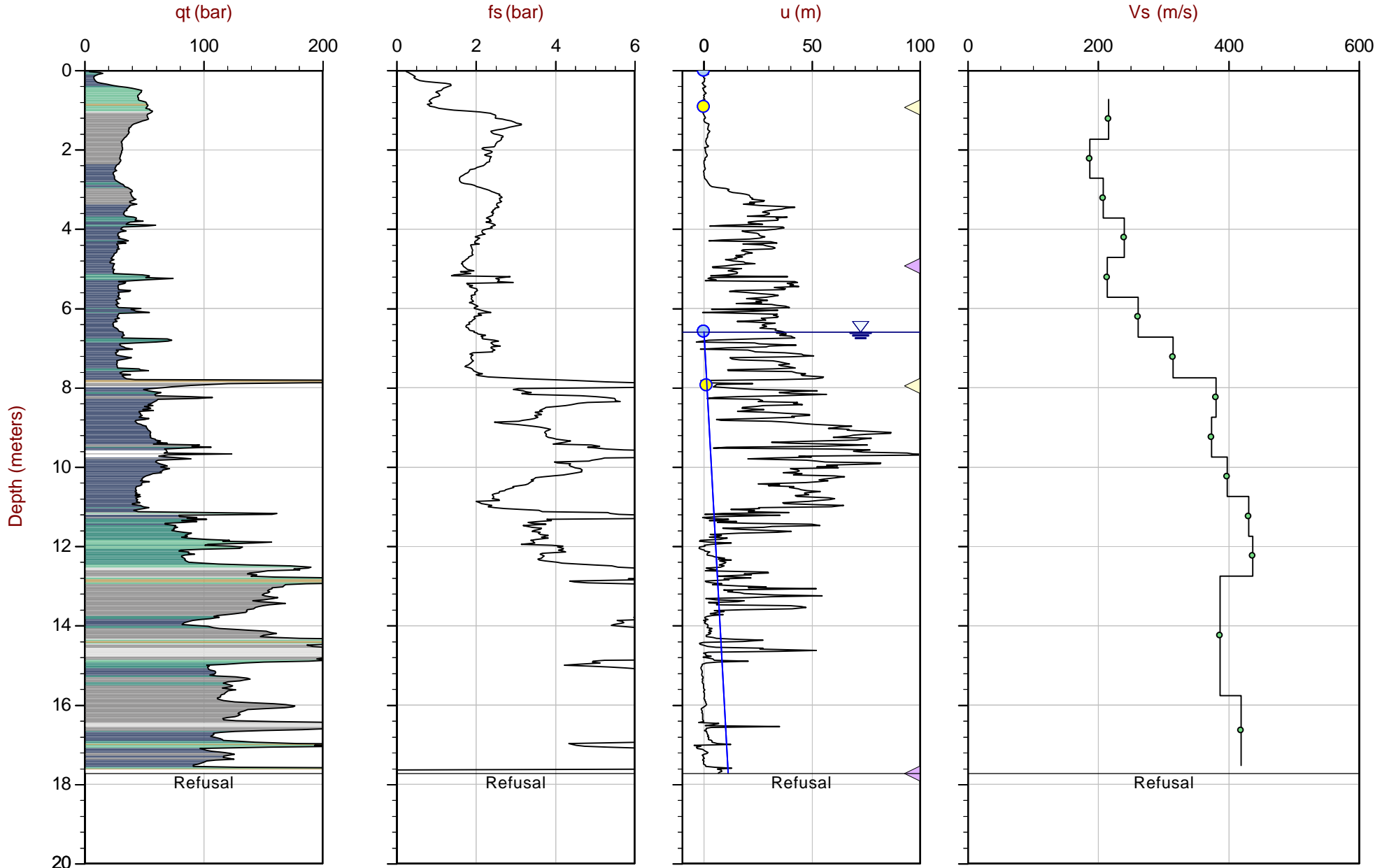
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Stantec

Job No: 18-03010
Date: 2018-05-03 08:49
Site: Val Vista Ranch, Springbank, AB

Sounding: SCPT18-10
Cone: 329:T1500F15U500



Max Depth: 17.725 m / 58.15 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: EveryPoint

File: 18-03010_SP10.COR
Unit Wt: SBTQtn(PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM Zone 11 N: 5659199m E: 681359m
Sheet No: 1 of 1

Overplot Item: ● Ueq ● Assumed Ueq ◀ Dissipation, Ueq not achieved — Hydrostatic Line

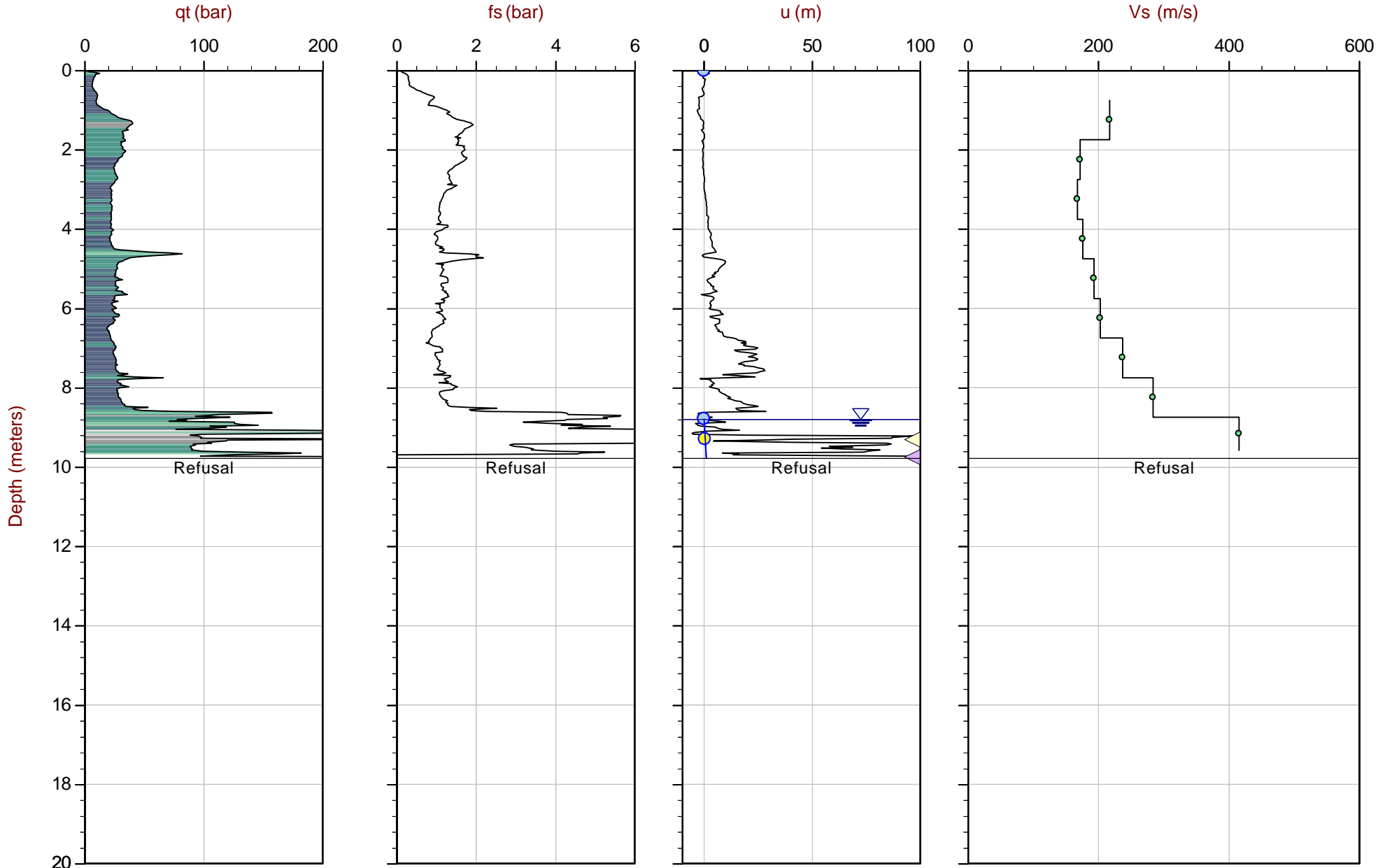
The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Stantec

Job No: 18-03010
Date: 2018-05-02 12:40
Site: Val Vista Ranch, Springbank, AB

Sounding: SCPT18-12
Cone: 329:T1500F15U500



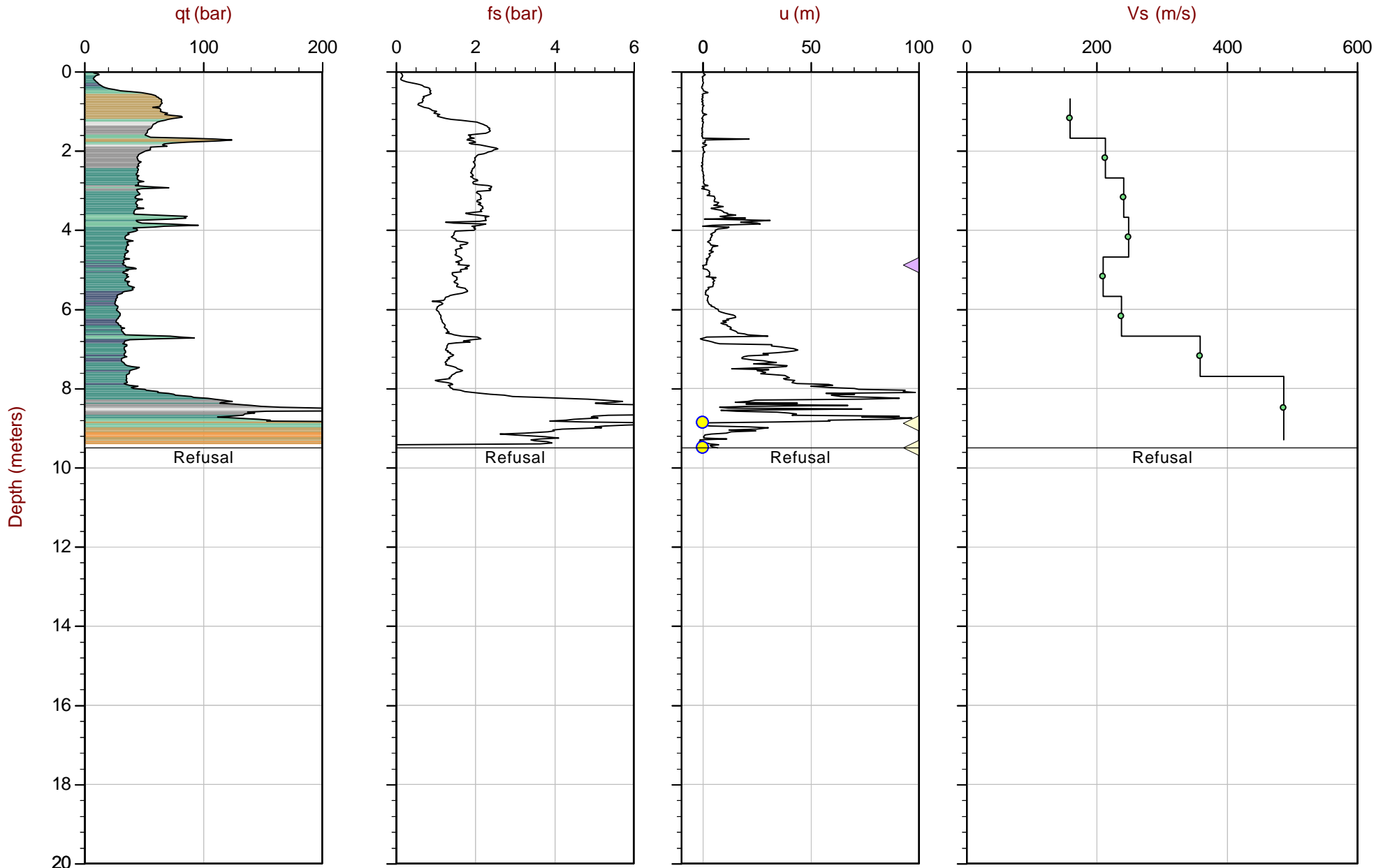
Max Depth: 9.775 m / 32.07 ft
Depth Inc: 0.025 m / 0.082 ft
Avg Int: EveryPoint

File: 18-03010_SP12.COR
Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
Coords: UTM Zone 11 N: 5659173m E: 681437m
Sheet No: 1 of 1

Overplot Item: ● Ueq ● Assumed Ueq ▲ Dissipation, Ueq not achieved — Hydrostatic Line

The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.



Max Depth: 9.500 m / 31.17 ft
 Depth Inc: 0.025 m / 0.082 ft
 Avg Int: EveryPoint

File: 18-03010_SP15.COR
 Unit Wt: SBTQtn (PKR2009)

SBT: Robertson, 2009 and 2010
 Coords: UTM Zone 11 N: 5659078m E: 681526m
 Sheet No: 1 of 1

Overplot Item: ● Ueq ● Assumed Ueq ▲ Dissipation, Ueq not achieved — Hydrostatic Line

The reported coordinates were acquired from consumer grade GPS equipment and are only approximate locations. The coordinates should not be used for design purposes.

Seismic Cone Penetration Test Tabular Results



Job No: 18-03010
Client: Stantec Consulting Ltd.
Project: Val Vista Ranch, Springbank, AB
Sounding ID: SCPT18-01
Date: 02-May-2018

Seismic Source: Beam
Source Offset (m): 0.46
Source Depth (m): 0.00
Geophone Offset (m): 0.20

SCPT_u SHEAR WAVE VELOCITY TEST RESULTS - Vs

Tip Depth (m)	Geophone Depth (m)	Ray Path (m)	Ray Path Difference (m)	Travel Time Interval (ms)	Interval Velocity (m/s)
0.85	0.65	0.80			
1.85	1.65	1.71	0.92	5.97	154
2.85	2.65	2.69	0.98	5.03	194
3.85	3.65	3.68	0.99	5.85	169
4.85	4.65	4.67	0.99	6.08	163
5.85	5.65	5.67	1.00	5.15	193
6.85	6.65	6.67	1.00	3.74	266
8.82	8.62	8.63	1.97	5.03	391
9.85	9.65	9.66	1.03	2.46	419
10.82	10.62	10.63	0.97	2.69	360
11.82	11.62	11.63	1.00	2.93	342
12.82	12.62	12.63	1.00	2.46	407
13.78	13.58	13.59	0.96	2.11	456



Job No: 18-03010
Client: Stantec Consulting Ltd.
Project: Val Vista Ranch, Springbank, AB
Sounding ID: SCPT18-03
Date: 01-May-2018

Seismic Source: Beam
Source Offset (m): 0.50
Source Depth (m): 0.00
Geophone Offset (m): 0.20

SCPT_u SHEAR WAVE VELOCITY TEST RESULTS - V_s

Tip Depth (m)	Geophone Depth (m)	Ray Path (m)	Ray Path Difference (m)	Travel Time Interval (ms)	Interval Velocity (m/s)
0.93	0.73	0.88			
1.93	1.73	1.80	0.92	5.62	163
2.92	2.72	2.77	0.96	4.88	198
3.92	3.72	3.75	0.99	3.78	261
4.97	4.77	4.80	1.04	3.06	341
5.97	5.77	5.79	1.00	2.51	397
6.97	6.77	6.79	1.00	2.53	394
7.92	7.72	7.74	0.95	2.50	379
8.90	8.70	8.71	0.98	2.58	379
9.88	9.68	9.69	0.98	2.78	352
10.88	10.68	10.69	1.00	3.02	331



Job No: 18-03010
Client: Stantec Consulting Ltd.
Project: Val Vista Ranch, Springbank, AB
Sounding ID: SCPT18-05
Date: 01-May-2018

Seismic Source: Beam
Source Offset (m): 0.75
Source Depth (m): 0.00
Geophone Offset (m): 0.20

SCPT_u SHEAR WAVE VELOCITY TEST RESULTS - Vs

Tip Depth (m)	Geophone Depth (m)	Ray Path (m)	Ray Path Difference (m)	Travel Time Interval (ms)	Interval Velocity (m/s)
0.98	0.78	1.08			
1.98	1.78	1.93	0.85	6.10	139
2.98	2.78	2.88	0.95	5.48	173
3.98	3.78	3.85	0.97	6.13	159
4.97	4.77	4.83	0.97	5.72	170
5.97	5.77	5.82	0.99	4.90	202
6.97	6.77	6.81	0.99	2.92	340
7.97	7.77	7.81	0.99	2.96	336
8.97	8.77	8.80	1.00	2.44	408
9.97	9.77	9.80	1.00	2.24	445
10.97	10.77	10.80	1.00	2.24	445
11.97	11.77	11.79	1.00	2.26	441
12.97	12.77	12.79	1.00	2.35	424
13.97	13.77	13.79	1.00	3.01	332
14.97	14.77	14.79	1.00	2.88	347
15.97	15.77	15.79	1.00	3.10	322



Job No: 18-03010
Client: Stantec Consulting Ltd.
Project: Val Vista Ranch, Springbank, AB
Sounding ID: SCPT18-10
Date: 03-May-2018

Seismic Source: Beam
Source Offset (m): 0.60
Source Depth (m): 0.00
Geophone Offset (m): 0.20

SCPT_u SHEAR WAVE VELOCITY TEST RESULTS - Vs

Tip Depth (m)	Geophone Depth (m)	Ray Path (m)	Ray Path Difference (m)	Travel Time Interval (ms)	Interval Velocity (m/s)
0.93	0.73	0.94			
1.93	1.73	1.83	0.89	4.10	216
2.92	2.72	2.79	0.95	5.10	187
3.92	3.72	3.77	0.98	4.72	208
4.92	4.72	4.76	0.99	4.12	240
5.92	5.72	5.75	0.99	4.64	214
6.92	6.72	6.75	1.00	3.81	261
7.95	7.75	7.77	1.03	3.26	315
8.95	8.75	8.77	1.00	2.62	381
9.95	9.75	9.77	1.00	2.67	374
10.95	10.75	10.77	1.00	2.51	398
11.95	11.75	11.77	1.00	2.32	431
12.95	12.75	12.76	1.00	2.28	437
15.97	15.77	15.78	3.02	7.79	387
17.73	17.53	17.54	1.76	4.20	419



Job No: 18-03010
Client: Stantec Consulting Ltd.
Project: Val Vista Ranch, Springbank, AB
Sounding ID: SCPT18-12
Date: 02-May-2018

Seismic Source: Beam
Source Offset (m): 0.60
Source Depth (m): 0.00
Geophone Offset (m): 0.20

SCPT_u SHEAR WAVE VELOCITY TEST RESULTS - Vs

Tip Depth (m)	Geophone Depth (m)	Ray Path (m)	Ray Path Difference (m)	Travel Time Interval (ms)	Interval Velocity (m/s)
0.95	0.75	0.96			
1.95	1.75	1.85	0.89	4.10	217
2.95	2.75	2.81	0.96	5.62	172
3.95	3.75	3.80	0.98	5.85	168
4.95	4.75	4.79	0.99	5.62	176
5.95	5.75	5.78	0.99	5.15	193
6.95	6.75	6.78	1.00	4.91	203
7.95	7.75	7.77	1.00	4.21	237
8.95	8.75	8.77	1.00	3.51	284
9.78	9.58	9.60	0.83	1.99	416



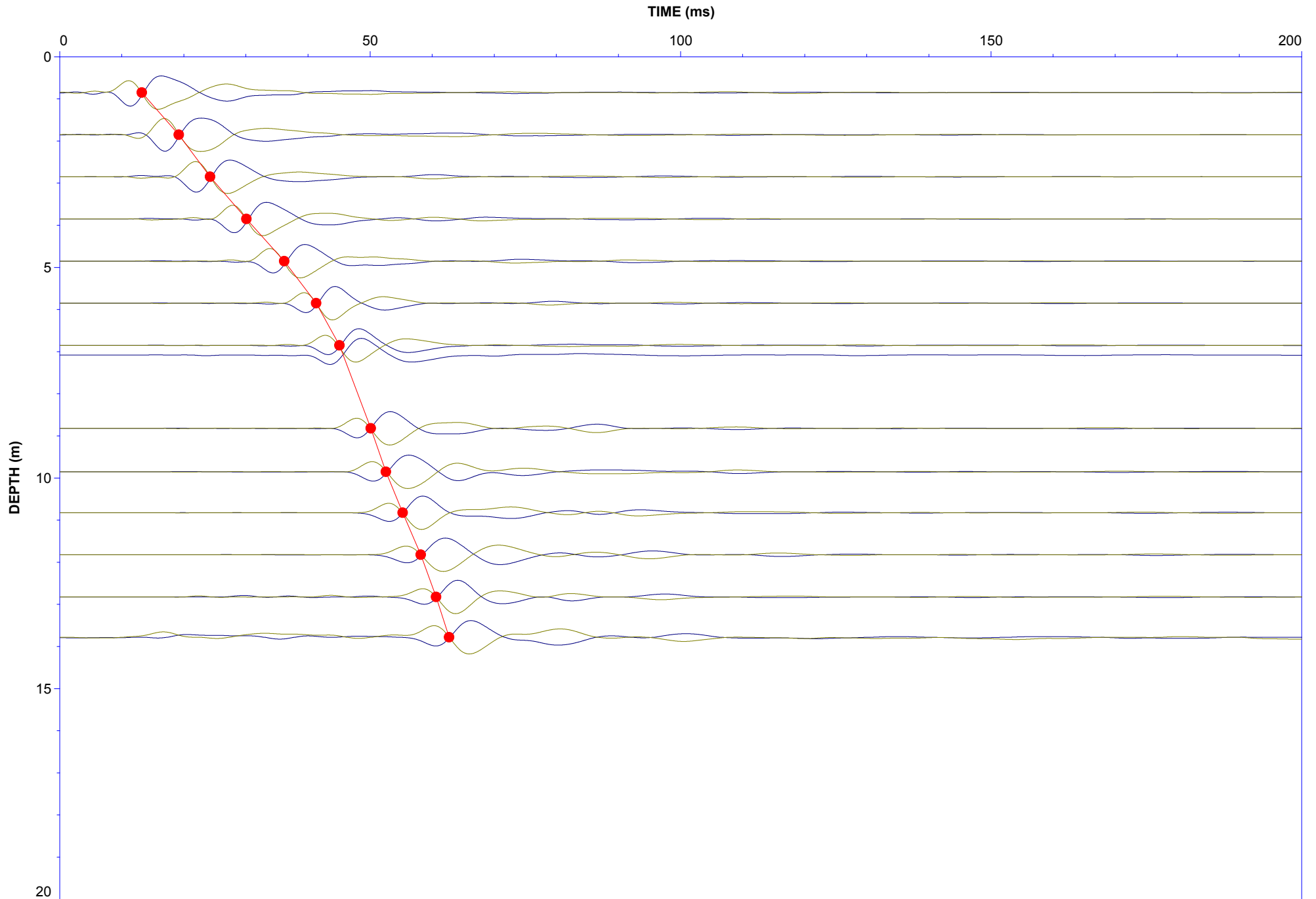
Job No: 18-03010
Client: Stantec Consulting Ltd.
Project: Val Vista Ranch, Springbank, AB
Sounding ID: SCPT18-15
Date: 02-May-2018

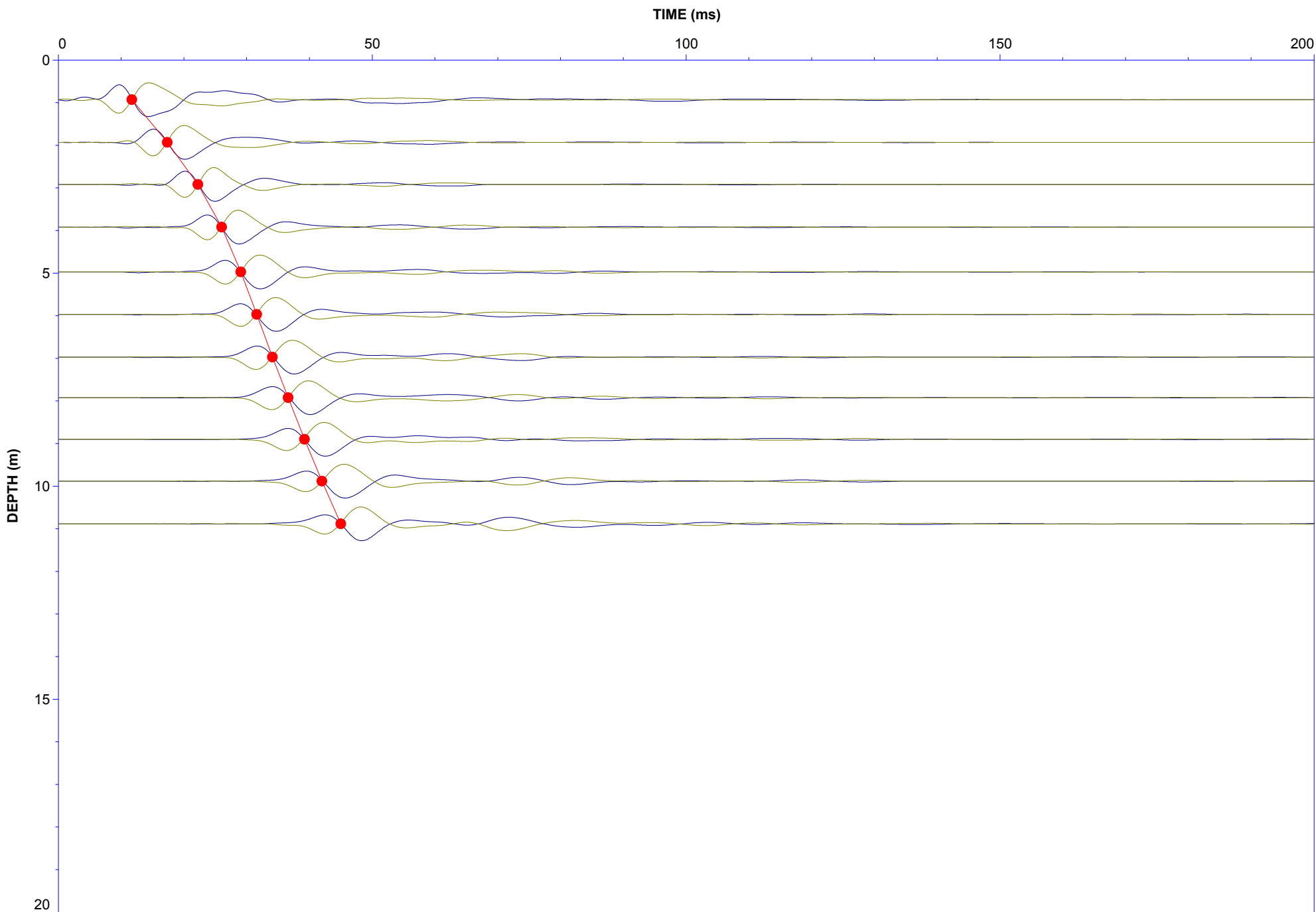
Seismic Source: Beam
Source Offset (m): 0.58
Source Depth (m): 0.00
Geophone Offset (m): 0.20

SCPT_u SHEAR WAVE VELOCITY TEST RESULTS - V_s

Tip Depth (m)	Geophone Depth (m)	Ray Path (m)	Ray Path Difference (m)	Travel Time Interval (ms)	Interval Velocity (m/s)
0.88	0.68	0.89			
1.88	1.68	1.78	0.88	5.54	159
2.88	2.68	2.74	0.96	4.52	213
3.88	3.68	3.73	0.98	4.07	241
4.88	4.68	4.72	0.99	3.97	249
5.88	5.68	5.71	0.99	4.74	210
6.88	6.68	6.71	1.00	4.19	238
7.90	7.70	7.72	1.02	2.83	359
9.50	9.30	9.32	1.60	3.28	487

Seismic Cone Penetration Test Time Domain Traces







Job No: 18-03010

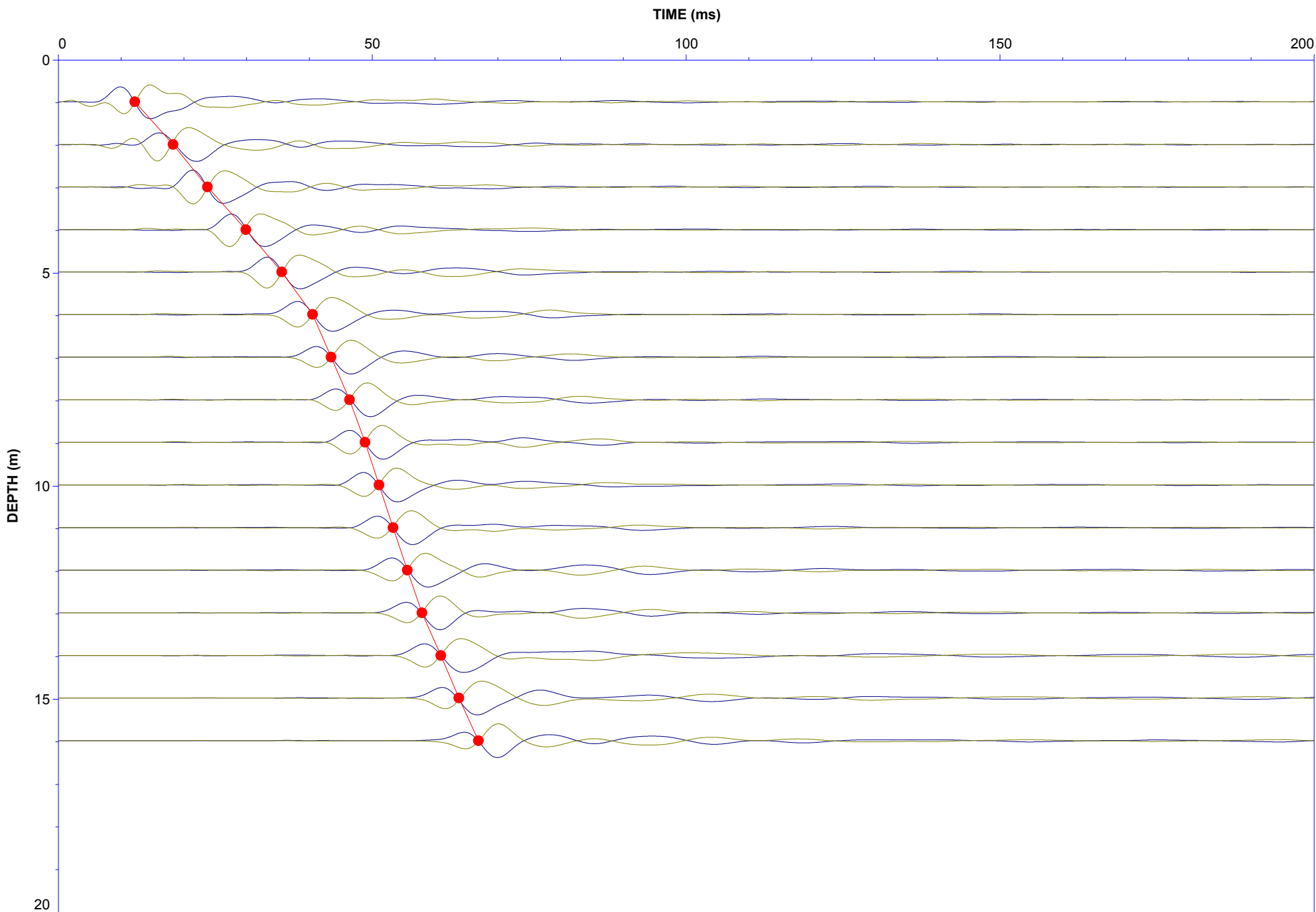
Client: Stantec

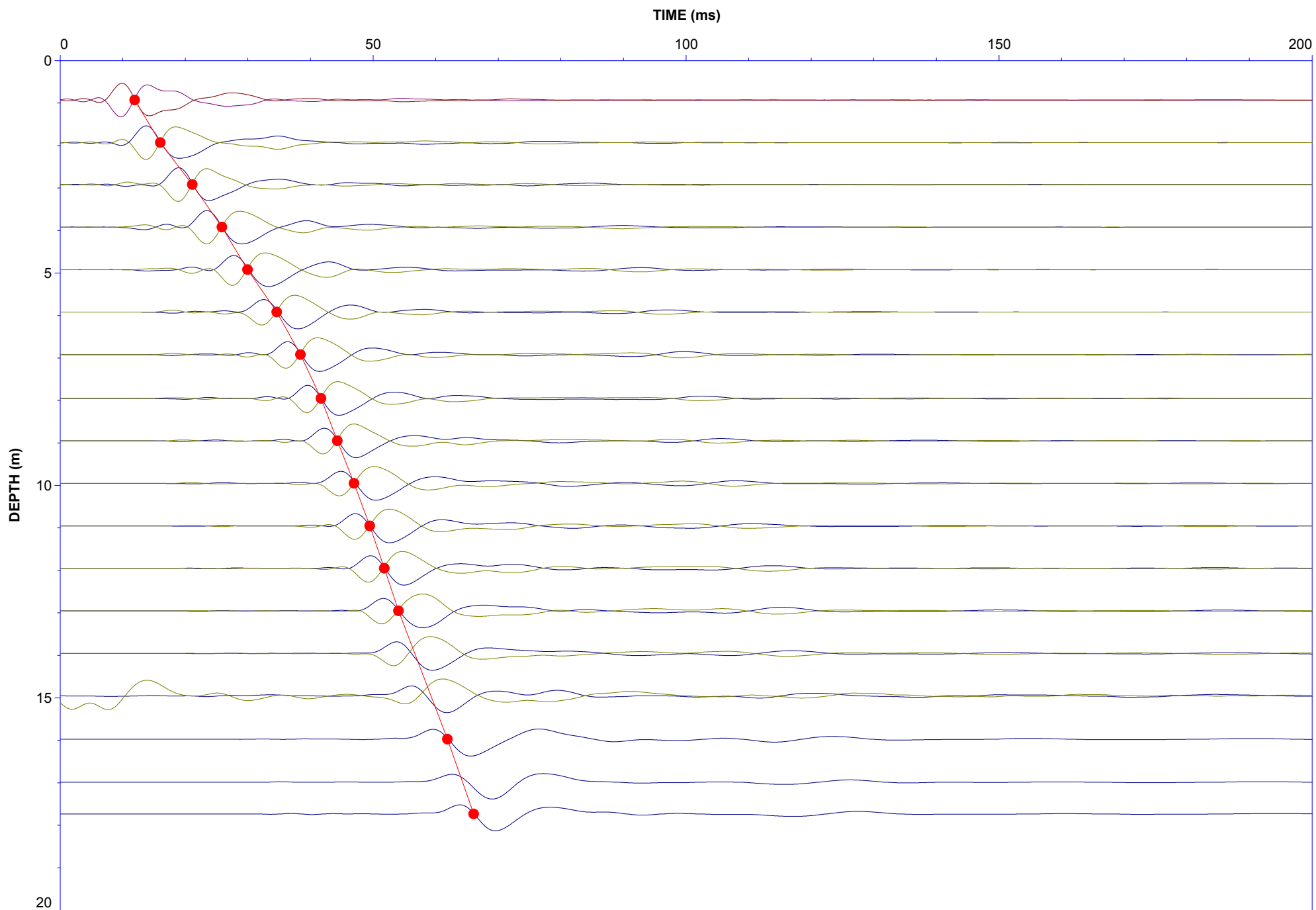
Project Title: Val Vista Ranch

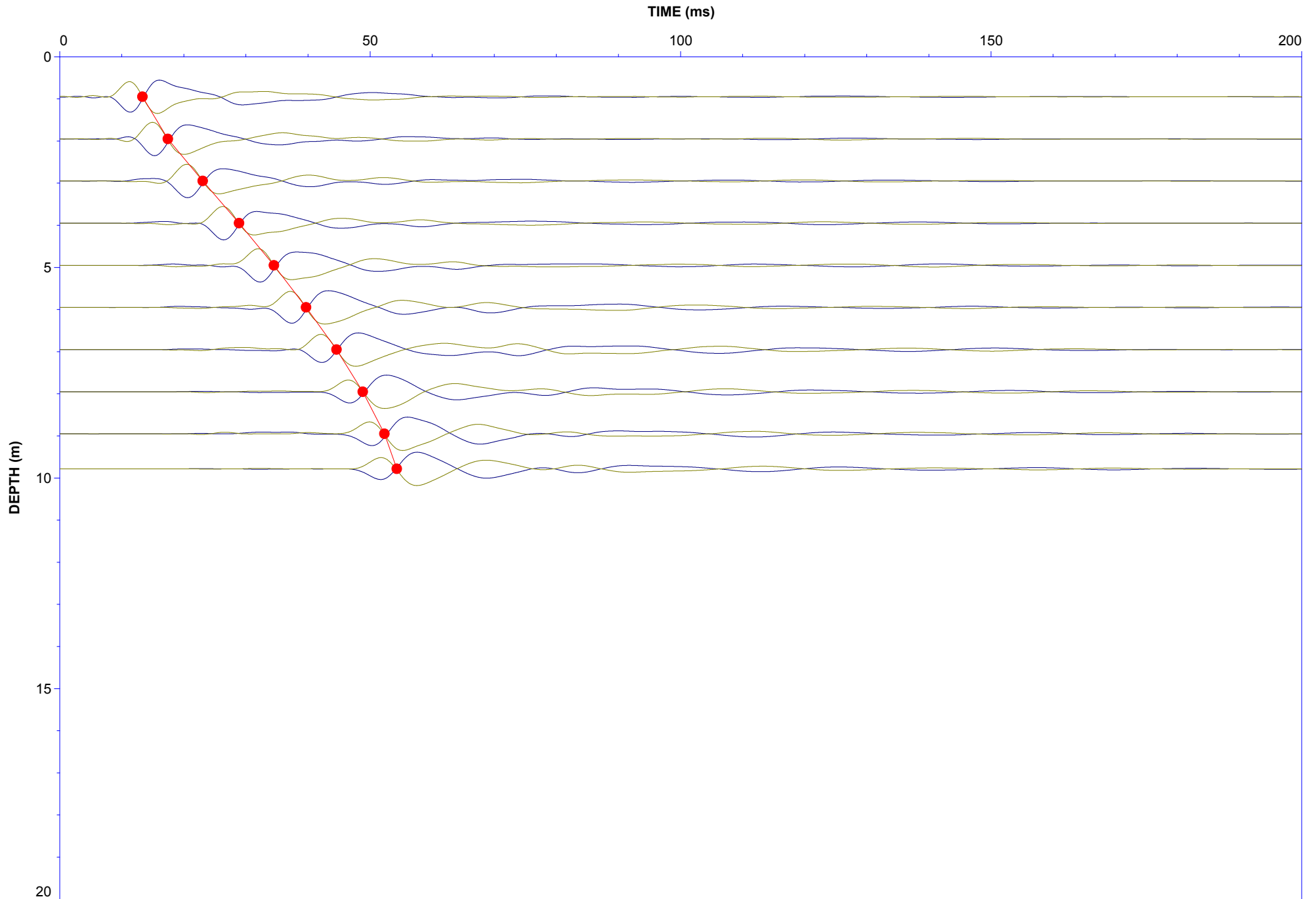
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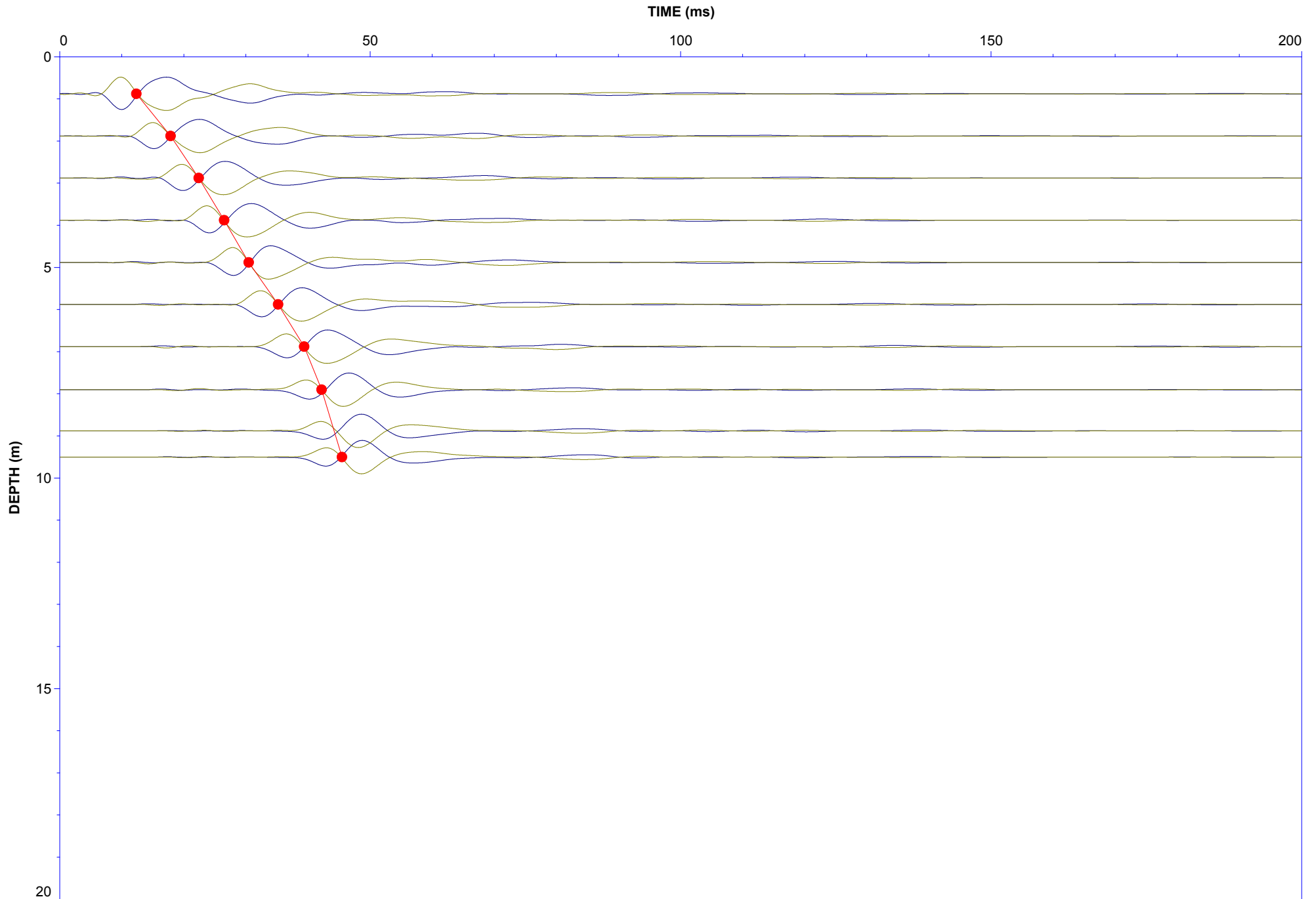
Sounding: SCPT18-05

Date: 01-May-2018



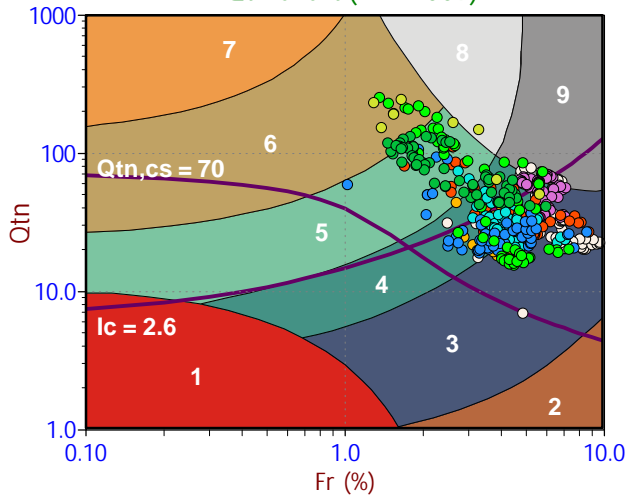




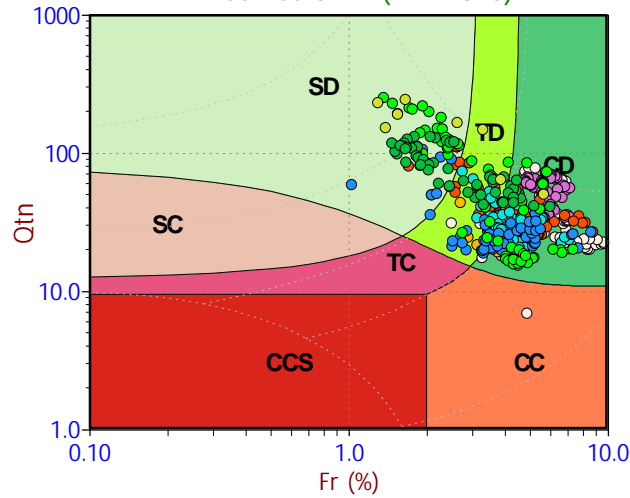


Soil Behaviour Type (SBT) Scatter Plots

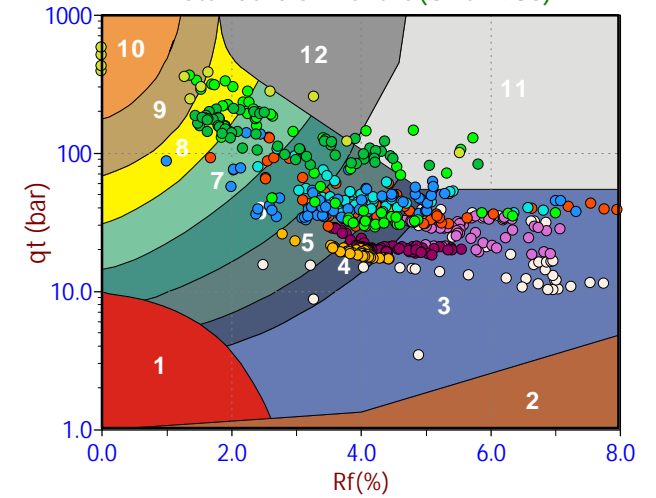
Qtn Chart (PKR 2009)



Modified SBTn (PKR 2016)



Standard SBT Chart (UBC 1986)



Depth Ranges

- >0.0 to 1.5 m
- >1.5 to 3.0 m
- >3.0 to 4.5 m
- >4.5 to 6.0 m
- >6.0 to 7.5 m
- >7.5 to 9.0 m
- >9.0 to 10.5 m
- >10.5 to 12.0 m
- >12.0 to 13.5 m
- >13.5 to 15.0 m
- >15.0 m

Legend

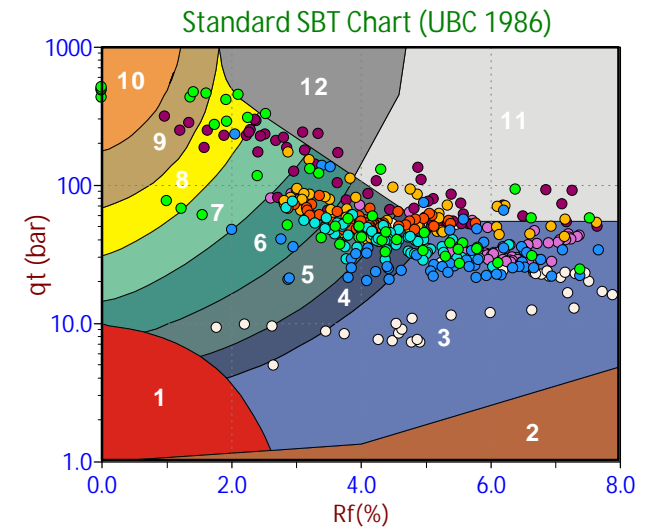
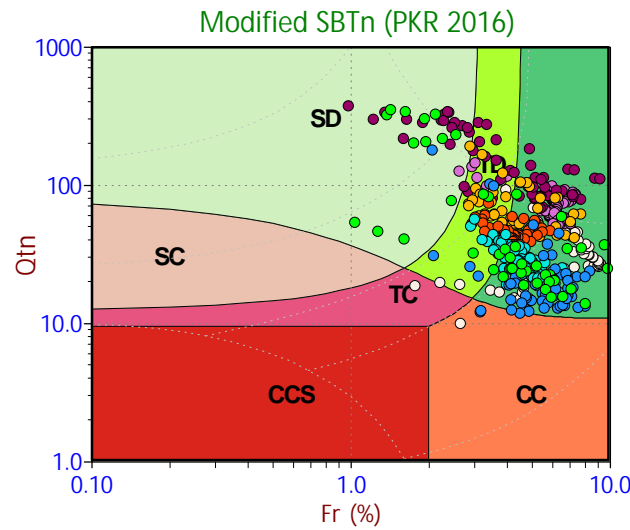
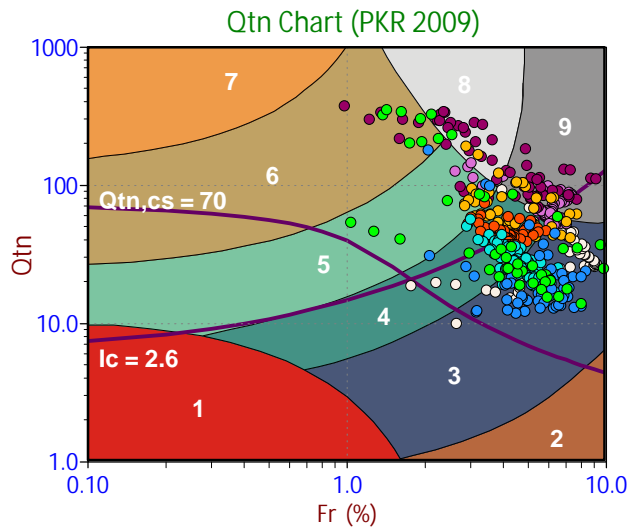
- Sensitive, Fine Grained
- Organic Soils
- Clays
- Silt Mixtures
- Sand Mixtures
- Sands
- Gravelly Sand to Sand
- Stiff Sand to Clayey Sand
- Very Stiff Fine Grained

Legend

- CCS (Cont. sensitive clay like)
- CC (Cont. clay like)
- TC (Cont. transitional)
- SC (Cont. sand like)
- CD (Dil. clay like)
- TD (Dil. transitional)
- SD (Dil. sand like)

Legend

- Sensitive Fines
- Organic Soil
- Clay
- Silty Clay
- Clayey Silt
- Silt
- Sandy Silt
- Silty Sand/Sand
- Sand
- Gravelly Sand
- Stiff Fine Grained
- Cemented Sand



Depth Ranges

- >0.0 to 1.5 m
- >1.5 to 3.0 m
- >3.0 to 4.5 m
- >4.5 to 6.0 m
- >6.0 to 7.5 m
- >7.5 to 9.0 m
- >9.0 to 10.5 m
- >10.5 to 12.0 m
- >12.0 to 13.5 m
- >13.5 to 15.0 m
- >15.0 m

Legend

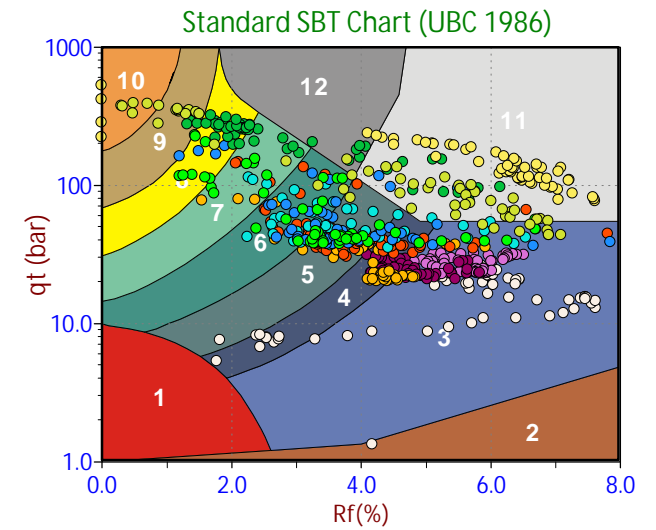
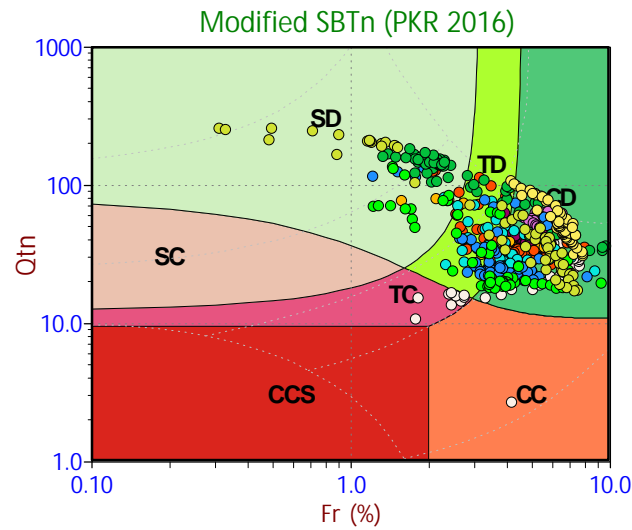
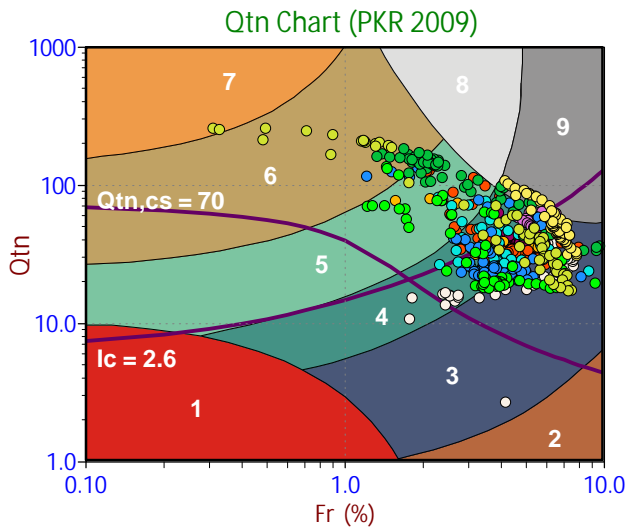
- Sensitive, Fine Grained
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Legend

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- >6.0 to 7.5 m
- >7.5 to 9.0 m
- >9.0 to 10.5 m
- >10.5 to 12.0 m
- >12.0 to 13.5 m
- >13.5 to 15.0 m
- >15.0 m

Legend

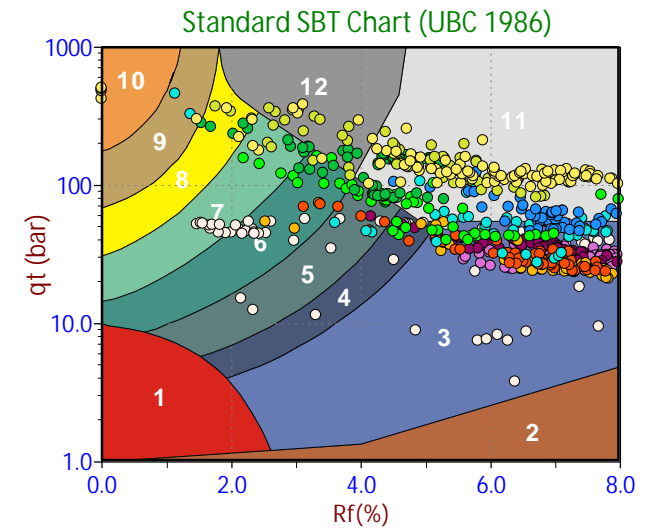
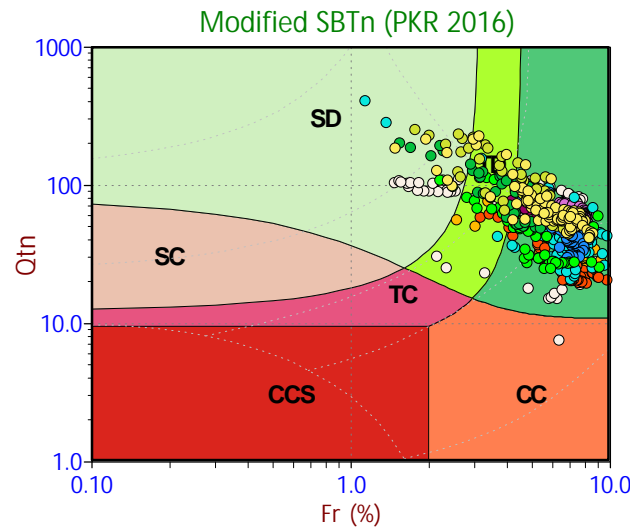
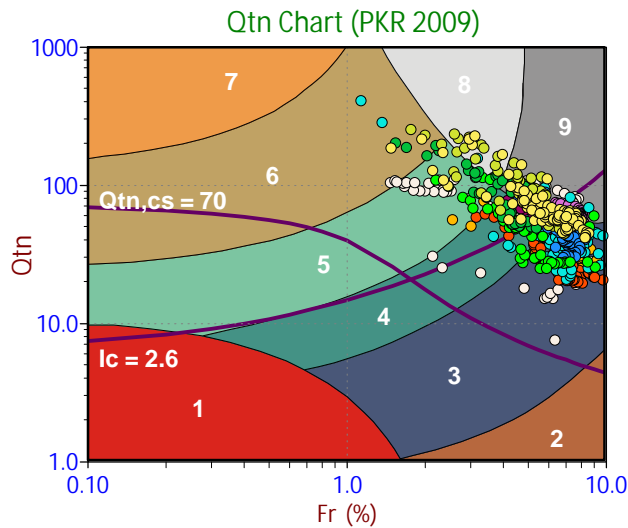
- Sensitive, Fine Grained
- Organic Soils
- Clays
- Silt Mixtures
- Sand Mixtures
- Sands
- Gravelly Sand to Sand
- Stiff Sand to Clayey Sand
- Very Stiff Fine Grained

Legend

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Legend

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Depth Ranges

- >0.0 to 1.5 m
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- >3.0 to 4.5 m
- >4.5 to 6.0 m
- >6.0 to 7.5 m
- >7.5 to 9.0 m
- >9.0 to 10.5 m
- >10.5 to 12.0 m
- >12.0 to 13.5 m
- >13.5 to 15.0 m
- >15.0 m

Legend

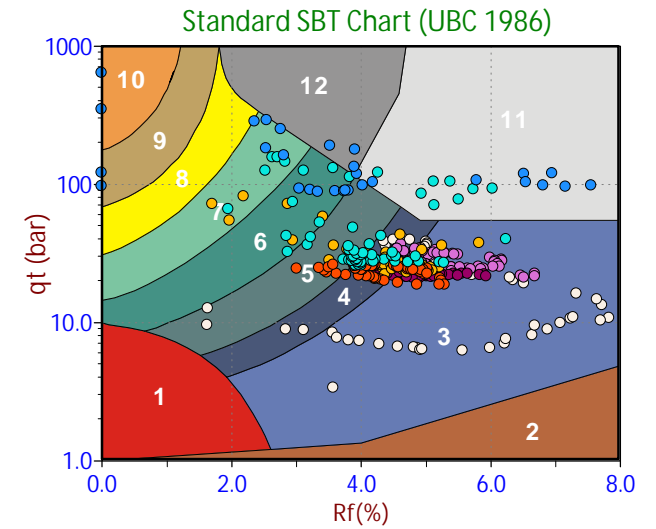
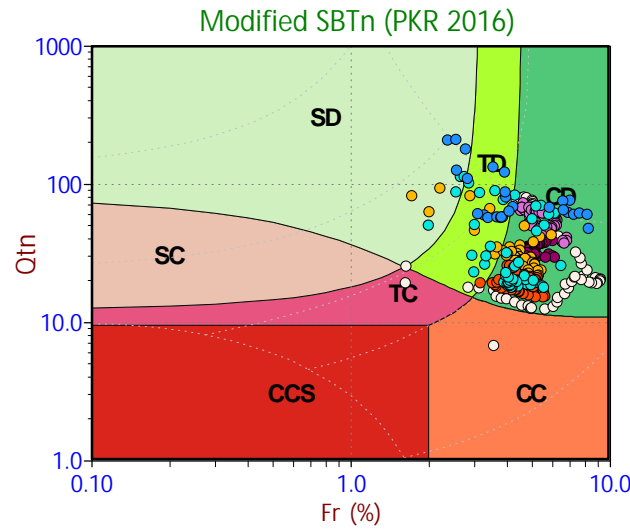
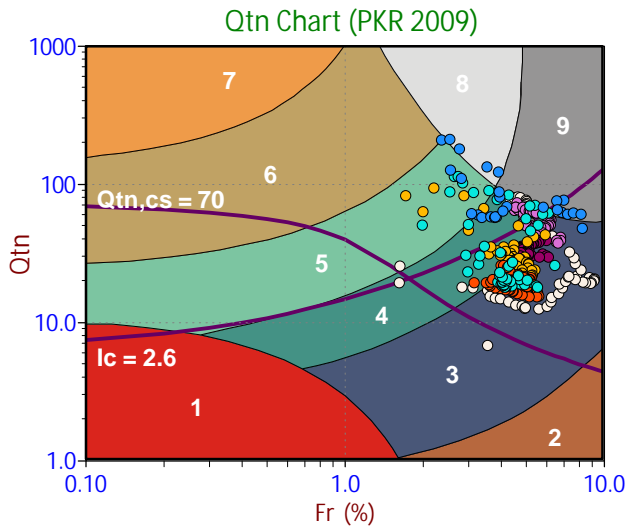
- Sensitive, Fine Grained
- Organic Soils
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- Silt Mixtures
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Legend

- CCS (Cont. sensitive clay like)
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Legend

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Depth Ranges

- >0.0 to 1.5 m
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- >4.5 to 6.0 m
- >6.0 to 7.5 m
- >7.5 to 9.0 m
- >9.0 to 10.5 m
- >10.5 to 12.0 m
- >12.0 to 13.5 m
- >13.5 to 15.0 m
- >15.0 m

Legend

- Sensitive, Fine Grained
- Organic Soils
- Clays
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- Sand Mixtures
- Sands
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- Very Stiff Fine Grained

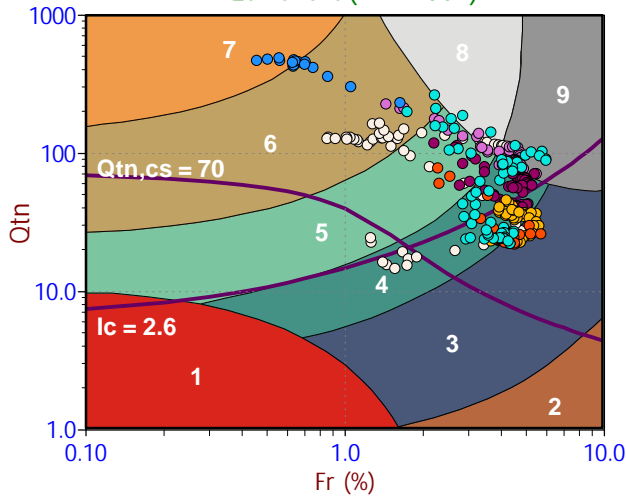
Legend

- CCS (Cont. sensitive clay like)
- CC (Cont. clay like)
- TC (Cont. transitional)
- SC (Cont. sand like)
- CD (Dil. clay like)
- TD (Dil. transitional)
- SD (Dil. sand like)

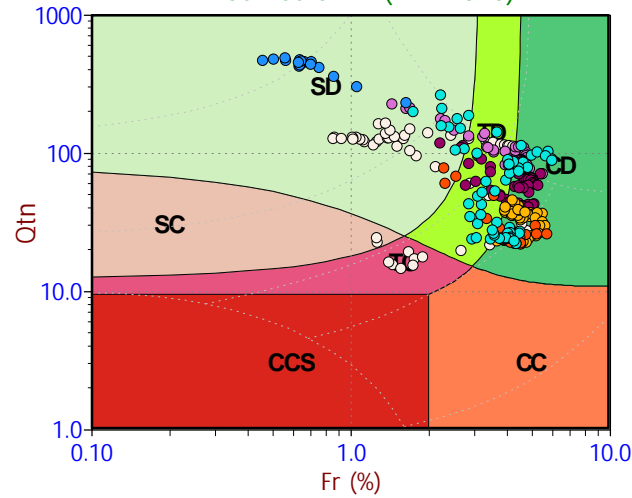
Legend

- Sensitive Fines
- Organic Soil
- Clay
- Silty Clay
- Clayey Silt
- Silt
- Sandy Silt
- Silty Sand/Sand
- Sand
- Gravelly Sand
- Stiff Fine Grained
- Cemented Sand

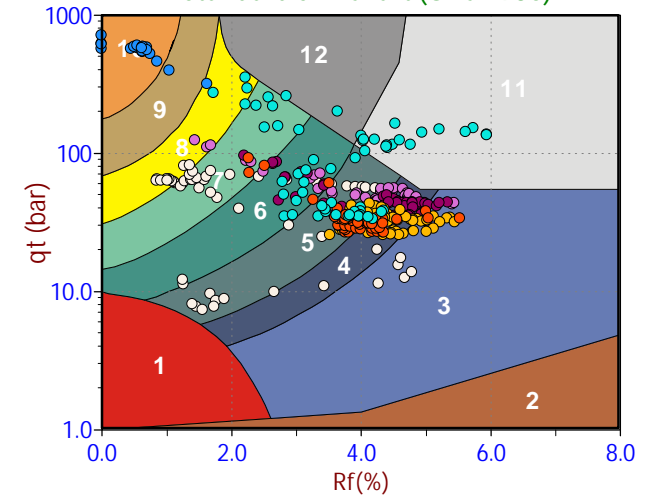
Qtn Chart (PKR 2009)



Modified SBTn (PKR 2016)



Standard SBT Chart (UBC 1986)



Depth Ranges

- >0.0 to 1.5 m
- >1.5 to 3.0 m
- >3.0 to 4.5 m
- >4.5 to 6.0 m
- >6.0 to 7.5 m
- >7.5 to 9.0 m
- >9.0 to 10.5 m
- >10.5 to 12.0 m
- >12.0 to 13.5 m
- >13.5 to 15.0 m
- >15.0 m

Legend

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- Organic Soils
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- Sands
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- Stiff Sand to Clayey Sand
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Legend

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Legend

- Sensitive Fines
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- Gravelly Sand
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Pore Pressure Dissipation Summary and Pore Pressure Dissipation Plots



Job No: 18-03010
 Client: Stantec Consulting Ltd.
 Project: Val Vista Ranch, Springbank, AB
 Start Date: 01-May-2018
 End Date: 03-May-2018

CPT_u PORE PRESSURE DISSIPATION SUMMARY

Sounding ID	File Name	Cone Area (cm ²)	Duration (s)	Test Depth (m)	Estimated Equilibrium Pore Pressure U _{eq} (m)	Calculated Phreatic Surface (m)	Estimated Phreatic Surface (m)	t ₅₀ ¹ (s)	Assumed Rigidity Index (I _r)	C _n ² (cm ² /min)	Refer to Notation Number
SCPT18-01	18-03010_SP01	15	260	2.850	Not achieved						
SCPT18-01	18-03010_SP01	15	2345	7.075	Not achieved						
SCPT18-01	18-03010_SP01	15	520	11.825	Not achieved						
SCPT18-01	18-03010_SP01	15	1095	13.775	4.6	9.1					
SCPT18-03	18-03010_SP03	15	310	2.925	Not achieved						
SCPT18-03	18-03010_SP03	15	3160	5.975	Not achieved						
SCPT18-03	18-03010_SP03	15	2400	8.900	Not achieved		7.0	2105	100	0.2	
SCPT18-03	18-03010_SP03	15	345	11.775	4.7	7.0					
SCPT18-05	18-03010_SP05	15	555	2.975	Not achieved						
SCPT18-05	18-03010_SP05	15	580	5.975	Not achieved						
SCPT18-05	18-03010_SP05	15	350	8.975	Not achieved						
SCPT18-05	18-03010_SP05	15	1340	10.975	Not achieved						
SCPT18-05	18-03010_SP05	15	455	11.975	0.0						
SCPT18-05	18-03010_SP05	15	570	13.975	Not achieved						
SCPT18-05	18-03010_SP05	15	320	16.425	Not achieved						



Job No: 18-03010
Client: Stantec Consulting Ltd.
Project: Val Vista Ranch, Springbank, AB
Start Date: 01-May-2018
End Date: 03-May-2018

CPT_u PORE PRESSURE DISSIPATION SUMMARY

Sounding ID	File Name	Cone Area (cm ²)	Duration (s)	Test Depth (m)	Estimated Equilibrium Pore Pressure U _{eq} (m)	Calculated Phreatic Surface (m)	Estimated Phreatic Surface (m)	t ₅₀ ¹ (s)	Assumed Rigidity Index (I _r)	C _n ² (cm ² /min)	Refer to Notation Number
SCPT18-10	18-03010_SP10	15	200	0.925	0.0						
SCPT18-10	18-03010_SP10	15	310	4.925	Not achieved						
SCPT18-10	18-03010_SP10	15	400	7.950	1.4	6.6					
SCPT18-10	18-03010_SP10	15	345	17.725	Not achieved						
SCPT18-12	18-03010_SP12	15	300	9.300	0.5						
SCPT18-12	18-03010_SP12	15	375	9.750	Not achieved						
SCPT18-15	18-03010_SP15	15	225	4.875	Not achieved						
SCPT18-15	18-03010_SP15	15	345	8.875	0.0						
SCPT18-15	18-03010_SP15	15	570	9.500	0.0						

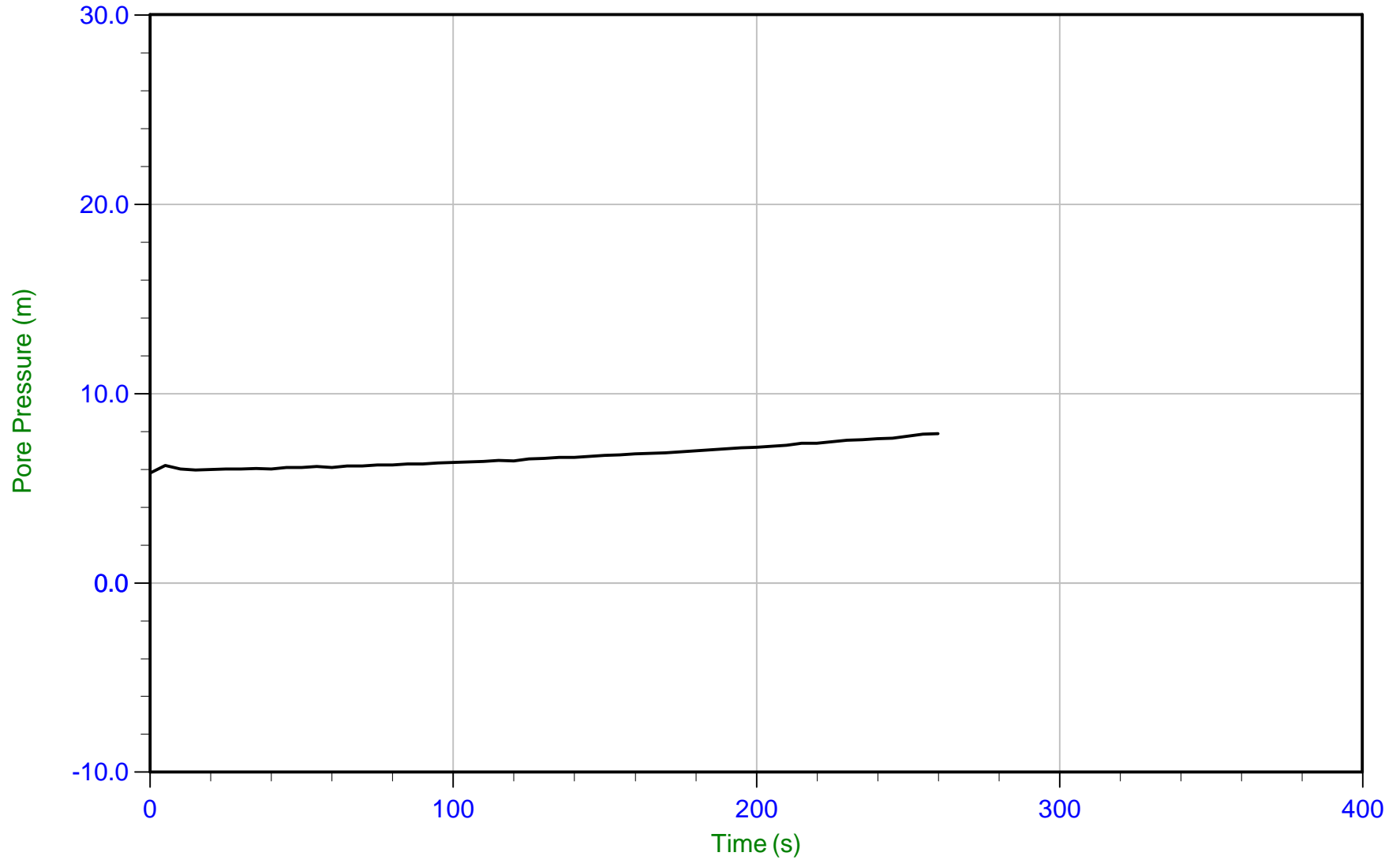
1. Time is relative to where u_{max} occurred
2. Houlsby and Teh, 1991



Stantec

Job No: 18-03010
Date: 05/02/2018 08:26
Site: Val Vista Ranch, Springbank, AB

Sounding: SCPT18-01
Cone: 329:T1500F15U500 Area=15 cm²



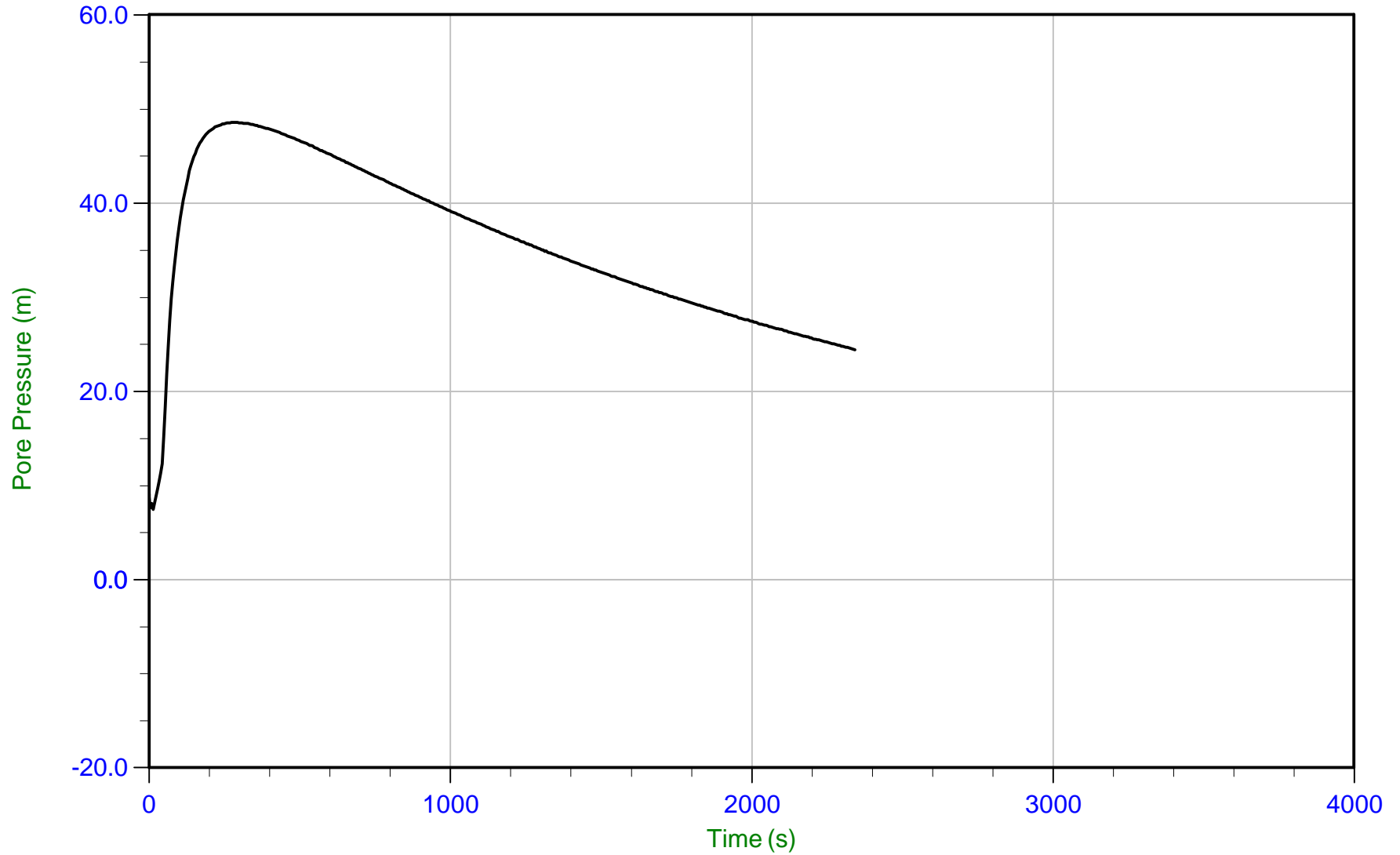
Trace Summary: Filename: 18-03010_SP01.PPF U Min: 5.8 m
Depth: 2.850 m / 9.350 ft U Max: 7.9 m
Duration: 260.0 s



Stantec

Job No: 18-03010
Date: 05/02/2018 08:26
Site: Val Vista Ranch, Springbank, AB

Sounding: SCPT18-01
Cone: 329:T1500F15U500 Area=15 cm²



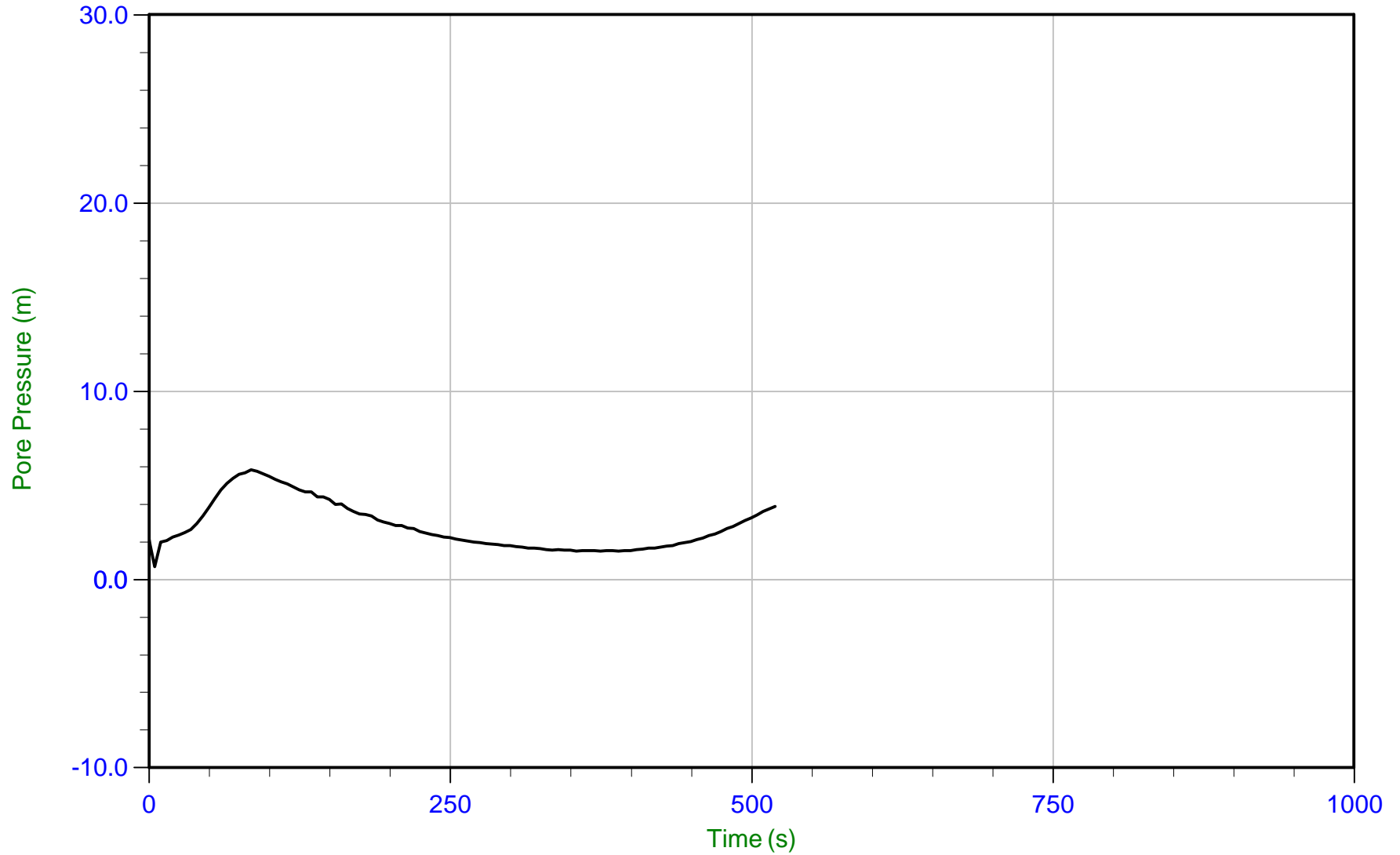
Trace Summary: Filename: 18-03010_SP01.PPF U Min: 7.4 m
Depth: 7.075 m / 23.212 ft U Max: 48.6 m
Duration: 2345.0 s



Stantec

Job No: 18-03010
Date: 05/02/2018 08:26
Site: Val Vista Ranch, Springbank, AB

Sounding: SCPT18-01
Cone: 329:T1500F15U500 Area=15 cm²



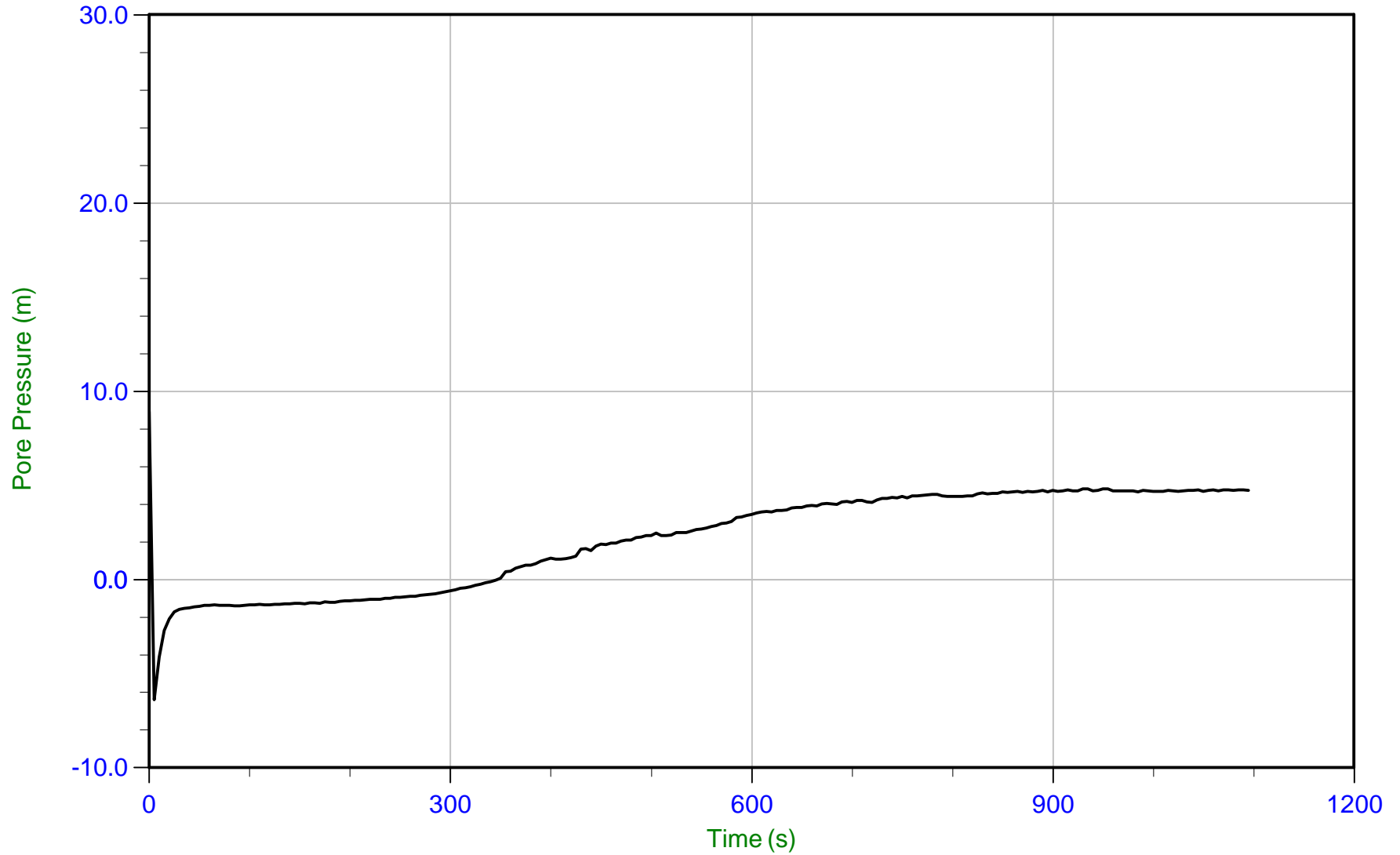
Trace Summary: Filename: 18-03010_SP01.PPF U Min: 0.7 m
Depth: 11.825 m / 38.795 ft U Max: 5.8 m
Duration: 520.0 s



Stantec

Job No: 18-03010
Date: 05/02/2018 08:26
Site: Val Vista Ranch, Springbank, AB

Sounding: SCPT18-01
Cone: 329:T1500F15U500 Area=15 cm²



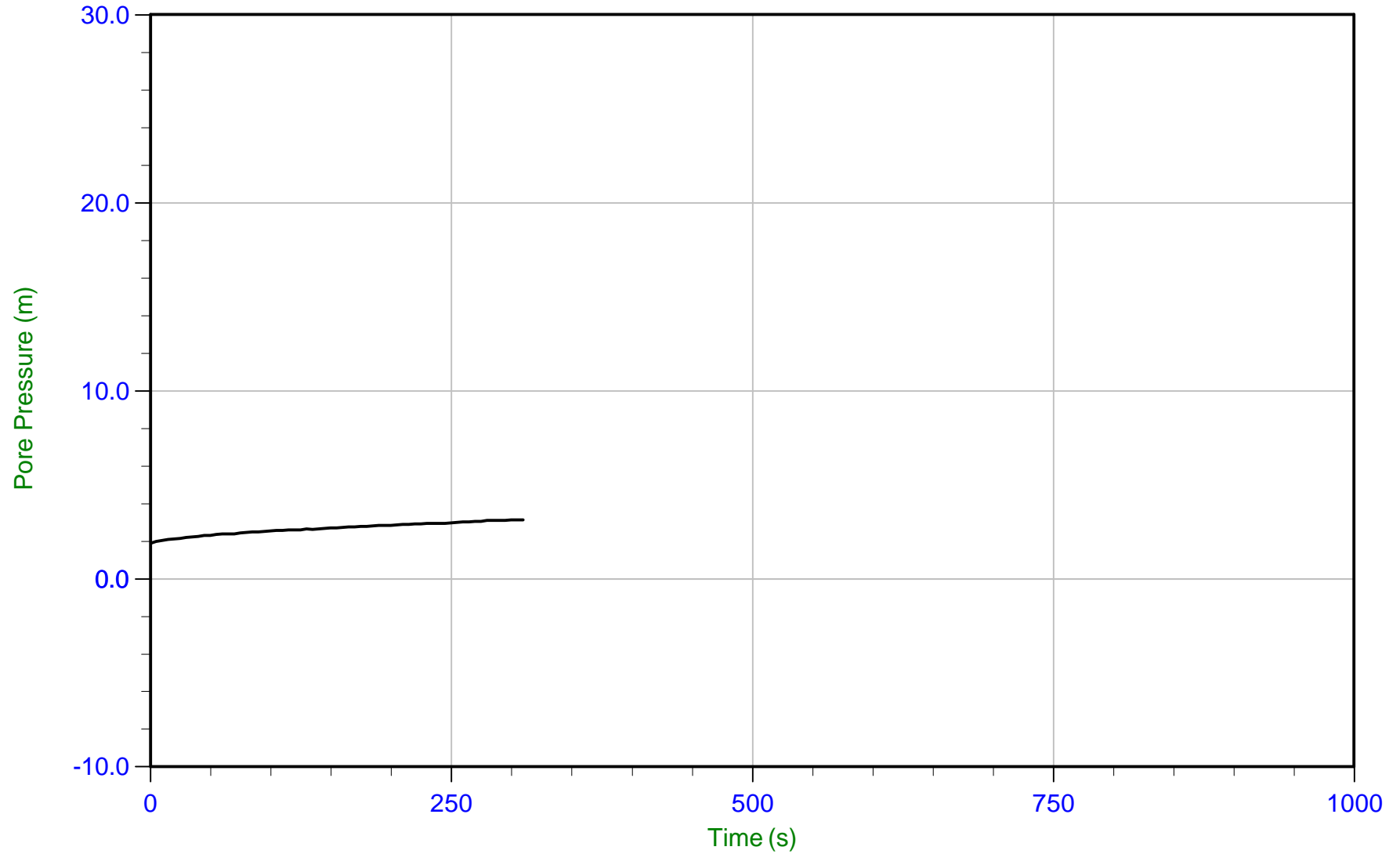
Trace Summary: Filename: 18-03010_SP01.PPF U Min: -6.4 m WT: 9.131 m / 29.957 ft
Depth: 13.775 m / 45.193 ft U Max: 8.9 m Ueq: 4.6 m
Duration: 1095.0 s



Stantec

Job No: 18-03010
Date: 05/01/2018 14:45
Site: Val Vista Ranch, Springbank, AB

Sounding: SCPT18-03
Cone: 329:T1500F15U500 Area=15 cm²



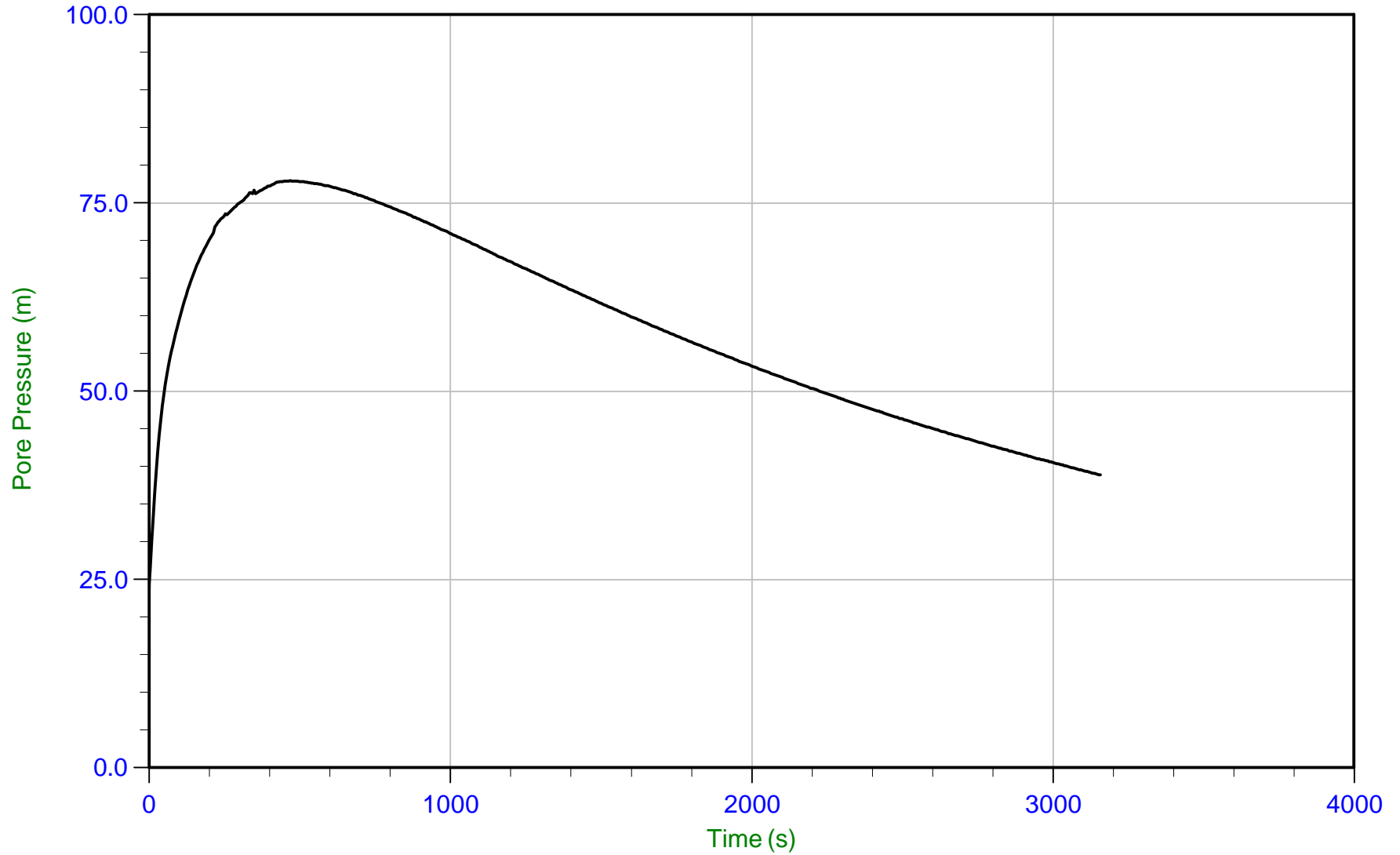
Trace Summary: Filename: 18-03010_SP03.PPF U Min: 1.9 m
Depth: 2.925 m / 9.596 ft U Max: 3.1 m
Duration: 310.0 s



Stantec

Job No: 18-03010
Date: 05/01/2018 14:45
Site: Val Vista Ranch, Springbank, AB

Sounding: SCPT18-03
Cone: 329:T1500F15U500 Area=15 cm²



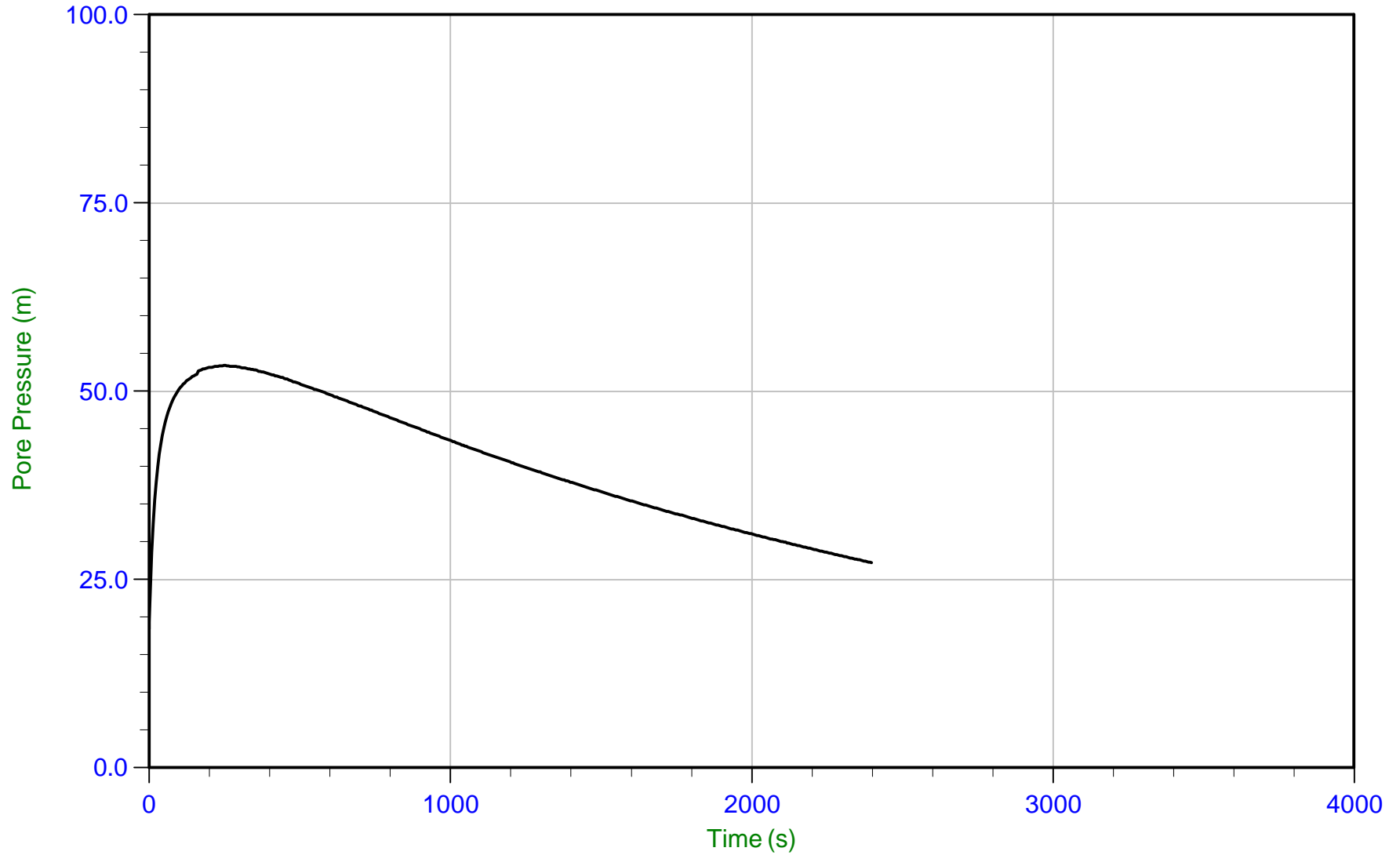
Trace Summary: Filename: 18-03010_SP03.PPF U Min: 23.8 m
Depth: 5.975 m / 19.603 ft U Max: 77.9 m
Duration: 3160.0 s



Stantec

Job No: 18-03010
Date: 05/01/2018 14:45
Site: Val Vista Ranch, Springbank, AB

Sounding: SCPT18-03
Cone: 329:T1500F15U500 Area=15 cm²



Trace Summary: Filename: 18-03010_SP03.PPF U Min: 18.4 m WT: 7.000 m / 22.966 ft T(50): 2104.8 s
 Depth: 8.900 m / 29.199 ft U Max: 53.4 m Ueq: 1.9 m Ir: 100
 Duration: 2400.0 s U(50): 27.65 m Ch: 0.2 cm²/min



Stantec

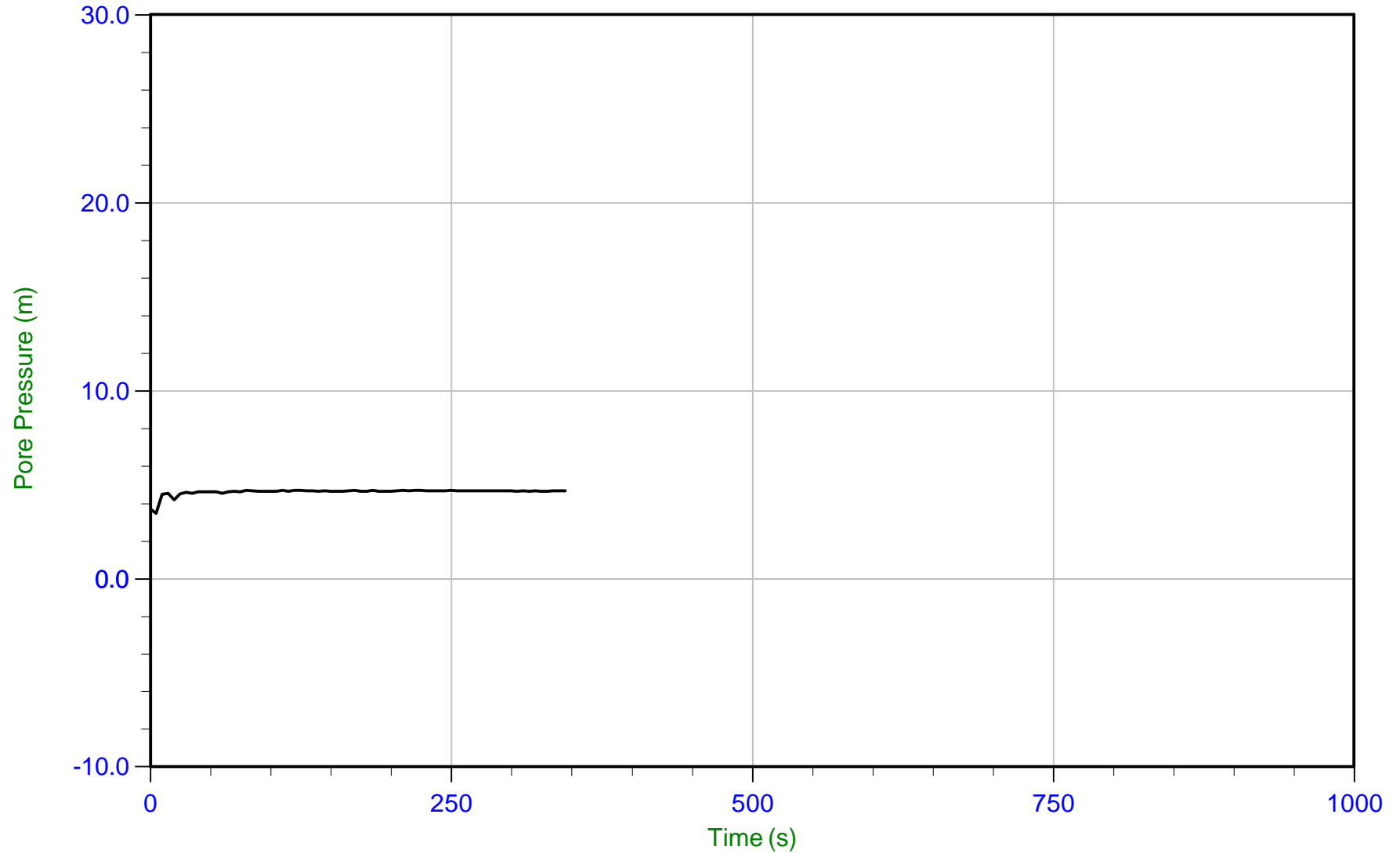
Job No: 18-03010

Date: 05/01/2018 14:45

Site: Val Vista Ranch, Springbank, AB

Sounding: SCPT18-03

Cone: 329:T1500F15U500 Area=15 cm²



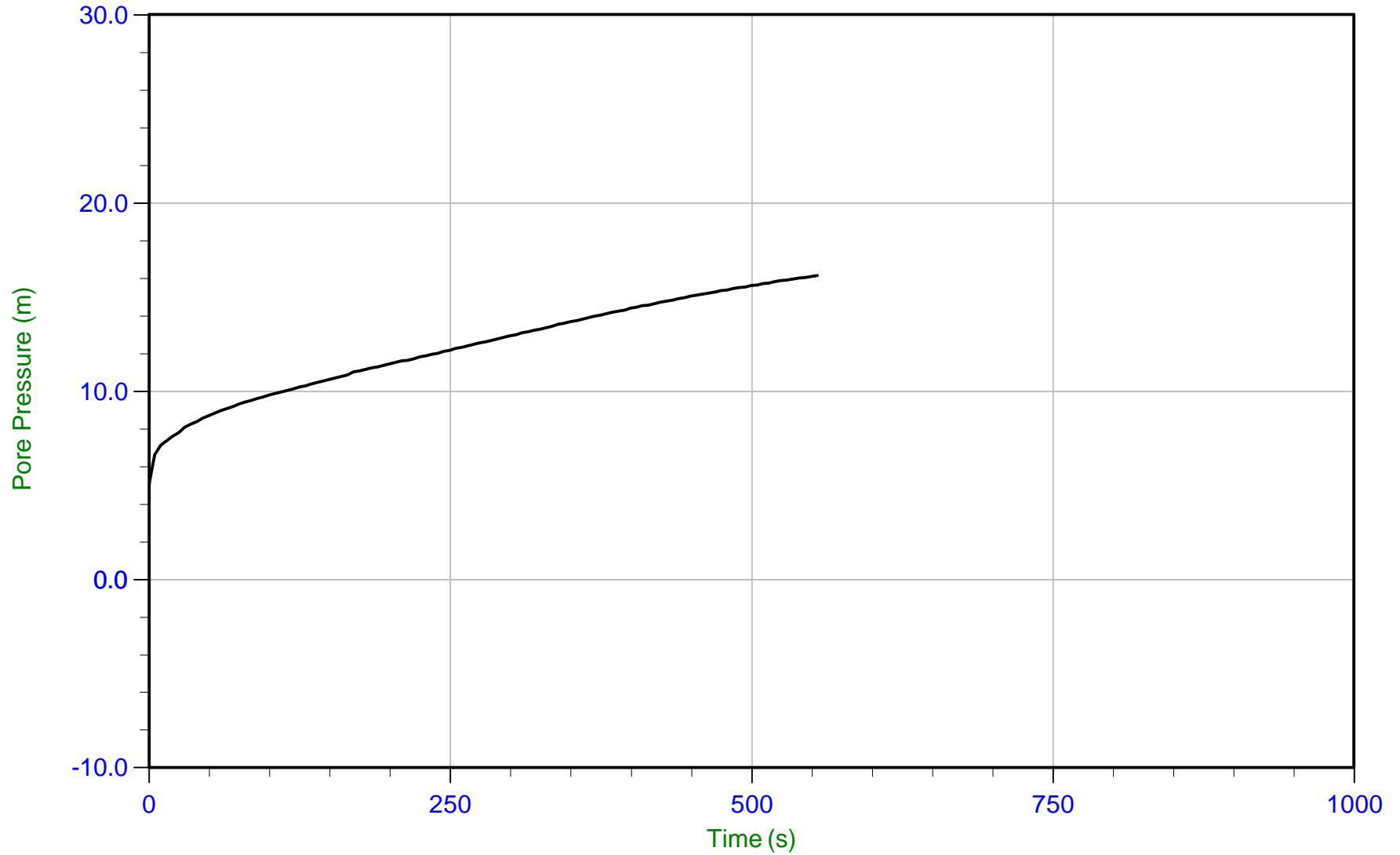
Trace Summary: Filename: 18-03010_SP03.PPF U Min: 3.5 m WT: 7.029 m / 23.061 ft
 Depth: 11.775 m / 38.631 ft U Max: 4.7 m Ueq: 4.7 m
 Duration: 345.0 s



Stantec

Job No: 18-03010
Date: 05/01/2018 10:46
Site: Val Vista Ranch, Springbank, AB

Sounding: SCPT18-05
Cone: 316:T1500F15U500 Area=15 cm²



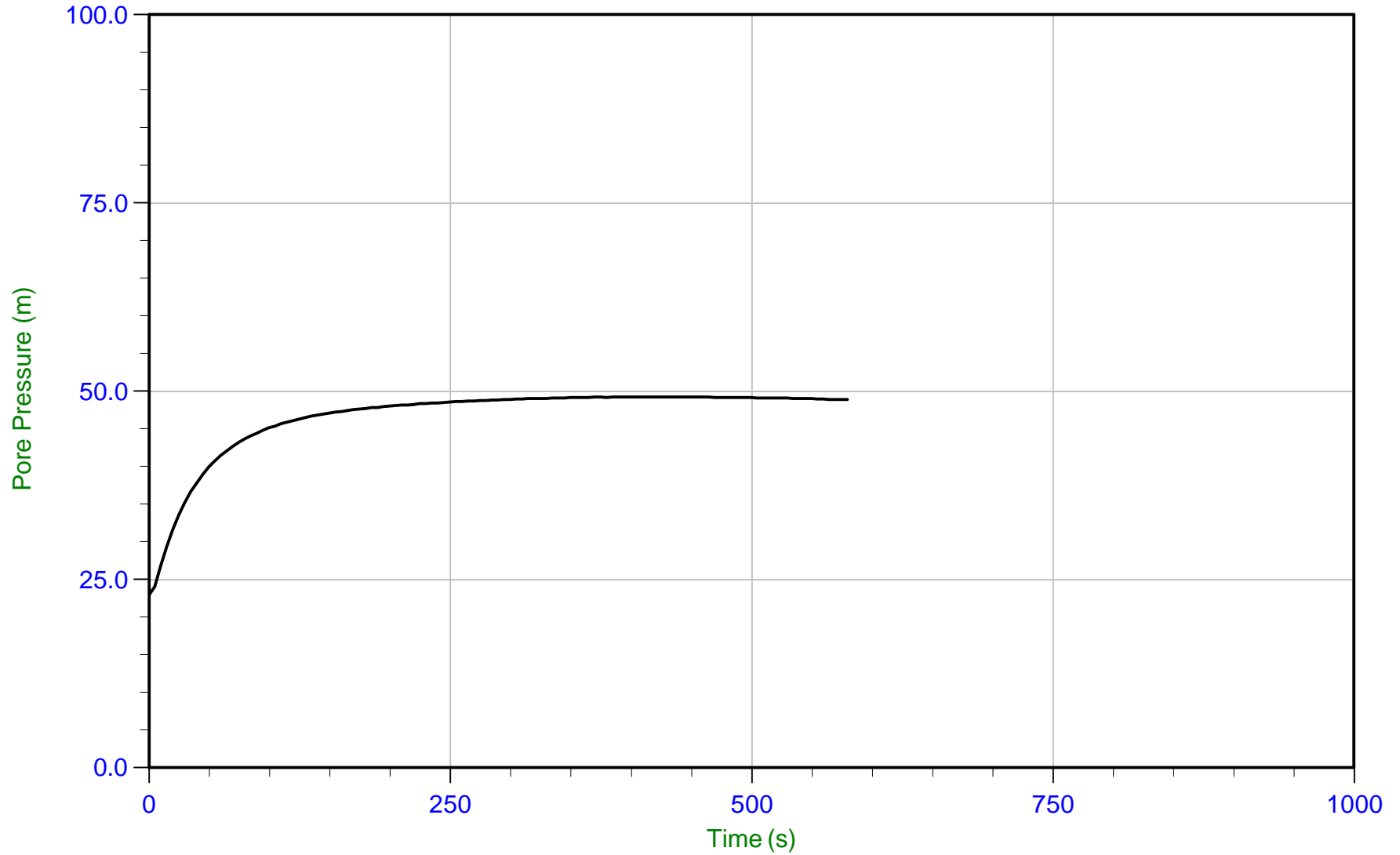
Trace Summary: Filename: 18-03010_SP05.PPF U Min: 5.1 m
Depth: 2.975 m / 9.760 ft U Max: 16.2 m
Duration: 555.0 s



Stantec

Job No: 18-03010
Date: 05/01/2018 10:46
Site: Val Vista Ranch, Springbank, AB

Sounding: SCPT18-05
Cone: 316:T1500F15U500 Area=15 cm²



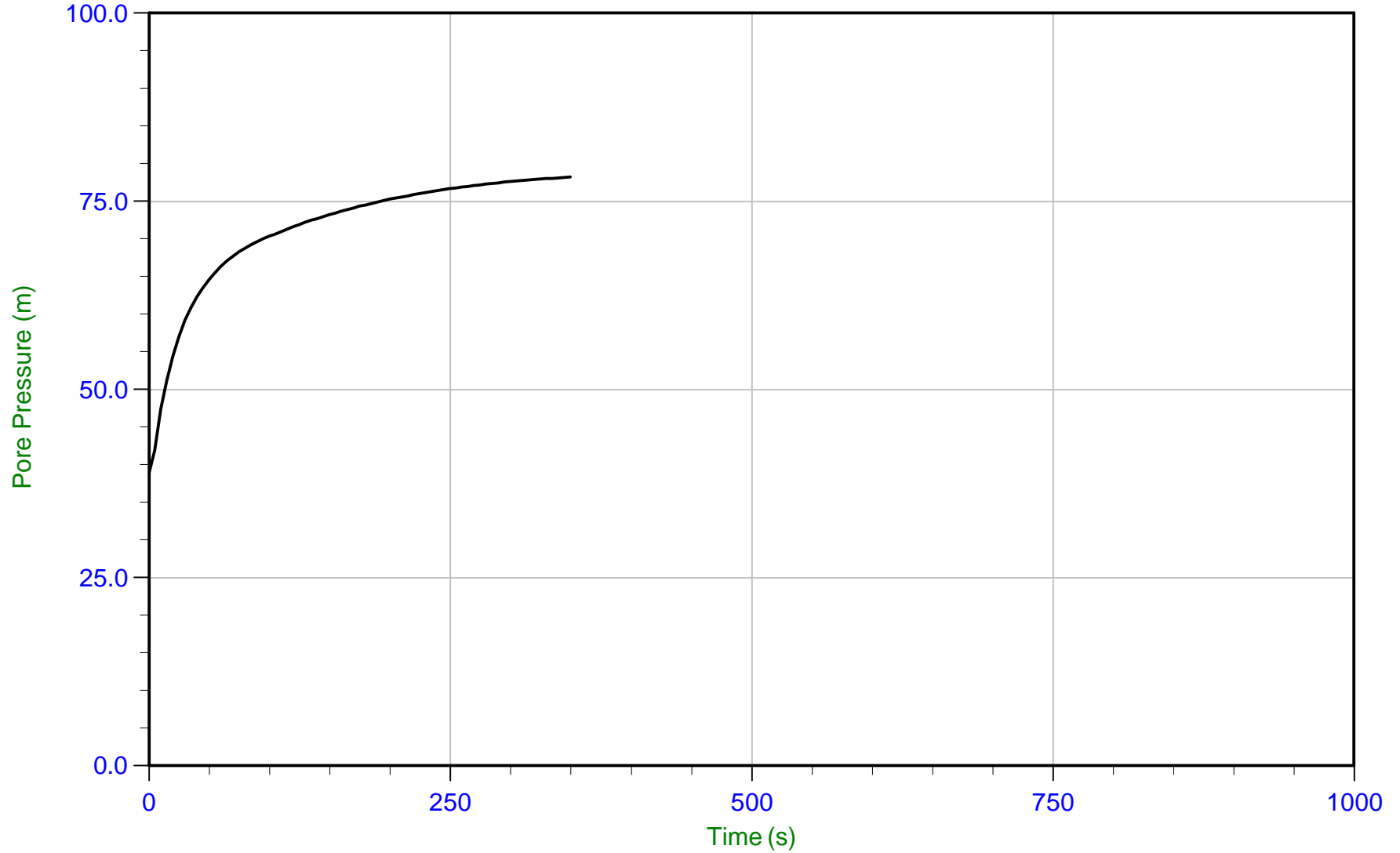
Trace Summary: Filename: 18-03010_SP05.PPF U Min: 22.9 m
Depth: 5.975 m / 19.603 ft U Max: 49.2 m
Duration: 580.0 s



Stantec

Job No: 18-03010
Date: 05/01/2018 10:46
Site: Val Vista Ranch, Springbank, AB

Sounding: SCPT18-05
Cone: 316:T1500F15U500 Area=15 cm²



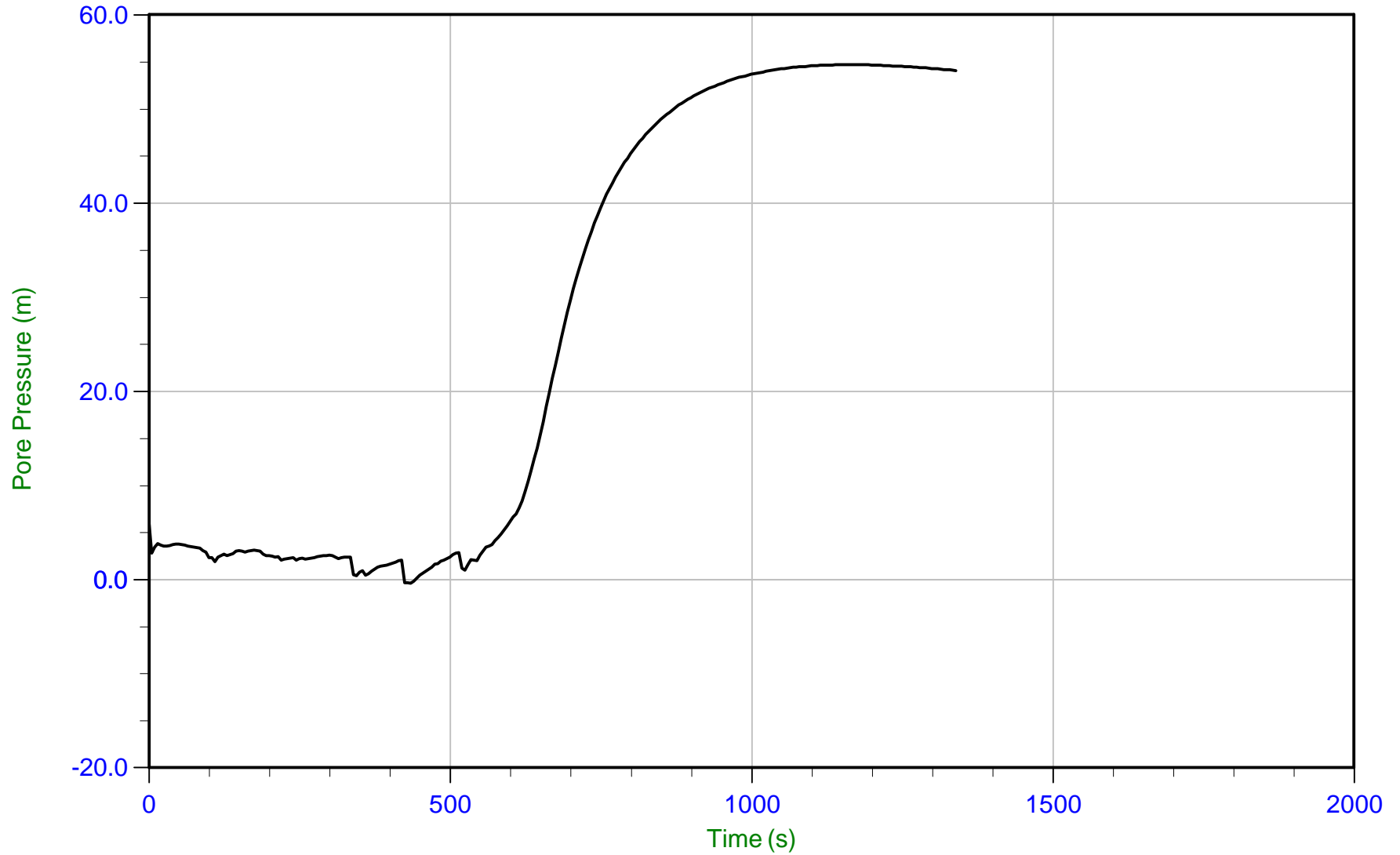
Trace Summary: Filename: 18-03010_SP05.PPF U Min: 38.9 m
Depth: 8.975 m / 29.445 ft U Max: 78.2 m
Duration: 350.0 s



Stantec

Job No: 18-03010
Date: 05/01/2018 10:46
Site: Val Vista Ranch, Springbank, AB

Sounding: SCPT18-05
Cone: 316:T1500F15U500 Area=15 cm²



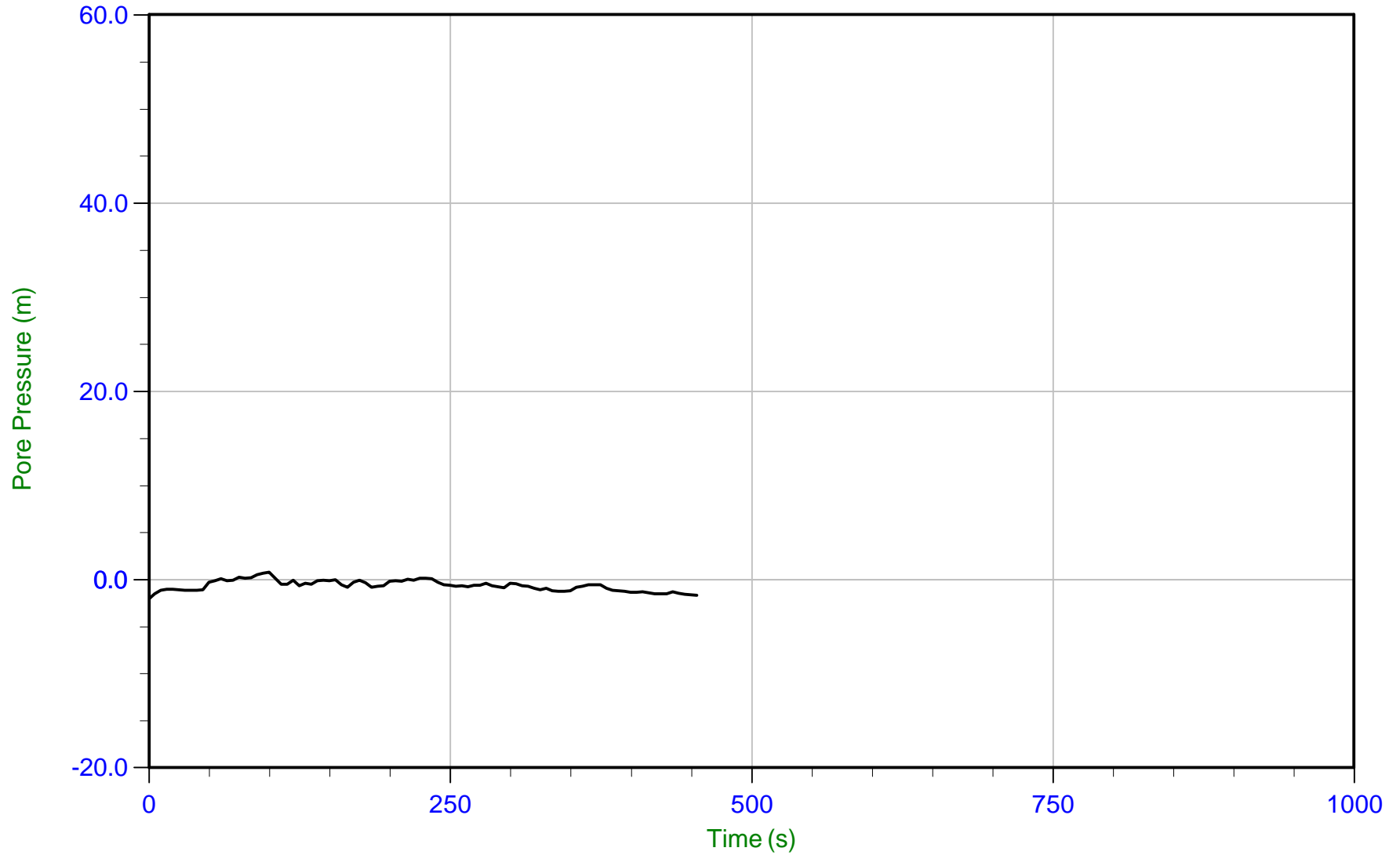
Trace Summary: Filename: 18-03010_SP05.PPF U Min: -0.4 m
Depth: 10.975 m / 36.007 ft U Max: 54.7 m
Duration: 1340.0 s



Stantec

Job No: 18-03010
Date: 05/01/2018 10:46
Site: Val Vista Ranch, Springbank, AB

Sounding: SCPT18-05
Cone: 316:T1500F15U500 Area=15 cm²



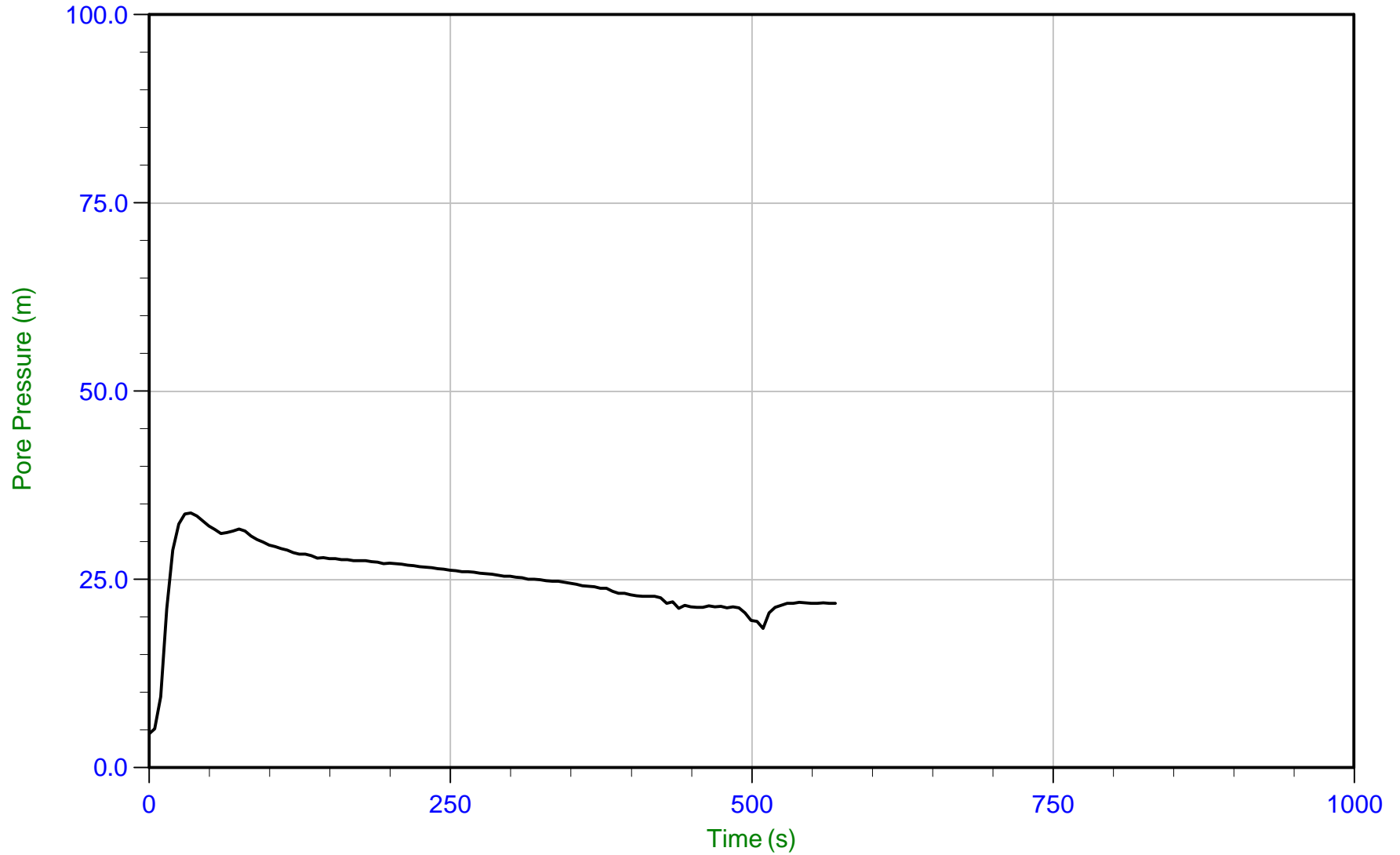
Trace Summary: Filename: 18-03010_SP05.PPF U Min: -2.0 m WT: 11.975 m / 39.288 ft
Depth: 11.975 m / 39.288 ft U Max: 0.8 m Ueq: 0.0 m
Duration: 455.0 s



Stantec

Job No: 18-03010
Date: 05/01/2018 10:46
Site: Val Vista Ranch, Springbank, AB

Sounding: SCPT18-05
Cone: 316:T1500F15U500 Area=15 cm²



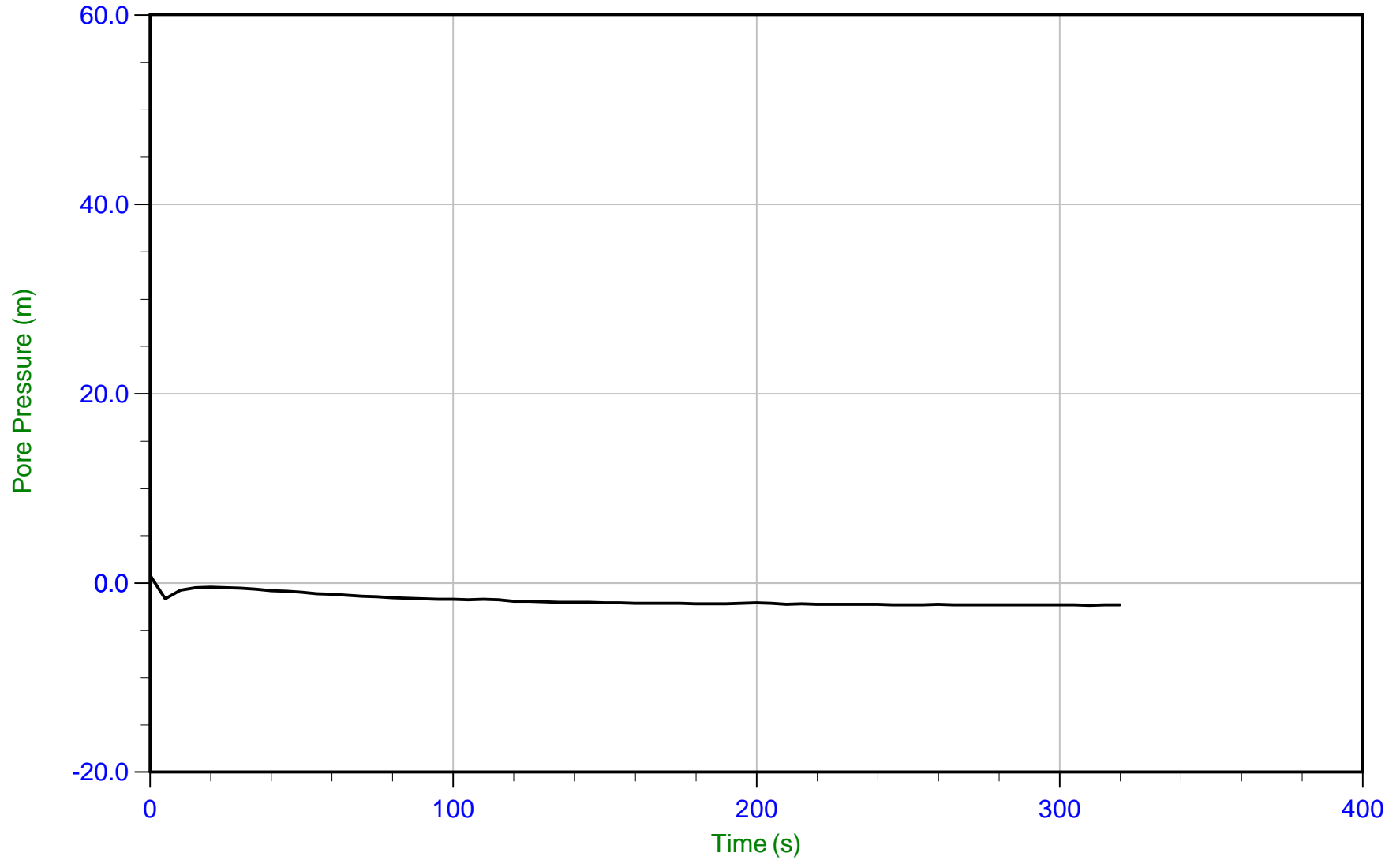
Trace Summary: Filename: 18-03010_SP05.PPF U Min: 4.5 m
Depth: 13.975 m / 45.849 ft U Max: 33.8 m
Duration: 570.0 s



Stantec

Job No: 18-03010
Date: 05/01/2018 10:46
Site: Val Vista Ranch, Springbank, AB

Sounding: SCPT18-05
Cone: 316:T1500F15U500 Area=15 cm²



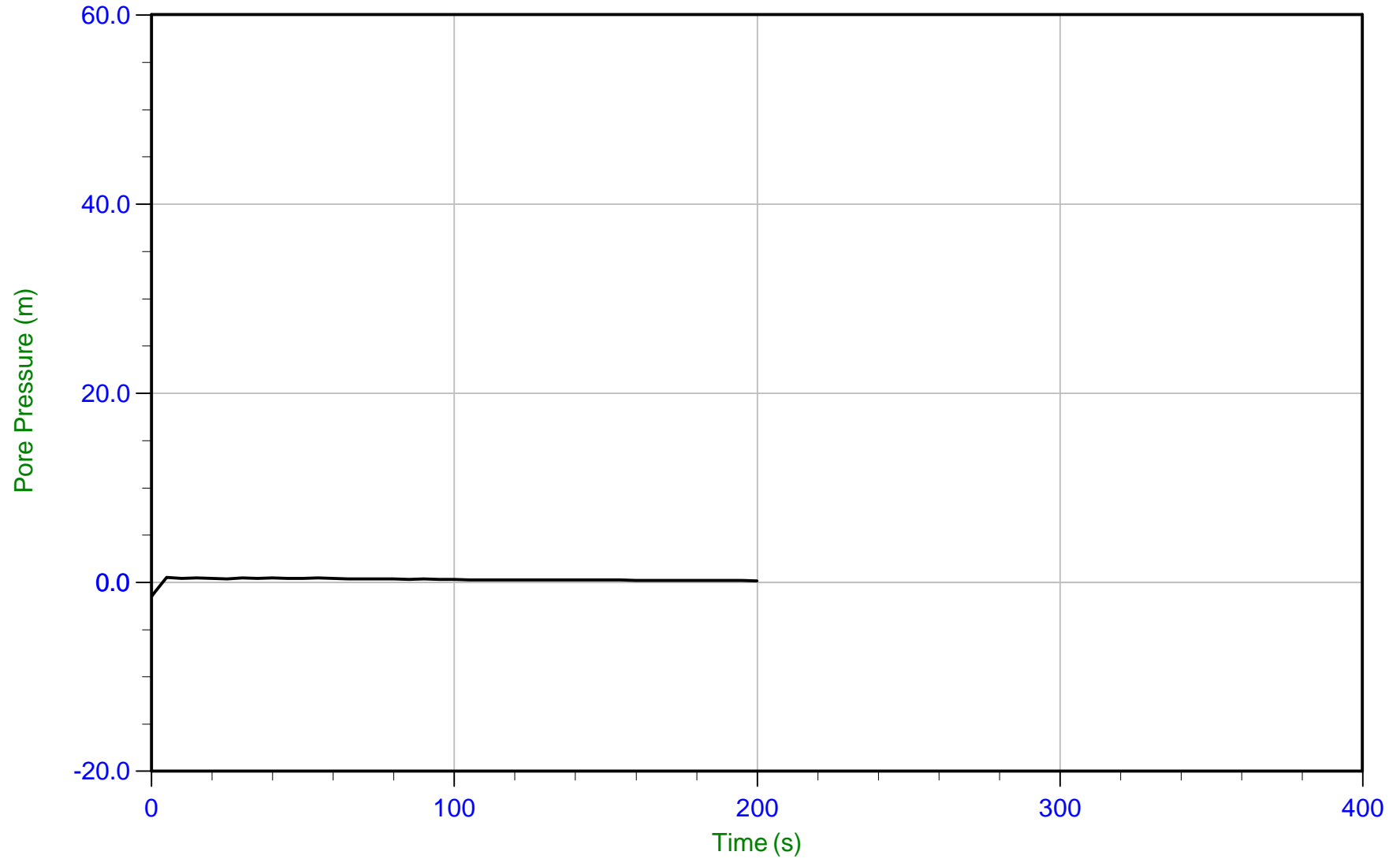
Trace Summary: Filename: 18-03010_SP05.PPF U Min: -2.3 m
Depth: 16.425 m / 53.887 ft U Max: 0.8 m
Duration: 320.0 s



Stantec

Job No: 18-03010
Date: 05/03/2018 08:49
Site: Val Vista Ranch, Springbank, AB

Sounding: SCPT18-10
Cone: 329:T1500F15U500 Area=15 cm²



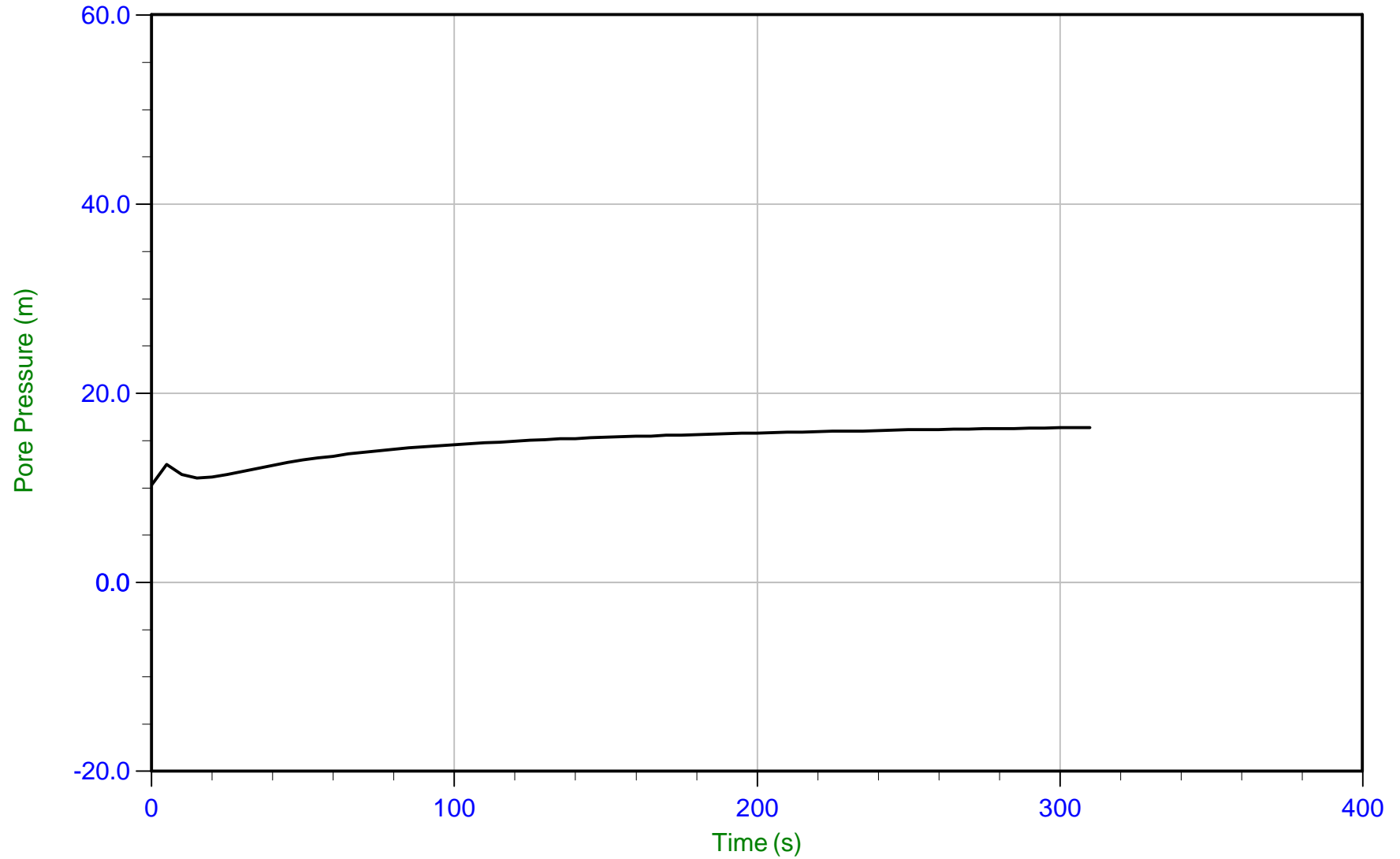
Trace Summary: Filename: 18-03010_SP10.PPF U Min: -1.5 m WT: 0.925 m / 3.035 ft
Depth: 0.925 m / 3.035 ft U Max: 0.5 m Ueq: 0.0 m
Duration: 200.0 s



Stantec

Job No: 18-03010
Date: 05/03/2018 08:49
Site: Val Vista Ranch, Springbank, AB

Sounding: SCPT18-10
Cone: 329:T1500F15U500 Area=15 cm²



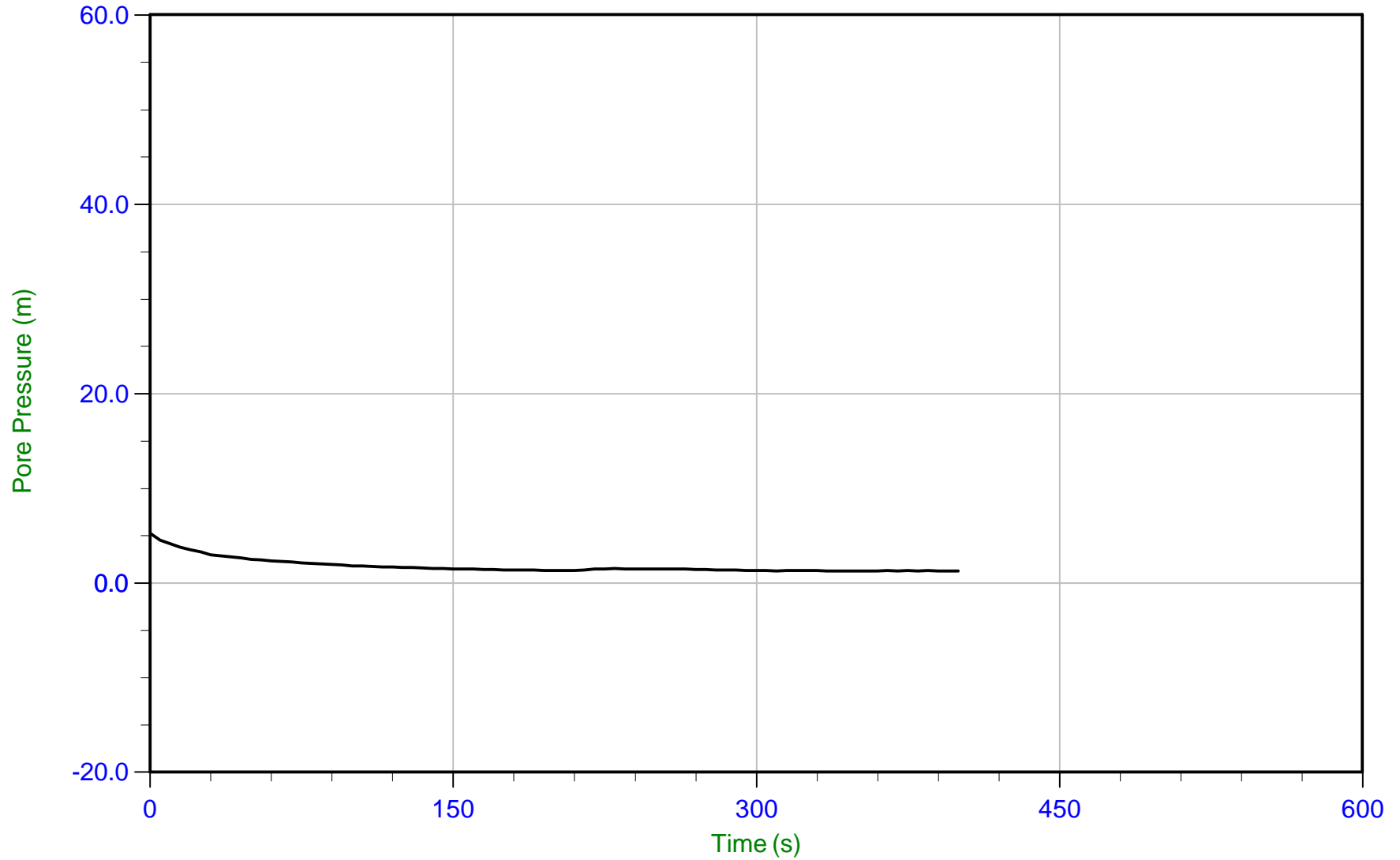
Trace Summary: Filename: 18-03010_SP10.PPF U Min: 10.3 m
Depth: 4.925 m / 16.158 ft U Max: 16.4 m
Duration: 310.0 s



Stantec

Job No: 18-03010
Date: 05/03/2018 08:49
Site: Val Vista Ranch, Springbank, AB

Sounding: SCPT18-10
Cone: 329:T1500F15U500 Area=15 cm²



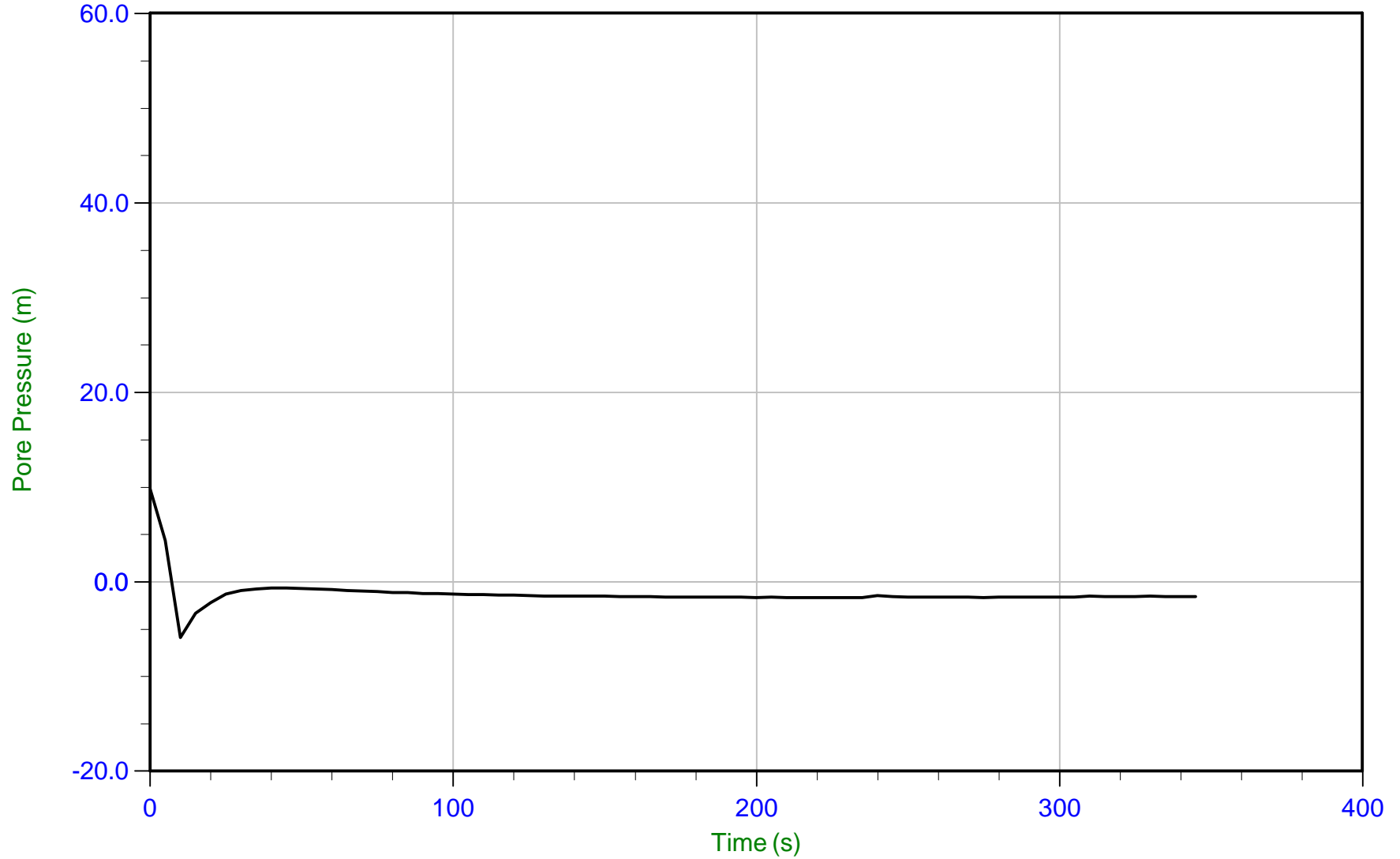
Trace Summary: Filename: 18-03010_SP10.PPF U Min: 1.3 m WT: 6.594 m / 21.634 ft
Depth: 7.950 m / 26.082 ft U Max: 5.3 m Ueq: 1.4 m
Duration: 400.0 s



Stantec

Job No: 18-03010
Date: 05/03/2018 08:49
Site: Val Vista Ranch, Springbank, AB

Sounding: SCPT18-10
Cone: 329:T1500F15U500 Area=15 cm²



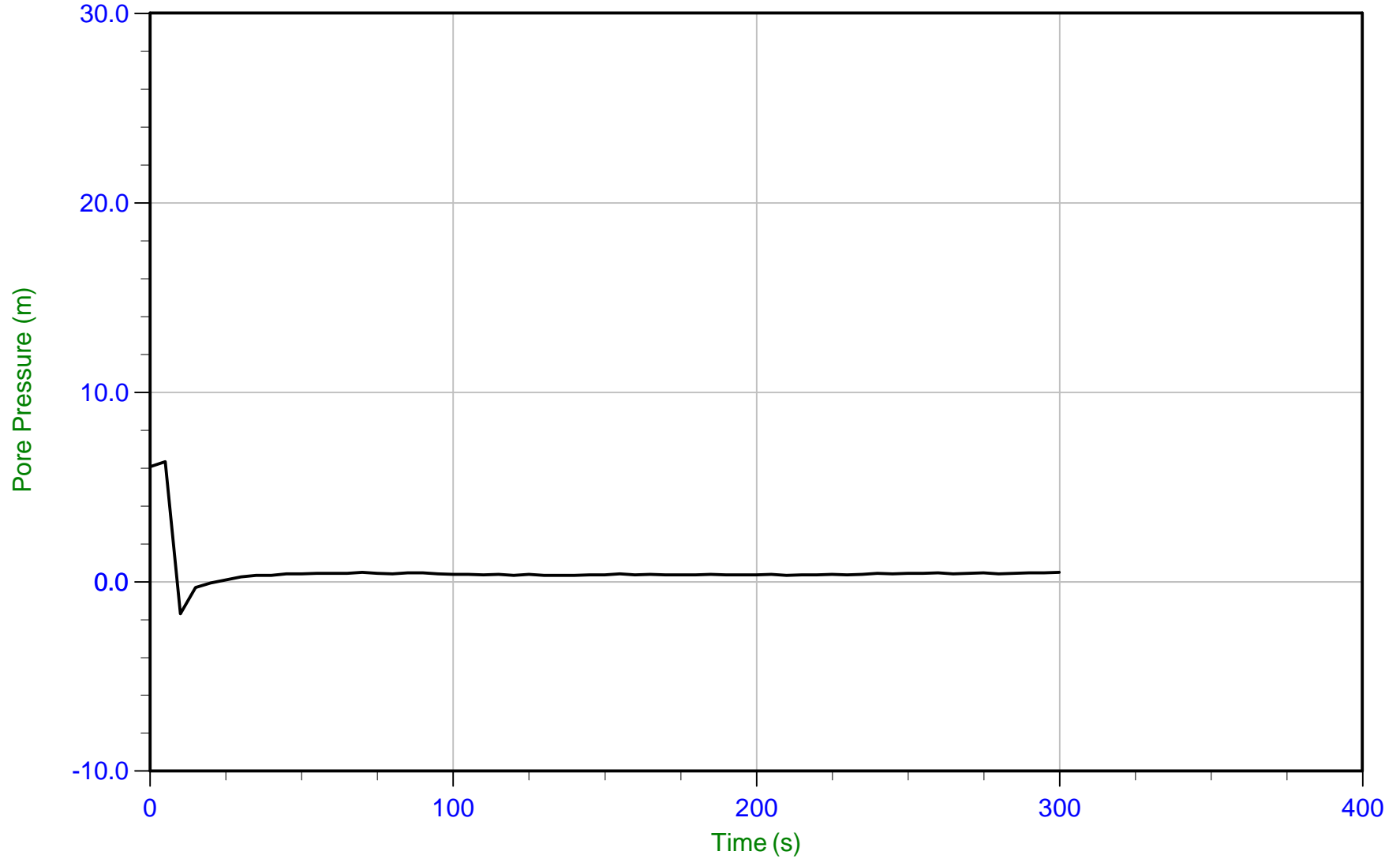
Trace Summary: Filename: 18-03010_SP10.PPF U Min: -5.9 m
Depth: 17.725 m / 58.152 ft U Max: 9.8 m
Duration: 345.0 s



Stantec

Job No: 18-03010
Date: 05/02/2018 12:40
Site: Val Vista Ranch, Springbank, AB

Sounding: SCPT18-12
Cone: 329:T1500F15U500 Area=15 cm²



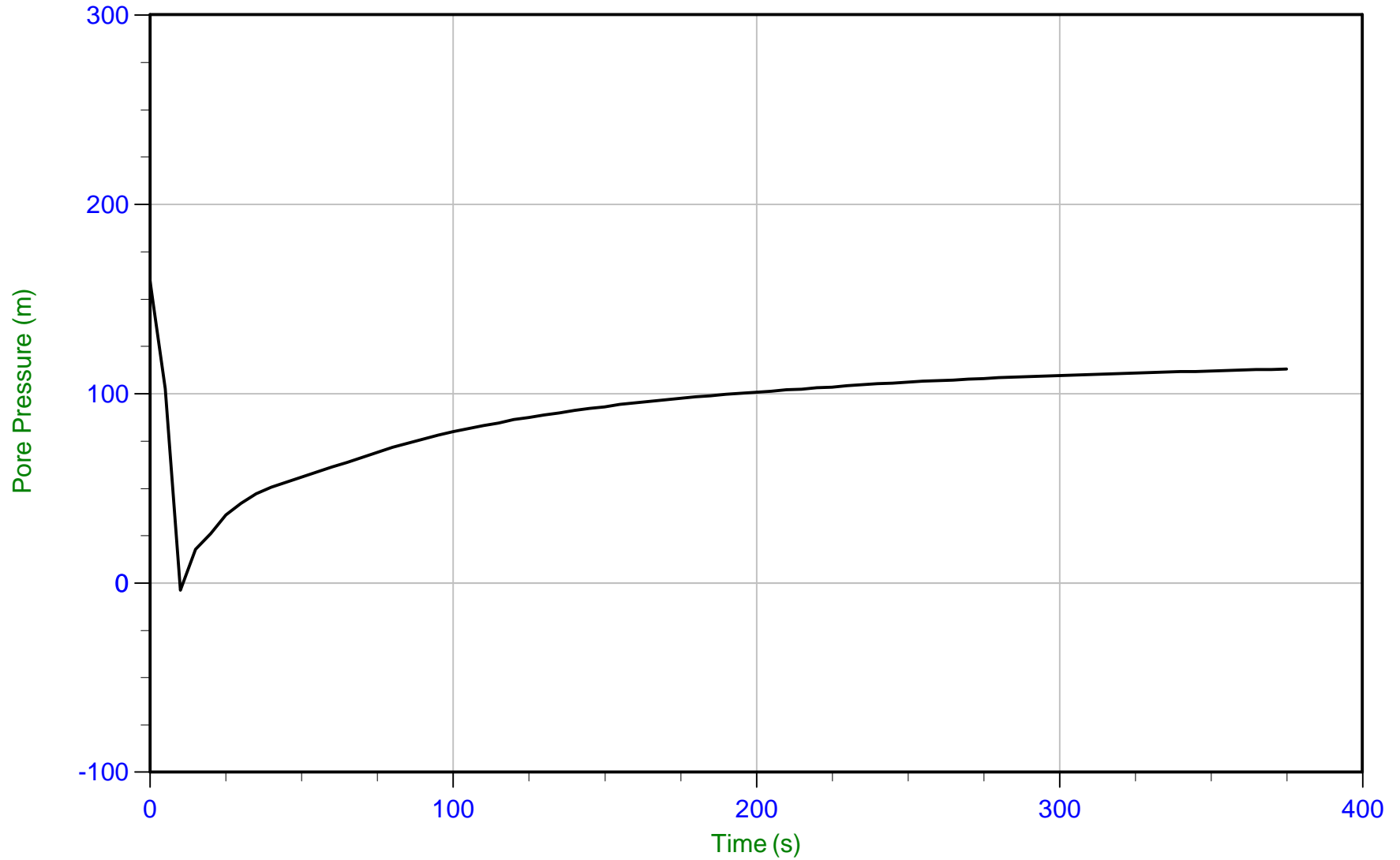
Trace Summary: Filename: 18-03010_SP12.PPF U Min: -1.7 m WT: 8.792 m / 28.845 ft
Depth: 9.300 m / 30.511 ft U Max: 6.3 m Ueq: 0.5 m
Duration: 300.0 s



Stantec

Job No: 18-03010
Date: 05/02/2018 12:40
Site: Val Vista Ranch, Springbank, AB

Sounding: SCPT18-12
Cone: 329:T1500F15U500 Area=15 cm²



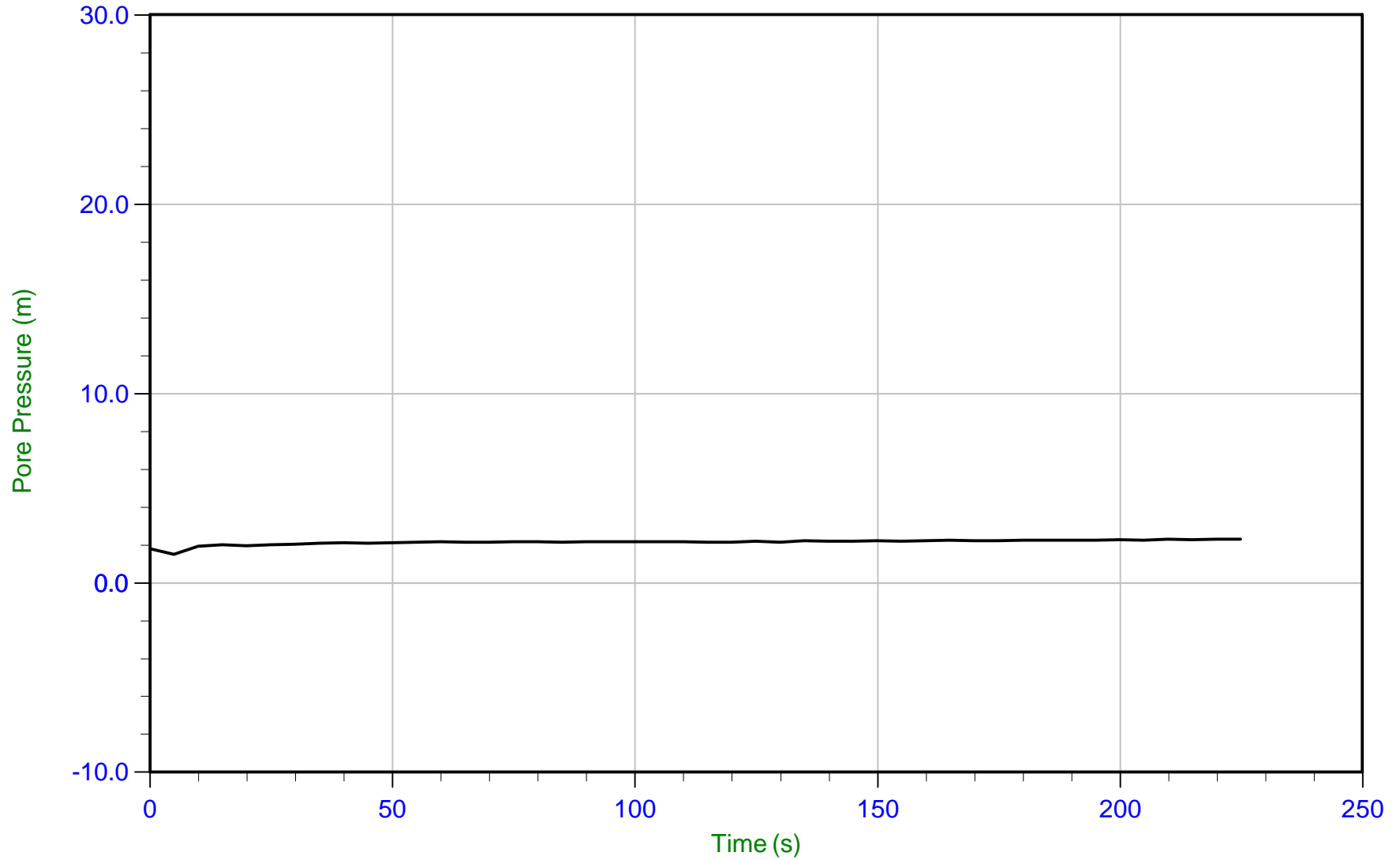
Trace Summary: Filename: 18-03010_SP12.PPF U Min: -3.8 m
Depth: 9.750 m / 31.988 ft U Max: 159.2 m
Duration: 375.0 s



Stantec

Job No: 18-03010
Date: 05/02/2018 14:18
Site: Val Vista Ranch, Springbank, AB

Sounding: SCPT18-15
Cone: 329:T1500F15U500 Area=15 cm²



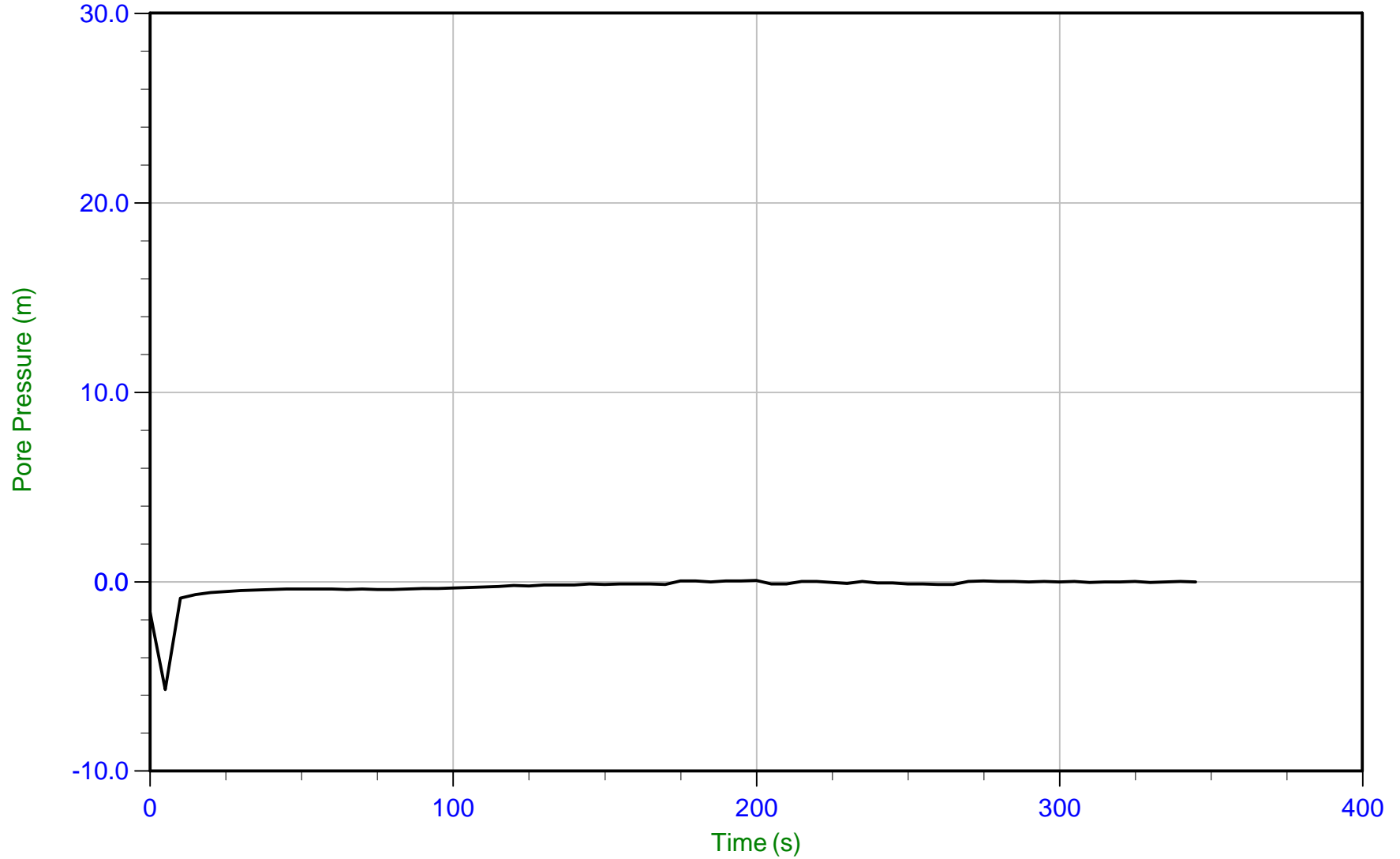
Trace Summary: Filename: 18-03010_SP15.PPF U Min: 1.5 m
Depth: 4.875 m / 15.994 ft U Max: 2.3 m
Duration: 225.0 s



Stantec

Job No: 18-03010
Date: 05/02/2018 14:18
Site: Val Vista Ranch, Springbank, AB

Sounding: SCPT18-15
Cone: 329:T1500F15U500 Area=15 cm²



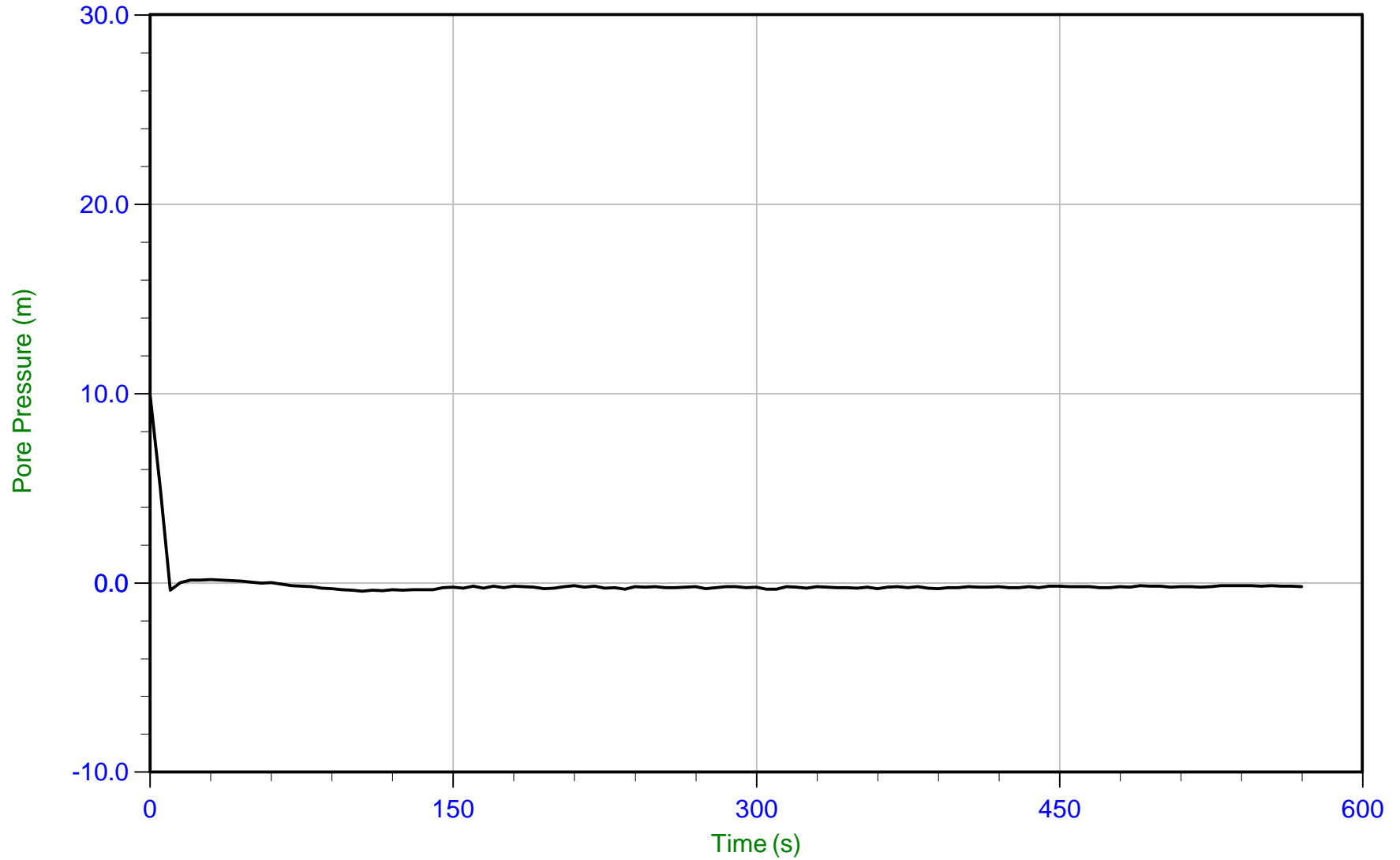
Trace Summary: Filename: 18-03010_SP15.PPF U Min: -5.7 m WT: 8.875 m / 29.117 ft
Depth: 8.875 m / 29.117 ft U Max: 0.1 m Ueq: 0.0 m
Duration: 345.0 s



Stantec

Job No: 18-03010
Date: 05/02/2018 14:18
Site: Val Vista Ranch, Springbank, AB

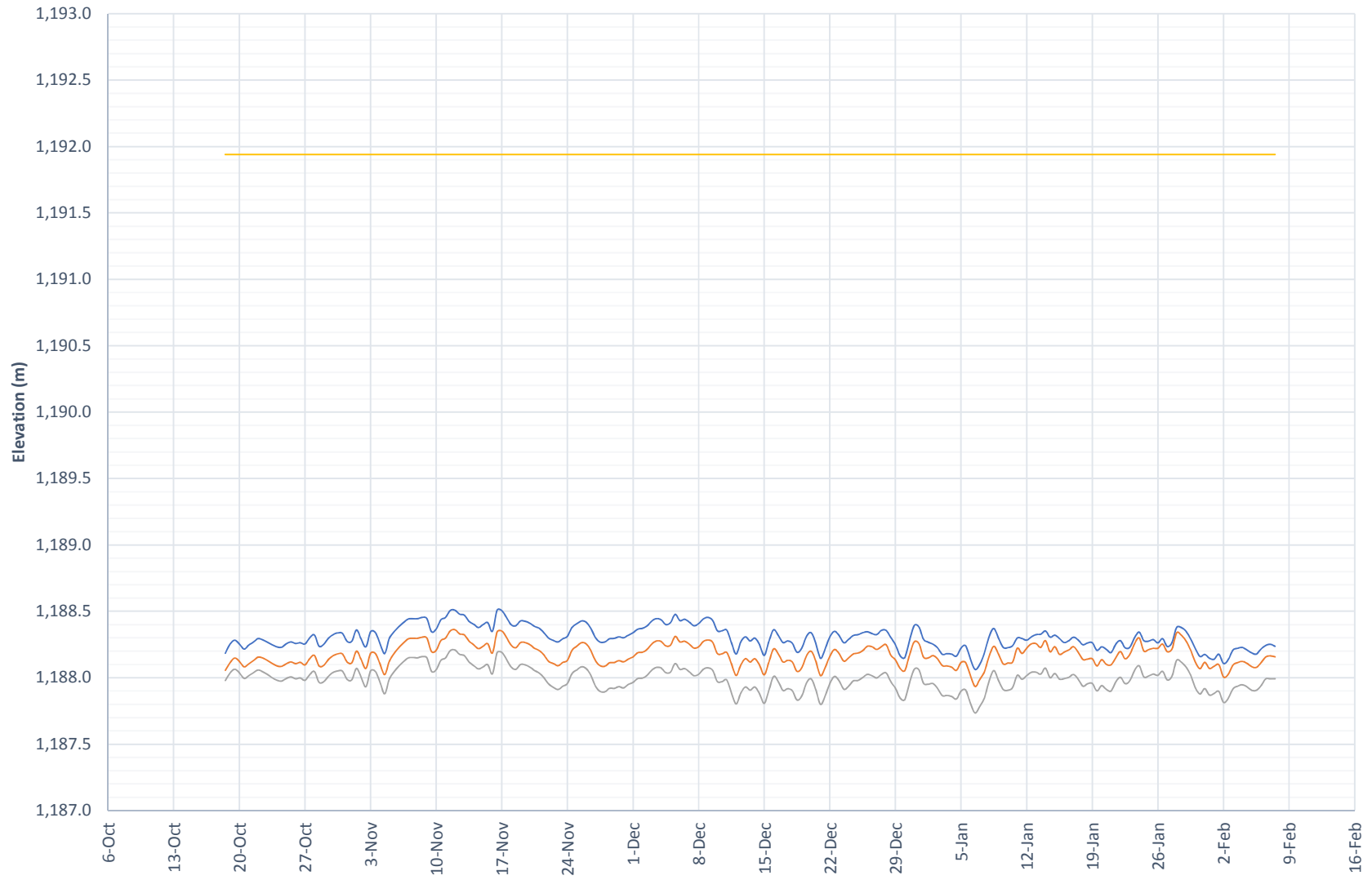
Sounding: SCPT18-15
Cone: 329:T1500F15U500 Area=15 cm²



Trace Summary: Filename: 18-03010_SP15.PPF U Min: -0.5 m WT: 9.500 m / 31.168 ft
Depth: 9.500 m / 31.168 ft U Max: 9.9 m Ueq: 0.0 m
Duration: 570.0 s

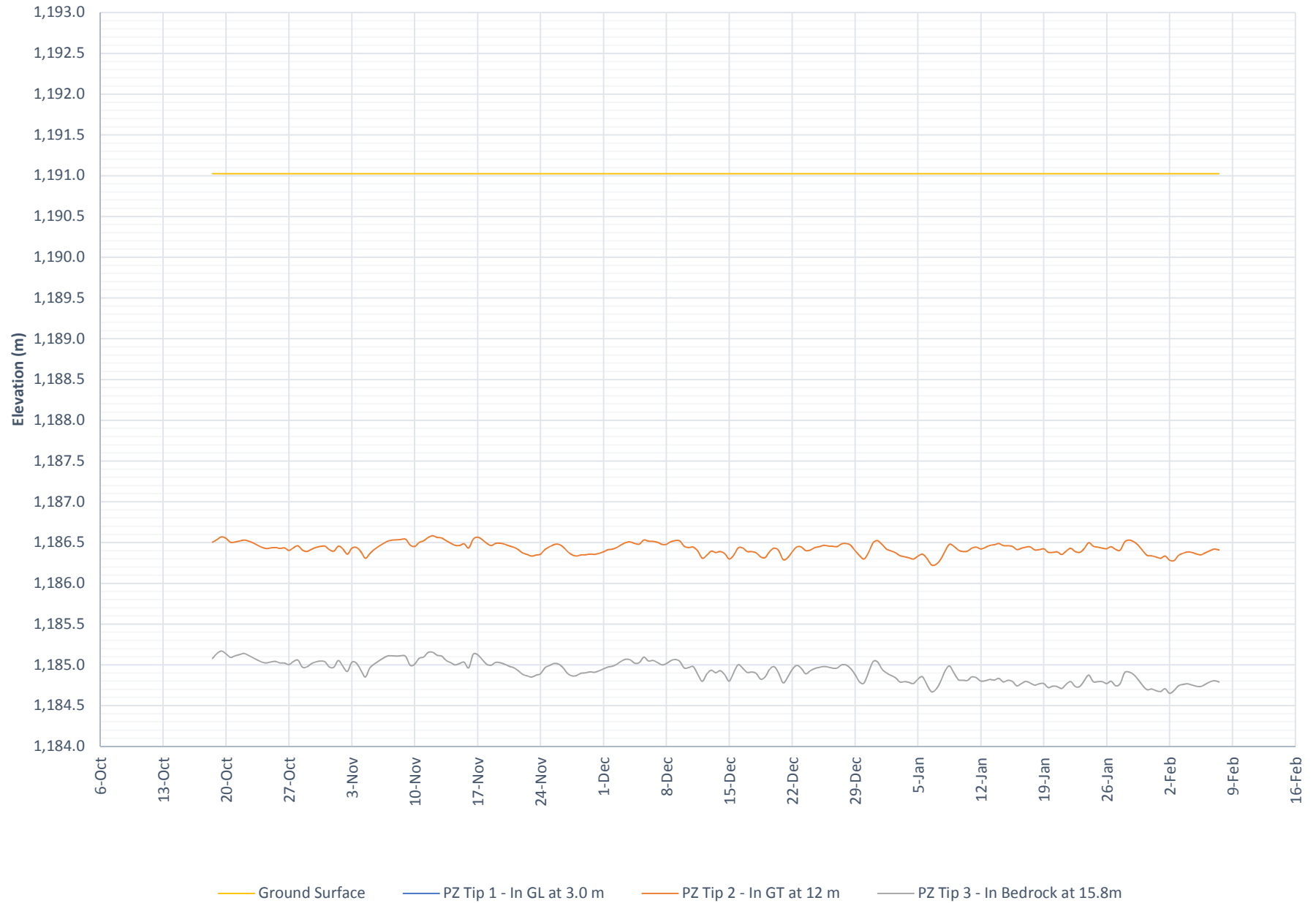
APPENDIX H: VIBRATING WIRE PIEZOMETER READINGS

Vibrating Wire Piezometers in Borehole GL1 - Oct 2018 to Feb 2019

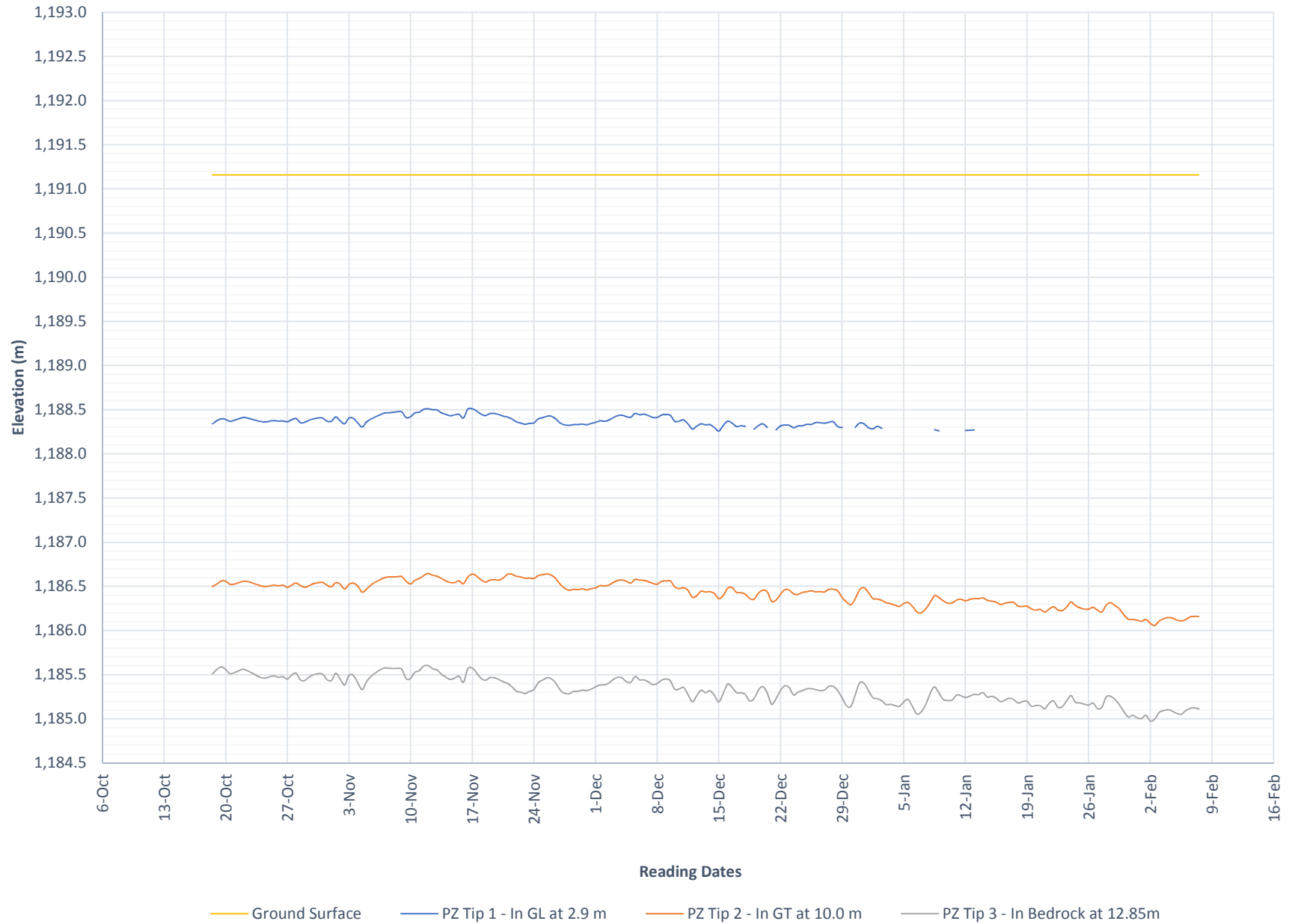


— Ground Surface — PZ Tip 1 - In GL at 7.0 m — PZ Tip 2 - In GT at 14 m — PZ Tip 3 - In Bedrock at 16.5m

Vibrating Wire Piezometers in Borehole GL3 - Oct 2018 to Feb 2019

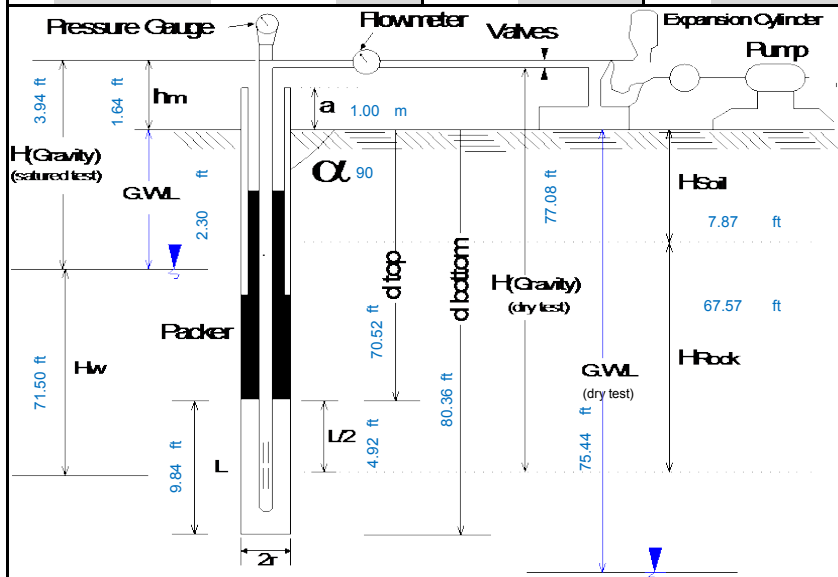


Vibrating Wire Piezometers in Borehole LLO17 - Oct 2016 to Feb 2019



APPENDIX I: PACKER TESTING RESULTS

GENERAL INFORMATION		BOREHOLE INFORMATION		TEST INFORMATION							
Contractor Company:	All Service Drilling	North (m):	5655698.000	Inclination/H (α):	90	Depth of the Test From (m):	21.50	to (m):	24.50	RQD%:	74
Field Responsible of Contractor:	Tim Plourde	East (m):	676679.000	Location:	Debris Barrier	Initial Hour:	15:20	d top:	21.50 m.	h soil (m):	2.40
Field Engineer of MWH:	Colleen Small	Elevation (m):	1219.000	Borehole Diameter (2r):	9.61	End Hour:	17:00	d bottom:	24.50 m.	h rock (m):	20.60
Date:	23-Apr-2018	Turn Day/Night:	Day	Azimuth:	N/A	GM (m):	0.7	hm (m):	0.50	L (m):	3.00
										a (m):	1



Packer Inflation Pressure = Pp

- $P_h = (d_{top} + a) \rho_{soil}$ Hydrostatic Pressure on the Packer & Convent. $\rho_{soil} = 0.7m$
- $P_w = 200 \text{ psi}$ Packer Working Pressure
- $P_p = (P_h + P_w) \times 1.2 \text{ psi}$ Packer Inflation Pressure

Minimum Allowable Pressure = Pmax

- $\sigma'_t = (H_{soil} \times \gamma_{soil} + H_{rock} \times \gamma_{rock})$ Correct for inclined holes & Convent 1m = 3.28 feet
- $u = [(H_{soil} + H_{rock}) - GWL] \times \gamma_w$ Correct for inclined holes & Convent 1m = 3.28 feet
- $\sigma'_v = \sigma'_t - u$ Correct 1 psi = 144 pd
- $H_g = H_{gravity} \times \gamma_w$ Correct for inclined holes & Convent 1m = 3.28 feet
- $P_{max} = \sigma'_v - H_g$ Convent 1 psi = 144 pd
- $P_M = \% P_{max}$ which is dependent on RQD

If RQD is > 75% in the test zone then: $P_{M1} = 25\% P_{max}$ $P_{M2} = 50\% P_{max}$ $P_{M3} = 75\% P_{max}$
 $P_{M4} = 25\% P_{max}$ $P_{M5} = 50\% P_{max}$

If RQD is < 75% in the test zone then: $P_{M1} = 20\% P_{max}$ $P_{M2} = 40\% P_{max}$ $P_{M3} = 60\% P_{max}$
 $P_{M4} = 40\% P_{max}$ $P_{M5} = 20\% P_{max}$

Notes:

- Maximum Allowable Pressure (Pmax) must not exceed 1 psi/ft (convert meters to ft) or 3.28 psi/m
- Account for pore water pressure if there is measured water
- Test Zone (L) should not be greater than 5m and 3m is recommended
- Hsoil, Hrock and Hw should be corrected if test hole is inclined [Hsoil of]
- Incremental Pressures depend on RQD
- Packer can only be set in rock that has an RQD > 60%
- $\gamma_{soil} = 100 \text{ pd}$
- $\gamma_{rock} = 140 \text{ pd}$
- $\gamma_w = 62.4 \text{ pd}$
- Inflow rate = 1000 L/min
- Wait until flow rate remains relatively constant and reaches equilibrium (~5 min) before starting tests
- Calibrating the flowmeter weekly

Legend:

- hm : Height to Gauge Pressure
- GWL : Ground Water Level
- Hgravity : Distance from Ground Water Level to Sewal
- d top : Depth from Ground surface to top of testing zone
- d bottom : Depth from Ground surface to bottom of testing zone
- α : Inclination with the horizontal
- L : Length of the portion of the hole tested
- 2r : Diameter of the hole tested
- Pm : Surface Gauge Pressure
- Rflowmeter : Flow Meter Reading
- q : Change in Flow Meter Reading
- Hw : Height of casing above the ground (stick up)
- a : Height of casing above the ground (stick up)

Maximum Allowable Pressure Calculation:

- $\sigma'_t = \frac{(7.87 \times 100 + 67.57 \times 140)}{144} = 71.16 \text{ ft. Psi}$
- $u = \frac{(7.87 + 67.57) - 2.3}{144} = 31.7 \text{ ft. Psi}$
- $\sigma'_v = 71.16 - 31.7 = 39.46 \text{ ft. Psi}$
- $H_g = \frac{3.94 \times 62.4}{144} = 1.71 \text{ ft. Psi}$
- $P_{max} = 39.46 - 1.71 = 37.75 \text{ ft. Psi}$

6.- P_M if RQD is > 75% in the test zone then:

$P_{M1} = 25\% P_{max} = 9$ $P_{M2} = 50\% P_{max} = 19$ $P_{M3} = 75\% P_{max} = 28$

$P_{M4} = 25\% P_{max} = 19$ $P_{M5} = 50\% P_{max} = 9$

P_M if RQD is < 75% in the test zone then:

$P_{M1} = 20\% P_{max} = 8$ $P_{M2} = 40\% P_{max} = 15$ $P_{M3} = 60\% P_{max} = 23$

$P_{M4} = 40\% P_{max} = 15$ $P_{M5} = 20\% P_{max} = 8$

Packer Inflation Pressure Calculation:

- $Ph = (21.5 + 1) m = 32.14 \text{ psi}$
- $Pw = 200 \text{ psi}$
- $Pp = (32.14 + 200) \times 1.2 \text{ psi}$

Pp = 279 psi

PACKER TEST Time (minutes)	$P_{M1} \text{ (psi)} = 8$		$P_{M2} \text{ (psi)} = 15$		$P_{M3} \text{ (psi)} = 23$		$P_{M4} \text{ (psi)} = 15$		$P_{M5} \text{ (psi)} = 8$	
	$R_{flowmeter}$ (m3)	q (Liters)	$R_{flowmeter}$ (m3)	q (Liters)	$R_{flowmeter}$ (m3)	q (Liters)	$R_{flowmeter}$ (m3)	q (Liters)	$R_{flowmeter}$ (m3)	q (Liters)
0	67.0880	-----	67.0940	-----	67.0960	-----	67.1020	-----	67.1020	-----
1	67.089	1.00	67.095	1.00	67.0970	1.00	67.1020	0.00	67.1020	0.00
2	67.0890	0.00	67.095	0.00	67.0980	1.00	67.1020	0.00	67.1020	0.00
3	67.089	0.00	67.095	0.00	67.0980	0.00	67.1020	0.00	67.1020	0.00
4	67.0900	1.00	67.096	1.00	67.0990	1.00	67.1020	0.00	67.1020	0.00
5	67.0910	1.00	67.096	0.00	67.0990	0.00	67.1020	0.00	67.1020	0.00
6	67.091	0.00	67.0960	0.00	67.1000	1.00				
7	67.092	1.00	67.096	0.00	67.1000	0.00				
8	67.092	0.00	67.096	0.00	67.1000	0.00				
9	67.093	1.00	67.096	0.00	67.1010	1.00				
10	67.093	0.00	67.096	0.00	67.1020	1.00				

Lithology: **Competent Shale and Siltstone**

Comments: **No take when pressures reduced for Pressure 4 and Pressure 5**



Revision Date: February 17, 2010
 Revised by: K. Gudenkauf
 Checked by: C. Brueckman
 Reviewed by: H. Ramirez

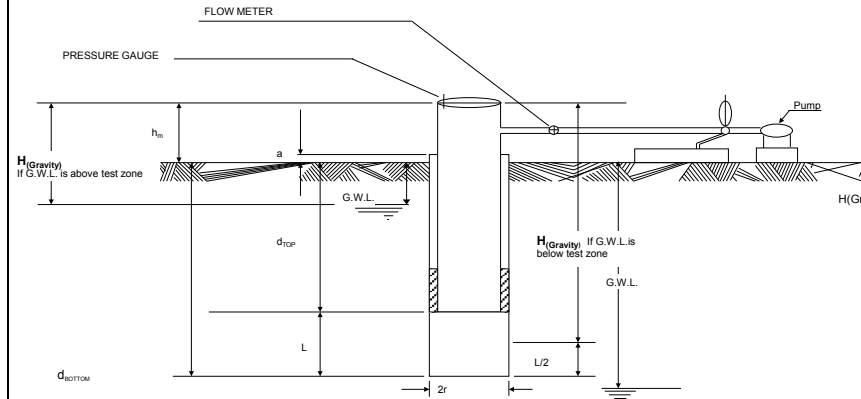
PACKER TEST

DB1

PROJECT : 110773396
 JOB N° : 0
 Supervisor: Colleen Small

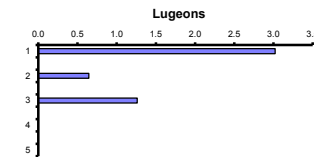
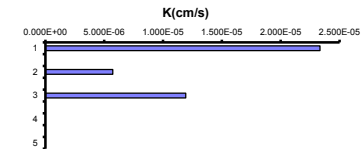
DEPTH OF THE TEST FROM: 21.50 to 24.50 m.
 DATE: April 23, 2018 I.Hour: 3:20:00 PM E. Hour: 17:00
 AZIMUTH: - N/A Ground Water Level (If no water is present place a depth greater than middle of test zone): 0.7 m.

TEST NUMBER: 01



- h_m = Height of the Gauge Pressure = 0.50 m.
- a = Height above of the surface = 1.00 m.
- G.W.L. = Ground Water Level = 0.70 m.
- $H_{(Gravity)}$ = Distance from ground-water level to swivel = 2.20 m.
- d_{TOP} = Depth from ground surface to top of testing zone = 21.50 m.
- d_{BOTTOM} = Depth from ground surface to bottom of testing zone = 24.50 m.
- α = Inclination with the horizontal = 90 deg
- $H_{(Gravity)}$ corrected = $SIN \alpha \times H_{(Gravity)}$ = 2.20 m.
- L = Length of the portion of the hole tested = 3.00 m.
- $2r$ = Two times the radius of hole tested (Diameter) = 9.61 cm.
- P_M = Gauge Pressure
- Δp = Head Loss
- q = Volume in liters during the test

Time (min)	P_{M1} = Surface Gauge Pressure (psi) = 8.00		P_{M2} = Surface Gauge Pressure (psi) = 15.00		P_{M3} = Surface Gauge Pressure (psi) = 23.00		P_{M4} = Surface Gauge Pressure (psi) = 15.00		P_{M5} = Surface Gauge Pressure (psi) = 8.00	
	Flow Meter Reading (m³)	Change in Flow Meter Reading q(l)	Flow Meter Reading (m³)	Change in Flow Meter Reading q(l)	Flow Meter Reading (m³)	Change in Flow Meter Reading q(l)	Flow Meter Reading (m³)	Change in Flow Meter Reading q(l)	Flow Meter Reading (m³)	Change in Flow Meter Reading q(l)
0	67.088		67.094		67.096		67.102		67.102	
1	67.089	1.00	67.095	1.00	67.097	1.00	67.102	0.00	67.102	0.00
2	67.089	0.00	67.095	0.00	67.098	1.00	67.102	0.00	67.102	0.00
3	67.089	0.00	67.095	0.00	67.098	0.00	67.102	0.00	67.102	0.00
4	67.090	1.00	67.096	1.00	67.099	1.00	67.102	0.00	67.102	0.00
5	67.091	1.00	67.096	0.00	67.099	0.00	67.102	0.00	67.102	0.00
6	67.091	0.00	67.096	0.00	67.100	1.00		0.00		0.00
7	67.092	1.00	67.096	0.00	67.100	0.00		0.00		0.00
8	67.092	0.00	67.096	0.00	67.100	0.00		0.00		0.00
9	67.093	1.00	67.096	0.00	67.101	1.00		0.00		0.00
10	67.093	0.00	67.096	0.00	67.102	1.00		0.00		0.00
Sum of q (l) =		5.0		2.0		6.0		0.0		0.0
Average q(l) from raw data=Q(l/min) =		0.50		0.20		0.60		0.00		0.00
Average q(l) from raw data=Q (m³/sec) =		8.33E-06		3.33E-06		1.00E-05		0.00E+00		0.00E+00
H_p (psi) =		11.12		18.12		26.12		18.12		11.12
Differential Head of Water = H (m) =		7.83		12.76		18.40		12.76		7.83
Permeability = K(cm/s) =		2.333E-05		5.728E-06		1.192E-05		0.000E+00		0.0
Lugeon =		3.0		0.8		1.3		0.0		0.0



K : 2.333E-05 cm/s
 Lugeon: 3.0

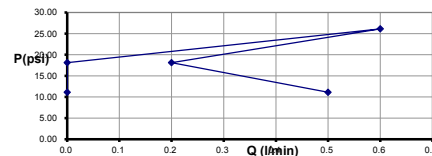
$$H_p = P_{Mn} (psi) + (Y_w(pcf) \times H_{Gravity} (Corrected) (ft) / 144(psf))$$

$$K_H = \frac{Q}{2\pi L H_p} * \ln\left(\frac{L}{r}\right)$$

For : $L \geq 10r$

$$Lugeon = (liters / m / min) \times (10 / pressure(bars))$$

Notes & Observations:

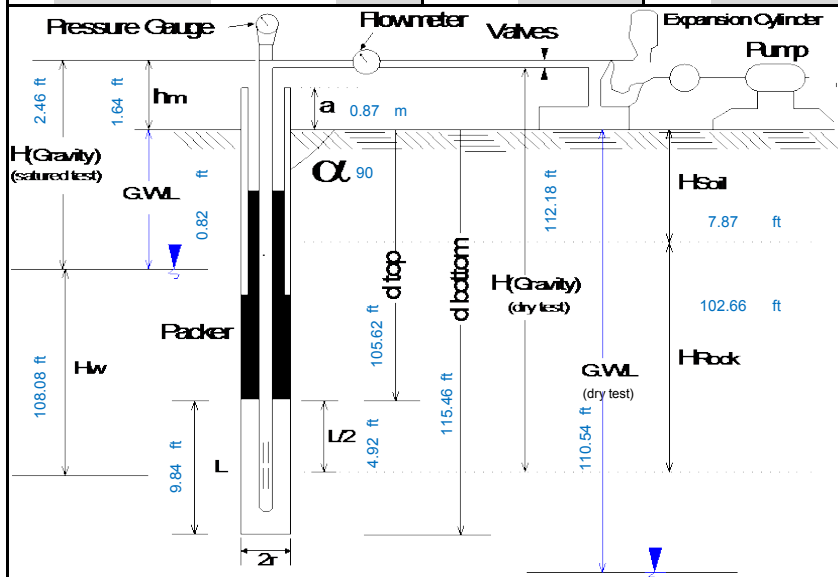


References:
 "Design of Small Dams," Bureau of Reclamation, Third edition, 1987, pg. 177.

"Construction and Design of Cement Grouting," A.C. Houbly

Permeability Interpretations (change reported K & Lugeon):
 Limited test sample indicate Dilaton
 High initial flow at low pressure 1
 Remaining tests indicate
 Wash Out

GENERAL INFORMATION		BOREHOLE INFORMATION		TEST INFORMATION							
Contractor Company:	All Service Drilling	North (m):	5655698.000	Inclination/H (α):	90	Depth of the Test From (m):	32.20	to (m):	35.20	RQD%:	94
Field Responsible of Contractor:	Tim Plourde	East (m):	676679.000	Location:	Debris Barrier	Initial Hour:	12:15	d top:	32.20 m.	h soil (m):	2.40
Field Engineer of MWH:	Colleen Small	Elevation (m):	1219.000	Borehole Diameter (2r):	9.61	End Hour:		d bottom:	35.20 m.	h rock (m):	31.30
Date:	24-Apr-2018	Turn Day/Night:	Day	Azimuth:	N/A	GWI (m):	0.25	hm (m):	0.50	L (m):	3.00
										a (m):	0.87



Packer Inflation Pressure = Pp

1. $P_h = (d_{top} + a) \rho_{soil}$ Hydrostatic Pressure on the Packer & Convent. $\rho_{soil} = 0.7 \text{ m}$
2. $P_w = 200 \text{ psi}$ Packer Working Pressure
3. $P_p = (P_h + P_w) \times 1.2$ Packer Inflation Pressure

Minimum Allowable Pressure = Pmax

1. $\sigma'_t = (H_{soil} \times \gamma_{soil} + H_{rock} \times \gamma_{rock})$ Correct for inclined holes & Convent 1m = 3.28 feet
2. $u = [(H_{soil} + H_{rock}) - GWL] \times \gamma_w$ Correct for inclined holes & Convent 1m = 3.28 feet
3. $\sigma'_v = \sigma'_t - u$ Convent 1 psi = 144 pd
4. $H_g = H(Gavity) \times \gamma_w$ Correct for inclined holes & Convent 1m = 3.28 feet
5. $P_{max} = \sigma'_v - H_g$ Convent 1 psi = 144 pd
6. $P_M = \% P_{max}$ which is dependent on RQD
 If RQD is > 75% in the test zone then: $P_{M1} = 25\% P_{max}$ $P_{M2} = 50\% P_{max}$ $P_{M3} = 75\% P_{max}$
 If RQD is < 75% in the test zone then: $P_{M1} = 20\% P_{max}$ $P_{M2} = 40\% P_{max}$ $P_{M3} = 60\% P_{max}$

Notes:

- Maximum Allowable Pressure (Pmax) must not exceed 1 psi/ft (convert meters to ft) or 3.28 psi/m
- Account for pore water pressure if there is measured water
- Test Zone (L) should not be greater than 5m and 3m is recommended
- Hsoil, Hrock and Hw should be corrected if test hole is inclined [Hsoil of]
- Incremental Pressures depend on RQD
- Packer can only be set in rock that has an RQD > 60%
- $\gamma_{soil} = 100 \text{ pd}$
- $\gamma_{rock} = 140 \text{ pd}$
- $\gamma_w = 62.4 \text{ pd}$
- Inflow = 1000 L/min
- Wait until flow rate remains relatively constant and reaches equilibrium (~5 min) before starting tests
- Calibrating the Flowmeter weekly.

Legend:
hm : Height to Gauge Pressure
GWL : Ground Water Level
H(Gavity) : Distance from Ground Water Level to Sewal
d top : Depth from Ground surface to top of testing zone
d bottom : Depth from Ground surface to bottom of testing zone
α : Inclination with the horizontal
L : Length of the portion of the hole tested
2r : Diameter of the hole tested
Pw : Surface Gauge Pressure
Flowmeter : Flow Meter Reading
q : Change in Flow Meter Reading
Hw : Height of casing above the ground (stick up)

Maximum Allowable Pressure Calculation:

- $\sigma'_t = \frac{(7.87 \times 100 + 102.66 \times 140)}{144} = 105.28 \text{ ft. Psi}$
- $u = \frac{(7.87 + 102.66) - 0.82}{144} = 47.54 \text{ ft. Psi}$
- $\sigma'_v = 105.28 - 47.54 = 57.74 \text{ ft. Psi}$
- $H_g = \frac{2.46 \times 62.4}{144} = 1.07 \text{ ft. Psi}$
- $P_{max} = 57.74 - 1.07 = 56.67 \text{ ft. Psi}$

6.- P_M If RQD is > 75% in the test zone then:

$P_{M1} = 25\% P_{max} = 14$ $P_{M2} = 50\% P_{max} = 28$ $P_{M3} = 75\% P_{max} = 43$

$P_{M4} = 25\% P_{max} = 28$ $P_{M5} = 50\% P_{max} = 14$

P_M If RQD is < 75% in the test zone then:

$P_{M1} = 20\% P_{max} = 11$ $P_{M2} = 40\% P_{max} = 23$ $P_{M3} = 60\% P_{max} = 34$

$P_{M4} = 40\% P_{max} = 23$ $P_{M5} = 20\% P_{max} = 11$

Packer Inflation Pressure Calculation:

- $Ph = (32.2 + 0.87) \text{ m} = 47.24 \text{ p}$
- $Pw = 200 \text{ psi}$
- $Pp = (47.24 + 200) \times 1.2 \text{ psi}$

Pp = 297 psi

PACKER TEST Time (minutes)	P _{M1} (psi) = 15		P _{M2} (psi) = 31		P _{M3} (psi) = 46		P _{M4} (psi) = 31		P _{M5} (psi) = 15	
	R _{flowmeter} (m3)	q (Liters)	R _{flowmeter} (m3)	q (Liters)	R _{flowmeter} (m3)	q (Liters)	R _{flowmeter} (m3)	q (Liters)	R _{flowmeter} (m3)	q (Liters)
0	67.132	-----	67.134	-----	67.1340	-----	67.1340	-----	67.1340	-----
1	67.133	1.00	67.134	0.00	67.1340	0.00	67.1340	0.00	67.1340	0.00
2	67.134	1.00	67.134	0.00	67.1340	0.00				
3	67.134	0.00	67.134	0.00	67.1340	0.00				
4	67.134	0.00	67.134	0.00	67.1340	0.00				
5	67.134	0.00	67.134	0.00	67.1340	0.00				
6	67.134	0.00								
7	67.134	0.00								
8	67.134	0.00								
9	67.134	0.00								
10	67.134	0.00								

Lithology: Siltstone and competent shale - close to moderately jointed

Comments: 50mm thick rubble zone (horizontal) at 33.8 m
No take after Minute 2 during Pressure 1, and remaining pressure increases



Revision Date: February 17, 2010
 Revised by: K. Gudenkauf
 Checked by: C. Brueckman
 Reviewed by: H. Ramirez

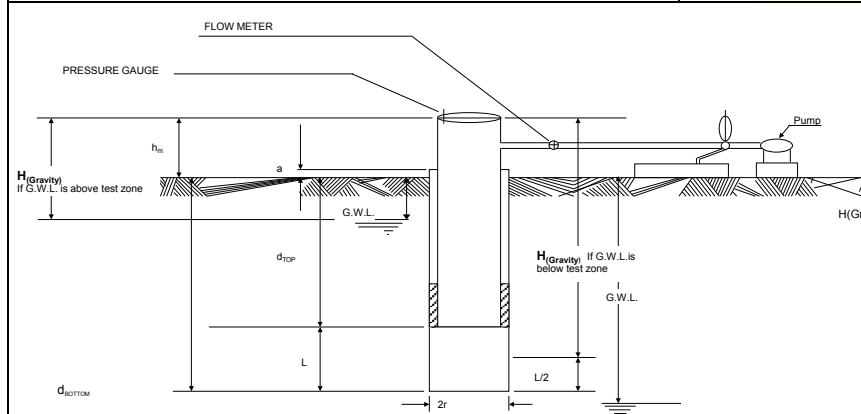
PACKER TEST

DB1

PROJECT : 110773396
 JOB N° : 0
 Supervisor: Colleen Small

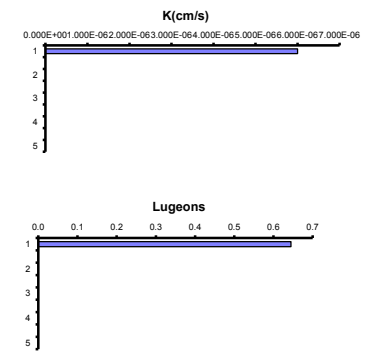
DEPTH OF THE TEST FROM: 32.20 to 35.20 m.
 DATE: April 24, 2018 I.Hour: 12:15:00 PM E. Hour: 0:00
 AZIMUTH: - N/A Ground Water Level (If no water is present place a depth greater than middle of test zone): 0.3 m.

TEST NUMBER: 02



- h_m = Height of the Gauge Pressure 0.50 m.
- a = Height above of the surface 0.87 m.
- G.W.L. = Ground Water Level 0.25 m.
- $H(Grav)$ = Distance from ground-water level to swivel 1.62 m.
- d_{TOP} = Depth from ground surface to top of testing zone 32.20 m.
- d_{BOTTOM} = Depth from ground surface to bottom of testing zone 35.20 m.
- α = Inclination with the horizontal 90 deg
- $H(Grav)$ corrected = $SIN \alpha \times H(Grav)$ 1.62 m.
- L = Length of the portion of the hole tested 3.00 m.
- $2r$ = Two times the radius of hole tested (Diameter) 9.61 cm.
- P_M = Gauge Pressure
- Δp = Head Loss
- q = Volume in liters during the test

Time (min)	P_{M1} = Surface Gauge Pressure (psi) = 15.00		P_{M2} = Surface Gauge Pressure (psi) = 31.00		P_{M3} = Surface Gauge Pressure (psi) = 46.00		P_{M4} = Surface Gauge Pressure (psi) = 31.00		P_{M5} = Surface Gauge Pressure (psi) = 15.00	
	Flow Meter Reading (m³)	Change in Flow Meter Reading q(l)	Flow Meter Reading (m³)	Change in Flow Meter Reading q(l)	Flow Meter Reading (m³)	Change in Flow Meter Reading q(l)	Flow Meter Reading (m³)	Change in Flow Meter Reading q(l)	Flow Meter Reading (m³)	Change in Flow Meter Reading q(l)
0	67.132		67.134		67.134		67.134		67.134	
1	67.133	1.00	67.134	0.00	67.134	0.00	67.134	0.00	67.134	0.00
2	67.134	1.00	67.134	0.00	67.134	0.00	67.134	0.00	67.134	0.00
3	67.134	0.00	67.134	0.00	67.134	0.00	67.134	0.00	67.134	0.00
4	67.134	0.00	67.134	0.00	67.134	0.00	67.134	0.00	67.134	0.00
5	67.134	0.00	67.134	0.00	67.134	0.00	67.134	0.00	67.134	0.00
6	67.134	0.00	67.134	0.00	67.134	0.00	67.134	0.00	67.134	0.00
7	67.134	0.00	67.134	0.00	67.134	0.00	67.134	0.00	67.134	0.00
8	67.134	0.00	67.134	0.00	67.134	0.00	67.134	0.00	67.134	0.00
9	67.134	0.00	67.134	0.00	67.134	0.00	67.134	0.00	67.134	0.00
10	67.134	0.00	67.134	0.00	67.134	0.00	67.134	0.00	67.134	0.00
Sum of q (l) =		2.0	0.0		0.0		0.0		0.0	
Average q(l) from raw data=Q(l/min) =		0.20	0.00		0.00		0.00		0.00	
Average q(l) from raw data=Q (m³/sec) =		3.33E-06	0.00E+00		0.00E+00		0.00E+00		0.00E+00	
H_p (psi) =		17.30	33.30		48.30		33.30		17.30	
Differential Head of Water = H (m) =		12.18	23.45		34.01		23.45		12.18	
Permeability = K(cm/s) =		6.001E-06	0.000E+00		0.000E+00		0.000E+00		0.000E+00	
Lugeon =		0.6	0.0		0.0		0.0		0.0	



$K : 6.001E-06$ cm/s
 Lugeon: 0.6

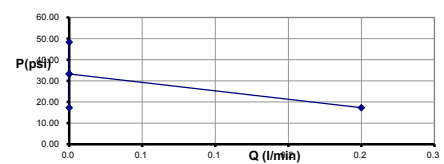
$$H_p = P_{Mn} (psi) + (Y_w(pcf) \times H_{Grav} (Corrected) (ft) / 144(psf))$$

$$K_H = \frac{Q}{2\pi L H_p} * \ln\left(\frac{L}{r}\right)$$

For : $L \geq 10r$

$$Lugeon = (liters / m / min) \times (10 / pressure(bars))$$

Graphic P vs. Q

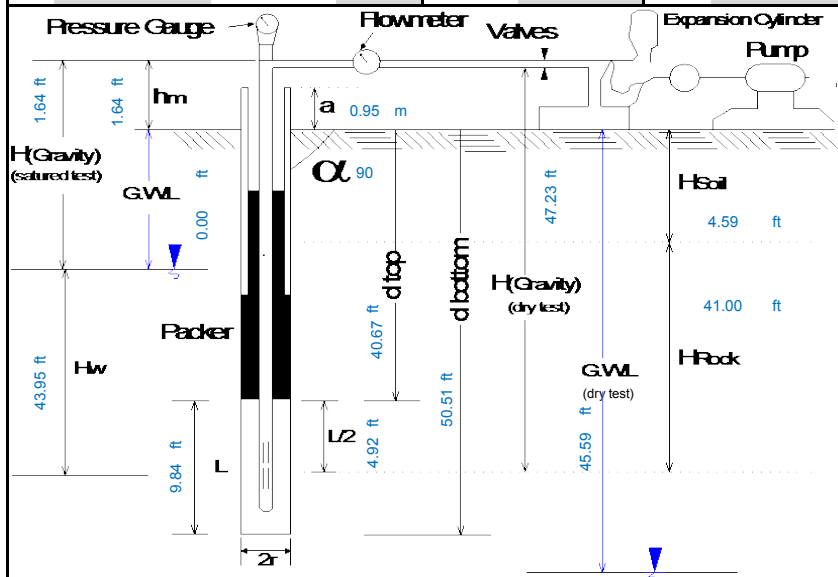


Notes & Observations:

References:
 "Design of Small Dams," Bureau of Reclamation, Third edition, 1987, pg. 177.
 "Construction and Design of Cement Grouting," A.C. Houbly

Permeability Interpretations (change reported K & Lugeon):
 Limited test sample indicate Dilaton
 Take only at Interval 1
 Remaining tests indicate
 Void Filling

GENERAL INFORMATION		BOREHOLE INFORMATION		TEST INFORMATION			
Contractor Company: All Service Drilling	North (m):	Inclination/H (α): 90	Depth of the Test From (m): 12.40	to (m): 15.40	RQD%: 38		
Field Responsible of Contractor: Tim Plourde	East (m):	Location: Debris Barrier	Initial Hour: 8:35	d top: 12.40 m.	h soil (m): 1.40		
Field Engineer of MWH: Colleen Small	Elevation (m):	Borehole Diameter (2r): 9.61	End Hour: 10:00	d bottom: 15.40 m.	h rock (m): 12.50		
Date: 25-Apr-2018	Turn Day/Night: Day	Azimuth: N/A	GWI (m): 0	hm (m): 0.50	L (m): 3.00	a (m): 0.95	



Packer Inflation Pressure = Pp

1. $P_h = (d_{top} + a) \rho_i$ Hydrostatic Pressure on the Packer & Convent. $\rho_i = 0.7$ m
2. $P_w = 200$ psi Packer Working Pressure
3. $P_p = (P_h + P_w) \times 1.2$ psi Packer Inflation Pressure

Minimum Allowable Pressure = Pmax

1. $\sigma'_t = (H_{soil} \times \gamma_{soil} + H_{rock} \times \gamma_{rock})$ Correct for inclined holes & Convent 1m = 3.28 feet
2. $u = [(H_{soil} + H_{rock}) - GWL] \times \gamma_w$ Correct for inclined holes & Convent 1m = 3.28 feet
3. $\sigma'_v = \sigma'_t - u$ Correct 1 psi = 144 pd
4. $H_g = H_{gravity} \times \gamma_w$ Correct for inclined holes & Convent 1m = 3.28 feet
5. $P_{max} = \sigma'_v - H_g$ Correct 1 psi = 144 pd
6. $P_M = \% P_{max}$ which is dependent on RQD
 - If RQD is > 75% in the test zone then: $P_{M1} = 25\% P_{max}$ $P_{M2} = 50\% P_{max}$ $P_{M3} = 75\% P_{max}$
 - If RQD is < 75% in the test zone then: $P_{M1} = 20\% P_{max}$ $P_{M2} = 40\% P_{max}$ $P_{M3} = 60\% P_{max}$

Notes:

1. Maximum Allowable Pressure (Pmax) must not exceed 1 psi/ft (convert meters to ft) or 3.28 psi/m
2. Account for pore water pressure if there is measured water
3. Test Zone (L) should not be greater than 5m and 3m is recommended
4. Hsoil, Hrock and Hw should be corrected if test hole is inclined [Hsoil of]
5. Incremental Pressures depend on RQD
6. Packer can only be set in rock that has an RQD > 60%
7. $\gamma_{soil} = 100$ pd
8. $\gamma_{rock} = 140$ pd
9. $\gamma_w = 62.4$ pd
10. Inflow rate = 1000 L/min
11. Wait until flow rate remains relatively constant and reaches equilibrium (~5 min) before starting tests
12. Calibrating the flowmeter weekly.

Legend:

- hm : Height to Gauge Pressure
- GWL : Ground Water Level
- Hgravity : Distance from Ground Water Level to Sewal
- d top : Depth from Ground surface to top of testing zone
- d bottom : Depth from Ground surface to bottom of testing zone
- α : Inclination with the horizontal
- L : Length of the portion of the hole tested
- 2r : Diameter of the hole tested
- Pm : Surface Gauge Pressure
- Rflowmeter : Flow Meter Reading
- q : Change in Flow Meter Reading
- Hw : Height of casing above the ground (stick up)
- a : Height of casing above the ground (stick up)

Maximum Allowable Pressure Calculation:

- 1.- $\sigma'_t = \frac{(4.59 \times 100 + 41 \times 140)}{144} = 43.05$ ft. Psi
- 2.- $u = \frac{(4.59 + 41) - 0}{144} = 19.76$ ft. Psi
- 3.- $\sigma'_v = 43.05 - 19.76 = 23.29$ ft. Psi
- 4.- $H_g = \frac{1.64 \times 62.4}{144} = 0.71$ ft. Psi
- 5.- $P_{max} = 23.29 - 0.71 = 22.58$ ft. Psi

6.- P_M if RQD is > 75% in the test zone then:

$P_{M1} = 25\% P_{max} = 6$	$P_{M2} = 50\% P_{max} = 11$	$P_{M3} = 75\% P_{max} = 17$
$P_{M4} = 25\% P_{max} = 11$	$P_{M5} = 50\% P_{max} = 6$	

P_M if RQD is < 75% in the test zone then:

$P_{M1} = 20\% P_{max} = 5$	$P_{M2} = 40\% P_{max} = 9$	$P_{M3} = 60\% P_{max} = 14$
$P_{M4} = 40\% P_{max} = 9$	$P_{M5} = 20\% P_{max} = 5$	

Packer Inflation Pressure Calculation:

- 1.- $P_h = (12.4 + 0.95) \text{ m} = 19.07 \text{ psi}$
- 2.- $P_w = 200 \text{ psi}$
- 3.- $P_p = (19.07 + 200) \times 1.2 \text{ psi}$

Pp = 263 psi

PACKER TEST Time (minutes)	P _{M1} (psi) = 4		P _{M2} (psi) = 8		P _{M3} (psi) = 13		P _{M4} (psi) = 8		P _{M5} (psi) = 4	
	R _{flowmeter} (m3)	q (Liters)	R _{flowmeter} (m3)	q (Liters)	R _{flowmeter} (m3)	q (Liters)	R _{flowmeter} (m3)	q (Liters)	R _{flowmeter} (m3)	q (Liters)
0	67.135	-----	67.135	-----	67.135	-----	67.135	-----	67.135	-----
1	67.135	0.00	67.135	0.00	67.135	0.00	67.135	0.00	67.135	0.00
2	67.135	0.00	67.135	0.00	67.135	0.00				
3	67.135	0.00	67.135	0.00	67.135	0.00				
4	67.135	0.00	67.135	0.00	67.135	0.00				
5	67.135	0.00	67.135	0.00	67.135	0.00				
6										
7										
8										
9										
10										

Lithology: **Brown mudstone with closely to moderately spaced joints**

Comments: **No take recorded during all pressure intervals.**
Test results not used for bedrock permeability, test results invalid.



Revision Date: February 17, 2010
 Revised by: K. Gudenkauf
 Checked by: C. Brueckman
 Reviewed by: H. Ramirez

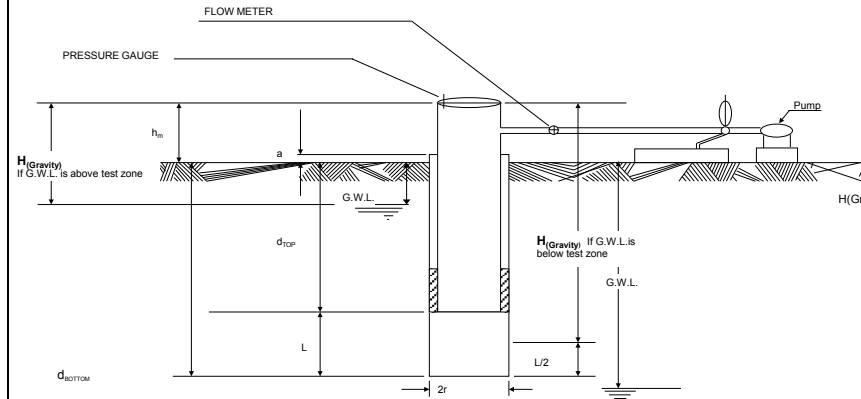
PACKER TEST

DB2

PROJECT : 110773396
 JOB N° : 0
 Supervisor: Colleen Small

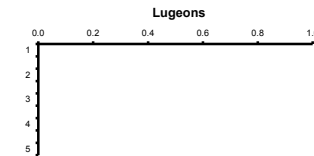
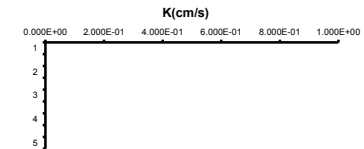
DEPTH OF THE TEST FROM: 12.40 to 15.40 m.
 DATE: April 25, 2018 I.Hour: 8:35:00 AM E. Hour: 10:00
 AZIMUTH: - N/A Ground Water Level (If no water is present place a depth greater than middle of test zone): 0.0 m.

TEST NUMBER: 01



- h_m = Height of the Gauge Pressure 0.50 m.
- a = Height above of the surface 0.95 m.
- G.W.L. = Ground Water Level 0.00 m.
- $H_{(Gravity)}$ = Distance from ground-water level to swivel 1.45 m.
- d_{TOP} = Depth from ground surface to top of testing zone 12.40 m.
- d_{BOTTOM} = Depth from ground surface to bottom of testing zone 15.40 m.
- α = Inclination with the horizontal 90 deg
- $H(Gravity) \text{ corrected}$ = $SIN \alpha \times H(Gravity)$ 1.45 m.
- L = Length of the portion of the hole tested 3.00 m.
- $2r$ = Two times the radius of hole tested (Diameter) 9.61 cm.
- P_M = Gauge Pressure
- Δp = Head Loss
- q = Volume in liters during the test

Time (min)	P_{M1} = Surface Gauge Pressure (psi) = 4.00		P_{M2} = Surface Gauge Pressure (psi) = 8.00		P_{M3} = Surface Gauge Pressure (psi) = 13.00		P_{M4} = Surface Gauge Pressure (psi) = 8.00		P_{M5} = Surface Gauge Pressure (psi) = 4.00	
	Flow Meter Reading (m ³)	Change in Flow Meter Reading q(l)	Flow Meter Reading (m ³)	Change in Flow Meter Reading q(l)	Flow Meter Reading (m ³)	Change in Flow Meter Reading q(l)	Flow Meter Reading (m ³)	Change in Flow Meter Reading q(l)	Flow Meter Reading (m ³)	Change in Flow Meter Reading q(l)
0	67.135		67.135		67.135		67.135		67.135	
1	67.135	0.00	67.135	0.00	67.135	0.00	67.135	0.00	67.135	0.00
2	67.135	0.00	67.135	0.00	67.135	0.00	67.135	0.00	67.135	0.00
3	67.135	0.00	67.135	0.00	67.135	0.00	67.135	0.00	67.135	0.00
4	67.135	0.00	67.135	0.00	67.135	0.00	67.135	0.00	67.135	0.00
5	67.135	0.00	67.135	0.00	67.135	0.00	67.135	0.00	67.135	0.00
6		0.00		0.00		0.00		0.00		0.00
7		0.00		0.00		0.00		0.00		0.00
8		0.00		0.00		0.00		0.00		0.00
9		0.00		0.00		0.00		0.00		0.00
10		0.00		0.00		0.00		0.00		0.00
Sum of q (l) =		0.0	0.0		0.0		0.0		0.0	
Average q(l) from raw data=Q(l/min) =		0.00	0.00		0.00		0.00		0.00	
Average q(l) from raw data=Q (m ³ /sec) =		0.00E+00	0.00E+00		0.00E+00		0.00E+00		0.00E+00	
Head (psi) =		6.06	10.06		15.06		10.06		6.06	
Differential Head of Water = H (m) =		4.27	7.08		10.60		7.08		4.27	
Permeability = K(cm/s) =		0.000E+00	0.000E+00		0.000E+00		0.000E+00		0.000E+00	
Lugeon =		0.0	0.0		0.0		0.0		0.0	



K : 0.000E+00 cm/s
 Lugeon: 0.0

$$H_p = P_{Mn} \text{ (psi)} + (Y_w \text{ (pcf)} \times H_{Gravity \text{ (Corrected)}} \text{ (ft)} / 144 \text{ (psf)})$$

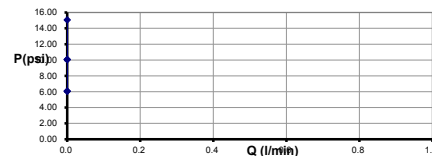
$$K_H = \frac{Q}{2\pi L H_p} * \ln\left(\frac{L}{r}\right)$$

For : $L \geq 10r$

$$\text{Lugeon} = (\text{liters / m / min}) \times (10 / \text{pressure (bars)})$$

Graphic P vs. Q

Notes & Observations:



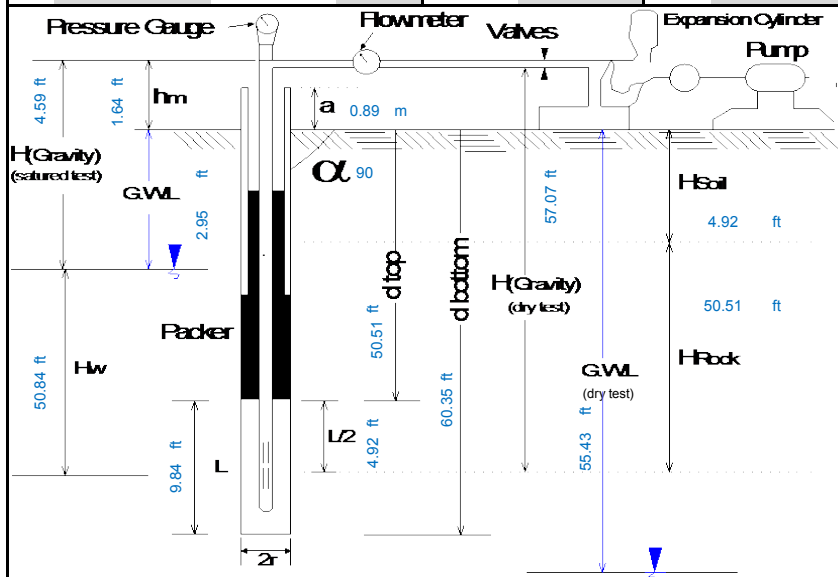
References:
 "Design of Small Dams," Bureau of Reclamation, Third edition, 1987, pg. 177.

"Construction and Design of Cement Grouting," A.C. Houbly

Permeability interpretations (change reported K & Lugeon):

Limited test sample indicate Dilation
 No take at all intervals
 No valid result

GENERAL INFORMATION	BOREHOLE INFORMATION	TEST INFORMATION			
Contractor Company: All Service Drilling	North (m):	Inclination/H (α): 90	Depth of the Test From (m): 15.40	to (m): 18.40	RQD%: 45
Field Responsible of Contractor: Tim Plourde	East (m):	Location: Debris Barrier	Initial Hour: 8:35	d top: 15.40 m.	h soil (m): 1.50
Field Engineer of MWH: Colleen Small	Elevation (m):	Borehole Diameter (2r): 9.61	End Hour: 10:00	d bottom: 18.40 m.	h rock (m): 15.40
Date: 26-Apr-2018 Turn Day/Night: Day	Azimuth: N/A	GWI (m): 0.9	hm (m): 0.50	L (m): 3.00	a (m): 0.89



Packer Inflation Pressure = Pp

- Hydrostatic Pressure on the Packer & Convert 1 psi = 0.7 m
- Packering Pressure
- Packer Inflation Pressure

Minimum Allowable Pressure = Pmax

- Correct for inclined holes & Convert 1 m = 3.28 feet
- Correct for inclined holes & Convert 1 m = 3.28 feet
- Correct 1 psi = 144 pd
- Correct for inclined holes & Convert 1 m = 3.28 feet
- Correct 1 psi = 144 pd
- FM = % Pmax which is dependent on RQD

Notes:

- Maximum Allowable Pressure (Pmax) must not exceed 1 psi/ft (convert meters to ft) or 3.28 psi/m
- Account for pore water pressure if there is measured water
- Test Zone (L) should not be greater than 5m and 3m is recommended
- Hsoil, Hrock and Hw should be corrected if test hole is inclined [Hsoil of]
- Incremental Pressures depend on RQD
- Packer can only be set in rock that has an RQD > 60%
- γsoil = 100 pd
- γrock = 140 pd
- γw = 62.4 pd
- Infl. Rate = 1000 L/min
- Wait until flow rate remains relatively constant and reaches equilibrium (~5 min) before starting tests
- Calibrating the Flowmeter weekly

Legend:

- Hm: Height to Gauge Pressure
- GWL: Ground Water Level
- H(Gravity): Distance from Ground Water Level to Sewal
- d top: Depth from Ground surface to top of testing zone
- d bottom: Depth from Ground surface to bottom of testing zone
- α: Inclination with the horizontal
- L: Length of the portion of the hole tested
- 2r: Diameter of the hole tested
- FM: Surface Gauge Pressure
- Flowmeter: Flow Meter Reading
- q: Change in Flow Meter Reading
- Hw: Height of casing above the ground (stick up)
- a: Height of casing above the ground (stick up)

Maximum Allowable Pressure Calculation:

- $\sigma'_t = \frac{(4.92 \times 100 + 50.51 \times 140)}{144} = 52.53 \text{ ft. Psi}$
- $u = \frac{(4.92 + 50.51) - 2.95}{144} = 22.74 \text{ ft. Psi}$
- $\sigma' = 52.53 - 22.74 = 29.79 \text{ ft. Psi}$
- $H_g = \frac{4.59 \times 62.4}{144} = 1.99 \text{ ft. Psi}$
- $P_{max} = 29.79 - 1.99 = 27.8 \text{ ft. Psi}$

6.- P_M if RQD is > 75% in the test zone then:

P _{M1} = 25%P _{max} = 7	P _{M2} = 50%P _{max} = 14	P _{M3} = 75%P _{max} = 21
P _{M4} = 25%P _{max} = 14	P _{M5} = 50%P _{max} = 7	

P_M if RQD is < 75% in the test zone then:

P _{M1} = 20%P _{max} = 6	P _{M2} = 40%P _{max} = 11	P _{M3} = 60%P _{max} = 17
P _{M4} = 40%P _{max} = 11	P _{M5} = 20%P _{max} = 6	

Packer Inflation Pressure Calculation:

- Ph = (15.4 + 0.89) m = 23.27 p
- Pw = 200 psi
- Pp = (23.27 + 200) x 1.2 psi

Pp = 268 psi

PACKER TEST Time (minutes)	P _{M1} (psi) = 6		P _{M2} (psi) = 11		P _{M3} (psi) = 17		P _{M4} (psi) = 11		P _{M5} (psi) = 6	
	R _{flowmeter} (m3)	q (Liters)	R _{flowmeter} (m3)	q (Liters)	R _{flowmeter} (m3)	q (Liters)	R _{flowmeter} (m3)	q (Liters)	R _{flowmeter} (m3)	q (Liters)
0	67.1360	-----	67.1410	-----	67.1410	-----				
1	67.138	2.00	67.141	0.00	67.1410	0.00				
2	67.1390	1.00	67.141	0.00	67.1410	0.00				
3	67.141	2.00								
4	67.1410	0.00								
5	67.1410	0.00								
6	67.141	0.00								
7	67.141	0.00								
8										
9										
10										

Lithology: **Competent Shale and Siltstone**

Comments: **No take when pressures reduced for Pressure 4 and Pressure 5**



Revision Date: February 17, 2010
 Revised by: K. Gudenkauf
 Checked by: C. Brueckman
 Reviewed by: H. Ramirez

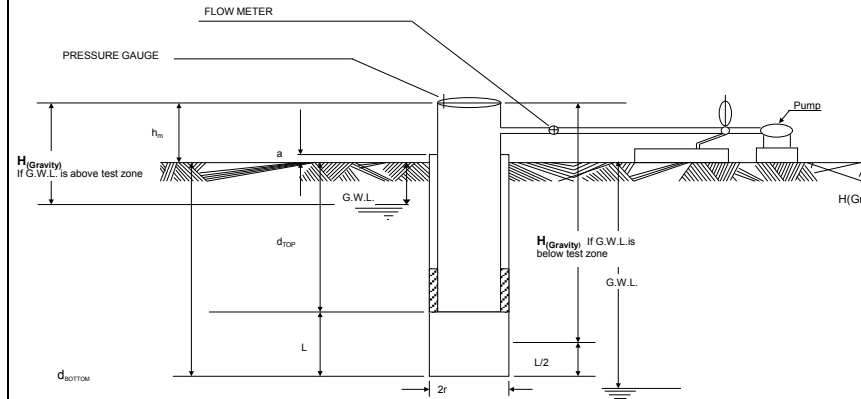
PACKER TEST

DB2

PROJECT : 110773396
 JOB N° : 0
 Supervisor: Colleen Small

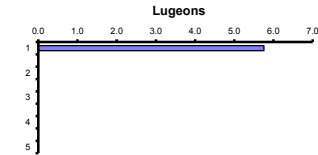
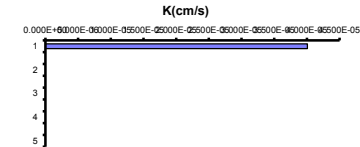
DEPTH OF THE TEST FROM: 15.40 to 18.40 m.
 DATE: April 26, 2018 I.Hour: 8:35:00 AM E. Hour: 10:00
 AZIMUTH: - N/A Ground Water Level (If no water is present place a depth greater than middle of test zone): 0.9 m.

TEST NUMBER: 02



- h_m = Height of the Gauge Pressure = 0.50 m.
- a = Height above of the surface = 0.89 m.
- G.W.L. = Ground Water Level = 0.90 m.
- $H_{(Gravity)}$ = Distance from ground-water level to swivel = 2.29 m.
- d_{TOP} = Depth from ground surface to top of testing zone = 15.40 m.
- d_{BOTTOM} = Depth from ground surface to bottom of testing zone = 18.40 m.
- α = Inclination with the horizontal = 90 deg
- $H(Gravity) \text{ corrected}$ = $SIN \alpha \times H(Gravity)$ = 2.29 m.
- L = Length of the portion of the hole tested = 3.00 m.
- $2r$ = Two times the radius of hole tested (Diameter) = 9.61 cm.
- P_M = Gauge Pressure
- Δp = Head Loss
- q = Volume in liters during the test

Time (min)	P_{M1} = Surface Gauge Pressure (psi) = 6.00		P_{M2} = Surface Gauge Pressure (psi) = 11.00		P_{M3} = Surface Gauge Pressure (psi) = 17.00		P_{M4} = Surface Gauge Pressure (psi) = 11.00		P_{M5} = Surface Gauge Pressure (psi) = 6.00	
	Flow Meter Reading (m³)	Change in Flow Meter Reading q(l)	Flow Meter Reading (m³)	Change in Flow Meter Reading q(l)	Flow Meter Reading (m³)	Change in Flow Meter Reading q(l)	Flow Meter Reading (m³)	Change in Flow Meter Reading q(l)	Flow Meter Reading (m³)	Change in Flow Meter Reading q(l)
0	67.136		67.141		67.141					
1	67.138	2.00	67.141	0.00	67.141	0.00		0.00		0.00
2	67.139	1.00	67.141	0.00	67.141	0.00		0.00		0.00
3	67.141	2.00		0.00		0.00		0.00		0.00
4	67.141	0.00		0.00		0.00		0.00		0.00
5	67.141	0.00		0.00		0.00		0.00		0.00
6	67.141	0.00		0.00		0.00		0.00		0.00
7	67.141	0.00		0.00		0.00		0.00		0.00
8		0.00		0.00		0.00		0.00		0.00
9		0.00		0.00		0.00		0.00		0.00
10		0.00		0.00		0.00		0.00		0.00
Sum of q (l) =		5.0	0.0		0.0		0.0		0.0	
Average q(l) from raw data=Q(l/min) =		0.71	0.00		0.00		0.00		0.00	
Average q(l) from raw data=Q (m³/sec) =		1.19E-05	0.00E+00		0.00E+00		0.00E+00		0.00E+00	
H_p (psi) =		9.25	14.25		20.25		14.25		9.25	
Differential Head of Water = H (m) =		6.52	10.04		14.26		10.04		6.52	
Permeability = K(cm/s) =		4.007E-05	0.000E+00		0.000E+00		0.000E+00		0.000E+00	
Lugeon =		5.8	0.0		0.0		0.0		0.0	



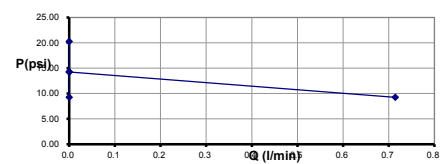
$K = 4.007E-05$ cm/s
 Lugeon: 5.8

$$H_p = P_{Mn} (psi) + (Y_w(pcf) \times H_{Gravity} (Corrected) (ft) / 144(psf))$$

$$K_H = \frac{Q}{2\pi L H_p} * \ln\left(\frac{L}{r}\right)$$

For: $L \geq 10r$
 Lugeon = (liters / m / min) x (10 / pressure(bars))

Graphic P vs. Q

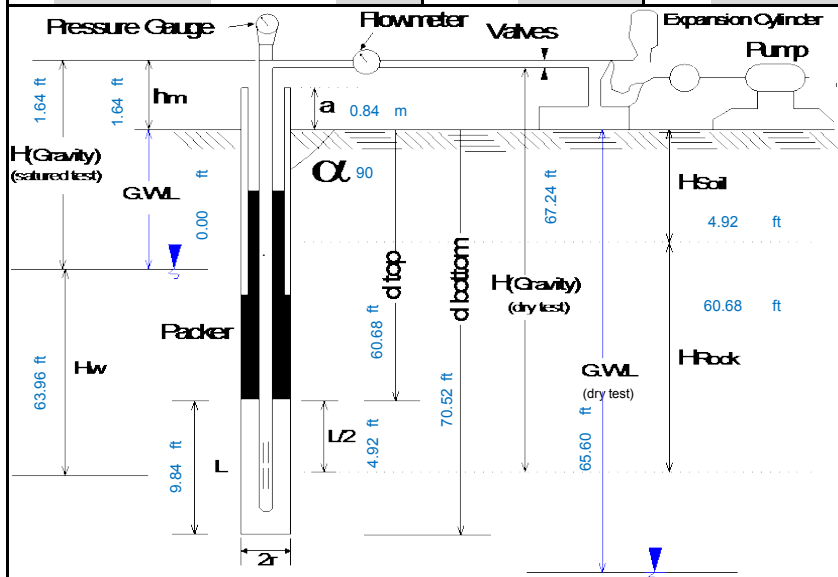


Notes & Observations:

References:
 "Design of Small Dams," Bureau of Reclamation, Third edition, 1987, pg. 177.
 "Construction and Design of Cement Grouting," A.C. Houbly

Permeability Interpretations (change reported K & Lugeon):
 Limited test sample indicate Dilation
 Flow only at Interval 1
 Remaining tests indicate
 Void Filling

GENERAL INFORMATION	BOREHOLE INFORMATION	TEST INFORMATION			
Contractor Company: All Service Drilling	North (m):	Inclination/H (α): 90	Depth of the Test From (m): 18.50	to (m): 21.50	RQD%: 78
Field Responsible of Contractor: Tim Plourde	East (m):	Location: Debris Barrier	Initial Hour: 10:45	d top: 18.50 m.	h soil (m): 1.50
Field Engineer of MWH: Colleen Small	Elevation (m):	Borehole Diameter (2r): 9.61	End Hour: 12:15	d bottom: 21.50 m.	h rock (m): 18.50
Date: 26-Apr-2018 Turn Day/Night: Day	Azimuth: N/A	GWI (m): 0	hm (m): 0.50	L (m): 3.00	a (m): 0.84



Packer Inflation Pressure = Pp

- Hydrostatic Pressure on the Packer & Convent. $\rho_{wi} = 0.7m$
- Packer Working Pressure
- Packer Inflation Pressure

Minimum/Allowable Pressure = Pmax

- Correct for inclined holes & Convent. $1m = 3.28ft$
- Correct for inclined holes & Convent. $1m = 3.28ft$
- Correct $1psi = 144pd$
- Correct for inclined holes & Convent. $1m = 3.28ft$
- Correct $1psi = 144pd$
- FM = % Pmax which is dependent on RQD

Notes:

- Maximum/Allowable Pressure (Pmax) must not exceed 1 psi/ft (convert meters to ft) or 3.28 psi/m
- Account for pore water pressure if there is measured water
- Test Zone (L) should not be greater than 5m and 3m is recommended
- Hsoil, Hrock and Hw should be corrected if test hole is inclined [Hsoil of]
- Incremental Pressures depend on RQD
- Packer can only be set in rock that has an RQD > 60%
- $\gamma_{soil} = 100pd$
- $\gamma_{rock} = 140pd$
- $\gamma_w = 62.4pd$
- Infl. Rate = 1000 L/min
- Wait until flow rate remains relatively constant and reaches equilibrium (~5min) before starting tests
- Calibrating the Flowmeter weekly

Legend:

- Hm : Height to Gauge Pressure
- GWL : Ground Water Level
- H(Gravity) : Distance from Ground Water Level to Sewal
- d top : Depth from Ground surface to top of testing zone
- d bottom : Depth from Ground surface to bottom of testing zone
- α : Inclination with the horizontal
- L : Length of the portion of the hole tested
- 2r : Diameter of the hole tested
- FM : Surface Gauge Pressure
- Flowmeter : Flow Meter Reading
- q : Change in Flow Meter Reading
- Hw : Height of casing above the ground (stick up)

Maximum/Allowable Pressure Calculation:

- $\sigma_t = \frac{(4.92 \times 100 + 60.68 \times 140)}{144} = 62.41 \text{ ft. Psi}$
- $u = \frac{(4.92 + 60.68) - 0}{144} = 28.43 \text{ ft. Psi}$
- $\sigma' = 62.41 - 28.43 = 33.98 \text{ ft. Psi}$
- $H_g = \frac{1.64 \times 62.4}{144} = 0.71 \text{ ft. Psi}$
- $P_{max} = 33.98 - 0.71 = 33.27 \text{ ft. Psi}$

6.- P_M if RQD is > 75% in the test zone then:

$P_{M1} = 25\%P_{max} = 8$	$P_{M2} = 50\%P_{max} = 17$	$P_{M3} = 75\%P_{max} = 25$
$P_{M4} = 25\%P_{max} = 17$	$P_{M5} = 50\%P_{max} = 8$	

P_M if RQD is < 75% in the test zone then:

$P_{M1} = 20\%P_{max} = 7$	$P_{M2} = 40\%P_{max} = 13$	$P_{M3} = 60\%P_{max} = 20$
$P_{M4} = 40\%P_{max} = 13$	$P_{M5} = 20\%P_{max} = 7$	

Packer Inflation Pressure Calculation:

- $Ph = (18.5 + 0.84) m = 27.63 \text{ psi}$
- $Pw = 200 \text{ psi}$
- $Pp = (27.63 + 200) \times 1.2 \text{ psi}$

Pp = 273 psi

PACKER TEST Time (minutes)	P _{M1} (psi) = 8		P _{M2} (psi) = 17		P _{M3} (psi) = 25		P _{M4} (psi) = 17		P _{M5} (psi) = 8	
	R _{flowmeter} (m3)	q (Liters)	R _{flowmeter} (m3)	q (Liters)	R _{flowmeter} (m3)	q (Liters)	R _{flowmeter} (m3)	q (Liters)	R _{flowmeter} (m3)	q (Liters)
0	67.144	-----	67.147	-----	67.147	-----				
1	67.145	1.00	67.147	0.00	67.147	0.00				
2	67.146	1.00	67.147	0.00	67.147	0.00				
3	67.146	0.00								
4	67.147	1.00								
5	67.147	0.00								
6	67.147	0.00								
7										
8										
9										
10										

Lithology: **Competent Shale and Siltstone**

Comments: **No take when pressures reduced for Pressure 4 and Pressure 5**



Revision Date: February 17, 2010
 Revised by: K. Gudenkauf
 Checked by: C. Brueckman
 Reviewed by: H. Ramirez

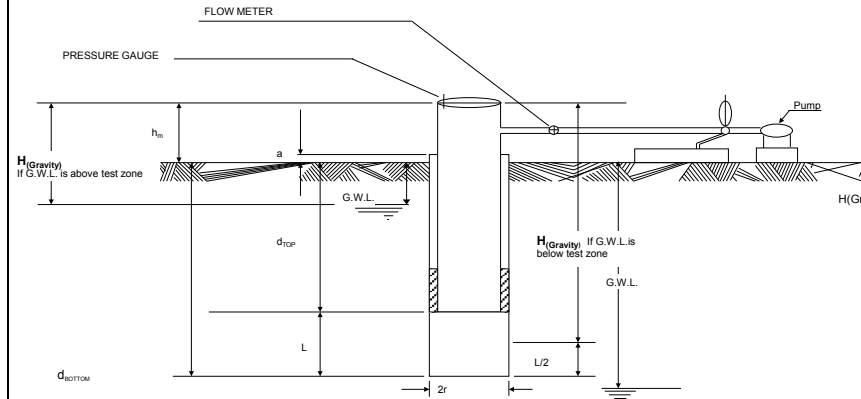
PACKER TEST

DB2

PROJECT : 110773396
 JOB N° : 0
 Supervisor: Colleen Small

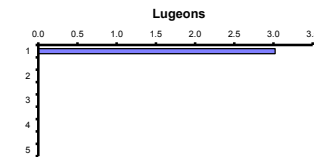
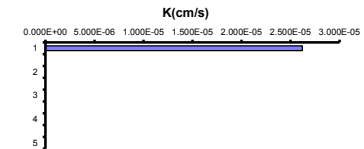
DEPTH OF THE TEST FROM: 18.50 to 21.50 m.
 DATE: April 26, 2018 I.Hour: 10:45:00 AM E. Hour: 12:15
 AZIMUTH: - N/A Ground Water Level (If no water is present place a depth greater than middle of test zone): 0.0 m.

TEST NUMBER: 03



h_m	=	Height of the Gauge Pressure	0.50	m.
a	=	Height above of the surface	0.84	m.
G.W.L.	=	Ground Water Level	0.00	m.
$H_{(Gravity)}$	=	Distance from ground-water level to swivel	1.34	m.
d_{TOP}	=	Depth from ground surface to top of testing zone	18.50	m.
d_{BOTTOM}	=	Depth from ground surface to bottom of testing zone	21.50	m.
α	=	Inclination with the horizontal	90	deg
$H(Grav) corrected$	=	$SIN \alpha \times H(Grav)$	1.34	m.
L	=	Length of the portion of the hole tested	3.00	m.
$2r$	=	Two times the radius of hole tested (Diameter)	9.61	cm.
P_M	=	Gauge Pressure		
Δp	=	Head Loss		
q	=	Volume in liters during the test		

Time (min)	P_{M1} = Surface Gauge Pressure (psi) = 8.00		P_{M2} = Surface Gauge Pressure (psi) = 17.00		P_{M3} = Surface Gauge Pressure (psi) = 25.00		P_{M4} = Surface Gauge Pressure (psi) = 17.00		P_{M5} = Surface Gauge Pressure (psi) = 8.00	
	Flow Meter Reading (m³)	Change in Flow Meter Reading q(l)	Flow Meter Reading (m³)	Change in Flow Meter Reading q(l)	Flow Meter Reading (m³)	Change in Flow Meter Reading q(l)	Flow Meter Reading (m³)	Change in Flow Meter Reading q(l)	Flow Meter Reading (m³)	Change in Flow Meter Reading q(l)
0	67.144		67.147		67.147					
1	67.145	1.00	67.147	0.00	67.147	0.00		0.00		0.00
2	67.146	1.00	67.147	0.00	67.147	0.00		0.00		0.00
3	67.146	0.00		0.00		0.00		0.00		0.00
4	67.147	1.00		0.00		0.00		0.00		0.00
5	67.147	0.00		0.00		0.00		0.00		0.00
6	67.147	0.00		0.00		0.00		0.00		0.00
7		0.00		0.00		0.00		0.00		0.00
8		0.00		0.00		0.00		0.00		0.00
9		0.00		0.00		0.00		0.00		0.00
10		0.00		0.00		0.00		0.00		0.00
Sum of q (l) =		3.0	0.0		0.0		0.0		0.0	
Average q(l) from raw data=Q(l/min) =		0.50	0.00		0.00		0.00		0.00	
Average q(l) from raw data=Q (m³/sec) =		8.33E-06	0.00E+00		0.00E+00		0.00E+00		0.00E+00	
H_p (psi) =		9.90	18.90		26.90		18.90		9.90	
Differential Head of Water = H (m) =		6.97	13.31		18.95		13.31		6.97	
Permeability = K(cm/s) =		2.621E-05	0.000E+00		0.000E+00		0.000E+00		0.000E+00	
Lugeon =		3.0	0.0		0.0		0.0		0.0	



$K : 2.621E-05$ cm/s
 Lugeon: 3.0

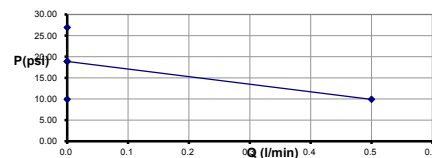
$$H_p = P_{Mn} (psi) + (Y_w(pcf) \times H_{Gravity} (Corrected) (ft) / 144(psf))$$

$$K_H = \frac{Q}{2\pi L H_p} * \ln\left(\frac{L}{r}\right)$$

For : $L \geq 10r$

$$Lugeon = (liters / m / min) \times (10 / pressure(bars))$$

Notes & Observations:

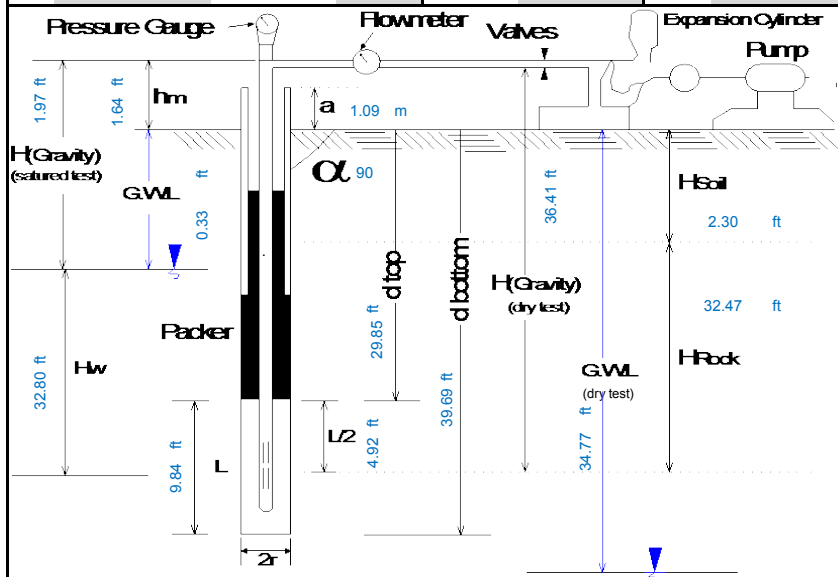


References:
 "Design of Small Dams," Bureau of Reclamation, Third edition, 1987, pg. 177.

"Construction and Design of Cement Grouting," A.C. Houbly

Permeability Interpretations (change reported K & Lugeon):
 Limited test sample indicate Dilaton
 Flow only at interval 1
 Remaining tests indicate
 Void Filling

GENERAL INFORMATION		BOREHOLE INFORMATION		TEST INFORMATION					
Contractor Company:	All Service Drilling	North (m):	Inclination/H (α): 90	Depth of the Test From (m):	9.10	to (m):	12.10	RQD%:	96
Field Responsible of Contractor:	Tim Plourde	East (m):	Location: Debris Barrier	Initial Hour:	13:40	d top:	9.10 m.	h soil (m):	0.70
Field Engineer of MWH:	Colleen Small	Elevation (m):	Borehole Diameter (2r): 9.61	End Hour:	14:30	d bottom:	12.10 m.	h rock (m):	9.90
Date:	19-Apr-2018	Turn Day/Night:	Day	Azimuth:	N/A	GWI (m):	0.1	hm (m):	0.50
						L (m):	3.00	a (m):	1.09



Packer Initiation Pressure = Pp

1. $P_h = (d \times \rho) \times g$ Hydrostatic Pressure on the Packer & Convent. $\rho_{water} = 0.7$ m
2. $P_w = 200$ psi Packer Working Pressure
3. $P_p = (P_h + P_w) \times 1.2$ psi Packer Initiation Pressure

Minimum Allowable Pressure = Pmax

1. $\sigma'_t = (H_{soil} \times \gamma_{soil} + H_{rock} \times \gamma_{rock})$ Correct for inclined holes & Convent 1m = 3.28 feet
2. $u = [(H_{soil} + H_{rock}) - GWL] \times \gamma_w$ Correct for inclined holes & Convent 1m = 3.28 feet
3. $\sigma' = \sigma'_t - u$ Convent 1 psi = 144 psi
4. $H_g = H_{gravity} \times \gamma_w$ Correct for inclined holes & Convent 1m = 3.28 feet
5. $P_{max} = \sigma' - H_g$ Convent 1 psi = 144 psi
6. $P_M = \% P_{max}$ which is dependent on RQD
 - If RQD is > 75% in the test zone then:

$P_{M1} = 25\% P_{max}$	$P_{M2} = 50\% P_{max}$	$P_{M3} = 75\% P_{max}$
$P_{M4} = 25\% P_{max}$	$P_{M5} = 50\% P_{max}$	$P_{M6} = 40\% P_{max}$
$P_{M7} = 60\% P_{max}$	$P_{M8} = 20\% P_{max}$	
- If RQD is < 75% in the test zone then:

$P_{M1} = 20\% P_{max}$	$P_{M2} = 40\% P_{max}$	$P_{M3} = 60\% P_{max}$
$P_{M4} = 40\% P_{max}$	$P_{M5} = 20\% P_{max}$	

Notes:

1. Maximum Allowable Pressure (Pmax) must not exceed 1 psi/ft (convert meters to ft) or 3.28 psi/m
2. Account for pore water pressure if there is measured water
3. Test Zone (L) should not be greater than 5m and 3m is recommended
4. Hsoil, Hrock and Hw should be corrected if test hole is inclined [Hsoil of]
5. Incremental Pressures depend on RQD
6. Packer can only be set in rock that has an RQD > 60%
7. $\gamma_{soil} = 100$ pcf
8. $\gamma_{rock} = 140$ pcf
9. $\gamma_w = 62.4$ pcf
10. $\text{Inj Rate} = 1000$ l/min
11. Wait until flow rate remains relatively constant and reaches equilibrium (~5min) before starting tests
12. Calibrating the Flowmeter weekly.

Legend:

- hm : Height to Gauge Pressure
- GWL : Ground Water Level
- H(Gravity) : Distance from Ground Water Level to Sewel
- d top : Depth from Ground surface to top of testing zone
- d bottom : Depth from Ground surface to bottom of testing zone
- α : Inclination with the horizontal
- L : Length of the portion of the hole tested
- 2r : Diameter of the hole tested
- Pm : Surface Gauge Pressure
- Rflowmeter : Flow Meter Reading
- q : Change in Flow Meter Reading
- Hw : Height of casing above the ground (stick up)
- a : Height of casing above the ground (stick up)

Maximum Allowable Pressure Calculation:

1. $\sigma'_t = \frac{(2.3 \times 100 + 32.47 \times 140)}{144} = 33.16$ ft. Psi
2. $u = \frac{(2.3 + 32.47) - 0.33}{144} = 14.92$ ft. Psi
3. $\sigma' = 33.16 - 14.92 = 18.24$ ft. Psi
4. $H_g = \frac{1.97 \times 62.4}{144} = 0.85$ ft. Psi
5. $P_{max} = 18.24 - 0.85 = 17.39$ ft. Psi

6. - P_M if RQD is > 75% in the test zone then:

$P_{M1} = 25\% P_{max} = 4$	$P_{M2} = 50\% P_{max} = 9$	$P_{M3} = 75\% P_{max} = 13$
$P_{M4} = 25\% P_{max} = 9$	$P_{M5} = 50\% P_{max} = 4$	

P_M if RQD is < 75% in the test zone then:

$P_{M1} = 20\% P_{max} = 3$	$P_{M2} = 40\% P_{max} = 7$	$P_{M3} = 60\% P_{max} = 10$
$P_{M4} = 40\% P_{max} = 7$	$P_{M5} = 20\% P_{max} = 3$	

Packer Initiation Pressure Calculation:

1. $P_h = (9.1 + 1.09) \times 0.7 = 14.56$ psi
2. $P_w = 200$ psi
3. $P_p = (14.56 + 200) \times 1.2$ psi

Pp = 257 psi

PACKER TEST Time (minutes)	P _{M1} (psi) = 7		P _{M2} (psi) = 14		P _{M3} (psi) = 20		P _{M4} (psi) = 14		P _{M5} (psi) = 7	
	R _{flowmeter} (m3)	q (Liters)	R _{flowmeter} (m3)	q (Liters)	R _{flowmeter} (m3)	q (Liters)	R _{flowmeter} (m3)	q (Liters)	R _{flowmeter} (m3)	q (Liters)
0	66.831	-----		-----		-----		-----		-----
1	66.841	10.00								
2	66.852	11.00								
3	66.862	10.00								
4	66.872	10.00								
5	66.882	10.00								
6	66.893	11.00								
7	66.900	7.40								
8	66.918	17.60								
9	66.932	14.00								
10	66.946	14.00								

Lithology: Good quality fine grain sandstone

Comments: During test water noted to be flowing around the casing and bubbling noted within the casing used to seat the packer
 No recovery when coring from 7.56 to 9.08 m (approximate zone where packer was seated)
 Upon increasing pressure to 14 psi bubbling and flow noted within casing, packer seal released and test abandoned



Revision Date: February 17, 2010
 Revised by: K. Gudenkauf
 Checked by: C. Brueckman
 Reviewed by: H. Ramirez

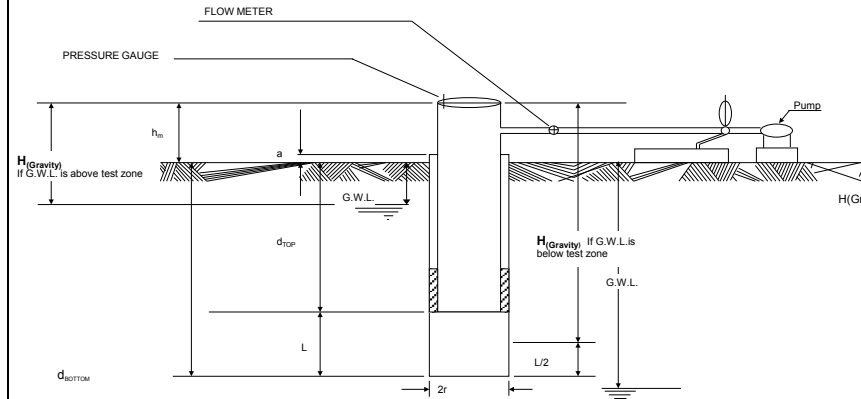
PACKER TEST

DB3

PROJECT : 110773396
 JOB N° : 0
 Supervisor: Colleen Small

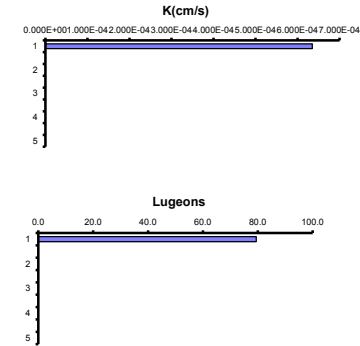
DEPTH OF THE TEST FROM: 9.10 to 12.10 m.
 DATE: April 19, 2018 I.Hour: 1:40:00 PM E. Hour: 14:30
 AZIMUTH: - N/A Ground Water Level (If no water is present place a depth greater than middle of test zone): 0.1 m.

TEST NUMBER: 02



- h_m = Height of the Gauge Pressure 0.50 m.
- a = Height above of the surface 1.09 m.
- G.W.L. = Ground Water Level 0.10 m.
- $H_{(Gravity)}$ = Distance from ground-water level to swivel 1.69 m.
- d_{TOP} = Depth from ground surface to top of testing zone 9.10 m.
- d_{BOTTOM} = Depth from ground surface to bottom of testing zone 12.10 m.
- α = Inclination with the horizontal 90 deg
- $H(Gravity) \text{ corrected}$ = $SIN \alpha \times H(Gravity)$ 1.69 m.
- L = Length of the portion of the hole tested 3.00 m.
- $2r$ = Two times the radius of hole tested (Diameter) 9.61 cm.
- P_M = Gauge Pressure
- Δp = Head Loss
- q = Volume in liters during the test

Time (min)	P_{M1} = Surface Gauge Pressure (psi) = 7.00		P_{M2} = Surface Gauge Pressure (psi) = 14.00		P_{M3} = Surface Gauge Pressure (psi) = 20.00		P_{M4} = Surface Gauge Pressure (psi) = 14.00		P_{M5} = Surface Gauge Pressure (psi) = 7.00	
	Flow Meter Reading (m³)	Change in Flow Meter Reading q(l)	Flow Meter Reading (m³)	Change in Flow Meter Reading q(l)	Flow Meter Reading (m³)	Change in Flow Meter Reading q(l)	Flow Meter Reading (m³)	Change in Flow Meter Reading q(l)	Flow Meter Reading (m³)	Change in Flow Meter Reading q(l)
0	66.831									
1	66.841	10.00		0.00		0.00		0.00		0.00
2	66.852	11.00		0.00		0.00		0.00		0.00
3	66.862	10.00		0.00		0.00		0.00		0.00
4	66.872	10.00		0.00		0.00		0.00		0.00
5	66.882	10.00		0.00		0.00		0.00		0.00
6	66.893	11.00		0.00		0.00		0.00		0.00
7	66.900	7.40		0.00		0.00		0.00		0.00
8	66.918	17.60		0.00		0.00		0.00		0.00
9	66.932	14.00		0.00		0.00		0.00		0.00
10	66.946	14.00		0.00		0.00		0.00		0.00
Sum of q (l) =		115.0	0.0		0.0		0.0		0.0	
Average q(l) from raw data=Q(l/min) =		11.50	0.00		0.00		0.00		0.00	
Average q(l) from raw data=Q (m³/sec) =		1.92E-04	0.00E+00		0.00E+00		0.00E+00		0.00E+00	
Differential Head of Water = H (m) =		6.62	16.40		22.40		16.40		6.62	
Permeability = K(cm/s) =		6.350E-04	0.000E+00		0.000E+00		0.000E+00		0.000E+00	
Lugeon =		79.4	0.0		0.0		0.0		0.0	



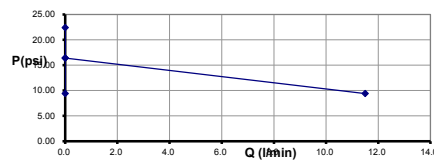
$K : 6.350E-04$ cm/s
 Lugeon: 79.4

$$H_p = P_{Mn} \text{ (psi)} + (Y_w(\text{pcf}) \times H_{\text{Gravity (Corrected)}} \text{ (ft)}) / 144(\text{psf})$$

$$K_H = \frac{Q}{2\pi L H_p} * \ln\left(\frac{L}{r}\right)$$

For : $L \geq 10r$
 Lugeon = (liters / m / min) x (10 / pressure(bars))

Graphic P vs. Q

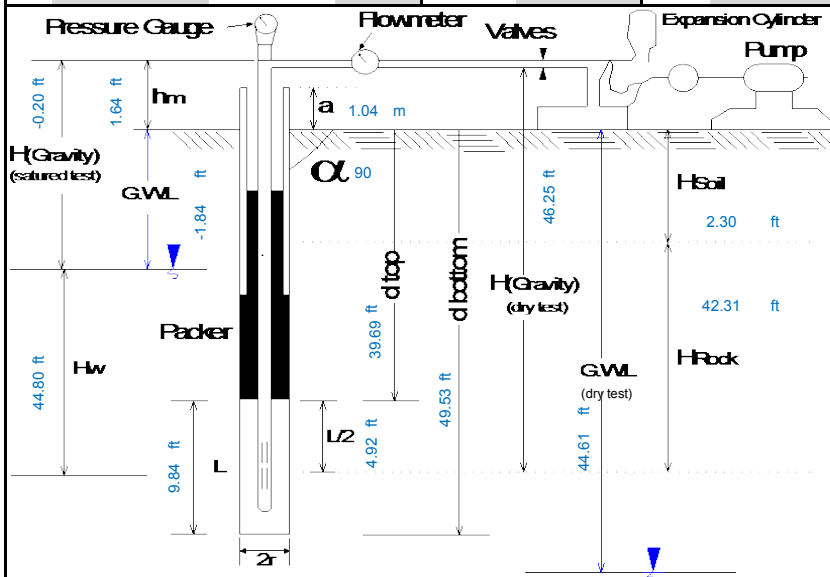


Notes & Observations:

References:
 "Design of Small Dams," Bureau of Reclamation, Third edition, 1987, pg. 177.
 "Construction and Design of Cement Grouting," A.C. Houbly

Permeability Interpretations (change reported K & Lugeon):
 Limited test results
 Test abandoned, leak at surface casing

GENERAL INFORMATION		BOREHOLE INFORMATION		TEST INFORMATION			
Contractor Company: All Service Drilling	North (m):	Inclination/H (α): 90	Depth of the Test From (m): 12.10	to (m): 15.10	RQD%: 52		
Field Responsible of Contractor: Tim Plourde	East (m):	Location: Debris Barrier	Initial Hour: 17:00	d top: 12.10 m.	h soil (m): 0.70		
Field Engineer of MWH: Colleen Small	Elevation (m):	Borehole Diameter (2r): 9.61	End Hour: 18:00	d bottom: 15.10 m.	h rock (m): 12.90		
Date: 19-Apr-2018	Turn Day/Night: Day	Azimuth: N/A	GWl (m): -0.56	hm (m): 0.50	L (m): 3.00	a (m): 1.04	



Packer Inflation Pressure = Pp

- $P_h = (\text{dep} + a) \text{ psi}$ Hydraulic Pressure on the Packer & Convent 1psi = 0.7m
- $P_w = 200 \text{ psi}$ Packer Working Pressure
- $P_p = (P_h + P_w) \times 1.2 \text{ psi}$ Packer Inflation Pressure

Maximum Allowable Pressure = Pmax

- $\sigma'_t = (H_{\text{soil}} \times \gamma_{\text{soil}} + H_{\text{rock}} \times \gamma_{\text{rock}})$ Correct for inclined holes & Convent 1m = 3.28feet
- $u = [(H_{\text{soil}} + H_{\text{rock}}) - \text{GWL}] \times \gamma_w$ Correct for inclined holes & Convent 1m = 3.28feet
- $\sigma' = \sigma'_t - u$ Convent 1psi = 144psf
- $H_g = H_{\text{gravity}} \times \gamma_w$ Correct for inclined holes & Convent 1m = 3.28feet
- $P_{\text{max}} = \sigma' - H_g$ Convent 1psi = 144psf
- $P_M = \% P_{\text{max}}$ which is dependent on RQD

Notes:

- Maximum Allowable Pressure: (Pmax) must not exceed 1 psi/ft (convert meters to ft) or 3.28 psi/m
- Account for pore water pressure if there is measured water
- Test Zone (L) should not be greater than 5m and 3m is recommended
- Hsoil, Hrock and Hw should be corrected if test hole is inclined [H = L cos α]
- Inclination Pressures depend on RQD
- Packer can only be set in rock that has an RQD > 60%
- $\gamma_{\text{soil}} = 100 \text{ pcf}$
- $\gamma_{\text{rock}} = 140 \text{ pcf}$
- $\gamma_w = 62.4 \text{ pcf}$
- $1 \text{ in}^3/\text{min} = 1000 \text{ L/min}$
- Wait until flowrate remains relatively constant and reaches equilibrium (~5min) before starting tests
- Calibrating the Flowmeter weekly.

Legend:

- hm : Height to Gauge Pressure
- GWL : Ground Water Level
- Hgravity : Distances from Ground Water Level to Swell
- Clap : Depth from Ground surface to top of testing zone
- Cbottom : Depth from Ground surface to bottom of testing zone
- α : Inclination with the horizontal
- L : Length of the portion of the hole tested
- 2r : Diameter of the hole tested
- Pw : Surface Gauge Pressure
- Rflowmeter : Flow Meter Reading
- q : Change in Flow Meter Reading
- Hw : Height of casing above the ground (stick up)
- a : Height of casing above the ground (stick up)

Maximum Allowable Pressure Calculation:

- $\sigma'_t = \frac{(2.3 \times 100 + 42.31 \times 140)}{144} = 42.73 \text{ ft. Psi}$
- $u = \frac{(2.3 + 42.31) \times 62.4}{144} = 20.13 \text{ ft. Psi}$
- $\sigma' = 42.73 - 20.13 = 22.6 \text{ ft. Psi}$
- $H_g = \frac{-0.2 \times 62.4}{144} = -0.09 \text{ ft. Psi}$
- $P_{\text{max}} = 22.6 - 0.09 = 22.69 \text{ ft. Psi}$

6.- P_M if RQD is > 75% in the test zone then:

$P_{M1} = 25\% P_{\text{max}} = 6$	$P_{M2} = 50\% P_{\text{max}} = 11$	$P_{M3} = 75\% P_{\text{max}} = 17$
$P_{M4} = 25\% P_{\text{max}} = 11$	$P_{M5} = 50\% P_{\text{max}} = 6$	

P_M if RQD is < 75% in the test zone then:

$P_{M1} = 20\% P_{\text{max}} = 5$	$P_{M2} = 40\% P_{\text{max}} = 9$	$P_{M3} = 60\% P_{\text{max}} = 14$
$P_{M4} = 40\% P_{\text{max}} = 9$	$P_{M5} = 20\% P_{\text{max}} = 5$	

Packer Inflation Pressure Calculation:

- $P_h = (12.1 + 1.04) \text{ m} = 18.77 \text{ psi}$
- $P_w = 200 \text{ psi}$
- $P_p = (18.77 + 200) \times 1.2 \text{ psi}$

Pp = 263 psi

PACKER TEST Time (minutes)	P _{M1} (psi) = 10		P _{M2} (psi) = 12		P _{M3} (psi) = 14		P _{M4} (psi) = 20		P _{M5} (psi) = 25	
	R _{flowmeter} (m3)	q (Liters)	R _{flowmeter} (m3)	q (Liters)	R _{flowmeter} (m3)	q (Liters)	R _{flowmeter} (m3)	q (Liters)	R _{flowmeter} (m3)	q (Liters)
0	67.025	-----	67.025	-----	67.025	-----	67.025	-----	67.025	-----
1	67.025	0.00	67.025	0.00	67.025	0.00	67.025	0.00	67.025	0.00
2	67.025	0.00	67.025	0.00	67.025	0.00	67.025	0.00	67.025	0.00
3	67.025	0.00	67.025	0.00	67.025	0.00	67.025	0.00	67.025	0.00
4	67.025	0.00	67.025	0.00	67.025	0.00	67.025	0.00	67.025	0.00
5	67.025	0.00	67.025	0.00	67.025	0.00	67.025	0.00	67.025	0.00
6										
7										
8										
9										
10										

Lithology: Sandstone, siltstone and shale

Comments: Artesian conditions present, water level was above ground surface within the casing prior to commencing test

No take recorded during testing

Increased pressure at Steps 1 to 5 to attempt to record change in flow, no change recorded



Revision Date: February 17, 2010
 Revised by: K. Gudenkauf
 Checked by: C. Brueckman
 Reviewed by: H. Ramirez

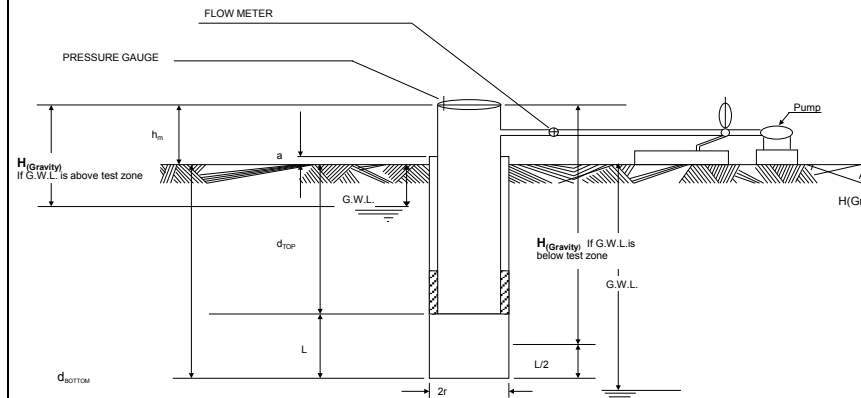
PACKER TEST

DB3

PROJECT : 110773396
 JOB N° : 0
 Supervisor: Colleen Small

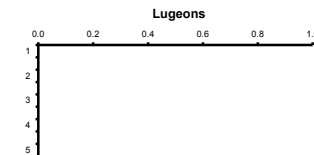
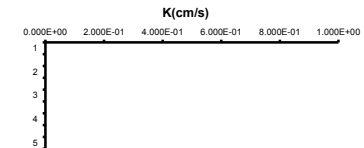
DEPTH OF THE TEST FROM: 12.10 to 15.10 m.
 DATE: April 19, 2018 I.Hour: 5:00:00 PM E. Hour: 18:00
 AZIMUTH: - N/A Ground Water Level (If no water is present place a depth greater than middle of test zone): -0.6 m.

TEST NUMBER: 03



- h_m = Height of the Gauge Pressure 0.50 m.
- a = Height above of the surface 1.04 m.
- G.W.L. = Ground Water Level -0.56 m.
- $H(Grav)$ = Distance from ground-water level to swivel 0.98 m.
- d_{TOP} = Depth from ground surface to top of testing zone 12.10 m.
- d_{BOTTOM} = Depth from ground surface to bottom of testing zone 15.10 m.
- α = Inclination with the horizontal 90 deg
- $H(Grav)$ corrected = $SIN \alpha \times H(Grav)$ 0.98 m.
- L = Length of the portion of the hole tested 3.00 m.
- $2r$ = Two times the radius of hole tested (Diameter) 9.61 cm.
- P_M = Gauge Pressure
- Δp = Head Loss
- q = Volume in liters during the test

Time (min)	P_{M1} = Surface Gauge Pressure (psi) = 10.00		P_{M2} = Surface Gauge Pressure (psi) = 12.00		P_{M3} = Surface Gauge Pressure (psi) = 14.00		P_{M4} = Surface Gauge Pressure (psi) = 20.00		P_{M5} = Surface Gauge Pressure (psi) = 25.00	
	Flow Meter Reading (m³)	Change in Flow Meter Reading q(l)	Flow Meter Reading (m³)	Change in Flow Meter Reading q(l)	Flow Meter Reading (m³)	Change in Flow Meter Reading q(l)	Flow Meter Reading (m³)	Change in Flow Meter Reading q(l)	Flow Meter Reading (m³)	Change in Flow Meter Reading q(l)
0	67.025		67.025		67.025		67.025		67.025	
1	67.025	0.00	67.025	0.00	67.025	0.00	67.025	0.00	67.025	0.00
2	67.025	0.00	67.025	0.00	67.025	0.00	67.025	0.00	67.025	0.00
3	67.025	0.00	67.025	0.00	67.025	0.00	67.025	0.00	67.025	0.00
4	67.025	0.00	67.025	0.00	67.025	0.00	67.025	0.00	67.025	0.00
5	67.025	0.00	67.025	0.00	67.025	0.00	67.025	0.00	67.025	0.00
6		0.00		0.00		0.00		0.00		0.00
7		0.00		0.00		0.00		0.00		0.00
8		0.00		0.00		0.00		0.00		0.00
9		0.00		0.00		0.00		0.00		0.00
10		0.00		0.00		0.00		0.00		0.00
Sum of q (l) =		0.0	0.0		0.0		0.0		0.0	
Average q(l) from raw data=Q(l/min) =		0.00	0.00		0.00		0.00		0.00	
Average q(l) from raw data=Q (m³/sec) =		0.00E+00	0.00E+00		0.00E+00		0.00E+00		0.00E+00	
H_p (psi) =		11.39	13.39		15.39		21.39		26.39	
Differential Head of Water = H (m) =		8.02	9.43		10.84		15.06		18.59	
Permeability = K(cm/s) =		0.000E+00	0.000E+00		0.000E+00		0.000E+00		0.000E+00	
Lugeon =		0.0	0.0		0.0		0.0		0.0	



$K : 0.000E+00$ cm/s
 Lugeon: 0.0

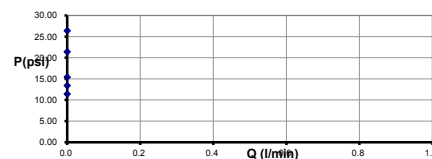
$$H_p = P_{Mn} (psi) + (Y_w(pcf) \times H_{Grav} (Corrected) (ft) / 144(psf))$$

$$K_H = \frac{Q}{2\pi L H_p} * \ln\left(\frac{L}{r}\right)$$

For : $L \geq 10r$

$$Lugeon = (liters / m / min) \times (10 / pressure(bars))$$

Graphic P vs. Q



Notes & Observations:

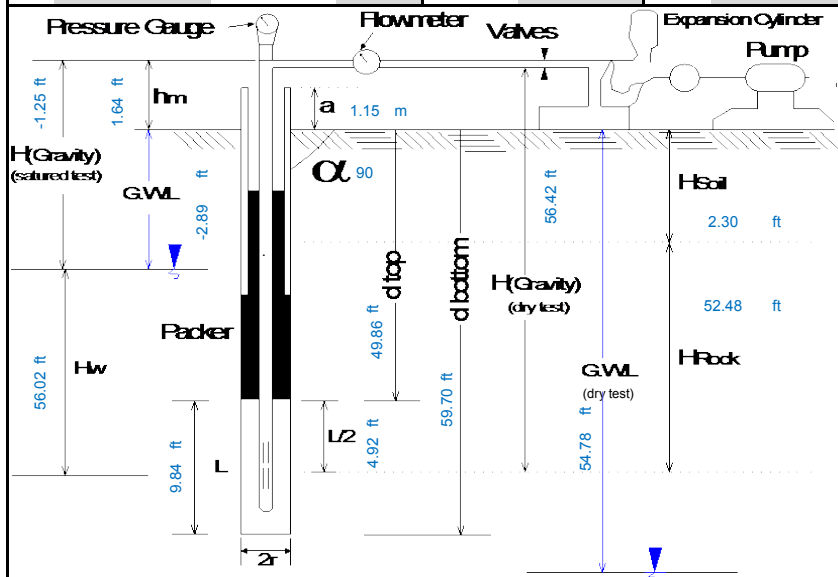
References:
 "Design of Small Dams," Bureau of Reclamation, Third edition, 1987, pg. 177.

"Construction and Design of Cement Grouting," A.C. Houbly

Permeability Interpretations (change reported K & Lugeon):

No results

GENERAL INFORMATION		BOREHOLE INFORMATION		TEST INFORMATION									
Contractor Company:	All Service Drilling	North (m):	Inclination/H (α):	90	Depth of the Test From (m):	15.20	to (m):	18.20	RQD%:	76			
Field Responsible of Contractor:	Tim Plourde	East (m):	Location:	Debris Barrier	Initial Hour:	15:10	d top:	15.20 m.	h soil (m):	0.70			
Field Engineer of MWH:	Colleen Small	Elevation (m):	Borehole Diameter (2r):	9.61	End Hour:	16:10	d bottom:	18.20 m.	h rock (m):	16.00			
Date:	20-Apr-2018	Turn Day/Night:	Day	Azimuth:	N/A	GWI (m):	-0.88	hm (m):	0.50	L (m):	3.00	a (m):	1.15



Packer Initiation Pressure = Pp

1. $P_h = (d_{top} + a) \rho_i$ Hydrostatic Pressure on the Packer & Convent. $\rho_i = 0.7$ m
2. $P_w = 200$ psi Packer Working Pressure
3. $P_p = (P_h + P_w) \times 1.2$ psi Packer Initiation Pressure

Minimum Allowable Pressure = Pmax

1. $\sigma'_t = (H_{soil} \times \gamma_{soil} + H_{rock} \times \gamma_{rock})$ Correct for inclined holes & Convent 1m = 3.28 feet
2. $u = [(H_{soil} + H_{rock}) - GWL] \times \gamma_w$ Correct for inclined holes & Convent 1m = 3.28 feet
3. $\sigma'_v = \sigma'_t - u$ Correct 1 psi = 144 psi
4. $H_g = H_{gravity} \times \gamma_w$ Correct for inclined holes & Convent 1m = 3.28 feet
5. $P_{max} = \sigma'_v - H_g$ Correct 1 psi = 144 psi
6. $P_M = \% P_{max}$ which is dependent on RQD
 - If RQD is > 75% in the test zone then:

$P_{M1} = 25\% P_{max}$	$P_{M2} = 50\% P_{max}$	$P_{M3} = 75\% P_{max}$
$P_{M4} = 25\% P_{max}$	$P_{M5} = 50\% P_{max}$	$P_{M6} = 40\% P_{max}$
$P_{M7} = 60\% P_{max}$	$P_{M8} = 20\% P_{max}$	
 - If RQD is < 75% in the test zone then:

$P_{M1} = 20\% P_{max}$	$P_{M2} = 40\% P_{max}$	$P_{M3} = 60\% P_{max}$
$P_{M4} = 40\% P_{max}$	$P_{M5} = 20\% P_{max}$	

Notes:

1. Maximum Allowable Pressure (Pmax) must not exceed 1 psi/ft (convert meters to ft) or 3.28 psi/m
2. Account for pore water pressure if there is measured water
3. Test Zone (L) should not be greater than 5m and 3m is recommended
4. Hsoil, Hrock and Hw should be corrected if test hole is inclined [Hsoil of]
5. Incremental Pressures depend on RQD
6. Packer can only be set in rock that has an RQD > 60%
7. $\gamma_{soil} = 100$ pd
8. $\gamma_{rock} = 140$ pd
9. $\gamma_w = 62.4$ pd
10. Airflow rate = 1000 L/min
11. Wait until flow rate remains relatively constant and reaches equilibrium (~5 min) before starting tests
12. Calibrating the flowmeter weekly.

Legend:

- hm : Height to Gauge Pressure
- GWL : Ground Water Level
- H(Gavity) : Distance from Ground Water Level to Sewel
- d top : Depth from Ground surface to top of testing zone
- d bottom : Depth from Ground surface to bottom of testing zone
- α : Inclination with the horizontal
- L : Length of the portion of the hole tested
- 2r : Diameter of the hole tested
- Pm : Surface Gauge Pressure
- R flowmeter : Flow Meter Reading
- q : Change in Flow Meter Reading
- Hw : Height of casing above the ground (stick up)

Maximum Allowable Pressure Calculation:

- 1.- $\sigma'_t = \frac{(2.3 \times 100 + 52.48 \times 140)}{144} = 52.62$ ft. Psi
- 2.- $u = \frac{(2.3 + 52.48) \times -2.89}{144} = 24.99$ ft. Psi
- 3.- $\sigma'_v = 52.62 - 24.99 = 27.63$ ft. Psi
- 4.- $H_g = \frac{-1.25 \times 62.4}{144} = -0.54$ ft. Psi
- 5.- $P_{max} = 27.63 - (-0.54) = 28.17$ ft. Psi

6.- P_M if RQD is > 75% in the test zone then:

$P_{M1} = 25\% P_{max} = 7$	$P_{M2} = 50\% P_{max} = 14$	$P_{M3} = 75\% P_{max} = 21$
$P_{M4} = 25\% P_{max} = 14$	$P_{M5} = 50\% P_{max} = 7$	

P_M if RQD is < 75% in the test zone then:

$P_{M1} = 20\% P_{max} = 6$	$P_{M2} = 40\% P_{max} = 11$	$P_{M3} = 60\% P_{max} = 17$
$P_{M4} = 40\% P_{max} = 11$	$P_{M5} = 20\% P_{max} = 6$	

Packer Initiation Pressure Calculation:

- 1.- $P_h = (15.2 + 1.15) \text{ m} = 23.36$ psi
- 2.- $P_w = 200$ psi
- 3.- $P_p = (23.36 + 200) \times 1.2$ psi

Pp = 268 psi

PACKER TEST	P _{M1} (psi) = 7		P _{M2} (psi) = 14		P _{M3} (psi) = 21		P _{M4} (psi) = 14		P _{M5} (psi) = 7	
	R _{flowmeter} (m3)	q (Liters)	R _{flowmeter} (m3)	q (Liters)	R _{flowmeter} (m3)	q (Liters)	R _{flowmeter} (m3)	q (Liters)	R _{flowmeter} (m3)	q (Liters)
0	67.066	-----	67.066	-----	67.066	-----		-----		-----
1	67.066	0.00	67.066	0.00	67.066	0.00				
2	67.066	0.00	67.066	0.00	67.066	0.00				
3	67.066	0.00	67.066	0.00	67.066	0.00				
4	67.066	0.00	67.066	0.00	67.066	0.00				
5	67.066	0.00	67.066	0.00	67.066	0.00				
6										
7										
8										
9										
10										

Lithology: Grey sandstone interbedded with dark brown siltstone, clay infills present

Comments: During testing at Pm1 flow out of top of casing noted but no take recorded. Increased to Pm2
 During Pm2 no take recorded. Test abandoned after Pm3 due to no take.
 Artesian conditions present within borehole



Revision Date: February 17, 2010
 Revised by: K. Gudenkauf
 Checked by: C. Brueckman
 Reviewed by: H. Ramirez

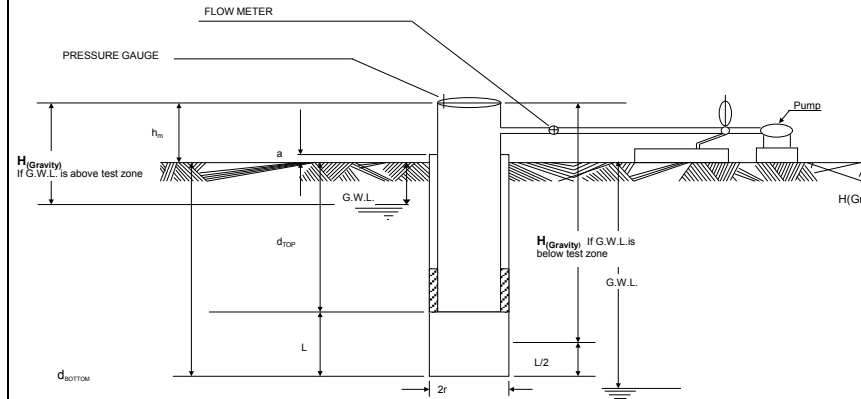
PACKER TEST

DB3

PROJECT : 110773396
 JOB N° : 0
 Supervisor: Colleen Small

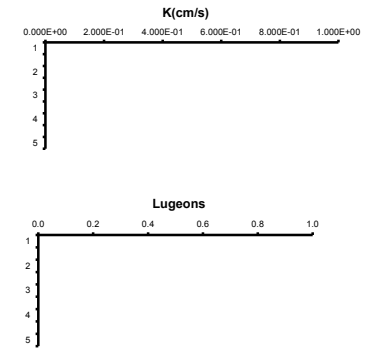
DEPTH OF THE TEST FROM: 15.20 to 18.20 m.
 DATE: April 20, 2018 I.Hour: 3:10:00 PM E. Hour: 16:10
 AZIMUTH: - N/A Ground Water Level (If no water is present place a depth greater than middle of test zone): -0.9 m.

TEST NUMBER: 04



- h_m = Height of the Gauge Pressure 0.50 m.
- a = Height above of the surface 1.15 m.
- G.W.L. = Ground Water Level -0.88 m.
- $H(Grav)$ = Distance from ground-water level to swivel 0.77 m.
- d_{TOP} = Depth from ground surface to top of testing zone 15.20 m.
- d_{BOTTOM} = Depth from ground surface to bottom of testing zone 18.20 m.
- α = Inclination with the horizontal 90 deg
- $H(Grav)$ corrected = $SIN \alpha \times H(Grav)$ 0.77 m.
- L = Length of the portion of the hole tested 3.00 m.
- $2r$ = Two times the radius of hole tested (Diameter) 9.61 cm.
- P_M = Gauge Pressure
- Δp = Head Loss
- q = Volume in liters during the test

Time (min)	P_{M1} = Surface Gauge Pressure (psi) = 7.00		P_{M2} = Surface Gauge Pressure (psi) = 14.00		P_{M3} = Surface Gauge Pressure (psi) = 21.00		P_{M4} = Surface Gauge Pressure (psi) = 14.00		P_{M5} = Surface Gauge Pressure (psi) = 7.00	
	Flow Meter Reading (m ³)	Change in Flow Meter Reading q(l)	Flow Meter Reading (m ³)	Change in Flow Meter Reading q(l)	Flow Meter Reading (m ³)	Change in Flow Meter Reading q(l)	Flow Meter Reading (m ³)	Change in Flow Meter Reading q(l)	Flow Meter Reading (m ³)	Change in Flow Meter Reading q(l)
0	67.066		67.066		67.066					
1	67.066	0.00	67.066	0.00	67.066	0.00		0.00		0.00
2	67.066	0.00	67.066	0.00	67.066	0.00		0.00		0.00
3	67.066	0.00	67.066	0.00	67.066	0.00		0.00		0.00
4	67.066	0.00	67.066	0.00	67.066	0.00		0.00		0.00
5	67.066	0.00	67.066	0.00	67.066	0.00		0.00		0.00
6		0.00		0.00		0.00		0.00		0.00
7		0.00		0.00		0.00		0.00		0.00
8		0.00		0.00		0.00		0.00		0.00
9		0.00		0.00		0.00		0.00		0.00
10		0.00		0.00		0.00		0.00		0.00
Sum of q (l) =		0.0	0.0		0.0		0.0		0.0	
Average q(l) from raw data=Q(l/min) =		0.00	0.00		0.00		0.00		0.00	
Average q(l) from raw data=Q (m ³ /sec) =		0.00E+00	0.00E+00		0.00E+00		0.00E+00		0.00E+00	
Head H_p (psi) =		8.09	15.09		22.09		15.09		8.09	
Differential Head of Water = H (m) =		5.70	10.63		15.56		10.63		5.70	
Permeability = K(cm/s) =		0.000E+00	0.000E+00		0.000E+00		0.000E+00		0.000E+00	
Lugeon =		0.0	0.0		0.0		0.0		0.0	



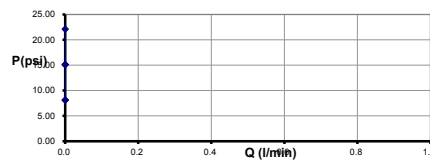
$K : 0.000E+00$ cm/s
 Lugeon: 0.0

$$H_p = P_{Mn} (psi) + (Y_w(pcf) \times H_{Grav} (Corrected) (ft) / 144(psf))$$

$$K_H = \frac{Q}{2\pi L H_p} * \ln\left(\frac{L}{r}\right)$$

For: $L \geq 10r$
 Lugeon = (liters / m / min) x (10 / pressure(bars))

Graphic P vs. Q

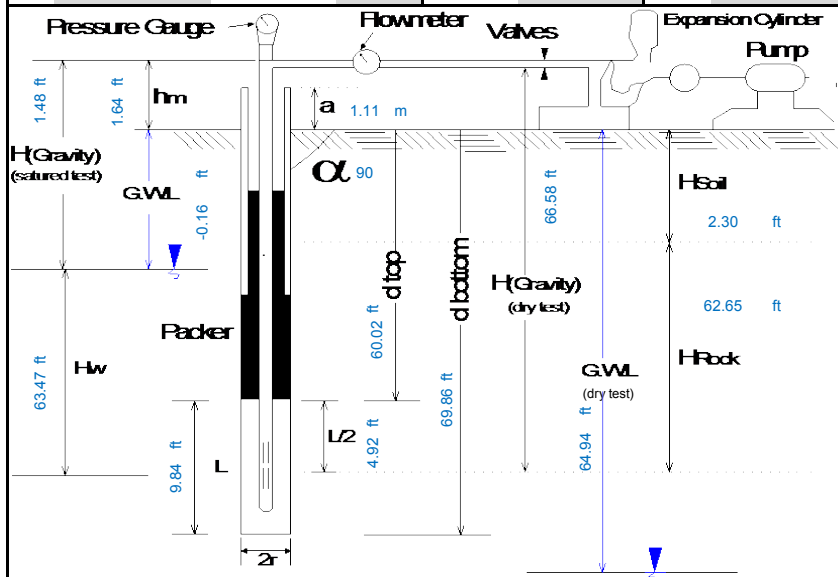


Notes & Observations:

References:
 "Design of Small Dams," Bureau of Reclamation, Third edition, 1987, pg. 177.
 "Construction and Design of Cement Grouting," A.C. Houbly

Permeability interpretations (change reported K & Lugeon):
 No take

GENERAL INFORMATION	BOREHOLE INFORMATION	TEST INFORMATION			
Contractor Company: All Service Drilling	North (m):	Inclination/H (α): 90	Depth of the Test From (m): 18.30	to (m): 21.30	RQD%: 72
Field Responsible of Contractor: Tim Plourde	East (m):	Location: Debris Barrier	Initial Hour: 15:10	d top: 18.30 m.	h soil (m): 0.70
Field Engineer of MWH: Colleen Small	Elevation (m):	Borehole Diameter (2r): 9.61	End Hour: 16:10	d bottom: 21.30 m.	h rock (m): 19.10
Date: 20-Apr-2018 Turn Day/Night: Day	Azimuth: N/A	GWI (m): -0.05	hm (m): 0.50	L (m): 3.00	a (m): 1.11



Packer Inflation Pressure = Pp

1. $P_h = (d_{top} + a) \rho_{soil}$ Hydrostatic Pressure on the Packer & Convent. $\rho_{soil} = 0.7m$
2. $P_w = 200 \text{ psi}$ Packer Working Pressure
3. $P_p = (P_h + P_w) \times 1.2$ Packer Inflation Pressure

Minimum Allowable Pressure = Pmax

1. $\sigma'_t = (H_{soil} \times \gamma_{soil} + H_{rock} \times \gamma_{rock})$ Correct for inclined holes & Convent 1m = 3.28 feet
2. $u = [(H_{soil} + H_{rock}) - GWL] \times \gamma_w$ Correct for inclined holes & Convent 1m = 3.28 feet
3. $\sigma' = \sigma'_t - u$ Convent 1 psi = 144 pd
4. $H_g = H_{gravity} \times \gamma_w$ Correct for inclined holes & Convent 1m = 3.28 feet
5. $P_{max} = \sigma' - H_g$ Convent 1 psi = 144 pd
6. $P_M = \% P_{max}$ which is dependent on RQD
 - If RQD is > 75% in the test zone then: $P_{M1} = 25\% P_{max}$ $P_{M2} = 50\% P_{max}$ $P_{M3} = 75\% P_{max}$
 - If RQD is < 75% in the test zone then: $P_{M1} = 20\% P_{max}$ $P_{M2} = 40\% P_{max}$ $P_{M3} = 60\% P_{max}$

Notes:

1. Maximum Allowable Pressure (Pmax) must not exceed 1 psi/ft (convert meters to ft) or 3.28 psi/m
2. Account for pore water pressure if there is measured water
3. Test Zone (L) should not be greater than 5m and 3m is recommended
4. Hsoil, Hrock and Hw should be corrected if test hole is inclined [Hsoil of]
5. Incremental Pressures depend on RQD
6. Packer can only be set in rock that has an RQD > 60%
7. $\gamma_{soil} = 100 \text{ pd}$
8. $\gamma_{rock} = 140 \text{ pd}$
9. $\gamma_w = 62.4 \text{ pd}$
10. Inflow rate = 1000 L/min
11. Wait until flow rate remains relatively constant and reaches equilibrium (~5 min) before starting tests
12. Calibrating the flowmeter weekly.

Legend:

- Hm : Height to Gauge Pressure
- GWL : Ground Water Level
- H(Gavity) : Distance from Ground Water Level to Sewel
- d top : Depth from Ground surface to top of testing zone
- d bottom : Depth from Ground surface to bottom of testing zone
- α : Inclination with the horizontal
- L : Length of the portion of the hole tested
- 2r : Diameter of the hole tested
- Pm : Surface Gauge Pressure
- R flowmeter : Flow Meter Reading
- q : Change in Flow Meter Reading
- Hw : Height of casing above the ground (stick up)
- a : Height of casing above the ground (stick up)

Maximum Allowable Pressure Calculation:

1. $\sigma'_t = \frac{(2.3 \times 100 + 62.65 \times 140)}{144} = 62.5 \text{ ft. Psi}$
2. $u = \frac{(2.3 + 62.65) - (-0.16)}{144} = 28.21 \text{ ft. Psi}$
3. $\sigma' = 62.5 - 28.21 = 34.29 \text{ ft. Psi}$
4. $H_g = \frac{1.48 \times 62.4}{144} = 0.64 \text{ ft. Psi}$
5. $P_{max} = 34.29 - 0.64 = 33.65 \text{ ft. Psi}$

6. - P_M If RQD is > 75% in the test zone then:

$P_{M1} = 25\% P_{max} = 8$ $P_{M2} = 50\% P_{max} = 17$ $P_{M3} = 75\% P_{max} = 25$

$P_{M4} = 25\% P_{max} = 17$ $P_{M5} = 50\% P_{max} = 8$

P_M If RQD is < 75% in the test zone then:

$P_{M1} = 20\% P_{max} = 7$ $P_{M2} = 40\% P_{max} = 13$ $P_{M3} = 60\% P_{max} = 20$

$P_{M4} = 40\% P_{max} = 13$ $P_{M5} = 20\% P_{max} = 7$

Packer Inflation Pressure Calculation:

1. $P_h = (18.3 + 1.11) m = 27.73 \text{ p}$
2. $P_w = 200 \text{ psi}$
3. $P_p = (27.73 + 200) \times 1.2 \text{ psi}$

Pp = 273 psi

PACKER TEST Time (minutes)	P _{M1} (psi) = 7		P _{M2} (psi) = 30		P _{M3} (psi) =		P _{M4} (psi) =		P _{M5} (psi) =	
	R _{flowmeter} (m3)	q (Liters)	R _{flowmeter} (m3)	q (Liters)	R _{flowmeter} (m3)	q (Liters)	R _{flowmeter} (m3)	q (Liters)	R _{flowmeter} (m3)	q (Liters)
0	67.068	-----	67.073	-----						
1	67.070	2.00	67.073	0.00						
2	67.071	1.00	67.073	0.00						
3	67.071	0.00	67.073	0.00						
4	67.071	0.00	67.073	0.00						
5	67.071	0.00	67.073	0.00						
6										
7										
8										
9										
10										

Lithology:

Comments: **No take after Minute 3 during 7psi test.**
Increased pressure, no take recorded



Revision Date: February 17, 2010
 Revised by: K. Gudenkauf
 Checked by: C. Brueckman
 Reviewed by: H. Ramirez

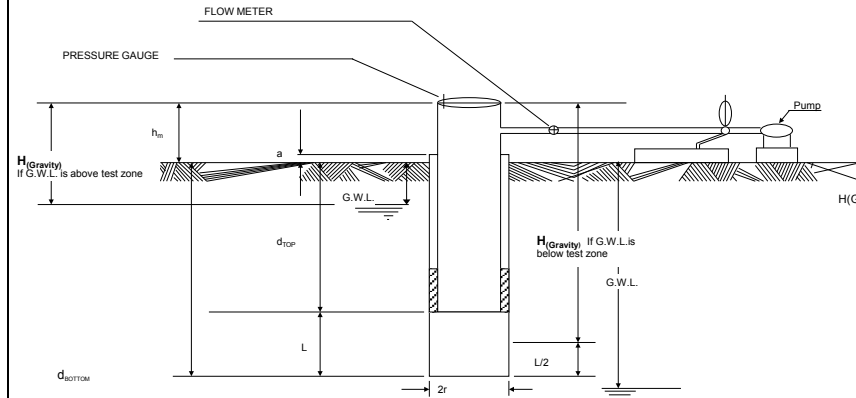
PACKER TEST

DB3

PROJECT : 110773396
 JOB N° : 0
 Supervisor: Colleen Small

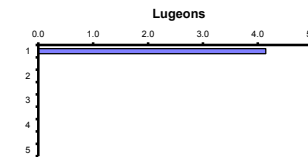
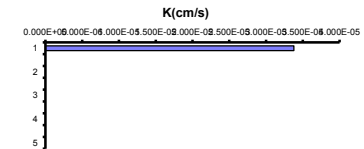
DEPTH OF THE TEST FROM: 18.30 to 21.30 m.
 DATE: April 20, 2018 I.Hour: 3:10:00 PM E. Hour: 16:10
 AZIMUTH: - N/A Ground Water Level (If no water is present place a depth greater than middle of test zone): -0.1 m.

TEST NUMBER: 05



- h_m = Height of the Gauge Pressure = 0.50 m.
- a = Height above of the surface = 1.11 m.
- G.W.L. = Ground Water Level = -0.05 m.
- $H_{(Gravity)}$ = Distance from ground-water level to swivel = 1.56 m.
- d_{TOP} = Depth from ground surface to top of testing zone = 18.30 m.
- d_{BOTTOM} = Depth from ground surface to bottom of testing zone = 21.30 m.
- α = Inclination with the horizontal = 90 deg
- $H_{(Gravity)}$ corrected = $SIN \alpha \times H_{(Gravity)}$ = 1.56 m.
- L = Length of the portion of the hole tested = 3.00 m.
- $2r$ = Two times the radius of hole tested (Diameter) = 9.61 cm.
- P_M = Gauge Pressure
- Δp = Head Loss
- q = Volume in liters during the test

Time (min)	P_{M1} = Surface Gauge Pressure (psi) = 7.00		P_{M2} = Surface Gauge Pressure (psi) = 30.00		P_{M3} = Surface Gauge Pressure (psi) = 0.00		P_{M4} = Surface Gauge Pressure (psi) = 0.00		P_{M5} = Surface Gauge Pressure (psi) = 0.00	
	Flow Meter Reading (m³)	Change in Flow Meter Reading q(l)	Flow Meter Reading (m³)	Change in Flow Meter Reading q(l)	Flow Meter Reading (m³)	Change in Flow Meter Reading q(l)	Flow Meter Reading (m³)	Change in Flow Meter Reading q(l)	Flow Meter Reading (m³)	Change in Flow Meter Reading q(l)
0	67.068		67.073							
1	67.070	2.00	67.073	0.00		0.00		0.00		0.00
2	67.071	1.00	67.073	0.00		0.00		0.00		0.00
3	67.071	0.00	67.073	0.00		0.00		0.00		0.00
4	67.071	0.00	67.073	0.00		0.00		0.00		0.00
5	67.071	0.00	67.073	0.00		0.00		0.00		0.00
6		0.00		0.00		0.00		0.00		0.00
7		0.00		0.00		0.00		0.00		0.00
8		0.00		0.00		0.00		0.00		0.00
9		0.00		0.00		0.00		0.00		0.00
10		0.00		0.00		0.00		0.00		0.00
Sum of q (l) =		3.0	0.0		0.0		0.0		0.0	
Average q(l) from raw data=Q/(min) =		0.60	0.00		0.00		0.00		0.00	
Average q(l) from raw data=Q (m³/sec) =		1.00E-05	0.00E+00		0.00E+00		0.00E+00		0.00E+00	
H_p (psi) =		9.22	32.22		2.22		2.22		2.22	
Differential Head of Water = H (m) =		6.49	22.69		1.56		1.56		1.56	
Permeability = K(cm/s) =		3.380E-05	0.000E+00		0.000E+00		0.000E+00		0.000E+00	
Lugeon =		4.1	0.0		#DIV/0!		#DIV/0!		#DIV/0!	



K : 3.380E-05 cm/s
 Lugeon: 4.1

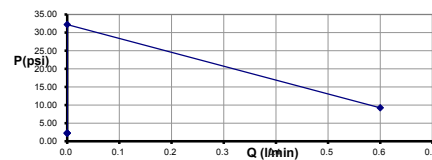
$$H_p = P_{Mn} (\text{psi}) + (Y_w(\text{pcf}) \times H_{Gravity} (\text{Corrected}) (\text{ft}) / 144(\text{psf}))$$

$$K_H = \frac{Q}{2\pi L H_p} * \ln\left(\frac{L}{r}\right)$$

For : $L \geq 10r$

$$\text{Lugeon} = (\text{liters} / \text{m} / \text{min}) \times (10 / \text{pressure}(\text{bars}))$$

Graphic P vs. Q



Notes & Observations:

References:
 "Design of Small Dams," Bureau of Reclamation, Third edition, 1987, pg. 177.

"Construction and Design of Cement Grouting," A.C. Houlsby

Permeability Interpretations (change reported K & Lugeon):

Limited test results