APPENDIX L

GEOTECHNICAL REPORT

BLACK & VEATCH
Building a world of difference.

ITC Lake Erie Connector, LLC
ITC Lake Erie Connector

B&V Project 185241
January 22, 2016

Summary of Geotechnical Testing Results In Water

This report summarizes the results of the geotechnical laboratory testing of samples recovered by vibratory coring in Lake Erie to support the ITC Lake Erie Connector Project. The report summarizes initial findings from field and lab tests, analysis of the results and engineer's recommendations for design will be addressed in later reports. The results from the rock coring to support the shoreline crossings will be addressed in later reports.

Sampling was completed during the summer of 2015. The cores taken were nominally 5 meters (16') long, and 100 mm (4") in diameter. Several cores had incomplete recovery, or were unable to penetrate harder sediments. The draft boring logs were provided by the sampling company, Canadian Seabed Research (CSR) in accordance with ASTM D-1587. Testing requirements for geotechnical analysis to support cable installation was identified by Black & Veatch. Laboratories subcontracted through CSR completed the requested testing. Additional testing for water quality modeling and contaminants was completed in coordination with HDR and are not included in this report.

The soil samples were tested for Atterberg Limits in accordance with ASTM D4318 and Unconfined Compression Soil Test in accordance with ASTM D2166 by Thurber Engineering LTD. The samples were tested for Organic Matter in accordance with ASTM D2974 by SGS Agrifood Laboratories.

A separate report will be prepared for the rock coring laboratory results and the engineering analysis and recommendations for design.

Boring Log Summary

Vibracore #	Depth (m)	Soil Classification
VC-C1a	0.00.43	Moderately Stiff Clay
	0.43-3.0	Stiff Clay
VC2	0.0-0.5	Clay with Muscles and Shell Fragments
	0.5-2.5	Medium Stiff Clay
	2.5-3.5	Clay with Mirror Sand
	3.5-4.5	Fine Sand with 7.5 cm Gravel Size Rock
	4.5-4.8	Soft Clay with Sand
VC3	0.0-0.5	Clay with Fine Sand, Muscles, and Shell Fragments
	0.5-1.5	Stiff Clay
	1.5-2.3	Stiff Clay with Shell Fragments
VC4	0.0-0.5	Siilt/Clay, trace sand, shell fragments
	0.5-1.5	Silt/Clay, trace sand
	1.5-2.5	Soft Silt with Fine Sand
	2.5-3.7	Silt with moderate find sand, 10% shell fragments
VC5	0.0-0.5	Soft Clay Fine Sand, Muscles, and Shell Fragments
	0.5-1.5	Soft Clay/Silt
	1.5-2.2	Very Stiff Clay
VC6	0.0-1.0	Soft Clay/Silt
	1.0-1.5	Medium Stiff Clay
VC7	0.0-0.5	Soft Soupy Clay/Silt with numerous Mussles and traces of find sands
	0.5-2.5	Soft Clay/Silt
	2.5-3.0	Stiff Clay
VC8	0.0-0.5	Soupy Soft Clay/Silt
	0.5-2.5	Soft Clay/Silt
	2.5-3.5	Clay/Silt
	3.5-4.0	Soft Clay
VC9	0.0-0.5	Soft Clay/Silt with Mussels
	0.5-1.5	Soft Clay
	1.5-2.65	Medium Clay, Fine Gravel
VC10	0.0-0.5	Very Soft Clay/Silt
	0.5-3.2	Soft Clay
VC11	0.0-0.5	Very Soft Clay
	0.5-2.5	Soft Clay
	2.5-3.8	Soft clay with trace gas
VC12	0.0-0.5	Very Soft Clay/Silt with mussels present
	0.5-4.1	Soft clay
VC13	0.0-0.5	Very Soft Silt with mussels present
	0.5-3.8	Soft Silt/clay
VC14	0.0-0.5	Very Soft Silt
	0.5-1.0	Soft Silt/Clay with dark streaks
	1.0-3.5	Soft Clay/Silt with gas bubbles
VC15	0.0-0.5	Very Soft Clay/Silt with mussels present
	0.5-1.5	Very soft clay/silt with dark streaks
	1.5-3.5	Soft clay/silt with gas bubbles
VC16	0.0-0.5	Soupy silt/clay
	0.5-1.5	Very soft clay/silt
	1.5-3.8	Soft clay/silt with gas
VC17	0.0-0.5	Very soft fine clay/silt
	0.5-3.0	Clay/silt with gas voids and odour present
	3.0-3.8	Clay/silt
VC18	0.0-0.5	Soft/wet clay
	0.5-1.5	Very soft clay
	1.5-2.5	Very soft clay/silt
	2.5-4.0	Soft clay/silt with few gas bubbles
VC19	0.0-0.5	Soft soupy clay
	0.5-4.0	Very soft clay/silt with gas voids

VC20	0.0-0.5	Soft soupy clay with mussels
	0.5-4.1	Soft clay/silt
VC21	0.0-0.5	Soft clay with gas bubbles and significant number of mussels
	0.5-1.5	Soft clay/silt with high concentration of gas
	1.5-3.9	Soft clay/silt with gas bubbles
VC22	0.0-0.5	Liquified with mussels present
	0.5-1.0	Soft clay
	1.0-2.0	Soft clay/silt with gas present
	2.0-3.0	Soft clay/silt
	3.0-3.6	Soft clay/silt with gas bubbles
VC23	0.0-0.5	Very soft clay/silt with high water content and mussels
	0.5-2.0	Very soft clay
	2.0-3.5	Very soft clay with some gas bubbles
VC24	0.0-0.5	Very soft clay/silt
	0.5-3.8	Very soft clay with some gas bubbles
VC25	0.0-0.5	Very soft clay with mussels present
	0.5-3.8	Very soft clay
VC26	0.0-0.5	Very Soft Clay/Silt with mussels present
	0.5-1.5	Very soft clay with high water content
	1.5-4.0	Very soft clay
VC27	0.0-0.5	Highly saturated clay
	0.5-1.5	Very soft clay with higher water content
	1.5-3.9	Very soft clay
VC28	0.0-0.5	Very soft clay, high percentage of black streaks, mussels present
	0.5-3.5	Very soft clay with black streaks
	3.5-4.2	Very soft clay
VC29	0.0-0.5	Very soft clay with traces of fine sand
	0.5-1.5	Very soft clay with high water content
	1.5-2.2	Very soft clay with black streaks
	2.2-4.5	Very soft clay
VC30	0.0-1.7	Soft clay with higher water content
	1.7-4.3	Very soft clay with traces of fine sand
VC31	0.0-0.5	Find to medium sand with mussles present and shell fragments
	0.5-3.7	Very soft clay with traces of fine sand
	3.7-3.9	Find sand with some silt and trace shell fragments
VC32	0.0-0.5	Soft silt with fine sand and mussels present
	0.5-4.0	Very soft silt with traces of fine sand
	4.0-4.4	Very soft clay with fine and medium sand
VC33	0.0-0.5	Soft clay/silt with fine sand and trace shell fragments
	0.5-1.2	Soft clay/silt with fine sand
	1.2-2.8	Very soft clay with silt and fine sands
	2.8-3.0	Very soft clay, silt with find and coarse sand, trace organics
VC34	0.0-0.5	Very soft silt/clay with trace fine sand, mussels, and organics
	0.5-1.5	Very soft silt with clay, trace fine sand, high water content
	1.5-2.5	Fine sand with silt
	2.5-3.0	Very soft silt with clay
VC35	0.0-0.5	Very soft clay with trace fine sand and shell fragments
	0.5-1.0	Very soft clay with silt, high water content, shell fragments
	1.0-2.0	Very soft clay with trace silt, trace organics
	2.0-3.0	Soft silt with clay, trace orgaincs
	3.0-3.3	Medium dense sand, fine grained
VC36	0.0-0.5	Very Soft Clay/Silt with mussels present
	0.5-1.2	Very soft clay with trace fine sand
	1.2-2.2	Soft clay with silt and trace sand
	2.2-3.1	Soft clay with silt
	3.1-4.0	Soft silt with clay, trace find sand, organics, and shells
	4.0-4.4	Very soft silt with clay, trace fine sand
VC37	0.0-0.5	Very soft silt with clay, shell fragments and high water content
	0.5-1.5	Soft clay with trace fine sand

	1.5-2.4	Soft clay
	2.4-3.4	Soft clay with trace fine sand
	3.4-3.8	Hard clay with coarse sand, fine gravel at top
VC38	0.0-0.5	Very soft clay with silt
	0.5-2.7	Very soft clay with trace fine sand
	2.7-4.0	Soft clay
VC39	0.0-0.5	Fine sand with clay/silt, well drained, shell fragments and mussels
	0.5-1.1	Soft clay witht race shell fragments, higher water content
	1.1-1.8	Medium stiff clay with trace shell fragments
	1.8-3.0	Medium stiff clay with trace organics
	3.0-3.3	Stiff clay with fine gravel
VC40	0.0-0.5	Fine gravel with medium to coarse sand, mussels present
	0.5-1.0	Stiff clay with traces of fine sand
	1.0-1.5	Stiff clay with fine gravel
VC41	0.0-0.5	Mixed sediment matrix, sub-rounded to rounded coarse gravel, live mussels
	0.5-1.5	Stiff clay with traces of fine to medium sand
VC42	0.0-0.5	Very soft clay with high water content
	0.5-1.0	Very soft clay
	1.0-3.0	Soft clay with trace sand
	3.0-3.9	Medium stiff clay with traces of fine sand
	3.9-4.3	Medium stiff clay
VC43	0.0-0.5	Very soft clay/silt with traces of fine sand, disturbed with mussels present
	0.5-1.2	Soft clay/silt with trace fine sand
	1.2-2.0	Medium to coarse sand with fine gravel
	2.0-2.1	Coarse sand with some fine - medium sand
VC44	0.0-0.5	Soft soupy clay
	0.5-2.2	Soft clay
	2.2-2.8	Moderately stiff clay
	2.8-4.0	Moderately stiff clay with pebble of shale/siltstone, medium fine sand
VC45	0.0-1.6	Moderately stiff clay
VC46	0.0-0.5	Fine sand/silt with fine gravel and shell fragments, high water content
	0.5-1.1	Clay, trace sand and shells
	1.1-1.5	Fine sand with silt and fine gravel, wood and shell fragments present
VC47	0.0-0.5	Fine sand, saturated, high water content, wood fragments
	0.5-2.8	Medium clay with organics and shell fragments
VC48	0.0-0.5	Medium stiff clay, mussels on top of sample
	0.5-1.4	Medium stiff clay
	1.4-1.9	Medium stiff clay/silt with no sand
	1.9-2.2	Medium clay with fine sand and high percentage of fine gravel and coarse gravel
VC49	0.0-0.5	Very soft silt/clay with mussels, high water content
	0.5-1.4	Soft clay
	1.4-2.2	Stiff clay, fine sand
VC50	0.0-1.3	Very soft clay with high water content
	1.3-2.2	Soft clay
	2.2-3.0	Trace amounts of sand and fine gravel
	3.0-3.5	Soft clay with gravel/sand
VC67	0.0-0.5	Fine to coarse grain sand, loosely packed, shell fragments, organics
	0.5-1.5	Fine sand, medium density
	1.5-2.0	Fine sand with medium to dense sand
VC68	0.0-0.5	Mixed sediments with very soft clay/silts and fine sand, few mussels
	0.5-1.3	Fine sand of medium density, high water content
	1.3-2.1	Soft clay/silt with fine sand, high water content
	2.1-2.7	Fine sand of medium density, low water content
	2.7-3.0	Medium density fine sand with shell fragments, ~10% silt with wood fragments
VC69	0.0-0.5	Fine sand with shell fragments, well drained loose sand
	0.5-1.9	Fine sand with traces of silt, trace organics and shells, highly saturated and poorly drained
	1.9-2.7	Soft clay/silt with trace shell fragments
	2.7-3.2	Soft clay/silt
VC70	0.0-0.5	Fine sand with silt, shell fragments and organics present

	0.5-1.3	Fine sand with clay/silt, poorly drained with high water content
	1.3-2.0	Medium stiff silt with clay, high water content, poorly drained, trace shells, organics and fine sand
	2.0-2.4	Soft clay/silt
VC70A	0.0-0.3	Very soft clay with fine sand and shell fragments
	0.3-1.0	Soft clay with silt, highly saturated and poorly drained, trace fine sand and organics
	1.0-1.9	Medium stiff clay with trace shell and organics, highly saturated and poorly drained
	1.9-2.7	Medium stiff silt with clay, poorly drained, high water content
	2.7-3.3	Soft clay with silt
VC71	0.0-0.5	Fine sand with fine gravel and shell fragments, well drained and loose sand
	0.5-1.5	Medium stiff silt with clay
	1.5-2.0	Soft silt with clay
VC71A	0.0-0.5	Fine sand with shell fragments, loose sand, trace organics, well drained
	0.5-1.4	Fine sand with trace organics, high water content
	1.4-2.2	Soft silt with clay, higher water content
	2.2-2.7	Soft silt with clay
VC72	0.0-0.5	Fine to medium sand with clay/silt, high water content, trace fine gravel
	0.5-1.7	Medium stiff silt with clay, high water content, trace fine sand
	1.7-2.7	Medium stiff claysilt with fine sand
	2.7-3.3	Fine sand with shell fragments, some clay/silt, loose sand
VC73	0.0-0.5	Fine sand with clay/silt, highly saturated, shell fragments present
	0.5-1.3	Fine sand with clay/silt and shell fragments
	1.3-2.4	Fine sand with shell fragments, well drained with low water content
	2.4-3.1	Fine sand with clay/silt
	3.1-3.9	Medium stiff clay with trace fine to medium sand
	3.9-4.5	Very soft clay
VC74	0.0-0.5	Soft clay/silt with fine sand, high water content, shell fragments
	0.5-1.8	Medium stiff clay/silt with fine sand, trace medium sand with shell fragments
	1.8-2.7	Stiff clay with trace fine to medium sand
	2.7-3.5	Stiff clay with trace fine to medium sand
	3.5-4.2	Medium stiff clay/silt with fine gravel
VC75	0.0-0.5	Fine sand with clay/silt
	0.5-1.7	Medium stiff clay/silt with trace fine sand, shell fragments present
	1.7-2.7	Medium stiff clay/silt with trace fine sand
	2.7-3.7	Medium stiff clay with silt and trace fine sand, higher water content
	3.7-4.2	Medium stiff clay
VC76	0.0-0.5	Fine sand with shell fragments
	0.5-1.5	Medium stiff clay/silt, higher water content
	1.5-1.9	Hard clay

Summary of Atterberg Limits Results

Bore Number	Depth (m)	Classification	Plasticity Index	Liquid Limit
1A	0.09	CI	18	41
1A	0.8	CI	22	43
1A	1.79	CI	19	42
2	0.26	MH-OH	38	80+
2	1.11	CL	14	27
2	2.06	MH-OH	32	74
2	4.63	CI	19	43
3	0.84	CI	18	41
3	1.61	CI	23	46
3	2.23	CI	23	46
4	0.33	CL	9	26
4	1.16	CL	10	27
4	2.01	CL/CL-ML	7	20
5	0.35	CL	12	29
5	1.3	CL	11	25
5	2.02	CI	18	38
6	0.1	CL	13	32
6	0.71	CI	24	45
6	1.33	CI	23	45
7	0.3	CI	23	47
7	0.35	CI	26	48
7	1.3	CH	27	55
7	2.9	CH	26	52
8A	0.37	CI	24	48
8A	1.35	CI	19	43
8A	2.3	CH	28	53
8A	3.9	CI	25	49
9	1.4	CI	24	46
10	1.5	CI	25	48
11	0.31	CH	30	56
12	0.96	CH	27	52
13	0.3	CH	28	57
13	2.05	CH	31	58
14	2.7	CH	30	58
15	0.2	CH	33	65
16	2.07	CH	31	60
17	0.35	CH	26	53
17	1.1	CH	27	53
17	2.05	CH	28	57
17	3	CH	30	58
18	0.4	CH	29	59
18	1.4	CH	26	53
18	2.35	CH	28	55
18	3.3	CH	29	56

18	3.96	CH	28	56
19	1.35	CH	25	52
19	2.2	CH	27	54
19	3.15	CH	27	52
19	3.85	CH	25	53
20	0.42	CH	25	54
20	1.45	CH	25	53
20	2.4	CH	25	51
20	3.35	CH	25	53
20	4.02	CH	28	52
21	0.33	CH	30	60
21	1.25	CH	25	54
22	1.05	CH	32	61
22	3.52	CH	28	54
23	0.23	CH	32	61
24	3.05	CH	34	65
44	0.95	CI	20	40
44	2.74	CL-ML	6	16
45	0.2	CI	25	39
45	0.91	CI	16	39
45	1.53	CI	21	43
46	0.94	CH/MH-OH	30	60
47	1.12	MH-OH	39	80+
47	1.97	MH-OH	39	80+
48	0.29	CI	25	48
48	1.82	CL	11	25
49	0.25	CL	13	32
49	1.75	CI/CH	25	50
50	0.23	CH	28	52

Summary of Organic Matter Tests

Vibracore Number	Depth (m)	Organic Matter (%)
VC-3	0.0-1.07	1.0
VC-49	0.0-0.5	0.8
VC-11	0.0-0.63	1.7
VC-17	0.0-0.70	1.5
VC-22	3.45-3.6	1.5
VC-23	0.0-0.46	1.5
VC-21	0.0-0.65	1.7

Summary of comprression test results

Vibracore #	Sample Number	Depth (m)	Unconfined Compressive Strength Test (UC) Compressive Strength (kPa)	Shear (kPa)	Unconsolidated Undrained Triaxial Compression Test (UU) (kPa)
1A	GT1	-	26.8	13.4	-
1A	GT2	-	17.9	9	-
1A	GT3	-	48.8	24.4	-
3	GT1	-	56.2	28.1	-
3	GT2	-	52	26	-
6	GT1	-	71	35.5	-
8A	GT1	-	11.2	5.6	-
10	GT2	1.15-1.85	-	-	5
44	GT1	2.5-3.0	-	-	34
45	GT1	-	29.2	14.6	-
45	GT2	-	34.6	17.3	-
46	GT1	0.59-1.0	-	-	18
47	GT1	-	28.1	14.1	-
47	GT2	0.87-1.37	-	-	26
48	GT1	1.57-2.07	-	-	46
48	GT3	-	27	13.5	-
49	GT1	-	62.3	31.2	-

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC-C1a	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 576696 / 4736330		Water Depth: 34 ft.
Depth of Sample Stratum:		Vessel Name/Type: ECOSSE
Time (Hypack Target Time): 14:14:12		Date: 16 Aug. 2015
Weather Conditions: Calm, sunny		
Collected by: MK,JN, PC		

Sample Collection device (Note modifications made during sampling): Rossfelder P3

000_1414.RAW

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number: VC-1a	Core Penetration Length: 2.75m
Sample Type: Vibracore	Recovered Core Length: 2.53m
Described By: PC	

CORE SAMPLE SUMMARY

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0	**-0.18**	**VC-1a-GT3**	**geotech**	liner
-0.18	**-0.28**	**VC-1a-EN3**	**environmental**	liner
-0.28	**-0.43**	**VC-1a-TR3**	**thermal**	liner
-0.43	**-1.18**	**VC-1a-GT2**	**geotech**	liner
-1.18	**-1.28**	**VC-1a-EN2**	**environmental**	liner
-1.28	**-1.43**	**VC-1a-TR2**	**thermal**	liner
-1.43	**-2.14**	**VC-1a-GT1**	**geotech**	liner
-2.14	**-2.24**	**VC-1a-EN1**	**environmental**	liner
-2.24	**-2.39**	**VC-1a-TR1**	**thermal**	liner
-2.39	**-2.53**	**VC-1a Nose**	**core nose**	bag

Live Organisms Present	Y / (N)
Oil Present	Y / (N)
Odor Present	Y / (N)
Debris Present	Y / (N)
Within 10% of Required Core Length	Y / N
Photo	Y / N

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC-C1a | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT3)										
	Moderately stiff clay	Light grey			X						
	0.43m - Top of GT2				X						
	Very Stiff Clay PP = 2 TSF TV = 0.45 TSF										
1m											
	1.43 m - Top of GT1	Light grey			X						
	Stiff Clay PP = 0.23 TSF TV = 0.25 TSF										
2m											
	2.53m - Nose Cone	Light grey			X						
	Stiff Clay PP = 0.26 TSF TV = 0.30 TSF										
3m											
4m											
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC-C02	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 576747 / 4735721		Water Depth: 36 ft.
Depth of Sample Stratum: ~ 5m		Vessel Name/Type: ECOSSE
Time (Hypack Target Time): 12:04:16		Date: 16 Aug. 2015
Weather Conditions: Calm, sunny		
Collected by: MK,JN, PC		

Sample Collection device (Note modifications made during sampling): Rossfelder P3

000_1205.RAW

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number: VC-2

Core Penetration Length: 4.8m

Sample Type: Vibracore

Recovered Core Length: 4.7m

Described By: PC

CORE SAMPLE SUMMARY

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0	**-0.51**	**VC-2-GT5**	**geotech**	liner
-0.51	**-0.61**	**VC-2-EN5**	**environmental**	liner
-0.61	**-0.76**	**VC-2-TR5**	**thermal**	liner
-0.76	**-1.46**	**VC-2-GT4**	**geotech**	liner
-1.46	**-1.56**	**VC-2-EN4**	**environmental**	liner
-1.56	**-1.71**	**VC-2-TR4**	**thermal**	liner
-1.71	**-2.41**	**VC-2-GT3**	**geotech**	liner
-2.41	**-2.51**	**VC-2-EN3**	**environmental**	liner
-2.51	**-2.66**	**VC-2-TR3**	**thermal**	liner
-2.66	**-3.36**	**VC-2-GT2**	**geotech**	liner
-3.36	**-3.46**	**VC-2-EN2**	**environmental**	liner
-3.46	**-3.61**	**VC-2-TR2**	**thermal**	liner
-3.61	**-4.31**	**VC-2-GT1**	**geotech**	liner
-4.31	**-4.41**	**VC-2-EN1**	**environmental**	liner
-4.41	**-4.56**	**VC-2-TR1**	**thermal**	liner
-4.56	**-4.7**	**VC-2 Nose**	**core nose**	bag

Live Organisms Present	Y / (N)
Oil Present	Y / (N)
Odor Present	Y / (N)
Debris Present	Y / (N)
Within 10% of Required Core Length	Y / N
Photo	Y / N

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC2 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT5)										
	Clay with muscles and shell fragments	Light olive grey			X						
	Medium stiff clay 0.76m - Top of GT4 PP = 0.22 TSF	Light olive grey			X						
1m	TV = 0.15 TSF										
	Medium stiff clay 1.71m - Top of GT3 PP = 0.2 TSF	Light olive grey			X						
2m	TV = 0.2 TSF										
	Clay with mirror sand 2.66m - Top of GT2 PP = 0.1 TSF	Brown grey			X						
3m	TV = 0.1 TSF										
	Fine sand with 7.5cm gravel size rock (limestone?) 3.61m - Top of GT1 PP = 0.26 TSF	Brown grey			X						
4m	TV = 0.03 TSF										
	Soft clay with sand 4.56m - Nose Cone PP = 0.08 TSF	Brown grey			X						
5m	TV = 0.1 TSF										
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC-C3	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 577891 / 4733363		Water Depth: 43 ft.
Depth of Sample Stratum:		Vessel Name/Type: ECOSSE
Time (Hypack Target Time): 15:51:52		Date: 16 Aug. 2015
Weather Conditions: Sunny, waves < 0.5m		
Collected by: MK,JN, PC		

Sample Collection device (Note modifications made during sampling): Rossfelder P3

000_1552.RAW

Start 15:52:30

End 15:55:00

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number: VC-3	Core Penetration Length: 2.5m
Sample Type: Vibracore	Recovered Core Length: 2.3m
Described By: PC	

CORE SAMPLE SUMMARY

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0	**-1.07**	**VC-3-GT2**	**geotech**	liner
-1.07	**-1.17**	**VC-3-EN2**	**environmental**	liner
-1.17	**-1.32**	**VC-3-TR2**	**thermal**	liner
-1.32	**-1.9**	**VC-3-GT1**	**geotech**	liner
-1.9	**-2**	**VC-3-EN1**	**environmental**	liner
-2	**-2.15**	**VC-3-TR1**	**thermal**	liner
-2.15	**-2.3**	**VC-3 Nose**	**core nose**	bag

Live Organisms Present	Y / (N)
Oil Present	Y / (N)
Odor Present	Y / (N)
Debris Present	Y / N
Within 10% of Required Core Length	Y / N
Photo	Y / N

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC3 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT2)										
	Clay with fine sand, muscles, and shell fragments	Green grey									
1m											
	Stiff clay 1.32m - Top of GT1 PP = 0.3 TSF TV = 0.3 TSF	Light grey			X						
2m											
	Stiff clay with shell fragments 2.15m - Core nose PP = 0.6 TSF TV = 0.4 TSF	Light grey			X						
3m											
4m											
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC-4	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 579119 / 4732039		Water Depth: 47 ft.
Depth of Sample Stratum:		Vessel Name/Type: ECOSSE
Time (Hypack Target Time): 10:19:18		Date: 17 Aug. 2015
Weather Conditions: Sunny, 1 kn winds		
Collected by: MK,JN, PC, CT		

Sample Collection device (Note modifications made during sampling): Rossfelder P3

000_1025.RAW

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number: VC-4	Core Penetration Length: 4.7m
Sample Type: Vibracore	Recovered Core Length: 3.7m
Described By: PC	

CORE SAMPLE SUMMARY

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0	**-0.66**	**VC-4-GT4**	**geotech**	liner
-0.66	**-0.76**	**VC-4-EN4**	**environmental**	liner
-0.76	**-0.91**	**VC-4-TR4**	**thermal**	liner
-0.91	**-1.41**	**VC-4-GT3**	**geotech**	liner
-1.41	**-1.51**	**VC-4-EN3**	**environmental**	liner
-1.51	**-1.66**	**VC-4-TR3**	**thermal**	liner
-1.66	**-2.36**	**VC-4-GT2**	**geotech**	liner
-2.36	**-2.46**	**VC-4-EN2**	**environmental**	liner
-2.46	**-2.61**	**VC-4-TR2**	**thermal**	liner
-2.61	**-3.31**	**VC-4-GT1**	**geotech**	liner
-3.31	**-3.41**	**VC-4-EN1**	**environmental**	liner
-3.41	**-3.56**	**VC-4-TR1**	**thermal**	liner
-3.56	**-3.7**	**VC-4 Nose**	**core nose**	bag

Live Organisms Present	Y / N
Oil Present	Y / N
Odor Present	Y / N
Debris Present	Y / N
Within 10% of Required Core Length	Y / N
Photo	Y / N

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

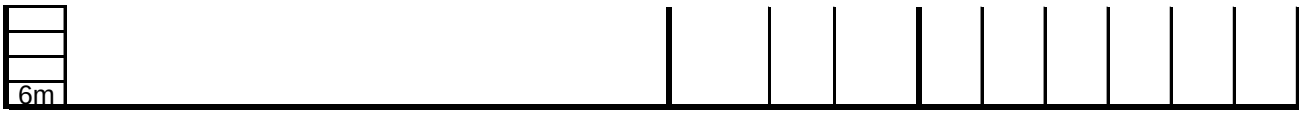
Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

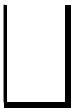
CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC4 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type					
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser
0m	Lakefloor (Top of GT4)									
	Silt / clay, trace sand, shell fragments	Green grey			X					
	Silt / clay, trace sand	Green grey			X					
1m	0.91m - Top of GT3									
	PP = <0.03TSF TV = < 0.02 TSF									
	Soft silt with fine sand 1.66m - Topf of GT2 PP = < 0.03 TSF TV = < 0.03 TSF	Green grey			X					
2m										
	Soft silt, trace sand	Green grey			X					
	2.61m - Top of GT1 PP = 0.03 TSF TV = 0.04 TSF									
3m										
	Silt with moderate fine sand, 10% shell fragments	Green grey			X					
	3.56m - Core nose									
4m										
5m										


6m

Lenticular



CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC5	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 579717 / 4730784		Water Depth: 61 ft.
Depth of Sample Stratum:		Vessel Name/Type: ECOSSE
Time (Hypack Target Time): 13:34:38		Date: 17 Aug. 2015
Weather Conditions: Sunny, 10 kn winds		
Collected by: MK,JN, PC, CT		

Sample Collection device (Note modifications made during sampling): Rossfelder P3

000_1336.RAW

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number: VC-5	Core Penetration Length: 2.2m
Sample Type: Vibracore	Recovered Core Length: 2.14m
Described By: PC	

CORE SAMPLE SUMMARY

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0	**-0.7**	**VC-5-GT2**	**geotech**	liner
-0.7	**-0.8**	**VC-5-EN2**	**environmental**	liner
-0.8	**-0.95**	**VC-5-TR2**	**thermal**	liner
-0.95	**-1.65**	**VC-5-GT1**	**geotech**	liner
-1.65	**-1.75**	**VC-5-EN1**	**environmental**	liner
-1.75	**-1.9**	**VC-5-TR1**	**thermal**	liner
-1.9	**-2.14**	**VC-5 Nose**	**core nose**	bag

Live Organisms Present	Y / N
Oil Present	Y / N
Odor Present	Y / N
Debris Present	Y / N
Within 10% of Required Core Length	Y / N
Photo	Y / N

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC5 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT2)										
	Soft clay / silt with muscles and shell fragments	Green grey	10								
1m	0.95m - Top of GT1	Light grey			X						
	Soft clay / silt PP = 0.03 TSF TV = 0.04 TSF										
2m	1.9m - Nose cone	Light grey			X						
	Very stiff clay PP = >4.5 TSF TV = ~2 TSF										
3m											
4m											
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC6	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 579706 / 4729701		Water Depth: 68 ft.
Depth of Sample Stratum:		Vessel Name/Type: ECOSSE
Time (Hypack Target Time): 14:54:03		Date: 17 Aug. 2015
Weather Conditions: Sunny, 10 kn winds		
Collected by: MK,JN, PC, CT		

Sample Collection device (Note modifications made during sampling): Rossfelder P3

Very little penetration

Amps = 10

000_1455.RAW

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number: VC-6	Core Penetration Length: 1.7m
Sample Type: Vibracore	Recovered Core Length: 1.45m
Described By: PC	

CORE SAMPLE SUMMARY

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0	**-0.21**	**VC-6-GT2**	**geotech**	liner
-0.21	**-0.31**	**VC-6-EN2**	**environmental**	liner
-0.31	**-0.46**	**VC-6-TR2**	**thermal**	liner
-0.46	**-0.96**	**VC-6-GT1**	**geotech**	liner
-0.96	**-1.06**	**VC-6-EN1**	**environmental**	liner
-1.06	**-1.21**	**VC-6-TR1**	**thermal**	liner
-1.21	**-1.45**	**VC-6 Nose**	**core nose**	bag

Live Organisms Present	Y / (N)
Oil Present	Y / N
Odor Present	Y / (N)
Debris Present	Y / (N)
Within 10% of Required Core Length	Y / N
Photo	Y / N

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC6 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT2)										
	Soft clay / silt with mussels	Light grey									
	0.46m - Top of GT1	Light olive			X						
	Soft clay / silt PP = 0.03 TSF TV = 0.07 TSF	grey									
1m											
	1.21m - Nose cone Medium stiff clay PP = 1 TSF TV = 0.6 TSF	Light olive grey			X						
2m											
3m											
4m											
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC7	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 579595 / 4728200		Water Depth: 71.5 ft. / 21.8m
Depth of Sample Stratum:		Vessel Name/Type: ECOSSE
Time (Hypack Target Time): 10:04:43		Date: 21 Aug. 2015
Weather Conditions: Sunny, 10 - 15 kn winds		
Collected by: MK, PC, CT, JM		
Sample Collection device (Note modifications made during sampling):		Rossfelder P3
HDOP = 0.9	Start 10:15:15	
SATS = 10	End 10:16:40	
000_1014.RAW		

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

Vibrocore location was moved to the North to avoid wellhead on the chart.

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number: VC-7	Core Penetration Length: 3.2 m
Sample Type: Vibracore	Recovered Core Length: 3 m
Described By: PC	Date Sampled: 21 Aug 2015

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0.00	-0.70	**VC-7 -GT3**	**geotech**	liner
-0.70	-0.80	**VC-7 -EN3**	**environmental**	liner
-0.80	-0.95	**VC-7 -TR3**	**thermal**	liner
-0.95	-1.65	**VC-7 -GT2**	**geotech**	liner
-1.65	-1.75	**VC-7 -EN2**	**environmental**	liner
-1.75	-1.90	**VC-7 -TR2**	**thermal**	liner
-1.90	-2.60	**VC-7 -GT1**	**geotech**	liner
-2.60	-2.70	**VC-7 -EN1**	**environmental**	liner
-2.70	-2.85	**VC-7 -TR1**	**thermal**	liner
-2.85	-3.00	**VC-7 Nose**	**core nose**	bag

Live Organisms Present	Y / (N)
Oil Present	Y / (N)
Odor Present	(Y) / N
Debris Present	Y / N
Within 10% of Required Core Length	Y / N
Photo	Y / (N)

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC7 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT3)										
	Soft soupy clay / silt Numerous mussles Traces of fine sand	Light grey									
1m	0.95m - Top of GT2	Light olive									
	Soft clay / silt PP = 0.03 TSF TV = 0.02 TSF	grey									
2m	1.90m - Top of GT1	Light olive									
	Soft clay / silt PP = < 0.03 TSF TV = 0.04 TSF	grey									
	2.85m - Core nose	Light grey									
3m	Stiff clay PP = 2 TSF TV = 1.5 TSF										
4m											
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC8a	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 579148 / 4725880		Water Depth: 95 ft. / 28m
Depth of Sample Stratum:		Vessel Name/Type: ECOSSE
Time (Hypack Target Time): 13:12:27		Date: 21 Aug. 2015
Weather Conditions: < 1m waves, 10 kn winds		
Collected by: MK, PC, CT, JM		
Sample Collection device (Note modifications made during sampling):		Rossfelder P3
HDOP = 0.9	Start 13:13:45	
SATS = 10	End 13:14:45	
000_1313.RAW		

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

Lost some of the sample when recovering.

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number: VC-8a	Core Penetration Length: 4.7m
Sample Type: Vibracore	Recovered Core Length: 4.0m
Described By: PC	Date Sampled: 21 Aug 2015

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0.00	-0.75	**VC-8a -GT4**	**geotech**	liner
-0.75	-0.85	**VC-8a -EN4**	**environmental**	liner
-0.85	-1.00	**VC-8a -TR4**	**thermal**	liner
-1.00	-1.70	**VC-8a -GT3**	**geotech**	liner
-1.70	-1.80	**VC-8a -EN3**	**environmental**	liner
-1.80	-1.95	**VC-8a -TR3**	**thermal**	liner
-1.95	-2.65	**VC-8a -GT2**	**geotech**	liner
-2.65	-2.75	**VC-8a -EN2**	**environmental**	liner
-2.75	-2.90	**VC-8a -TR2**	**thermal**	liner
-2.90	-3.60	**VC-8a -GT1**	**geotech**	liner
-3.60	-3.70	**VC-8a -EN1**	**environmental**	liner
-3.70	-3.85	**VC-8a -TR1**	**thermal**	liner
-3.85	-4.00	**VC-8a Nose**	**core nose**	bag

Live Organisms Present	Y / (N)
Oil Present	Y / (N)
Odor Present	(Y) / N
Debris Present	Y / (N)
Within 10% of Required Core Length	Y / N
Photo	Y / (N)

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC8a

Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT4)										
	Soupy soft clay / silt	Olive grey									
1m	1m - Top of GT3	Olive grey									
	Soft clay / silt PP = 0.03 TSF TV = 0.05 TSF										
2m	1.95m - Top of GT2	Olive grey									
	Soft clay / silt PP = 0.03 TSF TV = 0.05 TSF										
3m	2.90m - Top of GT1	Light olive grey									
	Clay / silt PP = 0.094TSF TV = 0.15 TSF										
	3.85m - Core nose	Light olive grey									
4m	Soft clay PP = 0.094 TSF										
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC-9	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 579214.1 E / 4724192		Water Depth: 95ft / 29m
Depth of Sample Stratum: 29-34m		Vessel Name/Type: ECOSSE
Time (Hypack Target Time):	8:57:03	Date: Aug. 26, 2015
Weather Conditions: Winds 15 knts. W, seas 3ft.		
Collected by: CT,MK,JM		

Sample Collection device (Note modifications made during sampling): Rossfelder P3

ADOP = 1.0	Start 8:59:15	Started logging @ top of WC
SIAT =10	End 9:00:50	
000.0856.RAW		

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

Started logging at seafloor. Stiffer clays than further offshore. Not sinking in at start.

Hard at bottom of hole due to glacial till.

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

Cut first 50cm for Geotech, GT1.

Bottom of Core, Glacial till.

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number: VC-9	Core Penetration Length: 3.55m
Sample Type: Vibracore	Recovered Core Length: 2.65 m
Described By: CT	Date Sampled: 26 Aug 2015

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0.00	-0.80	**VC-9-GT3**	**geotech**	liner
-0.80	-0.90	**VC-9-EN2**	**environmental**	liner
-0.90	-1.05	**VC-9-TR2**	**thermal**	liner
-1.05	-1.75	**VC-9-GT2**	**geotech**	liner
-1.75	-1.85	**VC-9-EN1**	**environmental**	liner
-1.85	-2.00	**VC-9-TR1**	**thermal**	liner
-2.00	-2.50	**VC-9-GT1**	**geotech**	liner
-2.50	-2.65	**VC-9-Nose**	**core nose**	bag

Live Organisms Present	Y / N	Muscles
Oil Present	Y / N	
Odor Present	Y / N	Faint
Debris Present	Y / N	
Within 10% of Required Core Length	Y / N	
Photo	Y / N	

Nose cone photo with rock

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
4.0"	0.50 Gal/ft

Liner Type: Soft Hard

Vibracorer: P3 P5 VT6 Other

Sample Length	From (equation)	To (equation)	From (value)	To (value)
-0.80	#REF!	#REF!	0	-0.85
-0.10	#REF!	#REF!	-0.85	-0.95
-0.15	#REF!	#REF!	-0.95	-1.1
-0.70	#REF!	#REF!	-1.1	-1.8
-0.10	-1.85	-1.75	-1.8	-1.9
-0.15	-2.00	-1.85	-1.9	-2.05
-0.50	-6.50	-6.00	-2.05	-2.75
-0.15	-2.65	-2.50	-2.75	-2.85
0.00	#VALUE!	#VALUE!	-2.85	-3
0.00	#REF!	#REF!	-3	-3.7
0.00	#REF!	#REF!	-3.7	-3.8
0.00	1.85	1.85	-3.8	-3.95
0.00	2.50	2.50	-3.95	-4.1

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC9 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT3)										
	Soft clay / silt. High water content, mussels present PP = <0.031 TSF TV = <0.01 TSF	Light grey	20								
1m											
	1.05m - Top of GT2 Soft clay PP = <0.031 TSF TV = <0.01 TSF	Light grey									
2m	2m - Top of GT1	Light grey									
	Medium clay, fine gravel. PP = 0.031 TSF TV = 0.075 TSF 2.50m - Core nose	Light brown									
3m	Medium stiff clay with fine sand. Large rock in cone, see photo										
4m											
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC-10	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 579453.4 E / 4722341		Water Depth: 112ft / 34m
Depth of Sample Stratum: 34-39m		Vessel Name/Type: ECOSSE
Time (Hypack Target Time):	10:15:09	Date: Aug. 26, 2015
Weather Conditions: Winds 15 knts. W; Seas 3 ft.		
Collected by: CT, MK, JM		

Sample Collection device (Note modifications made during sampling): Rossfelder P3

HDOP = 1.1 Start 10:17:30 AM

SAT = 9

000_1015.RAW

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

Hypack File: 000_1414.raw

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number: VC-10	Core Penetration Length: 4.7m
Sample Type: Vibracore	Recovered Core Length: 3.2m
Described By: PC	Date Sampled: 26 Aug 2015

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0.00	-0.90	**VC-10-GT3**	**geotech**	liner
-0.90	-1.00	**VC-18-EN3**	**environmental**	liner
-1.00	-1.15	**VC-10-TR3**	**thermal**	liner
-1.15	-1.85	**VC-10-GT2**	**geotech**	liner
-1.85	-1.95	**VC-10-EN2**	**environmental**	liner
-1.95	-2.10	**VC-10-TR2**	**thermal**	liner
-2.10	-2.80	**VC-10-GT1**	**geotech**	liner
-2.80	-2.90	**VC-10-EN1**	**environmental**	liner
-2.90	-3.05	**VC-18-TR1**	**thermal**	liner
-3.05	-3.20	**VC-10Nose**	**core nose**	bag

Live Organisms Present	Y / (N)
Oil Present	Y / (N)
Odor Present	(Y) / N
Debris Present	Y / (N)
Within 10% of Required Core Length	Y / N
Photo	(Y) / N

Top GT2

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC10 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT3)										
	Very soft clay / silt. High water content PP = <0.031 TSF TV = <0.01 TSF	Light grey									
1m											
	1.15m - Top of GT2 Soft clay, no gravel or gas apparent. PP = <0.031 TSF TV = 0.015 TSF	Light grey									
2m											
	2.10m - Top of GT1 Soft clay. No gas apparent PP = <0.031 TSF TV = 0.025 TSF	Light grey									
3m											
	3.05m - Core nose Soft clay with brown streaks	Light grey									
4m											
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC-11	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 579453.4 E / 4722341		Water Depth: 125ft / 38m
Depth of Sample Stratum: 38-43m		Vessel Name/Type: ECOSSE
Time (Hypack Target Time):	11:13:35	Date: Aug. 26, 2015
Weather Conditions: Winds 10 knts. W; Seas 2 ft.		
Collected by: CT, MK, JM		

Sample Collection device (Note modifications made during sampling): Rossfelder P3

HDOP = 1.4	Start 11:27:45 AM	Start logging TWC
SAT = 10	End 11:29:35 AM	Seems soft
000_1123.RAW		

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

Full penetration

VC sunk in about 1m without vibrating

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

Approximately bottom 2m of core contains gas. Not as much as VC17-21.

Difficult to see in core but sediments expand at surface.

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number: VC-11	Core Penetration Length: 4.7 m
Sample Type: Vibracore	Recovered Core Length: 3.88 m
Described By: CT	Date Sampled: 26 Aug 2015

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0.00	-0.63	**VC-11-GT4**	**geotech**	liner
-0.63	-0.73	**VC-11-EN4**	**environmental**	liner
-0.73	-0.88	**VC-11-TR4**	**thermal**	liner
-0.88	-1.58	**VC-11-GT3**	**geotech**	liner
-1.58	-1.68	**VC-18-EN3**	**environmental**	liner
-1.68	-1.83	**VC-11-TR3**	**thermal**	liner
-1.83	-2.53	**VC-11-GT2**	**geotech**	liner
-2.53	-2.63	**VC-11-EN2**	**environmental**	liner
-2.63	-2.78	**VC-11-TR2**	**thermal**	liner
-2.78	-3.48	**VC-11-GT1**	**geotech**	liner
-3.48	-3.58	**VC-11-EN1**	**environmental**	liner
-3.58	-3.73	**VC-11-TR1**	**thermal**	liner
-3.73	-3.88	**VC-11 Nose**	**core nose**	bag

Live Organisms Present	Y / (N)
Oil Present	Y / (N)
Odor Present	(Y) / N
Debris Present	Y / (N)
Within 10% of Required Core Length	Y / N
Photo	(Y) / N

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

Tops of GT1, GT2, GT3

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC11 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT4)										
	Very soft clay with black streaks. High water content. PP = <0.031 TSF TV = <0.01 TSF	Light grey									
	0.88m - Top of GT3	Light grey									
1m	Soft clay PP = <0.031 TSF TV = 0.01 TSF										
	1.83m - Top of GT2	Light grey									
2m	Soft clay. No trace of gas, gravel, or sand PP = <0.031 TSF TV = 0.02 TSF										
	2.78m - Top of GT1 Soft clay with trace gas	Light grey									
3m	PP = <0.031 TSF TV = 0.04 TSF										
	3.73m - Core nose Soft clay with silt. No gravel. Brown streaks.	Light grey									
4m	Trace gas.										
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC-12	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 581194.5 E / 4718542		Water Depth: 136ft / 41.5m
Depth of Sample Stratum: 41.5-46.5m		Vessel Name/Type: ECOSSE
Time (Hypack Target Time):	13:10:01 PM	Date: Aug. 26, 2015
Weather Conditions: Winds 10 knts. W; Seas 2 ft.		
Collected by: CT, MK, JM		

Sample Collection device (Note modifications made during sampling): Rossfelder P3

HDOP = 0.9 Start 13:14:00 AM Start logging TWC

SAT = 9 End 13:14:45 PM

000_1310.RAW

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

Sunk 2m without vibrating

45 seconds for full penetration

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

Approximately bottom 2m of core has gas. Sediments expanding at surface.

Not obvious in core through liner.

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number:	VC-12	Core Penetration Length:	4.7m
Sample Type: Vibracore		Recovered Core Length:	4.1m
Described By:	CT	Date Sampled:	26-Aug-15

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0.00	-0.46	**VC-12-GT4**	**geotech**	liner
-0.46	-0.56	**VC-12-EN4**	**environmental**	liner
-0.56	-0.71	**VC-12-TR4**	**thermal**	liner
-0.71	-1.21	**VC-12-GT3**	**geotech**	liner
-1.21	-1.31	**VC-12-EN3**	**environmental**	liner
-1.31	-1.46	**VC-12-TR3**	**thermal**	liner
-1.46	-2.16	**VC-12-GT2**	**geotech**	liner
-2.16	-2.26	**VC-12-EN2**	**environmental**	liner
-2.26	-2.41	**VC-12-TR2**	**thermal**	liner
-2.41	-3.11	**VC-12-GT1**	**geotech**	liner
-3.11	-3.21	**VC-12-EN1**	**environmental**	liner
-3.21	-3.36	**VC-12-TR1**	**thermal**	liner
-3.36	-3.51	**VC-12 Nose**	**core nose**	bag

Live Organisms Present	(Y) / N
Oil Present	Y / (N)
Odor Present	(Y) / N
Debris Present	Y / (N)
Within 10% of Required Core Length	Y / N
Photo	(Y) / N

Muscles on lake floor

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

Top of GT1, GT2, GT3

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC12 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT4)										
	Very soft clay / silt. Mussels present PP = <0.031 TSF TV = < 0.01 TSF	Light grey	20								
	0.71m - Top of GT3 Very soft clay with higher water content	Light grey									
1m	PP = <0.031 TSF TV = 0.02 TSF										
	1.46m - Top of GT2 PP = <0.031 TSF TV = 0.03 TSF										
2m											
	2.41m - Top of GT1 Soft clay. Trace gas PP = <0.031 TSF TV = 0.05 TSF										
3m											
	3.36m - Core nose Soft clay. Trace gas	Light grey									
4m											
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC-13	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 592881 E / 4717488 N		Water Depth: 141ft / 43m
Depth of Sample Stratum:		Vessel Name/Type: ECOSSE
Time (Hypack Target Time):	14:09:00 PM	Date: Aug. 27, 2015
Weather Conditions: Winds 5-10 knts. W; Seas < 0.5 ft.		
Collected by: CT, MK, JM		

Sample Collection device (Note modifications made during sampling): Rossfelder P3

HDOP = 1.0 Start logging TWC

SAT = 9 Vibrated ~ 45 sec.

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number:	VC-13	Core Penetration Length:	4.7m
Sample Type: Vibracore		Recovered Core Length:	3.85 m
Described By:	MK	Date Sampled:	27-Aug-15

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0.00	-0.60	**VC-13-GT4**	**geotech**	liner
-0.60	-0.70	**VC-13-EN4**	**environmental**	liner
-0.70	-0.85	**VC-13-TR4**	**thermal**	liner
-0.85	-1.55	**VC-13-GT3**	**geotech**	liner
-1.55	-1.65	**VC-13-EN3**	**environmental**	liner
-1.65	-1.80	**VC-13-TR3**	**thermal**	liner
-1.80	-2.50	**VC-13-GT2**	**geotech**	liner
-2.50	-2.60	**VC-13-EN2**	**environmental**	liner
-2.60	-2.75	**VC-13-TR2**	**thermal**	liner
-2.75	-3.45	**VC-13-GT1**	**geotech**	liner
-3.45	-3.55	**VC-13-EN1**	**environmental**	liner
-3.55	-3.70	**VC-13-TR1**	**thermal**	liner
-3.70	-3.85	**VC-13 Nose**	**core nose**	bag

Live Organisms Present	(Y) / N
Oil Present	Y / N
Odor Present	(Y) / N
Debris Present	Y / N
Within 10% of Required Core Length	Y / N
Photo	Y / N

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC13 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT4)										
	Very soft silt. Mussels present	Light grey									
	0.85m - Top of GT3	Light grey									
1m	Very soft silt / clay										
	PP = <0.031 TSF TV = 0.02 TSF										
	1.80m - Top of GT2 Soft clay / silt	Light grey									
2m	PP = <0.031 TSF										
	TV = 0.02 TSF										
	2.75m - Top of GT1 Soft clay / silt. Faint odour	Light grey									
3m	PP = <0.031 TSF										
	TV = 0.03 TSF										
	3.70m - Core nose Soft clay / silt. Faint odour. Dark grey streaks	Light grey									
4m											
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC14	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 584633 / 4716496		Water Depth:
Depth of Sample Stratum:		Vessel Name/Type: ECOSSE
Time (Hypack Target Time): 12:56:00		Date: 27 Aug. 2015
Weather Conditions: Winds < 10 kn, seas < 0.5m		
Collected by: CT,MK,JM		

Sample Collection device (Note modifications made during sampling): Rossfelder P3

HDOP = 0.9 Start

SATS = 10 End

000_1256.RAW Vibrocore time = 30 seconds

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number:	VC-14	Core Penetration Length:	4.7m
Sample Type: Vibracore		Recovered Core Length:	3.45 m
Described By:	MK	Date Sampled:	27-Aug-15

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0.00	-0.40	**VC-14-GT4**	**geotech**	liner
-0.40	-0.50	**VC-14-EN4**	**environmental**	liner
-0.50	-0.65	**VC-14-TR4**	**thermal**	liner
-0.65	-1.15	**VC-14-GT3**	**geotech**	liner
-1.15	-1.25	**VC-14-EN3**	**environmental**	liner
-1.25	-1.40	**VC-14-TR3**	**thermal**	liner
-1.40	-2.10	**VC-14-GT2**	**geotech**	liner
-2.10	-2.20	**VC-14-EN2**	**environmental**	liner
-2.20	-2.35	**VC-14-TR2**	**thermal**	liner
-2.35	-3.05	**VC-14-GT1**	**geotech**	liner
-3.05	-3.15	**VC-14-EN1**	**environmental**	liner
-3.15	-3.30	**VC-14-TR1**	**thermal**	liner
-3.30	-3.45	**VC-14 Nose**	**core nose**	bag

Live Organisms Present	Y / (N)
Oil Present	Y / (N)
Odor Present	(Y) / N
Debris Present	Y / N
Within 10% of Required Core Length	Y / N
Photo	Y / N

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC14 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT4)										
	Very soft silt	Dark grey									
	0.65m - Top of GT3 Soft silt / clay with dark streaks PP = <0.031 TSF	Light grey									
1m	TV = 0.02 TSF										
	1.40m - Top of GT2	Light grey									
	Soft clay / silt with gas bubbles PP = <0.031 TSF TV = 0.03 TSF										
2m											
	2.35m - Top of GT1 PP = <0.031 TSF	Light grey									
	TV = 0.04 TSF										
3m											
	3.30m - Core nose Soft clay / silt with gas bubbles	Light grey									
4m											
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC15	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 585357 / 4714666		Water Depth: 51m
Depth of Sample Stratum:		Vessel Name/Type: ECOSSE
Time (Hypack Target Time): 10:47:00		Date: 27 Aug. 2015
Weather Conditions: Winds < 10 kn, seas < 0.5m		
Collected by: CT,MK,JM		

Sample Collection device (Note modifications made during sampling): Rossfelder P3

HDOP = 1.3 Start

SATS = 9 End

000_1047.RAW Vibrocore time = 30 seconds

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

Penetration marker was accidentally slid by operator on retrieval.

Two of the crew members report seeing the marker at ~4.6m before being moved.

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number:	VC-15	Core Penetration Length:	4.6m
Sample Type: Vibracore		Recovered Core Length:	3.65 m
Described By:	MK	Date Sampled:	27-Aug-15

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0.00	-0.40	**VC-15-GT4**	**geotech**	liner
-0.40	-0.50	**VC-15-EN4**	**environmental**	liner
-0.50	-0.65	**VC-15-TR4**	**thermal**	liner
-0.65	-1.35	**VC-15-GT3**	**geotech**	liner
-1.35	-1.45	**VC-15-EN3**	**environmental**	liner
-1.45	-1.60	**VC-15-TR3**	**thermal**	liner
-1.60	-2.30	**VC-15-GT2**	**geotech**	liner
-2.30	-2.40	**VC-15-EN2**	**environmental**	liner
-2.40	-2.55	**VC-15-TR2**	**thermal**	liner
-2.55	-3.25	**VC-15-GT1**	**geotech**	liner
-3.25	-3.35	**VC-15-EN1**	**environmental**	liner
-3.35	-3.50	**VC-15-TR1**	**thermal**	liner
-3.50	-3.65	**VC-15 Nose**	**core nose**	bag

Live Organisms Present	(Y) / N
Oil Present	Y / N
Odor Present	Y / N
Debris Present	Y / N
Within 10% of Required Core Length	Y / N
Photo	Y / N

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC15 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT4)										
	Very soft clay / silt. Mussels present	Light grey									
	0.65m - Top of GT3 Very soft clay / silt with dark streaks PP = <0.031 TSF	Light grey									
1m	TV = 0.02 TSF										
	1.60m - Top of GT2 Soft clay / silt with fewer gas bubbles PP = <0.031 TSF	Light grey									
2m	TV = 0.03 TSF										
	2.55m - Top of GT1 Soft clay / silt with gas bubbles PP = <0.031 TSF	Light grey									
3m	TV = 0.06 TSF										
	3.50m - Core nose Soft clay / silt with gas bubbles	Light grey									
4m											
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC16	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 585500 / 4712721		Water Depth: 54m
Depth of Sample Stratum:		Vessel Name/Type: ECOSSE
Time (Hypack Target Time): 09:39:00		Date: 27 Aug. 2015
Weather Conditions: Winds < 10 kn, seas < 0.5m		
Collected by: CT,MK,JM		

Sample Collection device (Note modifications made during sampling): Rossfelder P3

HDOP = 1.2	Start
SATS = 9	End
000_0939.RAW	Vibrocore time = 30 seconds

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number:	VC-16	Core Penetration Length:	4.7m
Sample Type: Vibracore		Recovered Core Length:	3.77 m
Described By:	MK	Date Sampled:	27-Aug-15

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0.00	-0.52	**VC-16-GT4**	**geotech**	liner
-0.52	-0.62	**VC-16-EN4**	**environmental**	liner
-0.62	-0.77	**VC-16-TR4**	**thermal**	liner
-0.77	-1.47	**VC-16-GT3**	**geotech**	liner
-1.47	-1.57	**VC-16-EN3**	**environmental**	liner
-1.57	-1.72	**VC-16-TR3**	**thermal**	liner
-1.72	-2.42	**VC-16-GT2**	**geotech**	liner
-2.42	-2.52	**VC-16-EN2**	**environmental**	liner
-2.52	-2.67	**VC-16-TR2**	**thermal**	liner
-2.67	-3.37	**VC-16-GT1**	**geotech**	liner
-3.37	-3.47	**VC-16-EN1**	**environmental**	liner
-3.47	-3.62	**VC-16-TR1**	**thermal**	liner
-3.62	-3.77	**VC-16 Nose**	**core nose**	bag

Live Organisms Present	Y / (N)
Oil Present	Y / (N)
Odor Present	(Y) / N
Debris Present	Y / N
Within 10% of Required Core Length	Y / N
Photo	Y / N

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC16 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT4)										
	Soupy silt / clay	Light grey									
	0.77m - Top of GT3 Very soft clay / silt	Light grey									
1m	Dark grey streaks										
	1.72m - Top of GT2 Soft clay / silt with gas.	Light grey									
2m	PP = <0.031 TSF TV = 0.02 TSF										
	2.67m - Top of GT1 Soft clay / silt with gas and faint odour PP = <0.031 TSF	Light grey									
3m	TV = 0.03 TSF										
	3.62m - Core nose Soft clay / silt with gas bubbles Faint odour present										
4m											
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC17	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 585663 / 4710700		Water Depth: 57m
Depth of Sample Stratum:		Vessel Name/Type: ECOSSE
Time (Hypack Target Time): 13:30:12		Date: 23 Aug. 2015
Weather Conditions: Light wind, < 0.5m waves		
Collected by: MK, CT, JM		

Sample Collection device (Note modifications made during sampling): Rossfelder P3

HDOP = 0.9 Tgt: 1330 Log started in water column

SATS = 9 Vibe time = 30 sec

000_1325.RAW

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

Target UTM: 585562.30 / 4710696.84

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number: VC-17	Core Penetration Length: 4.7 m
Sample Type: Vibracore	Recovered Core Length: 3.75 m
Described By: PC	Date Sampled: 23 Aug 2015

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0.00	-0.70	**VC-17 -GT4**	**geotech**	liner
-0.70	-0.80	**VC-17 -EN4**	**environmental**	liner
-0.80	-0.95	**VC-17 -TR4**	**thermal**	liner
-0.95	-1.45	**VC-17 -GT3**	**geotech**	liner
-1.45	-1.55	**VC-17-EN3**	**environmental**	liner
-1.55	-1.70	**VC-17 -TR3**	**thermal**	liner
-1.70	-2.40	**VC-17-GT2**	**geotech**	liner
-2.40	-2.50	**VC-17 -EN2**	**environmental**	liner
-2.50	-2.65	**VC-17 -TR2**	**thermal**	liner
-2.65	-3.35	**VC-17 -GT1**	**geotech**	liner
-3.35	-3.45	**VC-17 -EN1**	**environmental**	liner
-3.45	-3.60	**VC-17 -TR1**	**thermal**	liner
-3.60	-3.75	**VC-17 Nose**	**core nose**	bag

Live Organisms Present	Y / (N)
Oil Present	Y / (N)
Odor Present	(Y) / N
Debris Present	Y / (N)
Within 10% of Required Core Length	Y / (N)
Photo	Y / (N)

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC17 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT4)										
	Very soft fine clay / silt	Olive grey									
1m	0.95m - Top of GT3	Olive grey									
	Clay / silt with 2-3mm gas voids, odour present PP = <0.031 TSF TV = 0.02 TSF										
	1.70m - Top of GT2 2-3mm gas voids. Odour present PP = <0.031 TSF	Olive grey									
2m	TV = 0.02 TSF										
	2.65m - Top of GT1 1mm gas voids with faint odour PP = <0.031 TSF	Olive grey									
3m	TV = 0.03 TSF										
	3.60m - Core nose Clay / silt	Olive grey									
4m											
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC18	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 585396.76/4708794.9		Water Depth: 60m
Depth of Sample Stratum: 60 - 65m		Vessel Name/Type: ECOSSE
Time (Hypack Target Time): 10:56:21		Date: 23 Aug. 2015
Weather Conditions: Winds 10 kn E, seas 0.5m		
Collected by: MK, CT, JM		

Sample Collection device (Note modifications made during sampling): Rossfelder P3

HDOP = 1.0 Started logging in water column

SATS = 10 Vibe time = 45 sec

000_1031.RAW

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number: VC-18	Core Penetration Length: 4.7m
Sample Type: Vibracore	Recovered Core Length: 4.05m
Described By: PC	Date Sampled: 23 Aug 2015

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0.00	-0.80	**VC-18 -GT4**	**geotech**	liner
-0.80	-0.90	**VC-18 -EN4**	**environmental**	liner
-0.90	-1.05	**VC-18 -TR4**	**thermal**	liner
-1.05	-1.75	**VC-18 -GT3**	**geotech**	liner
-1.75	-1.85	**VC-18-EN3**	**environmental**	liner
-1.85	-2.00	**VC-18 -TR3**	**thermal**	liner
-2.00	-2.70	**VC-18 -GT2**	**geotech**	liner
-2.70	-2.80	**VC-18 -EN2**	**environmental**	liner
-2.80	-2.95	**VC-18 -TR2**	**thermal**	liner
-2.95	-3.65	**VC-18 -GT1**	**geotech**	liner
-3.65	-3.75	**VC-18 -EN1**	**environmental**	liner
-3.75	-3.90	**VC-18-TR1**	**thermal**	liner
-3.90	-4.05	**VC-18 Nose**	**core nose**	bag

Live Organisms Present	Y / (N)
Oil Present	Y / (N)
Odor Present	(Y) / N
Debris Present	Y / (N)
Within 10% of Required Core Length	Y / N
Photo	(Y) / N

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC18 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT4)										
	Soft / wet clay	Light grey									
1m											
	1.05m - Top of GT3 Very soft clay PP = <0.031 TSF TV = <0.01 TSF	Light grey									
2m	2m - Top of GT2	Light grey									
	Very soft clay / silt PP = <0.031 TSF TV = 0.02 TSF										
3m	2.95m - Top of GT1	Light grey									
	Soft clay / silt Few gas bubbles Faint odour PP = <0.031 TSF TV = 0.03 TSF										
4m	3.90m - Core nose	Light grey									
	Soft clay / silt with faint odour and gas bubbles										
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC19	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 584766 / 4706851		Water Depth: 203 ft.
Depth of Sample Stratum:		Vessel Name/Type: ECOSSE
Time (Hypack Target Time): 13:15:52		Date: 19 Aug. 2015
Weather Conditions: Sunny, calm, 1 kn winds		
Collected by: MK, PC, CT		
Sample Collection device (Note modifications made during sampling):		Rossfelder P3
HDOP = 0.9	Start 13:21:50	
SATS = 9	End 13:23:10	
000_1321.RAW		

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number: VC-19	Core Penetration Length: 4.7m
Sample Type: Vibracore	Recovered Core Length: 3.95m
Described By: PC	

CORE SAMPLE SUMMARY

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0	**-0.85**	**VC-19-GT4**	**geotech**	liner
-0.85	**-0.95**	**VC-19-EN4**	**environmental**	liner
-0.95	**-1.1**	**VC-19-TR4**	**thermal**	liner
-1.1	**-1.6**	**VC-19-GT3**	**geotech**	liner
-1.6	**-1.7**	**VC-19-EN3**	**environmental**	liner
-1.7	**-1.85**	**VC-19-TR3**	**thermal**	liner
-1.85	**-2.55**	**VC-19-GT2**	**geotech**	liner
-2.55	**-2.65**	**VC-19-EN2**	**environmental**	liner
-2.65	**-2.8**	**VC-19-TR2**	**thermal**	liner
-2.8	**-3.5**	**VC-19-GT1**	**geotech**	liner
-3.5	**-3.6**	**VC-19-EN1**	**environmental**	liner
-3.6	**-3.75**	**VC-19-TR1**	**thermal**	liner
-3.75	**-3.95**	**VC-19 Nose**	**core nose**	bag

Live Organisms Present	Y / (N)
Oil Present	Y / (N)
Odor Present	(Y) / N
Debris Present	Y / (N)
Within 10% of Required Core Length	Y / N
Photo	(Y) / N

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC19 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT4)										
	Soft soupy clay	Olive grey			X						
1m											
	1.1m - Top of GT3 very soft clay / silt with gas voids	Olive grey									
	1.85m - Top of GT2	Olive grey			X						
2m	Clay / silt, soft, moderate odour, gas voids										
	2.8m - Top of GT1	Olive grey			X						
3m	Very soft clay / silt PP = <0.02 TSF Numerous gas filled voids. Moderate to strong odour										
	3.75m - Core nose	Olive grey			X						
4m	Clay / silt, moderate gas odour. Numerous gas filled voids										
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC20	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 583903 / 4705058		Water Depth: 205 ft.
Depth of Sample Stratum:		Vessel Name/Type: ECOSSE
Time (Hypack Target Time): 10:51:36		Date: 19 Aug. 2015
Weather Conditions: Sunny, calm, 10 - 15 kn winds		
Collected by: MK, PC, CT		
Sample Collection device (Note modifications made during sampling):		Rossfelder P3
HDOP = 0.9	Start 10:54:40	
SATS = 10	End 10:57:30	
000_1054.RAW		

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number: VC-20	Core Penetration Length: 4.7m
Sample Type: Vibracore	Recovered Core Length: 4.1m
Described By: PC	

CORE SAMPLE SUMMARY

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0	**-0.85**	**VC-20-GT4**	**geotech**	liner
-0.85	**-0.95**	**VC-20-EN4**	**environmental**	liner
-0.95	**-1.1**	**VC-20-TR4**	**thermal**	liner
-1.1	**-1.8**	**VC-20-GT3**	**geotech**	liner
-1.8	**-1.9**	**VC-20-EN3**	**environmental**	liner
-1.9	**-2.05**	**VC-20-TR3**	**thermal**	liner
-2.05	**-2.75**	**VC-20-GT2**	**geotech**	liner
-2.75	**-2.85**	**VC-20-EN2**	**environmental**	liner
-2.85	**-3**	**VC-20-TR2**	**thermal**	liner
-3	**-3.7**	**VC-20-GT1**	**geotech**	liner
-3.7	**-3.8**	**VC-20-EN1**	**environmental**	liner
-3.8	**-3.95**	**VC-20-TR1**	**thermal**	liner
-3.95	**-4.1**	**VC-20 Nose**	**core nose**	bag

Live Organisms Present	(Y) / N
Oil Present	Y / (N)
Odor Present	(Y) / N
Debris Present	Y / (N)
Within 10% of Required Core Length	Y / N
Photo	Y / N

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC20 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT4)										
	Soft soupy clay with mussels	Olive grey									
1m	Numerous small voids filled with gas in remainder of core										
	1.1m - Top of GT3 Soft clay / silt	Olive grey			X						
2m											
	2.05m - Top of GT2 Soft clay / silt Moderate odour	Olive grey			X						
3m	3m - Top of GT1	Light olive			X						
	Soft clay / silt PP = <0.02 TSF	grey									
4m	3.95m - Core nose	Light olive			X						
	Soft clay / silt Moderate odour	grey									
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC21	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 582652.89/4703555.1(		Water Depth: 62.5m
Depth of Sample Stratum: 62.5-67.5m		Vessel Name/Type: ECOSSE
Time (Hypack Target Time): 13:31:42		Date: 22 Aug. 2015
Weather Conditions: Seas calm, no wind		
Collected by: MK, CT, JM		

Sample Collection device (Note modifications made during sampling): Rossfelder P3

HDOP = 0.9 Started logging in water column

SATS = 9 Vibe time = 30 sec Stopped logging on way up

000A1336.RAW

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

Very soft

Bottom of escarpment

~ 1.5m of penetration without vibrating

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number: VC-21	Core Penetration Length: 4.7m
Sample Type: Vibracore	Recovered Core Length: 3.9m
Described By: PC	Date Sampled: 22 Aug 2015

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0.00	-0.65	**VC-21 -GT4**	**geotech**	liner
-0.65	-0.75	**VC-21 -EN4**	**environmental**	liner
-0.75	-0.90	**VC-21 -TR4**	**thermal**	liner
-0.90	-1.60	**VC-21 -GT3**	**geotech**	liner
-1.60	-1.70	**VC-21-EN3**	**environmental**	liner
-1.70	-1.85	**VC-21 -TR3**	**thermal**	liner
-1.85	-2.55	**VC-21 -GT2**	**geotech**	liner
-2.55	-2.65	**VC-21 -EN2**	**environmental**	liner
-2.65	-2.80	**VC-21 -TR2**	**thermal**	liner
-2.80	-3.50	**VC-21 -GT1**	**geotech**	liner
-3.50	-3.60	**VC-21 -EN1**	**environmental**	liner
-3.60	-3.75	**VC-21-TR1**	**thermal**	liner
-3.75	-3.90	**VC-21 Nose**	**core nose**	bag

Live Organisms Present	(Y) / N	Mussels
Oil Present	Y / (N)	
Odor Present	(Y) / N	
Debris Present	Y / (N)	
Within 10% of Required Core Length	Y / N	
Photo	(Y) / N	

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC21 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT4)										
	Significant number of mussels, 20 - 30% Soft clay with gas bubbles present	Light grey	10								
1m	0.90m - Top of GT3	Light grey									
	Soft clay / silt. Higher concentration of gas PP = <0.031 TSF TV = 0.02 TSF										
2m	1.85m - Top of GT2 Soft clay / silt with gas bubbles and faint odour	Light grey									
	PP = <0.031 TSF TV = 0.025 TSF										
3m	2.80m - Top of GT1 Soft clay / silt. Gas bubbles, 5 - 10% PP =<0.031 TSF	Light grey									
	TV = 0.03 TSF										
4m	3.75m - Core nose										
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC22_new	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 582921.45 / 4701788.9		Water Depth: 45m
Depth of Sample Stratum: 45 - 50m		Vessel Name/Type: ECOSSE
Time (Hypack Target Time): 10:40:13		Date: 22 Aug. 2015
Weather Conditions: Seas calm, no wind		
Collected by: MK, CT, JM		

Sample Collection device (Note modifications made during sampling): Rossfelder P3

HDOP = 1.0	Start 10:46:50	Started logging in water column
SATS = 9	End 10:47:25	
000_1042.RAW		

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

Moved VC22 back 200m to avoid linear features.

Approximately 2m of sample recovered without vibrating

Very soft, lake floor

Approximately 20m off route, no wind

No cone inversion

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number: VC-22	Core Penetration Length: 4.7m
Sample Type: Vibracore	Recovered Core Length: 3.6m
Described By: PC	Date Sampled: 22 Aug 2015

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
-3.45	-3.60	**VC-22 -GT4**	**geotech**	liner
-3.30	-3.45	**VC-22 -EN4**	**environmental**	liner
-3.20	-3.30	**VC-22 -TR4**	**thermal**	liner
-2.50	-3.20	**VC-22 -GT3**	**geotech**	liner
-2.35	-2.50	**VC-22-EN3**	**environmental**	liner
-2.25	-2.35	**VC-22 -TR3**	**thermal**	liner
-1.55	-2.25	**VC-22 -GT2**	**geotech**	liner
-1.40	-1.55	**VC-22 -EN2**	**environmental**	liner
-1.30	-1.40	**VC-22 -TR2**	**thermal**	liner
-0.80	-1.30	**VC-22 -GT1**	**geotech**	liner
-0.65	-0.80	**VC-22 -EN1**	**environmental**	liner
-0.55	-0.65	**VC-22-TR1**	**thermal**	liner
0.00	-0.55	**VC-22 Nose**	**core nose**	bag

Live Organisms Present	(Y) / N
Oil Present	Y / (N)
Odor Present	(Y) / N
Debris Present	Y / (N)
Within 10% of Required Core Length	Y / N
Photo	(Y) / N

Mussels

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC22 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT4)										
	Liquified. Mussels present PP = <0.031 TSF TV = <0.01 TSF	Light grey	5								
	0.80m - Top of GT3	Light grey									
1m	Soft clay. Sediments expanding at surface.										
	More liquid, viscous PP = <0.031 TSF TV = 0.02TSF										
	1.55m - Top of GT2	Light grey									
	Soft clay / silt. Gas in sediment, cohesive PP = <0.031 TSF TV = 0.02 TSF										
2m											
	2.5m - Top of GT1	Light grey									
	Soft clay / silt. Faint odour PP = <0.031 TSF TV = 0.04 TSF										
3m											
	3.45m - Core nose	Light grey									
	Soft clay / silt. 2-3mm Gas bubbles. Much less concentration than VC 19 - 20										
4m											
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC23	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 582673.9 / 4699653.4		Water Depth: 45m
Depth of Sample Stratum: 45-50m		Vessel Name/Type: ECOSSE
Time (Hypack Target Time): 11:45:01		Date: 28 Aug. 2015
Weather Conditions: Winds light, Seas < 0.5 m		
Collected by: CT,MK,JM		

Sample Collection device (Note modifications made during sampling): Rossfelder P3

HDOP = 1.1 Start 11:48:35 Started logging at top of WC

SATS = 10 End 11:49:10

000_1145.RAW

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

2m penetration without vibrating

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number:	VC-23	Core Penetration Length:	4.7m
Sample Type: Vibracore		Recovered Core Length:	3.51 m
Described By: CT		Date Sampled:	28-Aug-15

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0.00	-0.46	**VC-23-GT4**	**geotech**	liner
-0.46	-0.56	**VC-23-EN4**	**environmental**	liner
-0.56	-0.71	**VC-23-TR4**	**thermal**	liner
-0.71	-1.21	**VC-23-GT3**	**geotech**	liner
-1.21	-1.31	**VC-23-EN3**	**environmental**	liner
-1.31	-1.46	**VC-23-TR3**	**thermal**	liner
-1.46	-2.16	**VC-23-GT2**	**geotech**	liner
-2.16	-2.26	**VC-23-EN2**	**environmental**	liner
-2.26	-2.41	**VC-23-TR2**	**thermal**	liner
-2.41	-3.11	**VC-23-GT1**	**geotech**	liner
-3.11	-3.21	**VC-23-EN1**	**environmental**	liner
-3.21	-3.36	**VC-23-TR1**	**thermal**	liner
-3.36	-3.51	**VC-23 Nose**	**core nose**	bag

Live Organisms Present	Y / N	Muscles
Oil Present	Y / N	
Odor Present	Y / N	Faint
Debris Present	Y / N	
Within 10% of Required Core Length	Y / N	
Photo	Y / N	

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
4.0"	0.50 Gal/ft

Liner Type: Soft Hard

Vibracorer: P3 P5 VT6 Other

Top of core , muscles

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC23 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT4)										
	High water content. Mussels present Very soft clay silt PP = <0.031 TSF TV = <0.01 TSF	Olive grey									
	0.71m - Top of GT3										
1m											
	1.46m - Top of GT2										
	Very soft clay. Black streak in EN3 PP = <0.031 TSF TV = 0.03 TSF	Olive grey									
2m											
	2.41m - Top of GT1	Olive grey									
	Very soft clay with some gas bubbles PP = <0.031 TSF TV = 0.03 TSF										
3m											
	3.36m - Core nose	Olive grey									
	Very soft clay with some gas bubbles										
4m											
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC24	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 581953.1 / 4697824.9		Water Depth: 44m
Depth of Sample Stratum: 44-49m		Vessel Name/Type: ECOSSE
Time (Hypack Target Time): 10:31:12		Date: 28 Aug. 2015
Weather Conditions: Winds light, Seas < 0.5 m		
Collected by: CT,MK,JM		
Sample Collection device (Note modifications made during sampling):		Rossfelder P3
HDOP = 1.2	Start 10:34:30	
SATS = 9	End 10:35:15	
000A1031.RAW		

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

2m penetration without vibrating

30 seconds to full penetration

Included 15 seconds extra vibrating

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number:	VC-24	Core Penetration Length:	4.7m
Sample Type: Vibracore		Recovered Core Length:	3.8 m
Described By: CT		Date Sampled:	28-Aug-15

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0.00	-0.75	**VC-24-GT4**	**geotech**	liner
-0.75	-0.85	**VC-24-EN4**	**environmental**	liner
-0.85	-1.00	**VC-24-TR4**	**thermal**	liner
-1.00	-1.50	**VC-24-GT3**	**geotech**	liner
-1.50	-1.60	**VC-24-EN3**	**environmental**	liner
-1.60	-1.75	**VC-24-TR3**	**thermal**	liner
-1.75	-2.45	**VC-24-GT2**	**geotech**	liner
-2.45	-2.55	**VC-24-EN2**	**environmental**	liner
-2.55	-2.70	**VC-24-TR2**	**thermal**	liner
-2.70	-3.40	**VC-24-GT1**	**geotech**	liner
-3.40	-3.50	**VC-24-EN1**	**environmental**	liner
-3.50	-3.65	**VC-24-TR1**	**thermal**	liner
-3.65	-3.80	**VC-24 Nose**	**core nose**	bag

Live Organisms Present	(Y) / N
Oil Present	Y / (N)
Odor Present	(Y) / N
Debris Present	Y / (N)
Within 10% of Required Core Length	Y / N
Photo	(Y) / N

Mussels

Top GT3

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC24 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT4)										
	High water content. Mussels present. Very soft clay / silt PP = <0.031 TSF TV = <0.01 TSF Black streaks and organics present	Dark grey									
1m	1m - Top of GT3	Olive grey									
	Very soft clay with some gas bubbles PP = <0.031 TSF TV = 0.02 TSF										
	1.75m - Top of GT2 Very soft clay with gas bubbles	Olive grey									
2m	PP = <0.031 TSF TV = 0.03 TSF										
	2.70m - Top of GT1 Very soft clay with gas bubbles	Olive grey									
3m	PP = <0.031 TSF TV = 0.04 TSF										
	3.65m - Core nose Very soft clay with some gas bubbles	Olive grey									
4m											
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC44	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 579066 / 4725213		Water Depth: 29m
Depth of Sample Stratum:		Vessel Name/Type: ECOSSE
Time (Hypack Target Time): 14:41:21		Date: 21 Aug. 2015
Weather Conditions: Sunny, 15 - 20 kn winds		
Collected by: MK, CT, JM, PC		

Sample Collection device (Note modifications made during sampling): Rossfelder P3

HDOP = 1.1	Start 14:54:05	Started logging in water column
SATS = 7	End 14:54:58	
000_1453.RAW		

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

Took geotech sample first in order to capture geotech properties at the glacial sediment

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number: VC-44	Core Penetration Length: 4.7m
Sample Type: Vibracore	Recovered Core Length: 4.0m
Described By: PC	Date Sampled: 21 Aug 2015

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0.00	-0.35	**VC-44 GT4**	**Geotech**	liner
-0.35	-0.45	**VC-44 EN3**	**Environmental**	liner
-0.45	-0.60	**VC-44 TR3**	**Thermal**	liner
-0.60	-1.30	**VC-44 GT3**	**Geotech**	liner
-1.30	-1.40	**VC-44 EN2**	**Environmental**	liner
-1.40	-1.55	**VC-44 TR2**	**Thermal**	liner
-1.55	-2.25	**VC-44 GT2**	**Geotech**	liner
-2.25	-2.35	**VC-44 EN1**	**Environmental**	liner
-2.35	-2.50	**VC-44 TR1**	**Thermal**	liner
-2.50	-3.00	**VC-44 GT1**	**Geotech**	liner
-3.00	-3.15	**VC-44 Nose**	**core nose**	bag

Live Organisms Present	Y / (N)
Oil Present	Y / (N)
Odor Present	(Y) / N
Debris Present	Y / (N)
Within 10% of Required Core Length	Y / N
Photo	Y / (N)

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC44 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT4)										
	Soft soupy clay	Olive grey									
	0.60m - Top of GT3 Soft clay PP = <0.031 TSF	Olive grey									
1m											
	1.55m - Top of GT2 Soft clay PP = <0.031 TSF TV = 0.03 TSF	Olive grey									
2m											
	2.50m - Top of GT1 Moderately stiff clay PP = 1 TSF	Light olive grey									
3m	3.0m - Core nose	Light grey									
	Moderately stiff clay with pebble of 0.15cm shale/ siltstone. Medium fine sand. PP = 0.219 TSF TV = 0.70 TSF										
4m											
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC45	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 576959 / 4734828		Water Depth: 39 ft.
Depth of Sample Stratum:		Vessel Name/Type: ECOSSE
Time (Hypack Target Time): 8:46:07		Date: 17 Aug. 2015
Weather Conditions: Sunny, 1 kn winds		
Collected by: MK, PC, CT, JN		

Sample Collection device (Note modifications made during sampling): Rossfelder P3

000_0846.RAW

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

Lost ~ 1m of core, stiff clay

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number: VC-45	Core Penetration Length: 2.9m
Sample Type: Vibracore	Recovered Core Length: 1.6m
Described By: PC	

CORE SAMPLE SUMMARY

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0	**-0.41**	**VC-45-GT2**	**geotech**	liner
-0.41	**-0.51**	**VC-45-EN2**	**environmental**	liner
-0.51	**-0.66**	**VC-45-TR2**	**thermal**	liner
-0.66	**-1.16**	**VC-45-GT1**	**geotech**	liner
-1.16	**-1.31**	**VC-45-EN1**	**environmental**	liner
-1.31	**-1.46**	**VC-45-TR1**	**thermal**	liner
-1.46	**-1.6**	**VC-45 Nose**	**core nose**	bag

Live Organisms Present	Y / N
Oil Present	Y / N
Odor Present	Y / N
Debris Present	Y / N
Within 10% of Required Core Length	Y / N
Photo	Y / N

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC45 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT2)										
	Moderately stiff clay	Light grey			X						
	0.66m - Top of GT1 Moderately stiff clay PP = 0.2 TSF	Light grey			X						
1m	TV = 0.3 TSF										
	1.46m - Core nose	Light grey			X						
	Moderately stiff clay, very dry PP = 0.3 TSF TV = 0.3 TSF										
2m											
3m											
4m											
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC46	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 576892.7 / 4738189.0		Water Depth: 5m
Depth of Sample Stratum: 27-32m		Vessel Name/Type: ECOSSE
Time (Hypack Target Time): 08:40:39		Date: 29 Aug. 2015
Weather Conditions: Winds light, Seas flat		
Collected by: CT,MK,JM		

Sample Collection device (Note modifications made during sampling): Rossfelder P3

HDOP = 0.9	Start 1 - 08:40:50	Start 2 - 08:55:40
SATS = 1.0	End 1 - 08:41:20	End 2 - 08:57:50

000_0840.RAW - No sample recovered

000_0851.RAW - Second attempt successful

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

No weight stand used on first attempt due to shallow water

Weight stand and float package included on second attempt with float pack secured to gunnel

~ 2 - 2.5m penetration

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number:	VC-46	Core Penetration Length:	1.80 m
Sample Type: Vibracore		Recovered Core Length:	1.48 m
Described By: CT		Date Sampled:	29-Aug-15

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0.00	-0.34	**VC-46-GT2**	**geotech**	liner
-0.34	-0.44	**VC-46-EN2**	**environmental**	liner
-0.44	-0.59	**VC-46-TR2**	**thermal**	liner
-0.59	-1.03	**VC-46-GT1**	**geotech**	liner
-1.03	-1.13	**VC-46-EN1**	**environmental**	liner
-1.13	-1.33	**VC-46-TR1**	**thermal**	liner
-1.33	-1.48	**VC-46 Nose**	**core nose**	bag

Live Organisms Present	Y / (N)
Oil Present	Y / (N)
Odor Present	(Y) / N
Debris Present	Y / N
Within 10% of Required Core Length	Y / N
Photo	(Y) / N

Faint

Whole core

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC46 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT2)										
	Fine sand / silt with fine gravel and shell fragments High water content PP = 0.141 TSF TV = 0.25 TSF	Dark grey									
	0.59m - Top of GT1 Dark grey at both ends of sample with olive grey clay seen in middle. Trace sand and shells PP = 0.125 TSF	Dark grey	2								
1m	TV = 0.25 TSF										
	1.33m - Core nose Fine sand with silt and fine gravel. Wood and shell fragments present	Dark grey	5	5							
2m											
3m											
4m											
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC47	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 576998.0 / 4738077.6		Water Depth: 6.5m
Depth of Sample Stratum: 6.5-11.5m		Vessel Name/Type: ECOSSE
Time (Hypack Target Time): 10:03:02		Date: 29 Aug. 2015
Weather Conditions: Winds light, Seas flat		
Collected by: CT,MK,JM		
Sample Collection device (Note modifications made during sampling):		Rossfelder P3
HDOP = 1.1	Start 10:06:15	
SATS = 9	End 10:08:30	
000_1003.RAW - Ended		
000_1005.RAW - Taken after float package adjustment		

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

Float package adjustment ended 000_1003.RAW

000_1005.RAW is the good file

~ 3m of penetration - Hard

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number:	VC-47	Core Penetration Length: 2.95 m	
Sample Type: Vibracore		Recovered Core Length: 2.77 m	
Described By: CT		Date Sampled:	29-Aug-15

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0.00	-0.62	**VC-47-GT3**	**geotech**	liner
-0.62	-0.72	**VC-47-EN3**	**environmental**	liner
-0.72	-0.87	**VC-47-TR3**	**thermal**	liner
-0.87	-1.37	**VC-47-GT2**	**geotech**	liner
-1.37	-1.47	**VC-47-EN2**	**environmental**	liner
-1.47	-1.62	**VC-47-TR2**	**thermal**	liner
-1.62	-2.32	**VC-47-GT1**	**geotech**	liner
-2.32	-2.42	**VC-47-EN1**	**environmental**	liner
-2.42	-2.57	**VC-47-TR1**	**thermal**	liner
-2.57	-2.77	**VC-47 Nose**	**core nose**	bag

Live Organisms Present	(Y) / N	Mussels
Oil Present	Y / (N)	
Odor Present	(Y) / N	Faint
Debris Present	Y / (N)	
Within 10% of Required Core Length	Y / N	
Photo	(Y) / N	

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

Nose cone / Shells organics

Debris present is organics: wood fragments and shell fragments

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC47 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT3)										
	Fine sand. Saturated. High water content. Wood fragments PP = <0.031 TSF TV = <0.01 TSF	Dark grey	0.5	20							
	0.87m - Top of GT2										
1m	Medium clay with organics and shell fragments	Olive grey									
	PP = 0.188 TSF TV = 0.035 TSF										
	1.62m - Top of GT1 PP = 0.235 TSF TV = 0.30 TSF	Olive grey									
2m											
	2.57m - Core nose Medium clay Shell fragments and organics present	Olive grey	5	10							
3m											
4m											
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC48	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 576795.9 / 4736735.0		Water Depth: 10m
Depth of Sample Stratum: 10 - 15m		Vessel Name/Type: ECOSSE
Time (Hypack Target Time): 11:09:59		Date: 29 Aug. 2015
Weather Conditions: Winds light, Seas flat		
Collected by: CT,MK,JM		

Sample Collection device (Note modifications made during sampling): Rossfelder P3

HDOP = 1.3 Start 11:12:10 Started logging at top of WC

SATS = 10 End 11:14:40

000_1110.RAW

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

Glacial till shallow, hard

Penetration approximately 2m.

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number:	VC-48	Core Penetration Length: 2.22m	
Sample Type: Vibracore		Recovered Core Length: 2.22 m	
Described By:	CT	Date Sampled:	29-Aug-15

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0.00	-0.57	**VC-48-GT3**	**geotech**	liner
-0.57	-0.67	**VC-48-EN2**	**environmental**	liner
-0.67	-0.82	**VC-48-TR2**	**thermal**	liner
-0.82	-1.32	**VC-48-GT2**	**geotech**	liner
-1.32	-1.42	**VC-48-EN1**	**environmental**	liner
-1.42	-1.57	**VC-48-TR1**	**thermal**	liner
-1.57	-2.07	**VC-48-GT1**	**geotech**	liner
-2.07	-2.22	**VC-48 Nose**	**core nose**	bag

Live Organisms Present	(Y) / N
Oil Present	Y / (N)
Odor Present	(Y) / N
Debris Present	Y / (N)
Within 10% of Required Core Length	Y / N
Photo	(Y) / N

Mussels

Top core in liner

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC48 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT3)										
	Mussels covering top of sample. Medium stiff clay PP = <0.031 TSF TV = <0.01 TSF	Light grey	10%								
1m	0.82m - Top of GT2 Medium stiff clay	Light grey									
	PP = 0.250 TSF TV = 0.45 TSF										
2m	1.57m - Top of GT1 Medium stiff clay / silt with no sand PP = 0.219 TSF TV = 0.30 TSF	Light grey									
3m	2.07m - Core nose Medium clay with fine sand and high percentage of fine gravel and coarse gravel	Light grey									
4m											
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC49	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 579636.6 / 4728628.7		Water Depth: 21m
Depth of Sample Stratum: 21 - 26m		Vessel Name/Type: ECOSSE
Time (Hypack Target Time): 12:25:46		Date: 29 Aug. 2015
Weather Conditions: Winds light, Seas flat		
Collected by: CT,MK,JM		
Sample Collection device (Note modifications made during sampling):		Rossfelder P3
HDOP = 1.4	Start 12:26:40	
SATS = 7	End 12:28:10	
000_1225.RAW		

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

Stiff clay, hard

~ 2.3 m penetration

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number:	VC-49	Core Penetration Length: 2.40m	
Sample Type: Vibracore		Recovered Core Length: 2.15 m	
Described By:	CT	Date Sampled:	29-Aug-15

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0.00	-0.50	**VC-49-GT3**	**geotech**	liner
-0.50	-0.60	**VC-49-EN2**	**environmental**	liner
-0.60	-0.75	**VC-49-TR2**	**thermal**	liner
-0.75	-1.25	**VC-49-GT2**	**geotech**	liner
-1.25	-1.35	**VC-49-EN1**	**environmental**	liner
-1.35	-1.50	**VC-49-TR1**	**thermal**	liner
-1.50	-2.00	**VC-49-GT1**	**geotech**	liner
-2.00	-2.15	**VC-49 Nose**	**core nose**	bag

Live Organisms Present	(Y) / N	Mussels
Oil Present	Y / (N)	
Odor Present	(Y) / N	
Debris Present	Y / (N)	
Within 10% of Required Core Length	Y / N	
Photo	(Y) / N	

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

Stiff Clay in nose cone

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC49 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT3)										
	Very soft silt / clay with mussels High water content PP = <0.031 TSF TV = <0.01 TSF	Light grey	30%								
	0.75m - Top of GT2 Soft clay	Light grey									
1m	PP = 0.031 TSF TV = 0.05 TSF										
	1.5m - Top of GT1 Stiff clay, fine sand PP = 1 TSF TV = 0.75 TSF	Olive grey	2								
2m											
	2m - Core nose Very stiff clay. Low water content.	Olive grey									
3m											
4m											
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC50	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 579112.0 / 4725310.9		Water Depth: 27m
Depth of Sample Stratum: 27-32m		Vessel Name/Type: ECOSSE
Time (Hypack Target Time): 14:25:00		Date: 28 Aug. 2015
Weather Conditions: Winds light, Seas flat		
Collected by: CT,MK,JM		

Sample Collection device (Note modifications made during sampling): Rossfelder P3

HDOP = 1.1 Start 14:27:40 Started logging at top of WC

SATS = 7 End 14:28:45

000_1125.RAW

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

Additional core approved by TE Justin.

Trying to sample glacial till

Hitting hard layer at 3-4m

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number:	VC-50	Core Penetration Length: 3.8 m	
Sample Type: Vibracore		Recovered Core Length: 3.5 m	
Described By:	CT	Date Sampled:	28-Aug-15

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0.00	-0.45	**VC-50-GT4**	**geotech**	liner
-0.45	-0.55	**VC-50-EN4**	**environmental**	liner
-0.55	-0.70	**VC-50-TR4**	**thermal**	liner
-0.70	-1.20	**VC-50-GT3**	**geotech**	liner
-1.20	-1.30	**VC-50-EN3**	**environmental**	liner
-1.30	-1.45	**VC-50-TR3**	**thermal**	liner
-1.45	-2.15	**VC-50-GT2**	**geotech**	liner
-2.15	-2.25	**VC-50-EN2**	**environmental**	liner
-2.25	-2.40	**VC-50-TR2**	**thermal**	liner
-2.40	-3.10	**VC-50-GT1**	**geotech**	liner
-3.10	-3.20	**VC-50-EN1**	**environmental**	liner
-3.20	-3.35	**VC-50-TR1**	**thermal**	liner
-3.35	-3.50	**VC-50 Nose**	**core nose**	bag

Live Organisms Present	(Y) / N	Mussels
Oil Present	Y / (N)	
Odor Present	(Y) / N	
Debris Present	Y / (N)	
Within 10% of Required Core Length	Y / N	
Photo	(Y) / N	

Colour change at 1m from bottom

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC50 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT4)										
	Very soft clay with high water content Mussels present PP = <0.031 TSF TV = <0.01 TSF	Light grey									
	0.70m - Top of GT3 Very soft clay with high water content	Light grey									
1m	PP = <0.031 TSF TV = <0.01 TSF										
	1.45m - Top of GT2	Light grey									
	Soft clay PP = <0.031 TSF TV = 0.02 TSF										
2m											
	2.40m - Top of GT1	light brown									
	Trace amounts of sand and fine gravel. PP = 0.063 TSF TV = 0.05 TSF	to light grey									
3m											
	3.35m - Core nose Soft clay with gravel / sand	Light grey									
4m											
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC25	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 580870.4 / 4696111.1		Water Depth: 42.5m
Depth of Sample Stratum: 42.5-47.5m		Vessel Name/Type: ECOSSE
Time (Hypack Target Time): 10:34:08		Date: 2 Sept. 2015
Weather Conditions: Winds 15 kn SW , Seas 3 - 5 ft.		
Collected by: CT,MK,JM		
Sample Collection device (Note modifications made during sampling):		Rossfelder P3
HDOP = 1.4	Start 10:37:00	Started logging at top of WC
SATS = 9	End 10:37:45	
000_1034.RAW		

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

Soft bottom. 45 seconds for full penetration

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number:	VC-25	Core Penetration Length:	4.7m
Sample Type: Vibracore		Recovered Core Length:	3.85 m
Described By: CT		Date Sampled:	2-Sep-15

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0.00	-0.60	**VC-25-GT4**	**geotech**	liner
-0.60	-0.70	**VC-25-EN4**	**environmental**	liner
-0.70	-0.85	**VC-25-TR4**	**thermal**	liner
-0.85	-1.55	**VC-25-GT3**	**geotech**	liner
-1.55	-1.65	**VC-25-EN3**	**environmental**	liner
-1.65	-1.80	**VC-25-TR3**	**thermal**	liner
-1.80	-2.50	**VC-25-GT2**	**geotech**	liner
-2.50	-2.60	**VC-25-EN2**	**environmental**	liner
-2.60	-2.75	**VC-25-TR2**	**thermal**	liner
-2.75	-3.45	**VC-25-GT1**	**geotech**	liner
-3.45	-3.55	**VC-25-EN1**	**environmental**	liner
-3.55	-3.70	**VC-25-TR1**	**thermal**	liner
-3.70	-3.85	**VC-25Nose**	**core nose**	bag

Live Organisms Present	(Y) / N
Oil Present	Y / (N)
Odor Present	(Y) / N
Debris Present	Y / (N)
Within 10% of Required Core Length	Y / N
Photo	(Y) / N

Mussels

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

GT4 - Whole sample

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC25 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT4)										
	Very soft clay with mussels present. Darker colour at top of core PP = N/A TV = N/A	Dark grey	25								
	0.85m - Top of GT3	Olive grey									
1m	Very soft clay with higher water content Black streaks PP = <0.031 TSF TV = 0.01 TSF										
	1.80m - Top of GT2	Light grey									
2m	Very soft clay PP = <0.031 TSF TV = 0.02 TSF										
	2.75m - Top of GT1 Very soft clay	Light grey									
3m	PP = <0.031 TSF TV = 0.04 TSF										
	3.70m - Core nose Very soft clay with faint odour.	Light grey									
4m	Sediments expanding rapidly, had to cap quickly.										
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC26	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 579752.5 / 4694437.7		Water Depth: 40.5m
Depth of Sample Stratum: 40.5-45.5m		Vessel Name/Type: ECOSSE
Time (Hypack Target Time): 12:04:43		Date: 2 Sept. 2015
Weather Conditions: Winds 15 kn SW , Seas 3 - 4 ft.		
Collected by: CT,MK,JM		
Sample Collection device (Note modifications made during sampling):		Rossfelder P3
HDOP = 1.3	Start 12:07:45	Started logging at top of WC
SATS = 8	End 12:08:30	
000_1204.RAW		

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

1 - 2m penetration without vibrating

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number:	VC-26	Core Penetration Length:	4.7m
Sample Type: Vibracore		Recovered Core Length:	3.97 m
Described By: CT		Date Sampled:	2-Sep-15

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0.00	-0.72	**VC-26-GT4**	**geotech**	liner
-0.72	-0.82	**VC-26-EN4**	**environmental**	liner
-0.82	-0.97	**VC-26-TR4**	**thermal**	liner
-0.97	-1.67	**VC-26-GT3**	**geotech**	liner
-1.67	-1.77	**VC-26-EN3**	**environmental**	liner
-1.77	-1.92	**VC-26-TR3**	**thermal**	liner
-1.92	-2.62	**VC-26-GT2**	**geotech**	liner
-2.62	-2.72	**VC-26-EN2**	**environmental**	liner
-2.72	-2.87	**VC-26-TR2**	**thermal**	liner
-2.87	-3.57	**VC-26-GT1**	**geotech**	liner
-3.57	-3.67	**VC-26-EN1**	**environmental**	liner
-3.67	-3.82	**VC-26-TR1**	**thermal**	liner
-3.82	-3.97	**VC-26Nose**	**core nose**	bag

Live Organisms Present	(Y) / N
Oil Present	Y / (N)
Odor Present	(Y) / N
Debris Present	Y / (N)
Within 10% of Required Core Length	Y / N
Photo	(Y) / N

Mussels

Top core with mussels

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC26 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT4)										
	Very soft clay / silt Highly staurated Mussels present	Dark grey	25								
1m	0.97m - Top of GT3	Olive grey									
	Very soft clay with high water content PP = <0.031 TSF TV = 0.03 TSF										
2m	1.92m - Top of GT2	Olive grey									
	Very soft clay PP = <0.031 TSF TV = 0.04 TSF										
3m	2.87m - Top of GT1 Very soft clay	Olive grey									
	Sediments expanding quickly PP = <0.031 TSF TV = 0.05 TSF										
4m	3.82m - Core nose Very soft clay / silt	Olive grey									
	Faint odour										
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC27	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 578653.9 / 4692835.2		Water Depth: 38m
Depth of Sample Stratum: 38 - 43m		Vessel Name/Type: ECOSSE
Time (Hypack Target Time): 10:17:38		Date: 1 Sept. 2015
Weather Conditions: Winds light, Seas flat		
Collected by: CT,MK,JM		

Sample Collection device (Note modifications made during sampling): Rossfelder P3

HDOP = 1.2 Start 10:20:45 Started logging at top of WC

SATS = 9 End 10:21:40

000_1017.RAW

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

Started vibrating 1m above bottom to try for more recovery and less compaction.

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number:	VC-27	Core Penetration Length:	4.7m
Sample Type: Vibracore		Recovered Core Length:	3.87 m
Described By: CT		Date Sampled:	1-Sep-15

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0.00	-0.62	**VC-27-GT4**	**geotech**	liner
-0.62	-0.72	**VC-27-EN4**	**environmental**	liner
-0.72	-0.87	**VC-27-TR4**	**thermal**	liner
-0.87	-1.57	**VC-27-GT3**	**geotech**	liner
-1.57	-1.67	**VC-27-EN3**	**environmental**	liner
-1.67	-1.82	**VC-27-TR3**	**thermal**	liner
-1.82	-2.52	**VC-27-GT2**	**geotech**	liner
-2.52	-2.62	**VC-27-EN2**	**environmental**	liner
-2.62	-2.77	**VC-27-TR2**	**thermal**	liner
-2.77	-3.47	**VC-27-GT1**	**geotech**	liner
-3.47	-3.57	**VC-27-EN1**	**environmental**	liner
-3.57	-3.72	**VC-27-TR1**	**thermal**	liner
-3.72	-3.87	**VC-27Nose**	**core nose**	bag

Live Organisms Present	Y / (N)
Oil Present	Y / (N)
Odor Present	(Y) / N
Debris Present	Y / (N)
Within 10% of Required Core Length	Y / N
Photo	(Y) / N

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

Top of GT1 - Very soft clay

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC27 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT4)										
	Highly saturated clay PP = <0.031 TSF TV = <0.01 TSF	Light grey									
	0.87m - GT3	Light grey									
1m	Very soft clay with higher water content PP = <0.031 TSF TV = 0.03 TSF										
	1.82m - Top of GT2	Light grey									
2m	Very soft clay with black streaks Faint odour PP = <0.031 TSF TV = 0.05 TSF										
	2.77m - Top of GT1 Very soft clay	Light grey									
3m	PP = <0.031 TSF TV = 0.05 TSF										
	3.72m - Core nose Very soft clay with darker streaks	Light grey									
4m	Faint odour										
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC28	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 577546.8 / 4691133.7		Water Depth: 36m
Depth of Sample Stratum: 36 - 41m		Vessel Name/Type: ECOSSE
Time (Hypack Target Time): 10:17:38		Date: 1 Sept. 2015
Weather Conditions: Winds light, Seas flat		
Collected by: CT,MK,JM		

Sample Collection device (Note modifications made during sampling): Rossfelder P3

HDOP = 1.3 Start 12:09:00 Started logging at top of WC

SATS = 9 End 12:10:10

000_1206.RAW

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

Dropped weight stand to lake bed, then started vibrating.

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number:	VC-28	Core Penetration Length:	4.7m
Sample Type: Vibracore		Recovered Core Length:	4.2 m
Described By: CT		Date Sampled:	1-Sep-15

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0.00	-0.95	**VC-28-GT4**	**geotech**	liner
-0.95	-1.05	**VC-28-EN4**	**environmental**	liner
-1.05	-1.20	**VC-28-TR4**	**thermal**	liner
-1.20	-1.90	**VC-28-GT3**	**geotech**	liner
-1.90	-2.00	**VC-28-EN3**	**environmental**	liner
-2.00	-2.15	**VC-28-TR3**	**thermal**	liner
-2.15	-2.85	**VC-28-GT2**	**geotech**	liner
-2.85	-2.95	**VC-28-EN2**	**environmental**	liner
-2.95	-3.10	**VC-28-TR2**	**thermal**	liner
-3.10	-3.80	**VC-28-GT1**	**geotech**	liner
-3.80	-3.90	**VC-28-EN1**	**environmental**	liner
-3.90	-4.05	**VC-28-TR1**	**thermal**	liner
-4.05	-4.20	**VC-28Nose**	**core nose**	bag

Live Organisms Present	(Y) / N
Oil Present	Y / (N)
Odor Present	(Y) / N
Debris Present	Y / (N)
Within 10% of Required Core Length	Y / N
Photo	(Y) / N

Mussels

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

GT4 - Whole sample

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC28 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT4)										
	Very soft clay. Higher percentage of black streaks, 15 - 20%. Mussels present PP = <0.031 TSF TV = N/A	Yellowish orange									
1m											
	1.20m - Top of GT3 Very soft clay with black streaks and high water content PP = <0.031 TSF TV = 0.02 TSF	Light grey									
2m											
	2.15m - Top of GT2 Very soft clay with black streaks (~ 5%) PP = <0.031 TSF TV = 0.03 TSF	Light grey									
3m											
	3.10m - Top of GT1 Very soft clay with black streaks (~ 5%) PP = <0.031 TSF TV = 0.03 TSF	Light grey									
4m											
	4.05m - Core nose Very soft clay	Light grey									
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC29	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 576455.6 / 4689469.9		Water Depth: 33.5m
Depth of Sample Stratum: 33.5 - 38.5m		Vessel Name/Type: ECOSSE
Time (Hypack Target Time): 14:10:59		Date: 2 Sept. 2015
Weather Conditions: Winds 15 kn SW , Seas 3 - 4 ft.		
Collected by: CT,MK,JM		
Sample Collection device (Note modifications made during sampling):		Rossfelder P3
HDOP = 1.0	Start 14:12:35	Started logging at top of WC
SATS = 7	End 14:13:35	
Differential		
000_1411.RAW		

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

1 - 2m penet ~ 45 seconds for full penetration with 15 seconds extra

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number:	VC-29	Core Penetration Length:	4.7m
Sample Type: Vibracore		Recovered Core Length:	4.5 m
Described By:	CT	Date Sampled:	2-Sep-15

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0.00	-0.50	**VC-29-GT5**	**geotech**	liner
-0.50	-0.60	**VC-29-EN5**	**environmental**	liner
-0.60	-0.75	**VC-29-TR5**	**thermal**	liner
-0.75	-1.25	**VC-29-GT4**	**geotech**	liner
-1.25	-1.35	**VC-29-EN4**	**environmental**	liner
-1.35	-1.50	**VC-29-TR4**	**thermal**	liner
-1.50	-2.20	**VC-29-GT3**	**geotech**	liner
-2.20	-2.30	**VC-29-EN3**	**environmental**	liner
-2.30	-2.45	**VC-29-TR3**	**thermal**	liner
-2.45	-3.15	**VC-29-GT2**	**geotech**	liner
-3.15	-3.25	**VC-29-EN2**	**environmental**	liner
-3.25	-3.40	**VC-29-TR2**	**thermal**	liner
-3.40	-4.10	**VC-29-GT1**	**geotech**	liner
-4.10	-4.20	**VC-29-EN1**	**environmental**	liner
-4.20	-4.35	**VC-29-TR1**	**thermal**	liner
-4.35	-4.50	**VC-29Nose**	**core nose**	bag

Live Organisms Present	(Y) / N	Mussels
Oil Present	Y / (N)	
Odor Present	(Y) / N	
Debris Present	Y / (N)	
Within 10% of Required Core Length	Y / N	
Photo	(Y) / N	

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

Top of GT1

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC29 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT5)										
	Very soft clay with traces of fine sand Mussels	Yellowish orange									
	0.75m - Top of GT4 Very soft clay with high water content	Light grey									
1m	PP = <0.031 TSF TV = 0.04 TSF										
	1.50m - Top of GT3 Very soft clay with black streaks PP = <0.031 TSF TV = 0.04 TSF	Light grey									
2m											
	2.45m - Top of GT2	Light grey									
	Very soft clay PP = <0.031 TSF TV = 0.03 TSF										
3m											
	3.40m - Top of GT1	Light grey									
	Very soft clay PP = <0.031 TSF TV = 0.04 TSF										
4m											
	4.35m - Core nose Very soft clay	Light grey									
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC30	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 575362.6 / 4687836.3		Water Depth: 31m
Depth of Sample Stratum: 31 - 36m		Vessel Name/Type: ECOSSE
Time (Hypack Target Time): 09:24:50		Date: 3 Sept. 2015
Weather Conditions: Winds 10 kn SW , Seas 2 ft.		
Collected by: CT,MK,JM		
Sample Collection device (Note modifications made during sampling):		Rossfelder P3
HDOP = 0.9	Start 09:26:45	Started logging at top of WC
SATS = 10	End 09:27:30	
Differential		
000_0924.RAW		

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

Slightly hard. Sand?

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number:	VC-30	Core Penetration Length:	4.7m
Sample Type: Vibracore		Recovered Core Length:	4.33 m
Described By:	CT	Date Sampled:	3-Sep-15

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0.00	-0.33	**VC-30-GT5**	**geotech**	liner
-0.33	-0.43	**VC-30-EN5**	**environmental**	liner
-0.43	-0.58	**VC-30-TR5**	**thermal**	liner
-0.58	-1.08	**VC-30-GT4**	**geotech**	liner
-1.08	-1.18	**VC-30-EN4**	**environmental**	liner
-1.18	-1.33	**VC-30-TR4**	**thermal**	liner
-1.33	-2.03	**VC-30-GT3**	**geotech**	liner
-2.03	-2.13	**VC-30-EN3**	**environmental**	liner
-2.13	-2.28	**VC-30-TR3**	**thermal**	liner
-2.28	-2.98	**VC-30-GT2**	**geotech**	liner
-2.98	-3.08	**VC-30-EN2**	**environmental**	liner
-3.08	-3.23	**VC-30-TR2**	**thermal**	liner
-3.23	-3.93	**VC-30-GT1**	**geotech**	liner
-3.93	-4.03	**VC-30-EN1**	**environmental**	liner
-4.03	-4.18	**VC-30-TR1**	**thermal**	liner
-4.18	-4.33	**VC-30Nose**	**core nose**	bag

Live Organisms Present	Y / (N)
Oil Present	Y / (N)
Odor Present	(Y) / N
Debris Present	Y / N
Within 10% of Required Core Length	Y / N
Photo	(Y) / N

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

Top GT5 / core

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC30 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT5)										
	Soft clay with higher water content PP = N/A TV = N/A Top disturbed	Yellowish orange									
1m											
	1.08m - Top of GT4 Very soft clay with higher water content PP = <0.031 TSF TV = 0.03 TSF	Olive grey									
2m											
	2.03m - Top of GT3 Very soft clay with traces of find sand PP = <0.031 TSF TV = 0.05 TSF	Olive grey									
3m	2.98m - Top of GT2	Olive grey									
	Very soft clay with traces of find sand PP = <0.031 TSF TV = 0.04 TSF										
4m	3.93m - Top of GT1	Olive grey									
	Very soft clay with traces of fine sand. PP = <0.031 TSF TV = 0.04 TSF										
	4.33m - Core nose	Olive grey									
	Very soft clay with traces of fine sand										
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC31	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 574221.7 / 4686138.7		Water Depth: 29m
Depth of Sample Stratum: 29 - 34m		Vessel Name/Type: ECOSSE
Time (Hypack Target Time): 10:29:13		Date: 3 Sept. 2015
Weather Conditions: Winds 10 kn SW , Seas 2 ft.		
Collected by: CT,MK,JM		
Sample Collection device (Note modifications made during sampling):		Rossfelder P3
HDOP = 1.4	Start 10:31:00	Started logging at top of WC
SATS = 9	End 10:31:40	
Differential		
000_1029.RAW		

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

On bottom - then vibrating

40 seconds total

30 seconds to penetrate 4.5m

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

Fine - medium sand at bottom core. ~ 4.5m

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number:	VC-31	Core Penetration Length:	4.5m
Sample Type: Vibracore		Recovered Core Length:	3.82 m
Described By: CT		Date Sampled:	3-Sep-15

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0.00	-0.57	**VC-31-GT4**	**geotech**	liner
-0.57	-0.67	**VC-31-EN4**	**environmental**	liner
-0.67	-0.82	**VC-31-TR4**	**thermal**	liner
-0.82	-1.52	**VC-31-GT3**	**geotech**	liner
-1.52	-1.62	**VC-31-EN3**	**environmental**	liner
-1.62	-1.77	**VC-31-TR3**	**thermal**	liner
-1.77	-2.47	**VC-31-GT2**	**geotech**	liner
-2.47	-2.57	**VC-31-EN2**	**environmental**	liner
-2.57	-2.72	**VC-31-TR2**	**thermal**	liner
-2.72	-3.42	**VC-31-GT1**	**geotech**	liner
-3.42	-3.52	**VC-31-EN1**	**environmental**	liner
-3.52	-3.67	**VC-31-TR1**	**thermal**	liner
-3.67	-3.82	**VC-31Nose**	**core nose**	bag

Live Organisms Present	(Y) / N	Mussels
Oil Present	Y / (N)	
Odor Present	(Y) / N	
Debris Present	Y / (N)	
Within 10% of Required Core Length	Y / N	
Photo	(Y) / N	

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

GT4 - Top core

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC31 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT4)										
	Fine to medium sand with mussels present and shell fragments PP = N/A TV = N/A	Olive grey	10								
1m											
	1.52m - Top of GT3 Very soft clay with traces of fine sand. PP = <0.031 TSF TV = 0.02 TSF	Olive to light grey									
2m											
	2.47m - Top of GT2 Very soft clay with traces of fine sand PP = <0.031 TSF TV = 0.04 TSF	Olive to light grey									
3m											
	3.42m - Top of GT1 Very soft clay with trace sand and faint odour PP = <0.031 TSF TV = 0.05 TSF	Olive grey									
4m	3.82m - Core nose Fine sand with some silt and trace shell fragments	Dark grey									
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC32	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 573148.1 / 4684501.4		Water Depth: 26m
Depth of Sample Stratum: 26 - 31m		Vessel Name/Type: ECOSSE
Time (Hypack Target Time): 12:04:26		Date: 3 Sept. 2015
Weather Conditions: Winds 10 kn SW , Seas 2 ft.		
Collected by: CT,MK,JM		
Sample Collection device (Note modifications made during sampling):		Rossfelder P3
HDOP = 1.3	Start 12:05:45	Started logging at top of WC
SATS = 8	End 12:07:15	
Differential		
000A.1204.RAW		

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

1 minute 30 seconds of vibrating

Wind blowing boat off point by ~ 25m.

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number:	VC-32	Core Penetration Length:	4.7m
Sample Type: Vibracore		Recovered Core Length:	4.40 m
Described By:	CT	Date Sampled:	3-Sep-15

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0.00	**-0.15**	**VC-32-EN5**	**environmental**	liner w bag
-0.15	**-0.30**	**VC-32-TR5**	**thermal**	liner
-0.30	-1.15	**VC-32-GT4**	**geotech**	liner
-1.15	-1.25	**VC-32-EN4**	**environmental**	liner
-1.25	-1.40	**VC-32-TR4**	**thermal**	liner
-1.40	-2.10	**VC-32-GT3**	**geotech**	liner
-2.10	-2.20	**VC-32-EN3**	**environmental**	liner
-2.20	-2.35	**VC-32-TR3**	**thermal**	liner
-2.35	-3.05	**VC-32-GT2**	**geotech**	liner
-3.05	-3.15	**VC-32-EN2**	**environmental**	liner
-3.15	-3.30	**VC-32-TR2**	**thermal**	liner
-3.30	-4.00	**VC-32-GT1**	**geotech**	liner
-4.00	-4.10	**VC-32-EN1**	**environmental**	liner
-4.10	-4.25	**VC-32-TR1**	**thermal**	liner
-4.25	-4.40	**VC-32Nose**	**core nose**	bag

Live Organisms Present	(Y) / N	Mussels
Oil Present	Y / (N)	
Odor Present	(Y) / N	
Debris Present	Y / (N)	
Within 10% of Required Core Length	Y / N	
Photo	(Y) / N	

Top core EN5

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC32 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of EN5)										
	Soft silt with fine sand and mussels present	Yellowish orange									
	0.30m - Top of GT4	Yellowish									
1m											
	1.40m - Top of GT3	Olive grey									
	Very soft silt with traces of fine sand and black streaks PP = <0.031 TSF TV = 0.03 TSF										
2m											
	2.35m - Top of GT2	Olive grey									
	Very soft clay with traces of fine sand (~5%) PP = <0.031 TSF TV = 0.03 TSF										
3m											
	3.30m - Top of GT1	Olive grey									
	Very soft clay with traces of fine sand (~ 5%) PP = <0.031 TSF TV = 0.04 TSF Faint odour										
4m											
	4.25m - Core nose	Olive grey									
	Very soft clay with fine and medium sand										
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC33	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 572028.5 / 4682841.6		Water Depth: 23.5m
Depth of Sample Stratum: 23.5-28.5m		Vessel Name/Type: ECOSSE
Time (Hypack Target Time): 13:21:44		Date: 3 Sept. 2015
Weather Conditions: Winds 10 kn SW , Seas 2 ft.		
Collected by: CT,MK,JM		
Sample Collection device (Note modifications made during sampling):		Rossfelder P3
HDOP = 1.0	Start 13:23:05	Started logging at top of WC
SATS = 9	End 13:24:05	
Differential		
000A.1321.RAW		

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

1 minute of vibrating

Nose cone inverted

No nose cone sample

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

~ 0.15m of saturated sediment lost from top due to issues with saw.

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number:	VC-33	Core Penetration Length: 4.7m	
Sample Type: Vibracore		Recovered Core Length: 3.07 m	
Described By: CT		Date Sampled:	3-Sep-15

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
~15 cm of v saturated sediment was lost from the top.				
0.00	-0.27	**VC-33-GT4**	**geotech**	liner
-0.27	-0.37	**VC-33-EN3**	**environmental**	liner
-0.37	-0.52	**VC-33-TR3**	**thermal**	liner
-0.52	-1.22	**VC-33-GT3**	**geotech**	liner
-1.22	-1.32	**VC-33-EN2**	**environmental**	liner
-1.32	-1.47	**VC-33-TR2**	**thermal**	liner
-1.47	-2.17	**VC-33-GT2**	**geotech**	liner
-2.17	-2.27	**VC-33-EN1**	**environmental**	liner
-2.27	-2.42	**VC-33-TR1**	**thermal**	liner
-2.42	-2.92	**VC-33-GT1**	**geotech**	liner
-2.92	-3.07	**VC-33Nose**	**core nose**	bag

Live Organisms Present	(Y) / N
Oil Present	Y / (N)
Odor Present	(Y) / N
Debris Present	Y / (N)
Within 10% of Required Core Length	Y / N
Photo	(Y) / N

Mussels

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

GT4 - Top core

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC33 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT4)										
	Soft clay / silt with fine sand Trace shell fragments PP = <0.031 TSF TV = 0.03 TSF	Olive grey	<1								
	0.52m - Top of GT3 Soft clay / silt with fine sand PP = 0.031 TSF TV = 0.03 TSF	Olive grey	<1								
1m											
	1.47m - Top of GT2	Olive grey									
	Very soft clay / silt with fine sand PP = <0.031 TSF TV = 0.04 TSF										
2m											
	2.42m - Top of GT1	olive grey	<1								
	Very soft clay with silt and fine sand PP = <0.031 TSF TV = 0.04 TSF										
3m	2.92m - Core nose (Inverted, sample lost)	Dark grey									
	Very soft clay / silt with fine and coarse sand. Trace organics										
4m											
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC34	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 578941 / 468118.7		Water Depth: 23m
Depth of Sample Stratum: 23 - 28m		Vessel Name/Type: ECOSSE
Time (Hypack Target Time): 07:40:59		Date: 11 Sept. 2015
Weather Conditions: Calm		
Collected by: CT,LM,JM		

Sample Collection device (Note modifications made during sampling): Rossfelder P3

HDOP = 1.0	Start 07:43:00	Started logging at top of WC
SATS = 9	End 07:44:00	
Differential		
000_0740.RAW		

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

Soft sediments

Lost some of sample due to suction

~3m recovered

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number:	VC-34	Core Penetration Length: 4 m	
Sample Type: Vibracore		'Recovered Core Length: 2.7 m	
Described By:	CT	Date Sampled:	11-Sep-15

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0.00	-0.40	**VC-34-GT3**	**geotech**	liner
-0.40	-0.50	**VC-34-EN3**	**environmental**	liner
-0.50	-0.65	**VC-34-TR3**	**thermal**	liner
-0.65	-1.35	**VC-34-GT2**	**geotech**	liner
-1.35	-1.45	**VC-34-EN2**	**environmental**	liner
-1.45	-1.60	**VC-34-TR2**	**thermal**	liner
-1.60	-2.30	**VC-34-GT1**	**geotech**	liner
-2.30	-2.40	**VC-34-EN1**	**environmental**	liner
-2.40	-2.55	**VC-34-TR1**	**thermal**	liner
-2.55	-2.70	**VC-34Nose**	**core nose**	bag

Live Organisms Present	(Y) / N	Mussels
Oil Present	Y / (N)	
Odor Present	(Y) / N	
Debris Present	Y / (N)	
Within 10% of Required Core Length	Y / N	
Photo	Y / (N)	

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC34 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT3)										
	Very soft silt / clay Trace fine sand High water content with mussels and organics Disturbed	Olive grey	10	<5							
	0.65m - Top of GT2 Very soft silt with clay Trace fine sand	Olive grey	1	1							
1m	High water content										
	PP = <0.031 TSF TV = <0.05 TSF										
	1.60m - Top of GT1 Fine sand with silt ~5% clays, ~1% shells, ~1% organics	Olive grey	1	1							
2m	PP = 0.188 TSF										
	TV = 0.10 TSF										
	2.55m - Core nose Very soft silt with clay 5% Organics	Olive grey		5							
3m											
4m											
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC35	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 569815.5 / 4679500.1		Water Depth: 23m
Depth of Sample Stratum: 23 - 28m		Vessel Name/Type: ECOSSE
Time (Hypack Target Time): 08:37:00		Date: 11 Sept. 2015
Weather Conditions: Calm		
Collected by: CT,LM,JM		

Sample Collection device (Note modifications made during sampling): Rossfelder P3

HDOP = 1.0	Start 08:38:24	Started logging at top of WC
SATS = 10	End 08:39:43	
Differential		
000_0837.RAW		

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number:	VC-35	Core Penetration Length: 4.6 m	
Sample Type: Vibracore		'Recovered Core Length: 3.25 m	
Described By:	CT	Date Sampled:	11-Sep-15

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0.00	-0.20	**VC-35-GT4**	**geotech**	liner
-0.20	-0.30	**VC-35-EN4**	**environmental**	liner
-0.30	-0.45	**VC-35-TR4**	**thermal**	liner
-0.45	-0.95	**VC-35-GT3**	**geotech**	liner
-0.95	-1.05	**VC-35-EN3**	**environmental**	liner
-1.05	-1.20	**VC-35-TR3**	**thermal**	liner
-1.20	-1.90	**VC-35-GT2**	**geotech**	liner
-1.90	-2.00	**VC-35-EN2**	**environmental**	liner
-2.00	-2.15	**VC-35-TR2**	**thermal**	liner
-2.15	-2.85	**VC-35-GT1**	**geotech**	liner
-2.85	-2.95	**VC-35-EN1**	**environmental**	liner
-2.95	-3.10	**VC-35-TR1**	**thermal**	liner
-3.10	-3.25	**VC-35Nose**	**core nose**	bag

Live Organisms Present	Y / (N)
Oil Present	Y / (N)
Odor Present	(Y) / N
Debris Present	Y / N
Within 10% of Required Core Length	Y / N
Photo	Y / (N)

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC35 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT4)										
	Small sample Very soft clay with trace fine sand and shell frags. PP = N/A TV = N/A	Olive grey	1								
	0.45m - Top of GT3	Olive grey	1	1							
	Very soft clay with silt. High water content Shell fragments										
1m											
	1.20m - Top of GT2 Very soft clay with trace silt Trace organics	Olive grey		<1							
	PP = <0.031 TSF TV = 0.075 TSF										
2m											
	2.15m - Top of GT1 Soft silt with clay Trace organics PP = 0.031 TSF	Olive grey		1							
	TV = 0.10 TSF										
3m											
	3.10m - Core nose Medium dense sand, fine grained	Olive grey	1								
4m											
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC36	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 568737.9 / 4677879.0		Water Depth: 24m
Depth of Sample Stratum: 24 - 29m		Vessel Name/Type: ECOSSE
Time (Hypack Target Time): 09:31:30		Date: 11 Sept. 2015
Weather Conditions: Winds 5 kn, seas < 1 ft.		
Collected by: CT,LM,JM		
Sample Collection device (Note modifications made during sampling):		Rossfelder P3
HDOP = 1.0	Start 09:32:38	Started logging at top of WC
SATS = 10	End 09:33:55	
Differential		
000_0931.RAW		

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

Off target by ~38m but still on line

Full penetration

Soft

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number:	VC-36	Core Penetration Length: 4.7 m	
Sample Type: Vibracore		'Recovered Core Length: 4.4 m	
Described By:	CT	Date Sampled:	11-Sep-15

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0.00	-0.40	**VC-36-GT5**	**geotech**	liner
-0.40	-0.50	**VC-36-EN5**	**environmental**	liner
-0.50	-0.65	**VC-36-TR5**	**thermal**	liner
-0.65	-1.15	**VC-36-GT4**	**geotech**	liner
-1.15	-1.25	**VC-36-EN4**	**environmental**	liner
-1.25	-1.40	**VC-36-TR4**	**thermal**	liner
-1.40	-2.10	**VC-36-GT3**	**geotech**	liner
-2.10	-2.20	**VC-36-EN3**	**environmental**	liner
-2.20	-2.35	**VC-36-TR3**	**thermal**	liner
-2.35	-3.05	**VC-36-GT2**	**geotech**	liner
-3.05	-3.15	**VC-36-EN2**	**environmental**	liner
-3.15	-3.30	**VC-36-TR2**	**thermal**	liner
-3.30	-4.00	**VC-36-GT1**	**geotech**	liner
-4.00	-4.10	**VC-36-EN1**	**environmental**	liner
-4.10	-4.25	**VC-36-TR1**	**thermal**	liner
-4.25	-4.40	**VC-36Nose**	**core nose**	bag

Live Organisms Present	(Y) / N
Oil Present	Y / (N)
Odor Present	(Y) / N
Debris Present	Y / (N)
Within 10% of Required Core Length	Y / N
Photo	Y / (N)

Mussels

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC36 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT5)										
	Very soft clay / silt Mussels Highly saturated PP = N/A TV = N/A	Olive grey									
	0.65m - Top of GT4 Very soft clay with trace fine sand Black streaks	Olive grey									
1m	PP = <0.031 TSF										
	TV = 0.05 TSF 1.40m - Top of GT3	Olive grey		1							
	Soft clay with silt and trace sand Black streaks 90% clay and 10% silt PP = 0.031 TSF TV =).10 TSF										
2m											
	2.35m - Top of GT2 Soft clay with silt	Olive grey									
	PP = 0.031 TSF TV = 0.10 TSF										
3m											
	3.30m - Top of GT1 Soft silt with clay	Olive grey		1							
	Trace fine sand, organics, and shells PP = 0.079 TSF TV = 0.10 TSF										
4m											
	4.25m - Core nose Very soft silt with clay Trace fine sand	Olive grey									
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC37	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 568737.9 / 4677879.0		Water Depth: 24m
Depth of Sample Stratum: 23.5-28.5m		Vessel Name/Type: ECOSSE
Time (Hypack Target Time): 12:16:17		Date: 11 Sept. 2015
Weather Conditions: Calm		
Collected by: CT,LM,JM		

Sample Collection device (Note modifications made during sampling): Rossfelder P3

HDOP = 1.2 Start 12:17:13 Started logging at top of WC

SATS = 8 End 12:19:00

Differential

000_1216.RAW

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

Soft to ~4m

Hard layer at 4.0m. See chirp data

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number:	VC-37	Core Penetration Length: 4.2 m	
Sample Type: Vibracore		'Recovered Core Length: 3.8 m	
Described By:	CT	Date Sampled:	11-Sep-15

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0.00	-0.55	**VC-37-GT4**	**geotech**	liner
-0.55	-0.65	**VC-37-EN4**	**environmental**	liner
-0.65	-0.80	**VC-37-TR4**	**thermal**	liner
-0.80	-1.50	**VC-37-GT3**	**geotech**	liner
-1.50	-1.60	**VC-37-EN3**	**environmental**	liner
-1.60	-1.75	**VC-37-TR3**	**thermal**	liner
-1.75	-2.45	**VC-37-GT2**	**geotech**	liner
-2.45	-2.55	**VC-37-EN2**	**environmental**	liner
-2.55	-2.70	**VC-37-TR2**	**thermal**	liner
-2.70	-3.40	**VC-37-GT1**	**geotech**	liner
-3.40	-3.50	**VC-37-EN1**	**environmental**	liner
-3.50	-3.65	**VC-37-TR1**	**thermal**	liner
-3.65	-3.80	**VC-37Nose**	**core nose**	bag

Live Organisms Present	Y / (N)
Oil Present	Y / (N)
Odor Present	(Y) / N
Debris Present	Y / (N)
Within 10% of Required Core Length	Y / N
Photo	Y / (N)

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC37 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT4)										
	Very soft silt with clay ~10% fine sand, ~<5% organics Shell fragments and high water content PP = N/A TV = N/A	Olive grey	5	5							
	0.80 - Top of GT3	Olive grey									
1m	Soft clay with trace fine sand PP = <0.031 TSF TV = 0.05 TSF										
	1.75m - Top of GT2 Soft clay	Olive grey									
2m	PP = <0.031 TSF TV = 0.15 TSF										
	2.70m - Top of GT1 Soft clay with trace fine sand PP = 0.031 TSF	Olive grey									
3m	TV = 0.10 TSF										
	3.65m - Core nose Hard clay with coarse sand. Fine gravel at top	Olive grey									
4m	PP = 3.5 TSF TV = 0.55 TSF										
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC38	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 566487.0 / 4624473.9		Water Depth: 23m
Depth of Sample Stratum: 23 - 28m		Vessel Name/Type: ECOSSE
Time (Hypack Target Time): 12:16:17		Date: 11 Sept. 2015
Weather Conditions: Calm		
Collected by: CT,LM,JM		

Sample Collection device (Note modifications made during sampling): Rossfelder P3

HDOP = 1.1 Start 13:22:53 Started logging at top of WC

SATS = 7 End 13:22:20

Differential

000_1315.RAW

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

Jon's box not functioning

Lost nose cone sample

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number:	VC-38	Core Penetration Length: 4.25m	
Sample Type: Vibracore		Recovered Core Length: 4.15m	
Described By:	CT	Date Sampled:	11-Sep-15

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0.00	-0.90	**VC-38-GT4**	**geotech**	liner
-0.90	-1.00	**VC-38-EN4**	**environmental**	liner
-1.00	-1.15	**VC-38-TR4**	**thermal**	liner
-1.15	-1.85	**VC-38-GT3**	**geotech**	liner
-1.85	-1.95	**VC-38-EN3**	**environmental**	liner
-1.95	-2.10	**VC-38-TR3**	**thermal**	liner
-2.10	-2.80	**VC-38-GT2**	**geotech**	liner
-2.80	-2.90	**VC-38-EN2**	**environmental**	liner
-2.90	-3.05	**VC-38-TR2**	**thermal**	liner
-3.05	-3.75	**VC-38-GT1**	**geotech**	liner
-3.75	-3.85	**VC-38-EN1**	**environmental**	liner
-3.85	-4.00	**VC-38-TR1**	**thermal**	liner
-4.00	-4.15	**VC-38Nose**	**core nose**	bag

Live Organisms Present	Y / (N)
Oil Present	Y / (N)
Odor Present	(Y) / N
Debris Present	Y / N
Within 10% of Required Core Length	Y / N
Photo	Y / (N)

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC38 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT4)										
	Very soft clay with silt Disturbed PP = N/A TV = N/A	Olive grey with light brown									
1m											
	1.15m - Top of GT3 Very soft clay with trace fine sand PP = <0.031 TSF TV = 0.025 TSF	Olive grey									
2m											
	2.10m - Top of GT2 Very soft clay with trace fine sand PP = <0.031 TSF TV = 0.075 TSF	Olive grey									
3m											
	3.05m - Top of GT1 Soft clay PP = <0.031 TSF TV = 0.10 TSF	Olive grey									
4m											
	4.0m - Core nose Lost sample										
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC39	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 565272.5 / 4672866.9		Water Depth: 21.5m
Depth of Sample Stratum: 21.5-26.5m		Vessel Name/Type: ECOSSE
Time (Hypack Target Time): 14:58:43		Date: 7 Sept. 2015
Weather Conditions: Winds 10 kn W, seas 2 ft.		
Collected by: CT,MK,JM		
Sample Collection device (Note modifications made during sampling):		Rossfelder P3
HDOP = 0.9	Start 15:00:10	Started logging at top of WC
SATS = 8	End 15:03:40	
Differential		
000_1458.RAW		

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

Hard bottom - see chirp data

3 minutes 30 seconds - No progress in last 30 seconds

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number:	VC-39	Core Penetration Length: 3.7 m	
Sample Type: Vibracore		'Recovered Core Length: 3.32 m	
Described By:	CT	Date Sampled:	6-Sep-15

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0.00	-0.27	**VC-39-GT4**	**geotech**	liner
-0.27	-0.37	**VC-39-EN4**	**environmental**	liner
-0.37	-0.52	**VC-39-TR4**	**thermal**	liner
-0.52	-1.02	**VC-39-GT3**	**geotech**	liner
-1.02	-1.12	**VC-39-EN3**	**environmental**	liner
-1.12	-1.27	**VC-39-TR3**	**thermal**	liner
-1.27	-1.97	**VC-39-GT2**	**geotech**	liner
-1.97	-2.07	**VC-39-EN2**	**environmental**	liner
-2.07	-2.22	**VC-39-TR2**	**thermal**	liner
-2.22	-2.92	**VC-39-GT1**	**geotech**	liner
-2.92	-3.02	**VC-39-EN1**	**environmental**	liner
-3.02	-3.17	**VC-39-TR1**	**thermal**	liner
-3.17	-3.32	**VC-39Nose**	**core nose**	bag

Live Organisms Present	(Y) / N	Mussels
Oil Present	Y / (N)	
Odor Present	(Y) / N	Faint
Debris Present	Y / (N)	
Within 10% of Required Core Length	Y / N	
Photo	Y / (N)	

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC39 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT4)										
	Fine sand with clay / silt, well drained 90% sand and 10% clay Shell fragments and mussels present PP = N/A TV = N/A		10								
	0.52m - Top of GT3 Soft clay with trace shell fragments Higher water content PP = 0.047 TSF	Olive grey	<1								
1m	TV = 0.15 TSF										
	1.27m - Top of GT2 Medium stiff clay with trace shell fragments PP = 0.250 TSF	Olive grey	<1								
	TV = 0.30 TSF										
2m											
	2.22m - Top of GT1 Medium stiff clay with trace organics PP = 0.250 TSF	Olive grey		<1							
	TV = 0.30 TSF										
3m											
	3.17m - Core nose Stiff clay with fine gravel	Olive grey									
4m											
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC40	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 564107.5 / 4671268.3		Water Depth: 20m
Depth of Sample Stratum: 20 - 25m		Vessel Name/Type: ECOSSE
Time (Hypack Target Time): 14:08:45		Date: 5 Sept. 2015
Weather Conditions: Winds 5 kn S-SW, seas 1 ft.		
Collected by: CT,MK,JM		

Sample Collection device (Note modifications made during sampling): Rossfelder P3

HDOP = 1.0 Start 14:27:00 Started logging at top of WC

SATS = 7 End 14:31:00

Differential

000A1425.RAW

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

Hard bottom - see chirp data

Four minutes of vibrating

~ 2.5m penetration

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number:	VC-40	Core Penetration Length: 2.2 m	
Sample Type: Vibracore		'Recovered Core Length: 1.49 m	
Described By: CT		Date Sampled:	5-Sep-15

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0.00	-0.34	**VC-40-GT2**	**geotech**	liner
-0.34	-0.44	**VC-40-EN2**	**environmental**	liner
-0.44	-0.59	**VC-40-TR2**	**thermal**	liner
-0.59	-1.09	**VC-40-GT1**	**geotech**	liner
-1.09	-1.19	**VC-40-EN1**	**environmental**	liner
-1.19	-1.34	**VC-40-TR1**	**thermal**	liner
-1.34	-1.49	**VC-40Nose**	**core nose**	bag

Live Organisms Present	(Y) / N
Oil Present	Y / (N)
Odor Present	(Y) / N
Debris Present	Y / (N)
Within 10% of Required Core Length	Y / N
Photo	(Y) / N

Mussels

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

Top core - Fine gravel

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC40 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT2)										
	Fine gravel with medium to coarse sand Mussels present PP = N/A TV = N/A	Olive grey	50								
	0.59m - Top of GT1 Stiff clay with traces of fine sand <1% PP = 1 TSF TV = 0.50 TSF	Olive grey									
1m											
	1.34m - Core nose Stiff clay with fine gravel	Olive grey									
2m											
3m											
4m											
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC41	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 562897.7 / 4669670.2		Water Depth: 21.5m
Depth of Sample Stratum: 21.5-26.5m		Vessel Name/Type: ECOSSE
Time (Hypack Target Time): 14:08:45		Date: 4 Sept. 2015
Weather Conditions: Winds light, seas calm		
Collected by: CT,MK,JM		

Sample Collection device (Note modifications made during sampling): Rossfelder P3

HDOP = 1.0 Start 14:09:40 Started logging at top of WC

SATS = 7 End 14:16:10

Differential

000_1408.RAW

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

Very hard bottom - See chirp data for horizon. Comes to surface of lake bed

6 minute 30 second vibe

~ 2- 2.5m

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

Sample tapered at top due to hardness of sediment and core nose fingers.

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number:	VC-41	Core Penetration Length: 2 m	
Sample Type: Vibracore		'Recovered Core Length: 1.95 m	
Described By:	CT	Date Sampled:	4-Sep-15

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0.00	-0.60	**VC-41-GT2**	**geotech**	liner
-0.60	-0.70	**VC-41-EN2**	**environmental**	liner
-0.70	-0.85	**VC-41-TR2**	**thermal**	liner
-0.85	-1.55	**VC-41-GT1**	**geotech**	liner
-1.55	-1.65	**VC-41-EN1**	**environmental**	liner
-1.65	-1.80	**VC-41-TR1**	**thermal**	liner
-1.80	-1.95	**VC-41Nose**	**core nose**	bag

Live Organisms Present	(Y) / N
Oil Present	Y / (N)
Odor Present	(Y) / N
Debris Present	Y / (N)
Within 10% of Required Core Length	Y / N
Photo	(Y) / N

Mussels

Top core

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC41 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT2)										
	Mixed sediment matrix Sub-rounded to rounded coarse gravel (black-brown) Medium - coarse sand (black) Mussel shells with live mussels on top Olive grey soft clay		25								
	PP = N/A TV = N/A										
	0.85m - Top of GT1	Olive grey									
1m	Stiff clay with traces of fine to medium sand										
	PP = 0.281 TSF TV = 0.50 TSF										
	1.80m - Core nose	N/A									
2m	Sample not recovered										
3m											
4m											
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC42	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 561706.2 / 4668054.6		Water Depth: 19.5m
Depth of Sample Stratum: 19.5-24.5m		Vessel Name/Type: ECOSSE
Time (Hypack Target Time): 12:05:21		Date: 4 Sept. 2015
Weather Conditions: Winds light, seas flat		
Collected by: CT,MK,JM		

Sample Collection device (Note modifications made during sampling): Rossfelder P3

HDOP = 1.4	Start 12:07:00	Started logging at top of WC
SATS = 7	End 12:10:10	
Differential		
000B1205.RAW		

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

~ 3m soft then hard layer

See horizon in chirp data

2 minutes 10 seconds of vibe. Amps reached 9A.

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number:	VC-42	Core Penetration Length: 4.7 m	
Sample Type: Vibracore		'Recovered Core Length: 4.3 m	
Described By:	CT	Date Sampled:	4-Sep-15

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0.00	-0.30	**VC-42-GT5**	**geotech**	liner
-0.30	-0.40	**VC-42-EN5**	**environmental**	liner
-0.40	-0.55	**VC-42-TR5**	**thermal**	liner
-0.55	-1.05	**VC-42-GT4**	**geotech**	liner
-1.05	-1.15	**VC-42-EN4**	**environmental**	liner
-1.15	-1.30	**VC-42-TR4**	**thermal**	liner
-1.30	-2.00	**VC-42-GT3**	**geotech**	liner
-2.00	-2.10	**VC-42-EN3**	**environmental**	liner
-2.10	-2.25	**VC-42-TR3**	**thermal**	liner
-2.25	-2.95	**VC-42-GT2**	**geotech**	liner
-2.95	-3.05	**VC-42-EN2**	**environmental**	liner
-3.05	-3.20	**VC-42-TR2**	**thermal**	liner
-3.20	-3.90	**VC-42-GT1**	**geotech**	liner
-3.90	-4.00	**VC-42-EN1**	**environmental**	liner
-4.00	-4.15	**VC-42-TR1**	**thermal**	liner
-4.15	-4.30	**VC-42Nose**	**core nose**	bag

Live Organisms Present	Y / (N)
Oil Present	Y / (N)
Odor Present	(Y) / N
Debris Present	Y / (N)
Within 10% of Required Core Length	Y / N
Photo	(Y) / N

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

Bottom core - Medium stiff clay

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC42 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT5)										
	Very soft clay with high water content / disturbed PP = N/A TV = N/A	Olive grey									
	0.55m - Top of GT4 Very soft clay PP = <0.031 TSF TV = 0.03 TSF	Olive grey									
1m											
	1.30m - Top of GT3 Very soft clay with trace sand PP = <0.031 TSF	Olive grey									
	TV = 0.03 TSF										
2m											
	2.25m - Top of GT2 Soft clay with traces of sand <1% PP = 0.031 TSF	Olive grey									
	TV = 0.05 TSF										
3m											
	3.20m - Top of GT1 Medium stiff clay with traces of fine sand <1% PP = 0.188 TSF	Olive grey									
	TV = 0.20 TSF										
4m											
	4.15m - Core nose Medium stiff clay Faint odour	Olive grey									
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC43	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 557652.5 / 4663434.8		Water Depth: 17m
Depth of Sample Stratum: 17 - 22m		Vessel Name/Type: ECOSSE
Time (Hypack Target Time): 13:25:18		Date: 5 Sept. 2015
Weather Conditions: Winds 10 - 12 kn S-SW, seas 1 - 2 ft.		
Collected by: CT,MK,JM		
Sample Collection device (Note modifications made during sampling):		Rossfelder P3
HDOP = 1.0	Start 13:26:10	Started logging at top of WC
SATS = 8	End 13:32:10	
Differential		
000A1325.RAW		

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

Hard layer - significant horizon at 2 - 3m (see chirp data)

Amps = 7 steady

Six minute vibe

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

First sample taken from bottom of core was geotech.

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number:	VC-43	Core Penetration Length: 2.8 m	
Sample Type: Vibracore		'Recovered Core Length: 2.15 m	
Described By: CT		Date Sampled:	5-Sep-15

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0.00	-0.50	**VC-43-GT3**	**geotech**	liner
-0.50	-0.60	**VC-43-EN2**	**environmental**	liner
-0.60	-0.75	**VC-43-TR2**	**thermal**	liner
-0.75	-1.25	**VC-43-GT2**	**geotech**	liner
-1.25	-1.35	**VC-43-EN1**	**environmental**	liner
-1.35	-1.50	**VC-43-TR1**	**thermal**	liner
-1.50	-2.00	**VC-43-GT1**	**geotech**	liner
-2.00	-2.15	**VC-43Nose**	**core nose**	bag

Live Organisms Present	Y / (N)	
Oil Present	Y / (N)	
Odor Present	(Y) / N	Strong
Debris Present	Y / N	
Within 10% of Required Core Length	Y / (N)	
Photo	(Y) / N	

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

Top of nose cone and GT1

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC43 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT3)										
	Very soft clay / silt with traces of fine sand Strong odour, highly saturated Disturbed with mussels present PP = N/A TV = N/A	Olive grey	10								
	0.75m - Top of GT2 Soft clay / silt with trace fine sand	Olive grey									
1m	PP = 0.01 TSF TV = 0.05 TSF Faint odour										
	1.50m - Top of GT1 Medium to coarse sand with fine gravel ~5% PP = >0.281 TSF TV = 0.05 TSF	Olive grey									
2m											
	2.0m - Core nose Lost most of sample Coarse sand with some fine - medium sand	Olive grey									
3m											
4m											
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC67	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 558831.5 / 4664652.8		Water Depth: 15m
Depth of Sample Stratum: 15 - 20m		Vessel Name/Type: ECOSSE
Time (Hypack Target Time): 09:40:03		Date: 5 Sept. 2015
Weather Conditions: Winds 10 - 12 kn, seas 2 - 3 ft.		
Collected by: CT,MK,JM		
Sample Collection device (Note modifications made during sampling):		Rossfelder P3
HDOP = 0.9	Start 09:41:50	Started logging at top of WC
SATS = 10	End 09:46:50	
Differential		
000_0940.RAW		

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

Hard bottom - G;acial sediments? (sand on SSS)

Five minutes of vibrating

~ 3m of penetration

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number:	VC-67	Core Penetration Length: 3 m	
Sample Type: Vibracore		'Recovered Core Length: 2.03 m	
Described By: CT		Date Sampled:	5-Sep-15

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0.00	-0.68	**VC-67-GT2**	**geotech**	liner
-0.68	-0.78	**VC-67-EN2**	**environmental**	liner
-0.78	-0.93	**VC-67-TR2**	**thermal**	liner
-0.93	-1.63	**VC-67-GT1**	**geotech**	liner
-1.63	-1.73	**VC-67-EN1**	**environmental**	liner
-1.73	-1.88	**VC-67-TR1**	**thermal**	liner
-1.88	-2.03	**VC-67Nose**	**core nose**	bag

Live Organisms Present	Y / (N)
Oil Present	Y / (N)
Odor Present	Y / (N)
Debris Present	Y / N
Within 10% of Required Core Length	Y / N
Photo	Y / (N)

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC67 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT2)										
	Fine to coarse grain sand, loosely packed. ~20% clay / silt, mixed sediment with high water Medium to coarse sand is brown - black in colour Shell fragments, <5% organics PP = <0.031 TSF	Olive grey	5	5							
	TV = 0.15 TSF										
1m	0.93m - Top of GT1	Olive grey									
	Fine sand, medium density PP = 0.250 TSF TV = <0.01 TSF										
	1.88m - Core nose	Olive grey									
2m	Fine sand with medium to dense sand										
3m											
4m											
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC68	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 557652.5 / 4663434.8		Water Depth: 14.5m
Depth of Sample Stratum: 14.5-19.5m		Vessel Name/Type: ECOSSE
Time (Hypack Target Time): 12:25:32		Date: 5 Sept. 2015
Weather Conditions: Winds 10 - 12 kn S-SW, seas 1 - 2 ft.		
Collected by: CT,MK,JM		
Sample Collection device (Note modifications made during sampling):		Rossfelder P3
HDOP = 1.4	Start 12:26:15	Started logging at top of WC
SATS = 8	End 12:30:15	
Differential		
000A1225.RAW		

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

Four minute vibe.

First sample from bottom of core was geotech (GT1).

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number:	VC-68	Core Penetration Length: 4 m	
Sample Type: Vibracore		'Recovered Core Length: 2.98 m	
Described By:	CT	Date Sampled:	5-Sep-15

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0.00	-0.38	VC-68-GT4	geotech	liner
-0.38	-0.48	VC-68-EN3	environmental	liner
-0.48	-0.63	VC-68-TR3	thermal	liner
-0.63	-1.13	VC-68-GT3	geotech	liner
-1.13	-1.23	VC-68-EN2	environmental	liner
-1.23	-1.38	VC-68-TR2	thermal	liner
-1.38	-2.08	VC-68-GT2	geotech	liner
-2.08	-2.18	VC-68-EN1	environmental	liner
-2.18	-2.33	VC-68-TR1	thermal	liner
-2.33	-2.83	VC-68-GT1	geotech	liner
-2.83	-2.98	VC-68Nose	core nose	bag

Live Organisms Present	(Y) / N	Mussels
Oil Present	Y / (N)	
Odor Present	(Y) / N	Faint
Debris Present	Y / N	
Within 10% of Required Core Length	Y / N	
Photo	Y / (N)	

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC68 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT4)										
	Few mussels Highly saturated and disturbed Mixed sediments with very soft clay / silts and fine sand PP = N/A TV = N/A	Olive grey	10								
	0.63m - Top of GT3 Fine sand of medium density with faint odour High water content	Olive grey									
1m	PP = 0.219 TSF										
	TV = 0.03 TSF 1.38m - Top of GT2 Soft clay / silt with fine sand ~50-50%	Olive grey									
	PP = 0.5 TSF TV = 0.07 TSF Higher water content										
2m											
	2.33m - Top of GT1 Fine sand of medium density Low water content	Olive grey	<1								
	PP = 0.5 TSF TV = 0.50 TSF 2.83m - Core nose	Olive grey	<1	2							
3m	Medium density fine sand with shell fragments ~10% Silt with wood fragments of ~1 in. Medium sand at top of core nose										
4m											
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC69	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 556170.5 / 4662041.1		Water Depth: 13.5m
Depth of Sample Stratum: 13.5-18.5m		Vessel Name/Type: ECOSSE
Time (Hypack Target Time): 14:02:46		Date: 8 Sept. 2015
Weather Conditions: Calm		
Collected by: CT,MK,JM		

Sample Collection device (Note modifications made during sampling): Rossfelder P3

HDOP = 1.0 Start 14:04:20 Started logging at top of WC

SATS = 7 End 14:05:34

Differential

000_1402.RAW

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

Soft

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number:	VC-69	Core Penetration Length: 4.7m	
Sample Type: Vibracore		Recovered Core Length: 3.22m	
Described By:	CT	Date Sampled:	6-Sep-15

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0.00	-1.02	**VC-69-GT3**	**geotech**	liner
-1.02	-1.12	**VC-69-EN3**	**environmental**	liner
-1.12	-1.27	**VC-69-TR3**	**thermal**	liner
-1.27	-1.87	**VC-69-GT2**	**geotech**	liner
-1.87	-1.97	**VC-69-EN2**	**environmental**	liner
-1.97	-2.12	**VC-69-TR2**	**thermal**	liner
-2.12	-2.82	**VC-69-GT1**	**geotech**	liner
-2.82	-2.92	**VC-69-EN1**	**environmental**	liner
-2.92	-3.07	**VC-69-TR1**	**thermal**	liner
-3.07	-3.22	**VC-69 Nose**	**core nose**	bag

Live Organisms Present	Y / (N)	
Oil Present	Y / (N)	
Odor Present	(Y) / N	Faint
Debris Present	Y / N	
Within 10% of Required Core Length	Y / N	
Photo	Y / (N)	

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC69 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT3)										
	Fine sand with shell fragments Well drained loose sand PP = N/A TV = N/A	Olive grey	10								
1m											
	1.27m - Top of GT2 Fine sand with traces of silt. Trace organics and shells	Olive grey	1	1							
	Highly saturated and poorly drained PP = 0.094 TSF TV = 0.05 TSF										
2m											
	2.12m - Top of GT1 Soft clay / silt with trace shell fragments PP = 0.125 TSF TV = 0.20 TSF	Olive grey	<1								
3m											
	3.07m - Core nose Soft clay / silt	Olive grey									
4m											
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC70	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 554763.4 / 4660644.1		Water Depth: 13m
Depth of Sample Stratum: 13 - 18m		Vessel Name/Type: ECOSSE
Time (Hypack Target Time): 14:02:46		Date: 8 Sept. 2015
Weather Conditions: Calm		
Collected by: CT,MK,JM		

Sample Collection device (Note modifications made during sampling): Rossfelder P3

HDOP = 1.3 Start 11:33:30 Started logging at top of WC

SATS = 9 End 11:34:45

Differential

000_1132.RAW

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

Soft

1 minute 15 second

Full penetration

~ 3.0m of sample lost

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

Clay vacuum sucking sample out on retrieval

Nose cone inverted

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number:	VC-70	Core Penetration Length: 4.7 m	
Sample Type: Vibracore		'Recovered Core Length: 2.35 m	
Described By:	CT	Date Sampled:	8-Sep-15

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0.00	-0.45	**VC-70-GT3**	**geotech**	liner
-0.45	-0.55	**VC-70-EN3**	**environmental**	liner
-0.55	-0.70	**VC-70-TR3**	**thermal**	liner
-0.70	-1.20	**VC-70-GT2**	**geotech**	liner
-1.20	-1.30	**VC-70-EN2**	**environmental**	liner
-1.30	-1.45	**VC-70-TR2**	**thermal**	liner
-1.45	-1.95	**VC-70-GT1**	**geotech**	liner
-1.95	-2.05	**VC-70-EN1**	**environmental**	liner
-2.05	-2.20	**VC-70-TR1**	**thermal**	liner
-2.20	-2.35	**VC-70 Nose**	**core nose**	bag

Live Organisms Present	Y / (N)	
Oil Present	Y / (N)	
Odor Present	(Y) / N	Faint
Debris Present	Y / N	
Within 10% of Required Core Length	Y / N	
Photo	Y / (N)	

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC70 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT3)										
	Fine sand with silt Shell fragments and organics present PP = N/A TV = N/A	Olive grey	10	10							
	0.70m - Top of GT2 Fine sand with clay / silt	Olive grey	<5	<5							
1m	Poorly drained with high water content PP = >0.281 TSF TV = 0.05 TSF										
	1.45m - Top of GT1	Olive grey	<1	<1							
	Medium stiff silt with clay High water content, poorly drained Trace shells, organics, and fine sand PP = 0.188 TSF										
2m	TV = 0.10 TSF										
	2.20m - Core nose Soft clay / silt	Olive grey									
3m											
4m											
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC70A	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 554764.1 / 4660635.7		Water Depth: 13m
Depth of Sample Stratum: 13 - 18m		Vessel Name/Type: ECOSSE
Time (Hypack Target Time): 11:32:10		Date: 8 Sept. 2015
Weather Conditions: Winds light, seas calm		
Collected by: CT,MK,JM		
Sample Collection device (Note modifications made during sampling):		Rossfelder P3
HDOP = 0.9	Start 12:34:00	Started logging close to bottom
SATS = 9	End 12:35:25	
Differential		
000_1233.RAW		

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

2nd attempt at VC70 location

Soft bottom, 1 minute 25 seconds for full penetration

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

Nose cone inverted

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number:	VC-70a	Core Penetration Length: 4.7 m	
Sample Type: Vibracore		'Recovered Core Length: 3.25 m	
Described By:	CT	Date Sampled:	8-Sep-15

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0.00	-0.10	**VC-70a-EN4**	**environmental**	liner
-0.10	-0.25	**VC-70a-TR4**	**thermal**	liner
-0.25	-0.95	**VC-70a-GT3**	**geotech**	liner
-0.95	-1.05	**VC-70a-EN3**	**environmental**	liner
-1.05	-1.20	**VC-70a-TR3**	**thermal**	liner
-1.20	-1.90	**VC-70a-GT2**	**geotech**	liner
-1.90	-2.00	**VC-70a-EN2**	**environmental**	liner
-2.00	-2.15	**VC-70a-TR2**	**thermal**	liner
-2.15	-2.85	**VC-70a-GT1**	**geotech**	liner
-2.85	-2.95	**VC-70a-EN1**	**environmental**	liner
-2.95	-3.10	**VC-70a-TR1**	**thermal**	liner
-3.10	-3.25	**VC-70a Nose**	**core nose**	bag

Live Organisms Present	Y / (N)
Oil Present	Y / (N)
Odor Present	(Y) / N
Debris Present	Y / N
Within 10% of Required Core Length	Y / N
Photo	Y / (N)

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC70A | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of EN4)										
	Very soft clay with fine sand and shell fragments	Dark grey	<5	<5							
	0.25m - Top of GT3 Soft clay with silt. 50% clay 50% silt Highly saturated and poorly drained	Olive grey	<5	<5							
	Trace fine sand and organics PP = N/A TV = N/A										
1m											
	1.20m - Top of GT2 Medium stiff clay with trace shell and organics Highly saturated and poorly drained	Olive grey	<1	<5							
	PP = 0.063 TSF TV = 0.02 TSF										
2m											
	2.15m - Top of GT1 Medium stiff silt with clay Poorly drained, high water content PP = 0.219 TSF	Olive grey									
	TV = 0.10 TSF										
3m											
	3.10m - Core nose Soft clay with silt	Olive grey									
4m											
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC71	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 553349.1 / 4659249.9		Water Depth: 13.5m
Depth of Sample Stratum: 13.5-18.5m		Vessel Name/Type: ECOSSE
Time (Hypack Target Time): 12:37:28		Date: 7 Sep. 2015
Weather Conditions: Winds 10 kn SW-W, Seas 1 - 2 ft.		
Collected by: CT,MK,JM		
Sample Collection device (Note modifications made during sampling):		Rossfelder P3
HDOP = 0.9	Start 12:38:15	Started logging at top of WC.
SATS = 9	End 12:40:00	
Differential		
000_1237.RAW		

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

Much softer bottom than 72,73 -->76

1 minute 45 seconds for full penetration

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

Only 2m recovered

Had to do second core (VC71A)

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number:	VC-71	Core Penetration Length: 4.7 m	
Sample Type: Vibracore		'Recovered Core Length: 1.93 m	
Described By:	CT	Date Sampled:	7-Sep-15

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0.00	-0.58	**VC-71-GT2**	**geotech**	liner
-0.58	-0.68	**VC-71-EN2**	**environmental**	liner
-0.68	-0.83	**VC-71-TR2**	**thermal**	liner
-0.83	-1.53	**VC-71-GT1**	**geotech**	liner
-1.53	-1.63	**VC-71-EN1**	**environmental**	liner
-1.63	-1.78	**VC-71-TR1**	**thermal**	liner
-1.78	-1.93	**LOST**	**core nose**	bag

Live Organisms Present	Y / (N)
Oil Present	Y / (N)
Odor Present	Y / (N)
Debris Present	Y / (N)
Within 10% of Required Core Length	Y / N
Photo	Y / (N)

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC71 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT2)										
	Fine sand with fine gravel and shell fragments Disturbed Well drained and loose sand PP = N/A TV = N/A	Olive grey	5								
	0.83m - Top of GT1	Olive grey									
1m	Medium stiff silt with clay PP = 0.109 TSF TV = 0.15 TSF										
	1.78m - Core nose Soft silt with clay	Olive grey									
2m	Lost 3m of core - See VC71A										
3m											
4m											
	4.34m - Core nose Very soft clay from touchdown on lake floor during retrieval	Olive grey									
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC71A	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 553349.1 / 4659249.9		Water Depth: 13.5m
Depth of Sample Stratum: 13.5-18.5m		Vessel Name/Type: ECOSSE
Time (Hypack Target Time): 13:19:52		Date: 7 Sep. 2015
Weather Conditions: Winds 10 kn SW-W, Seas 1 - 2 ft.		
Collected by: CT,MK,JM		
Sample Collection device (Note modifications made during sampling):		Rossfelder P3
HDOP = 1.0	Start 13:20:55	Started logging at 5m deep
SATS = 8	End 13:22:10	
Differential		
000_1319.RAW		

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

Soft

Recore of VC71

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

Lost 2m of core

~3m recovered

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number:	VC-71A	Core Penetration Length: 4.7 m	
Sample Type: Vibracore		'Recovered Core Length: 2.74 m	
Described By:	CT	Date Sampled:	7-Sep-15

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0.00	-0.64	**VC-71A-GT3**	**geotech**	liner
-0.64	-0.74	**VC-71A-EN3**	**environmental**	liner
-0.74	-0.89	**VC-71A-TR3**	**thermal**	liner
-0.89	-1.39	**VC-71A-GT2**	**geotech**	liner
-1.39	-1.49	**VC-71A-EN2**	**environmental**	liner
-1.49	-1.64	**VC-71A-TR2**	**thermal**	liner
-1.64	-2.34	**VC-71A-GT1**	**geotech**	liner
-2.34	-2.44	**VC-71A-EN1**	**environmental**	liner
-2.44	-2.59	**VC-71A-TR1**	**thermal**	liner
-2.59	-2.74	**VC-71ANose**	**core nose**	bag

Live Organisms Present	Y / (N)	
Oil Present	Y / (N)	
Odor Present	(Y) / N	Faint
Debris Present	Y / (N)	
Within 10% of Required Core Length	Y / N	
Photo	Y / (N)	

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC71A | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT3)										
	Fine sand with shell fragments Loose sand, trace organics, well drained Disturbed PP = N/A TV = N/A	Dark grey		<1							
	0.89m - Top of GT2	Olive grey		<5							
1m	Fine sand with trace organics High water content PP = 0.065 TSF TV = 0.15 TSF										
	1.64m - Top of GT1 Soft silt with clay. Higher water content PP = 0.063 TSF	Olive grey	<1								
2m	TV = 0.15 TSF										
	2.59m - Core nose Soft silt with clay	Olive grey									
3m											
4m											
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC72	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 551897.2 / 4657857.2		Water Depth: 13m
Depth of Sample Stratum: 13 - 18m		Vessel Name/Type: ECOSSE
Time (Hypack Target Time): 11:16:57		Date: 7 Sep. 2015
Weather Conditions: Winds 10 kn SW-W, Seas 1 - 2 ft.		
Collected by: CT,MK,JM		
Sample Collection device (Note modifications made during sampling):		Rossfelder P3
HDOP = 1.0	Start 11:17:40	Started logging at top of WC.
SATS = 10	End 11:20:10	
Differential		
000_1116.RAW		

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

2 minute 30 second vibe

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number:	VC-72	Core Penetration Length: 4 m	
Sample Type: Vibracore		'Recovered Core Length: 3.12 m	
Described By:	CT	Date Sampled:	7-Sep-15

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0.00	-0.82	**VC-72-GT3**	**geotech**	liner
-0.82	-0.92	**VC-72-EN3**	**environmental**	liner
-0.92	-1.07	**VC-72-TR3**	**thermal**	liner
-1.07	-1.77	**VC-72-GT2**	**geotech**	liner
-1.77	-1.87	**VC-72-EN2**	**environmental**	liner
-1.87	-2.02	**VC-72-TR2**	**thermal**	liner
-2.02	-2.72	**VC-72-GT1**	**geotech**	liner
-2.72	-2.82	**VC-72-EN1**	**environmental**	liner
-2.82	-2.97	**VC-72-TR1**	**thermal**	liner
-2.97	-3.12	**VC-72Nose**	**core nose**	bag

Live Organisms Present	(Y) / N	Mussels
Oil Present	Y / (N)	
Odor Present	(Y) / N	Faint
Debris Present	Y / (N)	
Within 10% of Required Core Length	Y / N	
Photo	Y / (N)	

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC72 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT3)										
	Fine to medium sand with clay / silt 70% sand and 30% clay High water content Disturbed Trace fine gravel	Olive grey	5								
	PP = N/A TV = N/A										
1m											
	1.07m - Top of GT2 Medium stiff silt with clay High water content Trace fine sand PP = 0.5 TSF	Olive grey	<1								
	TV = 0.15 TSF										
2m											
	2.02m - Top of GT1 Medium stiff clay / silt with fine sand 70% clay and 30% sand ~ <1% shell PP = 0.188 TSF	Olive grey	<1								
	TV = 0.25 TSF										
3m	2.97m - Core nose	Dark grey	10								
	Fine sand with shell fragments Some clay / silt Loose sand Lost most of sample										
4m											
	4.34m - Core nose Very soft clay from touchdown on lake floor during retrieval	Olive grey									
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC73	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 550478.5 / 4656432.1		Water Depth: 13m
Depth of Sample Stratum: 13 - 18m		Vessel Name/Type: ECOSSE
Time (Hypack Target Time): 14:02:34		Date: 6 Sept. 2015
Weather Conditions: Winds 5 kn W, seas < 1ft.		
Collected by: CT,MK,JM		
Sample Collection device (Note modifications made during sampling):		Rossfelder P3
HDOP = 1.0	Start 14:03:30	Started logging at top of WC
SATS = 7	End 14:07:00	
Differential		
000_1402.RAW		

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

3.5 minute vibe

Looks like full penetration

VC touchdown on retrieval

Nose cone material possibly from lake floor

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

Full penetration

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number:	VC-73	Core Penetration Length: 4.7 m	
Sample Type: Vibracore		'Recovered Core Length: 4.49 m	
Described By:	CT	Date Sampled:	6-Sep-15

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0.00	-0.49	**VC-73-GT5**	**geotech**	liner
-0.49	-0.59	**VC-73-EN5**	**environmental**	liner
-0.59	-0.74	**VC-73-TR5**	**thermal**	liner
-0.74	-1.24	**VC-73-GT4**	**geotech**	liner
-1.24	-1.34	**VC-73-EN4**	**environmental**	liner
-1.34	-1.49	**VC-73-TR4**	**thermal**	liner
-1.49	-2.19	**VC-73-GT3**	**geotech**	liner
-2.19	-2.29	**VC-73-EN3**	**environmental**	liner
-2.29	-2.44	**VC-73-TR3**	**thermal**	liner
-2.44	-3.14	**VC-73-GT2**	**geotech**	liner
-3.14	-3.24	**VC-73-EN2**	**environmental**	liner
-3.24	-3.39	**VC-73-TR2**	**thermal**	liner
-3.39	-4.09	**VC-73-GT1**	**geotech**	liner
-4.09	-4.19	**VC-73-EN1**	**environmental**	liner
-4.19	-4.34	**VC-73-TR1**	**thermal**	liner
-4.34	-4.49	**VC-73 Nose**	**core nose**	bag

Live Organisms Present	Y / (N)	
Oil Present	Y / (N)	
Odor Present	(Y) / N	Faint
Debris Present	Y / (N)	
Within 10% of Required Core Length	Y / N	
Photo	Y / (N)	

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC73 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT5)										
	Fine sand with clay / silt (50 -50%) Disturbed and highly saturated ~10% shell fragments present PP = N/A TV = N/A	Dark grey	10								
	0.74m - Top of GT4 Fine sand with clay / silt	Olive grey	5								
1m	~60% sand and 40% clay and ~5% shell fragments PP = 0.5 TSF TV = 0.15 TSF										
	1.49m - Top of GT3	Olive grey	5								
	Fine sand with ~5% shell fragments Well drained with low water content PP = 1.5 TSF TV = 0.10 TSF										
2m											
	2.44m - Top of GT2	Olive grey	1								
	Fine sand with clay / silt ~70% sand and 30% clay with ~1% shell fragments PP = 0.188 TSF TV = 0.20										
3m											
	3.39m - Top of GT1 Medium stiff clay with trace fine to medium sand	Olive grey									
	PP = 0.031 TSF TV = 0.25 TSF										
4m											
	4.34m - Core nose Very soft clay from touchdown on lake floor during retrieval	Olive grey									
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC74	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 549398.5 / 4655289.2		Water Depth: 13m
Depth of Sample Stratum: 13 -18m		Vessel Name/Type: ECOSSE
Time (Hypack Target Time): 12:49:15		Date: 6 Sept. 2015
Weather Conditions: Winds 5 kn W, seas < 1ft.		
Collected by: CT,MK,JM		
Sample Collection device (Note modifications made during sampling):		Rossfelder P3
HDOP = 1.0	Start 12:50:15	Started logging at top of WC
SATS = 9	End 12:55:15	
Differential		
000_1249.RAW		

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

Easy penetration for first 2 - 3m

Hard layer at ~ 3m - see chirp, Amps reached 8-9

Five minute vibe

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number:	VC-74	Core Penetration Length: 4.15 m	
Sample Type: Vibracore		'Recovered Core Length: 4.14 m	
Described By:	CT	Date Sampled:	6-Sep-15

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0.00	-0.89	**VC-74-GT4**	**geotech**	liner
-0.89	-0.99	**VC-74-EN4**	**environmental**	liner
-0.99	-1.14	**VC-74-TR4**	**thermal**	liner
-1.14	-1.84	**VC-74-GT3**	**geotech**	liner
-1.84	-1.94	**VC-74-EN3**	**environmental**	liner
-1.94	-2.09	**VC-74-TR3**	**thermal**	liner
-2.09	-2.79	**VC-74-GT2**	**geotech**	liner
-2.79	-2.89	**VC-74-EN2**	**environmental**	liner
-2.89	-3.04	**VC-74-TR2**	**thermal**	liner
-3.04	-3.74	**VC-74-GT1**	**geotech**	liner
-3.74	-3.84	**VC-74-EN1**	**environmental**	liner
-3.84	-3.99	**VC-74-TR1**	**thermal**	liner
-3.99	-4.14	**VC-74 Nose**	**core nose**	bag

Live Organisms Present	Y / (N)	
Oil Present	Y / (N)	
Odor Present	(Y) / N	Faint
Debris Present	Y / (N)	
Within 10% of Required Core Length	Y / N	
Photo	Y / (N)	

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC74 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT4)										
	Soft clay / silt with fine sand ~ 50% clay and 50% sand High water content Disturbed with ~1% shell fragments PP = N/A	Dark grey	1								
	TV = N/A										
1m											
	1.14m - Top of GT3 Medium stiff clay / silt with fine sand ~ 60% clay / silt and 40% sand Trace medium sand with shell fragments Higher wate content	Olive grey	1								
	PP = 0.266 TSF TV = 0.20 TSF										
2m											
	2.09m - Top of GT2 Stiff clay with trace fine to medium sand PP = 3.0 TSF TV = 0.60 TSF	Olive grey									
3m											
	3.04m - Top of GT1 Stiff clay with trace fine to medium sand PP = 3.0 TSF TV = 0.60 TSF	Olive grey									
4m	3.99m - Core nose	Olive grey									
	Medium stiff clay / silt with fine gravel ~10% gravel Limited cohesiveness										
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC75	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 548851.8 / 4654487.9		Water Depth: 12.5m
Depth of Sample Stratum: 12.5-17.5m		Vessel Name/Type: ECOSSE
Time (Hypack Target Time): 11:29:40		Date: 6 Sept. 2015
Weather Conditions: Winds 10 kn SW, seas < 1ft.		
Collected by: CT,MK,JM		
Sample Collection device (Note modifications made during sampling):		Rossfelder P3
HDOP = 1.4	Start 11:30:35	Started logging at top of WC
SATS = 8	End 11:34:35	
Differential		
000_1129.RAW		

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

Hard layer at ~2.5m - Amps 8-9

4 minute vibe with 4 - 5m penetration

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

Nose cone inverted

Nose cone stuck. Took 30 minutes to remove

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number:	VC-75	Core Penetration Length: 4.6 m	
Sample Type: Vibracore		'Recovered Core Length: 4.18 m	
Described By:	CT	Date Sampled:	6-Sep-15

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0.00	-0.93	**VC-75-GT4**	**geotech**	liner
-0.93	-1.03	**VC-75-EN4**	**environmental**	liner
-1.03	-1.18	**VC-75-TR4**	**thermal**	liner
-1.18	-1.88	**VC-75-GT3**	**geotech**	liner
-1.88	-1.98	**VC-75-EN3**	**environmental**	liner
-1.98	-2.13	**VC-75-TR3**	**thermal**	liner
-2.13	-2.83	**VC-75-GT2**	**geotech**	liner
-2.83	-2.93	**VC-75-EN2**	**environmental**	liner
-2.93	-3.08	**VC-75-TR2**	**thermal**	liner
-3.08	-3.78	**VC-75-GT1**	**geotech**	liner
-3.78	-3.88	**VC-75-EN1**	**environmental**	liner
-3.88	-4.03	**VC-75-TR1**	**thermal**	liner
-4.03	-4.18	**VC-75Nose**	**core nose**	bag

Live Organisms Present	Y / (N)	
Oil Present	Y / (N)	
Odor Present	(Y) / N	Faint
Debris Present	Y / (N)	
Within 10% of Required Core Length	Y / N	
Photo	(Y) / N	

Shell from top of core

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

CSR Sediment Log (Page 3 of 3)

Core Site/Sample Number: VC75 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT4)										
	Fine sand with ~10% clay / silt Loose sand, well drained PP = 0.281 TSF with foot and 0 without foot TV = 0.10 TSF	Olive grey with light brown									
1m											
	1.18m - Top of GT3 Medium stiff clay / silt with trace fien sand ~ 50 -50% clay / sand Shell fragments present PP = 0.5 TSF (Maxed out with foot) TV = 0.15 TSF	Olive grey	1								
2m											
	2.13m - Top of GT2 Medium stiff clay / silt with trace fine sand PP = 0.219 TSF TV = 0.15 TSF	Olive grey									
3m											
	3.08m - Top of GT1 Medium stiff clay with silt and trace fine sand Higher water content PP = 1.0 TSF TV = 0.20 TSF	Olive grey									
4m											
	4.03m - Core nose Medium stiff clay	Olive grey									
5m											
6m											

CSR Field Sample Log (Page 1 of 3)

Project: 1408 LEC	Client: ITC	Location: LAKE ERIE
Site/Sample #: VC76	Sample Type: Vibracore	Duplicate Sample #:
UTM Position: 548872.1 / 4653222.8		Water Depth: 12m
Depth of Sample Stratum: 12 - 17m		Vessel Name/Type: ECOSSE
Time (Hypack Target Time): 10:24:17		Date: 6 Sept. 2015
Weather Conditions: Winds 10 - 15 kn S-SW, seas 2 - 3 ft.		
Collected by: CT,MK,JM		
Sample Collection device (Note modifications made during sampling):		Rossfelder P3
HDOP = 1.4	Start 10:26:00	Started logging at top of WC
SATS = 9	End 10:28:00	
Differential		
000_1024.RAW		

Description of Sampling Procedure (Note possible sample contamination, equipment failure, unusual appearance of sediment integrity, deviations from standard procedures, etc.):

Bedrock at 2 -3m, see chirp data

2 minute vibe

Description of Sample (Note texture, consistency, colour, odour, presence of biota, quantity of recovered sediment by grab sampler, length and appearance of recovered cores):

See Attached Sample Log

Notes

CSR Sediment Log (Page 2 of 3)

Core Site/Sample Number:	VC-76	Core Penetration Length: 2.1 m	
Sample Type: Vibracore		'Recovered Core Length: 1.9 m	
Described By:	CT	Date Sampled:	6-Sep-15

Sample Interval (metres)		Sample ID #	Sample Type	Sample Container
0.00	-0.55	**VC-76-GT2**	**geotech**	liner
-0.55	-0.65	**VC-76-EN2**	**environmental**	liner
-0.65	-0.80	**VC-76-TR2**	**thermal**	liner
-0.80	-1.50	**VC-76-GT1**	**geotech**	liner
-1.50	-1.60	**VC-76-EN1**	**environmental**	liner
-1.60	-1.75	**VC-76-TR1**	**thermal**	liner
-1.75	-1.90	**VC-76 Nose**	**core nose**	bag

Live Organisms Present	Y / (N)	
Oil Present	Y / (N)	
Odor Present	(Y) / N	Faint
Debris Present	Y / N	
Within 10% of Required Core Length	Y / N	
Photo	Y / (N)	

Nominal Core-Barrel Diameter	Estimated Volume
3.0"	0.25 Gal/ft
3.5"	0.33 Gal/ft
(4.0")	0.50 Gal/ft

Liner Type: Soft (Hard)

Vibracorer: (P3) P5 VT6 Other

CSR Sediment Log (Page 3 of 3)

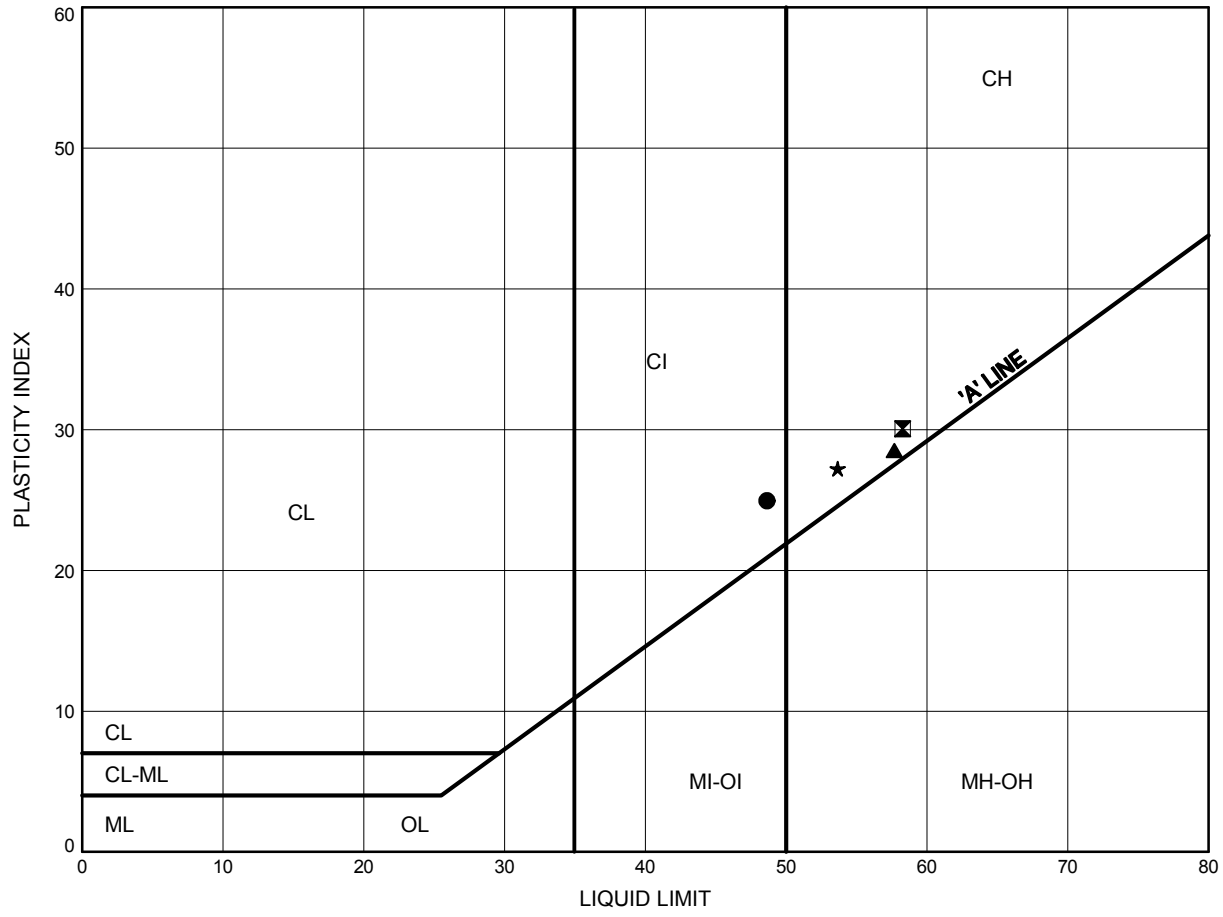
Core Site/Sample Number: VC76 | Sample Type: Vibracore

Depth (m)	SUBSURFACE DESCRIPTION	Physical Characteristics			Stratification Type						
		Colour	%Shell	%Organic	Massive Bed	Laminated	Cross Bed	Inclined Bed	Wavy	Flaser	Lenticular
0m	Lakefloor (Top of GT2)										
	Fine sand with shell fragments disturbed Very loose sand Sand dried quickly PP = N/A TV = N/A	Olive grey	5								
	0.80m - Top of GT1	Olive grey									
1m	Medium stiff clay / silt Higher water content PP = 0.5 TSF (Maxed out when using foot) TV = 0.15 TSF										
	1.75m - Core nose Hard clay	Olive grey									
2m	PP = >4.5 TSF TV = 0.63 TSF										
3m											
4m											
5m											
6m											

Canadian Seabed Research - Laboratory Testing

ATTERBERG LIMITS TEST RESULTS

FIGURE 1



LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	VC-10 GT2	1.50	
⊠	VC-17 GT1	3.00	
▲	VC-17 GT2	2.05	
★	VC-17 GT3	1.10	

Date October 2015

19-6969-0

THURBER

Prep'd EA

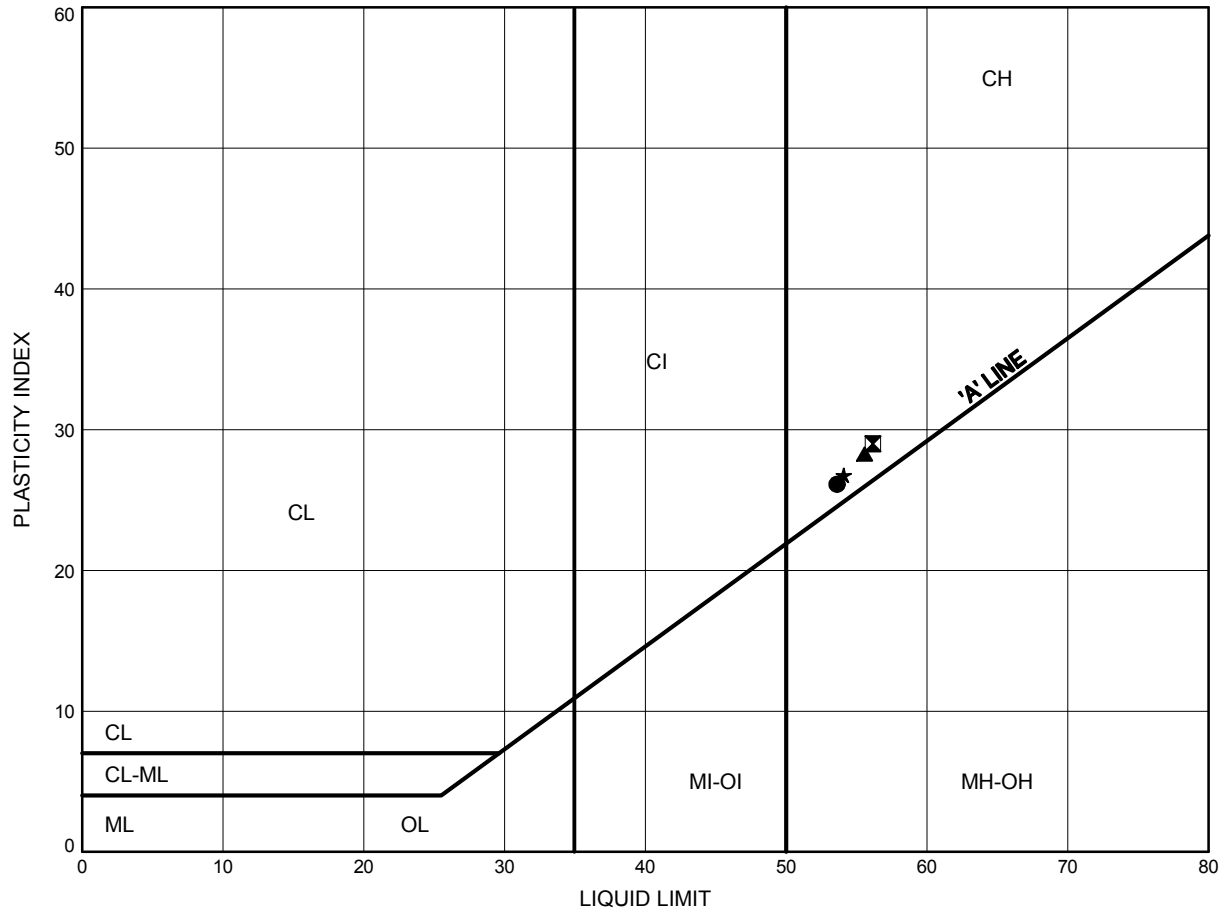
Chkd. WM

THURBALT 19-6969-0.GPJ 10/16/15

Canadian Seabed Research - Laboratory Testing

ATTERBERG LIMITS TEST RESULTS

FIGURE 2



LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	VC-17 GT4	0.35	
⊠	VC-18 GT1	3.30	
▲	VC-18 GT2	2.35	
★	VC-18 GT3	1.40	

Date October 2015

19-6969-0

THURBER

Prep'd EA

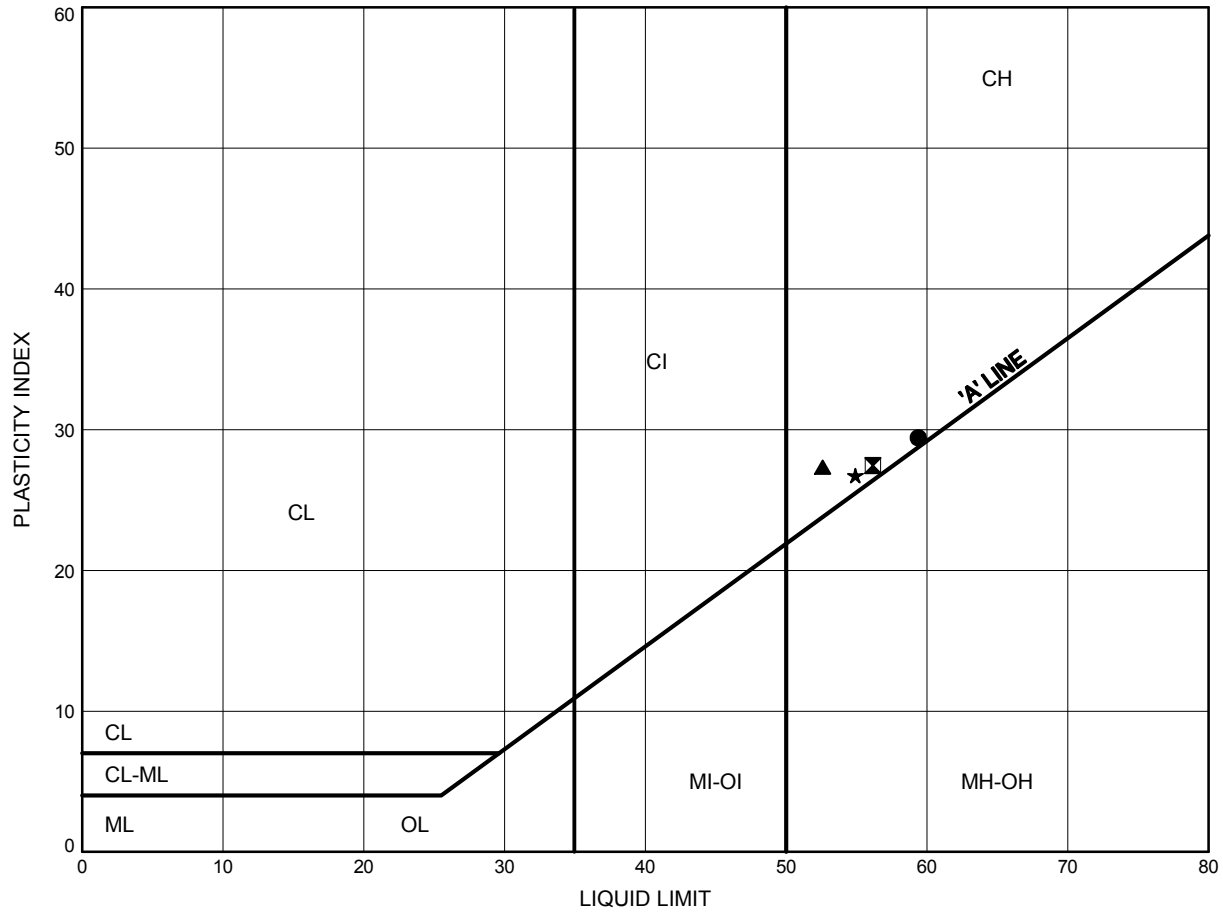
Chkd. WM

THURBALT 19-6969-0.GPJ 10/16/15

Canadian Seabed Research - Laboratory Testing

ATTERBERG LIMITS TEST RESULTS

FIGURE 3



LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	VC-18 GT4	0.40	
⊠	VC-18 NOSE	3.96	
▲	VC-19 GT1	3.15	
★	VC-19 GT2	2.20	

Date October 2015

19-6969-0

THURBER

Prep'd EA

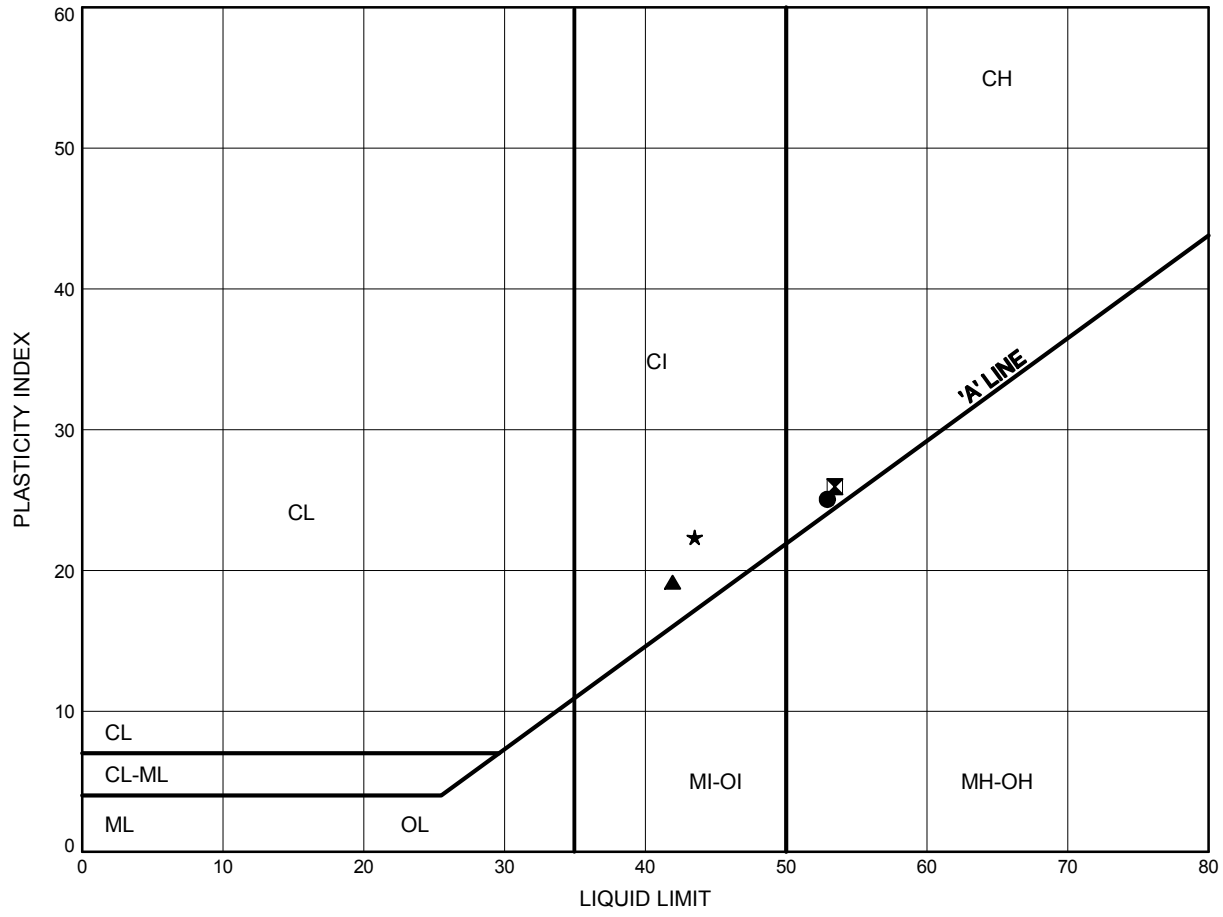
Chkd. WM

THURBALT 19-6969-0.GPJ 10/16/15

Canadian Seabed Research - Laboratory Testing

ATTERBERG LIMITS TEST RESULTS

FIGURE 4



LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	VC-19 GT3	1.35	
⊠	VC-19 NOSE	3.85	
▲	VC-1A GT1	1.79	
★	VC-1A GT2	0.80	

Date October 2015

19-6969-0

THURBER

Prep'd EA

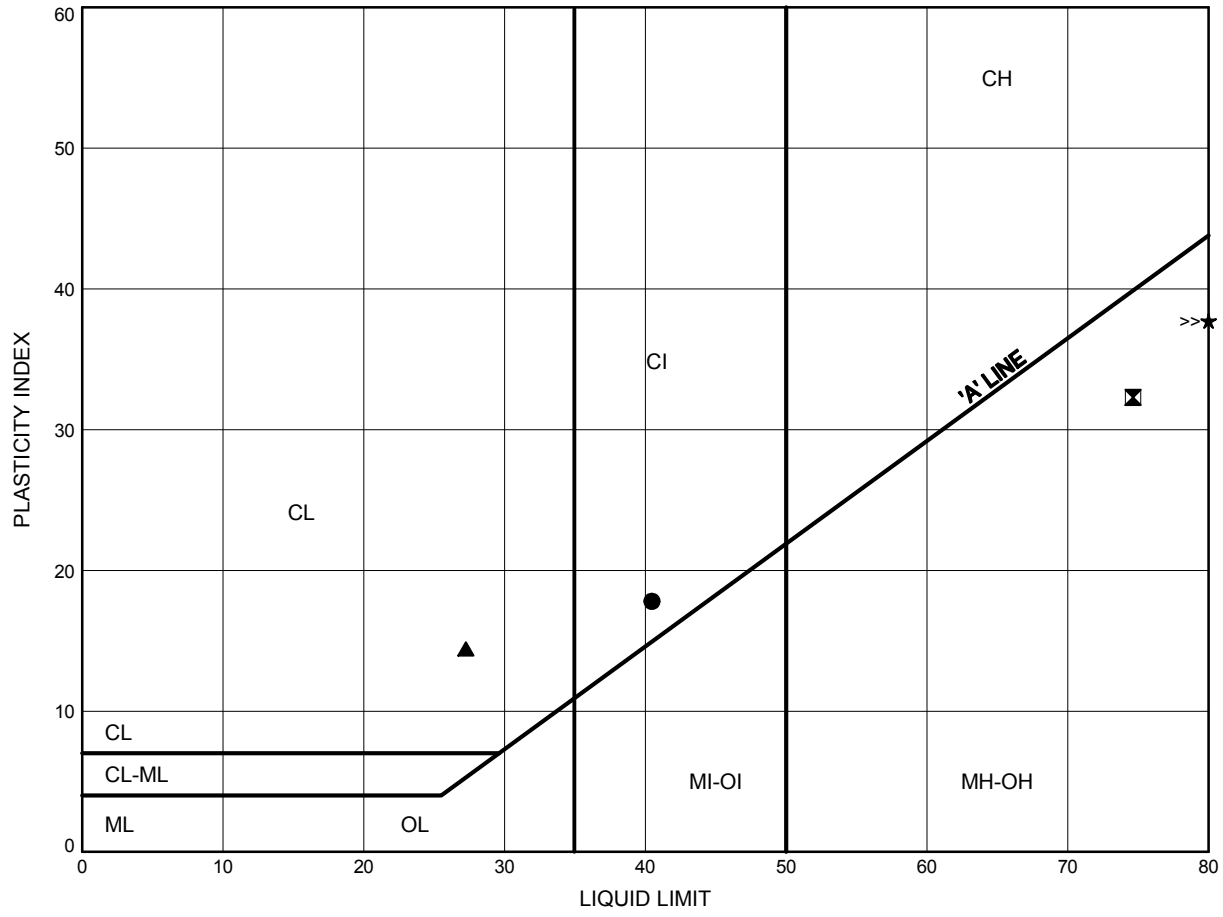
Chkd. WM

THURBALT 19-6969-0.GPJ 10/16/15

Canadian Seabed Research - Laboratory Testing

ATTERBERG LIMITS TEST RESULTS

FIGURE 5



LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	VC-1A GT3	0.09	
⧓	VC-2 GT3	2.06	
▲	VC-2 GT4	1.11	
★	VC-2 GT5	0.26	

Date October 2015

19-6969-0

THURBER

Prep'd EA

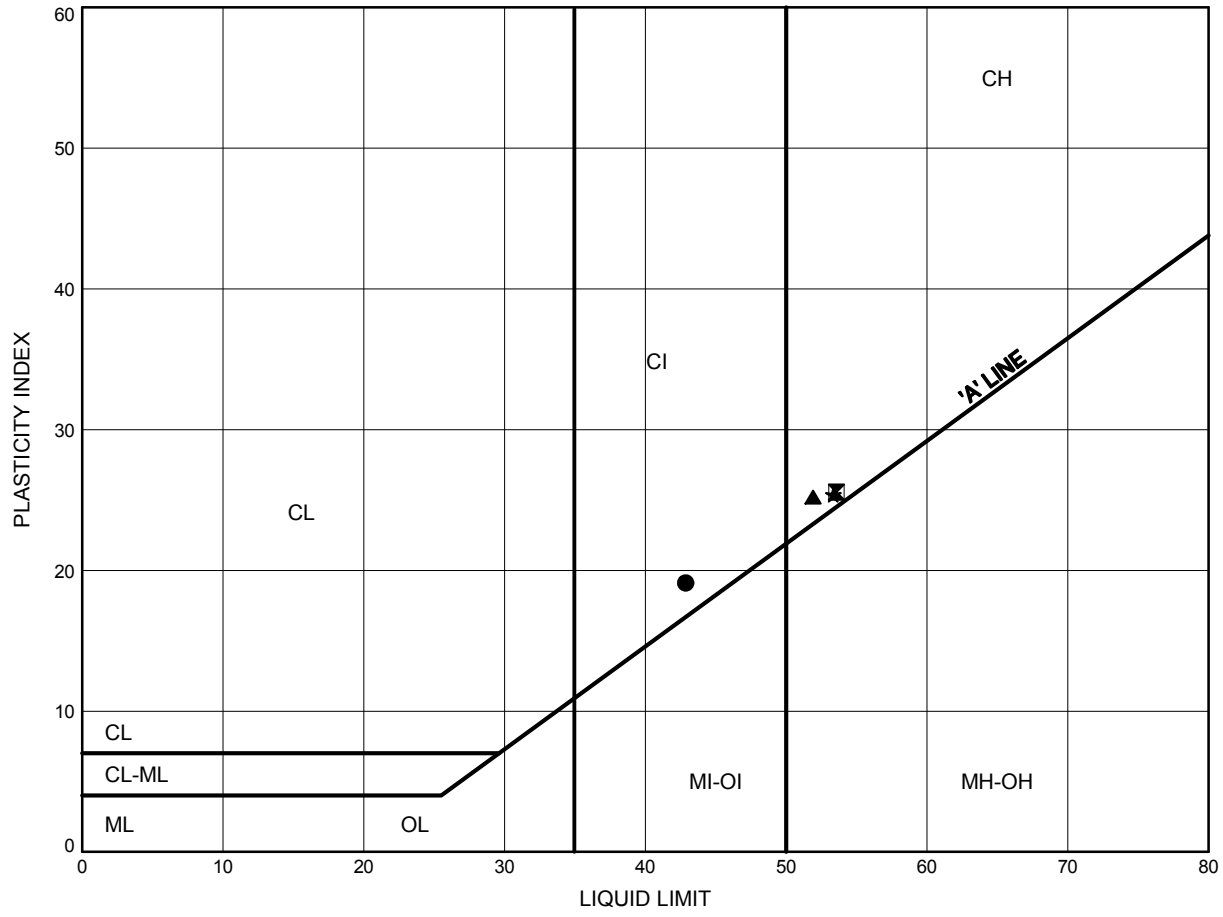
Chkd. WM

THURBALT 19-6969-0.GPJ 10/16/15

Canadian Seabed Research - Laboratory Testing

ATTERBERG LIMITS TEST RESULTS

FIGURE 6



LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	VC-2 NOSE	4.63	
⊠	VC-20 GT1	3.35	
▲	VC-20 GT2	2.40	
★	VC-20 GT3	1.45	

Date October 2015

19-6969-0

THURBER

Prep'd EA

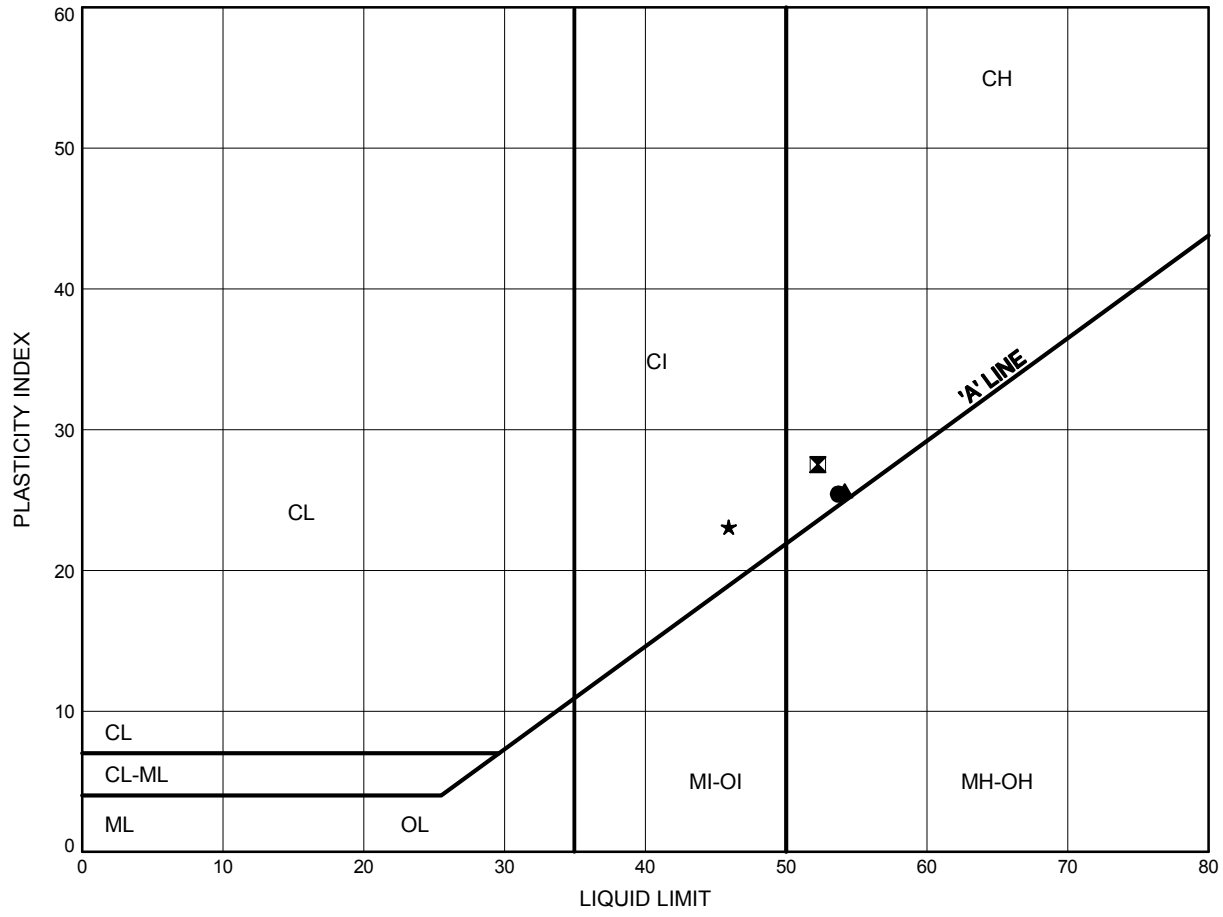
Chkd. WM

THURBALT 19-6969-0.GPJ 10/16/15

Canadian Seabed Research - Laboratory Testing

ATTERBERG LIMITS TEST RESULTS

FIGURE 7



LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	VC-20 GT4	0.42	
⧓	VC-20 NOSE	4.02	
▲	VC-21 GT2	1.25	
★	VC-3 GT1	1.61	

Date October 2015

19-6969-0

THURBER

Prep'd EA

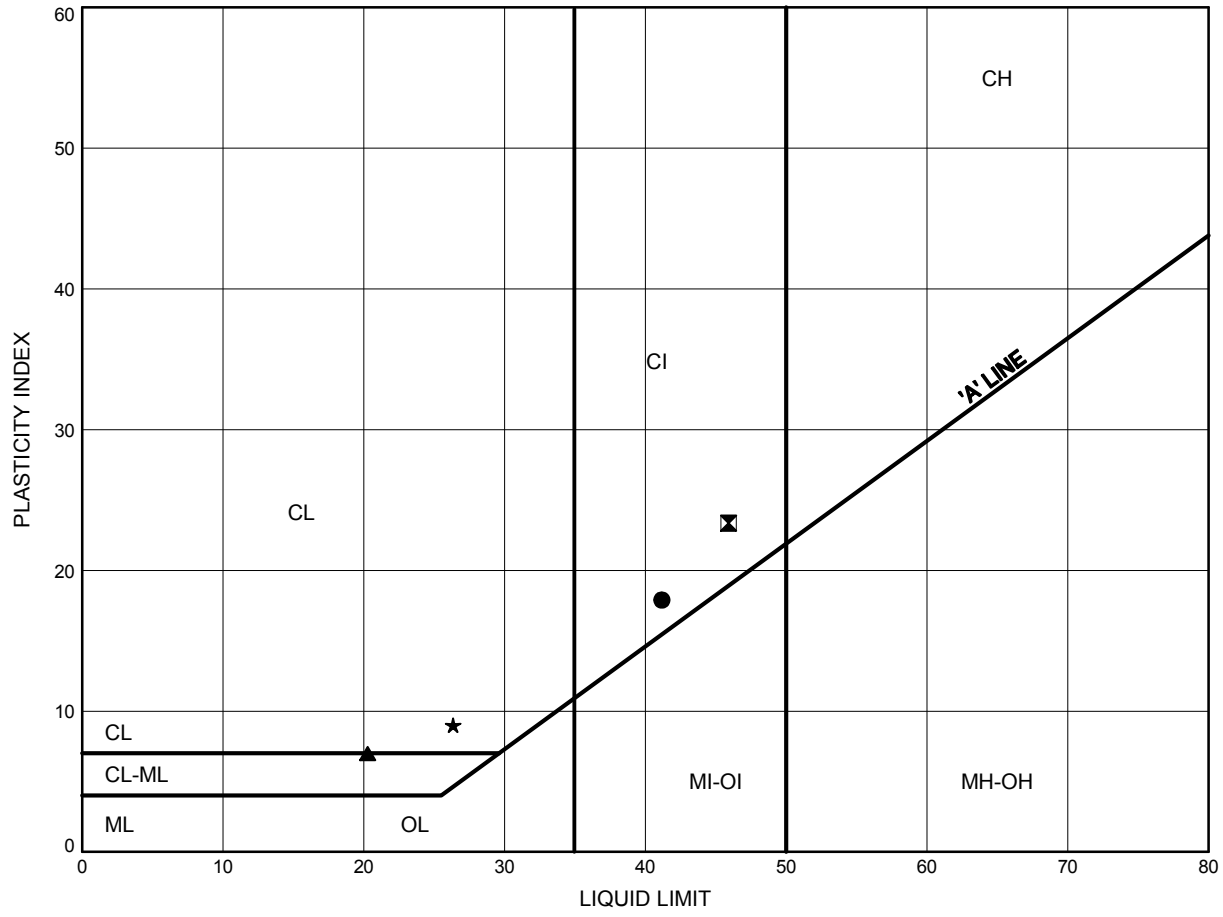
Chkd. WM

THURBALT 19-6969-0.GPJ 10/16/15

Canadian Seabed Research - Laboratory Testing

ATTERBERG LIMITS TEST RESULTS

FIGURE 8



LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	VC-3 GT2	0.84	
⊠	VC-3 NOSE	2.23	
▲	VC-4 GT2	2.01	
★	VC-4 GT4	0.33	

Date October 2015

19-6969-0

THURBER

Prep'd EA

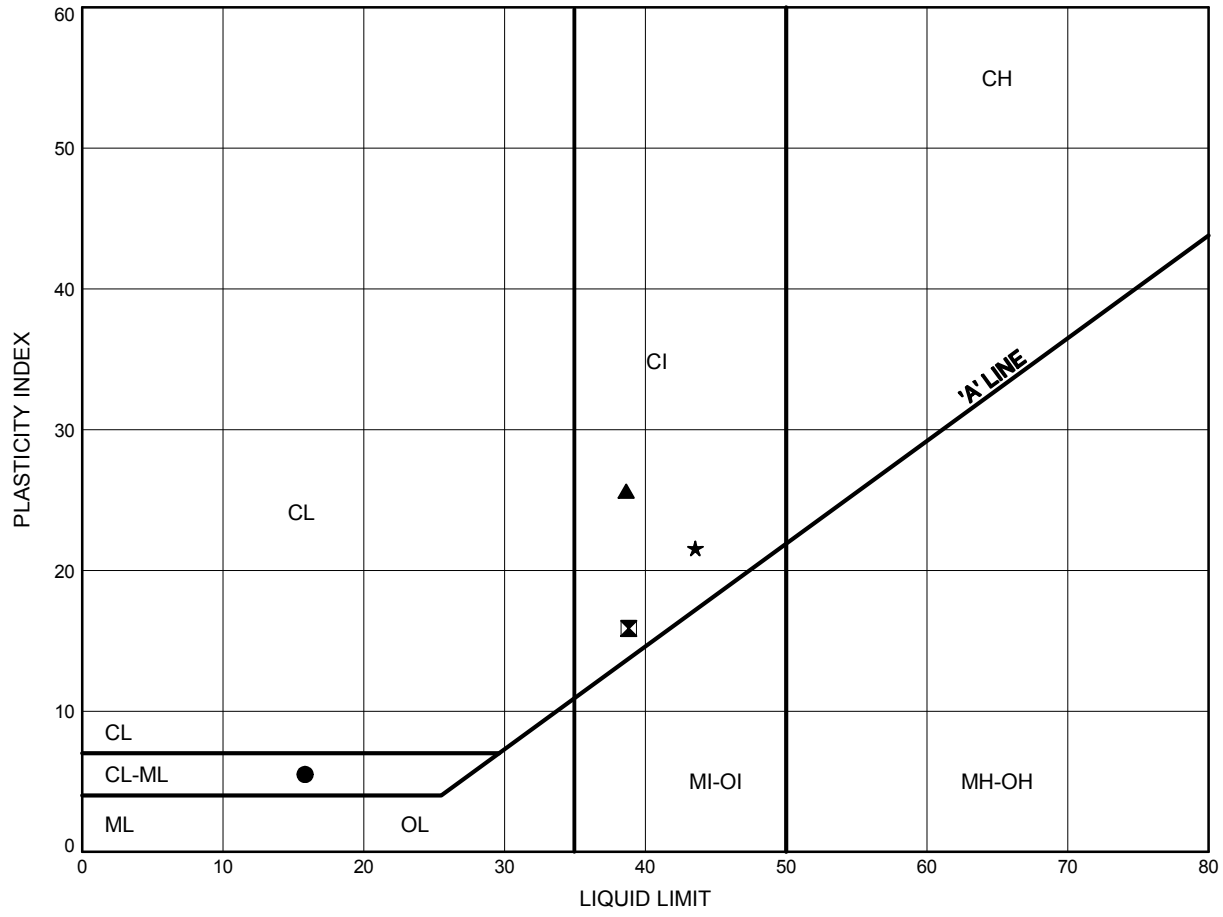
Chkd. WM

THURBALT 19-6969-0.GPJ 10/16/15

Canadian Seabed Research - Laboratory Testing

ATTERBERG LIMITS TEST RESULTS

FIGURE 9



LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	VC-44 GT1	2.74	
⊠	VC-45 GT1	0.91	
▲	VC-45 GT2	0.20	
★	VC-45 NOSE	1.53	

Date October 2015

19-6969-0

THURBER

Prep'd EA

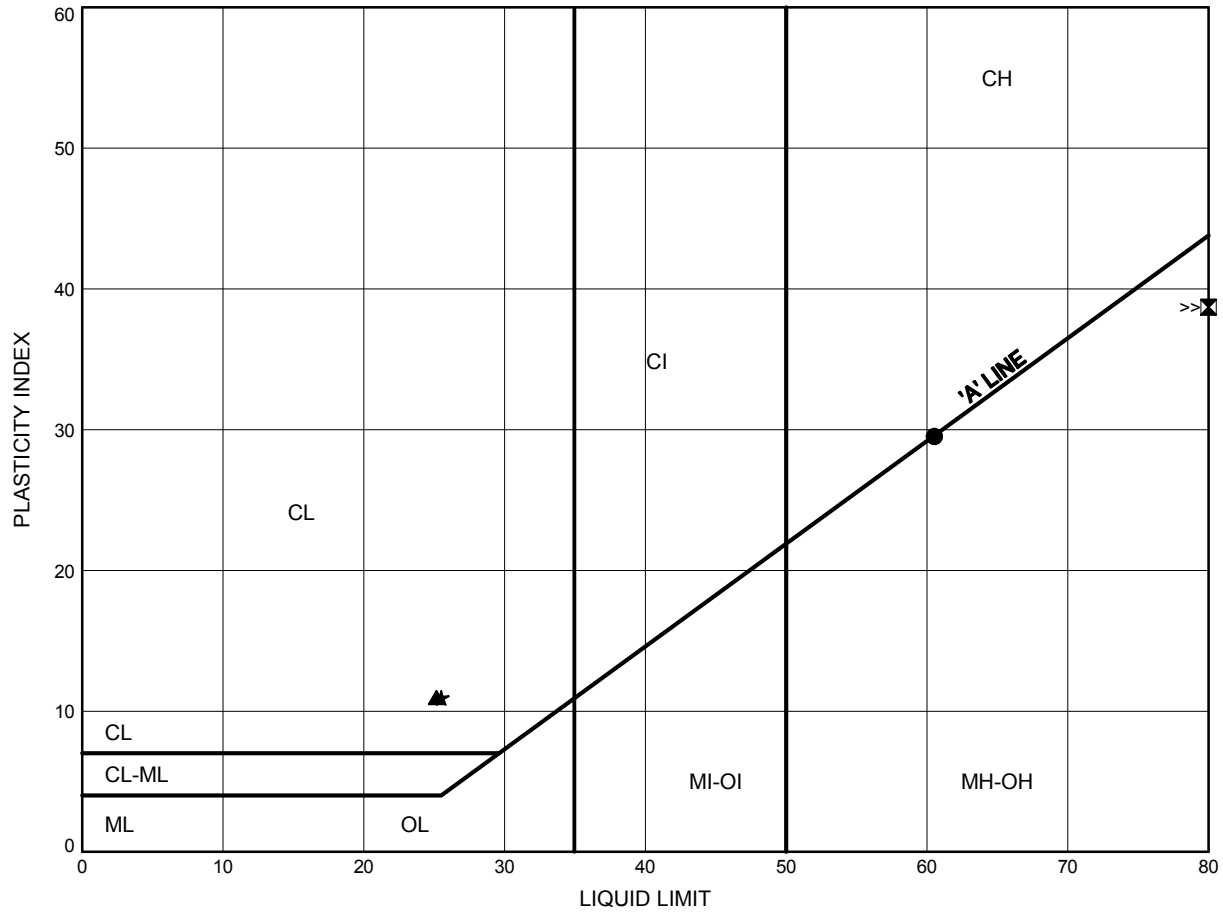
Chkd. WM

THURBALT 19-6969-0.GPJ 10/16/15

Canadian Seabed Research - Laboratory Testing

ATTERBERG LIMITS TEST RESULTS

FIGURE 10



LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	VC-46 GT1	0.94	
⊠	VC-47 GT2	1.12	
▲	VC-48 GT1	1.82	
★	VC-5 GT1	1.30	

Date October 2015

19-6969-0

THURBER

Prep'd EA

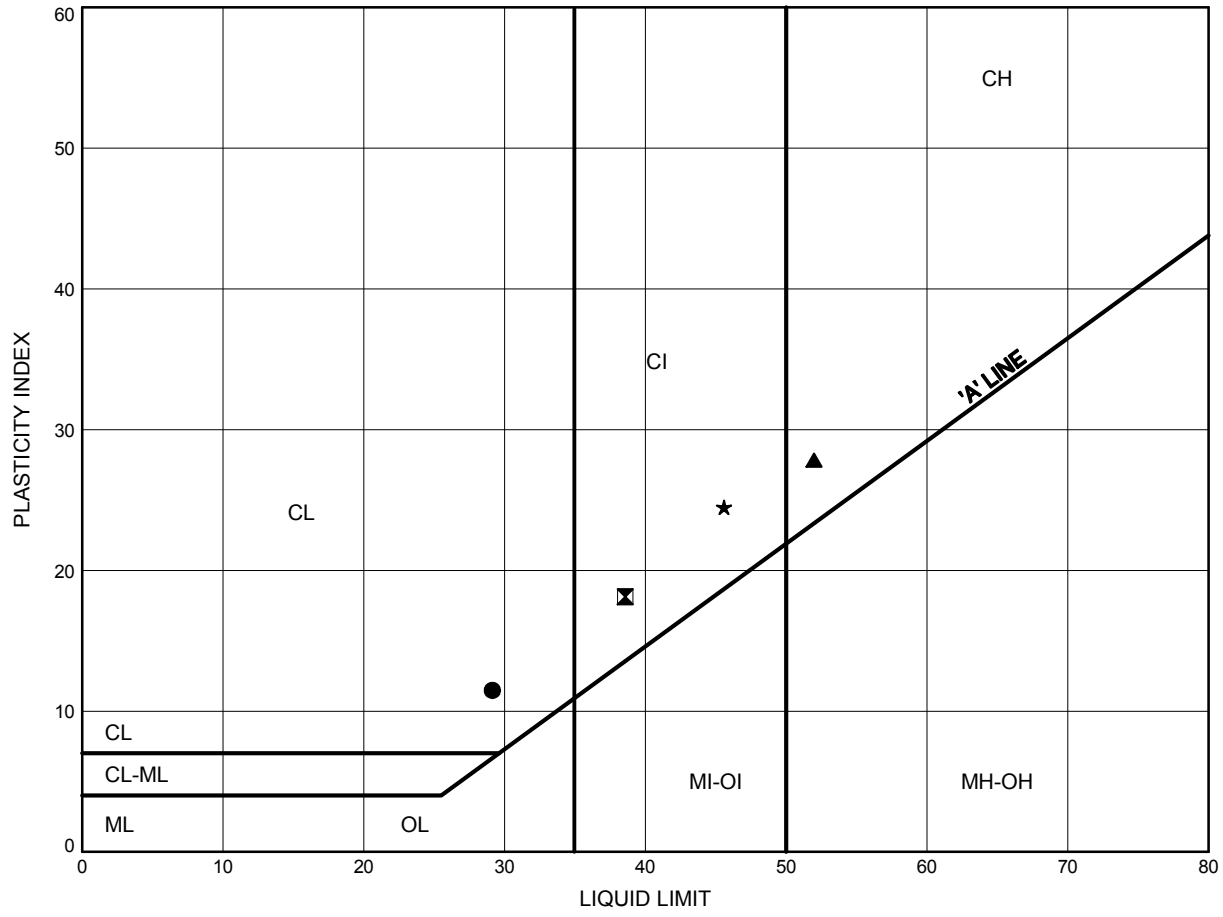
Chkd. WM

THURBALT 19-6969-0.GPJ 10/16/15

Canadian Seabed Research - Laboratory Testing

ATTERBERG LIMITS TEST RESULTS

FIGURE 11



LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	VC-5 GT2	0.35	
⊠	VC-5 NOSE	2.02	
▲	VC-50 GT4	0.23	
★	VC-6 GT1	0.71	

Date October 2015

19-6969-0

THURBER

Prep'd EA

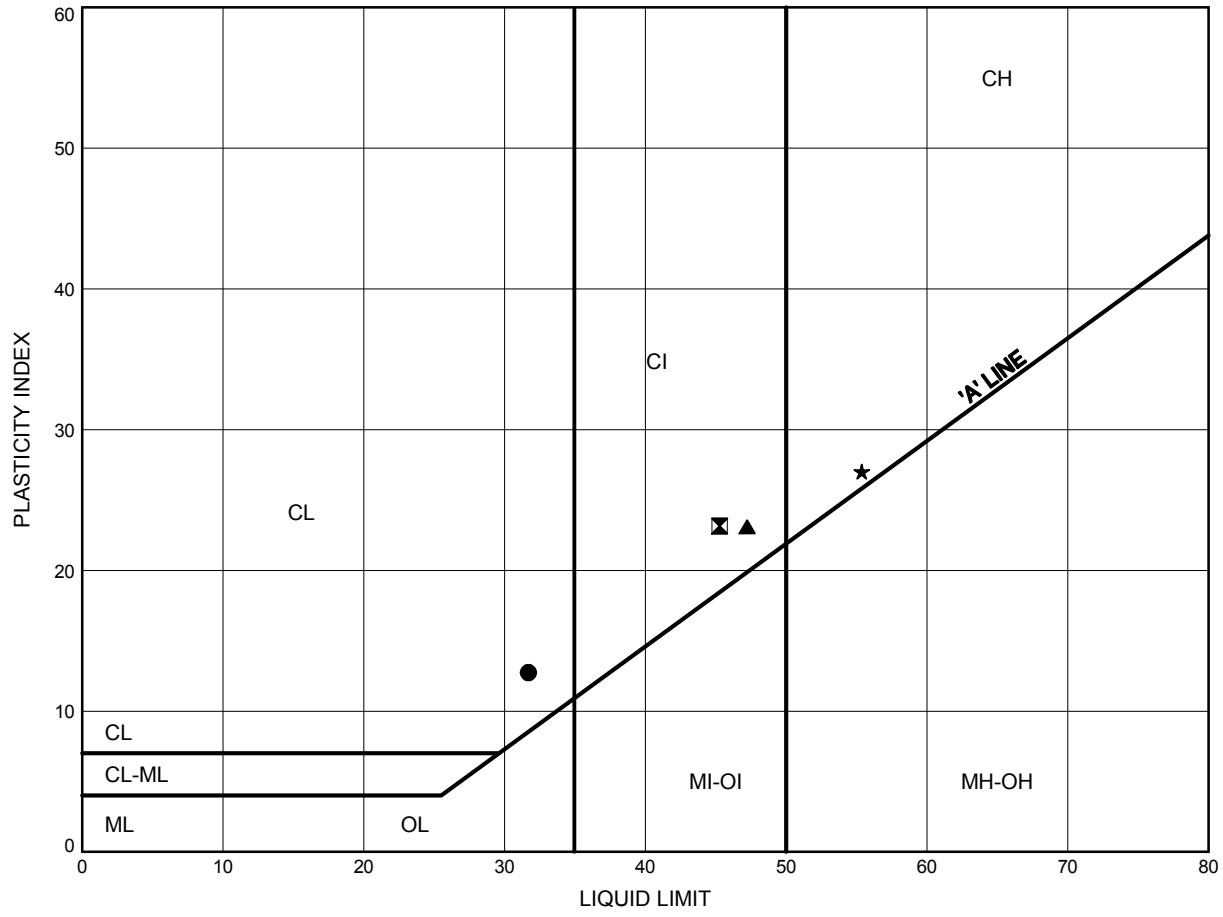
Chkd. WM

THURBALT 19-6969-0.GPJ 10/16/15

Canadian Seabed Research - Laboratory Testing

ATTERBERG LIMITS TEST RESULTS

FIGURE 12



LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	VC-6 GT2	0.10	
⊠	VC-6 NOSE	1.33	
▲	VC-7 GT1	0.30	
★	VC-7 GT2	1.30	

Date October 2015

19-6969-0

THURBER

Prep'd EA

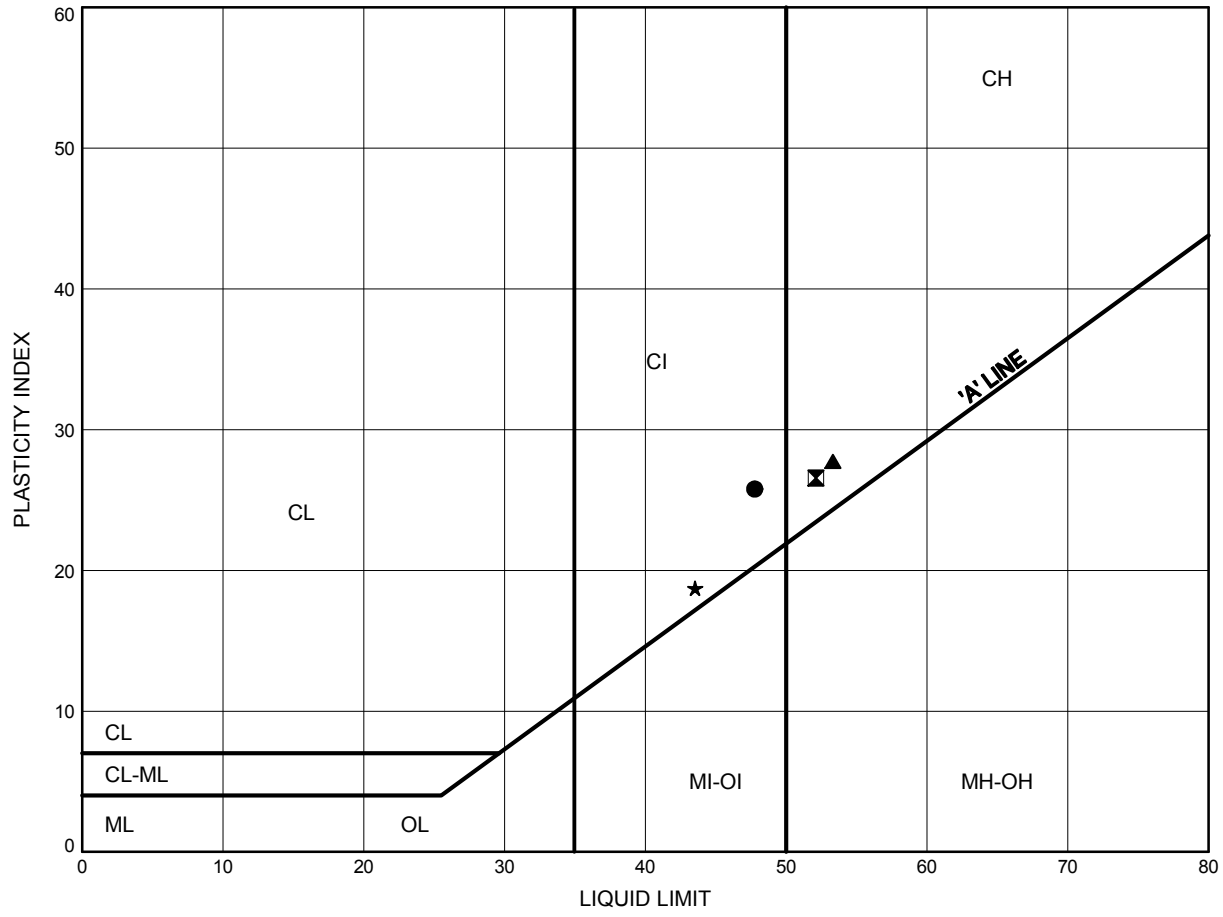
Chkd. WM

THURBALT 19-6969-0.GPJ 10/16/15

Canadian Seabed Research - Laboratory Testing

ATTERBERG LIMITS TEST RESULTS

FIGURE 13



LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	VC-7 GT3	0.35	
⊠	VC-7 NOSE	2.90	
▲	VC-8A GT2	2.30	
★	VC-8A GT3	1.35	

Date October 2015

19-6969-0

THURBER

Prep'd EA

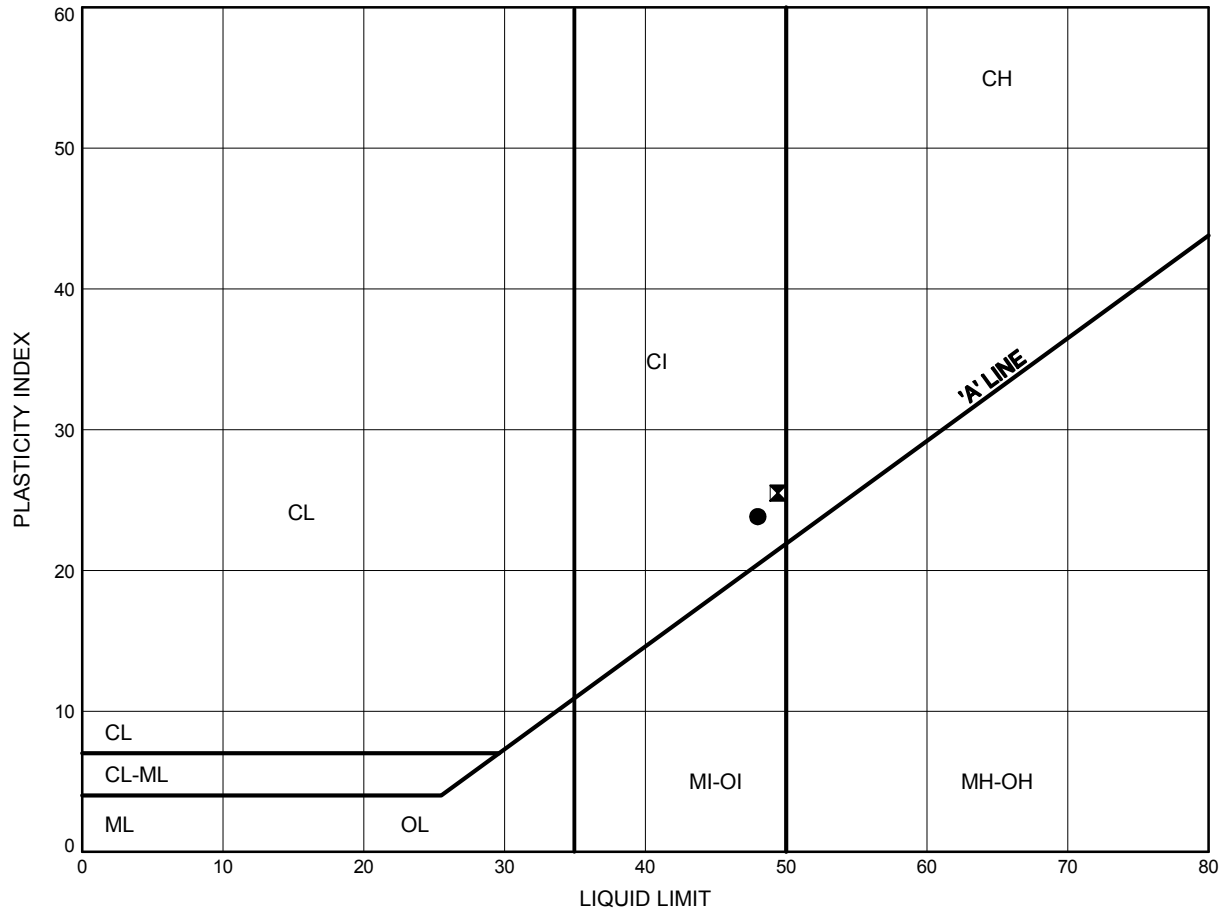
Chkd. WM

THURBALT 19-6969-0.GPJ 10/16/15

Canadian Seabed Research - Laboratory Testing

ATTERBERG LIMITS TEST RESULTS

FIGURE 14



LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	VC-8A GT4	0.37	
⧓	VC-8A NOSE	3.90	

Date October 2015

19-6969-0

THURBER

Prep'd EA

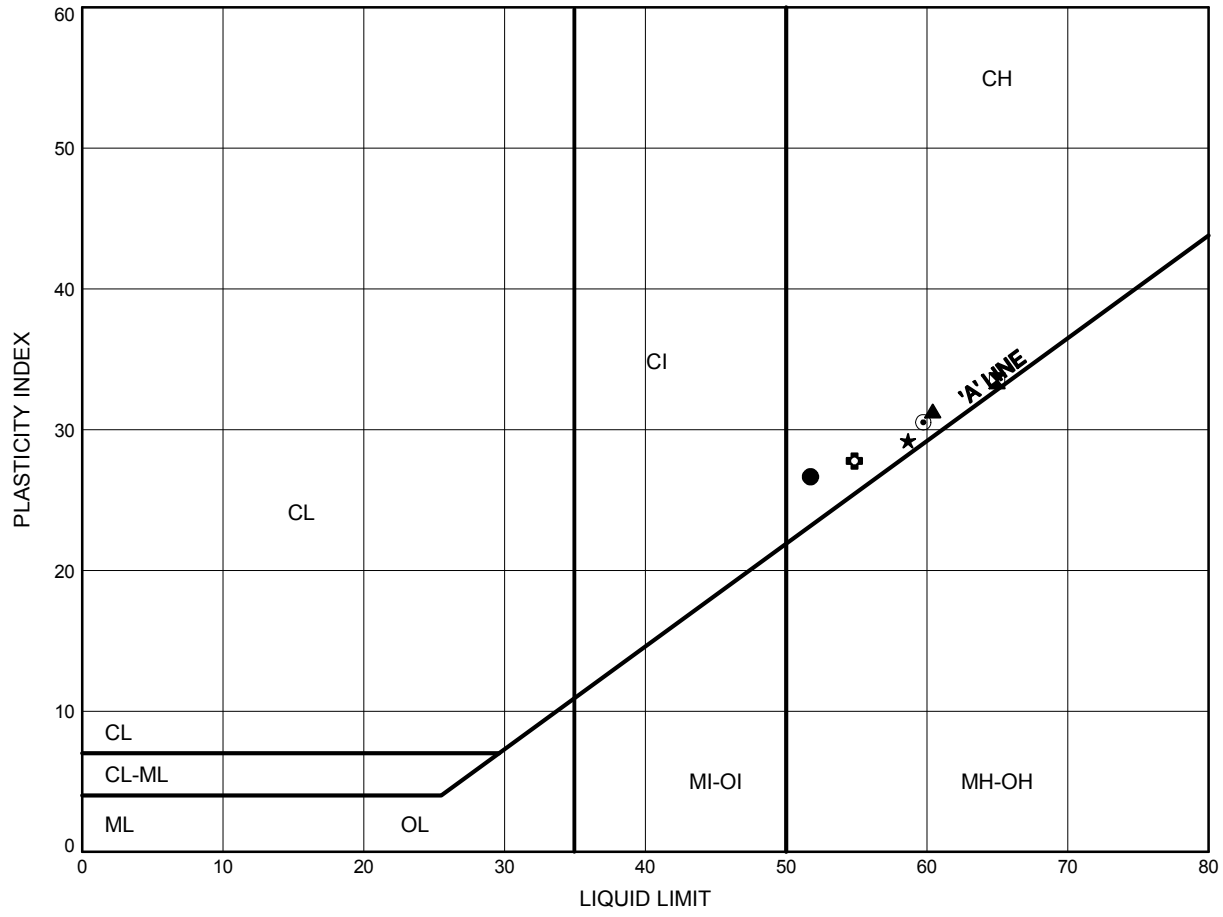
Chkd. WM

THURBALT 19-6969-0.GPJ 10/16/15

Canadian Seabed Research - Laboratory Testing

ATTERBERG LIMITS TEST RESULTS

FIGURE 1



LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	VC-12 GT3	0.96	
⊠	VC-15 GT4	0.20	
▲	VC-16 GT2	2.07	
★	VC-21 GT3	1.25	
⊙	VC-21 GT4	0.33	
✿	VC-22 GT4	3.52	

Date November 2015

Project 19-6969-0

THURBER

Prep'd EA

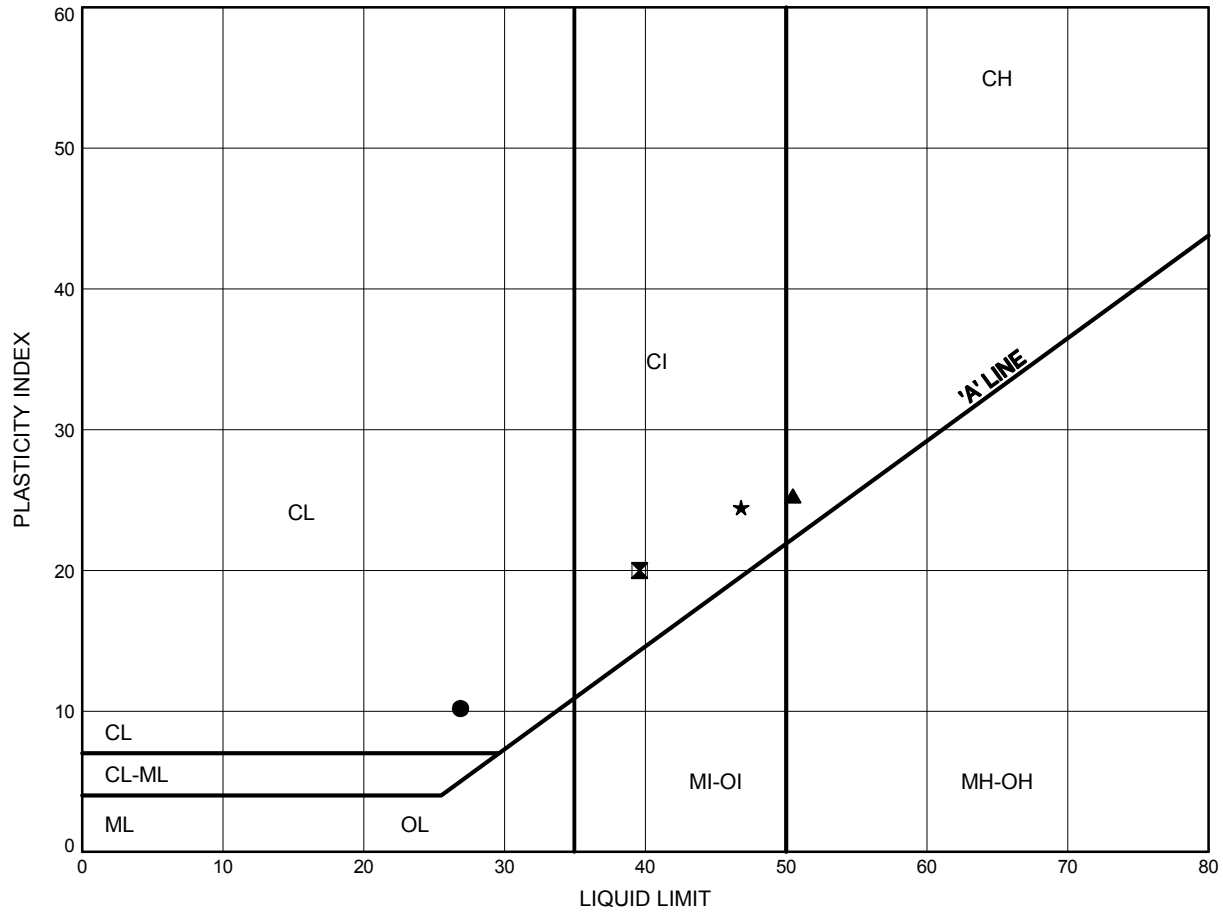
Chkd. WM

THURBALT 19-6969-0.GPJ 11/2/15

Canadian Seabed Research - Laboratory Testing

ATTERBERG LIMITS TEST RESULTS

FIGURE 2



LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	VC-4 GT3	1.16	
⊠	VC-44 GT3	0.95	
▲	VC-49 GT1	1.75	
★	VC-9 GT2	1.40	

Date November 2015

Project 19-6969-0

THURBER

Prep'd EA

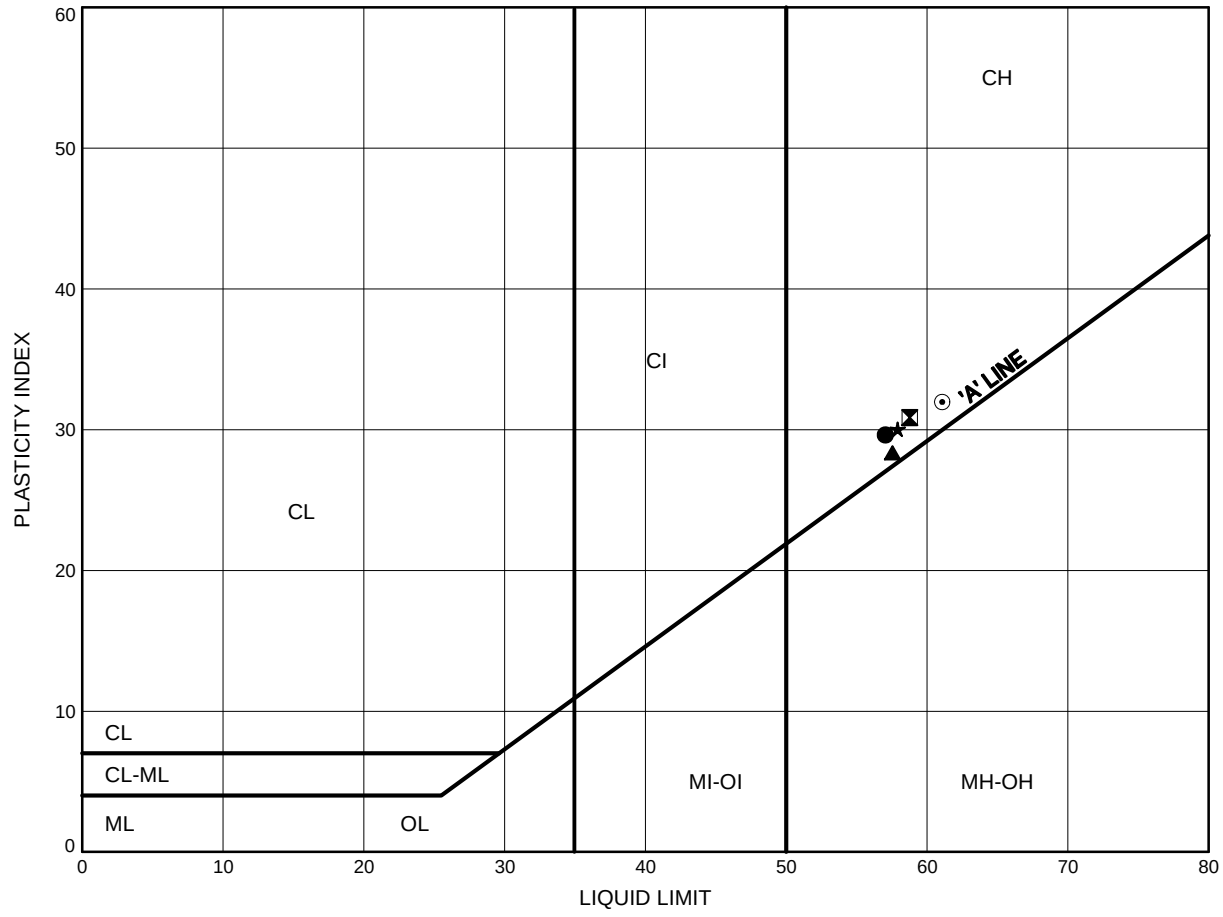
Chkd. WM

THURBALT 19-6969-0.GPJ 11/2/15

Canadian Seabed Research - Laboratory Testing

ATTERBERG LIMITS TEST RESULTS

FIGURE 1



LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	VC-11 GT4	0.31	
⊠	VC-13 GT2	2.05	
▲	VC-13 GT4	0.30	
★	VC-14 GT1	2.70	
⊙	VC-22 GT1	1.05	

Date November 2015

19-6969-0

THURBER

Prep'd EA

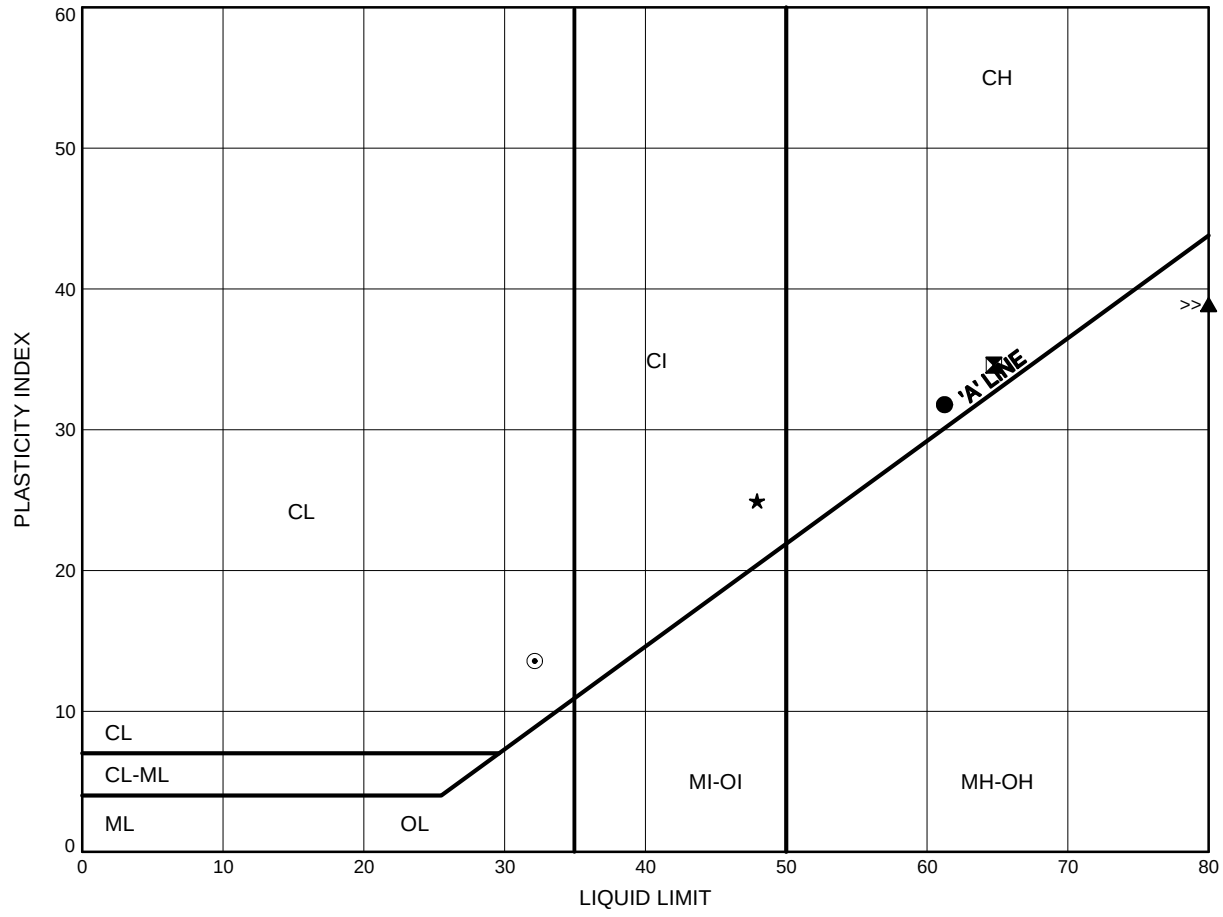
Chkd. WM

THURBALT 19-6969-0.GPJ 11/3/15

Canadian Seabed Research - Laboratory Testing

ATTERBERG LIMITS TEST RESULTS

FIGURE 2



LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	VC-23 GT4	0.23	
⊠	VC-24 GT1	3.05	
▲	VC-47 GT1	1.97	
★	VC-48 GT3	0.29	
⊙	VC-49 GT3	0.25	

Date November 2015

19-6969-0

THURBER

Prep'd EA

Chkd. WM

THURBALT 19-6969-0.GPJ 11/3/15

PHOTOGRAPHS OF CSR CORE SAMPLES

CANADIAN SEABED RESEARCH

DRILL HOLE: VC-1A

SAMPLE ID # GT3
(0-0.18) (m): Clay, silty, trace sand, brown
Lab Vane: 117 Kpa - Average moisture content 37.12%

DRILL HOLE: VC-1A

SAMPLE ID # GT2
(0.43-1.18) (m): Clay, silty, trace sand, brown
Lab Vane: 107 Kpa - Average moisture content 36.81%

THURBER

PHOTOGRAPHS OF CSR CORE SAMPLES

CANADIAN SEABED RESEARCH

DRILL HOLE: VC-1A

SAMPLE ID # GT1
(1.43-2.14) (m): Clay, silty, trace sand, brown
Lab Vane: 147 Kpa – Average moisture content = 43.63%

DRILL HOLE: VC-2

SAMPLE ID # GT5
(0-0.51) (m): Organic, some clay, some silt, occasional shell pieces, grey, soft
Lab Vane: 49 Kpa – Average moisture content = 124.54%

THURBER

PHOTOGRAPHS OF CSR CORE SAMPLES

CANADIAN SEABED RESEARCH

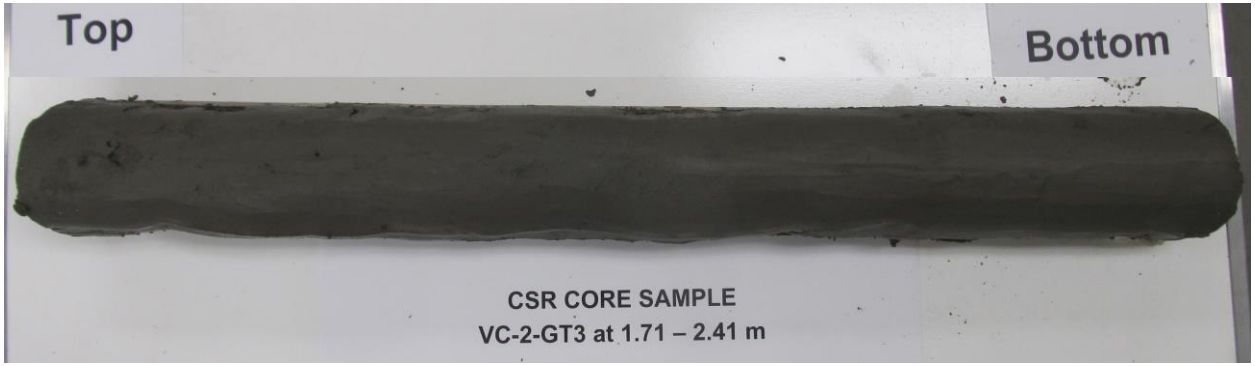
DRILL HOLE: VC-2

SAMPLE ID # GT4

(0.76-1.46) (m): Organic, some silt, some clay, occasional shell pieces, grey, soft

Lab Vane: 49 Kpa – Average moisture content – 91.20%

DRILL HOLE: VC-2



SAMPLE ID # GT3

(1.71-2.38) (m): Organic, some Silt, some Clay, occasional shell pieces, grey, soft

(2.38-2.46)(m): Silt, clayey, some organic, trace sand, grey, soft

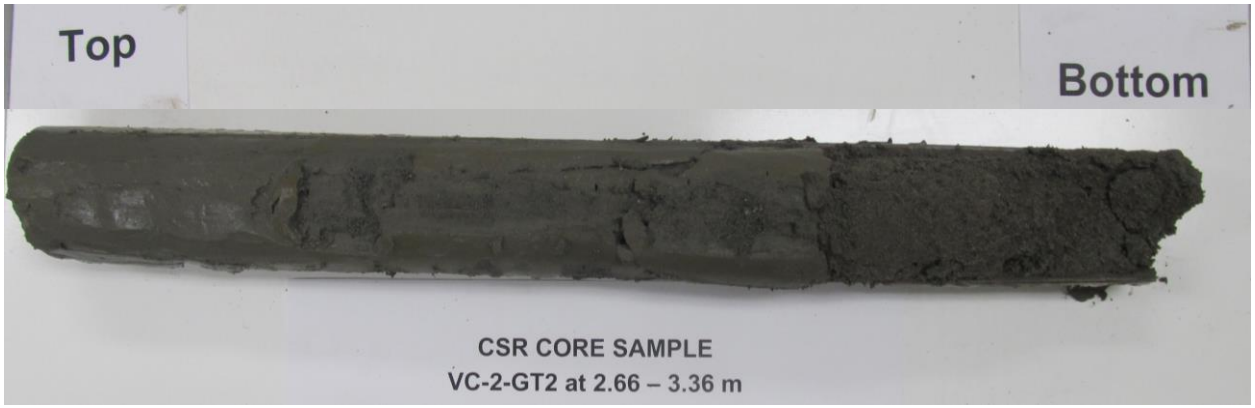
Lab Vane: 88 Kpa - Average moisture content from 1.75-2.38 m = 82.16% - Moisture content from 2.38 to 2.46 m = 30.42%

THURBER

PHOTOGRAPHS OF CSR CORE SAMPLES

CANADIAN SEABED RESEARCH

DRILL HOLE: VC-2



SAMPLE ID # GT2

(2.66-2.83) (m): Silt, sandy, trace organic, grey

(2.83-3.4)(m): Sand, trace to some silt, trace gravel, grey

Lab Vane: - Average moisture content from 2.66 to 2.83 m = 26.18%, from 2.83 -3.4 m = 17.46%

DRILL HOLE: VC-2

SAMPLE ID # GT1

(3.61-4.36) (m): Sand, trace silt, trace gravel. grey

(4.36-4.37)(m): Clay, silty, trace sand, grey

Lab Vane (at 4.37m): 29 Kpa = Average moisture content from 3.61-4.36 m = 20.24%, from 4.36-4.37 m = 41.01%

THURBER

PHOTOGRAPHS OF CSR CORE SAMPLES

CANADIAN SEABED RESEARCH

DRILL HOLE: VC-3

SAMPLE ID # GT2

(0-0.4) (m): Clay, silty, some organics - (0.4-0.67) (m): Sand, silty, trace gravel, grey
(0.67-1.0)(m): Clay, silty, trace sand, trace gravel, grey
Lab Vane (0.67-1.0 m): 150 Kpa = Moisture content from 0-0.4m = 41.77%, from 0.4-0.67m = 21.12%, from 0.67-1.0m = 37.29%

DRILL HOLE: VC-3

SAMPLE ID # GT1

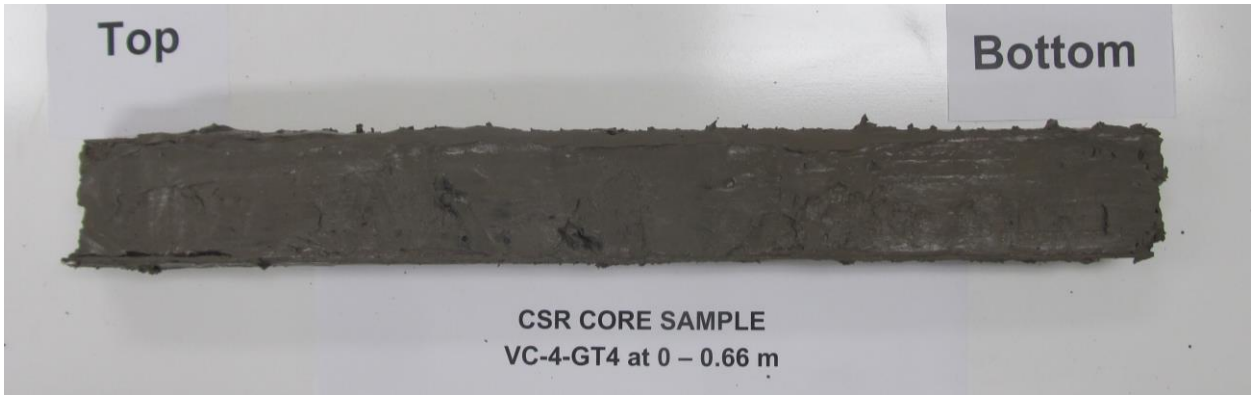
(1.32-1.9)(m): Clay, silty, trace sand, trace gravel, grey
Lab Vane:147 Kpa - Average moisture content = 33.88%

THURBER

PHOTOGRAPHS OF CSR CORE SAMPLES

CANADIAN SEABED RESEARCH

DRILL HOLE: VC-4



SAMPLE ID # GT4

(0-0.28) (m): Clay, silty, trace organic, trace sand, brown

(0.28-0.68)(m): Clay, silty, trace sand, trace gravel, soft, brown

Lab Vane: 0 Kpa = Average moisture content = 29.34%

DRILL HOLE: VC-4

SAMPLE ID # GT3

(0.91-1.41) (m): Silt, clayey, trace to some sand, trace organic, soft, grey

Lab Vane: 0 Kpa - Average moisture content = 30.20%

THURBER

PHOTOGRAPHS OF CSR CORE SAMPLES

CANADIAN SEABED RESEARCH

DRILL HOLE: VC-4

SAMPLE ID # GT2

(1.66-2.36) (m): Silt, clayey, some sand, trace organic, trace gravel, occasional shell pieces, soft, grey

Lab Vane: 0 Kpa - Average moisture content = 26.70 %

DRILL HOLE: VC-4

SAMPLE ID # GT1

(2.61-2.79) (m): Silt, clayey, some sand, trace organic, trace gravel, occasional shell pieces, soft, grey

(2.79-3.25) (m): Silt, sandy, trace organic, occasional shell pieces, grey

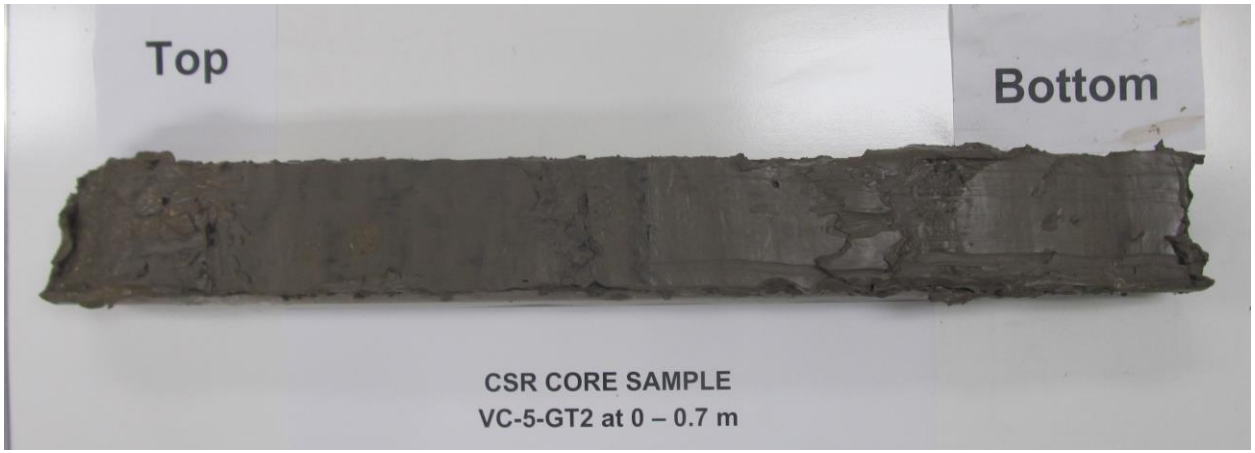
Lab Vane: 0 Kpa = Average moisture content = 21.73%

THURBER

PHOTOGRAPHS OF CSR CORE SAMPLES

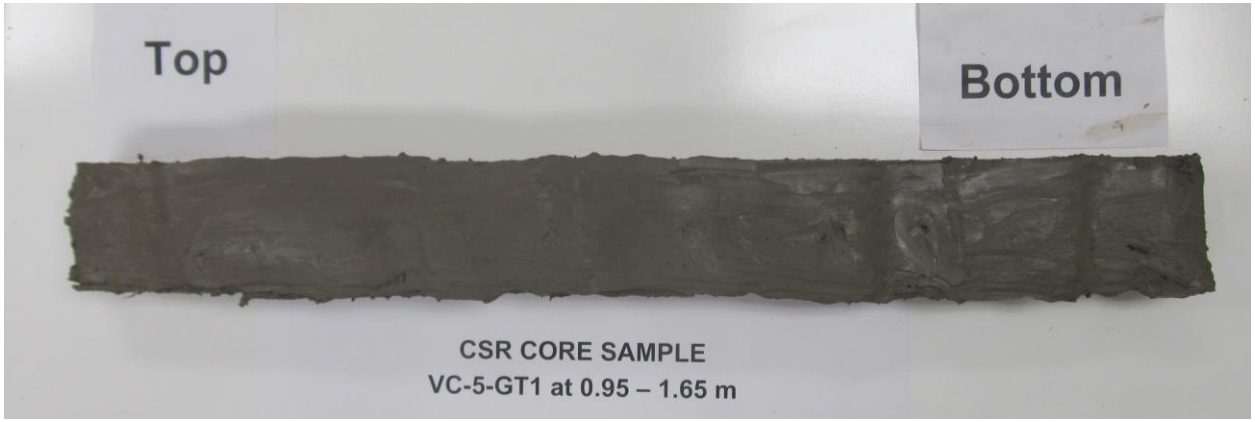
CANADIAN SEABED RESEARCH

DRILL HOLE: VC-5



SAMPLE ID # GT2
(0-0.7)(m): Clay, silty, trace sand, trace to some organic, grey
Lab Vane: 0 Kpa - Average moisture content = 55.34%

DRILL HOLE: VC-5



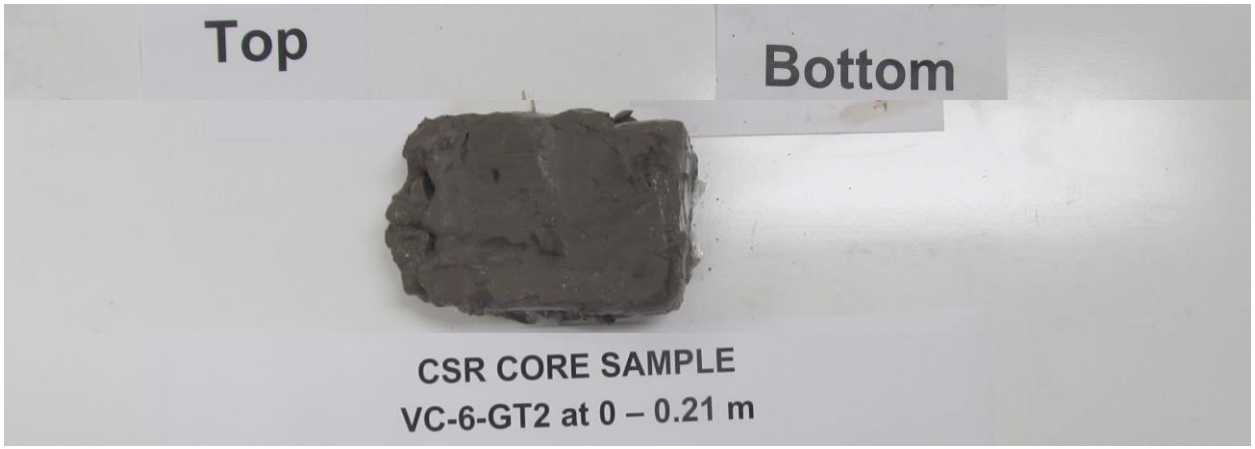
SAMPLE ID # GT1
(0.95-1.65)(m): Clay, silty, trace sand, trace organic, grey
Lab Vane: 49 Kpa – Average moisture content = 35.11%

THURBER

PHOTOGRAPHS OF CSR CORE SAMPLES

CANADIAN SEABED RESEARCH

DRILL HOLE: VC-6



SAMPLE ID # GT2

(0-0.21)(m): Clay, silty, trace sand, trace organic, grey, soft Lab Vane: 0 Kpa - Moisture content = 41.75%

DRILL HOLE: VC-6

SAMPLE ID # GT1

(0.46-0.58)(m): Disturbed. (0.58-0.96): Clay, silty, trace sand, grey

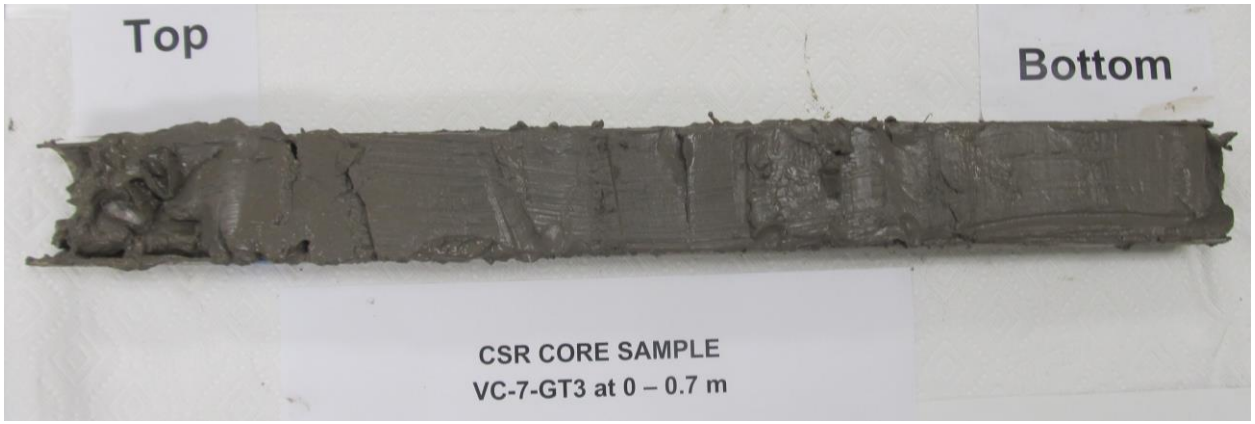
Lab Vane: 294 Kpa – Average moisture content = 32.77%

THURBER

PHOTOGRAPHS OF CSR CORE SAMPLES

CANADIAN SEABED RESEARCH

DRILL HOLE: VC-7



SAMPLE ID # GT3
(0.0-0.7)(m): Clay, silty, trace sand, some organic, grey
Lab Vane: 0 Kpa - Average moisture content = 55.49%

DRILL HOLE: VC-7

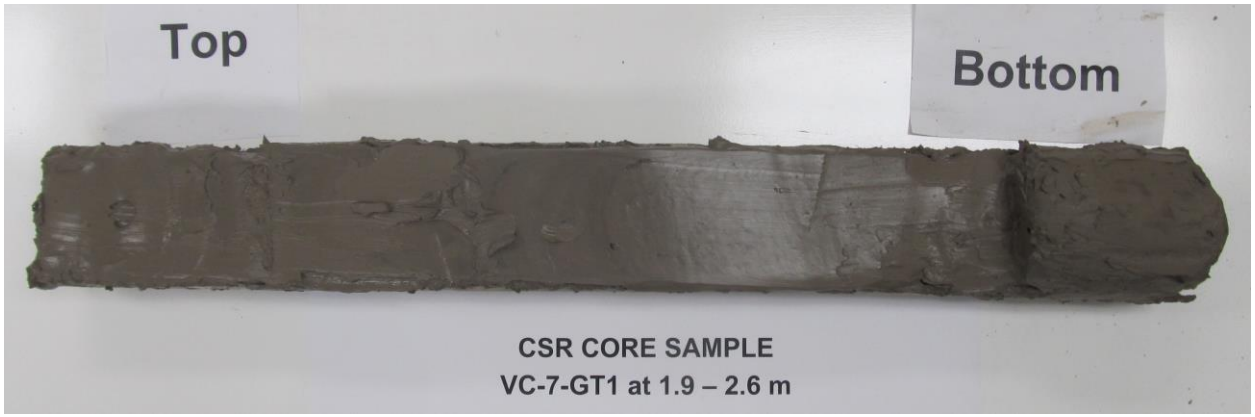
SAMPLE ID # GT2
(0.95-1.65)(m): Clay, silty, trace sand, trace organic, grey
Lab Vane: 0 Kpa - Average moisture content = 41.92%

THURBER

PHOTOGRAPHS OF CSR CORE SAMPLES

CANADIAN SEABED RESEARCH

DRILL HOLE: VC-7



SAMPLE ID # GT1

(1.90-2.6)(m): Clay, silty, trace sand, trace organic, grey

Lab Vane at 2.5 -2.6 m: 290 Kpa – Average moisture content = 37.25%

DRILL HOLE: VC-8a

SAMPLE ID # GT4

(0.0-0.75) (m): Organic, some Silt, some Clay, occasional shell pieces, grey, Soft

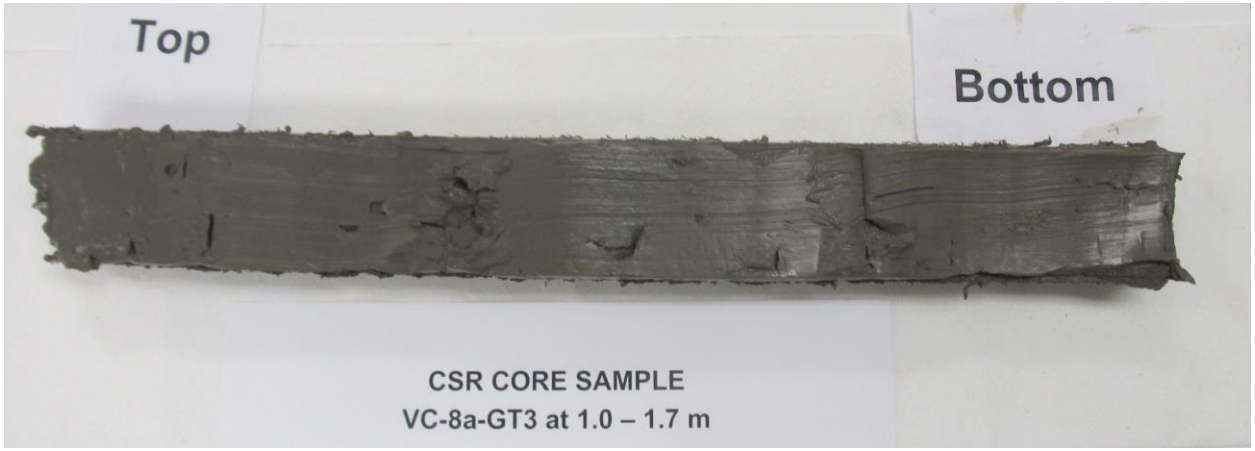
Lab Vane: 0 Kpa - Average moisture content = 100.95%

THURBER

PHOTOGRAPHS OF CSR CORE SAMPLES

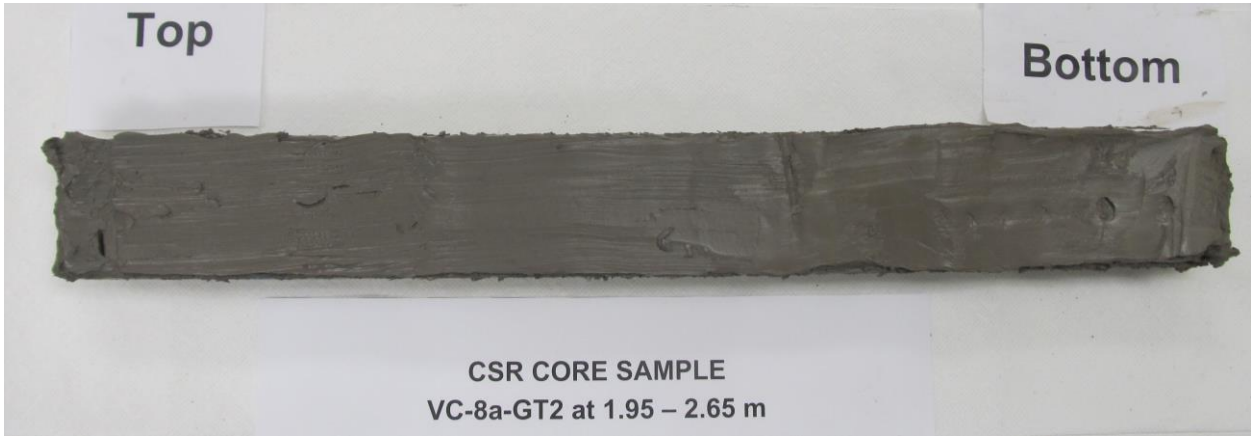
CANADIAN SEABED RESEARCH

DRILL HOLE: VC-8a



SAMPLE ID # GT3
(1.0-1.70) (m): Clay, silty, some organic, grey, soft
Lab Vane: 0 Kpa – Average moisture content = 60.19%

DRILL HOLE: VC-8a



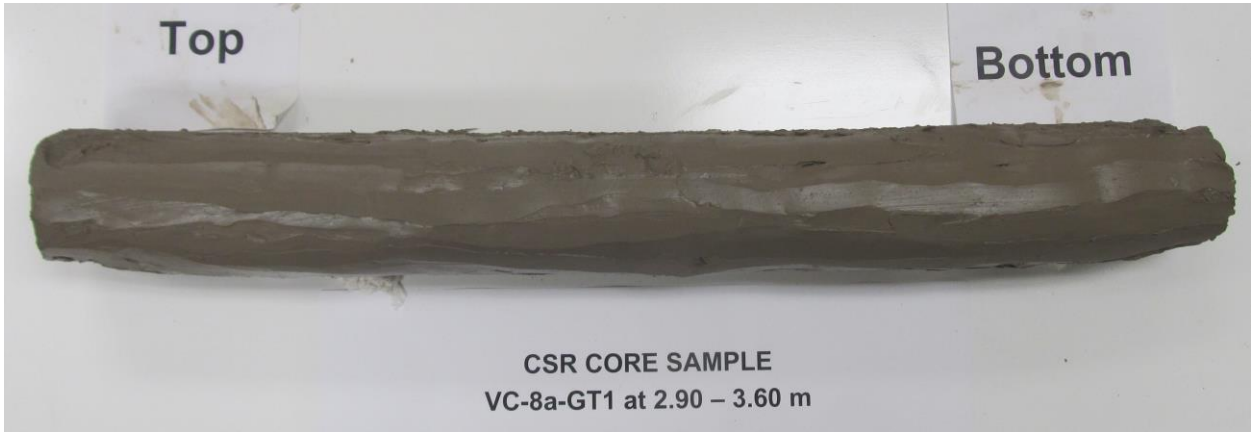
SAMPLE ID # GT2
(1.95-2.65) (m): Clay, silty, some organic, grey, soft
Lab Vane: 0 Kpa - Average moisture content = 53.91%

THURBER

PHOTOGRAPHS OF CSR CORE SAMPLES

CANADIAN SEABED RESEARCH

DRILL HOLE: VC-8a



SAMPLE ID # GT1

(2.90-3.60) (m): Clay, silty, trace sand, grey

Lab Vane: 73 Kpa = Average moisture content = 52.12%

DRILL HOLE: VC-17

SAMPLE ID # GT4

(0.0-0.70) (m): Organic, some Silt, some clay, trace sand, grey, soft

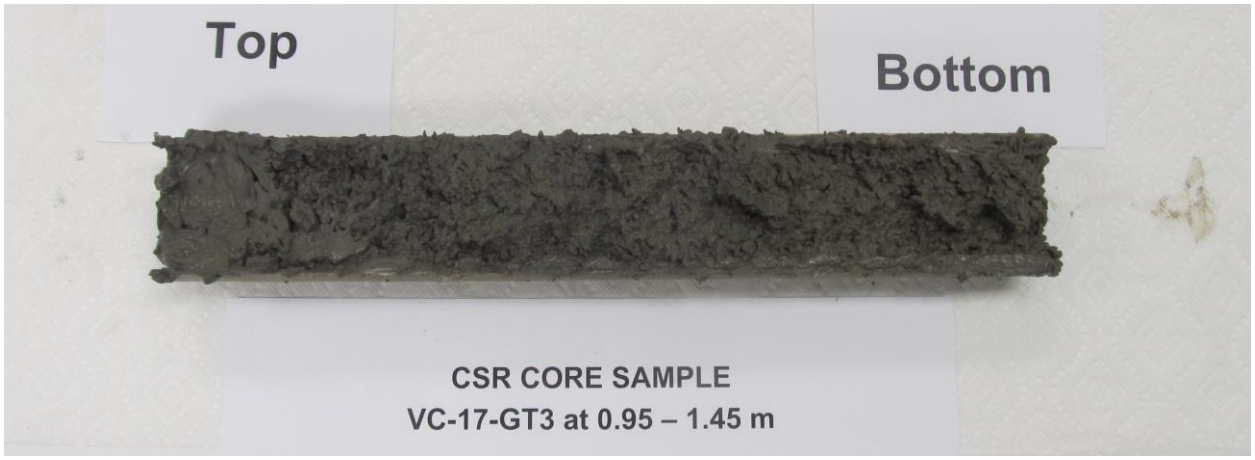
Lab Vane: 0 Kpa - Average moisture content = 126.04%

THURBER

PHOTOGRAPHS OF CSR CORE SAMPLES

CANADIAN SEABED RESEARCH

DRILL HOLE: VC-17



SAMPLE ID # GT3

(0.95-1.45) (m): Organic, some silt, some clay, trace sand, grey, soft

Lab Vane: 0 Kpa – Average moisture content = 103.56%

DRILL HOLE: VC-17

SAMPLE ID # GT2

(1.70-2.4) (m): Organic, some silt, some clay, trace sand, grey, soft

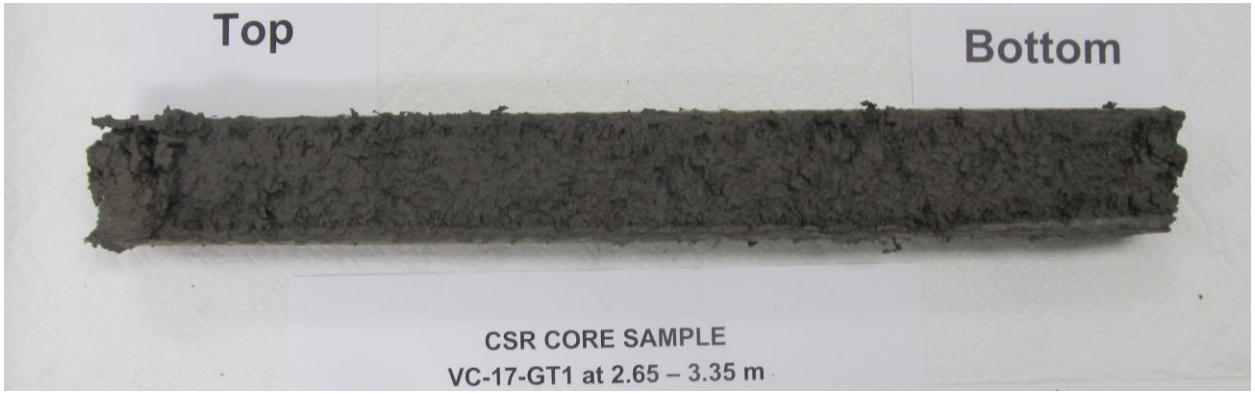
Lab Vane: 0 Kpa – Average moisture content = 95.49%

THURBER

PHOTOGRAPHS OF CSR CORE SAMPLES

CANADIAN SEABED RESEARCH

DRILL HOLE: VC-17

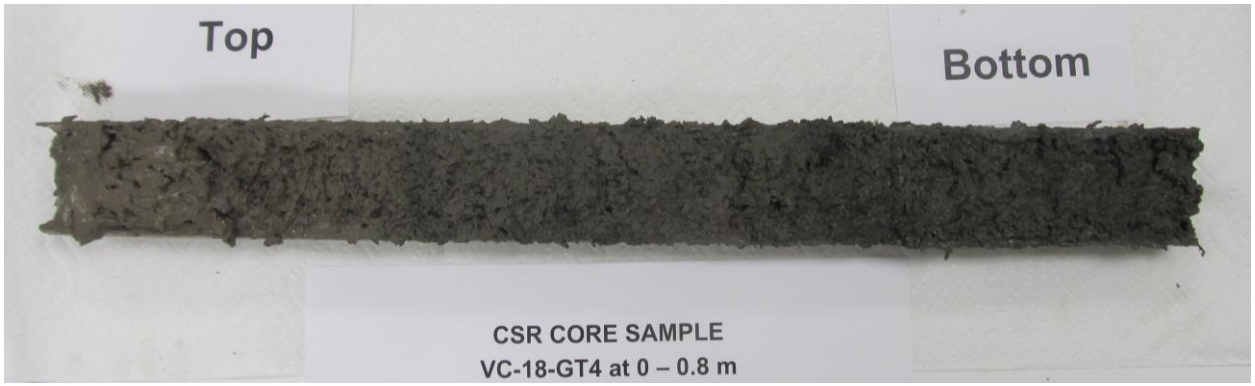


SAMPLE ID # GT1

(2.65-3.35) (m): Organic, some silt, some clay, trace sand, grey, soft

Lab Vane: 0 Kpa - Average moisture content = 89.32%

DRILL HOLE: VC-18



SAMPLE ID # GT4

(0.0-0.80) (m): Organic, some silt, some clay, trace sand, grey, soft

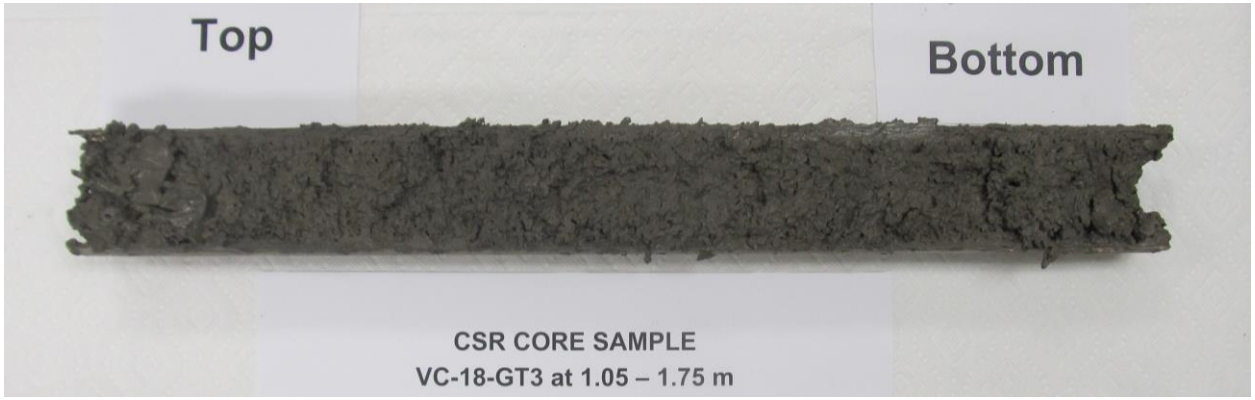
Lab Vane: 0 Kpa - Average moisture content = 116.83%

THURBER

PHOTOGRAPHS OF CSR CORE SAMPLES

CANADIAN SEABED RESEARCH

DRILL HOLE: VC-18



SAMPLE ID # GT3

(1.05-1.75) (m): Organic, some silt, some clay, trace sand, grey, soft

Lab Vane: 0 Kpa - Average moisture content = 94.33%

DRILL HOLE: VC-18

SAMPLE ID # GT2

(2.0-2.7) (m): Organic, some silt, some clay, trace sand, grey, soft

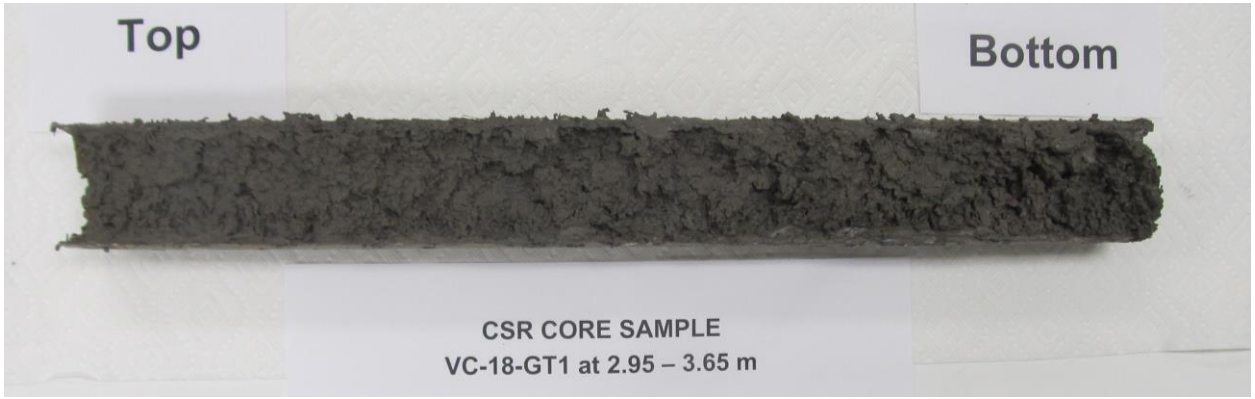
Lab Vane: 0 Kpa - Average moisture content = 91.82%

THURBER

PHOTOGRAPHS OF CSR CORE SAMPLES

CANADIAN SEABED RESEARCH

DRILL HOLE: VC-18



SAMPLE ID # GT1

(2.95-3.65) (m): Organic, some silt, some clay, some sand, grey, soft

Lab Vane: 0 Kpa - Average moisture content = 89.01%

DRILL HOLE: VC-19

SAMPLE ID # GT4

(0.0-0.85) (m): Organic, some silt, some clay, trace sand, grey, soft

Lab Vane: 0 Kpa - Average moisture content = 114.23%

THURBER

PHOTOGRAPHS OF CSR CORE SAMPLES

CANADIAN SEABED RESEARCH

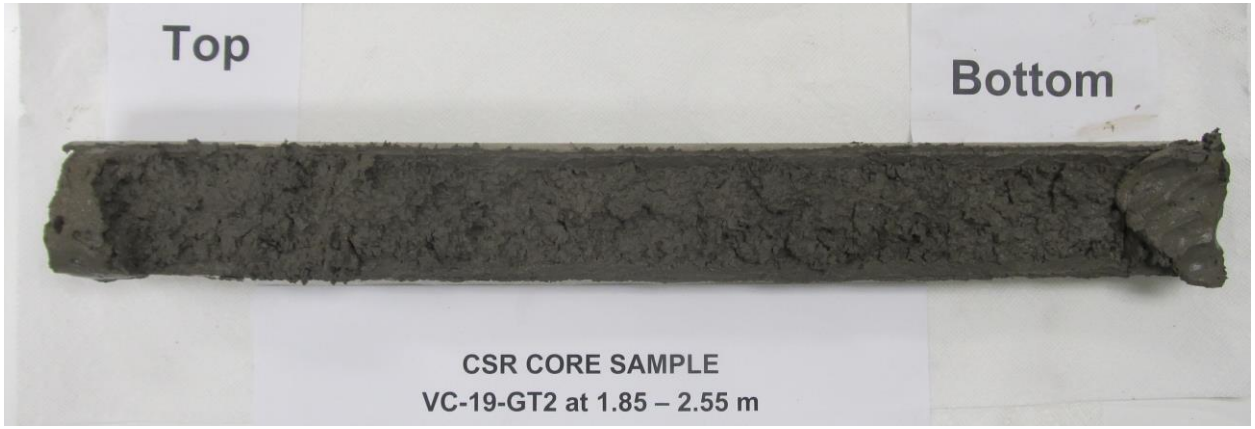
DRILL HOLE: VC-19

SAMPLE ID # GT3

(1.1-1.60) (m): Organic, some silt, some clay, trace sand, grey, soft

Lab Vane: 0 Kpa - Average moisture content = 92.82%

DRILL HOLE: VC-19



SAMPLE ID # GT2

(1.85-2.55) (m): Organic, some silt, some clay, trace sand, grey, soft

Lab Vane: 0 Kpa - Average moisture content = 87.47%

THURBER

PHOTOGRAPHS OF CSR CORE SAMPLES

CANADIAN SEABED RESEARCH

DRILL HOLE: VC-19

SAMPLE ID # GT1

(2.80-3.50) (m): Organic, some silt, some clay, trace sand, grey, soft

Lab Vane: 0 Kpa – Average moisture content = 83.37%

DRILL HOLE: VC-20

SAMPLE ID # GT4

(0.0-0.85) (m): Organic, some silt, some clay, trace sand, grey, soft

Lab Vane: 0 Kpa – Average moisture content = 110.41%

THURBER

PHOTOGRAPHS OF CSR CORE SAMPLES

CANADIAN SEABED RESEARCH

DRILL HOLE: VC-20

SAMPLE ID # GT3

(1.1-1.80) (m): Organic, some silt, some clay, trace sand, grey, soft

Lab Vane: 0 Kpa - Average moisture content = 90.69%

DRILL HOLE: VC-20

SAMPLE ID # GT2

(2.05-2.75) (m): Organic, some Silt, some Clay, trace sand, grey, soft

Lab Vane: 0 Kpa - Average moisture content = 87.31%

THURBER

PHOTOGRAPHS OF CSR CORE SAMPLES

CANADIAN SEABED RESEARCH

DRILL HOLE: VC-20

SAMPLE ID # GT1

(3.0-3.7) (m): Organic, some silt, some clay, trace sand, grey, soft

Lab Vane: 0 Kpa - Average moisture content = 83.30%

DRILL HOLE: VC-45

SAMPLE ID # GT2

(0.0-0.41) (m): Clay, silty, occasional shell pieces, brown

Lab Vane: 137 Kpa = Average moisture content = 39.14%

THURBER

PHOTOGRAPHS OF CSR CORE SAMPLES

CANADIAN SEABED RESEARCH

DRILL HOLE: VC-45

SAMPLE ID # GT1

(0.66-1.16) (m): Clay, silty, some sand, trace gravel, brown

Lab Vane: 290 Kpa - Average moisture content = 35.61%

DRILL HOLE: VC-9

TOP BOTTOM

SAMPLE ID # GT2

(1.05-1.75) (m): Clay, silty, trace sand, soft, brown

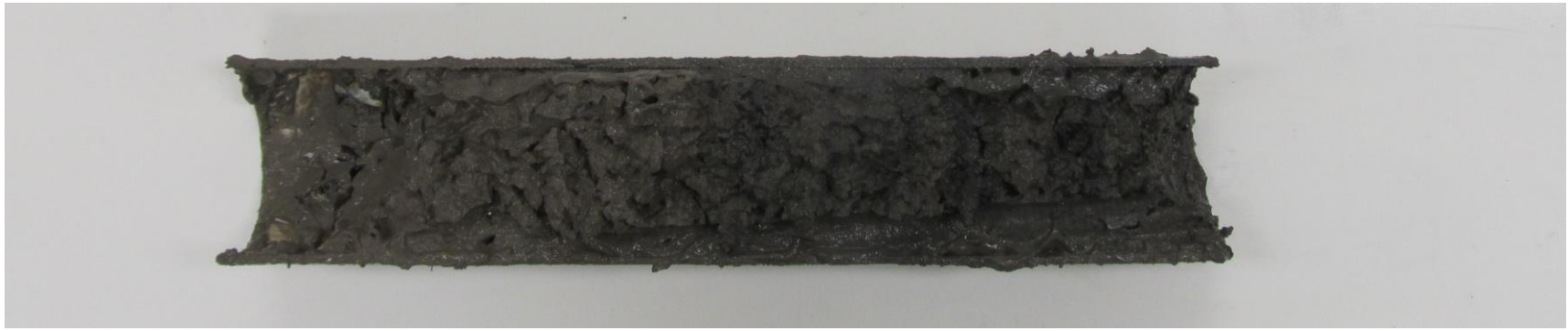
Moisture content = 51.72%

THURBER

PHOTOGRAPHS OF CSR CORE SAMPLES

CANADIAN SEABED RESEARCH

DRILL HOLE: VC-15



TOP BOTTOM

SAMPLE ID # GT4
(0.0-0.4) (m): Clay, silty, some organics, very soft, dark brown
Moisture content = 141.04%

DRILL HOLE: VC-16

TOP BOTTOM

SAMPLE ID # GT2
(1.72-2.42) (m): Clay, silty, some organics, dark brown
Moisture content = 94.93%

THURBER

PHOTOGRAPHS OF CSR CORE SAMPLES

CANADIAN SEABED RESEARCH

DRILL HOLE: VC-22

TOP BOTTOM

SAMPLE ID # GT4
(3.45-3.6) (m): Clay, silty, some organics, dark brown
Moisture content = 103.99%

DRILL HOLE: VC-44

TOP BOTTOM

SAMPLE ID # GT3
(0.6-1.3) (m): Clay, silty, trace sand, trace organics, dark brown
Moisture content = 79.18%

THURBER

PHOTOGRAPHS OF CSR CORE SAMPLES

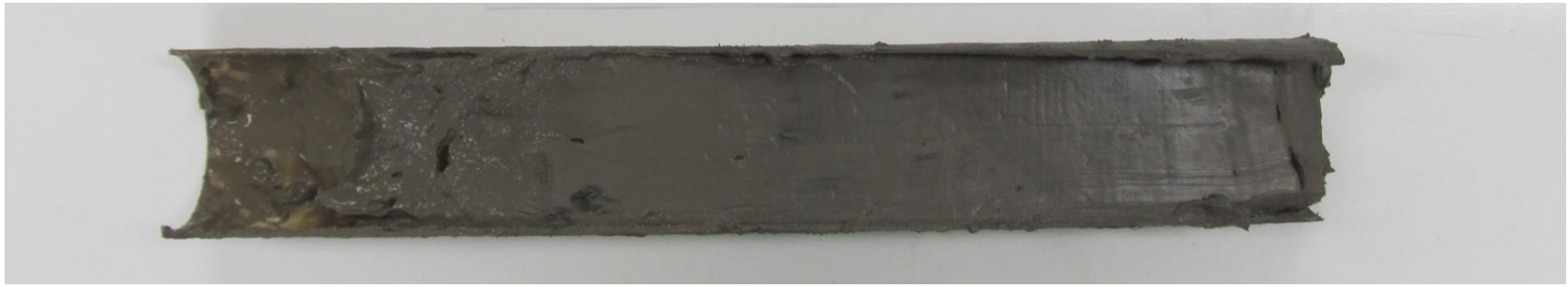
CANADIAN SEABED RESEARCH

DRILL HOLE: VC-46

TOP BOTTOM

SAMPLE ID # GT2
(0-0.34) (m): Sand, some silt, trace gravel, dark brown
Moisture content = 15.25%

DRILL HOLE: VC-49



TOP BOTTOM

SAMPLE ID # GT3
(0-0.5) (m): Clay, silty, brown
Moisture content = 37.31%

THURBER

PHOTOGRAPHS OF CSR CORE SAMPLES

CANADIAN SEABED RESEARCH

DRILL HOLE: VC-50

TOP BOTTOM

SAMPLE ID # GT1
(2.4-3.1) (m): Clay, silty, brown
Moisture content = 55.68%

THURBER

PHOTOGRAPHS OF CSR CORE SAMPLES

CANADIAN SEABED RESEARCH

VC-11 GT4

VC-22 GT1

THURBER

PHOTOGRAPHS OF CSR CORE SAMPLES

CANADIAN SEABED RESEARCH

VC-14 GT1

VC-24 GT1

THURBER

PHOTOGRAPHS OF CSR CORE SAMPLES

CANADIAN SEABED RESEARCH

VC-47 GT1

VC-13 GT2

THURBER

PHOTOGRAPHS OF CSR CORE SAMPLES

CANADIAN SEABED RESEARCH

VC-49 GT1

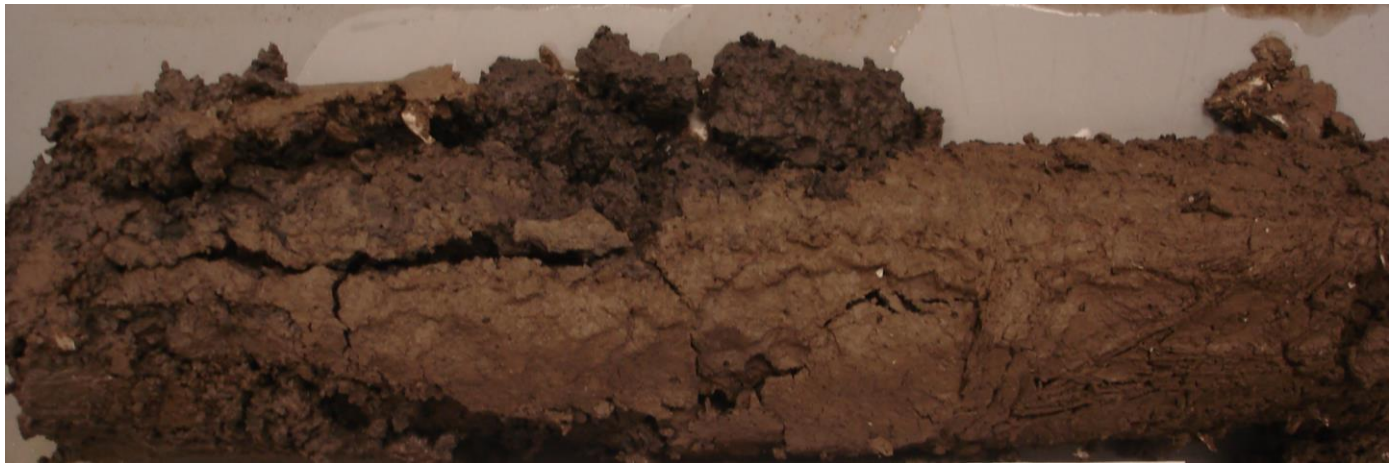
VC-12 GT3

THURBER

PHOTOGRAPHS OF CSR CORE SAMPLES

CANADIAN SEABED RESEARCH

VC-48 GT3

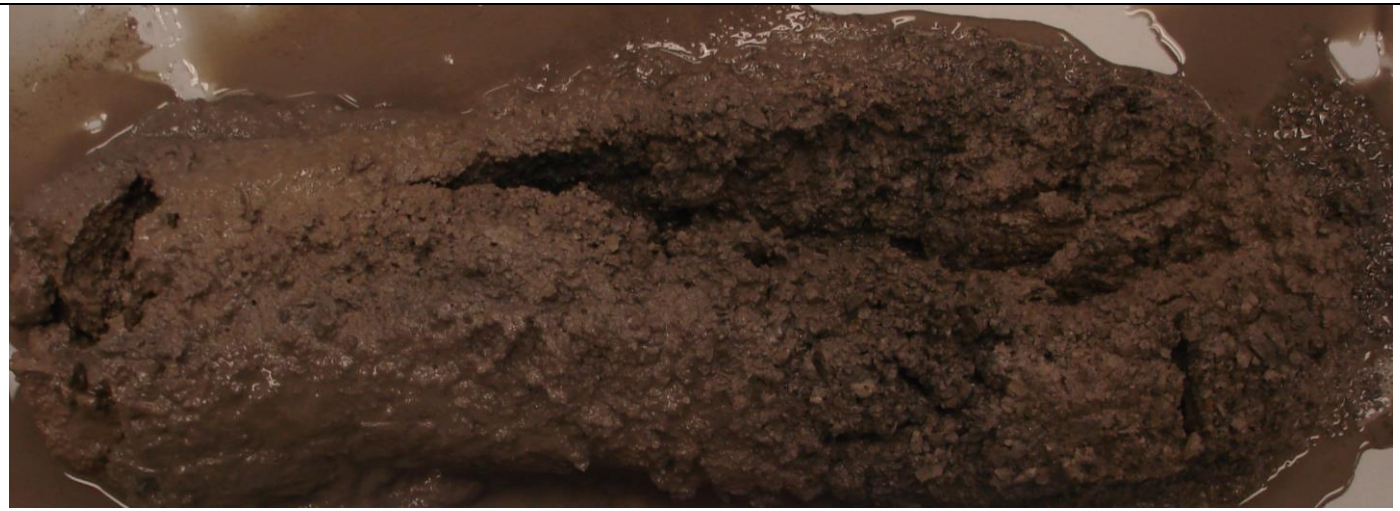


VC-23 GT4

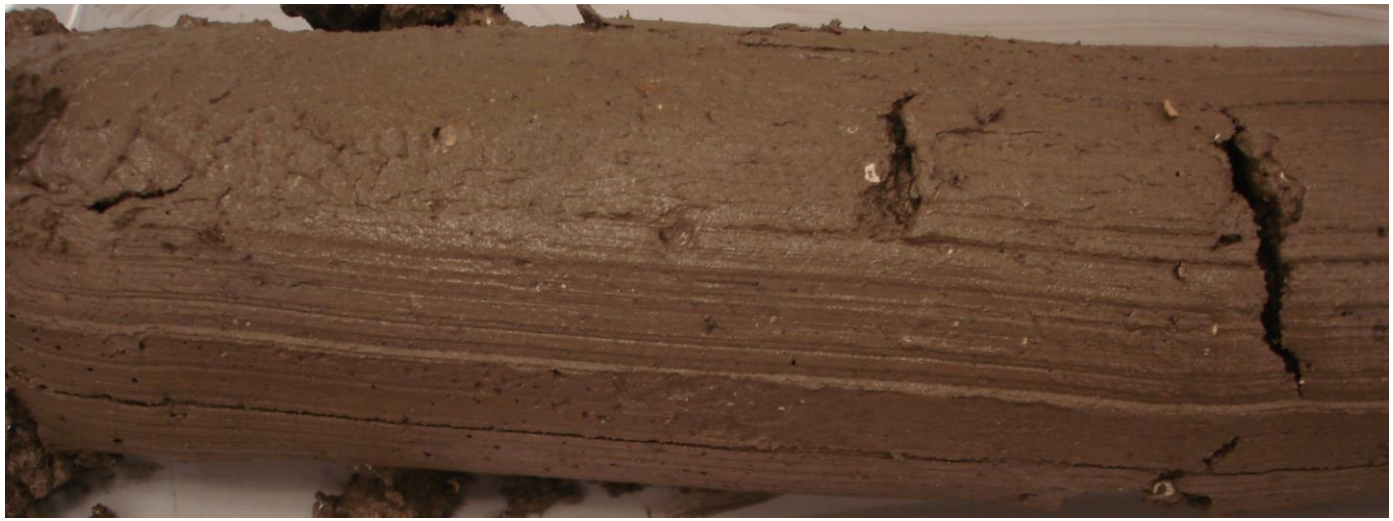
THURBER

PHOTOGRAPHS OF CSR CORE SAMPLES

CANADIAN SEABED RESEARCH



VC-13 GT4

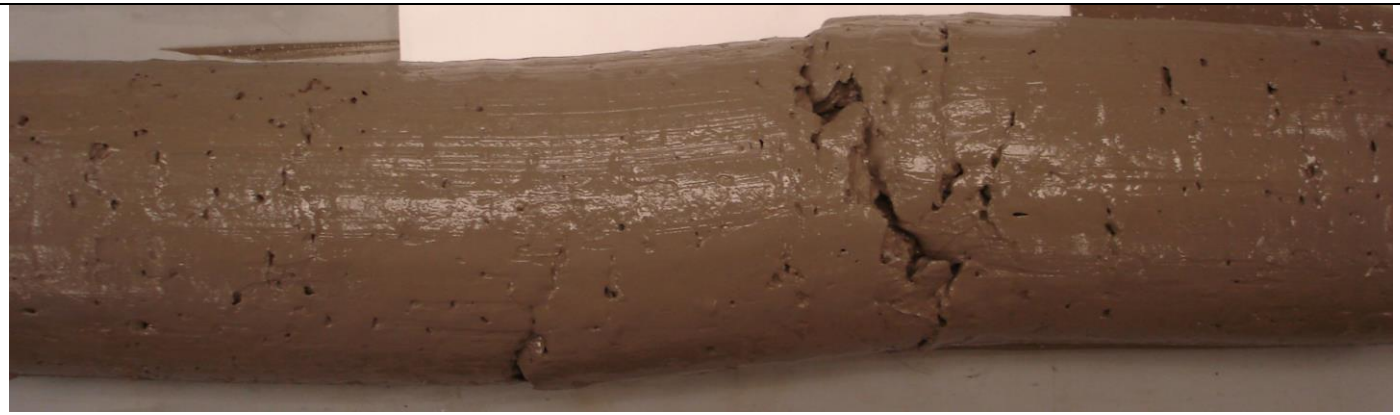


VC-47 GT2

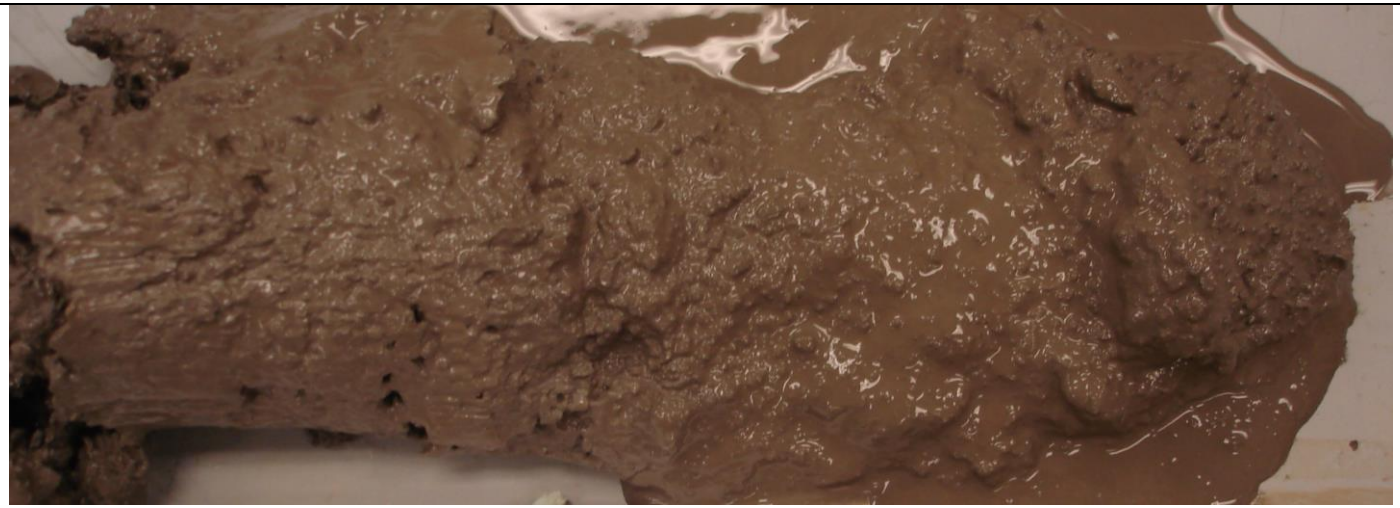
THURBER

PHOTOGRAPHS OF CSR CORE SAMPLES

CANADIAN SEABED RESEARCH



VC-10 GT2



VC-21 GT3

THURBER

PHOTOGRAPHS OF CSR CORE SAMPLES

CANADIAN SEABED RESEARCH

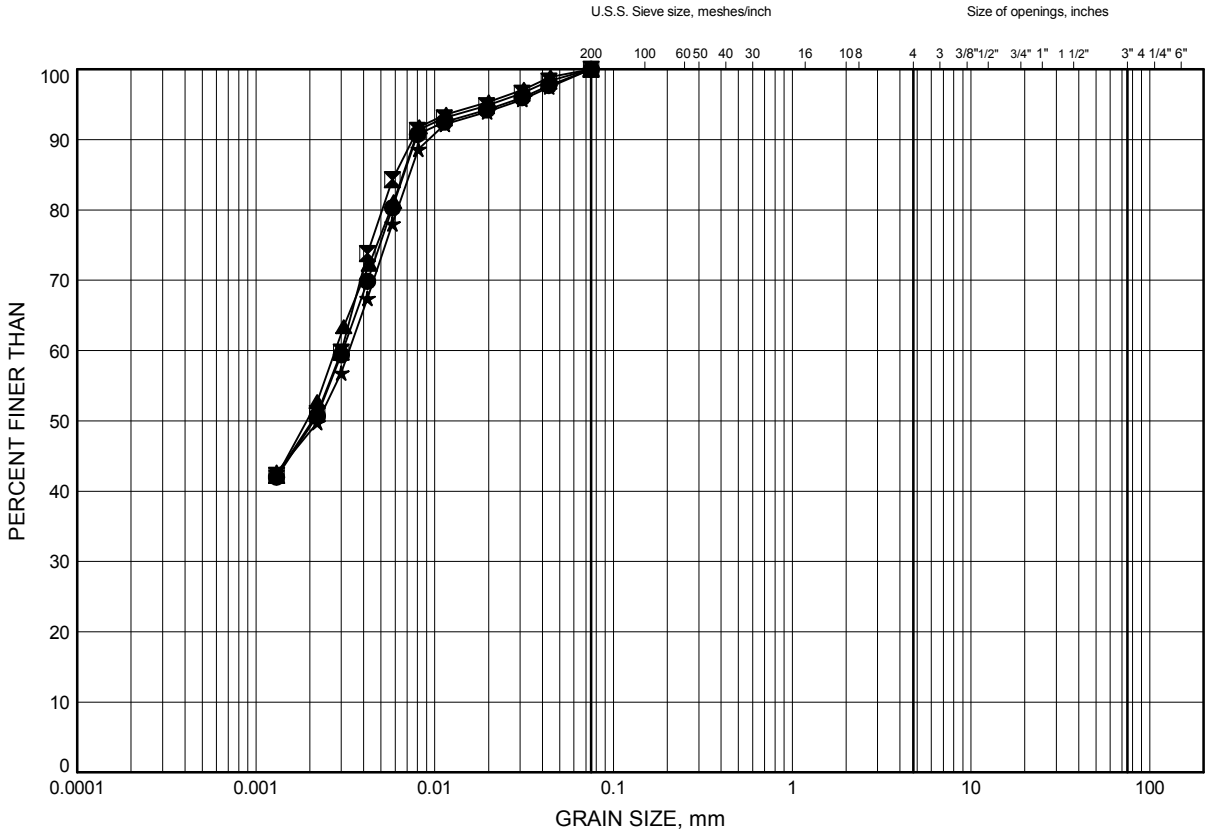
VC-50 GT4

THURBER

Canadian Seabed Research - Laboratory Testing

GRAIN SIZE DISTRIBUTION

FIGURE 1



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	VC-17 GT1	3.00	
⊠	VC-17 GT2	2.05	
▲	VC-17 GT3	1.10	
★	VC-17 GT4	0.35	

Date October 2015

19-6969-0

THURBER

Prep'd EA

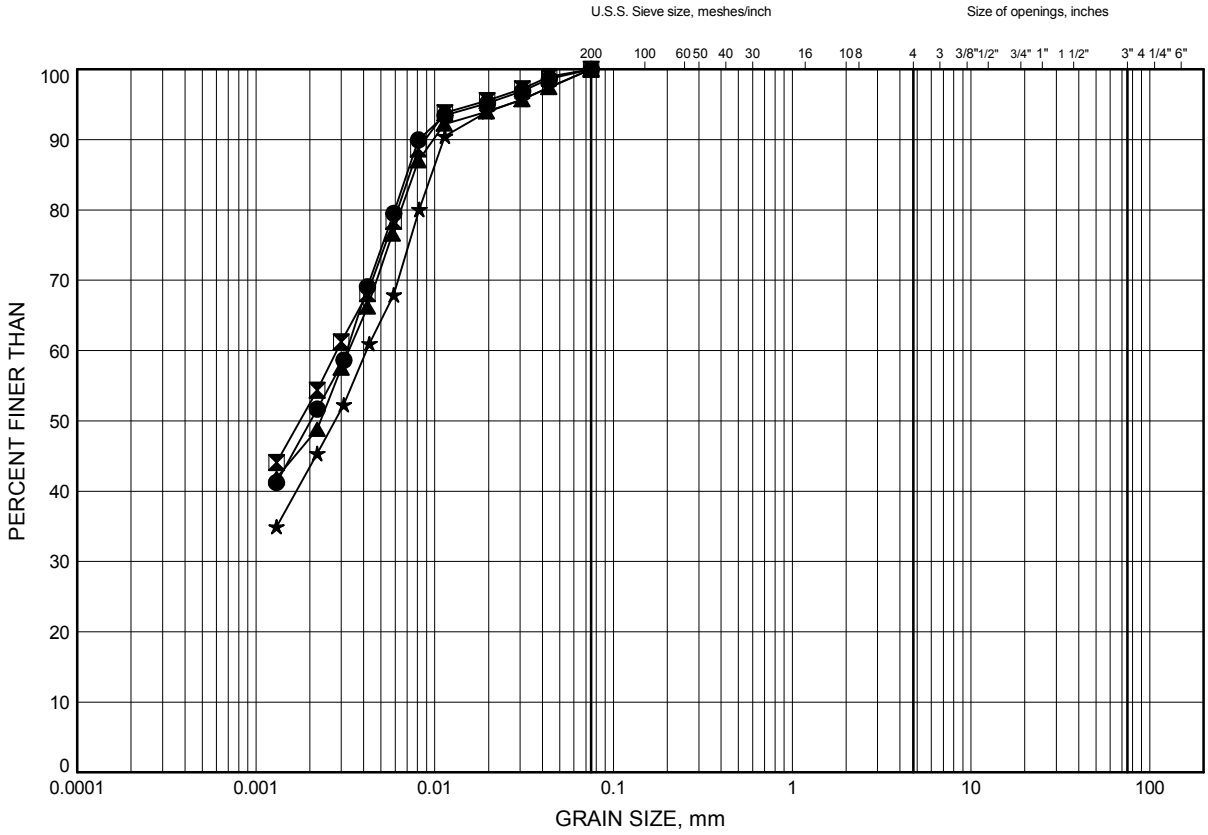
Chkd. WM

GRAIN SIZE DISTRIBUTION - THURBER 19-6969-0.GPJ 10/16/15

Canadian Seabed Research - Laboratory Testing

GRAIN SIZE DISTRIBUTION

FIGURE 2



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	VC-18 GT1	3.30	
⊠	VC-18 GT2	2.35	
▲	VC-18 GT3	1.40	
★	VC-18 GT4	0.40	

Date October 2015

19-6969-0

THURBER

Prep'd EA

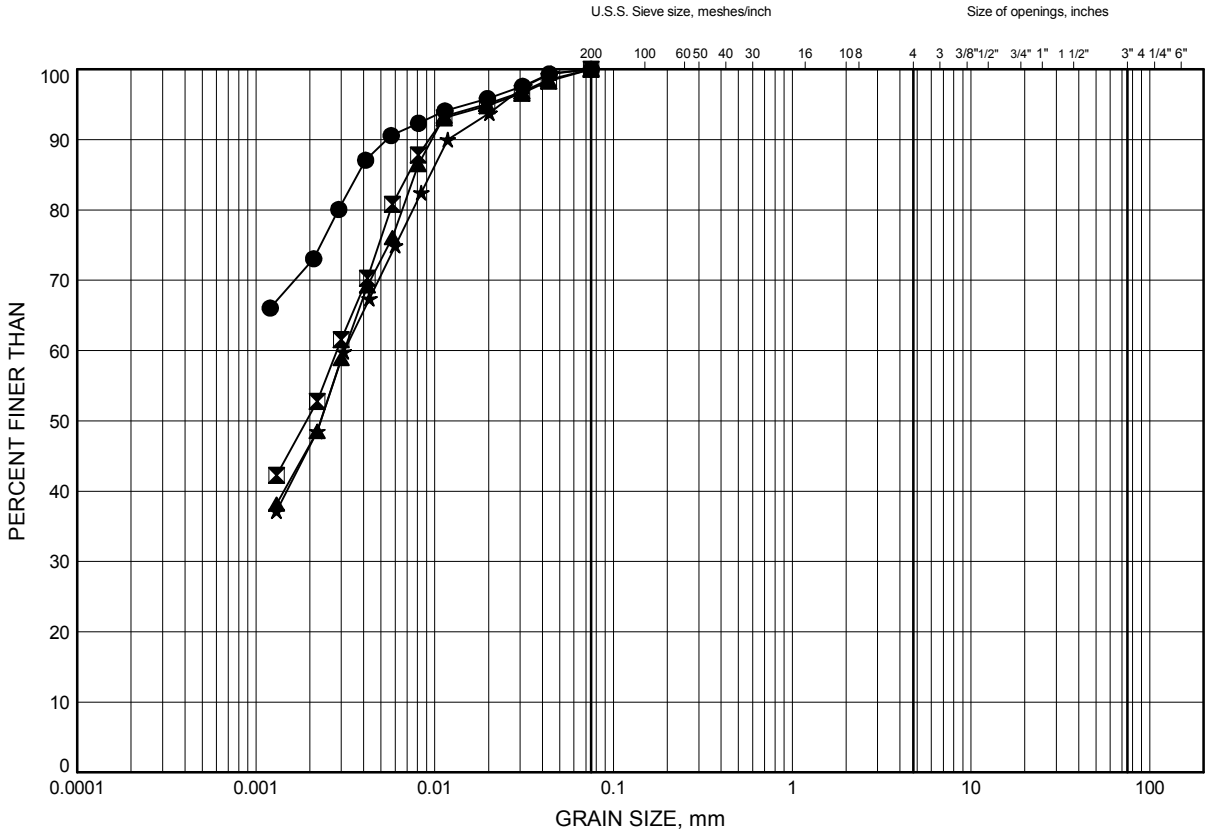
Chkd. WM

GRAIN SIZE DISTRIBUTION - THURBER 19-6969-0.GPJ 10/16/15

Canadian Seabed Research - Laboratory Testing

GRAIN SIZE DISTRIBUTION

FIGURE 3



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	VC-18A	3.25	
⊠	VC-19 GT1	3.15	
▲	VC-19 GT2	2.20	
★	VC-19 GT3	1.35	

Date October 2015

19-6969-0

THURBER

Prep'd EA

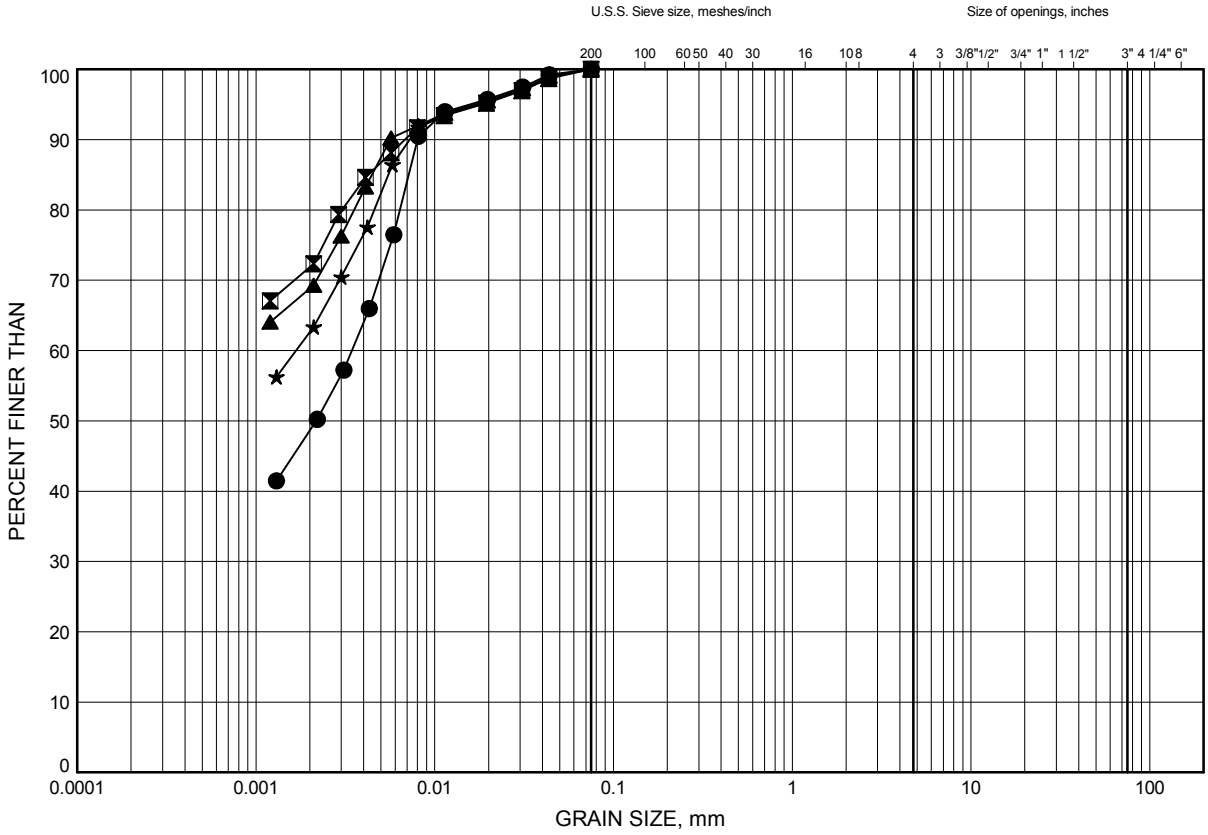
Chkd. WM

GRAIN SIZE DISTRIBUTION - THURBER 19-6969-0.GPJ 10/16/15

Canadian Seabed Research - Laboratory Testing

GRAIN SIZE DISTRIBUTION

FIGURE 4



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	VC-19 NOSE	3.85	
⊠	VC-1A GT1	1.79	
▲	VC-1A GT2	0.80	
★	VC-1A GT3	0.09	

Date October 2015

19-6969-0

THURBER

Prep'd EA

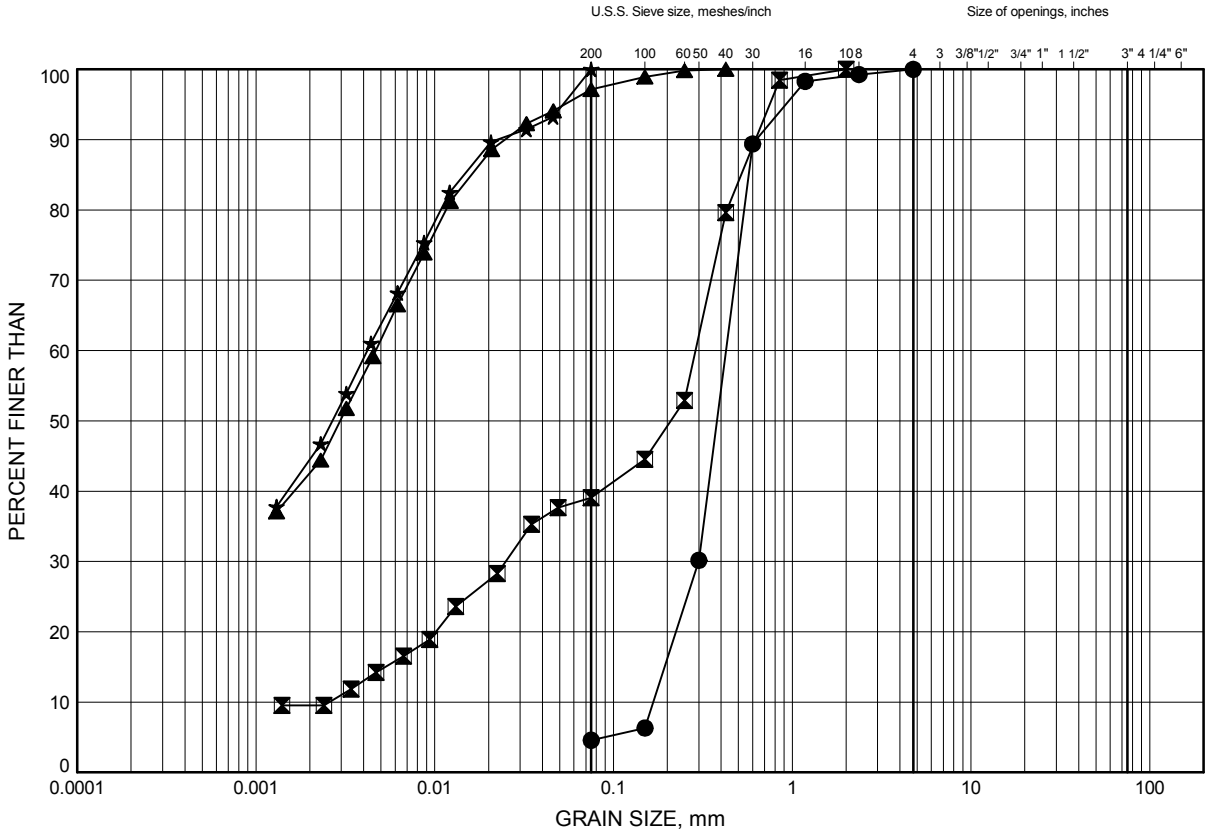
Chkd. WM

GRAIN SIZE DISTRIBUTION - THURBER 19-6969-0.GPJ 10/16/15

Canadian Seabed Research - Laboratory Testing

GRAIN SIZE DISTRIBUTION

FIGURE 5



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	VC-2 GT1	3.96	
⊠	VC-2 GT2	3.01	
▲	VC-2 GT3	2.06	
★	VC-2 GT4	1.11	

Date October 2015

19-6969-0

THURBER

Prep'd EA

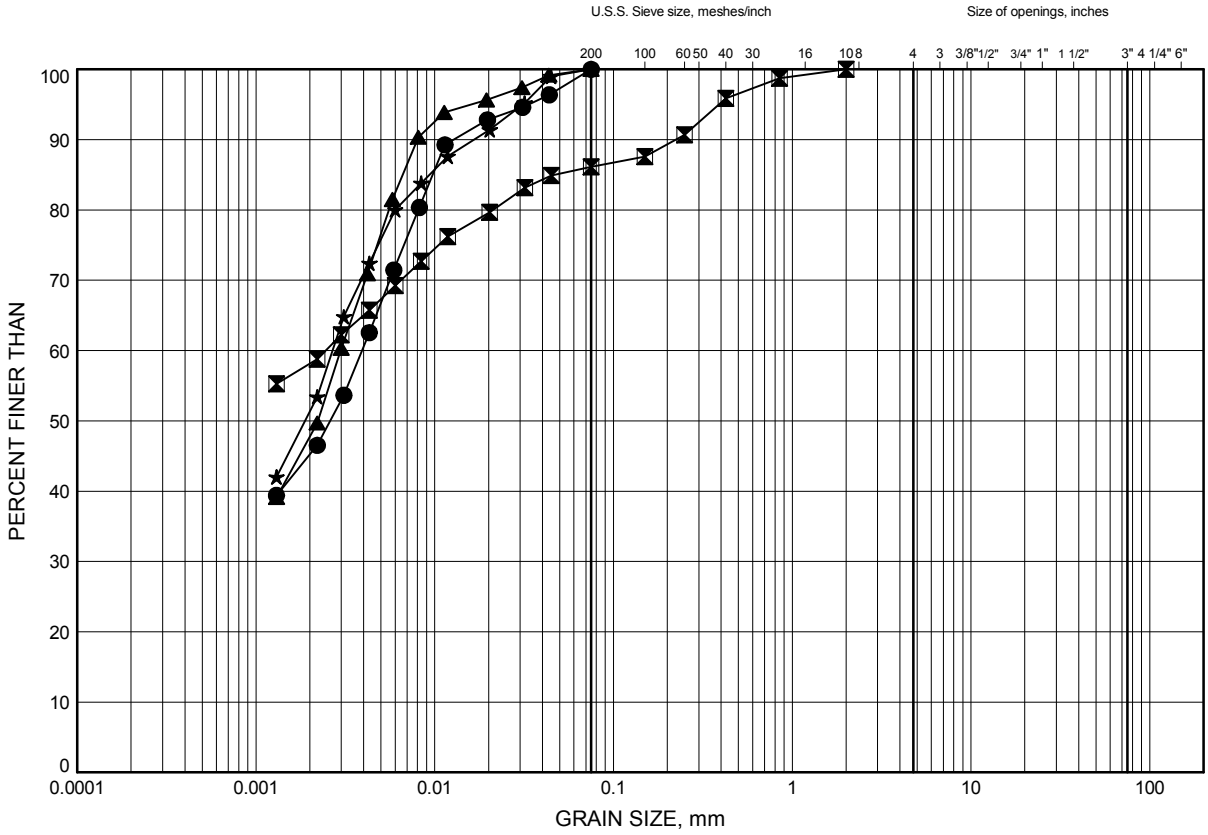
Chkd. WM

GRAIN SIZE DISTRIBUTION - THURBER 19-6969-0.GPJ 10/16/15

Canadian Seabed Research - Laboratory Testing

GRAIN SIZE DISTRIBUTION

FIGURE 6



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	VC-2 GT5	0.26	
⊠	VC-2 NOSE	4.63	
▲	VC-20 GT1	3.35	
★	VC-20 GT2	2.40	

Date October 2015

19-6969-0

THURBER

Prep'd EA

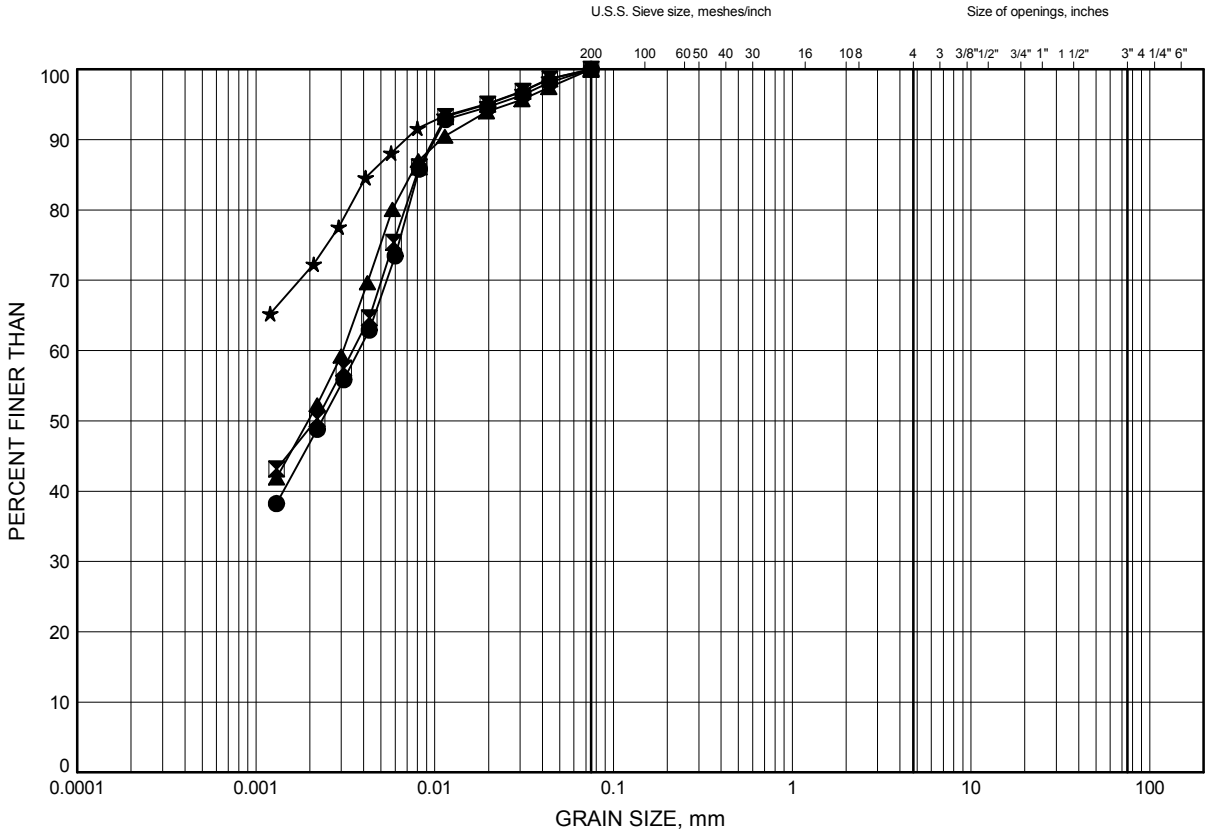
Chkd. WM

GRAIN SIZE DISTRIBUTION - THURBER 19-6969-0.GPJ 10/16/15

Canadian Seabed Research - Laboratory Testing

GRAIN SIZE DISTRIBUTION

FIGURE 7



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	VC-20 GT3	1.45	
⊠	VC-20 GT4	0.42	
▲	VC-20 NOSE	4.02	
★	VC-3 GT1	1.61	

Date October 2015

19-6969-0

THURBER

Prep'd EA

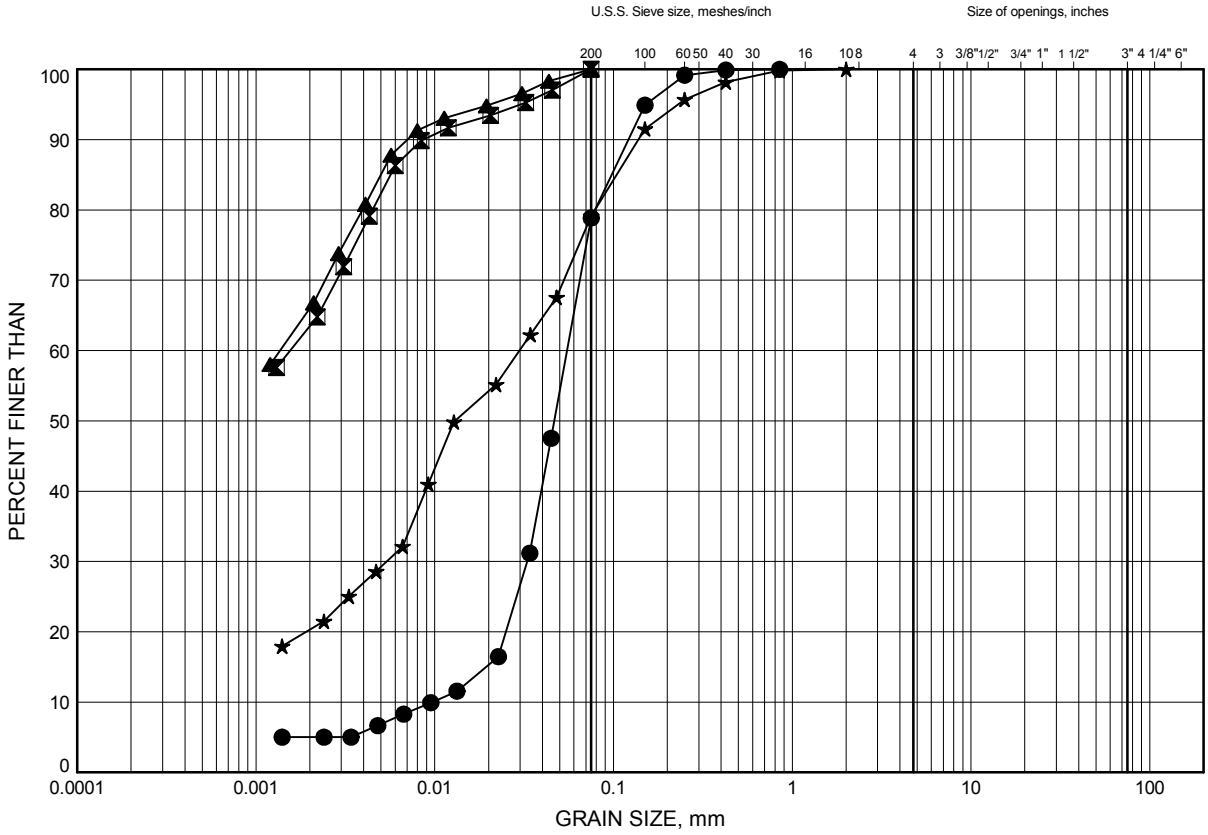
Chkd. WM

GRAIN SIZE DISTRIBUTION - THURBER 19-6969-0.GPJ 10/16/15

Canadian Seabed Research - Laboratory Testing

GRAIN SIZE DISTRIBUTION

FIGURE 8



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	VC-3 GT2	0.34	
⊠	VC-3 GT2	0.84	
▲	VC-3 NOSE	2.23	
★	VC-4 GT1	0.10	

Date October 2015

19-6969-0

THURBER

Prep'd EA

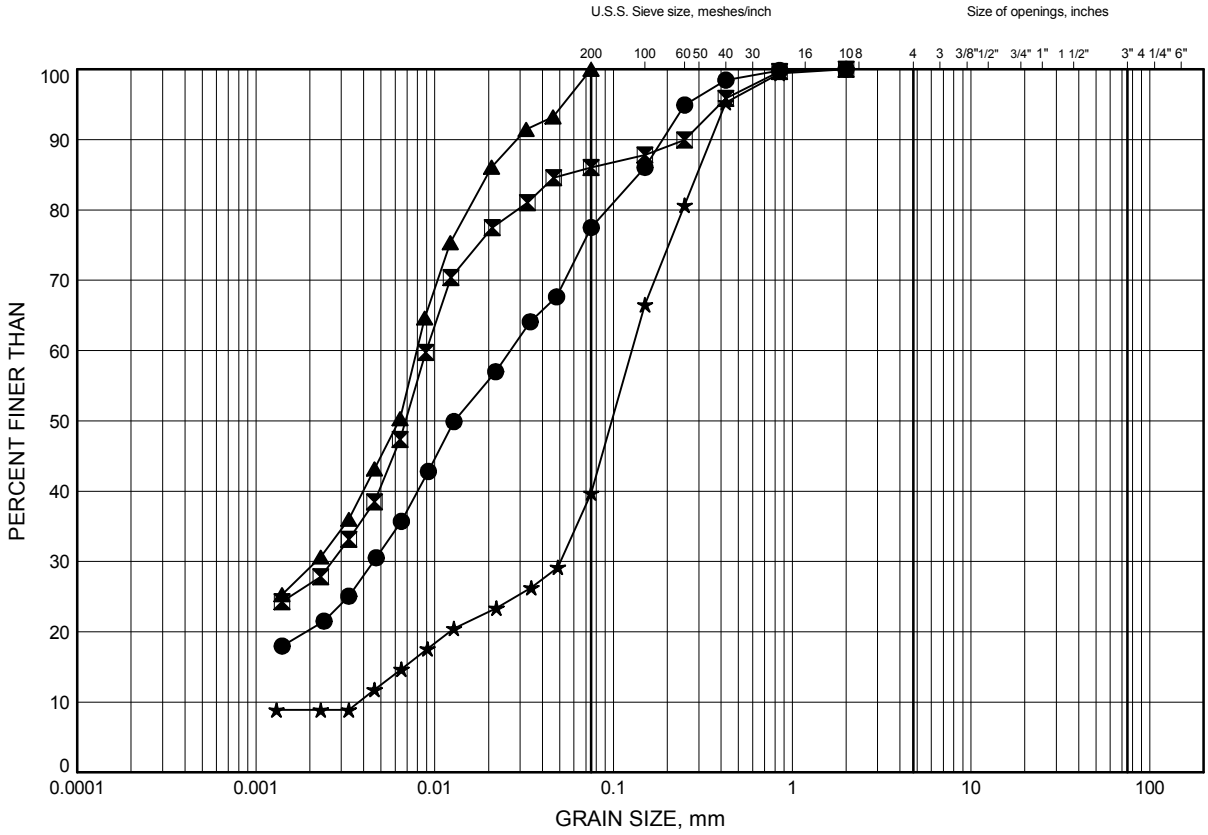
Chkd. WM

GRAIN SIZE DISTRIBUTION - THURBER 19-6969-0.GPJ 10/16/15

Canadian Seabed Research - Laboratory Testing

GRAIN SIZE DISTRIBUTION

FIGURE 9



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	VC-4 GT2	2.01	
⊠	VC-4 GT3	1.16	
▲	VC-4 GT4	0.33	
★	VC-4 NOSE	3.63	

Date October 2015

19-6969-0

THURBER

Prep'd EA

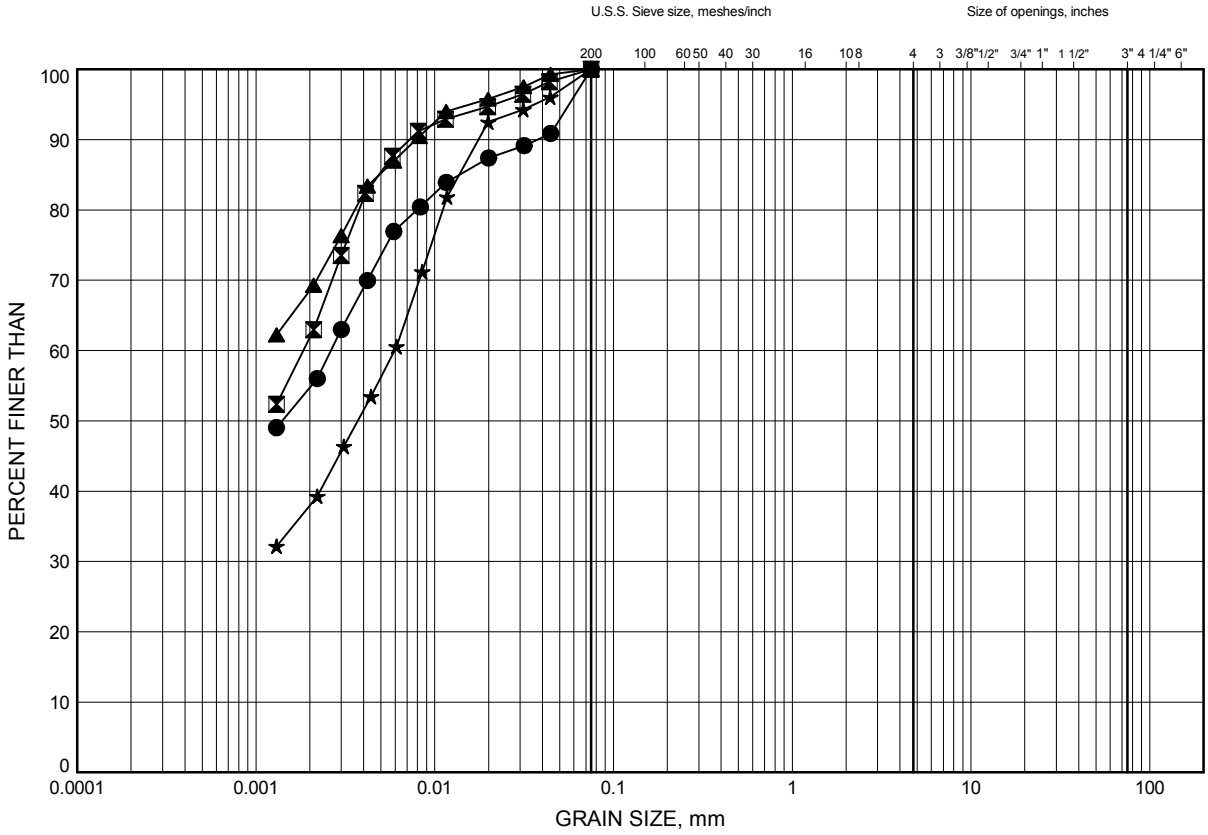
Chkd. WM

GRAIN SIZE DISTRIBUTION - THURBER 19-6969-0.GPJ 10/16/15

Canadian Seabed Research - Laboratory Testing

GRAIN SIZE DISTRIBUTION

FIGURE 10



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	VC-45 GT1	0.91	
⊠	VC-45 GT2	0.20	
▲	VC-45 NOSE	1.53	
★	VC-5 GT1	1.30	

Date October 2015

19-6969-0

THURBER

Prep'd EA

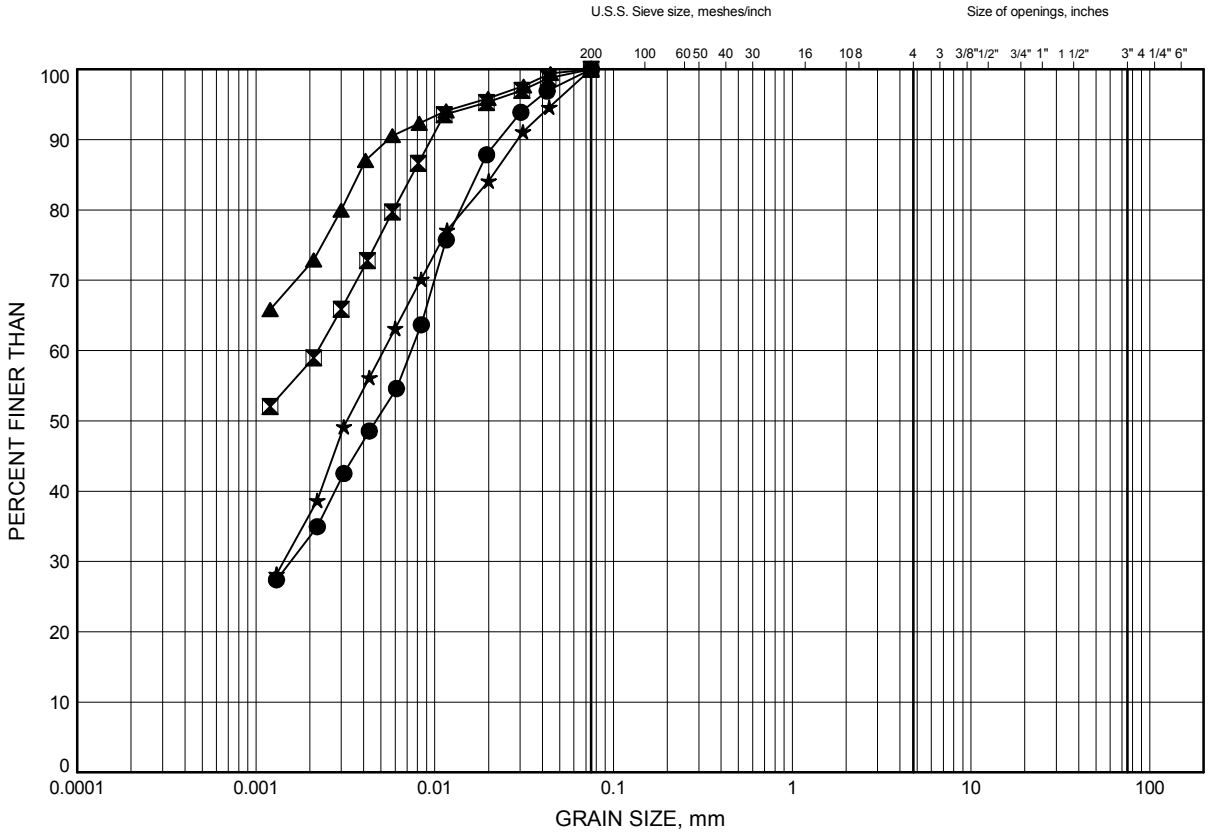
Chkd. WM

GRAIN SIZE DISTRIBUTION - THURBER 19-6969-0.GPJ 10/16/15

Canadian Seabed Research - Laboratory Testing

GRAIN SIZE DISTRIBUTION

FIGURE 11



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	VC-5 GT2	0.35	
⊠	VC-5 NOSE	2.02	
▲	VC-6 GT1	0.71	
★	VC-6 GT2	0.10	

Date October 2015

19-6969-0

THURBER

Prep'd EA

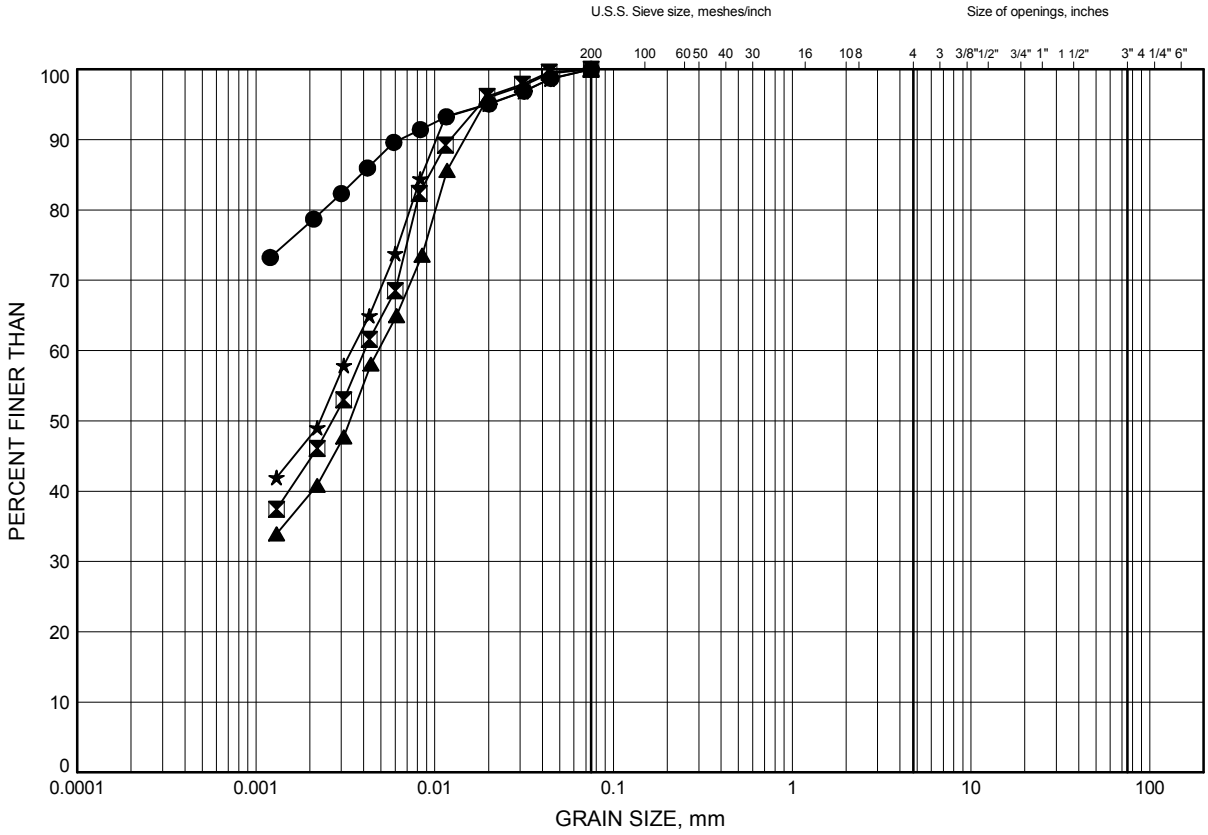
Chkd. WM

GRAIN SIZE DISTRIBUTION - THURBER 19-6969-0.GPJ 10/16/15

Canadian Seabed Research - Laboratory Testing

GRAIN SIZE DISTRIBUTION

FIGURE 12



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	VC-6 NOSE	1.33	
⊠	VC-7 GT1	0.30	
▲	VC-7 GT2	1.30	
★	VC-7 GT3	0.35	

Date October 2015

19-6969-0

THURBER

Prep'd EA

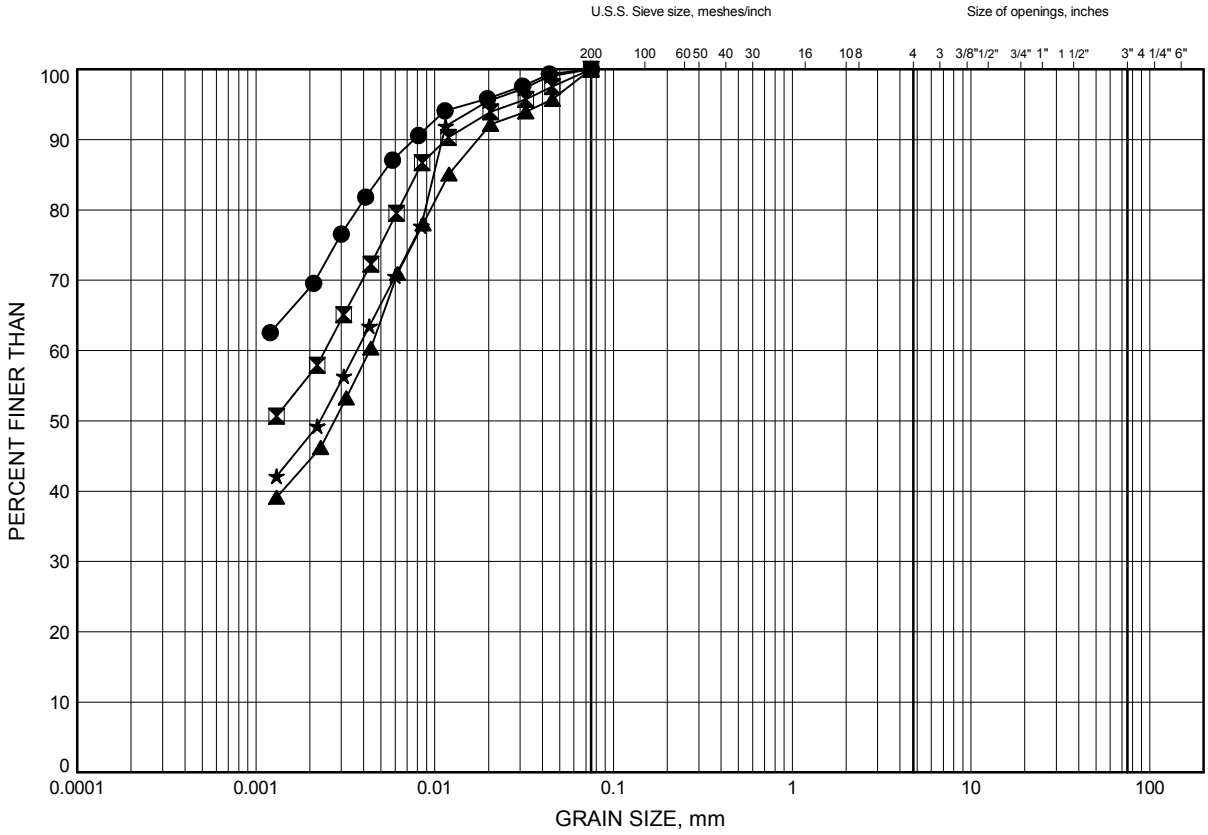
Chkd. WM

GRAIN SIZE DISTRIBUTION - THURBER 19-6969-0.GPJ 10/16/15

Canadian Seabed Research - Laboratory Testing

GRAIN SIZE DISTRIBUTION

FIGURE 13



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	VC-7 NOSE	2.90	
⊠	VC-8A GT2	2.30	
▲	VC-8A GT3	1.35	
★	VC-8A GT4	0.37	

Date October 2015

19-6969-0

THURBER

Prep'd EA

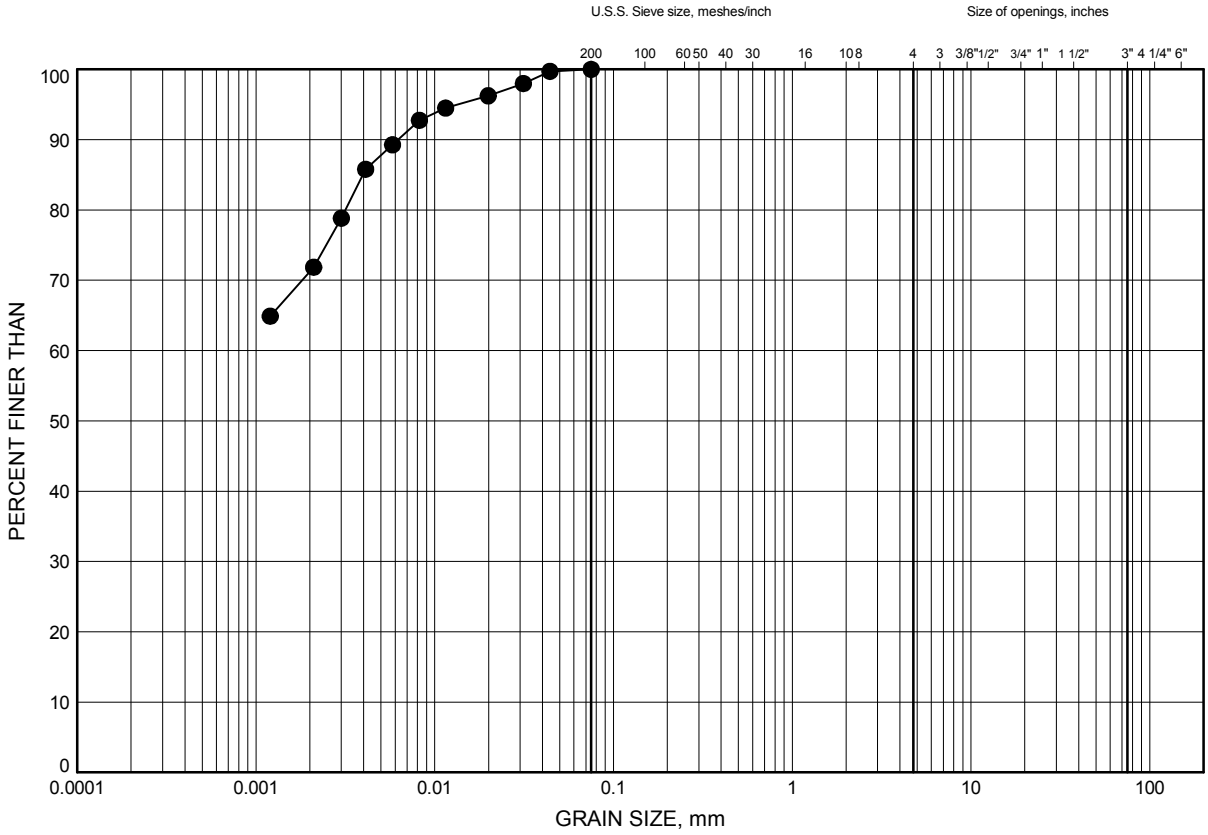
Chkd. WM

GRAIN SIZE DISTRIBUTION - THURBER 19-6969-0.GPJ 10/16/15

Canadian Seabed Research - Laboratory Testing

GRAIN SIZE DISTRIBUTION

FIGURE 14



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	VC-8A NOSE	3.90	

Date October 2015

19-6969-0

THURBER

Prep'd EA

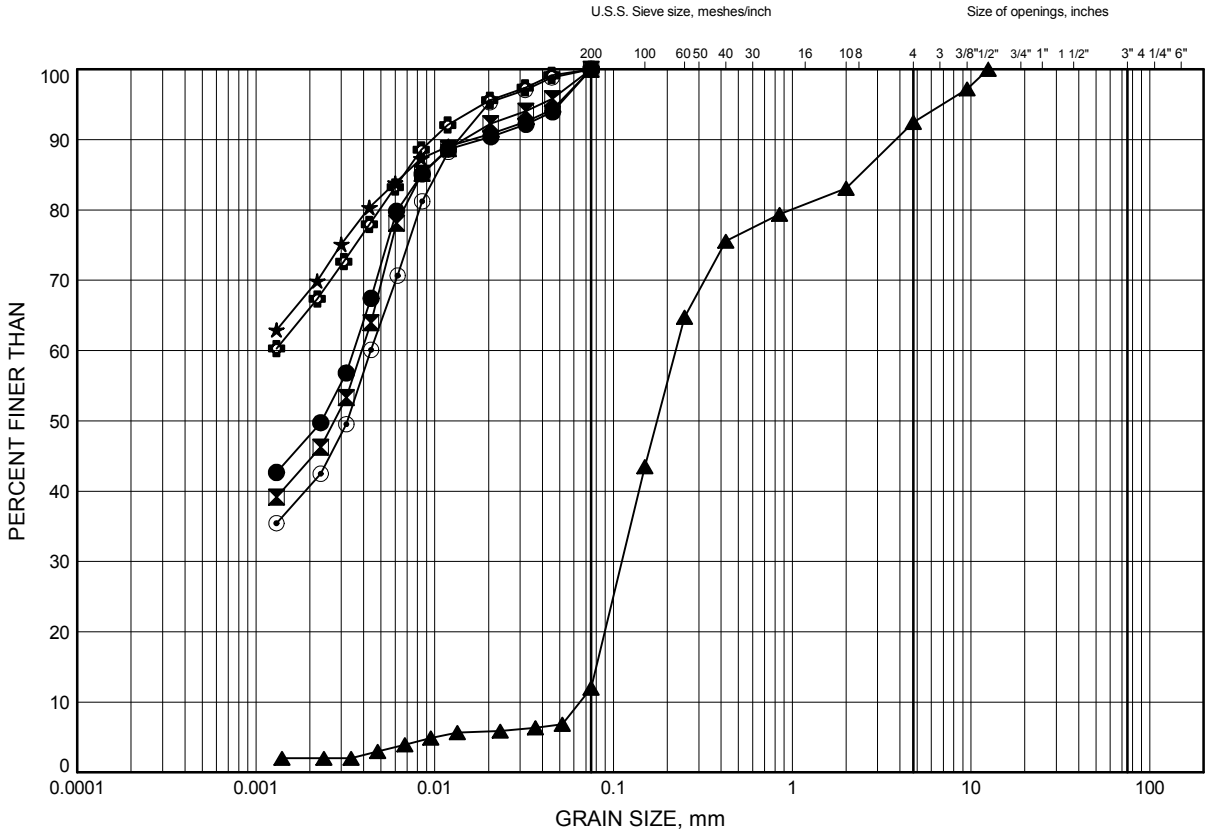
Chkd. WM

GRAIN SIZE DISTRIBUTION - THURBER 19-6969-0.GPJ 10/16/15

Canadian Seabed Research - Laboratory Testing

GRAIN SIZE DISTRIBUTION

FIGURE 1



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	VC-13 GT4	0.30	
⊠	VC-21 GT4	0.33	
▲	VC-46 GT2	0.17	
★	VC-49 GT1	1.75	
⊙	VC-49 GT3	0.25	
✿	VC-50 GT1	2.75	

Date November 2015

Project 19-6969-0

THURBER

Prep'd EA

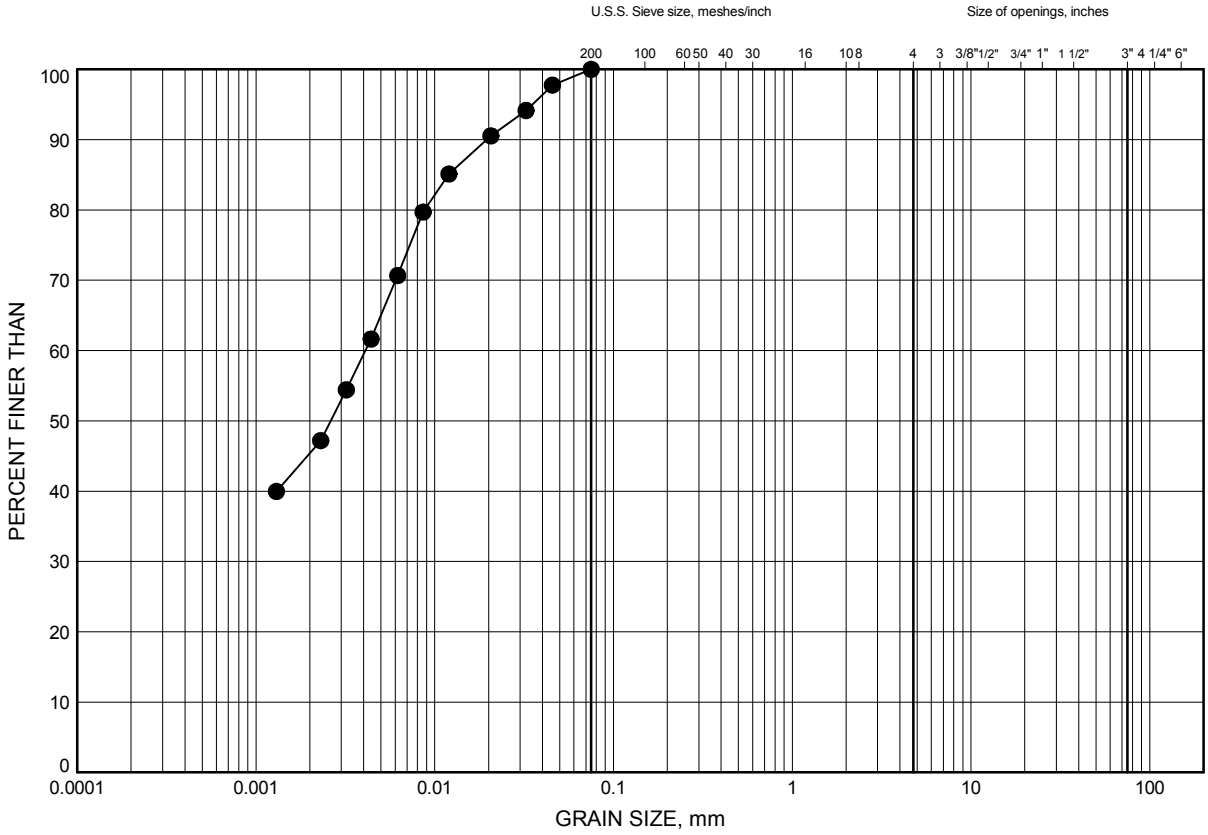
Chkd. WM

GRAIN SIZE DISTRIBUTION - THURBER 19-6969-0.GPJ 11/2/15

Canadian Seabed Research - Laboratory Testing

GRAIN SIZE DISTRIBUTION

FIGURE 2



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	VC-50 GT4	0.23	

GRAIN SIZE DISTRIBUTION - THURBER 19-6969-0.GPJ 11/2/15

Date November 2015

Project 19-6969-0

THURBER

Prep'd EA

Chkd. WM

SGS AGRIFOOD LABORATORIES

AgTest Farm Soil Report

1-503 Imperial Road North Guelph, ON, N1H 6T9 t: 519-837-1600 1-800-265-7175 f: 519-837-1242 ca.agri.guelph.lab@sgs.com

Report # 518668 THURBER ENGINEERING LTD. - VC3-VC21 OM

Sample ID:	Lab #	pH	BpH	Total Salts (mmhos/cm)	Organic Matter (%)	Nitrogen NO3-N (ppm)	Phosphorus - P (ppm)		Potassium K (ppm)	Magnesium Mg (ppm)	Calcium Ca (ppm)
1 - VC-3 GT-2 0-1.07 M	30685201				1.0						
2 - VC-49 GT-3 0-.5 M	30685202				0.8						
3 - VC-11 GT-4 0-.63 M	30685203				1.7						
4 - VC-17 GT-4 0-.70 M	30685204				1.5						
5 - VC-22 GT-4 3.45-3.6 M	30685205				1.5						
6 - VC-23 GT-4 0-.46 M	30685207				1.5						
7 - VC-21 GT-4 0-.65 M	30685208				1.7						

Sample ID:	Zinc Zn (ppm)	Zn Index	Manganese Mn (ppm)	Mn Index	Copper Cu (ppm)	Iron Fe (ppm)	Boron B (ppm)	Texture	Cation Exchange MEQ/100g	Base Saturation K%	Mg%	Ca%	H%
1													
2													
3													
4													
5													
6													
7													

Sample ID:	Sodium Na (ppm)	Sulphate Sulphur SO4-S (ppm)	Chloride Cl (ppm)	Aluminum Al (ppm)	K/Mg Ratio	Exchangeable Acidity						
1												
2												
3												
4												
5												
6												
7												

This Report shall not be reproduced without the written consent of SGS.Agri-Food Laboratories.
These results pertain solely to the sample(s) received by the laboratory.

Authorized By: *Jack Legg - Certified Crop Advisor, CCA-ON*

THURBER ENGINEERING LTD. - VC3-VC21 OM
Suite 103, 2010 Winston Park Dr
Oakville, ON L6H 5R7

Email

Date Received: Oct-30-2015
Date Reported: Nov-03-2015

Fax: 905-829-1166
Email: wmehdawi@thurber.ca

This document is issued by the Company under its General Conditions of Service accessible at http://www.sgs.com/terms_and_conditions.htm. (Printed copies are available upon request.) Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.
Your personal information is managed according to the Privacy Act. We will not willfully disclose individually identifiable information.

UNCONFINED COMPRESSIVE STRENGTH TEST (UC) OF COHESIVE SOIL

ASTM D 2166

SAMPLE IDENTIFICATION

PROJECT NUMBER	1541891	SAMPLE NUMBER	GT3
BOREHOLE NUMBER	VC48	SAMPLE DEPTH, m	-

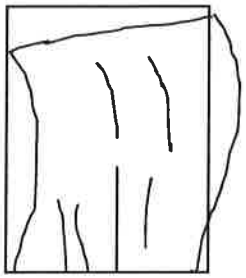
TEST CONDITIONS

MACHINE SPEED, mm/min	1.38	TYPE OF SPECIMEN	Intact
RATE OF AXIAL STRAIN, %/min	0.77	L/D	2.12

SPECIMEN INFORMATION

SAMPLE HEIGHT, cm	17.91	WATER CONTENT, (specimen) %	37.48
SAMPLE DIAMETER, cm	8.47	UNIT WEIGHT, kN/m^3	17.52
SAMPLE AREA, cm^2	56.28	DRY UNIT WT., kN/m^3	12.75
SAMPLE VOLUME, cm^3	1007.95	SPECIFIC GRAVITY, assumed	2.70
WET WEIGHT, g	1801.70	VOID RATIO	1.08
DRY WEIGHT, g	1310.52		

FAILURE SKETCH



TEST RESULTS

STRAIN AT FAILURE, %	9.2	UNCONFINED COMPRESSIVE STRENGTH, kPa	27.0
		SHEAR STRENGTH, kPa	13.5

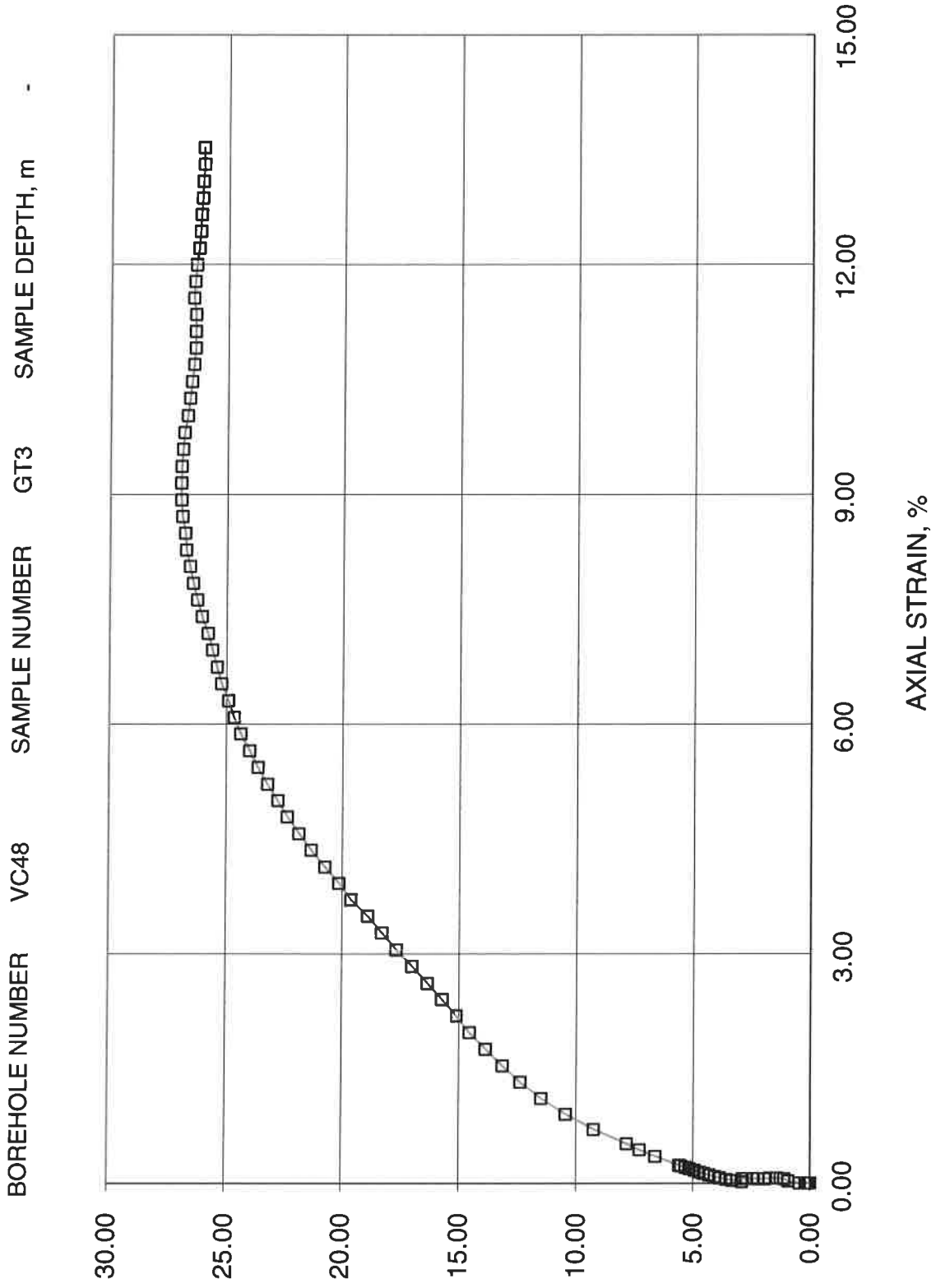
REMARKS:

DATE OF TESTING: October 18, 2015

Checked By:

Golder Associates

UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOIL | **FIGURE**



Project No. 1541891

Checked By:

UNCONFINED COMPRESSIVE STRENGTH TEST (UC) OF COHESIVE SOIL

ASTM D 2166

SAMPLE IDENTIFICATION

PROJECT NUMBER	1541891	SAMPLE NUMBER	GT1
BOREHOLE NUMBER	VC49	SAMPLE DEPTH, m	-

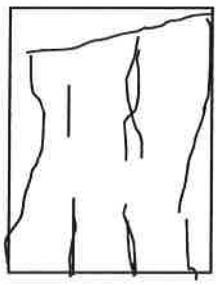
TEST CONDITIONS

MACHINE SPEED, mm/min	1.38	TYPE OF SPECIMEN	Intact
RATE OF AXIAL STRAIN, %/min	0.71	L/D	2.15

SPECIMEN INFORMATION

SAMPLE HEIGHT, cm	19.47	WATER CONTENT, (specimen) %	28.63
SAMPLE DIAMETER, cm	9.04	UNIT WEIGHT, kN/m^3	18.99
SAMPLE AREA, cm^2	64.18	DRY UNIT WT., kN/m^3	14.76
SAMPLE VOLUME, cm^3	1249.67	SPECIFIC GRAVITY, assumed	2.70
WET WEIGHT, g	2421.00	VOID RATIO	0.79
DRY WEIGHT, g	1882.14		

FAILURE SKETCH



TEST RESULTS

STRAIN AT FAILURE, %	15.0	UNCONFINED COMPRESSIVE STRENGTH, kPa	62.3
		SHEAR STRENGTH, kPa	31.2

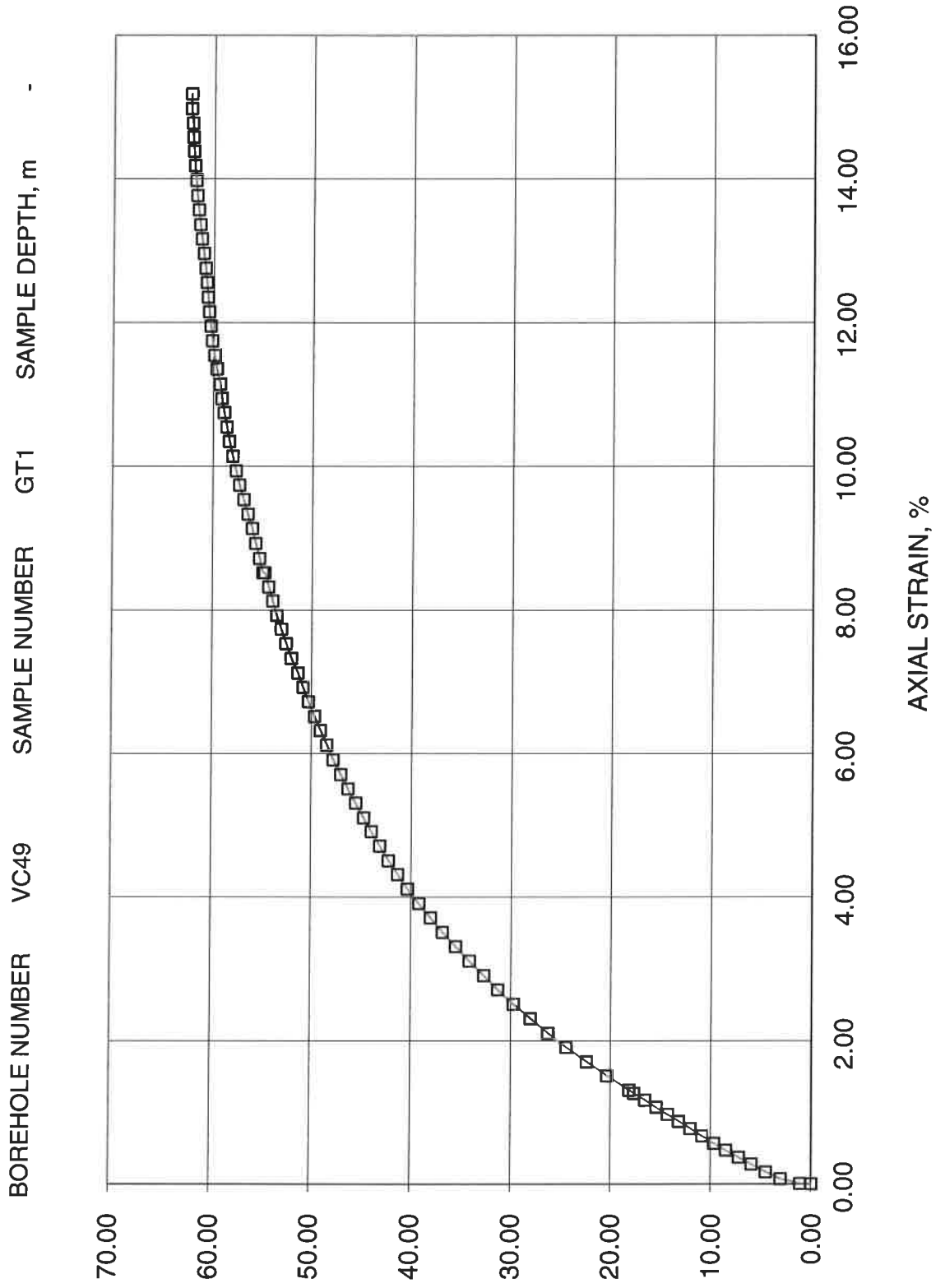
REMARKS:

DATE OF TESTING: October 18, 2015

Checked By:

Golder Associates

UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOIL	FIGURE



Project No. 1541891

Checked By:

UNCONFINED COMPRESSIVE STRENGTH TEST (UC) OF COHESIVE SOIL

ASTM D 2166

SAMPLE IDENTIFICATION

PROJECT NUMBER	1541891	SAMPLE NUMBER	GT1
BOREHOLE NUMBER	VC47	SAMPLE DEPTH, m	-

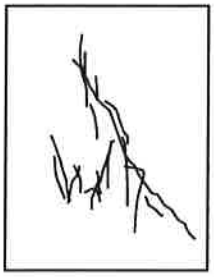
TEST CONDITIONS

MACHINE SPEED, mm/min	1.38	TYPE OF SPECIMEN	Intact
RATE OF AXIAL STRAIN, %/min	0.68	L/D	2.26

SPECIMEN INFORMATION

SAMPLE HEIGHT, cm	20.37	WATER CONTENT, (specimen) %	165.51
SAMPLE DIAMETER, cm	9.00	UNIT WEIGHT, kN/m^3	12.16
SAMPLE AREA, cm^2	63.62	DRY UNIT WT., kN/m^3	4.58
SAMPLE VOLUME, cm^3	1295.89	SPECIFIC GRAVITY, assumed	2.70
WET WEIGHT, g	1607.60	VOID RATIO	4.78
DRY WEIGHT, g	605.48		

FAILURE SKETCH



TEST RESULTS

STRAIN AT FAILURE, %	7.5	UNCONFINED COMPRESSIVE STRENGTH, kPa	28.1
		SHEAR STRENGTH, kPa	14.1

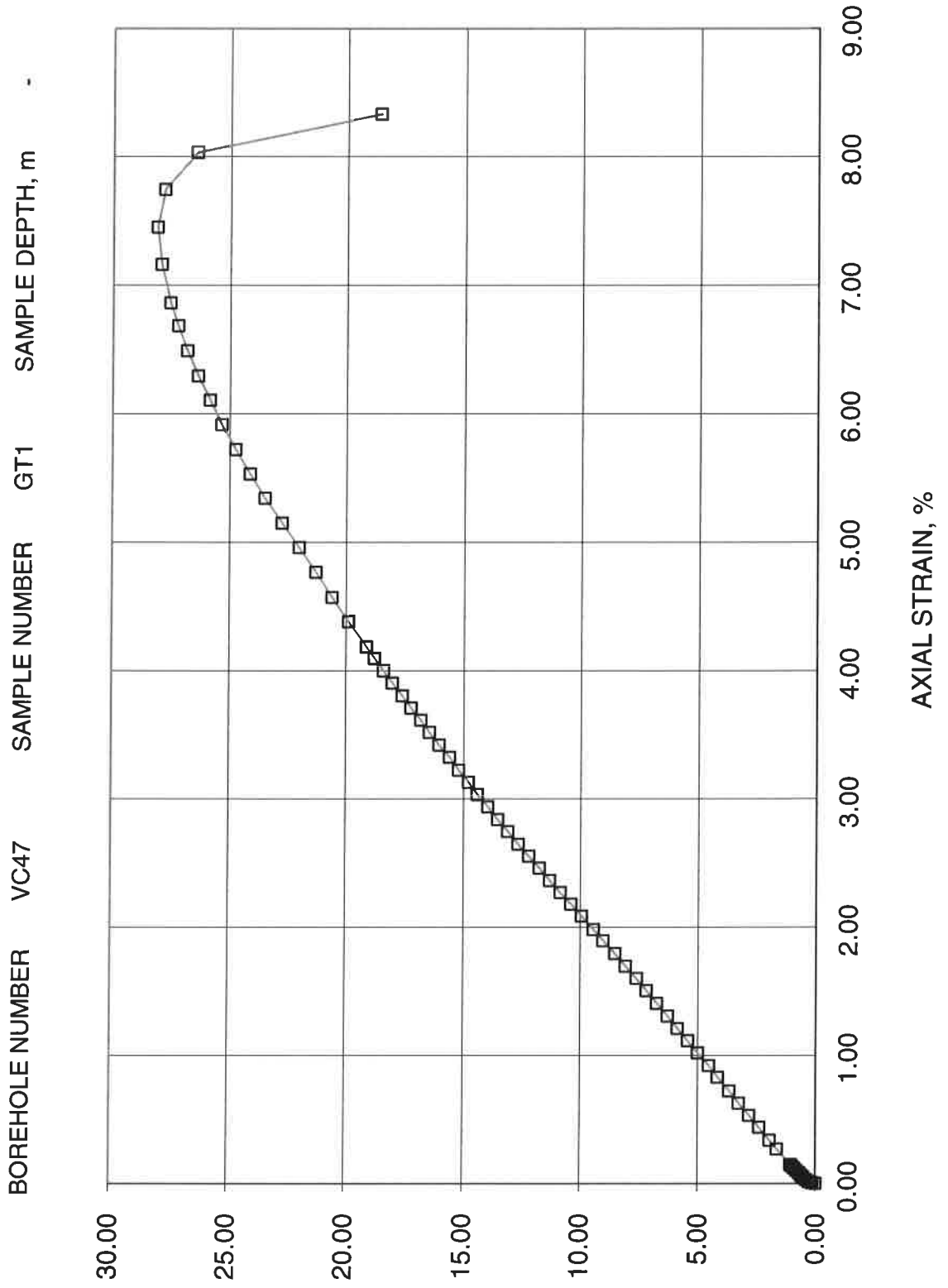
REMARKS:

DATE OF TESTING: October 18, 2015

Checked By:

Golder Associates

UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOIL	FIGURE



Project No. 1541891

Checked By:

UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST (UU)

ASTM D 2850

SAMPLE IDENTIFICATION

PROJECT NUMBER	1541891	SAMPLE NUMBER	GT2
BOREHOLE NUMBER	VC47	SAMPLE DEPTH, m	0.87-1.37

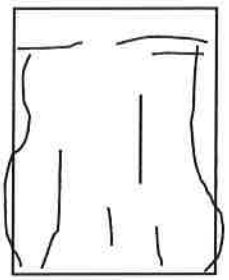
TEST CONDITIONS

MACHINE SPEED, mm/min	1.38	TYPE OF SPECIMEN	Intact
RATE OF AXIAL STRAIN, %/min	1.00	L/D	1.98
CELL PRESSURE, kPa	96		

SPECIMEN INFORMATION

SAMPLE HEIGHT, cm	13.85	WATER CONTENT, (specimen) %	109.80
SAMPLE DIAMETER, cm	6.99	UNIT WEIGHT, kN/m^3	13.69
SAMPLE AREA, cm^2	38.37	DRY UNIT WT., kN/m^3	6.52
SAMPLE VOLUME, cm^3	531.49	SPECIFIC GRAVITY, assumed	2.70
WET WEIGHT, g	742.18	VOID RATIO	3.06
DRY WEIGHT, g	353.76		

FAILURE SKETCH



TEST RESULTS

STRAIN AT FAILURE, %	15.1	COMPRESSIVE STRENGTH, kPa	26

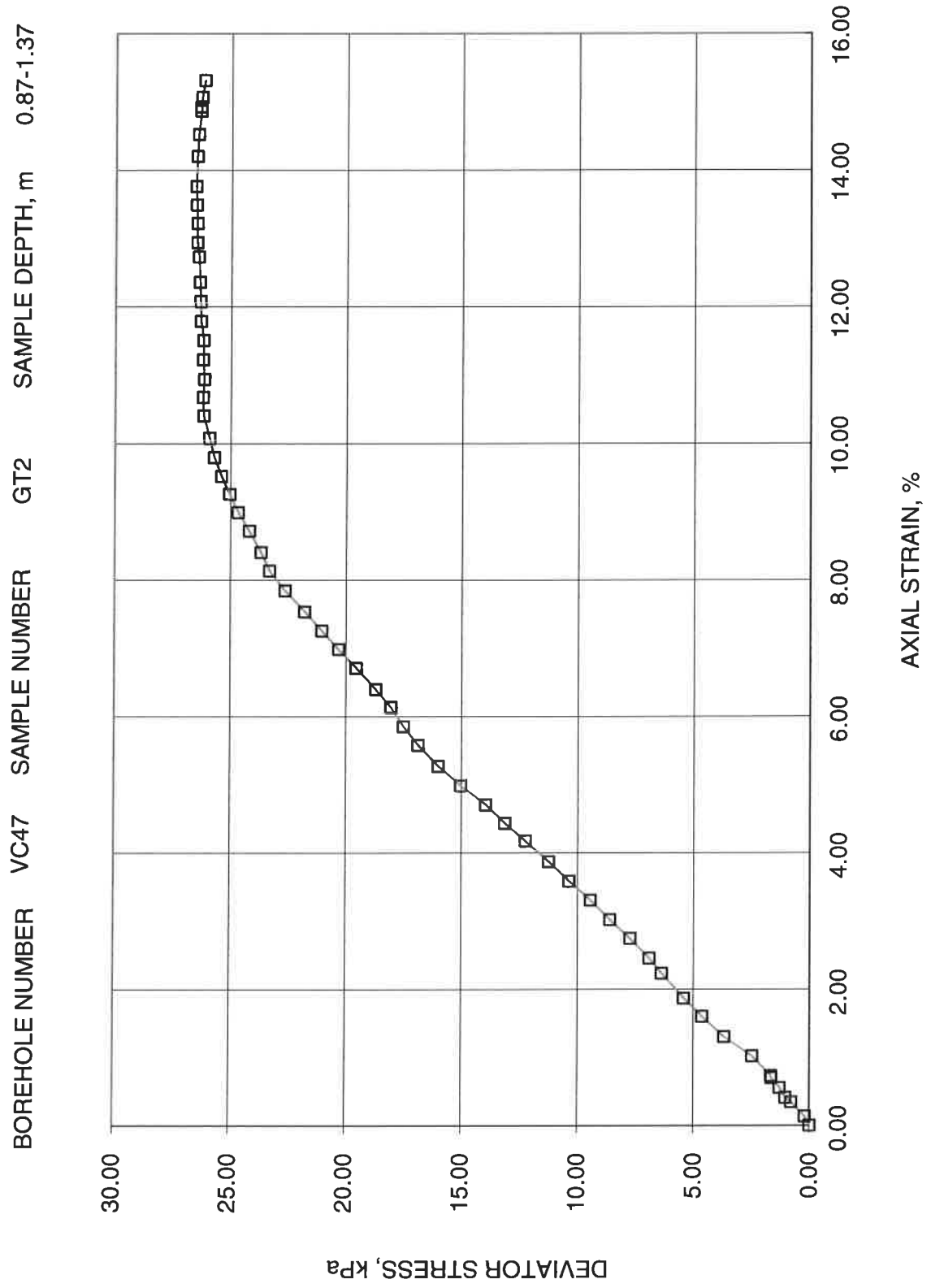
REMARKS: DATE: September 30, 2015

L/D Ratio not in accordance with ASTM Standard

Checked By:

Golder Associates

UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST (UU)	FIGURE



Project No. 1541891

Checked By: bde

UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST (UU)

ASTM D 2850

SAMPLE IDENTIFICATION

PROJECT NUMBER	1541891	SAMPLE NUMBER	GT1
BOREHOLE NUMBER	VC48	SAMPLE DEPTH, m	1.57-2.07

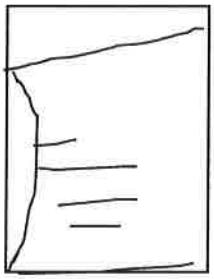
TEST CONDITIONS

MACHINE SPEED, mm/min	1.38	TYPE OF SPECIMEN	Intact
RATE OF AXIAL STRAIN, %/min	0.72	L/D	2.03
CELL PRESSURE, kPa	144		

SPECIMEN INFORMATION

SAMPLE HEIGHT, cm	19.22	WATER CONTENT, (specimen) %	18.43
SAMPLE DIAMETER, cm	9.45	UNIT WEIGHT, kN/m^3	22.41
SAMPLE AREA, cm^2	70.14	DRY UNIT WT., kN/m^3	18.92
SAMPLE VOLUME, cm^3	1348.06	SPECIFIC GRAVITY, assumed	2.70
WET WEIGHT, g	3081.83	VOID RATIO	0.40
DRY WEIGHT, g	2602.24		

FAILURE SKETCH



TEST RESULTS

STRAIN AT FAILURE, %	15.0	COMPRESSIVE STRENGTH, kPa	46

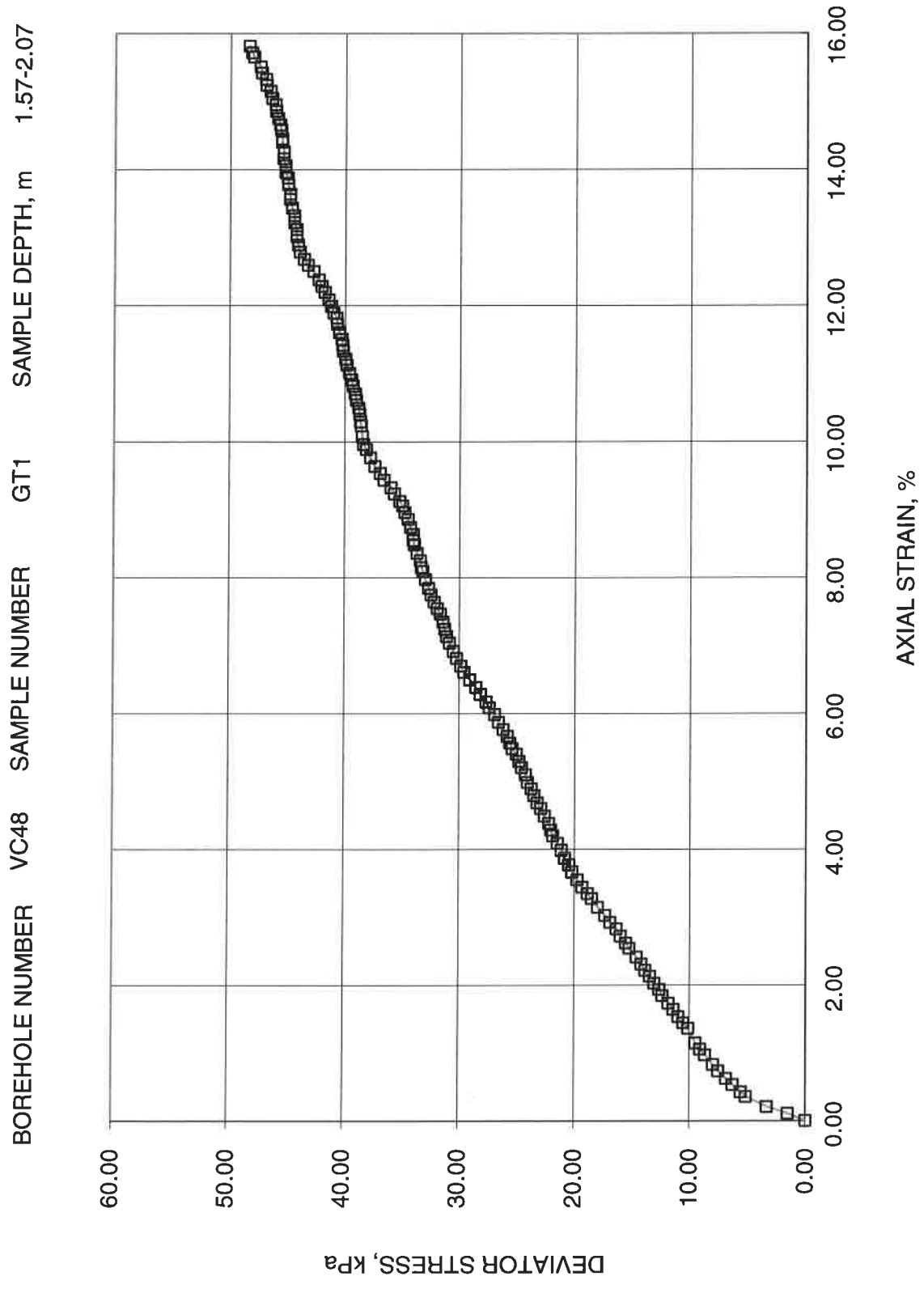
REMARKS:

DATE: September 30, 2015

Checked By:

Golder Associates

UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST (UU)	FIGURE



Project No. 1541891

Checked By: MG

UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST (UU)

ASTM D 2850

SAMPLE IDENTIFICATION

PROJECT NUMBER	1541891	SAMPLE NUMBER	GT2
BOREHOLE NUMBER	VC10	SAMPLE DEPTH, m	1.15-1.85

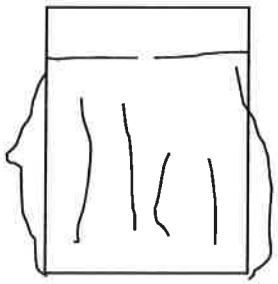
TEST CONDITIONS

MACHINE SPEED, mm/min	1.38	TYPE OF SPECIMEN	Intact
RATE OF AXIAL STRAIN, %/min	0.68	L/D	2.40
CELL PRESSURE, kPa	335		

SPECIMEN INFORMATION

SAMPLE HEIGHT, cm	20.39	WATER CONTENT, (specimen) %	78.84
SAMPLE DIAMETER, cm	8.51	UNIT WEIGHT, kN/m^3	16.24
SAMPLE AREA, cm^2	56.88	DRY UNIT WT., kN/m^3	9.08
SAMPLE VOLUME, cm^3	1159.76	SPECIFIC GRAVITY, assumed	2.70
WET WEIGHT, g	1921.83	VOID RATIO	1.91
DRY WEIGHT, g	1074.61		

FAILURE SKETCH



TEST RESULTS

STRAIN AT FAILURE, %	7.8	COMPRESSIVE STRENGTH, kPa	5

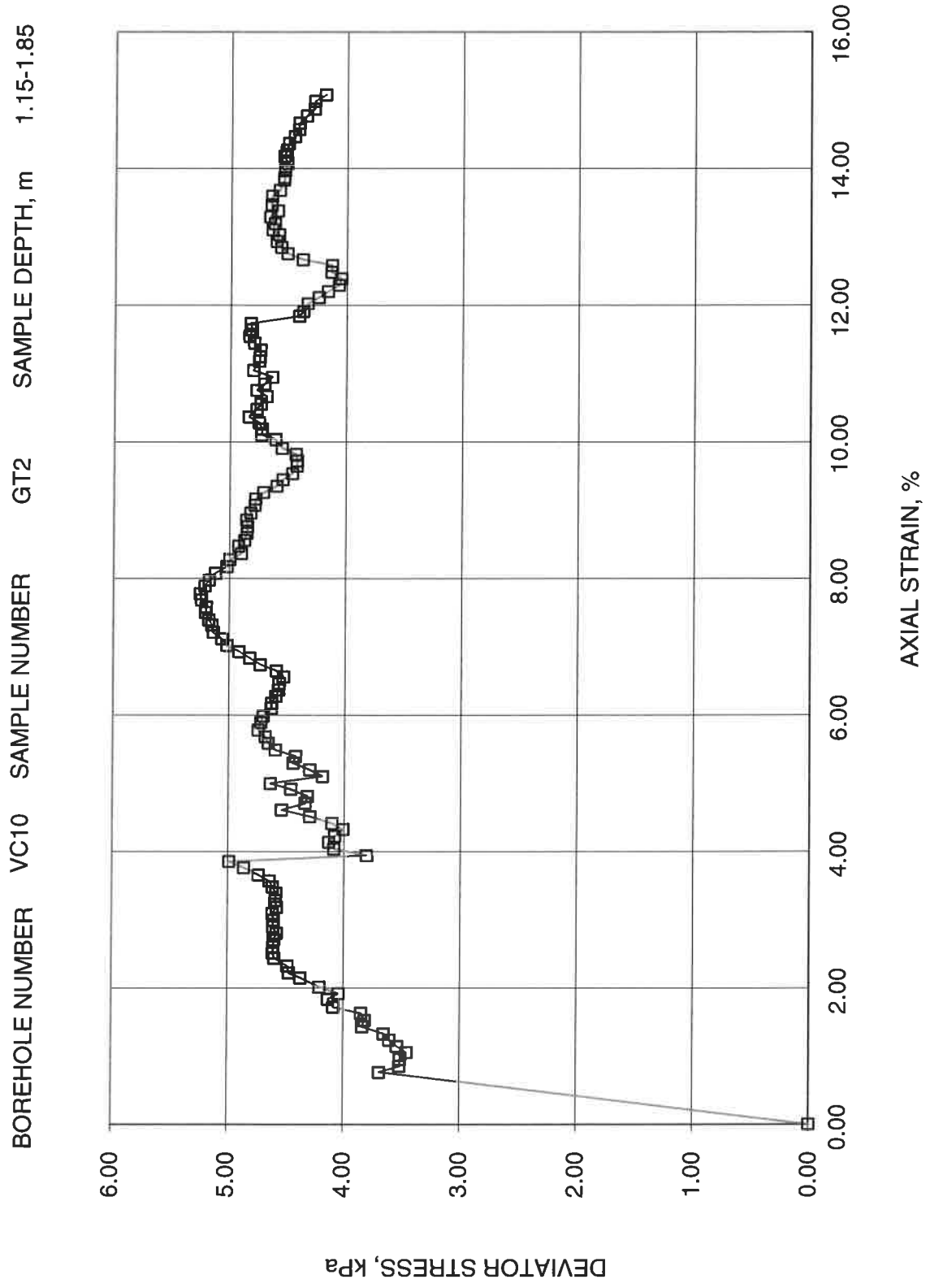
REMARKS:

DATE: October 5, 2015

Checked By:

Golder Associates

UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST (UU)	FIGURE



Project No. 1541891

Checked By: [illegible]

UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST (UU)

ASTM D 2850

SAMPLE IDENTIFICATION

PROJECT NUMBER	1541891	SAMPLE NUMBER	GT1
BOREHOLE NUMBER	VC44	SAMPLE DEPTH, m	2.5-3.0

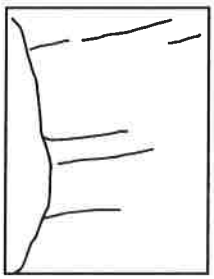
TEST CONDITIONS

MACHINE SPEED, mm/min	1.38	TYPE OF SPECIMEN	Intact
RATE OF AXIAL STRAIN, %/min	1.00	L/D	1.93
CELL PRESSURE, kPa	297		

SPECIMEN INFORMATION

SAMPLE HEIGHT, cm	13.75	WATER CONTENT, (specimen) %	13.38
SAMPLE DIAMETER, cm	7.12	UNIT WEIGHT, kN/m^3	22.05
SAMPLE AREA, cm^2	39.82	DRY UNIT WT., kN/m^3	19.45
SAMPLE VOLUME, cm^3	547.46	SPECIFIC GRAVITY, assumed	2.70
WET WEIGHT, g	1231.53	VOID RATIO	0.36
DRY WEIGHT, g	1086.20		

FAILURE SKETCH



TEST RESULTS

STRAIN AT FAILURE, %	14.8	COMPRESSIVE STRENGTH, kPa	34

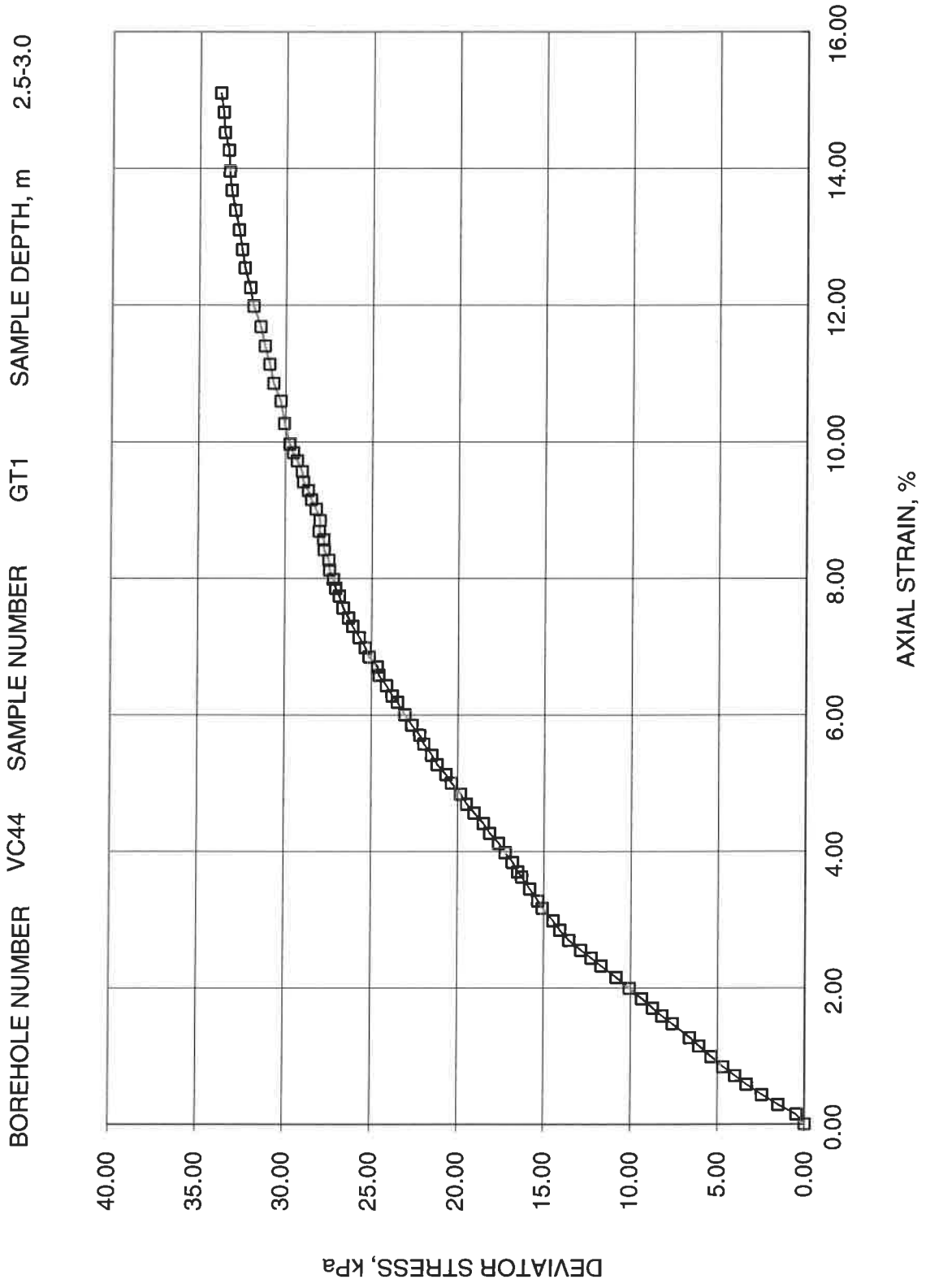
REMARKS: DATE: September 30, 2015

L/D Ratio not in accordance with ASTM Standard

Checked By: MM

Golder Associates

UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST (UU)	FIGURE



Project No. 1541891

Checked By:

UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST (UU)

ASTM D 2850

SAMPLE IDENTIFICATION

PROJECT NUMBER	1541891	SAMPLE NUMBER	GT1
BOREHOLE NUMBER	VC46	SAMPLE DEPTH, m	0.59-1.0

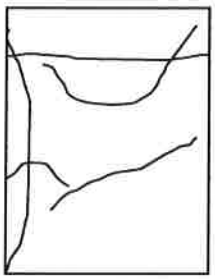
TEST CONDITIONS

MACHINE SPEED, mm/min	1.38	TYPE OF SPECIMEN	Intact
RATE OF AXIAL STRAIN, %/min	0.63	L/D	2.42
CELL PRESSURE, kPa	249		

SPECIMEN INFORMATION

SAMPLE HEIGHT, cm	21.94	WATER CONTENT, (specimen) %	74.37
SAMPLE DIAMETER, cm	9.05	UNIT WEIGHT, kN/m^3	14.88
SAMPLE AREA, cm^2	64.33	DRY UNIT WT., kN/m^3	8.54
SAMPLE VOLUME, cm^3	1411.32	SPECIFIC GRAVITY, assumed	2.70
WET WEIGHT, g	2142.86	VOID RATIO	2.10
DRY WEIGHT, g	1228.92		

FAILURE SKETCH



TEST RESULTS

STRAIN AT FAILURE, %	15.0	COMPRESSIVE STRENGTH, kPa	18

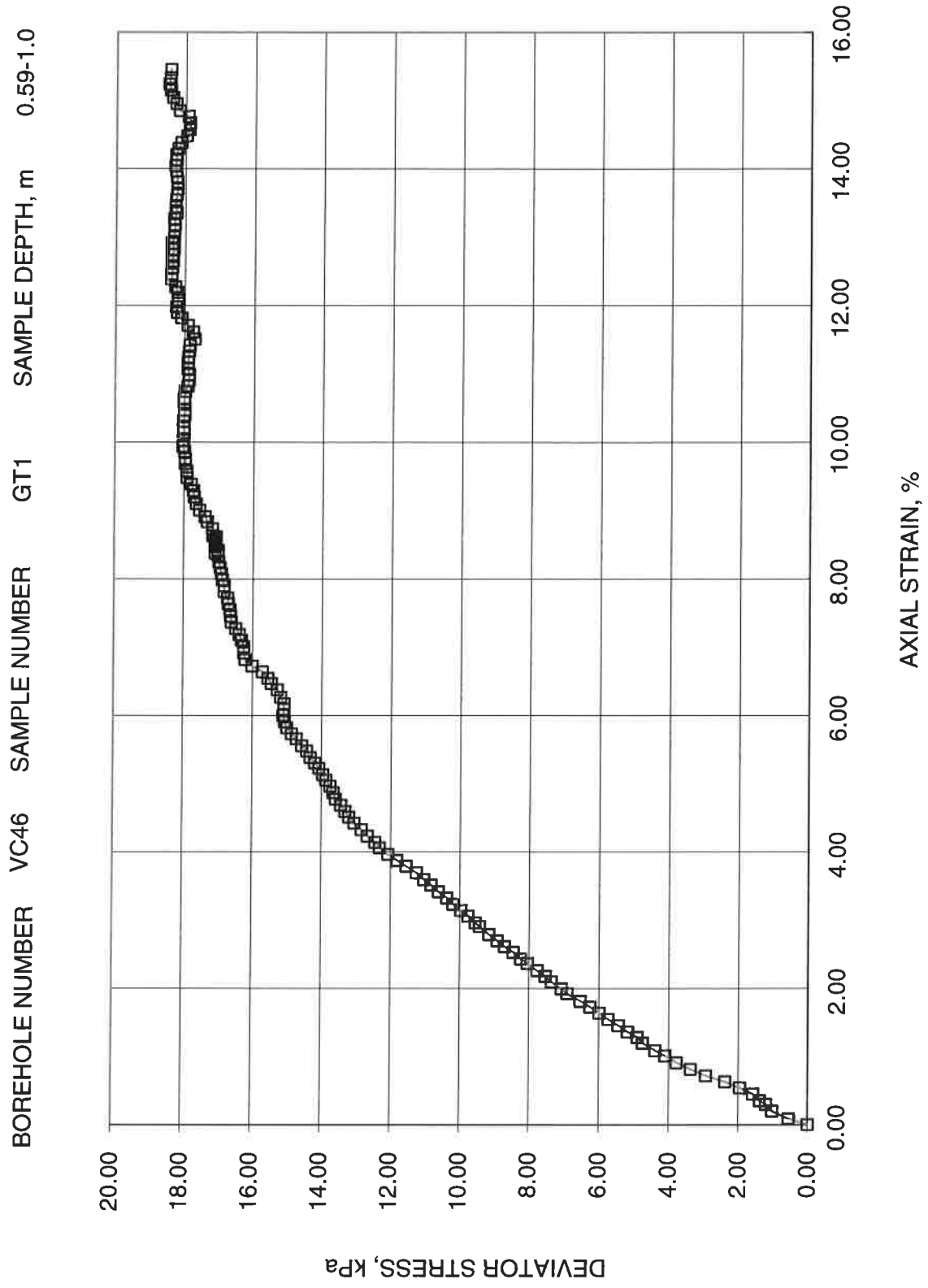
REMARKS:

DATE: October 1, 2015

Checked By:

Golder Associates

UNCONSOLIDATED UNDRAINED TRIAXIAL COMPRESSION TEST (UU)	FIGURE



Project No. 1541891

Checked By: GG

THURBER ENGINEERING LTD.
GEOTECHNICAL ▪ ENVIRONMENTAL ▪ MATERIALS

UNCONFINED COMPRESSION TEST REPORT

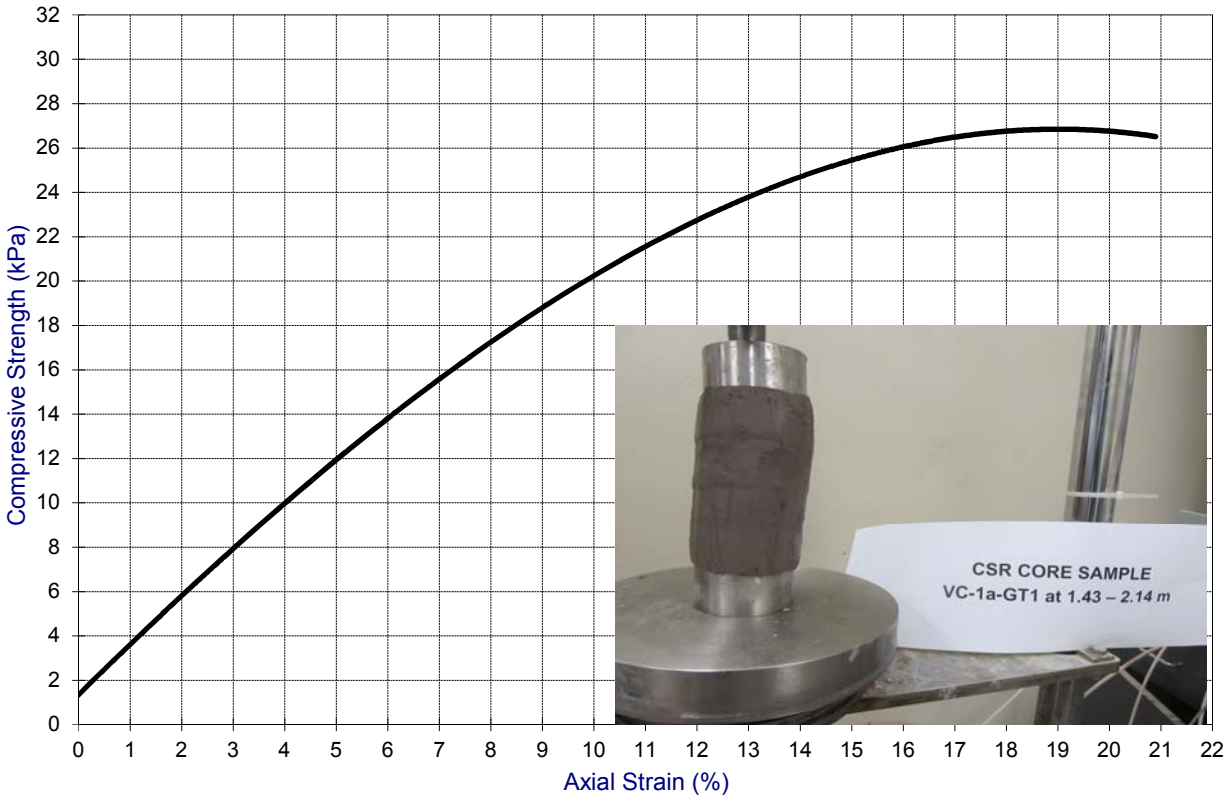
CLIENT: Canadian Seabed Research Ltd. FILE NUMBER: 19-6969-0

PROJECT: Laboratory Testing REPORT DATE: 29-Oct-15

BOREHOLE No.: VC-1A TEST DATE: 01-Sep-15
SAMPLE: GT1
DESCRIPTION: Silty CLAY, tr sand, tr gravel, brown, plastic

Avg. Height (cm):	15.0	Wet Density (kg/cu.m.):	1,843
Avg. Diameter (cm):	7.0	Dry Density (kg/cu.m.):	1,270
Height to Dia. Ratio	2:1	Moisture Content* (%):	45.2
Wet Weight (g):	1064.1	Void Ratio:	1.189
Dry Weight (g):	733	Assumed Sp. Gr.:	2.78

AVG. RATE OF STRAIN TO FAILURE: 1%/min
UNCONFINED COMPRESSIVE STRENGTH: 26.8 kPa @ 19.1 % strain
UNDRAINED SHEAR STRENGTH: 13.4 kPa



Note * The water content was obtained after shear from the entire specimen

TEST DONE BY: ME
REVIEWED BY: WM

THURBER ENGINEERING LTD.
GEOTECHNICAL ▪ ENVIRONMENTAL ▪ MATERIALS

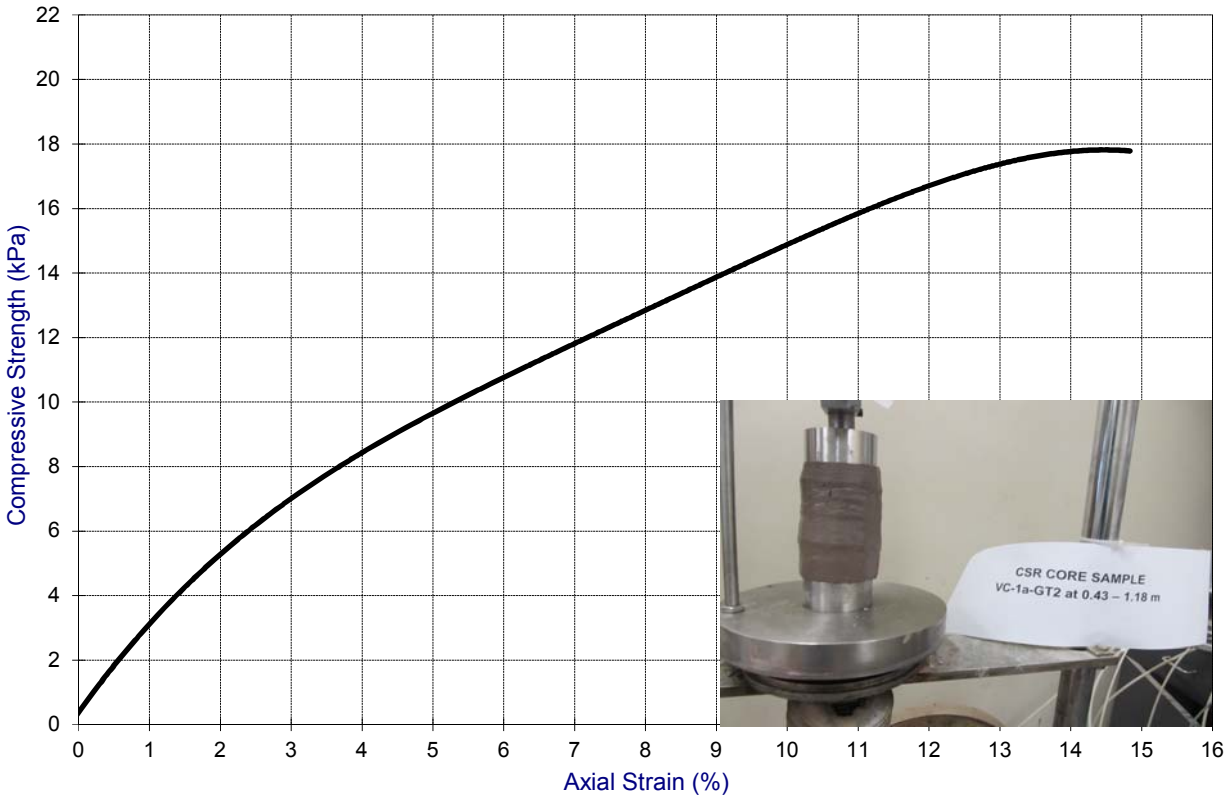
UNCONFINED COMPRESSION TEST REPORT

CLIENT:	Canadian Seabed Research Ltd.	FILE NUMBER:	19-6969-0
PROJECT:	Laboratory Testing	REPORT DATE:	29-Oct-15

BOREHOLE No.:	VC-1A	TEST DATE:	01-Sep-15
SAMPLE:	GT2		
DESCRIPTION:	Silty CLAY, tr sand, tr gravel, brown, plastic		

Avg. Height (cm):	15.0	Wet Density (kg/cu.m.):	1,796
Avg. Diameter (cm):	7.0	Dry Density (kg/cu.m.):	1,277
Height to Dia. Ratio	2:1	Moisture Content* (%):	40.7
Wet Weight (g):	1036.7	Void Ratio:	1.177
Dry Weight (g):	737	Assumed Sp. Gr.:	2.78

AVG. RATE OF STRAIN TO FAILURE:	1%/min
UNCONFINED COMPRESSIVE STRENGTH:	17.9 kPa @ 14.4 % strain
UNDRAINED SHEAR STRENGTH:	9.0 kPa



Note * The water content was obtained after shear from the entire specimen

TEST DONE BY: ME
REVIEWED BY: WM

THURBER ENGINEERING LTD.
GEOTECHNICAL ▪ ENVIRONMENTAL ▪ MATERIALS

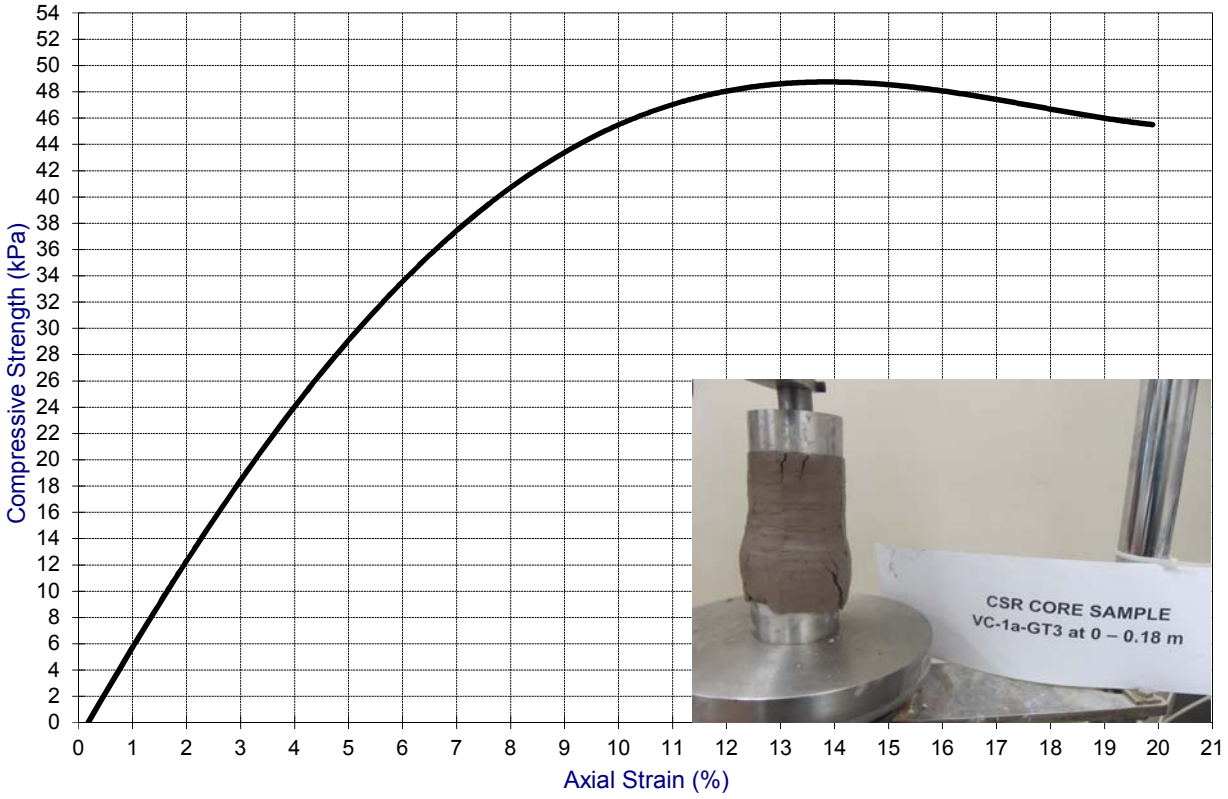
UNCONFINED COMPRESSION TEST REPORT

CLIENT:	Canadian Seabed Research Ltd.	FILE NUMBER:	19-6969-0
PROJECT:	Laboratory Testing	REPORT DATE:	29-Oct-15

BOREHOLE No.:	VC-1A	TEST DATE:	01-Sep-15
SAMPLE:	GT3		
DESCRIPTION:	Silty CLAY, tr sand, tr gravel, brown, plastic		

Avg. Height (cm):	15.0	Wet Density (kg/cu.m.):	1,920
Avg. Diameter (cm):	7.0	Dry Density (kg/cu.m.):	1,288
Height to Dia. Ratio	2:1	Moisture Content* (%):	49.0
Wet Weight (g):	1108.3	Void Ratio:	1.158
Dry Weight (g):	743.7	Assumed Sp. Gr.:	2.78

AVG. RATE OF STRAIN TO FAILURE:	1%/min
UNCONFINED COMPRESSIVE STRENGTH:	48.8 kPa @ 13.8 % strain
UNDRAINED SHEAR STRENGTH:	24.4 kPa



Note * The water content was obtained after shear from the entire specimen

TEST DONE BY: ME
REVIEWED BY: WM

THURBER ENGINEERING LTD.
GEOTECHNICAL ▪ ENVIRONMENTAL ▪ MATERIALS

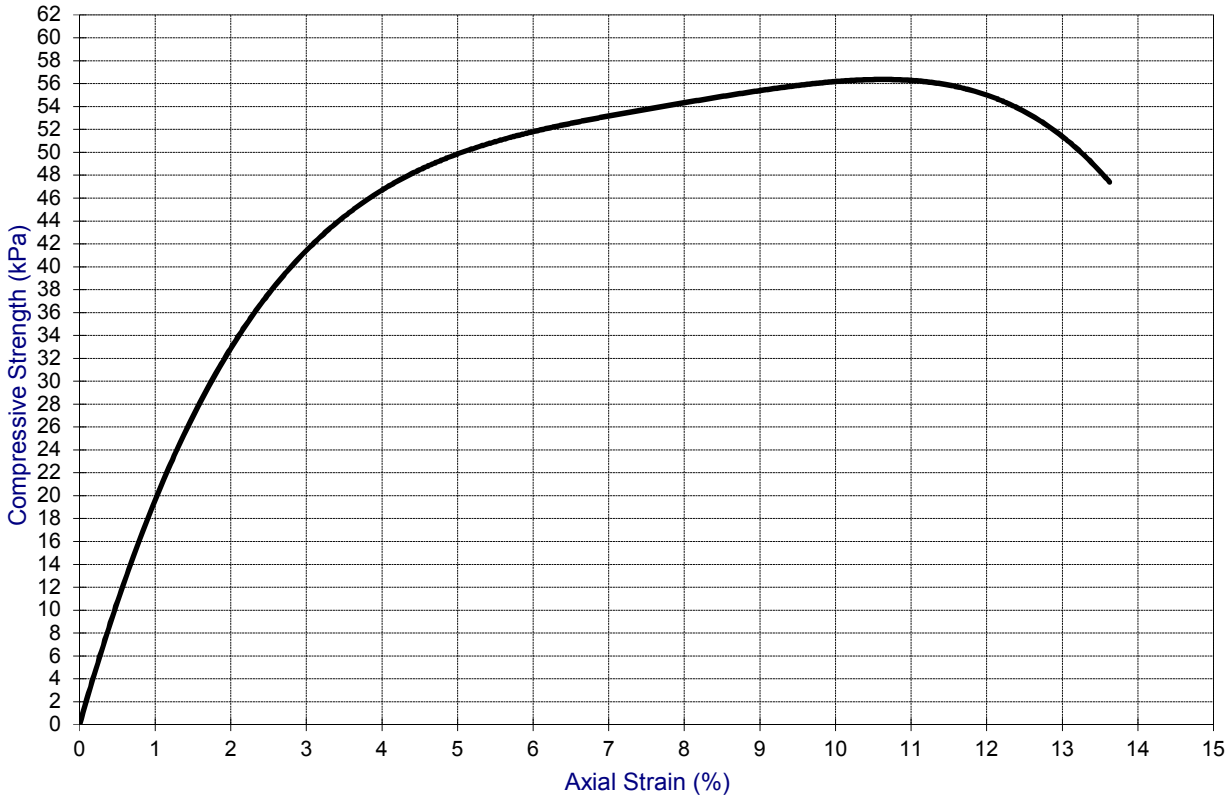
UNCONFINED COMPRESSION TEST REPORT

CLIENT:	Canadian Seabed Research Ltd.	FILE NUMBER:	19-6969-0
PROJECT:	Laboratory Testing	REPORT DATE:	29-Oct-15

BOREHOLE No.:	VC-3	TEST DATE:	01-Sep-15
SAMPLE:	GT1		
DESCRIPTION:	Silty CLAY, tr sand, brown, plastic		

Avg. Height (cm):	15.0	Wet Density (kg/cu.m.):	1,963
Avg. Diameter (cm):	7.0	Dry Density (kg/cu.m.):	1,407
Height to Dia. Ratio	2:1	Moisture Content* (%):	39.5
Wet Weight (g):	1133.2	Void Ratio:	0.975
Dry Weight (g):	812.4	Assumed Sp. Gr.:	2.78

AVG. RATE OF STRAIN TO FAILURE:	1%/min
UNCONFINED COMPRESSIVE STRENGTH:	56.2 kPa @ 10.6 % strain
UNDRAINED SHEAR STRENGTH:	28.1 kPa



Note * The water content was obtained after shear from the entire specimen

TEST DONE BY: ME
REVIEWED BY: WM

THURBER ENGINEERING LTD.
GEOTECHNICAL ▪ ENVIRONMENTAL ▪ MATERIALS

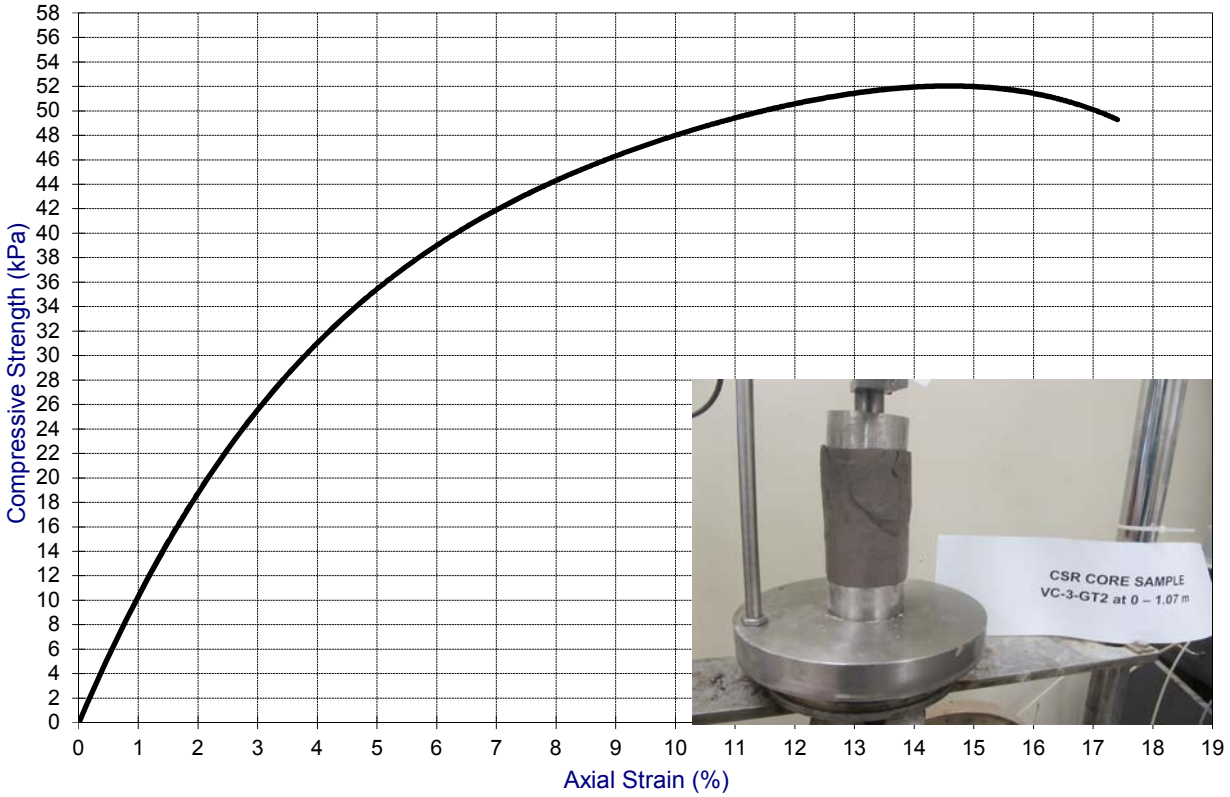
UNCONFINED COMPRESSION TEST REPORT

CLIENT:	Canadian Seabed Research Ltd.	FILE NUMBER:	19-6969-0
PROJECT:	Laboratory Testing	REPORT DATE:	29-Oct-15

BOREHOLE No.:	VC-3	TEST DATE:	01-Sep-15
SAMPLE:	GT2		
DESCRIPTION:	Silty CLAY, brown, plastic		

Avg. Height (cm):	15.0	Wet Density (kg/cu.m.):	1,872
Avg. Diameter (cm):	7.0	Dry Density (kg/cu.m.):	1,364
Height to Dia. Ratio	2:1	Moisture Content* (%):	37.3
Wet Weight (g):	1080.7	Void Ratio:	1.038
Dry Weight (g):	787.3	Assumed Sp. Gr.:	2.78

AVG. RATE OF STRAIN TO FAILURE:	1%/min
UNCONFINED COMPRESSIVE STRENGTH:	52.0 kPa @ 14.6 % strain
UNDRAINED SHEAR STRENGTH:	26.0 kPa



Note * The water content was obtained after shear from the entire specimen

TEST DONE BY: ME
REVIEWED BY: WM

THURBER ENGINEERING LTD.
GEOTECHNICAL ▪ ENVIRONMENTAL ▪ MATERIALS

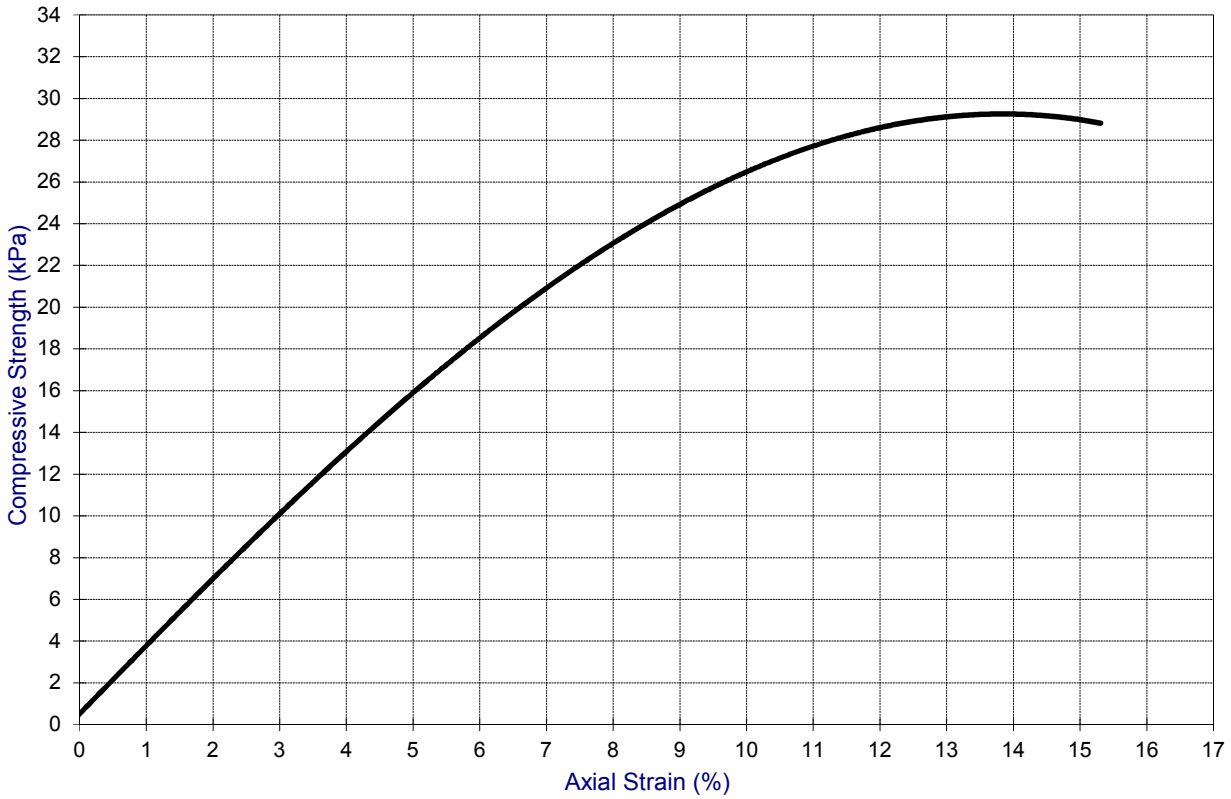
UNCONFINED COMPRESSION TEST REPORT

CLIENT:	Canadian Seabed Research Ltd.	FILE NUMBER:	19-6969-0
PROJECT:	Laboratory Testing	REPORT DATE:	29-Oct-15

BOREHOLE No.:	VC-45	TEST DATE:	31-Aug-15
SAMPLE:	GT1		
DESCRIPTION:	Silty CLAY, some gravel, some sand, brown, plastic		

Avg. Height (cm):	15.0	Wet Density (kg/cu.m.):	1,890
Avg. Diameter (cm):	7.0	Dry Density (kg/cu.m.):	1,414
Height to Dia. Ratio	2:1	Moisture Content* (%):	33.6
Wet Weight (g):	1090.9	Void Ratio:	0.966
Dry Weight (g):	816.3	Assumed Sp. Gr.:	2.78

AVG. RATE OF STRAIN TO FAILURE:	1%/min
UNCONFINED COMPRESSIVE STRENGTH:	29.2 kPa @ 13.8 % strain
UNDRAINED SHEAR STRENGTH:	14.6 kPa



Note * The water content was obtained after shear from the entire specimen

TEST DONE BY: ME
REVIEWED BY: WM

THURBER ENGINEERING LTD.
GEOTECHNICAL ▪ ENVIRONMENTAL ▪ MATERIALS

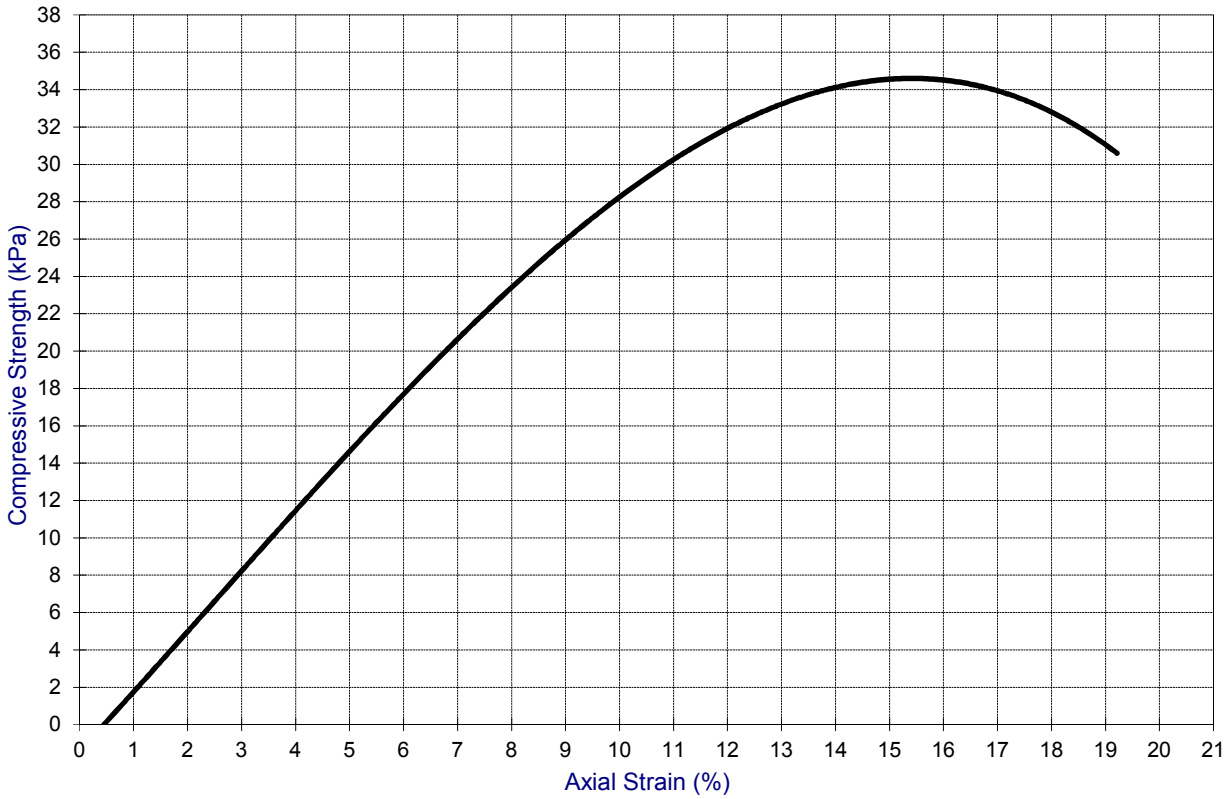
UNCONFINED COMPRESSION TEST REPORT

CLIENT:	Canadian Seabed Research Ltd.	FILE NUMBER:	19-6969-0
PROJECT:	Laboratory Testing	REPORT DATE:	29-Oct-15

BOREHOLE No.:	VC-45	TEST DATE:	31-Aug-15
SAMPLE:	GT2		
DESCRIPTION:	Silty CLAY, brown, plastic		

Avg. Height (cm):	15.0	Wet Density (kg/cu.m.):	1,889
Avg. Diameter (cm):	7.0	Dry Density (kg/cu.m.):	1,389
Height to Dia. Ratio	2:1	Moisture Content* (%):	36.0
Wet Weight (g):	1090.2	Void Ratio:	1.002
Dry Weight (g):	801.6	Assumed Sp. Gr.:	2.78

AVG. RATE OF STRAIN TO FAILURE:	1%/min
UNCONFINED COMPRESSIVE STRENGTH:	34.6 kPa @ 15.4 % strain
UNDRAINED SHEAR STRENGTH:	17.3 kPa



Note * The water content was obtained after shear from the entire specimen

TEST DONE BY: ME
REVIEWED BY: WM

THURBER ENGINEERING LTD.
GEOTECHNICAL ▪ ENVIRONMENTAL ▪ MATERIALS

UNCONFINED COMPRESSION TEST REPORT

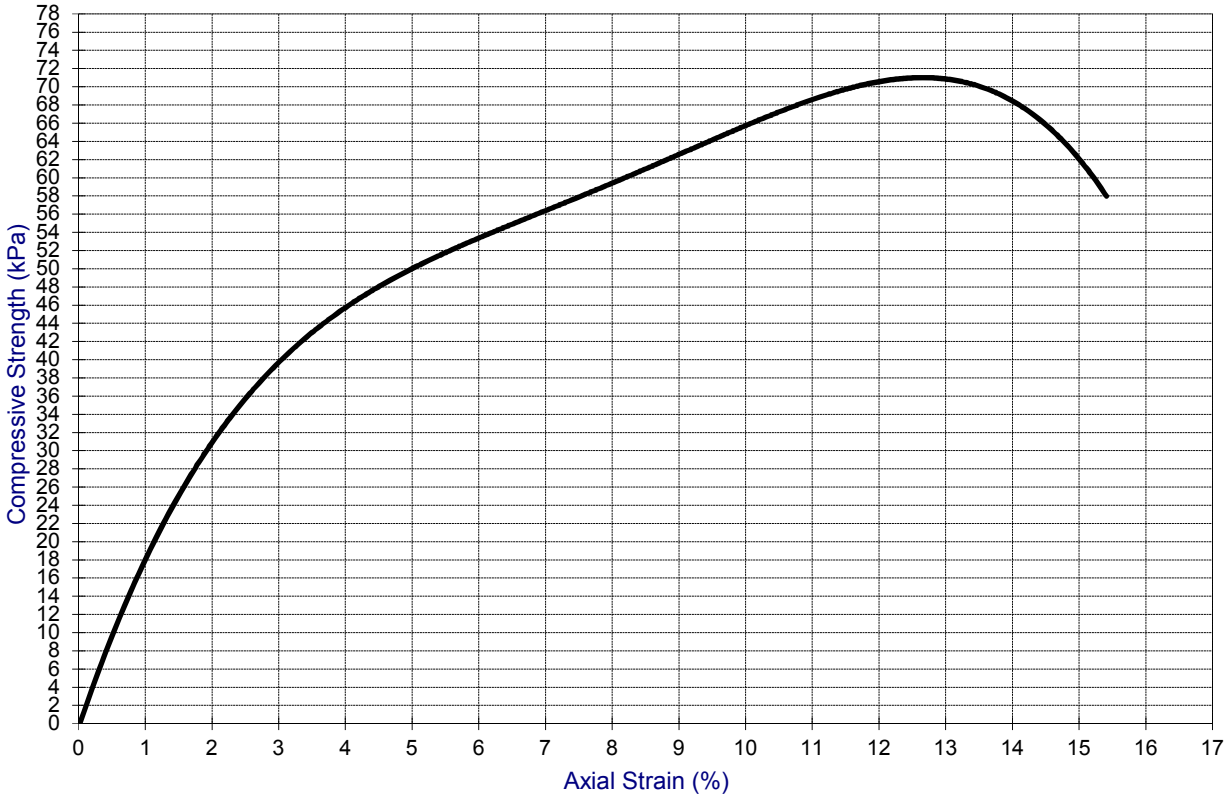
CLIENT: Canadian Seabed Research Ltd. FILE NUMBER: 19-6969-0

PROJECT: Laboratory Testing REPORT DATE: 29-Oct-15

BOREHOLE No.: VC-6 TEST DATE: 25-Aug-15
SAMPLE: GT1
DESCRIPTION: Silty CLAY, grey, plastic

Avg. Height (cm):	15.0	Wet Density (kg/cu.m.):	2,072
Avg. Diameter (cm):	7.0	Dry Density (kg/cu.m.):	1,558
Height to Dia. Ratio	2:1	Moisture Content* (%):	33.0
Wet Weight (g):	1196.335	Void Ratio:	0.784
Dry Weight (g):	899.5	Assumed Sp. Gr.:	2.78

AVG. RATE OF STRAIN TO FAILURE: 1%/min
UNCONFINED COMPRESSIVE STRENGTH: 71.0 kPa @ 12.6 % strain
UNDRAINED SHEAR STRENGTH: 35.5 kPa



Note * The water content was obtained after shear from the entire specimen

TEST DONE BY: EA
REVIEWED BY: WM

THURBER ENGINEERING LTD.
GEOTECHNICAL ▪ ENVIRONMENTAL ▪ MATERIALS

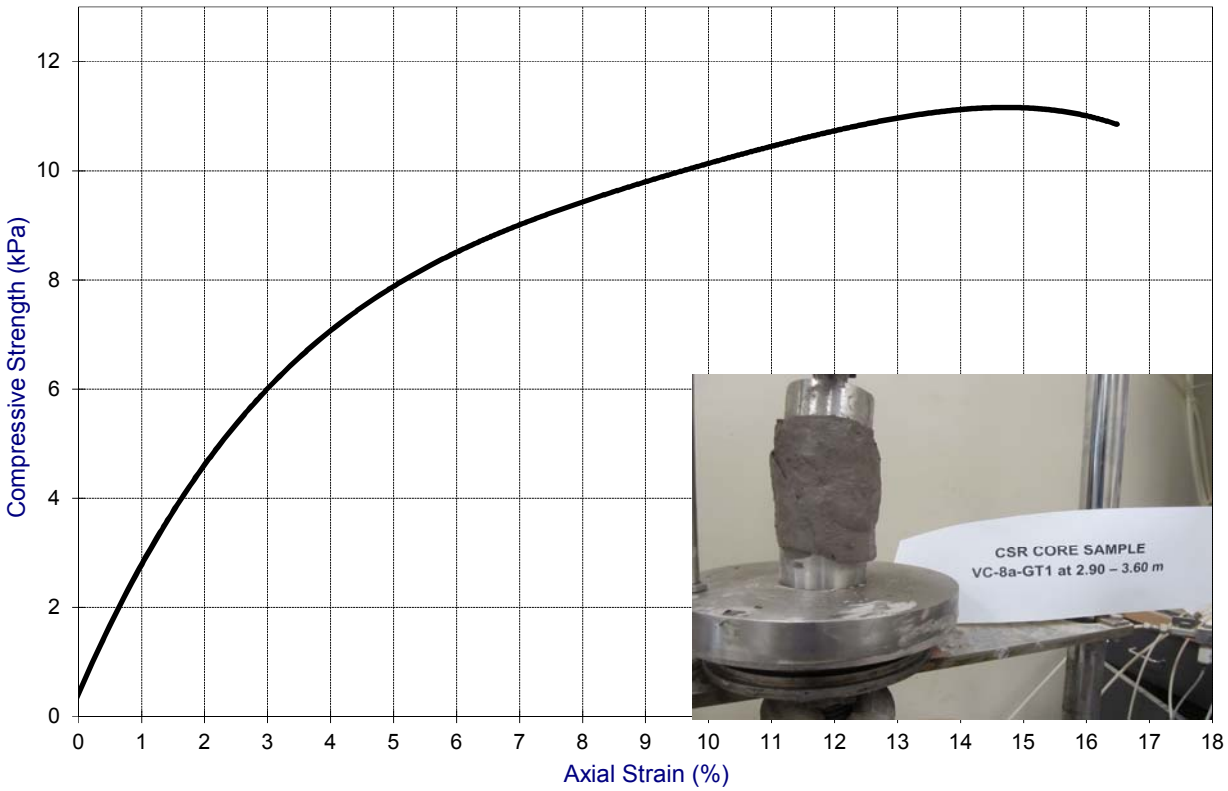
UNCONFINED COMPRESSION TEST REPORT

CLIENT:	Canadian Seabed Research Ltd.	FILE NUMBER:	19-6969-0
PROJECT:	Laboratory Testing	REPORT DATE:	29-Oct-15

BOREHOLE No.:	VC-8A	TEST DATE:	05-Sep-15
SAMPLE:	GT1		
DESCRIPTION:	Silty CLAY, tr sand, grey, plastic		

Avg. Height (cm):	15.0	Wet Density (kg/cu.m.):	1,614
Avg. Diameter (cm):	7.0	Dry Density (kg/cu.m.):	1,073
Height to Dia. Ratio	2:1	Moisture Content* (%):	50.5
Wet Weight (g):	931.9	Void Ratio:	1.592
Dry Weight (g):	619.2	Assumed Sp. Gr.:	2.78

AVG. RATE OF STRAIN TO FAILURE:	1%/min
UNCONFINED COMPRESSIVE STRENGTH:	11.2 kPa @ 14.7 % strain
UNDRAINED SHEAR STRENGTH:	5.6 kPa



Note * The water content was obtained after shear from the entire specimen

TEST DONE BY: ME
REVIEWED BY: WM

December 2, 2015

Project No. 2015-538-001

Mr. Colin Toole
Canadian Seabed Research Ltd.
341 Myra Rd., Porters Lake
Nova Scotia, Canada B3E 1G2

Transmittal
Laboratory Test Results
Lake Erie Connector 185241

Please find attached the laboratory test results for the above referenced project. The tests were outlined on the Project Verification Form that was transmitted to your firm prior to the testing. The testing was performed in general accordance with the methods listed on the enclosed data sheets. The test results are believed to be representative of the samples that were submitted for testing and are indicative only of the specimens that were evaluated. We have no direct knowledge of the origin of the samples and imply no position with regard to the nature of the test results, i.e. pass/fail and no claims as to the suitability of the material for its intended use.

The test data and all associated project information provided shall be held in strict confidence and disclosed to other parties only with authorization by our Client. The test data submitted herein is considered integral with this report and is not to be reproduced except in whole and only with the authorization of the Client and Geotechnics. The remaining sample materials for this project will be retained for a minimum of 90 days as directed by the Geotechnics' Quality Program.

We are pleased to provide these testing services. Should you have any questions or if we may be of further assistance, please contact our office.

Respectively submitted,
Geotechnics, Inc.

David R. Backstrom
Laboratory Director

We understand that you have a choice in your laboratory services and we thank you for choosing Geotechnics.

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

PHOTOGRAPHS

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-25
Client Reference:	Lake Erie Connector 185241	Depth (m):	0.0-0.60
Project No.:	2015-538-001	Sample No.:	GT4
Lab ID:	2015-538-001-001		

Tested By *NJM* *Date* *10/26/15* *Checked By* *KC* *Date* *11/5/15*

S:\Excel\Excel QA\Spreadsheets\Photo

SHELBY TUBE UNIT WEIGHT

ASTM D2937-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-25
Client Reference:	Lake Erie Connector 185241	Depth Pushed (m):	0.0-0.60
Project No.:	2015-538-001	Shelby Tube No.:	GT4
Lab ID:	2015-538-001-001	Recovery (m):	0.6

MOISTURE CONTENT

Section Number	**1**	**2**
Tare Number	3195	2942
Weight of Tare & Wet Sample (g)	159.10	108.32
Weight of Tare & Dry Sample (g)	72.62	52.04
Weight of Tare (g)	6.51	6.75
Moisture Content (%)	130.81	124.27

UNIT WEIGHT

Weight of Tube & Wet Sample (g)	969.08
Weight of Tube (g)	89.22
Weight of Wet Sample (g)	879.86
Length 1 (in)	3.797
Length 2 (in)	3.905
Length 3 (in)	3.898
Top Diameter (in)	3.624
Middle Diameter (in)	3.593
Bottom Diameter (in)	3.613
Sample Volume (cm^3)	648.55
Moisture Content (%)	124.27
Unit Wet Weight (g/cm^3)	1.36
Unit Wet Weight (pcf)	84.66
Unit Dry Weight (g/cm^3)	**0.60**
Unit Dry Weight (pcf)	**37.7**

SOIL PROFILE AND SAMPLING

DEPTH (m)	ELEV ( )	SECTION No.	SOIL PROFILE	SOIL DESCRIPTION AND REMARKS	TEST PERFORMED
0.00					
0.15					
0.30					
0.45		2		SOFT GRAY CLAY Pocket Penetrometer 0.0 TSF	WC, UNIT WGT, LIMITS
0.60		1			WC

***Note**: When full recovery is not achieved, the elevation can not be accurately define*
Indicate each cut of the tube with an arrow
Indicate dividing line between soil types with a solid lin
Indicate wax by cross-hatching. Indicate soil types by standard symbols

Tested By *NJM* Date *10/26/15* Checked By KC Date 11/2/15

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

ATTERBERG LIMITS

ASTM D 4318-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-25
Client Reference:	Lake Erie Connector 185241	Depth (m):	0.45-0.55
Project No.:	2015-538-001	Sample No.:	GT4
Lab ID:	2015-538-001-001	Soil Description:	DARK GRAY FAT CLAY

Note: The* USCS *symbol used with this test refers only to the minus No. 40 (Minus No. 40 sieve material, Airdried)
sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description .

Liquid Limit Test	**1**	**2**	**3**
Tare Number:	150	151	157
Wt. of Tare & Wet Sample (g):	40.37	40.22	38.85
Wt. of Tare & Dry Sample (g):	32.63	32.16	30.62
Weight of Tare (g):	19.77	18.84	17.49
Weight of Water (g):	7.7	8.1	8.2
Weight of Dry Sample (g):	12.9	13.3	13.1
Moisture Content (%):	**60.2**	**60.5**	**62.7**
Number of Blows:	**34**	**28**	**20**

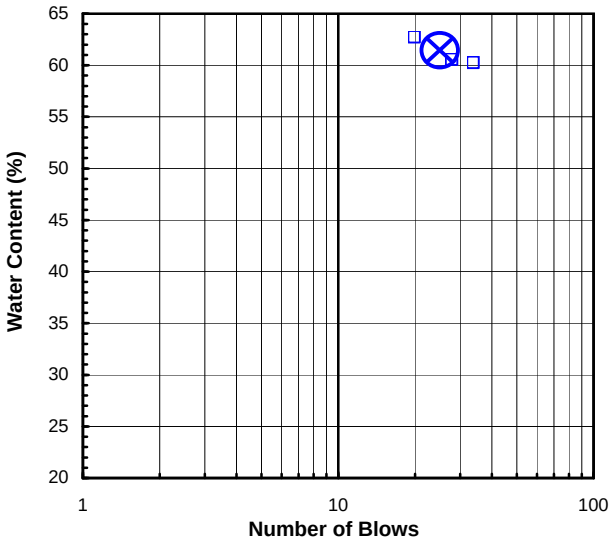
MULTIPOINT

Plastic Limit Test	**1**	**2**	**Range**
Tare Number:	158	206	
Wt. of Tare & Wet Sample (g):	23.93	26.52	
Wt. of Tare & Dry Sample (g):	22.61	24.83	
Weight of Tare (g):	17.55	18.41	
Weight of Water (g):	1.3	1.7	
Weight of Dry Sample (g):	5.1	6.4	
Moisture Content (%):	**26.1**	**26.3**	**-0.2**

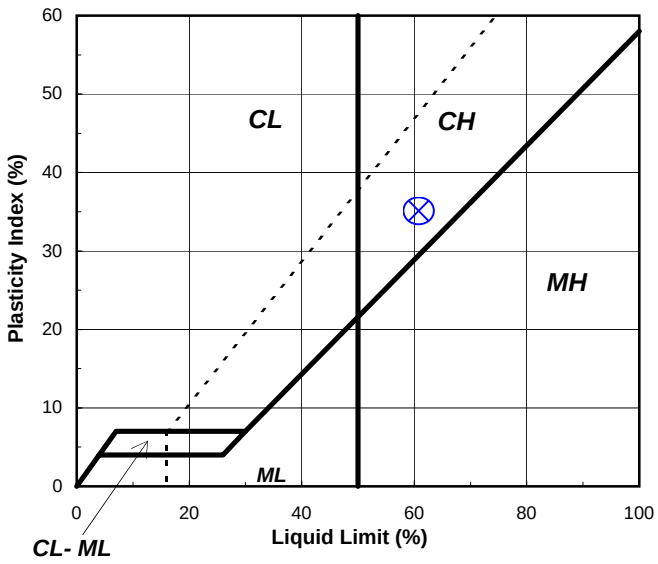
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%):	**61**
Plastic Limit (%):	**26**
Plasticity Index (%):	**35**
USCS Symbol:	**CH**

Flow Curve



Plasticity Chart



Tested By BS *Date* 10/28/15 *Checked By* CLK *Date* 10/30/15

S:\Excel\Excel QA\Spreadsheets\Limit 3Pt.xls

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

PHOTOGRAPHS

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-25
Client Reference:	Lake Erie Connector 185241	Depth (m):	0.85 - 1.55
Project No.:	2015-538-001	Sample No.:	GT3
Lab ID:	2015-538-001-002		

Tested By *JCM* *Date* *11/6/15* *Checked By* *KC* *Date* *11/19/15*

S:\Excel\Excel QA\Spr

SHELBY TUBE UNIT WEIGHT

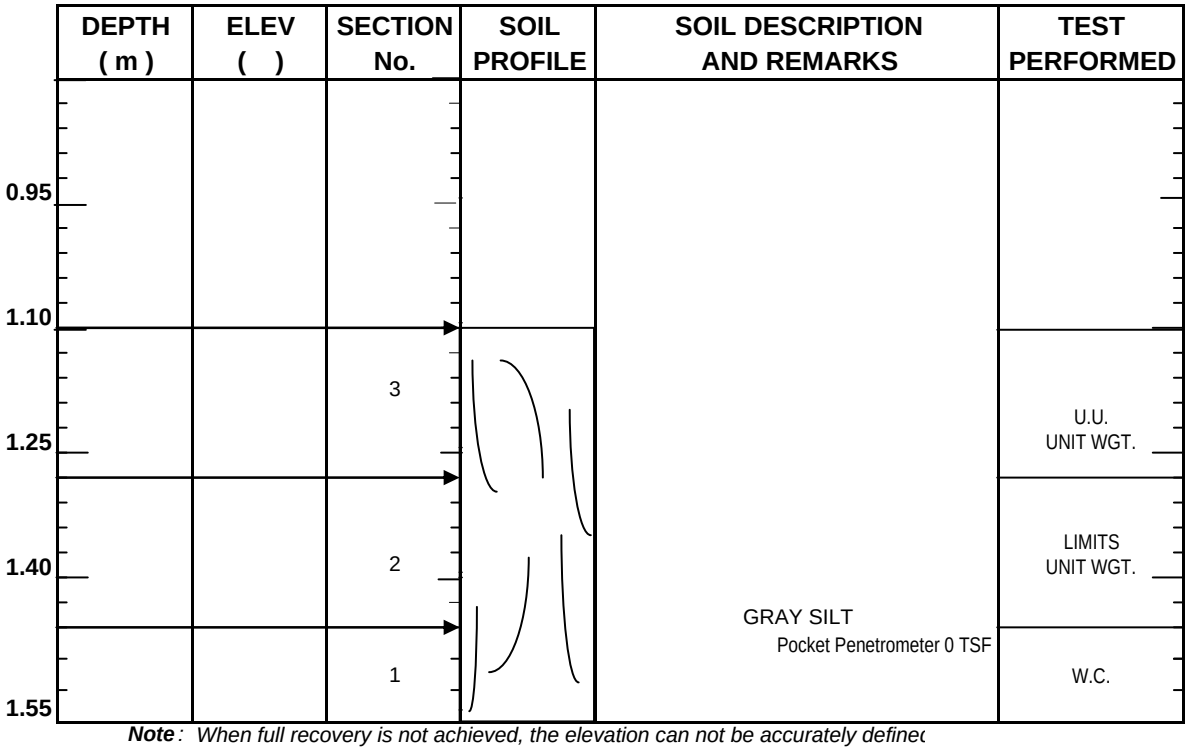
ASTM D2937-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-25
Client Reference:	Lake Erie Connector 185241	Depth Pushed (m):	0.85 - 1.55
Project No.:	2015-538-001	Shelby Tube No.:	GT3
Lab ID:	2015-538-001-002	Recovery (m):	0.7

MOISTURE CONTENT			After U.U.		
Section Number	**1**	**2**	**3**	**4**	**5**
Tare Number	1743		891		
Weight of Tare & Wet Sample (g)	420.98		592.54		
Weight of Tare & Dry Sample (g)	241.89		334.85		
Weight of Tare (g)	83.57		110.98		
Moisture Content (%)	113.12		115.11		

UNIT WEIGHT		
Weight of Tube & Wet Sample (g)	1689.03	1716.74
Weight of Tube (g)	118.02	117.22
Weight of Wet Sample (g)	1571.01	1599.52
Length 1 (in)	7.092	7.231
Length 2 (in)	7.094	7.242
Length 3 (in)	7.089	7.204
Top Diameter (in)	3.606	3.661
Middle Diameter (in)	3.649	3.651
Bottom Diameter (in)	3.608	3.642
Sample Volume (cm^3)	1196.73	1239.86
Moisture Content (%)	113.12	115.11
Unit Wet Weight (g/cm^3)	1.31	1.29
Unit Wet Weight (pcf)	81.92	80.50
Unit Dry Weight (g/cm^3)	**0.62**	**0.60**
Unit Dry Weight (pcf)	**38.4**	**37.4**

SOIL PROFILE AND SAMPLING



***Note**: When full recovery is not achieved, the elevation can not be accurately definec*
Indicate each cut of the tube with an arrow
Indicate dividing line between soil types with a solid lin
Indicate wax by cross-hatching. Indicate soil types by standard symbols

Tested By *JCM* Date *11/6/15* Checked By KC Date 11/19/15

ATTERBERG LIMITS

ASTM D 4318-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-25
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.28-1.46
Project No.:	2015-538-001	Sample No.:	GT3
Lab ID:	2015-538-001-002	Soil Description:	GRAY FAT CLAY

Note: The* USCS *symbol used with this test refers only to the minus No. 40 (Minus No. 40 sieve material, Airdried)
sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description .

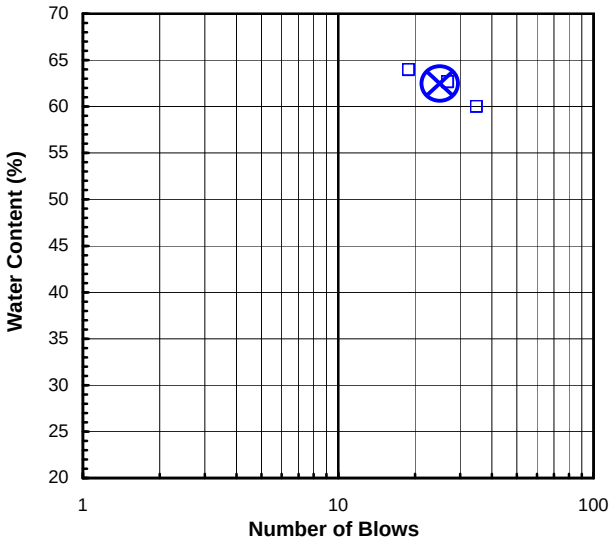
Liquid Limit Test	**1**	**2**	**3**	
				M
Tare Number:	195	108	245	**U**
Wt. of Tare & Wet Sample (g):	38.06	38.96	37.65	**L**
Wt. of Tare & Dry Sample (g):	29.95	31.01	30.03	**T**
Weight of Tare (g):	17.26	18.31	17.32	**I**
Weight of Water (g):	8.1	8.0	7.6	**P**
Weight of Dry Sample (g):	12.7	12.7	12.7	**O**
				I
Moisture Content (%):	**63.9**	**62.6**	**60.0**	**N**
Number of Blows:	**19**	**27**	**35**	**T**

Plastic Limit Test	**1**	**2**	**Range**
Tare Number:	176	192	
Wt. of Tare & Wet Sample (g):	25.55	25.14	
Wt. of Tare & Dry Sample (g):	24.21	23.80	
Weight of Tare (g):	19.40	18.92	
Weight of Water (g):	1.3	1.3	
Weight of Dry Sample (g):	4.8	4.9	
Moisture Content (%):	**27.9**	**27.5**	**0.4**

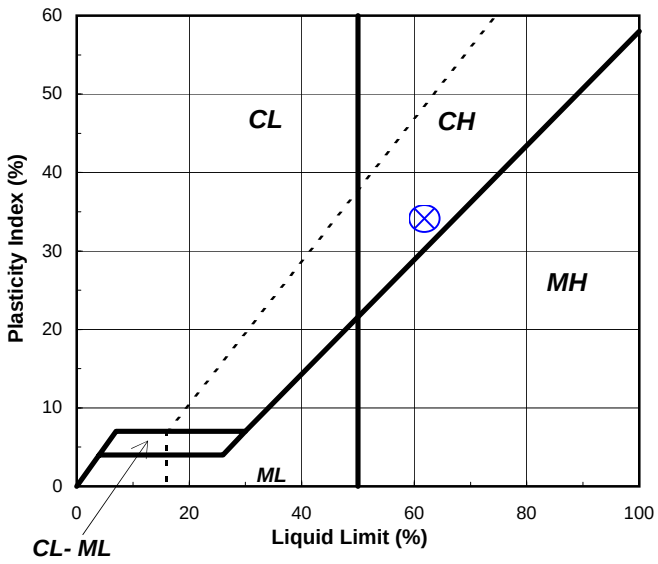
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%):	**62**
Plastic Limit (%):	**28**
Plasticity Index (%):	**34**
USCS Symbol:	**CH**

Flow Curve



Plasticity Chart



Tested By RAL *Date* 11/10/15 *Checked By* CLK *Date* 11/11/15

S:\Excel\Excel QA\Spreadsheets\Limit 3Pt.xls

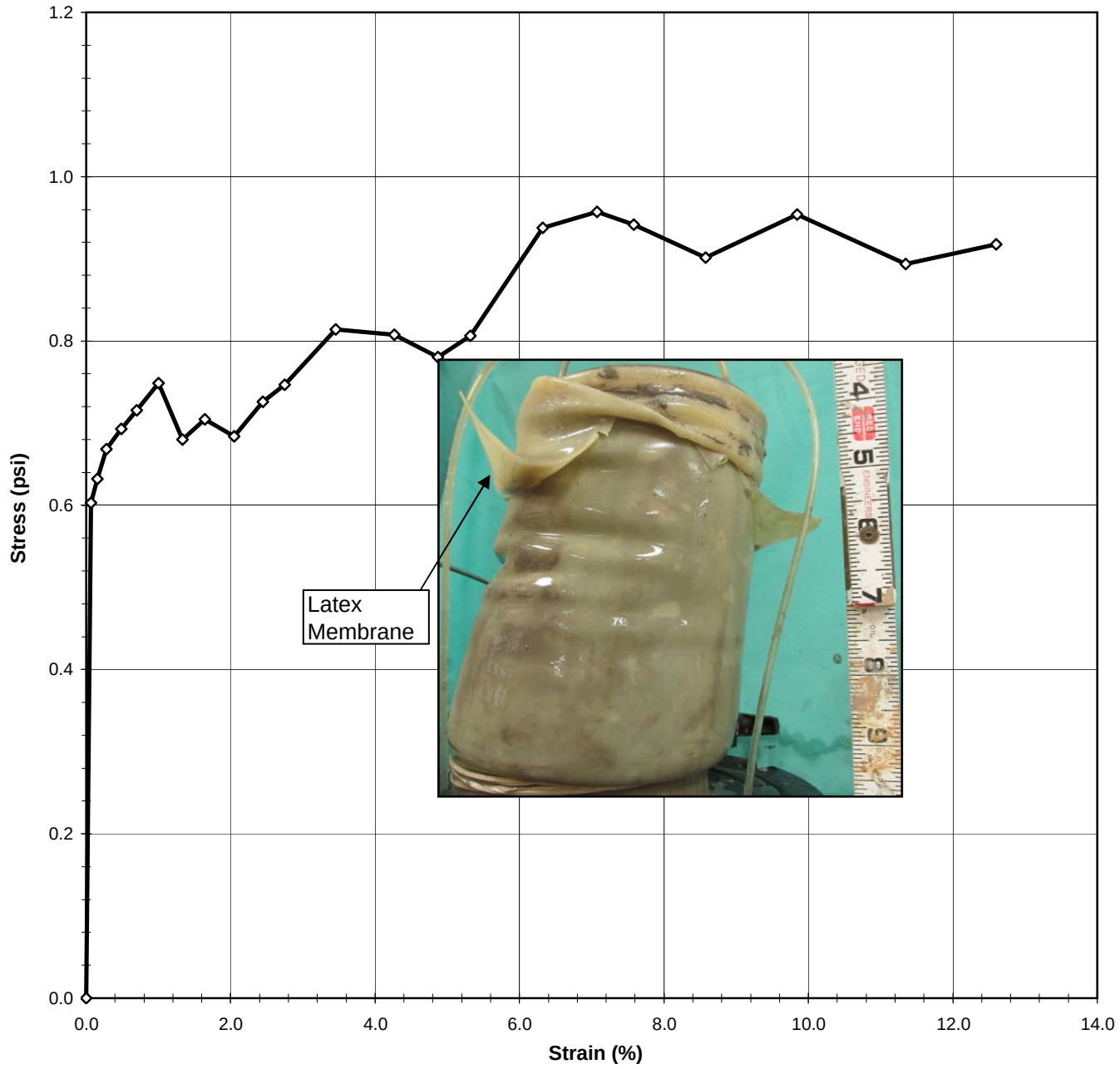
544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONSOLIDATED UNDRAINED TRIAXIAL

ASTM D2850-03a (2007)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-25
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.1-1.28
Project No.:	2015-538-001	Sample No.:	GT-3
Lab ID:	2015-538-001-002	Visual:	Gray Silt

CONFINING STRESS (psi) 62.5



Tested By JAB Date 11/9/15 Input Checked By KC Date 11/10/15

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONSOLIDATED UNDRAINED TRIAXIAL

ASTM D2850-03a (2007)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-25
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.1-1.28
Project No.:	2015-538-001	Sample No.:	GT-3
Lab ID:	2015-538-001-002	Visual:	Gray Silt

INITIAL SAMPLE DIMENSIONS

Length 1 (in):	7.231	Top Dia. (in):	3.661
Length 2 (in):	7.242	Mid. Dia. (in):	3.651
Length 3 (in):	7.204	Bot. Dia. (in):	3.642
Avg.Length (in)	**7.226**	**Area (in^2):**	**10.471**

WATER CONTENT (AFTER TEST)

Tare No.:	891
Weight of Tare & Wet Sample (g):	592.54
Weight of Tare & Dry Sample (g):	334.85
Weight of Tare (g):	110.98
% Moisture:	115.1

UNIT WEIGHT

Undisturbed Sample

Weight of Tube & Wet Sample (g):	1716.74	Sample Volume (cm^3):	1239.9
Weight of Tube (g):	117.22	Unit Wet Weight (g/cm^3):	1.29
Weight of Wet Sample (g):	1599.52	Unit Wet Weight (pcf):	80.50
Diameter (in):	3.65	Moisture Content (%):	115.1
Length (in):	7.22	Unit Dry Weight (pcf):	37.4
Length (cm):	18.35		

		Initial Dial Reading (mil)	70
CONFINING STRESS (psi)	**62.5**	Dial Reading Before Shearing (mil)	77

DEFORMATION (in)	*LOAD (lb)*	*ELAPSED TIME (min)*	*STRAIN (%)*	*STRESS (psi)*
0.000	22.1	0.0	0.0	0.000
0.005	28.4	0.07	0.1	0.603
0.011	28.7	0.15	0.2	0.632
0.020	29.1	0.28	0.3	0.668
0.035	29.4	0.48	0.5	0.693
0.051	29.6	0.70	0.7	0.716
0.072	30.0	1.00	1.0	0.749
0.096	29.3	1.33	1.3	0.680
0.119	29.6	1.63	1.6	0.705
0.148	29.4	2.03	2.0	0.684
0.177	29.9	2.45	2.4	0.726
0.198	30.1	2.75	2.7	0.747
0.250	30.9	3.45	3.5	0.814
0.308	30.9	4.25	4.3	0.807
0.352	30.6	4.87	4.9	0.781
0.384	31.0	5.32	5.3	0.806
0.456	32.5	6.32	6.3	0.937
0.511	32.8	7.07	7.1	0.957
0.547	32.7	7.57	7.6	0.942
0.619	32.4	8.57	8.6	0.902
0.711	33.1	9.83	9.8	0.954
0.819	32.6	11.33	11.4	0.894
0.910	33.1	12.58	12.6	0.918

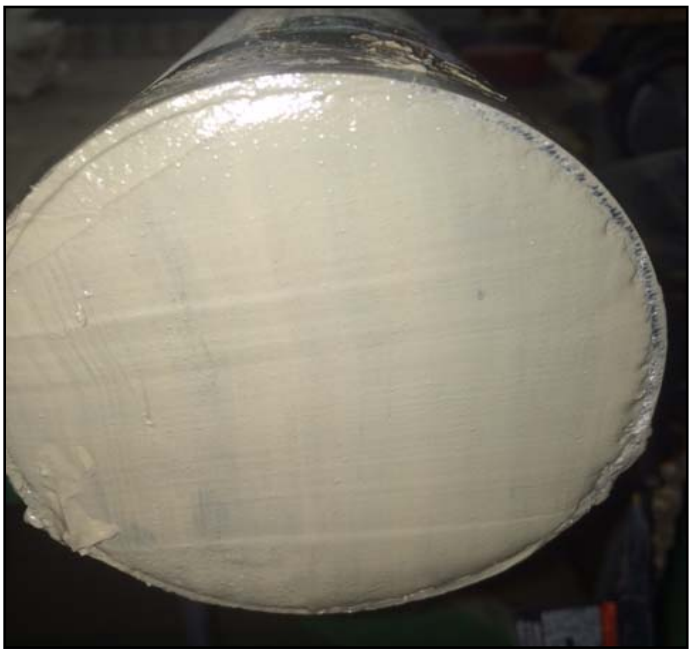
Tested By JAB Date 11/9/15 Input Checked By KC Date 11/10/15

DCN: CT-S29 DATE: 8-21-10 REVISION: 2

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

PHOTOGRAPHS

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-26
Client Reference:	Lake Erie Connector 185241	Depth (m):	0.0-0.72
Project No.:	2015-538-001	Sample No.:	GT4
Lab ID:	2015-538-001-003		



Tested By JCM *Date* 11/18/15 *Checked By* KC *Date* 12/1/15

S:\Excel\Excel QA\Spreadsheets\Photo

SHELBY TUBE UNIT WEIGHT

ASTM D2937-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-26
Client Reference:	Lake Erie Connector 185241	Depth Pushed (m):	0.0-0.72
Project No.:	2015-538-001	Shelby Tube No.:	GT4
Lab ID:	2015-538-001-003	Recovery (m):	0.72

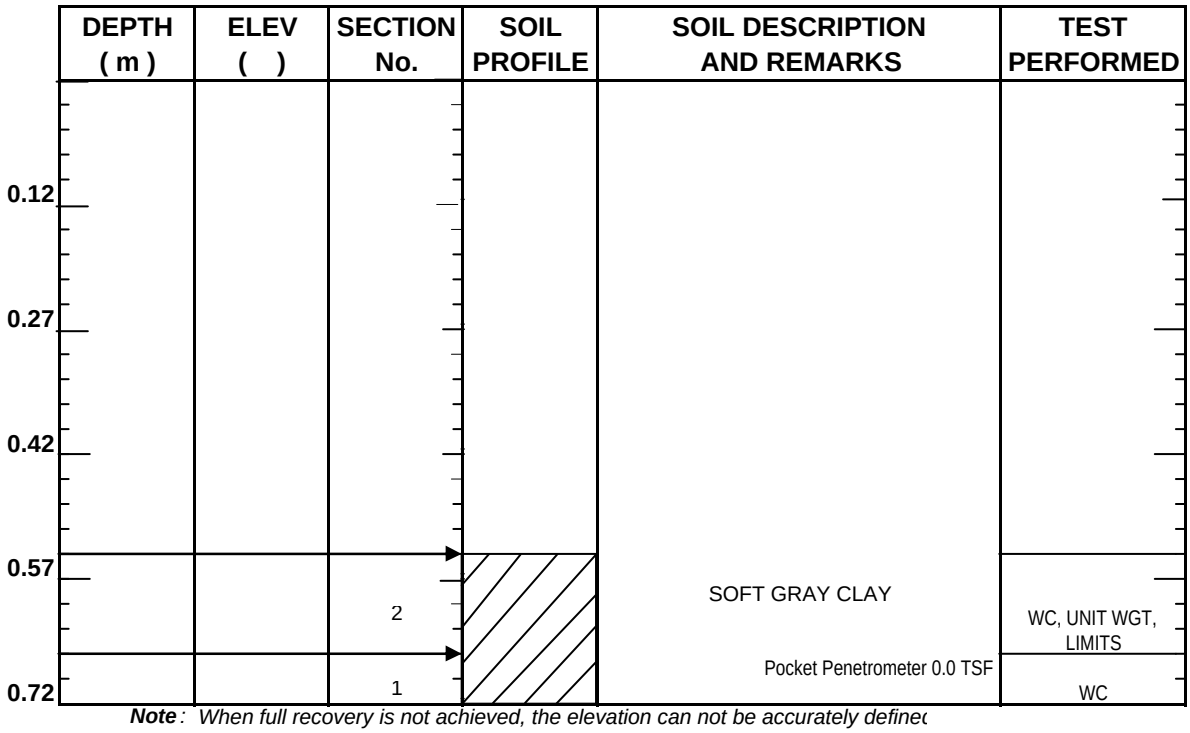
MOISTURE CONTENT

Section Number	**1**	**2**
Tare Number	3036	3139
Weight of Tare & Wet Sample (g)	251.68	163.47
Weight of Tare & Dry Sample (g)	114.86	73.13
Weight of Tare (g)	6.49	6.55
Moisture Content (%)	126.25	135.69

UNIT WEIGHT

Weight of Tube & Wet Sample (g)	1003.05
Weight of Tube (g)	101.66
Weight of Wet Sample (g)	901.39
Length 1 (in)	3.791
Length 2 (in)	3.914
Length 3 (in)	3.805
Top Diameter (in)	3.627
Middle Diameter (in)	3.587
Bottom Diameter (in)	3.622
Sample Volume (cm^3)	644.23
Moisture Content (%)	135.69
Unit Wet Weight (g/cm^3)	1.40
Unit Wet Weight (pcf)	87.31
Unit Dry Weight (g/cm^3)	**0.59**
Unit Dry Weight (pcf)	**37.0**

SOIL PROFILE AND SAMPLING



***Note**: When full recovery is not achieved, the elevation can not be accurately define*
Indicate each cut of the tube with an arrow
Indicate dividing line between soil types with a solid lin
Indicate wax by cross-hatching. Indicate soil types by standard symbols

Tested By *NJM* Date *10/26/15* Checked By KC Date 11/2/15

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

ATTERBERG LIMITS

ASTM D 4318-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-26
Client Reference:	Lake Erie Connector 185241	Depth (m):	0.57-0.67
Project No.:	2015-538-001	Sample No.:	GT4
Lab ID:	2015-538-001-003	Soil Description:	DARK GRAY FAT CLAY

Note: The* USCS *symbol used with this test refers only to the minus No. 40 (Minus No. 40 sieve material, Airdried)
sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description .

Liquid Limit Test	**1**	**2**	**3**
Tare Number:	315	1101	108
Wt. of Tare & Wet Sample (g):	39.04	38.30	39.26
Wt. of Tare & Dry Sample (g):	30.45	29.87	30.71
Weight of Tare (g):	18.58	18.01	18.32
Weight of Water (g):	8.6	8.4	8.6
Weight of Dry Sample (g):	11.9	11.9	12.4
Moisture Content (%):	**72.4**	**71.1**	**69.0**
Number of Blows:	**16**	**26**	**34**

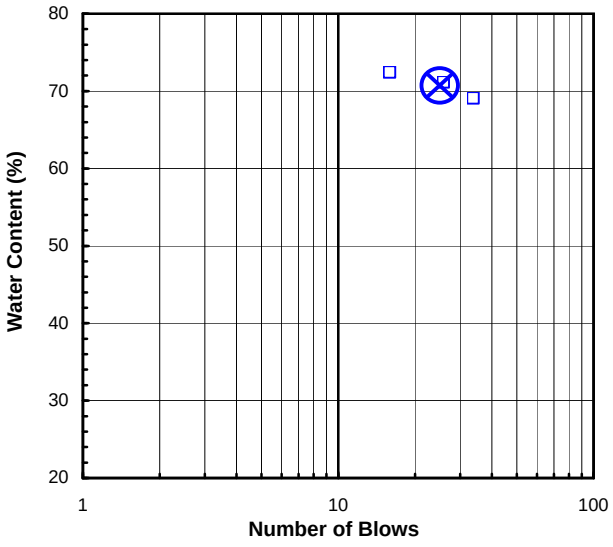
MULTIPOINT

Plastic Limit Test	**1**	**2**	**Range**
Tare Number:	171	325	
Wt. of Tare & Wet Sample (g):	25.40	25.20	
Wt. of Tare & Dry Sample (g):	24.08	23.87	
Weight of Tare (g):	19.12	18.80	
Weight of Water (g):	1.3	1.3	
Weight of Dry Sample (g):	5.0	5.1	
Moisture Content (%):	**26.6**	**26.2**	**0.4**

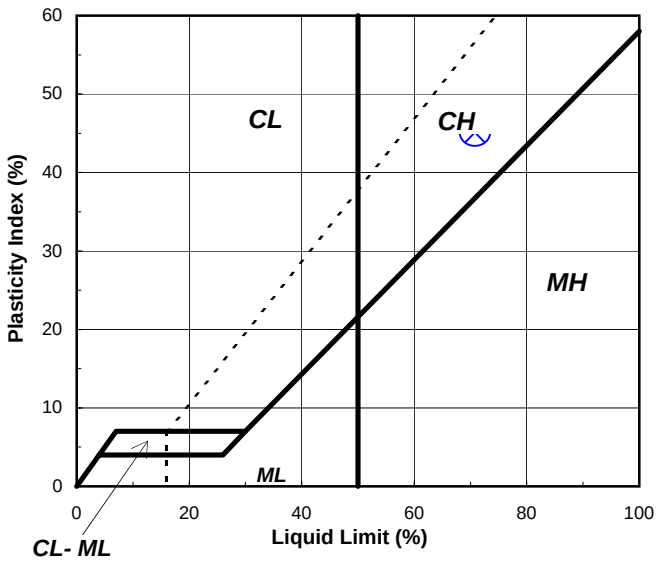
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%):	**71**
Plastic Limit (%):	**26**
Plasticity Index (%):	**45**
USCS Symbol:	**CH**

Flow Curve



Plasticity Chart



Tested By RAL *Date* 10/27/15 *Checked By* CLK *Date* 10/28/15

S:\Excel\Excel QA\Spreadsheets\Limit 3Pt.xls

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

PHOTOGRAPHS

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-26
Client Reference:	Lake Erie Connector 185241	Depth (m):	0.97-1.67
Project No.:	2015-538-001	Sample No.:	GT3
Lab ID:	2015-538-001-004		

Tested By *NJM* *Date* *11/17/15* *Checked By* *KC* *Date* *12/2/15*

S:\Excel\Excel QA\Spreadsheets\Photo

SHELBY TUBE UNIT WEIGHT

ASTM D2937-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-26
Client Reference:	Lake Erie Connector 185241	Depth Pushed (m):	0.97 - 1.67
Project No.:	2015-538-001	Shelby Tube No.:	GT3
Lab ID:	2015-538-001-004	Recovery (m):	0.7

MOISTURE CONTENT

Section Number	**1**
Tare Number	3115
Weight of Tare & Wet Sample (g)	405.10
Weight of Tare & Dry Sample (g)	193.58
Weight of Tare (g)	6.59
Moisture Content (%)	113.12

UNIT WEIGHT

Weight of Tube & Wet Sample (g)	1214.70
Weight of Tube (g)	99.05
Weight of Wet Sample (g)	1115.65
Length 1 (in)	4.631
Length 2 (in)	4.770
Length 3 (in)	4.783
Top Diameter (in)	3.617
Middle Diameter (in)	3.605
Bottom Diameter (in)	3.579
Sample Volume (cm^3)	788.78
Moisture Content (%)	113.12
Unit Wet Weight (g/cm^3)	1.41
Unit Wet Weight (pcf)	88.26
Unit Dry Weight (g/cm^3)	**0.66**
Unit Dry Weight (pcf)	**41.4**

SOIL PROFILE AND SAMPLING

DEPTH (m)	ELEV ( )	SECTION No.	SOIL PROFILE	SOIL DESCRIPTION AND REMARKS	TEST PERFORMED
1.07					
1.22					
1.37					
1.52				SOFT GRAY CLAY Pocket Penetrometer 0 TSF TORVANE= 0.0 kg/cm²	W.C., LIMITS UNIT WGT.
1.67		1			

***Note**: When full recovery is not achieved, the elevation can not be accurately definec*
Indicate each cut of the tube with an arrow
Indicate dividing line between soil types with a solid lin
Indicate wax by cross-hatching. Indicate soil types by standard symbols

Tested By *NJM* Date *11/17/15* Checked By KC Date 11/19/15

ATTERBERG LIMITS

ASTM D 4318-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-26
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.55-1.67
Project No.:	2015-538-001	Sample No.:	GT3
Lab ID:	2015-538-001-004	Soil Description:	GRAY FAT CLAY

Note: The* USCS *symbol used with this test refers only to the minus No. 40 (Minus No. 40 sieve material, Airdried)
sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description .

Liquid Limit Test	**1**	**2**	**3**
Tare Number:	247	166	242
Wt. of Tare & Wet Sample (g):	39.57	38.84	39.39
Wt. of Tare & Dry Sample (g):	31.18	30.68	31.40
Weight of Tare (g):	19.15	18.37	19.13
Weight of Water (g):	8.4	8.2	8.0
Weight of Dry Sample (g):	12.0	12.3	12.3
Moisture Content (%):	**69.7**	**66.3**	**65.1**
Number of Blows:	**15**	**24**	**30**

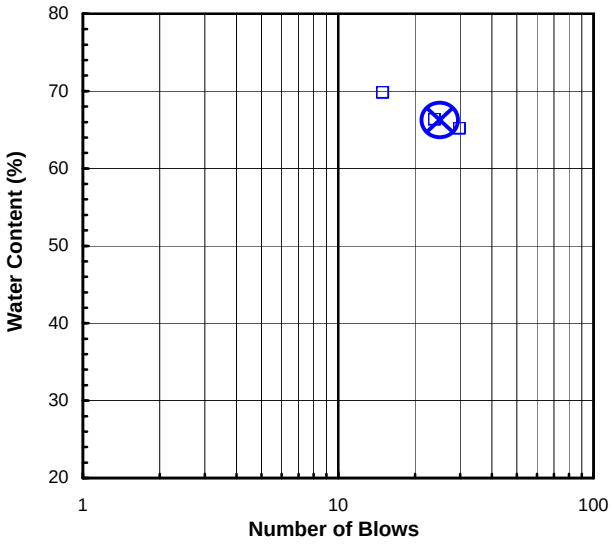
MULTI POINT

Plastic Limit Test	**1**	**2**	**Range**
Tare Number:	186	149	
Wt. of Tare & Wet Sample (g):	24.64	25.26	
Wt. of Tare & Dry Sample (g):	23.31	23.93	
Weight of Tare (g):	18.49	18.99	
Weight of Water (g):	1.3	1.3	
Weight of Dry Sample (g):	4.8	4.9	
Moisture Content (%):	**27.6**	**26.9**	**0.7**

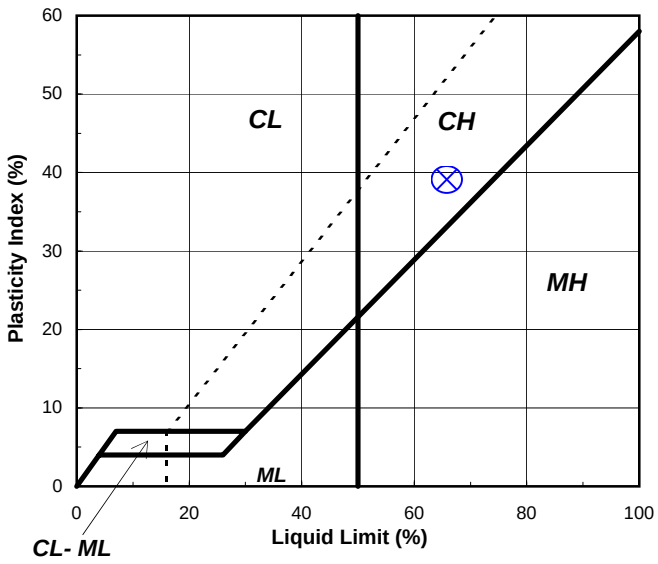
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%):	**66**
Plastic Limit (%):	**27**
Plasticity Index (%):	**39**
USCS Symbol:	**CH**

Flow Curve



Plasticity Chart



Tested By RAL *Date* 11/18/15 *Checked By* CLK *Date* 11/19/15

S:\Excel\Excel QA\Spreadsheets\Limit 3Pt.xls

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONFINED COMPRESSIVE STRENGTH

ASTM D2166-13 / AASHTO T208-10 (SOP S-30)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-26
Client Reference:	Lake Erie Connector 185241	Depth (m):	0.97-1.67
Project No.:	2015-538-001	Sample No.:	GT3
Lab ID:	2015-538-001-004	Visual:	Soft Gray Clay

INITIAL SAMPLE DIMENSIONS		**WATER CONTENT AFTER TEST**
Length 1 (in):	Top Diameter (in):	Tare No.:
Length 2 (in):	Middle Diameter (in):	Weight of Tare & Wet Sample (g):
Length 3 (in):	Bottom Diameter (in):	Weight of Tare & Dry Sample (g):
Avg. Length (in):	**Avg. Diameter (in):**	Weight of Tare (g):
	Area (in^2):	Moisture Content (%):

UNIT WEIGHT	
Weight of Tube & Wet Sample (g):	Sample Volume (cm^3):
Weight of Tube (g):	Unit Wet Weight (g/cm^3):
Weight of Wet Sample (g):	Unit Wet Weight (pcf):
Average Diameter (in):	Moisture Content (%):
Average Length (in):	Unit Dry Weight (pcf):
Average Length (cm):	

ELECTRONIC DEVICE DEFORMATION (in)	*LOAD (lb)*	*ELAPSED TIME (min)*	*STRAIN (%)*	*STRESS (psi)*

NO TEST. SAMPLE UNABLE TO SUPPORT ITS OWN WEIGHT.

Tested By NJM Date 11/17/15 Input Checked By KC Date 12/2/15

DCN: CT-S30 Date: 11/09/09 Revision: 4

S:\Excel\Excel QA\Spreadsheets\UC Sigma.xls

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

PHOTOGRAPHS

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-26
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.87-3.57
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-005		

Tested By *NJM* *Date* *11/17/15* *Checked By* *JCM* *Date* *12/2/15*

S:\Excel\Excel QA\Spreadsheets\Photo

SHELBY TUBE UNIT WEIGHT

ASTM D2937-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-26
Client Reference:	Lake Erie Connector 185241	Depth Pushed (m):	2.87 - 3.57
Project No.:	2015-538-001	Shelby Tube No.:	GT1
Lab ID:	2015-538-001-005	Recovery (m):	0.7

MOISTURE CONTENT

Section Number	**1**
Tare Number	3050
Weight of Tare & Wet Sample (g)	419.80
Weight of Tare & Dry Sample (g)	236.92
Weight of Tare (g)	6.45
Moisture Content (%)	79.35

UNIT WEIGHT

Weight of Tube & Wet Sample (g)	1849.00
Weight of Tube (g)	135.20
Weight of Wet Sample (g)	1713.80
Length 1 (in)	7.213
Length 2 (in)	6.935
Length 3 (in)	6.638
Top Diameter (in)	3.662
Middle Diameter (in)	3.556
Bottom Diameter (in)	3.583
Sample Volume (cm^3)	1155.92
Moisture Content (%)	79.35
Unit Wet Weight (g/cm^3)	1.48
Unit Wet Weight (pcf)	92.52
Unit Dry Weight (g/cm^3)	**0.83**
Unit Dry Weight (pcf)	**51.6**

SOIL PROFILE AND SAMPLING

DEPTH (m)	ELEV ( )	SECTION No.	SOIL PROFILE	SOIL DESCRIPTION AND REMARKS	TEST PERFORMED
2.97					
3.12					
3.27					
3.42		1		SOFT GRAY CLAY Pocket Penetrometer 0 TSF TORVANE= 0.05 kg/cm²	W.C., LIMITS UNIT WGT.
3.57					

***Note**: When full recovery is not achieved, the elevation can not be accurately defined*
Indicate each cut of the tube with an arrow
Indicate dividing line between soil types with a solid lin
Indicate wax by cross-hatching. Indicate soil types by standard symbols

Tested By *JCM* Date *11/18/15* Checked By KC Date 12/1/15

ATTERBERG LIMITS

ASTM D 4318-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-26
Client Reference:	Lake Erie Connector 185241	Depth (m):	3.39-3.57
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-005	Soil Description:	GRAY FAT CLAY

Note: The* USCS *symbol used with this test refers only to the minus No. 40 (Minus No. 40 sieve material, Airdried)
sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description .

Liquid Limit Test	**1**	**2**	**3**
Tare Number:	163	117	315
Wt. of Tare & Wet Sample (g):	38.48	39.02	39.44
Wt. of Tare & Dry Sample (g):	30.88	31.63	31.84
Weight of Tare (g):	18.07	18.83	18.57
Weight of Water (g):	7.6	7.4	7.6
Weight of Dry Sample (g):	12.8	12.8	13.3
Moisture Content (%):	**59.3**	**57.7**	**57.3**
Number of Blows:	**20**	**27**	**35**

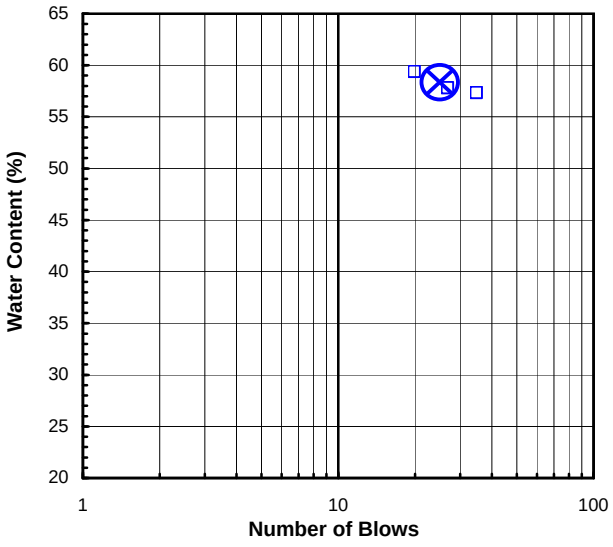
MULTIPOINT

Plastic Limit Test	**1**	**2**	**Range**
Tare Number:	175	167	
Wt. of Tare & Wet Sample (g):	25.84	24.83	
Wt. of Tare & Dry Sample (g):	24.65	23.65	
Weight of Tare (g):	19.67	18.43	
Weight of Water (g):	1.2	1.2	
Weight of Dry Sample (g):	5.0	5.2	
Moisture Content (%):	**23.9**	**22.6**	**1.3**

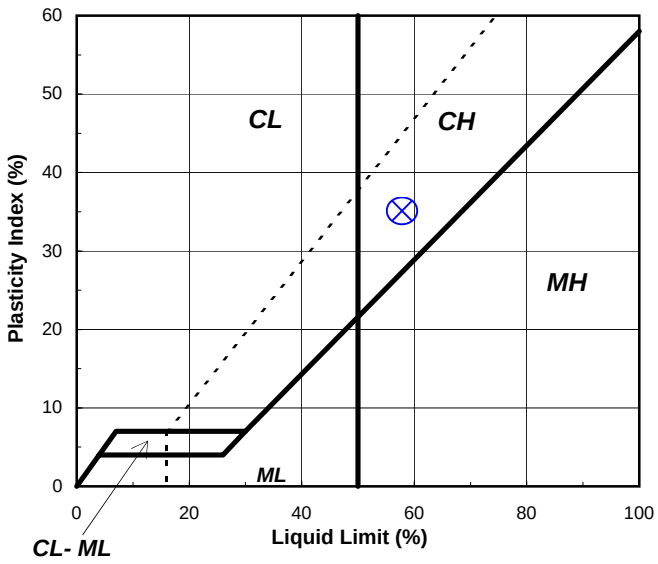
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%):	**58**
Plastic Limit (%):	**23**
Plasticity Index (%):	**35**
USCS Symbol:	**CH**

Flow Curve



Plasticity Chart



Tested By RAL *Date* 11/18/15 *Checked By* CLK *Date* 11/19/15

S:\Excel\Excel QA\Spreadsheets\Limit 3Pt.xls

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONSOLIDATED UNDRAINED TRIAXIAL

ASTM D2850-03a (2007)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-26
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.87-3.57
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-005	Visual:	Soft Gray Clay

INITIAL SAMPLE DIMENSIONS

Length 1 (in):	Top Dia. (in):
Length 2 (in):	Mid. Dia. (in):
Length 3 (in):	Bot. Dia. (in):
Avg.Length (in):	**Area (in^2):**

WATER CONTENT (AFTER TEST)

Total Weight of Sample (g):
Tare No.:
Weight of Tare & Wet Sample (g):
Weight of Tare & Dry Sample (g):
Weight of Tare (g):
% Moisture:

UNIT WEIGHT

Undisturbed Sample

Weight of Tube & Wet Sample (g):	Sample Volume (cm^3):
Weight of Tube (g):	Unit Wet Weight (g/cm^3):
Weight of Wet Sample (g):	Unit Wet Weight (pcf):
Diameter (in):	Moisture Content (%):
Length (in):	Unit Dry Weight (pcf):
Length (cm):	

Initial Dial Reading (mil)

CONFINING STRESS (psi) Dial Reading Before Shearing (mil)

DEFORMATION (in)	*LOAD (lb)*	*ELAPSED TIME (min)*	*STRAIN (%)*	*STRESS (psi)*

NO TEST. SAMPLE UNABLE TO SUPPORT ITS OWN WEIGHT.

Tested By NJM Date 11/17/15 Input Checked By KC Date 12/2/15

DCN: CT-S29 DATE: 8-21-10 REVISION: 2

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

PHOTOGRAPHS

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-27
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.82-2.52
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-006		

Tested By JCM *Date* 11/18/15 *Checked By* KC *Date* 12/1/15

S:\Excel\Excel QA\Spreadsheets\Photo

SHELBY TUBE UNIT WEIGHT

ASTM D2937-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-27
Client Reference:	Lake Erie Connector 185241	Depth Pushed (m):	1.82-2.52
Project No.:	2015-538-001	Shelby Tube No.:	GT2
Lab ID:	2015-538-001-006	Recovery (m):	0.7

MOISTURE CONTENT — After U.U.

Section Number	**1**	**2**	**3**	**4**	**5**
Tare Number	614	1450			
Weight of Tare & Wet Sample (g)	195.20	1960.01			
Weight of Tare & Dry Sample (g)	150.81	1260.80			
Weight of Tare (g)	84.70	144.96			
Moisture Content (%)	67.15	62.66			

UNIT WEIGHT

Weight of Tube & Wet Sample (g)	1820.14
Weight of Tube (g)	0.00
Weight of Wet Sample (g)	1820.14
Length 1 (in)	7.160
Length 2 (in)	7.153
Length 3 (in)	7.198
Top Diameter (in)	3.639
Middle Diameter (in)	3.591
Bottom Diameter (in)	3.637
Sample Volume (cm^3)	1210.90
Moisture Content (%)	62.66
Unit Wet Weight (g/cm^3)	1.50
Unit Wet Weight (pcf)	93.80
Unit Dry Weight (g/cm^3)	**0.92**
Unit Dry Weight (pcf)	**57.7**

SOIL PROFILE AND SAMPLING

DEPTH (m)	ELEV ( )	SECTION No.	SOIL PROFILE	SOIL DESCRIPTION AND REMARKS	TEST PERFORMED
1.92					
2.07					
2.22					
2.37		2		GRAY SILT Pocket Penetrometer 0 TSF TORVANE= 0.05 kg/cm²	U.U. UNIT WGT., W.C.
2.52		1			W.C. LIMITS

***Note**: When full recovery is not achieved, the elevation can not be accurately define*
Indicate each cut of the tube with an arrow
Indicate dividing line between soil types with a solid lin
Indicate wax by cross-hatching. Indicate soil types by standard symbols

Tested By *JCM* Date *11/18/15* Checked By KC Date 12/1/15

ATTERBERG LIMITS

ASTM D 4318-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-27
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.46-2.52
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-006	Soil Description:	GRAY FAT CLAY

Note: The* USCS *symbol used with this test refers only to the minus No. 40 (Minus No. 40 sieve material, Airdried)
sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description .

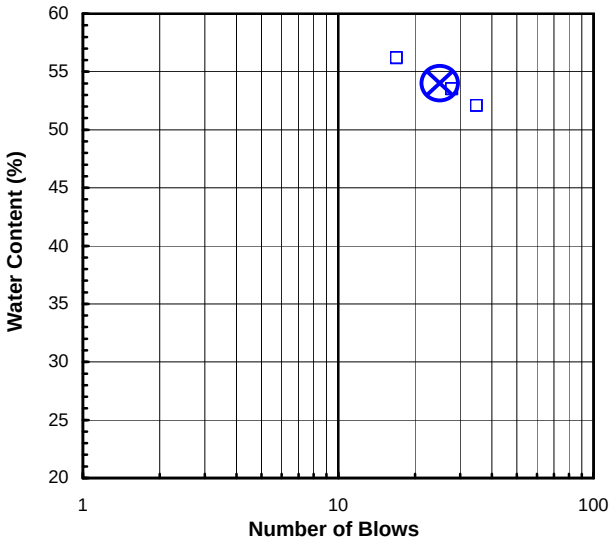
Liquid Limit Test	**1**	**2**	**3**	
				M
Tare Number:	161	202	163	**U**
Wt. of Tare & Wet Sample (g):	38.46	37.61	38.64	**L**
Wt. of Tare & Dry Sample (g):	31.05	30.53	31.60	**T**
Weight of Tare (g):	17.85	17.29	18.07	**I**
Weight of Water (g):	7.4	7.1	7.0	**P**
Weight of Dry Sample (g):	13.2	13.2	13.5	**O**
				I
Moisture Content (%):	**56.1**	**53.5**	**52.0**	**N**
Number of Blows:	**17**	**28**	**35**	**T**

Plastic Limit Test	**1**	**2**	**Range**
Tare Number:	220	182	
Wt. of Tare & Wet Sample (g):	25.90	25.53	
Wt. of Tare & Dry Sample (g):	24.73	24.43	
Weight of Tare (g):	19.26	19.37	
Weight of Water (g):	1.2	1.1	
Weight of Dry Sample (g):	5.5	5.1	
Moisture Content (%):	**21.4**	**21.7**	**-0.3**

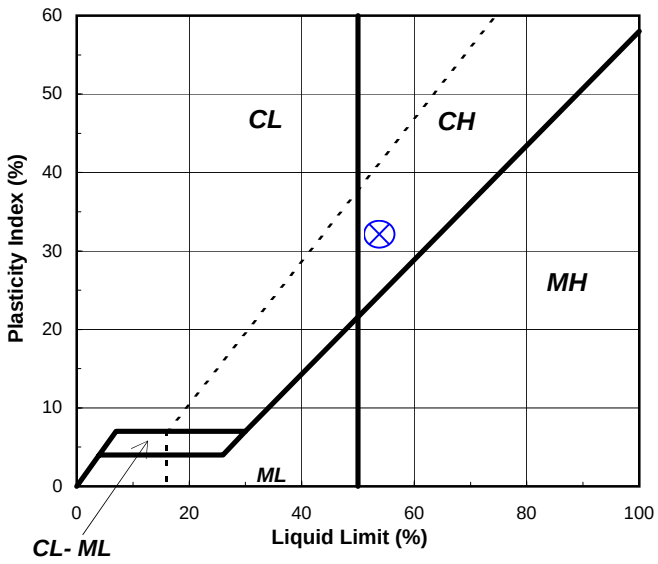
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%):	**54**
Plastic Limit (%):	**22**
Plasticity Index (%):	**32**
USCS Symbol:	**CH**

Flow Curve



Plasticity Chart



Tested By RAL *Date* 11/19/15 *Checked By* CLK *Date* 11/20/15

S:\Excel\Excel QA\Spreadsheets\Limit 3Pt.xls

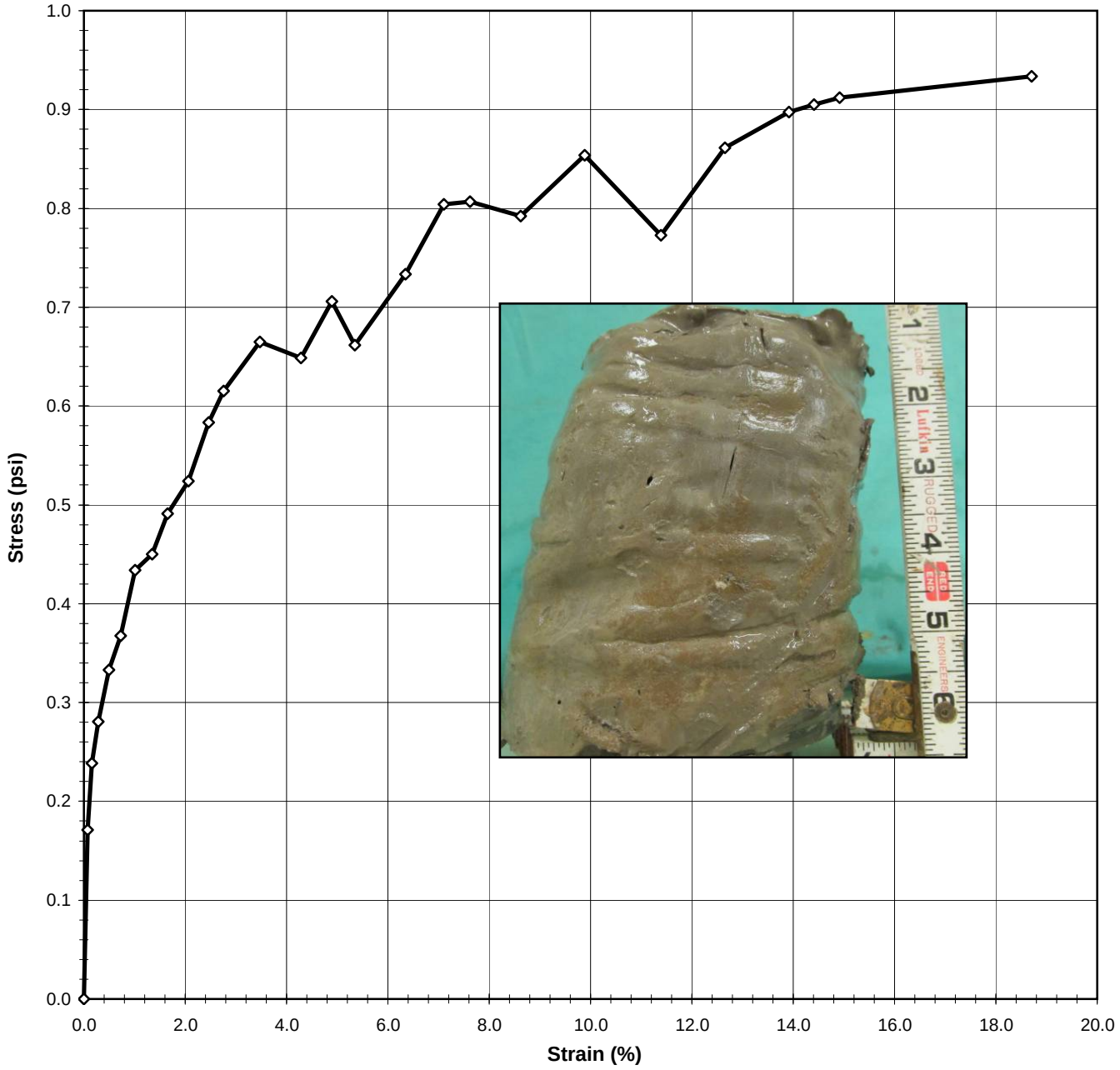
544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONSOLIDATED UNDRAINED TRIAXIAL

ASTM D2850-03a (2007)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-27
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.28-2.46
Project No.:	2015-538-001	Sample No.:	GT-2
Lab ID:	2015-538-001-006	Visual:	Gray Silt

CONFINING STRESS (psi) 55.6



Tested By	JAB	Date	11/18/15	Input Checked By	JCM	Date	11/20/15

DCN: CT-S29 DATE: 8/21/2015 REVISION: 2 *G:\GEOTECHNICAL PROJECTS\Canadian Seabed Research Ltd\2015-538-001 Lake Erie Connector\draft\[2015-538-001-006 UU.xls]Sheet1*

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONSOLIDATED UNDRAINED TRIAXIAL

ASTM D2850-03a (2007)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-27
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.28-2.46
Project No.:	2015-538-001	Sample No.:	GT-2
Lab ID:	2015-538-001-006	Visual:	Gray Silt

INITIAL SAMPLE DIMENSIONS

Length 1 (in):	7.160	Top Dia. (in):	3.639
Length 2 (in):	7.153	Mid. Dia. (in):	3.591
Length 3 (in):	7.198	0 Bot. Dia. (in):	3.637
Avg.Length (in)	**7.170**	**Area (in^2):**	**10.305**

WATER CONTENT (AFTER TEST)

Total Weight of Sample (g):	1820.14
Tare No.:	1450
Weight of Tare & Wet Sample (g):	1960.01
Weight of Tare & Dry Sample (g):	1260.80
Weight of Tare (g):	144.96
% Moisture:	62.7

UNIT WEIGHT

Undisturbed Sample

Weight of Tube & Wet Sample (g):	1820.14	Sample Volume (cm^3):	1210.9
Weight of Tube (g):	0.00	Unit Wet Weight (g/cm^3):	1.50
Weight of Wet Sample (g):	1820.14	Unit Wet Weight (pcf):	93.80
Diameter (in):	3.62	Moisture Content (%):	62.7
Length (in):	7.13	Unit Dry Weight (pcf):	57.7
Length (cm):	18.21		

		Initial Dial Reading (mil)	51
CONFINING STRESS (psi)	**55.6**	Dial Reading Before Shearing (mil)	91

DEFORMATION (in)	*LOAD (lb)*	*ELAPSED TIME (min)*	*STRAIN (%)*	*STRESS (psi)*
0.000	26.1	0.0	0.0	0.000
0.006	27.9	0.08	0.1	0.171
0.011	28.6	0.15	0.2	0.239
0.020	29.0	0.28	0.3	0.280
0.035	29.5	0.50	0.5	0.333
0.052	29.9	0.73	0.7	0.367
0.072	30.6	1.02	1.0	0.434
0.096	30.8	1.35	1.3	0.450
0.118	31.2	1.65	1.7	0.491
0.147	31.6	2.05	2.1	0.524
0.176	32.3	2.45	2.5	0.583
0.197	32.6	2.75	2.8	0.615
0.248	33.2	3.45	3.5	0.665
0.306	33.1	4.27	4.3	0.649
0.349	33.7	4.87	4.9	0.706
0.381	33.3	5.32	5.3	0.662
0.453	34.2	6.32	6.3	0.733
0.507	35.0	7.07	7.1	0.804
0.543	35.1	7.57	7.6	0.807
0.615	35.0	8.57	8.6	0.792
0.705	35.9	9.83	9.9	0.853
0.812	35.1	11.33	11.4	0.773
0.902	36.3	12.58	12.7	0.861
0.992	36.8	13.83	13.9	0.897
1.028	37.0	14.33	14.4	0.905
1.064	37.1	14.83	14.9	0.912
1.333	37.9	18.60	18.7	0.933

Tested By JAB Date 11/18/15 Input Checked By JCM Date 11/20/15

DCN: CT-S29 DATE: 8-21-10 REVISION: 2

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

PHOTOGRAPHS

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-27
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.77-3.47
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-007		

Tested By *NJM* *Date* *10/26/15* *Checked By* *KC* *Date* *11/5/15*

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

SHELBY TUBE UNIT WEIGHT

ASTM D2937-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-27
Client Reference:	Lake Erie Connector 185241	Depth Pushed (m):	2.77-3.47
Project No.:	2015-538-001	Shelby Tube No.:	GT1
Lab ID:	2015-538-001-007	Recovery (m):	0.7

MOISTURE CONTENT

Section Number	**1**
Tare Number	3142
Weight of Tare & Wet Sample (g)	189.20
Weight of Tare & Dry Sample (g)	115.31
Weight of Tare (g)	6.57
Moisture Content (%)	67.95

UNIT WEIGHT

Weight of Tube & Wet Sample (g)	1105.74
Weight of Tube (g)	91.47
Weight of Wet Sample (g)	1014.27
Length 1 (in)	3.744
Length 2 (in)	3.760
Length 3 (in)	3.836
Top Diameter (in)	3.604
Middle Diameter (in)	3.630
Bottom Diameter (in)	3.623
Sample Volume (cm^3)	637.18
Moisture Content (%)	67.95
Unit Wet Weight (g/cm^3)	1.59
Unit Wet Weight (pcf)	99.33
Unit Dry Weight (g/cm^3)	**0.95**
Unit Dry Weight (pcf)	**59.1**

SOIL PROFILE AND SAMPLING

DEPTH (m)	ELEV ( )	SECTION No.	SOIL PROFILE	SOIL DESCRIPTION AND REMARKS	TEST PERFORMED
2.87					
3.02					
3.17					
3.32				SOFT GRAY CLAY	
3.47		1		Pocket Penetrometer 0.0 TSF	UNIT WGT, LIMITS WC

***Note**: When full recovery is not achieved, the elevation can not be accurately define*
Indicate each cut of the tube with an arrow
Indicate dividing line between soil types with a solid lin
Indicate wax by cross-hatching. Indicate soil types by standard symbols

Tested By *NJM* Date *10/26/15* Checked By KC Date 11/2/15

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

ATTERBERG LIMITS

ASTM D 4318-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-27
Client Reference:	Lake Erie Connector 185241	Depth (m):	3.37-3.47
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-007	Soil Description:	GRAY FAT CLAY

Note: The* USCS *symbol used with this test refers only to the minus No. 40 (Minus No. 40 sieve material, Airdried)
sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description .

Liquid Limit Test	**1**	**2**	**3**
Tare Number:	203	143	169
Wt. of Tare & Wet Sample (g):	39.51	40.52	40.18
Wt. of Tare & Dry Sample (g):	32.20	33.31	33.04
Weight of Tare (g):	19.33	19.97	19.28
Weight of Water (g):	7.3	7.2	7.1
Weight of Dry Sample (g):	12.9	13.3	13.8
Moisture Content (%):	**56.8**	**54.0**	**51.9**
Number of Blows:	**15**	**25**	**35**

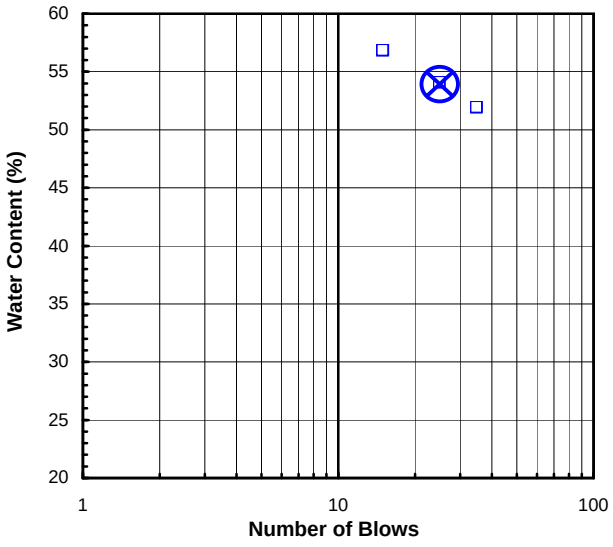
MULTIPOINT

Plastic Limit Test	**1**	**2**	**Range**
Tare Number:	187	367	
Wt. of Tare & Wet Sample (g):	25.45	26.78	
Wt. of Tare & Dry Sample (g):	24.30	25.62	
Weight of Tare (g):	19.09	20.37	
Weight of Water (g):	1.2	1.2	
Weight of Dry Sample (g):	5.2	5.3	
Moisture Content (%):	**22.1**	**22.1**	**0.0**

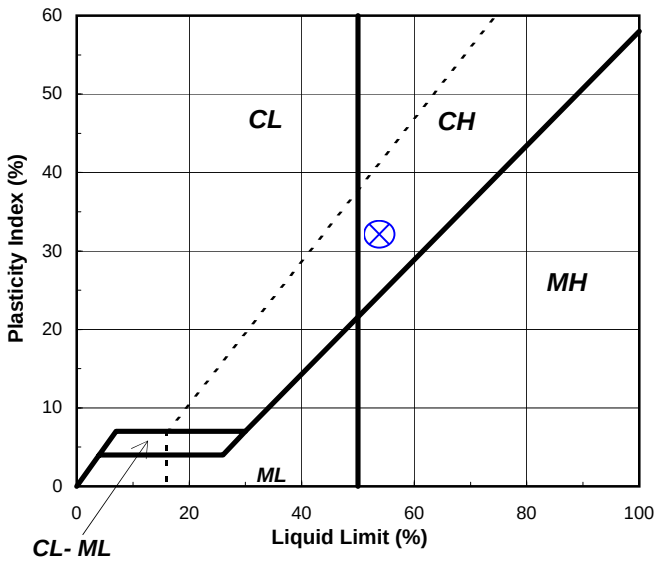
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%):	**54**
Plastic Limit (%):	**22**
Plasticity Index (%):	**32**
USCS Symbol:	**CH**

Flow Curve



Plasticity Chart



Tested By RAL *Date* 10/28/15 *Checked By* CLK *Date* 10/30/15

S:\Excel\Excel QA\Spreadsheets\Limit 3Pt.xls

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

PHOTOGRAPHS

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-28
Client Reference:	Lake Erie Connector 185241	Depth (m):	0.0-0.95
Project No.:	2015-538-001	Sample No.:	GT4
Lab ID:	2015-538-001-008		

Tested By JCM *Date* 11/18/15 *Checked By* KC *Date* 12/1/15

S:\Excel\Excel QA\Spreadsheets\Photo

SHELBY TUBE UNIT WEIGHT

ASTM D2937-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-28
Client Reference:	Lake Erie Connector 185241	Depth Pushed (m):	0.0-0.95
Project No.:	2015-538-001	Shelby Tube No.:	GT4
Lab ID:	2015-538-001-008	Recovery (m):	0.95

MOISTURE CONTENT — After U.U.

Section Number	**1**	**2**	**3**	**4**	**5**
Tare Number	579	1424			
Weight of Tare & Wet Sample (g)	336.27	1084.30			
Weight of Tare & Dry Sample (g)	232.09	709.00			
Weight of Tare (g)	83.03	146.18			
Moisture Content (%)	69.89	66.68			

UNIT WEIGHT

Weight of Tube & Wet Sample (g)	2038.66
Weight of Tube (g)	121.87
Weight of Wet Sample (g)	1916.79
Length 1 (in)	7.155
Length 2 (in)	7.141
Length 3 (in)	7.179
Top Diameter (in)	6.657
Middle Diameter (in)	6.590
Bottom Diameter (in)	6.634
Sample Volume (cm^3)	4046.10
Moisture Content (%)	66.68
Unit Wet Weight (g/cm^3)	0.47
Unit Wet Weight (pcf)	29.56
Unit Dry Weight (g/cm^3)	**0.28**
Unit Dry Weight (pcf)	**17.7**

SOIL PROFILE AND SAMPLING

DEPTH (m)	ELEV ( )	SECTION No.	SOIL PROFILE	SOIL DESCRIPTION AND REMARKS	TEST PERFORMED
0.35					
0.50					
0.65					
0.80		2		GRAY SILT	U.U. UNIT WGT., W.C. LIMITS
				Pocket Penetrometer 0 TSF	
				TORVANE= 0.05 kg/cm²	
0.95		1			W.C.

***Note**: When full recovery is not achieved, the elevation can not be accurately define*
Indicate each cut of the tube with an arrow
Indicate dividing line between soil types with a solid lin
Indicate wax by cross-hatching. Indicate soil types by standard symbols

Tested By *JCM* Date *11/18/15* Checked By KC Date 12/1/15

ATTERBERG LIMITS

ASTM D 4318-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-28
Client Reference:	Lake Erie Connector 185241	Depth (m):	.71-.89
Project No.:	2015-538-001	Sample No.:	GT4
Lab ID:	2015-538-001-008	Soil Description:	GRAY LEAN CLAY

Note: The* USCS *symbol used with this test refers only to the minus No. 40 (Minus No. 40 sieve material, Airdried)

sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description .

Liquid Limit Test	**1**	**2**	**3**
Tare Number:	291	5	158
Wt. of Tare & Wet Sample (g):	38.91	37.62	38.04
Wt. of Tare & Dry Sample (g):	32.03	30.96	31.69
Weight of Tare (g):	18.52	17.14	17.56
Weight of Water (g):	6.9	6.7	6.4
Weight of Dry Sample (g):	13.5	13.8	14.1
Moisture Content (%):	**50.9**	**48.2**	**44.9**
Number of Blows:	**16**	**27**	**34**

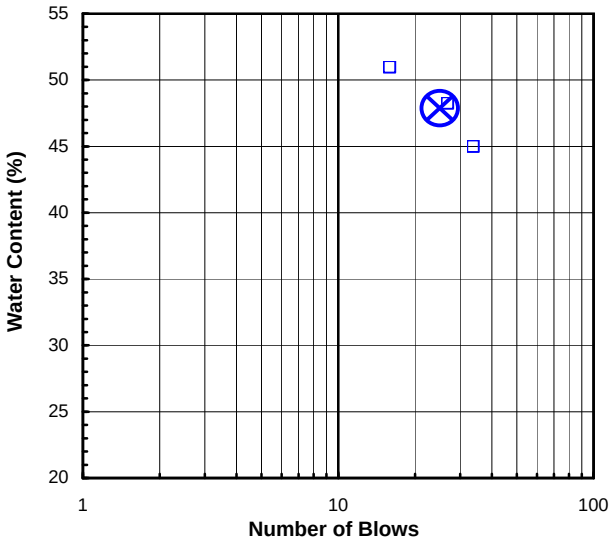
MULTIPOINT

Plastic Limit Test	**1**	**2**	**Range**
Tare Number:	135	143	
Wt. of Tare & Wet Sample (g):	25.82	24.77	
Wt. of Tare & Dry Sample (g):	24.67	23.70	
Weight of Tare (g):	19.42	18.59	
Weight of Water (g):	1.2	1.1	
Weight of Dry Sample (g):	5.3	5.1	
Moisture Content (%):	**21.9**	**20.9**	**1.0**

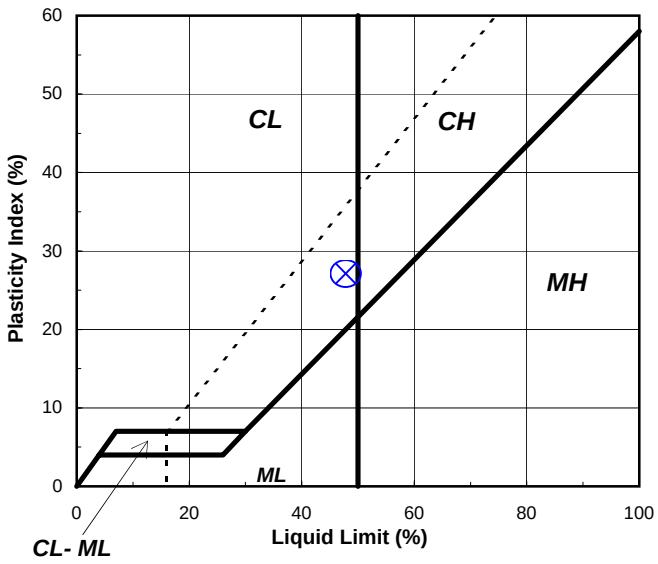
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%):	**48**
Plastic Limit (%):	**21**
Plasticity Index (%):	**27**
USCS Symbol:	**CL**

Flow Curve



Plasticity Chart



Tested By RAL *Date* 11/19/15 *Checked By* CLK *Date* 11/20/15

S:\Excel\Excel QA\Spreadsheets\Limit 3Pt.xls

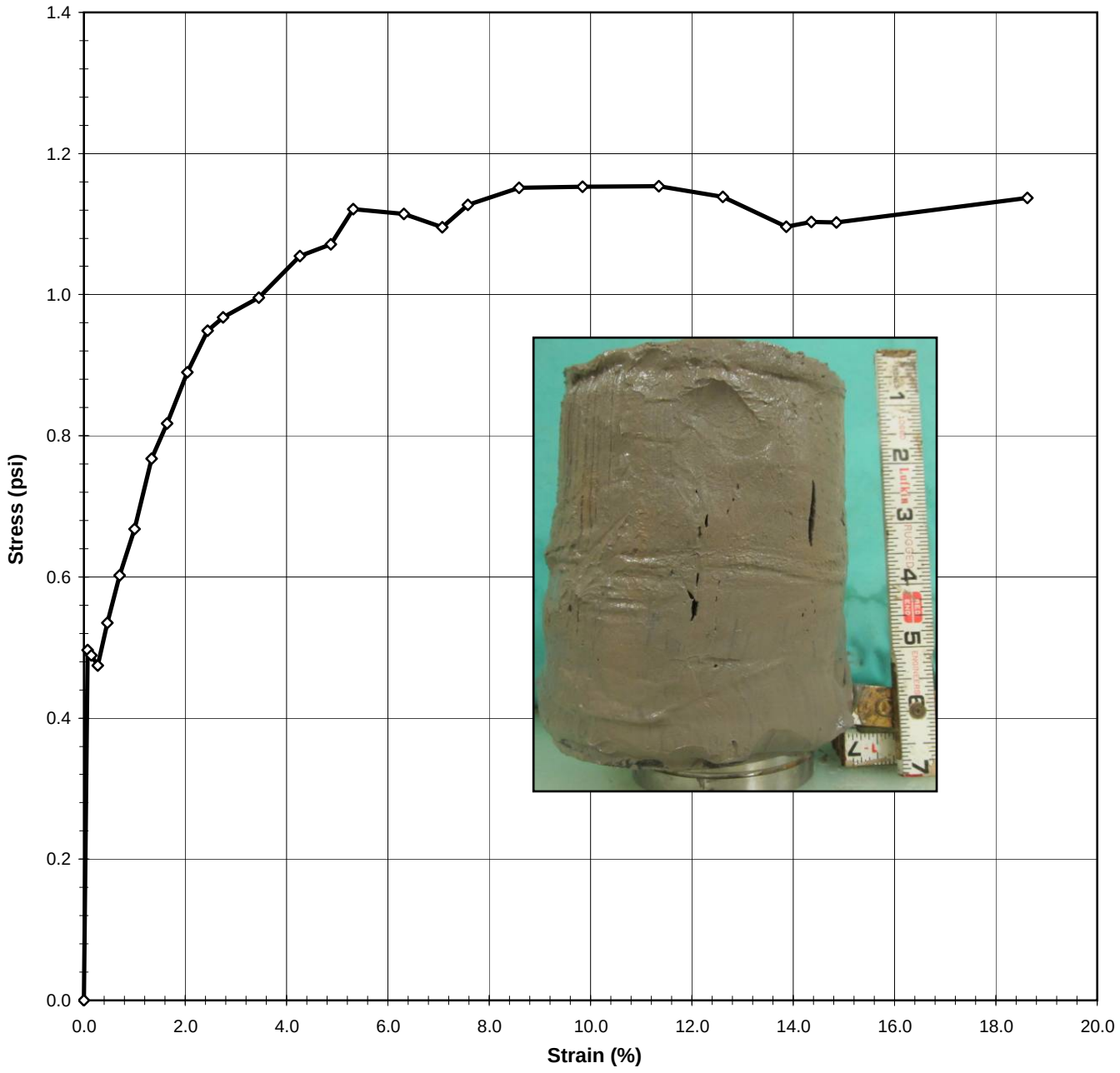
544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONSOLIDATED UNDRAINED TRIAXIAL

ASTM D2850-03a (2007)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-28
Client Reference:	Lake Erie Connector 185241	Depth (m):	.71-.89
Project No.:	2015-538-001	Sample No.:	GT4
Lab ID:	2015-538-001-008	Visual:	Gray Silt

CONFINING STRESS (psi) 48.6



Tested By	JCM	Date	11/18/15	Input Checked By	KC	Date	11/23/15

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONSOLIDATED UNDRAINED TRIAXIAL

ASTM D2850-03a (2007)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-28
Client Reference:	Lake Erie Connector 185241	Depth (m):	.71-.89
Project No.:	2015-538-001	Sample No.:	GT4
Lab ID:	2015-538-001-008	Visual:	Gray Silt

INITIAL SAMPLE DIMENSIONS

Length 1 (in):	7.155	Top Dia. (in):	3.657
Length 2 (in):	7.141	Mid. Dia. (in):	3.690
Length 3 (in):	7.179	0 Bot. Dia. (in):	3.634
Avg.Length (in)	**7.158**	**Area (in^2):**	**10.523**

WATER CONTENT (AFTER TEST)

Total Weight of Sample (g):	1843.84
Tare No.:	1424
Weight of Tare & Wet Sample (g):	1084.30
Weight of Tare & Dry Sample (g):	709.00
Weight of Tare (g):	146.18
% Moisture:	66.7

UNIT WEIGHT

Undisturbed Sample

Weight of Tube & Wet Sample (g):	2038.66	Sample Volume (cm^3):	1234.4
Weight of Tube (g):	121.87	Unit Wet Weight (g/cm^3):	1.55
Weight of Wet Sample (g):	1916.79	Unit Wet Weight (pcf):	96.90
Diameter (in):	3.66	Moisture Content (%):	66.7
Length (in):	7.14	Unit Dry Weight (pcf):	58.1
Length (cm):	18.18		

		Initial Dial Reading (mil)	63
CONFINING STRESS (psi)	**48.6**	Dial Reading Before Shearing (mil)	78

DEFORMATION (in)	*LOAD (lb)*	*ELAPSED TIME (min)*	*STRAIN (%)*	*STRESS (psi)*
0.000	16.6	0.0	0.0	0.000
0.005	21.8	0.07	0.1	0.496
0.010	21.7	0.15	0.1	0.489
0.020	21.6	0.28	0.3	0.475
0.033	22.2	0.47	0.5	0.535
0.050	22.9	0.70	0.7	0.602
0.072	23.7	1.00	1.0	0.668
0.095	24.7	1.33	1.3	0.768
0.117	25.3	1.63	1.6	0.817
0.146	26.1	2.03	2.0	0.890
0.175	26.8	2.43	2.4	0.949
0.196	27.0	2.73	2.7	0.968
0.247	27.4	3.45	3.5	0.996
0.304	28.2	4.25	4.3	1.055
0.348	28.4	4.85	4.9	1.072
0.380	29.0	5.32	5.3	1.121
0.451	29.1	6.32	6.3	1.115
0.505	29.0	7.07	7.1	1.096
0.542	29.4	7.57	7.6	1.127
0.613	29.8	8.57	8.6	1.151
0.703	30.0	9.82	9.8	1.153
0.811	30.3	11.32	11.4	1.154
0.900	30.3	12.58	12.6	1.138
0.990	29.9	13.83	13.9	1.096
1.026	30.1	14.33	14.4	1.103
1.061	30.2	14.83	14.9	1.102
1.330	31.3	18.58	18.6	1.137

Tested By JCM Date 11/18/15 Input Checked By KC Date 11/23/15

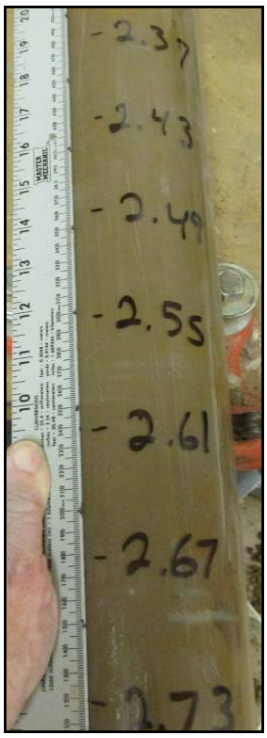
DCN: CT-S29 DATE: 8-21-10 REVISION: 2

\\GEOSERVER\Data Drive\2015 GEOTECHNICAL PROJECTS\Canadian Seabed Research Ltd\2015-538-001 Lake Erie Connector\draft\[2015-538-001-008 UU.xls]Sheet1

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

PHOTOGRAPHS

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-28
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.15-2.85
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-009		



Tested By JCM *Date* 11/18/15 *Checked By* KC *Date* 12/1/15

S:\Excel\Excel QA\Spreadsheets\Photo

SHELBY TUBE UNIT WEIGHT

ASTM D2937-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-28
Client Reference:	Lake Erie Connector 185241	Depth Pushed (m):	2.15-2.85
Project No.:	2015-538-001	Shelby Tube No.:	GT2
Lab ID:	2015-538-001-009	Recovery (m):	0.7

MOISTURE CONTENT — After U.U.

Section Number	**1**	**2**	**3**	**4**	**5**
Tare Number	891	1504			
Weight of Tare & Wet Sample (g)	373.35	1172.90			
Weight of Tare & Dry Sample (g)	269.02	766.60			
Weight of Tare (g)	110.73	148.16			
Moisture Content (%)	65.91	65.70			

UNIT WEIGHT

Weight of Tube & Wet Sample (g)	2028.20
Weight of Tube (g)	114.77
Weight of Wet Sample (g)	1913.43
Length 1 (in)	7.130
Length 2 (in)	7.144
Length 3 (in)	7.135
Top Diameter (in)	3.655
Middle Diameter (in)	3.606
Bottom Diameter (in)	3.653
Sample Volume (cm^3)	1215.60
Moisture Content (%)	65.70
Unit Wet Weight (g/cm^3)	1.57
Unit Wet Weight (pcf)	98.22
Unit Dry Weight (g/cm^3)	**0.95**
Unit Dry Weight (pcf)	**59.3**

SOIL PROFILE AND SAMPLING

DEPTH (m)	ELEV ( )	SECTION No.	SOIL PROFILE	SOIL DESCRIPTION AND REMARKS	TEST PERFORMED
2.25					
2.40					
2.55					
2.70		2		GRAY SILT Pocket Penetrometer 0 TSF TORVANE= 0.05 kg/cm²	U.U. UNIT WGT., W.C. GRAIN SIZE
2.85		1			W.C.

***Note**: When full recovery is not achieved, the elevation can not be accurately defined*
Indicate each cut of the tube with an arrow
Indicate dividing line between soil types with a solid lin
Indicate wax by cross-hatching. Indicate soil types by standard symbols

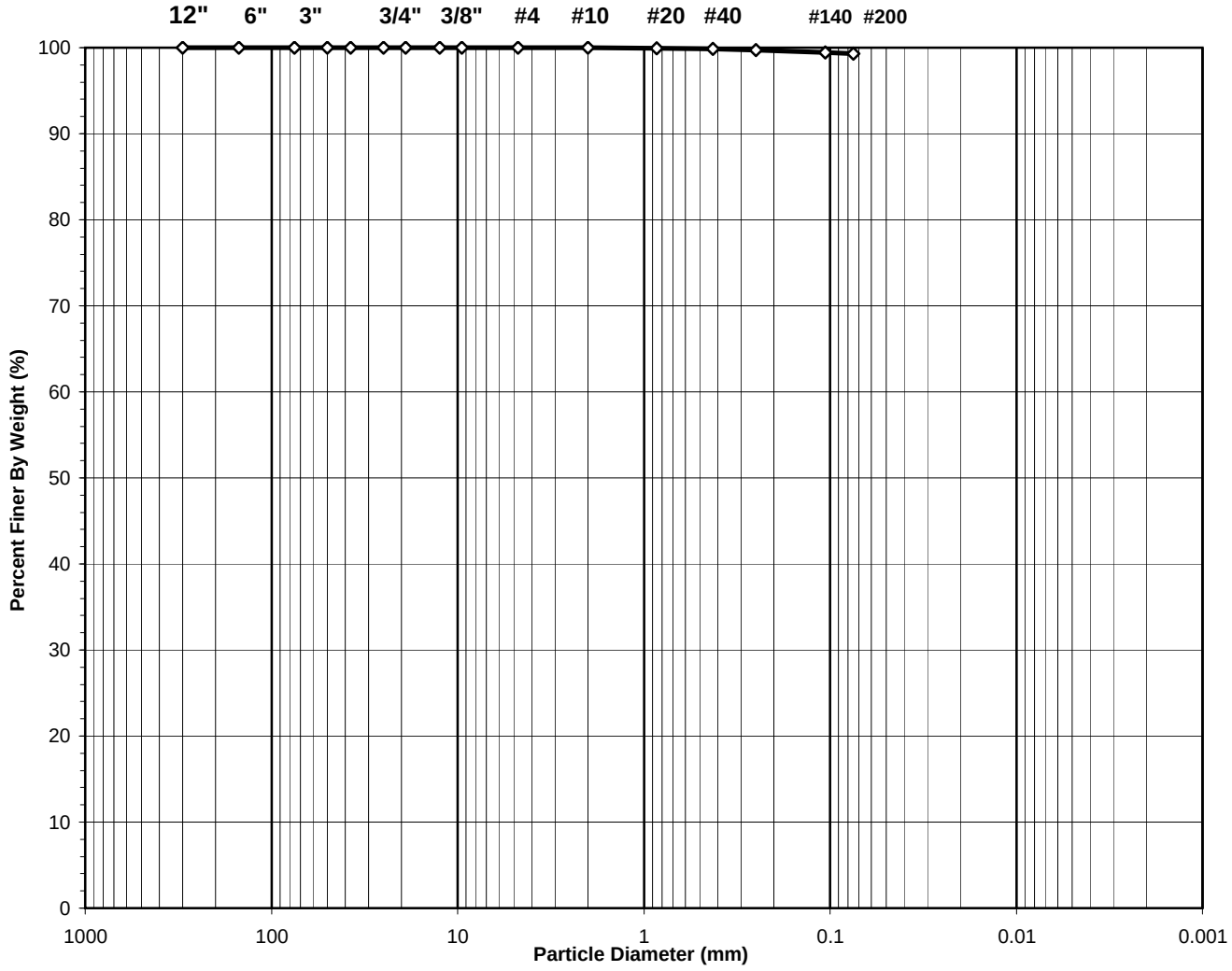
Tested By *JCM* Date *11/18/15* Checked By KC Date 12/1/15

SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-28
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.61-2.79
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-009	Soil Color:	Gray

	SIEVE ANALYSIS		*HYDROMETER*
USCS	**gravel**	**sand**	**silt and clay**



USCS Symbol:
ml, ASSUMED

USCS Classification:
SILT

Tested By	HL	Date	11/23/15	Checked By	KC	Date	11/24/15

DCN: CT-S3C DATE 3/20/13 REVISION: 3

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

WASH SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-28
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.61-2.79
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-009	Soil Color:	Gray

Moisture Content of Passing 3/4" Sample		Water Content of Retained 3/4" Sample	
Tare No.:	1504	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	1172.90	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	766.60	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	148.16	Weight of Tare (g):	NA
Weight of Water (g):	406.30	Weight of Water (g):	NA
Weight of Dry Sample (g):	618.44	Weight of Dry Sample (g):	NA
Moisture Content (%):	**65.7**	**Moisture Content (%):**	**NA**

Wet Weight of -3/4" Sample (g):	NA	Weight of the Dry Sample (g):	618.44
Dry Weight of - 3/4" Sample (g):	4.4	Weight of - #200 Material (g):	614.06
Wet Weight of +3/4" Sample (g):	NA	Weight of + #200 Material (g):	4.38
Dry Weight of + 3/4" Sample (g):	0.00		
Total Dry Weight of Sample (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.50	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	0.00	0.00	0.00	100.00	**100.00**
#4	4.75	0.11	0.02	0.02	99.98	**99.98**
#10	2.00	0.01	0.00	0.02	99.98	**99.98**
#20	0.850	0.28	0.05	0.06	99.94	**99.94**
#40	0.425	0.45	0.07	0.14	99.86	**99.86**
#60	0.250	0.91	0.15	0.28	99.72	**99.72**
#140	0.106	1.72	0.28	0.56	99.44	**99.44**
#200	0.075	0.90	0.15	0.71	99.29	**99.29**
Pan	-	614.06	99.29	100.00	-	**-**

Tested By HL Date 11/23/15 Checked By KC Date 11/24/15

DCN: CT-S3C DATE 3/20/13 REVISION: 3

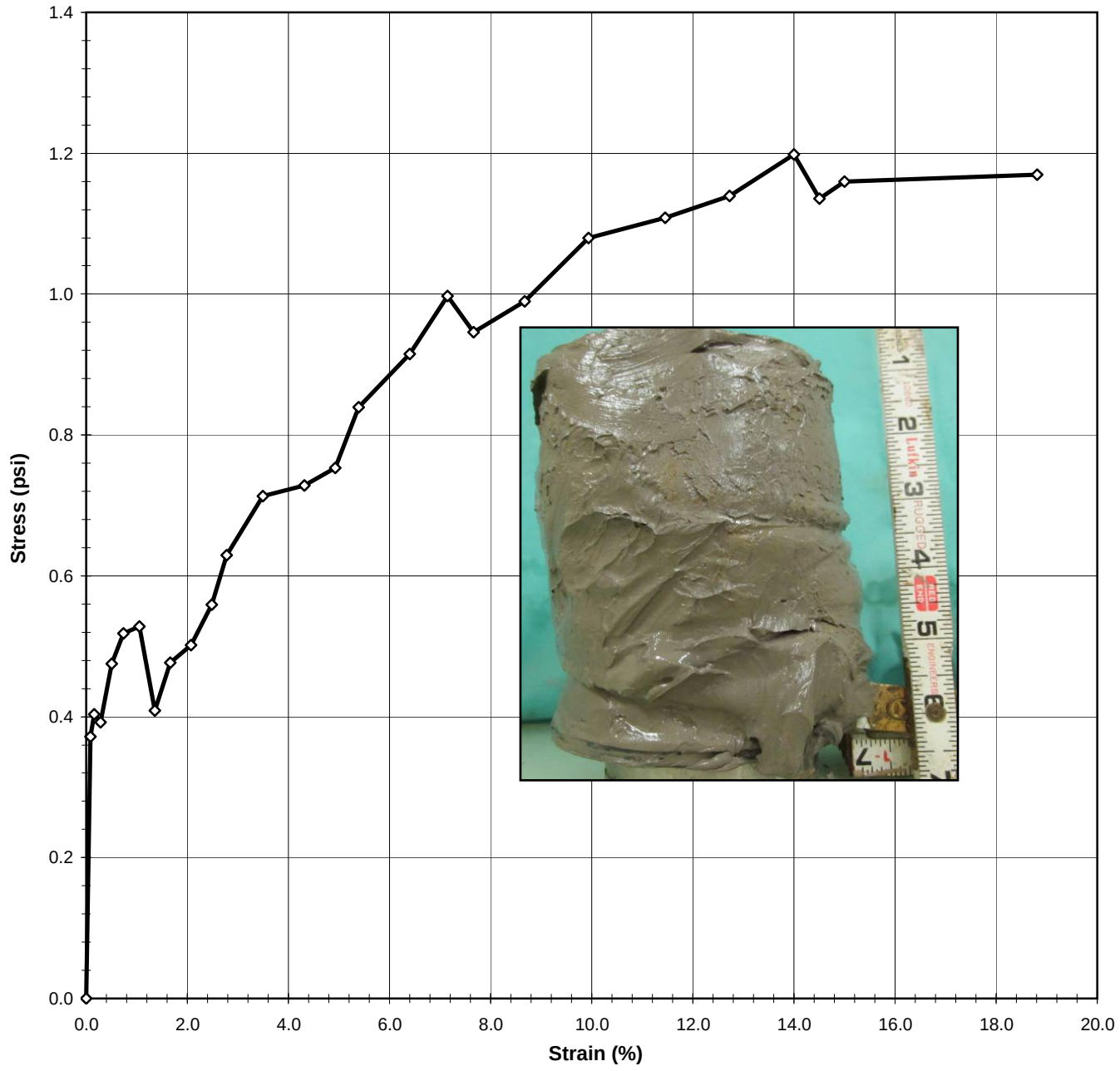
544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONSOLIDATED UNDRAINED TRIAXIAL

ASTM D2850-03a (2007)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-28
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.61-2.79
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-009	Visual:	Gray Silt

CONFINING STRESS (psi) 55.6



Tested By JCM Date 11/18/15 Input Checked By KC Date 11/23/15

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONSOLIDATED UNDRAINED TRIAXIAL

ASTM D2850-03a (2007)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-28
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.61-2.79
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-009	Visual:	Gray Silt

INITIAL SAMPLE DIMENSIONS

Length 1 (in):	7.130	Top Dia. (in):	3.655
Length 2 (in):	7.144	Mid. Dia. (in):	3.606
Length 3 (in):	7.135	0 Bot. Dia. (in):	3.653
Avg.Length (in)	**7.136**	**Area (in^2):**	**10.395**

WATER CONTENT (AFTER TEST)

Total Weight of Sample (g):	1778.92
Tare No.:	1504
Weight of Tare & Wet Sample (g):	1172.90
Weight of Tare & Dry Sample (g):	766.60
Weight of Tare (g):	148.16
% Moisture:	65.7

UNIT WEIGHT

Undisturbed Sample

Weight of Tube & Wet Sample (g):	2028.2	Sample Volume (cm^3):	1215.6
Weight of Tube (g):	114.77	Unit Wet Weight (g/cm^3):	1.57
Weight of Wet Sample (g):	1913.43	Unit Wet Weight (pcf):	98.22
Diameter (in):	3.64	Moisture Content (%):	65.7
Length (in):	7.06	Unit Dry Weight (pcf):	59.3
Length (cm):	18.13		

		Initial Dial Reading (mil)	42
CONFINING STRESS (psi)	**55.6**	Dial Reading Before Shearing (mil)	120

DEFORMATION (in)	*LOAD (lb)*	*ELAPSED TIME (min)*	*STRAIN (%)*	*STRESS (psi)*
0.000	18.8	0.0	0.0	0.000
0.006	22.7	0.07	0.1	0.372
0.011	23.0	0.15	0.2	0.403
0.020	22.9	0.28	0.3	0.392
0.035	23.8	0.50	0.5	0.475
0.052	24.3	0.73	0.7	0.519
0.074	24.4	1.03	1.1	0.528
0.096	23.2	1.33	1.4	0.409
0.118	23.9	1.65	1.7	0.477
0.146	24.2	2.05	2.1	0.502
0.175	24.8	2.45	2.5	0.559
0.196	25.6	2.75	2.8	0.630
0.247	26.5	3.45	3.5	0.713
0.305	26.8	4.27	4.3	0.728
0.348	27.1	4.87	4.9	0.753
0.380	28.1	5.32	5.4	0.840
0.452	29.0	6.32	6.4	0.915
0.505	30.0	7.07	7.2	0.997
0.541	29.5	7.58	7.7	0.946
0.612	30.1	8.58	8.7	0.990
0.702	31.3	9.83	9.9	1.080
0.809	31.9	11.33	11.5	1.108
0.898	32.4	12.58	12.7	1.139
0.988	33.3	13.83	14.0	1.198
1.023	32.6	14.33	14.5	1.135
1.059	33.0	14.83	15.0	1.160
1.328	33.8	18.60	18.8	1.169

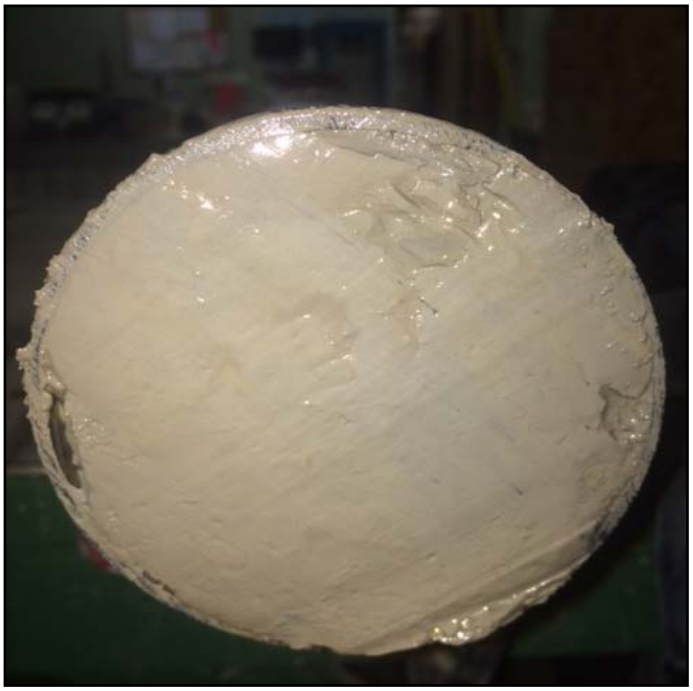
Tested By JCM Date 11/18/15 Input Checked By KC Date 11/23/15

DCN: CT-S29 DATE: 8-21-10 REVISION: 2

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

PHOTOGRAPHS

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-29
Client Reference:	Lake Erie Connector 185241	Depth (m):	0.75-1.25
Project No.:	2015-538-001	Sample No.:	GT4
Lab ID:	2015-538-001-010		



Tested By *NJM* *Date* *10/26/15* *Checked By* *KC* *Date* *11/5/15*

S:\Excel\Excel QA\Spreadsheets\Photo

SHELBY TUBE UNIT WEIGHT

ASTM D2937-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-29
Client Reference:	Lake Erie Connector 185241	Depth Pushed (m):	0.75-1.25
Project No.:	2015-538-001	Shelby Tube No.:	GT4
Lab ID:	2015-538-001-010	Recovery (m):	0.5

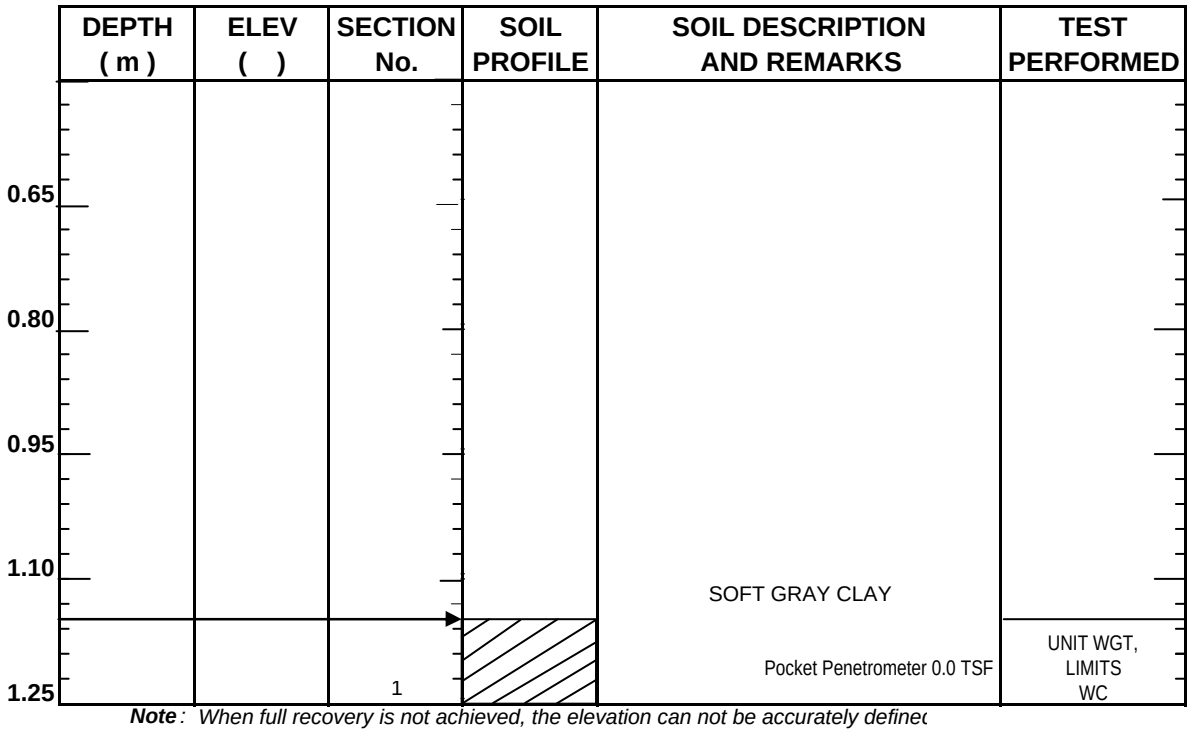
MOISTURE CONTENT

Section Number	**1**
Tare Number	3200
Weight of Tare & Wet Sample (g)	332.18
Weight of Tare & Dry Sample (g)	199.74
Weight of Tare (g)	6.46
Moisture Content (%)	68.52

UNIT WEIGHT

Weight of Tube & Wet Sample (g)	1130.08
Weight of Tube (g)	93.25
Weight of Wet Sample (g)	1036.83
Length 1 (in)	3.914
Length 2 (in)	3.651
Length 3 (in)	3.851
Top Diameter (in)	3.615
Middle Diameter (in)	3.634
Bottom Diameter (in)	3.593
Sample Volume (cm^3)	639.68
Moisture Content (%)	68.52
Unit Wet Weight (g/cm^3)	1.62
Unit Wet Weight (pcf)	101.14
Unit Dry Weight (g/cm^3)	**0.96**
Unit Dry Weight (pcf)	**60.0**

SOIL PROFILE AND SAMPLING



***Note**: When full recovery is not achieved, the elevation can not be accurately define*
Indicate each cut of the tube with an arrow
Indicate dividing line between soil types with a solid lin
Indicate wax by cross-hatching. Indicate soil types by standard symbols

Tested By *NJM* Date *10/26/15* Checked By KC Date 11/2/15

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

ATTERBERG LIMITS

ASTM D 4318-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-29
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.15-1.25
Project No.:	2015-538-001	Sample No.:	GT4
Lab ID:	2015-538-001-010	Soil Description:	GRAY LEAN CLAY

Note: The* USCS *symbol used with this test refers only to the minus No. 40 (Minus No. 40 sieve material, Airdried)

sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description .

Liquid Limit Test	**1**	**2**	**3**
Tare Number:	175	183	186
Wt. of Tare & Wet Sample (g):	39.69	40.40	38.78
Wt. of Tare & Dry Sample (g):	33.19	33.45	32.01
Weight of Tare (g):	19.67	19.29	18.50
Weight of Water (g):	6.5	7.0	6.8
Weight of Dry Sample (g):	13.5	14.2	13.5
Moisture Content (%):	**48.1**	**49.1**	**50.1**
Number of Blows:	**33**	**27**	**21**

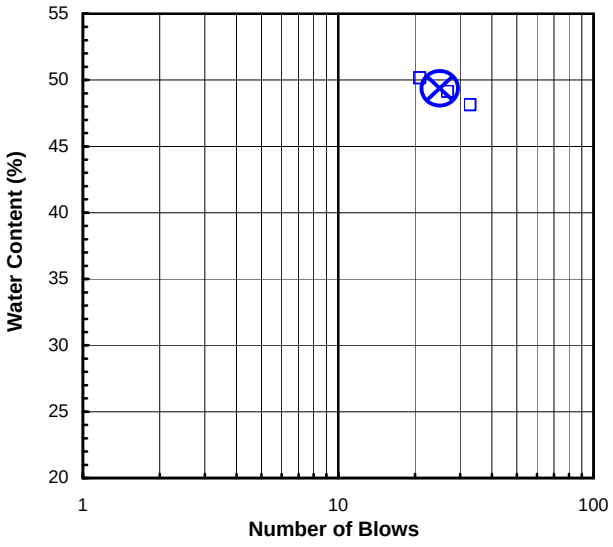
MULTI POINT

Plastic Limit Test	**1**	**2**	**Range**
Tare Number:	231	224	
Wt. of Tare & Wet Sample (g):	26.04	26.26	
Wt. of Tare & Dry Sample (g):	24.83	24.97	
Weight of Tare (g):	19.66	19.75	
Weight of Water (g):	1.2	1.3	
Weight of Dry Sample (g):	5.2	5.2	
Moisture Content (%):	**23.4**	**24.7**	**-1.3**

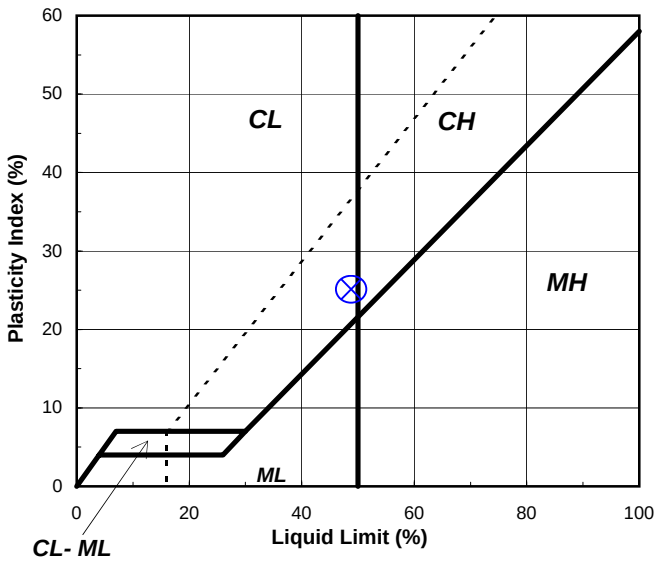
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%):	**49**
Plastic Limit (%):	**24**
Plasticity Index (%):	**25**
USCS Symbol:	**CL**

Flow Curve



Plasticity Chart



Tested By JP *Date* 10/28/15 *Checked By* CLK *Date* 10/30/15

S:\Excel\Excel QA\Spreadsheets\Limit 3Pt.xls

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

PHOTOGRAPHS

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-29
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.5-2.20
Project No.:	2015-538-001	Sample No.:	GT3
Lab ID:	2015-538-001-011		

Tested By JCM *Date* 11/18/15 *Checked By* KC *Date* 12/1/15

S:\Excel\Excel QA\Spreadsheets\Photo

SHELBY TUBE UNIT WEIGHT

ASTM D2937-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-29
Client Reference:	Lake Erie Connector 185241	Depth Pushed (m):	1.5-2.20
Project No.:	2015-538-001	Shelby Tube No.:	GT3
Lab ID:	2015-538-001-011	Recovery (m):	0.7

MOISTURE CONTENT — After U.U.

Section Number	**1**	**2**	**3**	**4**	**5**
Tare Number	907	1472			
Weight of Tare & Wet Sample (g)	388.04	1102.09			
Weight of Tare & Dry Sample (g)	298.28	745.60			
Weight of Tare (g)	110.45	144.03			
Moisture Content (%)	47.79	59.26			

UNIT WEIGHT

Weight of Tube & Wet Sample (g)	2125.49
Weight of Tube (g)	118.43
Weight of Wet Sample (g)	2007.06
Length 1 (in)	7.293
Length 2 (in)	7.327
Length 3 (in)	7.289
Top Diameter (in)	3.672
Middle Diameter (in)	3.607
Bottom Diameter (in)	3.589
Sample Volume (cm^3)	1233.53
Moisture Content (%)	59.26
Unit Wet Weight (g/cm^3)	1.63
Unit Wet Weight (pcf)	101.53
Unit Dry Weight (g/cm^3)	**1.02**
Unit Dry Weight (pcf)	**63.8**

SOIL PROFILE AND SAMPLING

DEPTH (m)	ELEV ( )	SECTION No.	SOIL PROFILE	SOIL DESCRIPTION AND REMARKS	TEST PERFORMED
1.60					
1.75					
1.90					
2.05		2		GRAY SILT	U.U. UNIT WGT., W.C. LIMITS
				Pocket Penetrometer 0 TSF	
2.20		1		TORVANE= 0.25 kg/cm^2	W.C.

***Note**: When full recovery is not achieved, the elevation can not be accurately define*
Indicate each cut of the tube with an arrow
Indicate dividing line between soil types with a solid lin
Indicate wax by cross-hatching. Indicate soil types by standard symbols

Tested By *JCM* Date *11/18/15* Checked By KC Date 12/1/15

ATTERBERG LIMITS

ASTM D 4318-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-29
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.96-2.14
Project No.:	2015-538-001	Sample No.:	GT3
Lab ID:	2015-538-001-011	Soil Description:	GRAY LEAN CLAY

Note: The* USCS *symbol used with this test refers only to the minus No. 40 (Minus No. 40 sieve material, Airdried)
sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description .

Liquid Limit Test	**1**	**2**	**3**
Tare Number:	144	115	213
Wt. of Tare & Wet Sample (g):	38.74	38.65	38.93
Wt. of Tare & Dry Sample (g):	32.29	32.57	32.92
Weight of Tare (g):	17.99	18.61	18.56
Weight of Water (g):	6.5	6.1	6.0
Weight of Dry Sample (g):	14.3	14.0	14.4
Moisture Content (%):	**45.1**	**43.6**	**41.9**
Number of Blows:	**17**	**26**	**35**

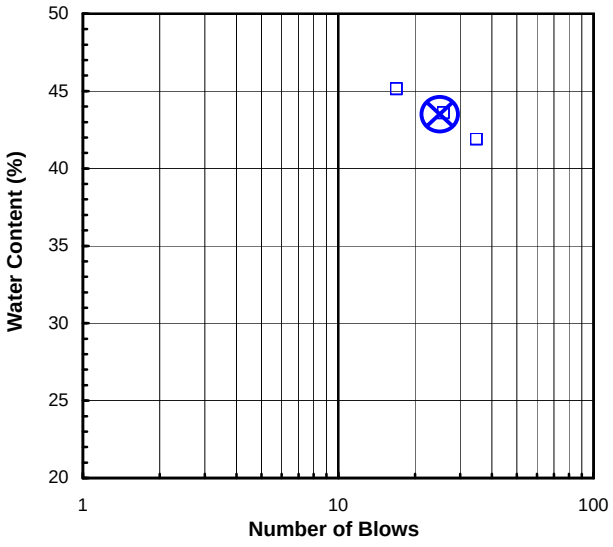
MULTIPOINT

Plastic Limit Test	**1**	**2**	**Range**
Tare Number:	111	175	
Wt. of Tare & Wet Sample (g):	25.73	25.83	
Wt. of Tare & Dry Sample (g):	24.75	24.89	
Weight of Tare (g):	19.25	19.67	
Weight of Water (g):	1.0	0.9	
Weight of Dry Sample (g):	5.5	5.2	
Moisture Content (%):	**17.8**	**18.0**	**-0.2**

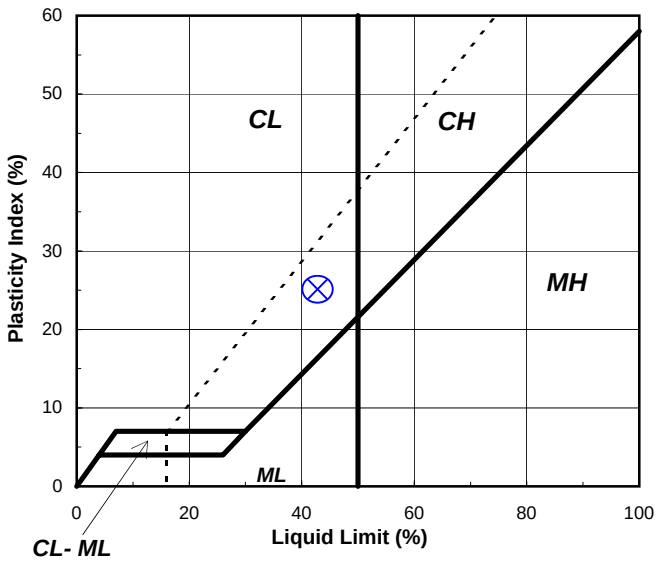
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%):	**43**
Plastic Limit (%):	**18**
Plasticity Index (%):	**25**
USCS Symbol:	**CL**

Flow Curve



Plasticity Chart



Tested By RAL *Date* 11/20/15 *Checked By* CLK *Date* 11/23/15

S:\Excel\Excel QA\Spreadsheets\Limit 3Pt.xls

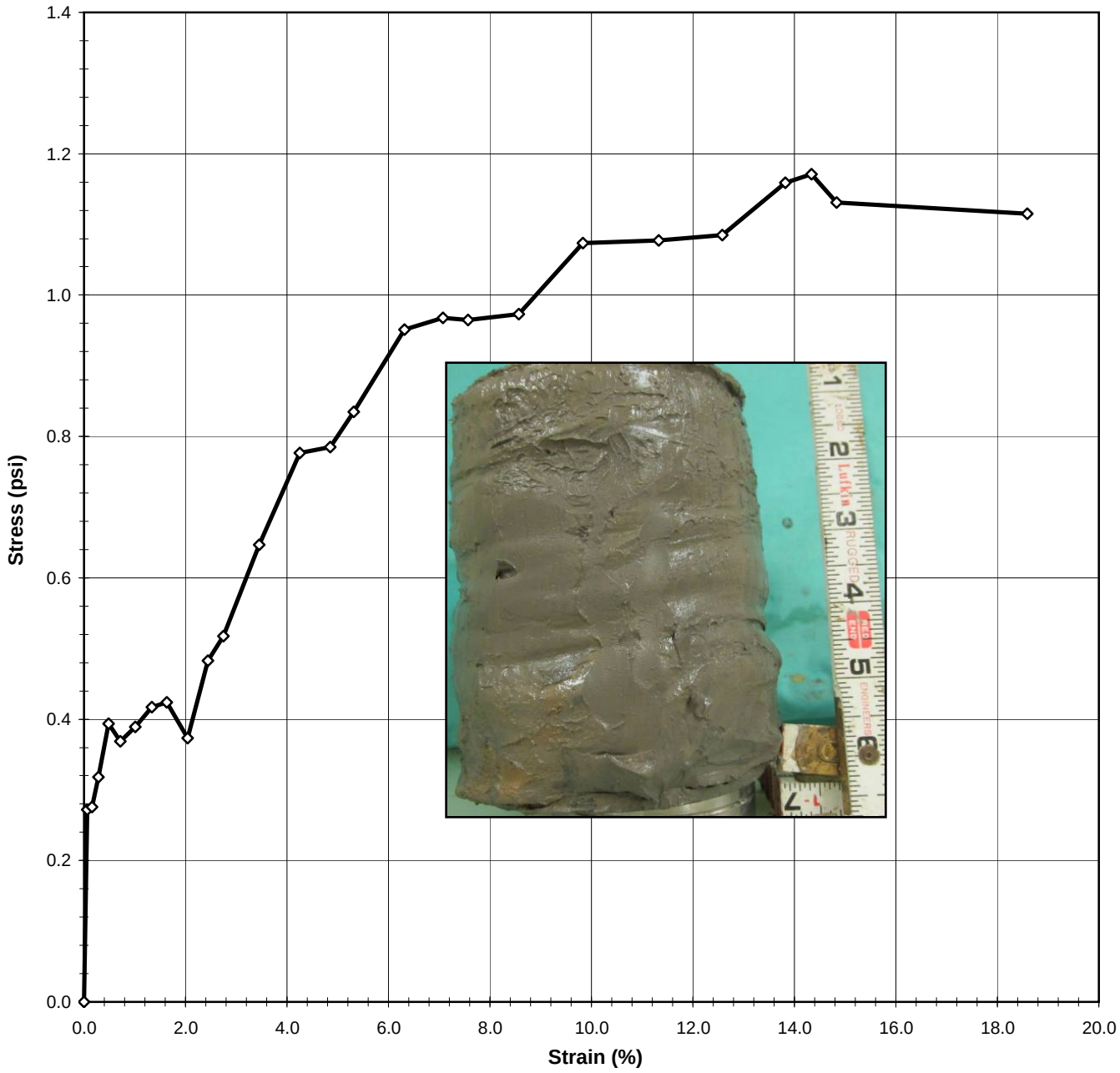
544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONSOLIDATED UNDRAINED TRIAXIAL

ASTM D2850-03a (2007)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-29
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.96-2.14
Project No.:	2015-538-001	Sample No.:	GT3
Lab ID:	2015-538-001-011	Visual:	Gray Silt

CONFINING STRESS (psi) 48.6



Tested By JCM Date 11/18/15 Input Checked By KC Date 11/23/15

DCN: CT-S29 DATE: 8/21/2015 REVISION: 2 *G:\GEOTECHNICAL PROJECTS\Canadian Seabed Research Ltd\2015-538-001 Lake Erie Connector\draft\[2015-538-001-011 UU.xls]Sheet1*

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONSOLIDATED UNDRAINED TRIAXIAL

ASTM D2850-03a (2007)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-29
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.96-2.14
Project No.:	2015-538-001	Sample No.:	GT3
Lab ID:	2015-538-001-011	Visual:	Gray Silt

INITIAL SAMPLE DIMENSIONS

Length 1 (in):	7.293	Top Dia. (in):	3.672
Length 2 (in):	7.327	Mid. Dia. (in):	3.607
Length 3 (in):	7.289	0 Bot. Dia. (in):	3.589
Avg.Length (in)	**7.303**	**Area (in^2):**	**10.307**

WATER CONTENT (AFTER TEST)

Total Weight of Sample (g):	1886.90
Tare No.:	1472
Weight of Tare & Wet Sample (g):	1102.09
Weight of Tare & Dry Sample (g):	745.60
Weight of Tare (g):	144.03
% Moisture:	59.3

UNIT WEIGHT

Undisturbed Sample

Weight of Tube & Wet Sample (g):	2125.49	Sample Volume (cm^3):	1233.5
Weight of Tube (g):	118.43	Unit Wet Weight (g/cm^3):	1.63
Weight of Wet Sample (g):	2007.06	Unit Wet Weight (pcf):	101.53
Diameter (in):	3.62	Moisture Content (%):	59.3
Length (in):	7.30	Unit Dry Weight (pcf):	63.8
Length (cm):	18.55		

		Initial Dial Reading (mil)	18
CONFINING STRESS (psi)	**48.6**	Dial Reading Before Shearing (mil)	20

DEFORMATION (in)	*LOAD (lb)*	*ELAPSED TIME (min)*	*STRAIN (%)*	*STRESS (psi)*
0.000	16.6	0.0	0.0	0.000
0.005	19.4	0.08	0.1	0.272
0.011	19.4	0.15	0.2	0.276
0.021	19.9	0.28	0.3	0.318
0.036	20.7	0.50	0.5	0.393
0.052	20.4	0.72	0.7	0.369
0.074	20.6	1.02	1.0	0.389
0.098	20.9	1.33	1.3	0.417
0.119	21.0	1.65	1.6	0.424
0.149	20.5	2.05	2.0	0.373
0.178	21.7	2.45	2.4	0.483
0.201	22.1	2.75	2.7	0.517
0.252	23.5	3.45	3.4	0.647
0.311	24.9	4.27	4.3	0.777
0.355	25.1	4.87	4.9	0.785
0.388	25.7	5.32	5.3	0.835
0.461	27.0	6.32	6.3	0.951
0.516	27.3	7.07	7.1	0.968
0.553	27.3	7.58	7.6	0.965
0.625	27.5	8.58	8.6	0.973
0.717	28.8	9.83	9.8	1.074
0.827	29.1	11.33	11.3	1.078
0.918	29.4	12.58	12.6	1.085
1.009	30.4	13.83	13.8	1.159
1.046	30.7	14.33	14.3	1.171
1.083	30.3	14.83	14.8	1.131
1.357	30.7	18.60	18.6	1.115

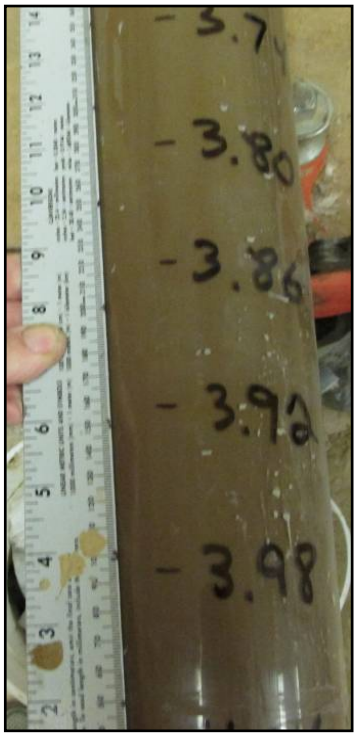
Tested By JCM Date 11/18/15 Input Checked By KC Date 11/23/15

DCN: CT-S29 DATE: 8-21-10 REVISION: 2

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

PHOTOGRAPHS

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-29
Client Reference:	Lake Erie Connector 185241	Depth (m):	3.40-4.10
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-012		



Tested By JCM *Date* 11/18/15 *Checked By* KC *Date* 12/1/15

S:\Excel\Excel QA\Spreadsheets\Photo

SHELBY TUBE UNIT WEIGHT

ASTM D2937-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-29
Client Reference:	Lake Erie Connector 185241	Depth Pushed (m):	3.40-4.10
Project No.:	2015-538-001	Shelby Tube No.:	GT1
Lab ID:	2015-538-001-012	Recovery (m):	0.7

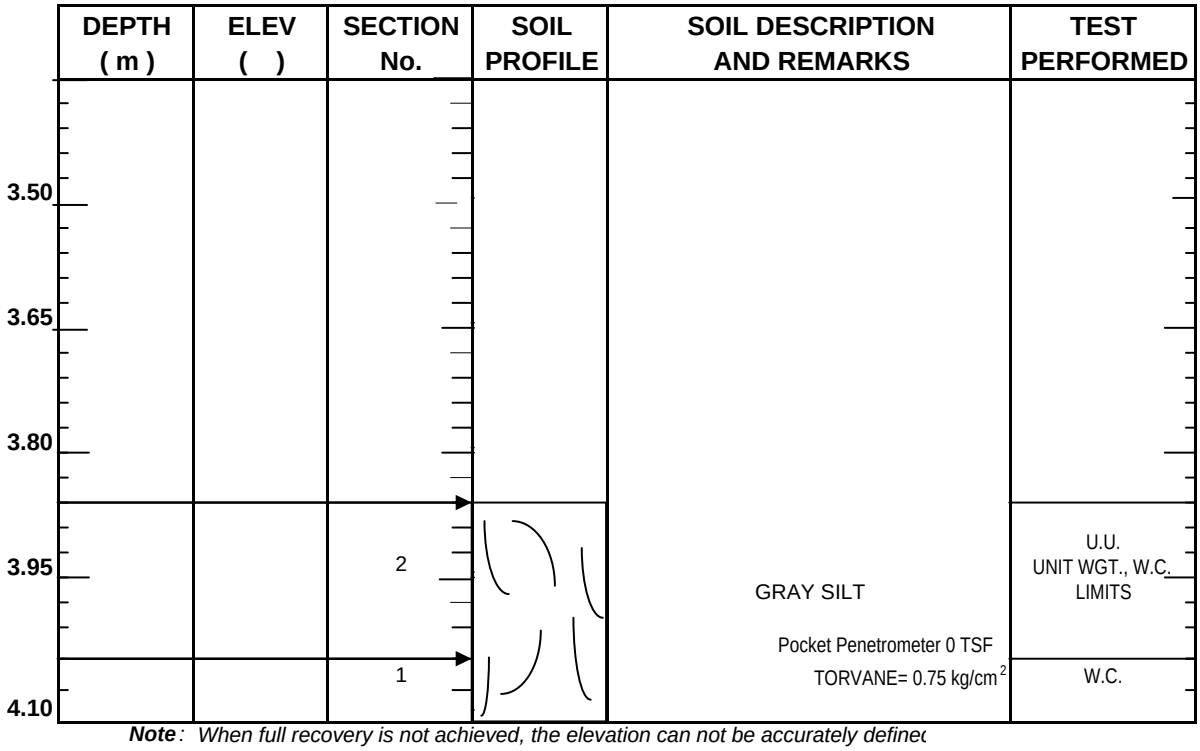
MOISTURE CONTENT — After U.U.

Section Number	**1**	**2**	**3**	**4**	**5**
Tare Number	1696	1526			
Weight of Tare & Wet Sample (g)	434.61	997.90			
Weight of Tare & Dry Sample (g)	330.38	729.41			
Weight of Tare (g)	83.01	146.30			
Moisture Content (%)	42.14	46.04			

UNIT WEIGHT

Weight of Tube & Wet Sample (g)	2207.50
Weight of Tube (g)	192.70
Weight of Wet Sample (g)	2014.80
Length 1 (in)	7.106
Length 2 (in)	7.125
Length 3 (in)	7.123
Top Diameter (in)	3.547
Middle Diameter (in)	3.572
Bottom Diameter (in)	3.606
Sample Volume (cm^3)	1170.85
Moisture Content (%)	46.04
Unit Wet Weight (g/cm^3)	1.72
Unit Wet Weight (pcf)	107.38
Unit Dry Weight (g/cm^3)	**1.18**
Unit Dry Weight (pcf)	**73.5**

SOIL PROFILE AND SAMPLING



***Note**: When full recovery is not achieved, the elevation can not be accurately define*
Indicate each cut of the tube with an arrow
Indicate dividing line between soil types with a solid lin
Indicate wax by cross-hatching. Indicate soil types by standard symbols

Tested By *JCM* Date *11/18/15* Checked By KC Date 12/1/15

ATTERBERG LIMITS

ASTM D 4318-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-29
Client Reference:	Lake Erie Connector 185241	Depth (m):	3.86-4.04
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-012	Soil Description:	GRAY LEAN CLAY

Note: The* USCS *symbol used with this test refers only to the minus No. 40 (Minus No. 40 sieve material, Airdried)

sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description .

Liquid Limit Test	**1**	**2**	**3**
Tare Number:	315	211	223
Wt. of Tare & Wet Sample (g):	39.14	39.44	37.84
Wt. of Tare & Dry Sample (g):	33.34	33.61	32.44
Weight of Tare (g):	18.59	18.16	17.55
Weight of Water (g):	5.8	5.8	5.4
Weight of Dry Sample (g):	14.8	15.5	14.9
Moisture Content (%):	**39.3**	**37.7**	**36.3**
Number of Blows:	**17**	**25**	**31**

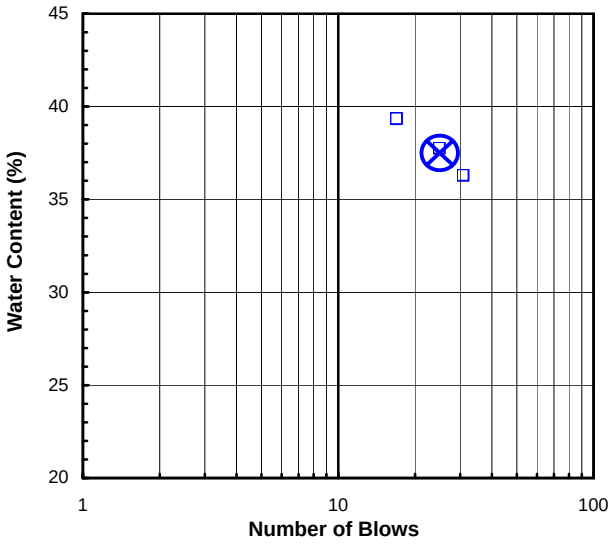
MULTIPOINT

Plastic Limit Test	**1**	**2**	**Range**
Tare Number:	335	185	
Wt. of Tare & Wet Sample (g):	25.92	25.60	
Wt. of Tare & Dry Sample (g):	25.08	24.81	
Weight of Tare (g):	19.70	19.37	
Weight of Water (g):	0.8	0.8	
Weight of Dry Sample (g):	5.4	5.4	
Moisture Content (%):	**15.6**	**14.5**	**1.1**

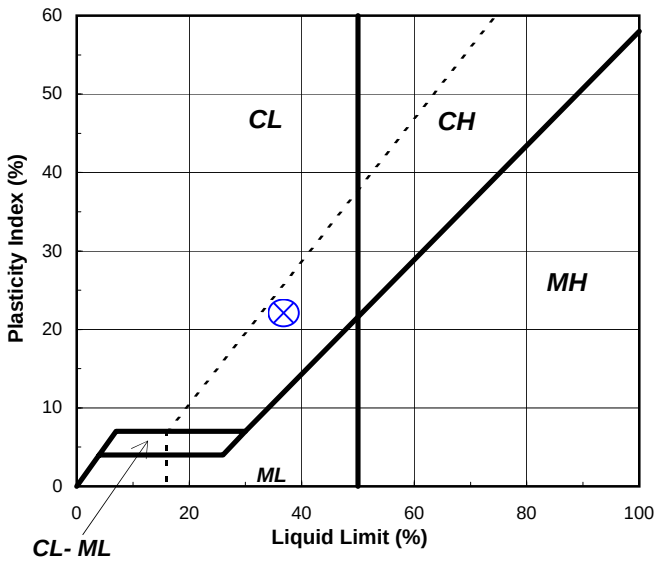
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%):	**37**
Plastic Limit (%):	**15**
Plasticity Index (%):	**22**
USCS Symbol:	**CL**

Flow Curve



Plasticity Chart



Tested By RAL *Date* 11/20/15 *Checked By* CLK *Date* 11/23/15

S:\Excel\Excel QA\Spreadsheets\Limit 3Pt.xls

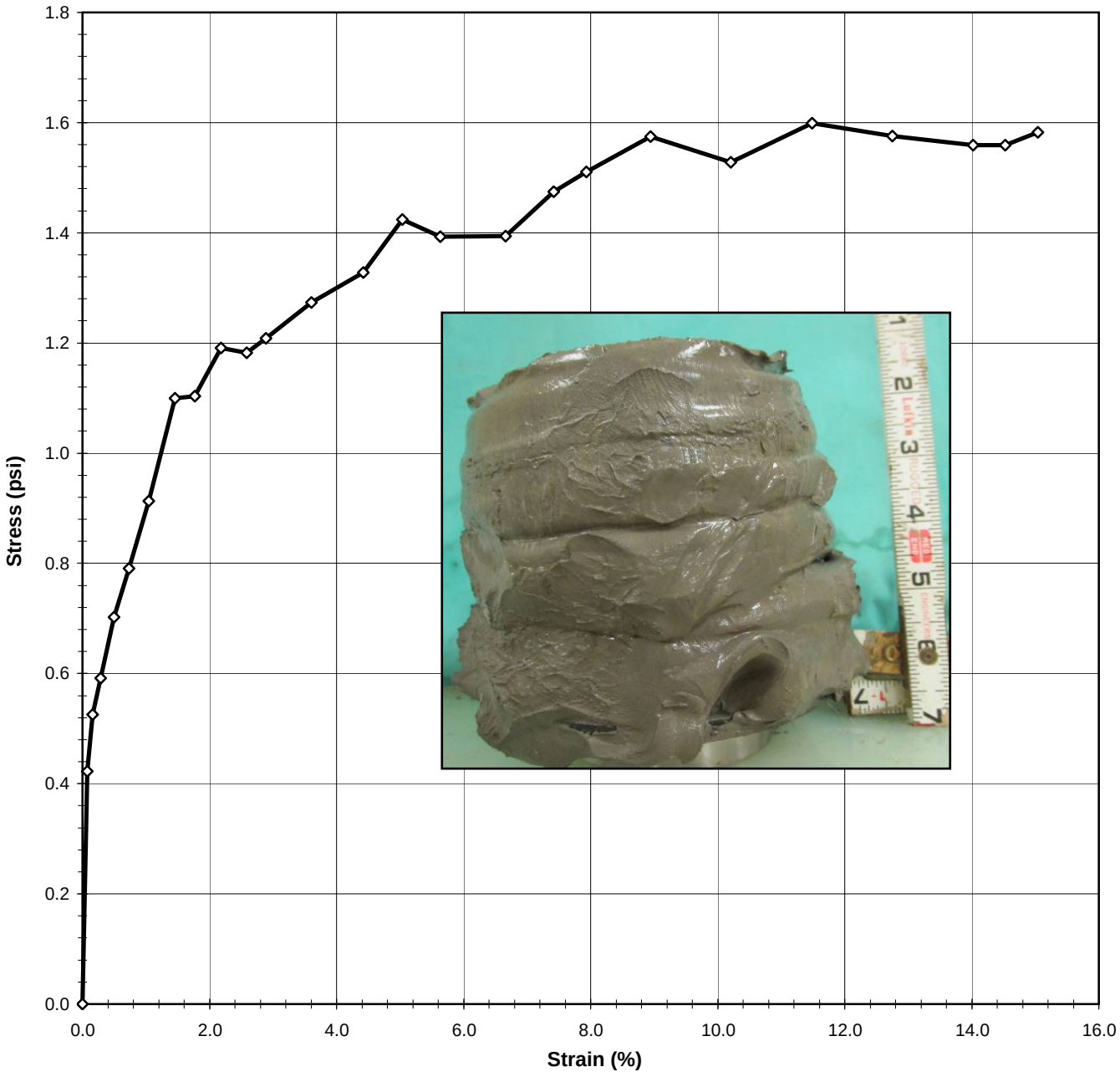
544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONSOLIDATED UNDRAINED TRIAXIAL

ASTM D2850-03a (2007)

Client:	Canadian Seabed Research, Ltd.	Boring No.:	VC-29
Client Reference:	Lake Erie Connector 185241	Depth (m):	3.86-4.04
Project No.:	2015-538-001	Sample No.:	GT-1
Lab ID:	2015-538-001-012	Visual:	Gray Silt

CONFINING STRESS (psi) 55.6



Tested By	JAB	Date	11/19/15	Input Checked By	KC	Date	11/30/15

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONSOLIDATED UNDRAINED TRIAXIAL

ASTM D2850-03a (2007)

Client:	Canadian Seabed Research, Ltd.	Boring No.:	VC-29
Client Reference:	Lake Erie Connector 185241	Depth (m):	3.86-4.04
Project No.:	2015-538-001	Sample No.:	GT-1
Lab ID:	2015-538-001-012	Visual:	Gray Silt

INITIAL SAMPLE DIMENSIONS

Length 1 (in):	7.106	Top Dia. (in):	3.547
Length 2 (in):	7.125	Mid. Dia. (in):	3.572
Length 3 (in):	7.123	Bot. Dia. (in):	3.606
Avg.Length (in)	**7.118**	**Area (in^2):**	**10.038**

WATER CONTENT (AFTER TEST)

Total Weight of Sample (g):	NA
Tare No.:	1526
Weight of Tare & Wet Sample (g):	997.90
Weight of Tare & Dry Sample (g):	729.41
Weight of Tare (g):	146.30
% Moisture:	46.0

UNIT WEIGHT

Undisturbed Sample

Weight of Tube & Wet Sample (g):	2207.5	Sample Volume (cm^3):	1170.8
Weight of Tube (g):	192.70	Unit Wet Weight (g/cm^3):	1.72
Weight of Wet Sample (g):	2014.8	Unit Wet Weight (pcf):	107.38
Diameter (in):	3.58	Moisture Content (%):	46.0
Length (in):	7.02	Unit Dry Weight (pcf):	73.5
Length (cm):	18.08		

		Initial Dial Reading (mil)	32
CONFINING STRESS (psi)	**55.6**	Dial Reading Before Shearing (mil)	131

DEFORMATION (in)	*LOAD (lb)*	*ELAPSED TIME (min)*	*STRAIN (%)*	*STRESS (psi)*
0.000	23.8	0.0	0.0	0.000
0.006	28.0	0.08	0.1	0.423
0.011	29.0	0.17	0.2	0.526
0.020	29.7	0.30	0.3	0.592
0.035	30.8	0.50	0.5	0.702
0.052	31.7	0.73	0.7	0.790
0.074	33.0	1.05	1.0	0.913
0.102	35.0	1.45	1.5	1.099
0.124	35.0	1.75	1.8	1.104
0.153	36.0	2.15	2.2	1.190
0.182	35.9	2.55	2.6	1.182
0.203	36.2	2.85	2.9	1.209
0.253	37.0	3.55	3.6	1.273
0.310	37.7	4.35	4.4	1.328
0.353	38.8	4.97	5.0	1.424
0.395	38.6	5.57	5.6	1.393
0.467	38.7	6.55	6.7	1.394
0.521	39.7	7.32	7.4	1.474
0.557	40.2	7.82	7.9	1.511
0.628	41.1	8.82	8.9	1.574
0.717	40.8	10.07	10.2	1.528
0.807	41.9	11.32	11.5	1.599
0.895	41.9	12.57	12.8	1.575
0.984	42.0	13.82	14.0	1.559
1.020	42.1	14.32	14.5	1.559
1.055	42.4	14.82	15.0	1.582

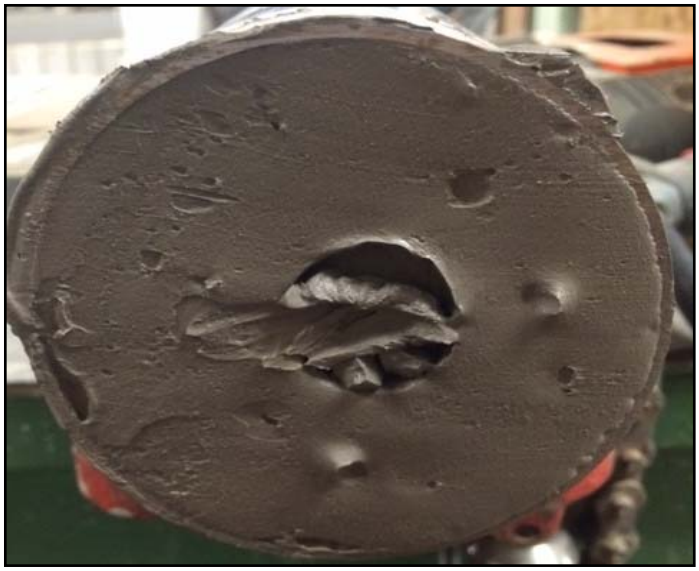
Tested By JAB Date 11/19/15 Input Checked By KC Date 11/30/15

DCN: CT-S29 DATE: 8-21-10 REVISION: 2

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

PHOTOGRAPHS

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-30
Client Reference:	Lake Erie Connector 185241	Depth (m):	0.0-0.33
Project No.:	2015-538-001	Sample No.:	GT5
Lab ID:	2015-538-001-013		



Tested By	*NJM*	*Date*	*11/18/15*	*Checked By*	*KC*	*Date*	*12/2/15*

S:\Excel\Excel QA\Spreadsheets\Photo

SHELBY TUBE UNIT WEIGHT

ASTM D2937-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-30
Client Reference:	Lake Erie Connector 185241	Depth Pushed (m):	0.0-0.33
Project No.:	2015-538-001	Shelby Tube No.:	GT5
Lab ID:	2015-538-001-013	Recovery (m):	0.33

MOISTURE CONTENT

Section Number	**1**	**2**	**3**	**4**	**5**
Tare Number	3085				
Weight of Tare & Wet Sample (g)	432.90				
Weight of Tare & Dry Sample (g)	294.80				
Weight of Tare (g)	6.50				
Moisture Content (%)	47.90				

UNIT WEIGHT

Weight of Tube & Wet Sample (g)	1113.70
Weight of Tube (g)	84.43
Weight of Wet Sample (g)	1029.27
Length 1 (in)	3.556
Length 2 (in)	3.547
Length 3 (in)	3.522
Top Diameter (in)	3.610
Middle Diameter (in)	3.626
Bottom Diameter (in)	3.595
Sample Volume (cm^3)	594.15
Moisture Content (%)	47.90
Unit Wet Weight (g/cm^3)	1.73
Unit Wet Weight (pcf)	108.10
Unit Dry Weight (g/cm^3)	**1.17**
Unit Dry Weight (pcf)	**73.1**

SOIL PROFILE AND SAMPLING

DEPTH (m)	ELEV ( )	SECTION No.	SOIL PROFILE	SOIL DESCRIPTION AND REMARKS	TEST PERFORMED
0.03					
0.18				SOFT GRAY SILTY CLAY	
		1		Pocket Penetrometer 0 TSF TORVANE= 0 kg/cm^2	UNIT WGT. W.C.
0.33					

***Note**: When full recovery is not achieved, the elevation can not be accurately define*
Indicate each cut of the tube with an arrow
Indicate dividing line between soil types with a solid lin
Indicate wax by cross-hatching. Indicate soil types by standard symbols

Tested By *NJM* Date *11/18/15* Checked By KC Date 12/2/15

UNCONFINED COMPRESSIVE STRENGTH

ASTM D2166-13 / AASHTO T208-10 (SOP S-30)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-30
Client Reference:	Lake Erie Connector 185241	Depth (m):	0.0-0.33
Project No.:	2015-538-001	Sample No.:	GT5
Lab ID:	2015-538-001-013	Visual:	Gray Silty Clay

INITIAL SAMPLE DIMENSIONS		**WATER CONTENT AFTER TEST**
Length 1 (in):	Top Diameter (in):	Tare No.:
Length 2 (in):	Middle Diameter (in):	Weight of Tare & Wet Sample (g):
Length 3 (in):	Bottom Diameter (in):	Weight of Tare & Dry Sample (g):
Avg. Length (in):	**Avg. Diameter (in):**	Weight of Tare (g):
	Area (in^2):	Moisture Content (%):

UNIT WEIGHT	
Weight of Tube & Wet Sample (g):	Sample Volume (cm^3):
Weight of Tube (g):	Unit Wet Weight (g/cm^3):
Weight of Wet Sample (g):	Unit Wet Weight (pcf):
Average Diameter (in):	Moisture Content (%):
Average Length (in):	Unit Dry Weight (pcf):
Average Length (cm):	

ELECTRONIC DEVICE DEFORMATION (in)	*LOAD (lb)*	*ELAPSED TIME (min)*	*STRAIN (%)*	*STRESS (psi)*

NO TEST. SAMPLE UNABLE TO SUPPORT ITS OWN WEIGHT.

Tested By NJM Date 11/18/15 Input Checked By KC Date 12/2/15

DCN: CT-S30 Date: 11/09/09 Revision: 4

S:\Excel\Excel QA\Spreadsheets\UC Sigma.xls

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

PHOTOGRAPHS

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-30
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.33-2.03
Project No.:	2015-538-001	Sample No.:	GT3
Lab ID:	2015-538-001-014		

Tested By *NJM* *Date* *10/27/15* *Checked By* *KC* *Date* *11/5/15*

S:\Excel\Excel QA\Spreadsheets\Photo

SHELBY TUBE UNIT WEIGHT

ASTM D2937-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-30
Client Reference:	Lake Erie Connector 185241	Depth Pushed (m):	1.33-2.03
Project No.:	2015-538-001	Shelby Tube No.:	GT3
Lab ID:	2015-538-001-014	Recovery (m):	0.7

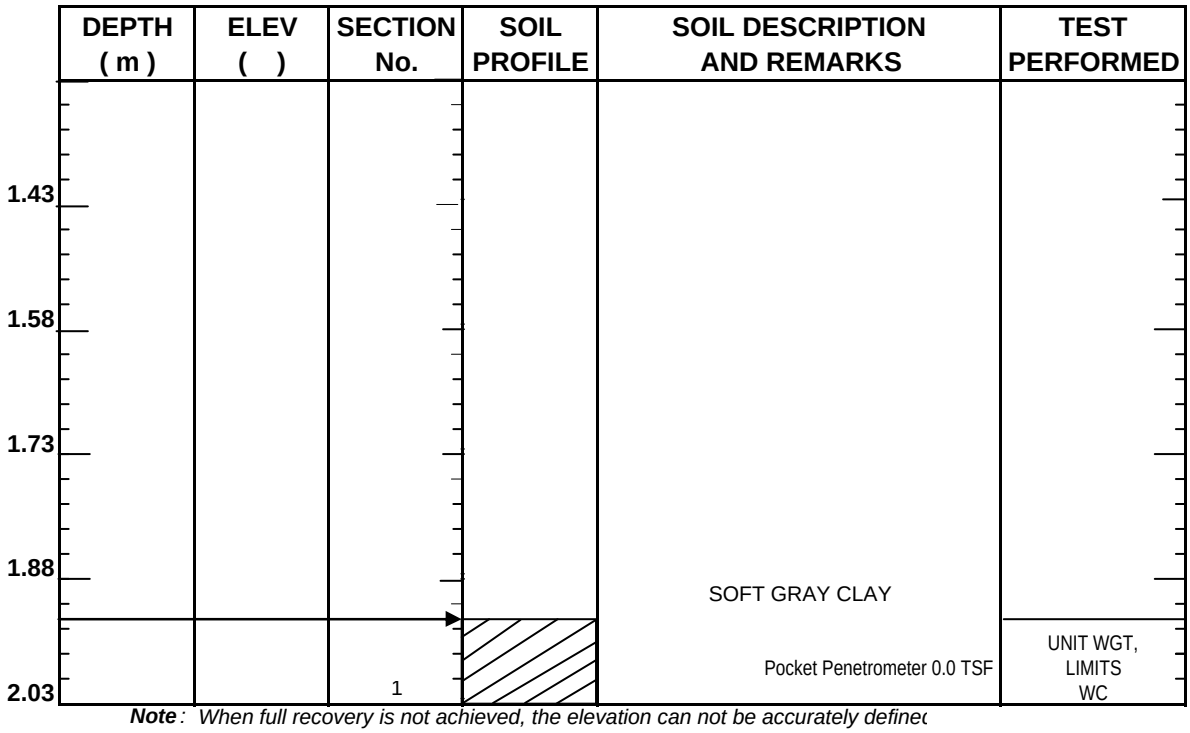
MOISTURE CONTENT

Section Number	**1**
Tare Number	2888
Weight of Tare & Wet Sample (g)	374.69
Weight of Tare & Dry Sample (g)	261.43
Weight of Tare (g)	6.66
Moisture Content (%)	44.46

UNIT WEIGHT

Weight of Tube & Wet Sample (g)	1243.53
Weight of Tube (g)	91.26
Weight of Wet Sample (g)	1152.27
Length 1 (in)	3.932
Length 2 (in)	4.171
Length 3 (in)	3.854
Top Diameter (in)	3.617
Middle Diameter (in)	3.591
Bottom Diameter (in)	3.581
Sample Volume (cm^3)	663.46
Moisture Content (%)	44.46
Unit Wet Weight (g/cm^3)	1.74
Unit Wet Weight (pcf)	108.37
Unit Dry Weight (g/cm^3)	**1.20**
Unit Dry Weight (pcf)	**75.0**

SOIL PROFILE AND SAMPLING



***Note**: When full recovery is not achieved, the elevation can not be accurately define*
Indicate each cut of the tube with an arrow
Indicate dividing line between soil types with a solid lin
Indicate wax by cross-hatching. Indicate soil types by standard symbols

Tested By *NJM* Date *10/27/15* Checked By KC Date 11/2/15

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

ATTERBERG LIMITS

ASTM D 4318-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-30
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.93-2.03
Project No.:	2015-538-001	Sample No.:	GT3
Lab ID:	2015-538-001-014	Soil Description:	GRAY LEAN CLAY

Note: The* USCS *symbol used with this test refers only to the minus No. 40 (Minus No. 40 sieve material, Airdried)

sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description .

Liquid Limit Test	**1**	**2**	**3**
Tare Number:	117	148	202
Wt. of Tare & Wet Sample (g):	44.43	41.19	38.55
Wt. of Tare & Dry Sample (g):	37.90	35.62	32.92
Weight of Tare (g):	18.83	19.60	17.30
Weight of Water (g):	6.5	5.6	5.6
Weight of Dry Sample (g):	19.1	16.0	15.6
Moisture Content (%):	**34.2**	**34.8**	**36.0**
Number of Blows:	**35**	**28**	**20**

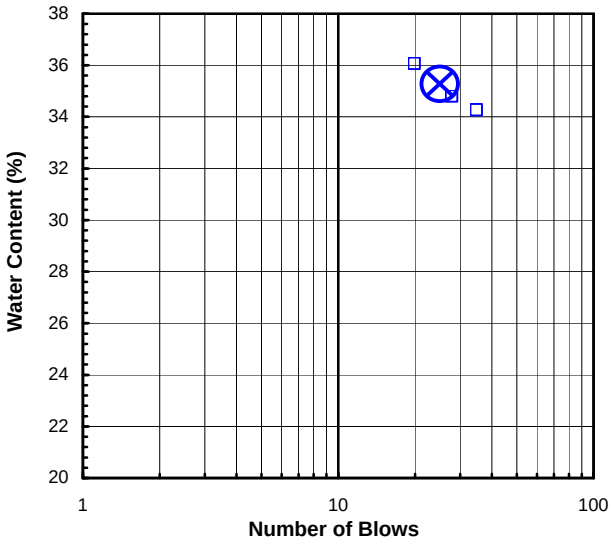
MULTI POINT

Plastic Limit Test	**1**	**2**	**Range**
Tare Number:	207	211	
Wt. of Tare & Wet Sample (g):	24.98	25.06	
Wt. of Tare & Dry Sample (g):	23.95	24.00	
Weight of Tare (g):	18.36	18.16	
Weight of Water (g):	1.0	1.1	
Weight of Dry Sample (g):	5.6	5.8	
Moisture Content (%):	**18.4**	**18.2**	**0.3**

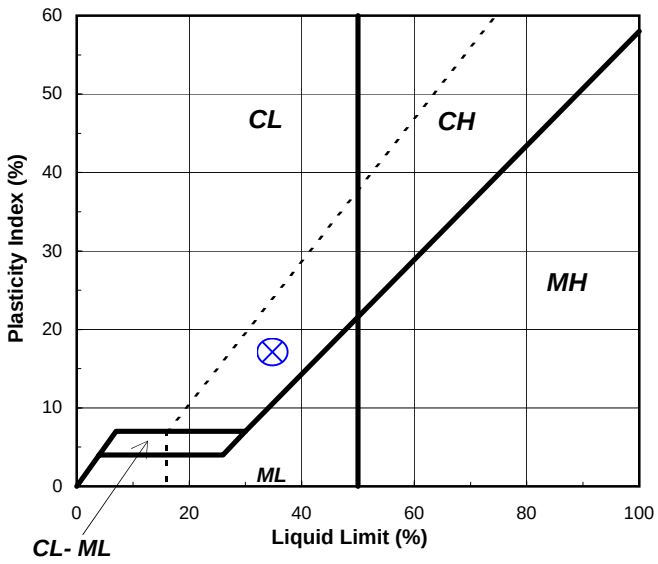
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%):	**35**
Plastic Limit (%):	**18**
Plasticity Index (%):	**17**
USCS Symbol:	**CL**

Flow Curve



Plasticity Chart



Tested By BS *Date* 10/27/15 *Checked By* CLK *Date* 10/28/15

S:\Excel\Excel QA\Spreadsheets\Limit 3Pt.xls

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

PHOTOGRAPHS

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-30
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.28-2.98
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-015		

Tested By	*NJM*	*Date*	*11/18/15*	*Checked By*	*KC*	*Date*	*12/2/15*

S:\Excel\Excel QA\Spreadsheets\Photo

SHELBY TUBE UNIT WEIGHT

ASTM D2937-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-30
Client Reference:	Lake Erie Connector 185241	Depth Pushed (m):	2.28-2.98
Project No.:	2015-538-001	Shelby Tube No.:	GT2
Lab ID:	2015-538-001-015	Recovery (m):	0.7

MOISTURE CONTENT

Section Number	**1**	**2**	**3**	**4**	**5**
Tare Number	3103				
Weight of Tare & Wet Sample (g)	412.10				
Weight of Tare & Dry Sample (g)	291.55				
Weight of Tare (g)	6.60				
Moisture Content (%)	42.31				

UNIT WEIGHT

Weight of Tube & Wet Sample (g)	2273.50
Weight of Tube (g)	145.40
Weight of Wet Sample (g)	2128.10
Length 1 (in)	7.082
Length 2 (in)	7.088
Length 3 (in)	7.396
Top Diameter (in)	3.559
Middle Diameter (in)	3.643
Bottom Diameter (in)	3.588
Sample Volume (cm^3)	1196.85
Moisture Content (%)	42.31
Unit Wet Weight (g/cm^3)	1.78
Unit Wet Weight (pcf)	110.95
Unit Dry Weight (g/cm^3)	**1.25**
Unit Dry Weight (pcf)	**78.0**

SOIL PROFILE AND SAMPLING

DEPTH (m)	ELEV ( )	SECTION No.	SOIL PROFILE	SOIL DESCRIPTION AND REMARKS	TEST PERFORMED
2.38					
2.53					
2.68					
2.83		1		GRAY SOFT SILTY CLAY WITH A TRACE OF FINE SAND Pocket Penetrometer 0 TSF TORVANE= 0 kg/cm^2	UNIT WGT. W.C. LIMITS
2.98					

***Note**: When full recovery is not achieved, the elevation can not be accurately define*
Indicate each cut of the tube with an arrow
Indicate dividing line between soil types with a solid lin
Indicate wax by cross-hatching. Indicate soil types by standard symbols

Tested By *NJM* Date *11/18/15* Checked By KC Date 12/2/15

ATTERBERG LIMITS

ASTM D 4318-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-30
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.80-2.98
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-015	Soil Description:	GRAY LEAN CLAY

Note: The* USCS *symbol used with this test refers only to the minus No. 40 (Minus No. 40 sieve material, Airdried)
sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description .

Liquid Limit Test	**1**	**2**	**3**
Tare Number:	159	394	247
Wt. of Tare & Wet Sample (g):	37.86	35.56	38.62
Wt. of Tare & Dry Sample (g):	32.59	29.46	32.49
Weight of Tare (g):	17.50	14.06	19.13
Weight of Water (g):	5.3	6.1	6.1
Weight of Dry Sample (g):	15.1	15.4	13.4
Moisture Content (%):	**34.9**	**39.6**	**45.9**
Number of Blows:	**34**	**21**	**15**

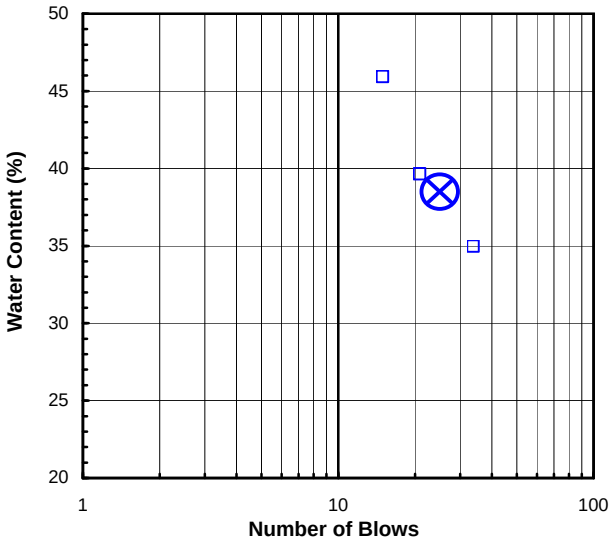
MULTIPOINT

Plastic Limit Test	**1**	**2**	**Range**
Tare Number:	172	229	
Wt. of Tare & Wet Sample (g):	25.88	24.48	
Wt. of Tare & Dry Sample (g):	24.95	23.58	
Weight of Tare (g):	19.56	18.19	
Weight of Water (g):	0.9	0.9	
Weight of Dry Sample (g):	5.4	5.4	
Moisture Content (%):	**17.3**	**16.7**	**0.6**

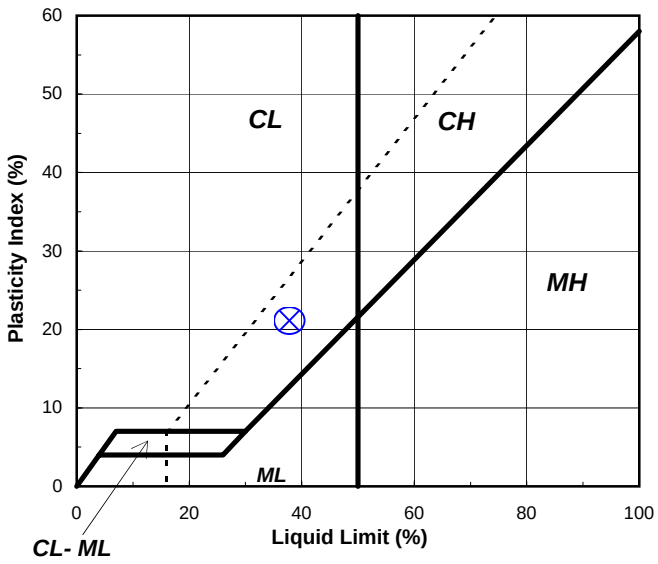
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%):	**38**
Plastic Limit (%):	**17**
Plasticity Index (%):	**21**
USCS Symbol:	**CL**

Flow Curve



Plasticity Chart



Tested By RAL *Date* 11/19/15 *Checked By* CLK *Date* 11/20/15

S:\Excel\Excel QA\Spreadsheets\Limit 3Pt.xls

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONSOLIDATED UNDRAINED TRIAXIAL

ASTM D2850-03a (2007)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-30
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.28-2.98
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-015	Visual:	Gray Soft Silty Clay, Trace of Fine Sand

INITIAL SAMPLE DIMENSIONS

Length 1 (in):	Top Dia. (in):
Length 2 (in):	Mid. Dia. (in):
Length 3 (in):	Bot. Dia. (in):
Avg.Length (in):	**Area (in^2):**

WATER CONTENT (AFTER TEST)

Total Weight of Sample (g):
Tare No.:
Weight of Tare & Wet Sample (g):
Weight of Tare & Dry Sample (g):
Weight of Tare (g):
% Moisture:

UNIT WEIGHT

Undisturbed Sample

Weight of Tube & Wet Sample (g):	Sample Volume (cm^3):
Weight of Tube (g):	Unit Wet Weight (g/cm^3):
Weight of Wet Sample (g):	Unit Wet Weight (pcf):
Diameter (in):	Moisture Content (%):
Length (in):	Unit Dry Weight (pcf):
Length (cm):	

CONFINING STRESS (psi)

Initial Dial Reading (mil)
Dial Reading Before Shearing (mil)

DEFORMATION (in)	*LOAD (lb)*	*ELAPSED TIME (min)*	*STRAIN (%)*	*STRESS (psi)*

NO TEST. SAMPLE UNABLE TO SUPPORT ITS OWN WEIGHT.

Tested By NJM Date 11/18/15 Input Checked By KC Date 12/2/15

DCN: CT-S29 DATE: 8-21-10 REVISION: 2

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

PHOTOGRAPHS

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-31
Client Reference:	Lake Erie Connector 185241	Depth (m):	0.0-0.57
Project No.:	2015-538-001	Sample No.:	GT4
Lab ID:	2015-538-001-016		

Tested By JCM *Date* 11/18/15 *Checked By* KC *Date* 12/1/15

S:\Excel\Excel QA\Spreadsheets\Photo

SHELBY TUBE UNIT WEIGHT

ASTM D2937-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-31
Client Reference:	Lake Erie Connector 185241	Depth Pushed (m):	0.0-0.57
Project No.:	2015-538-001	Shelby Tube No.:	GT4
Lab ID:	2015-538-001-016	Recovery (m):	0.57

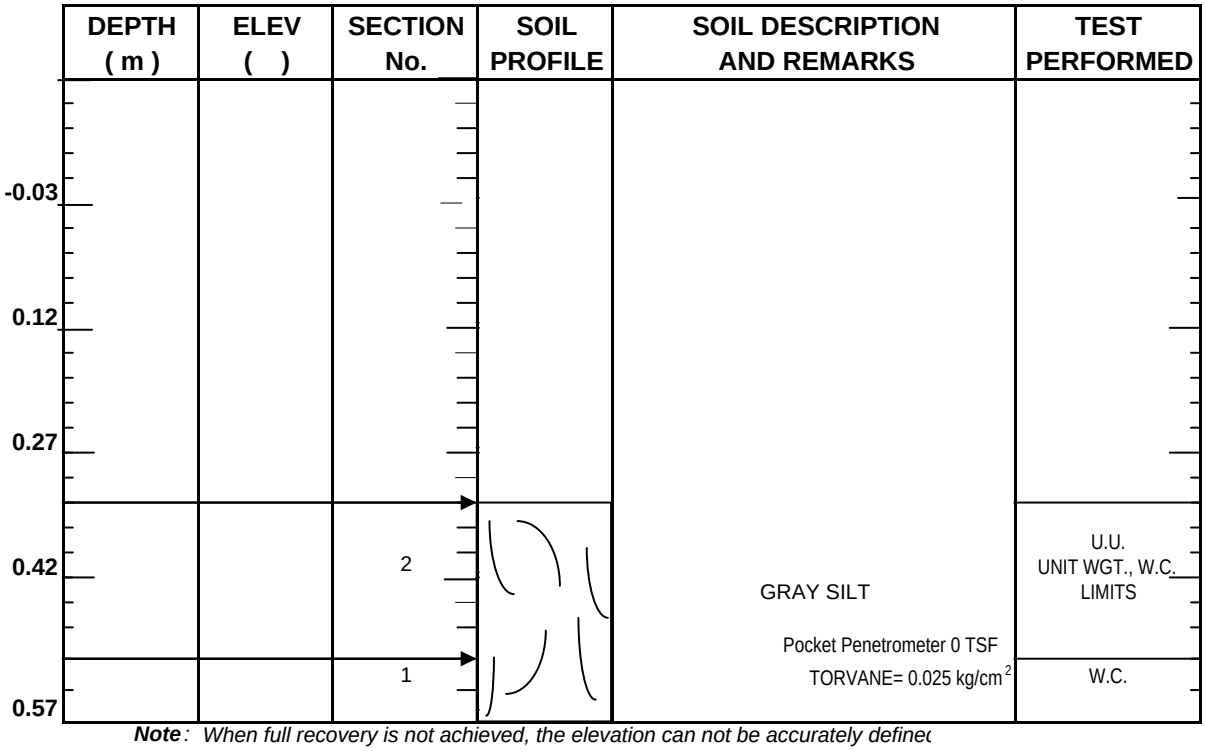
MOISTURE CONTENT — After U.U.

Section Number	**1**	**2**	**3**	**4**	**5**
Tare Number	872	1490			
Weight of Tare & Wet Sample (g)	513.25	1135.94			
Weight of Tare & Dry Sample (g)	411.29	880.03			
Weight of Tare (g)	110.55	144.64			
Moisture Content (%)	33.90	34.80			

UNIT WEIGHT

Weight of Tube & Wet Sample (g)	2312.60
Weight of Tube (g)	109.34
Weight of Wet Sample (g)	2203.26
Length 1 (in)	7.024
Length 2 (in)	7.038
Length 3 (in)	7.008
Top Diameter (in)	3.649
Middle Diameter (in)	3.611
Bottom Diameter (in)	3.608
Sample Volume (cm^3)	1186.29
Moisture Content (%)	34.80
Unit Wet Weight (g/cm^3)	1.86
Unit Wet Weight (pcf)	115.89
Unit Dry Weight (g/cm^3)	**1.38**
Unit Dry Weight (pcf)	**86.0**

SOIL PROFILE AND SAMPLING



***Note**: When full recovery is not achieved, the elevation can not be accurately define*
Indicate each cut of the tube with an arrow
Indicate dividing line between soil types with a solid lin
Indicate wax by cross-hatching. Indicate soil types by standard symbols

Tested By *JCM* Date *11/18/15* Checked By KC Date 12/1/15

ATTERBERG LIMITS

ASTM D 4318-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-31
Client Reference:	Lake Erie Connector 185241	Depth (m):	.33-.51
Project No.:	2015-538-001	Sample No.:	GT4
Lab ID:	2015-538-001-016	Soil Description:	GRAY LEAN CLAY

Note: The* USCS *symbol used with this test refers only to the minus No. 40 (Minus No. 40 sieve material, Airdried)
sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description .

Liquid Limit Test	**1**	**2**	**3**
Tare Number:	155	207	241
Wt. of Tare & Wet Sample (g):	38.82	39.17	38.98
Wt. of Tare & Dry Sample (g):	34.57	35.05	35.07
Weight of Tare (g):	18.39	18.35	18.52
Weight of Water (g):	4.3	4.1	3.9
Weight of Dry Sample (g):	16.2	16.7	16.6
Moisture Content (%):	**26.3**	**24.7**	**23.6**
Number of Blows:	**16**	**26**	**35**

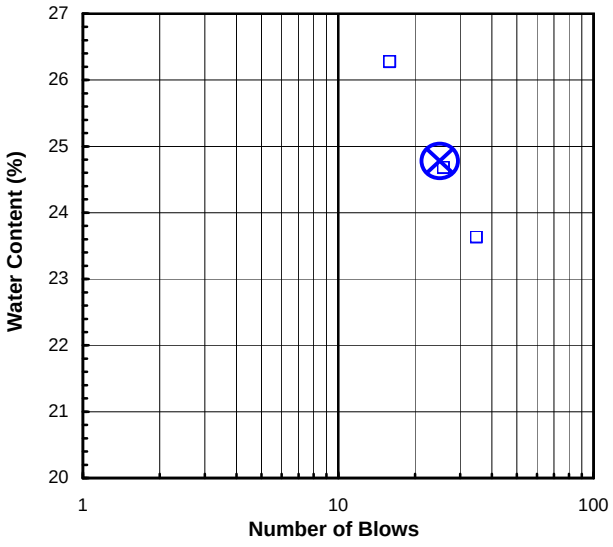
MULTI POINT

Plastic Limit Test	**1**	**2**	**Range**
Tare Number:	149	143	
Wt. of Tare & Wet Sample (g):	25.46	24.84	
Wt. of Tare & Dry Sample (g):	24.85	24.24	
Weight of Tare (g):	18.99	18.59	
Weight of Water (g):	0.6	0.6	
Weight of Dry Sample (g):	5.9	5.7	
Moisture Content (%):	**10.4**	**10.6**	**-0.2**

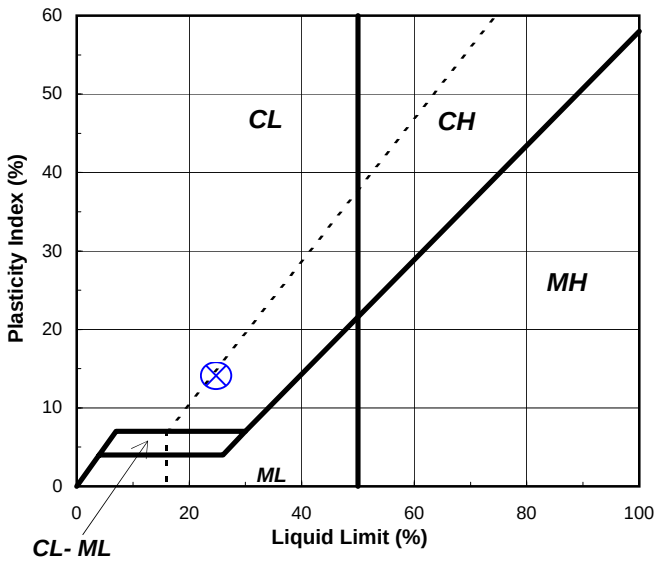
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%):	**25**
Plastic Limit (%):	**11**
Plasticity Index (%):	**14**
USCS Symbol:	**CL**

Flow Curve



Plasticity Chart



Tested By RAL *Date* 11/20/15 *Checked By* CLK *Date* 11/23/15

S:\Excel\Excel QA\Spreadsheets\Limit 3Pt.xls

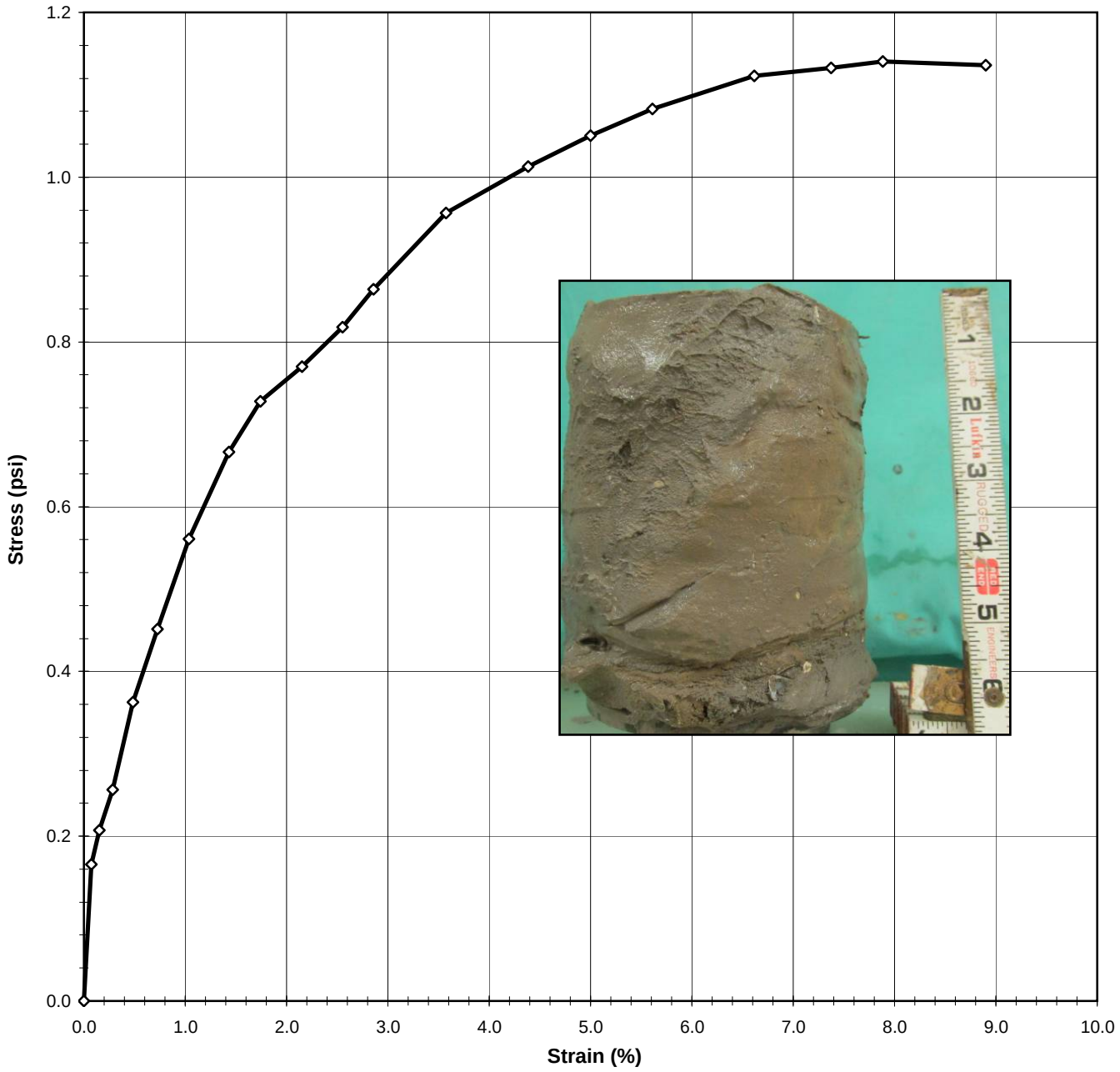
544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONSOLIDATED UNDRAINED TRIAXIAL

ASTM D2850-03a (2007)

Client:	Canadian Seabed Research, Ltd.	Boring No.:	VC-31
Client Reference:	Lake Erie Connector 185241	Depth (m):	0.33-0.51
Project No.:	2015-538-001	Sample No.:	GT-4
Lab ID:	2015-538-001-016	Visual:	Gray Silt

CONFINING STRESS (psi) 41.7



Tested By	JCM	Date	11/19/15	Input Checked By	KC	Date	11/30/15

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONSOLIDATED UNDRAINED TRIAXIAL

ASTM D2850-03a (2007)

Client:	Canadian Seabed Research, Ltd.	Boring No.:	VC-31
Client Reference:	Lake Erie Connector 185241	Depth (m):	0.33-0.51
Project No.:	2015-538-001	Sample No.:	GT-4
Lab ID:	2015-538-001-016	Visual:	Gray Silt

INITIAL SAMPLE DIMENSIONS

Length 1 (in):	7.024	Top Dia. (in):	3.649
Length 2 (in):	7.038	Mid. Dia. (in):	3.611
Length 3 (in):	7.008	Bot. Dia. (in):	3.608
Avg.Length (in)	**7.023**	**Area (in^2):**	**10.307**

WATER CONTENT (AFTER TEST)

Total Weight of Sample (g):	NA
Tare No.:	1490
Weight of Tare & Wet Sample (g):	1135.94
Weight of Tare & Dry Sample (g):	880.03
Weight of Tare (g):	144.64
% Moisture:	34.8

UNIT WEIGHT

Undisturbed Sample

Weight of Tube & Wet Sample (g):	2312.60	Sample Volume (cm^3):	1186.3
Weight of Tube (g):	109.34	Unit Wet Weight (g/cm^3):	1.86
Weight of Wet Sample (g):	2203.26	Unit Wet Weight (pcf):	115.89
Diameter (in):	3.62	Moisture Content (%):	34.8
Length (in):	6.96	Unit Dry Weight (pcf):	86.0
Length (cm):	17.84		

		Initial Dial Reading (mil)	79
CONFINING STRESS (psi)	**41.7**	Dial Reading Before Shearing (mil)	140

DEFORMATION (in)	*LOAD (lb)*	*ELAPSED TIME (min)*	*STRAIN (%)*	*STRESS (psi)*
0.000	19.4	0.0	0.0	0.000
0.005	21.1	0.07	0.1	0.166
0.011	21.5	0.15	0.2	0.207
0.020	22.0	0.28	0.3	0.257
0.034	23.1	0.48	0.5	0.363
0.051	24.1	0.72	0.7	0.451
0.072	25.2	1.02	1.0	0.561
0.100	26.4	1.42	1.4	0.666
0.121	27.0	1.73	1.7	0.728
0.150	27.5	2.13	2.2	0.770
0.178	28.0	2.53	2.6	0.818
0.199	28.5	2.83	2.9	0.864
0.249	29.6	3.53	3.6	0.957
0.305	30.3	4.35	4.4	1.013
0.348	30.8	4.95	5.0	1.050
0.391	31.2	5.55	5.6	1.082
0.461	31.8	6.57	6.6	1.123
0.514	32.0	7.32	7.4	1.133
0.549	32.1	7.82	7.9	1.141
0.620	32.2	8.82	8.9	1.136

Tested By JCM Date 11/19/15 Input Checked By KC Date 11/30/15

DCN: CT-S29 DATE: 8-21-10 REVISION: 2

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

PHOTOGRAPHS

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-31
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.77-2.47
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-017		

Tested By *NJM* *Date* *10/27/15* *Checked By* *KC* *Date* *11/5/15*

S:\Excel\Excel QA\Spreadsheets\Photo

SHELBY TUBE UNIT WEIGHT

ASTM D2937-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-31
Client Reference:	Lake Erie Connector 185241	Depth Pushed (m):	1.77-2.47
Project No.:	2015-538-001	Shelby Tube No.:	GT2
Lab ID:	2015-538-001-017	Recovery (m):	0.7

MOISTURE CONTENT

Section Number	**1**
Tare Number	3108
Weight of Tare & Wet Sample (g)	278.52
Weight of Tare & Dry Sample (g)	188.71
Weight of Tare (g)	6.56
Moisture Content (%)	49.31

UNIT WEIGHT

Weight of Tube & Wet Sample (g)	1139.12
Weight of Tube (g)	89.46
Weight of Wet Sample (g)	1049.66
Length 1 (in)	3.881
Length 2 (in)	3.754
Length 3 (in)	3.802
Top Diameter (in)	3.590
Middle Diameter (in)	3.602
Bottom Diameter (in)	3.581
Sample Volume (cm^3)	632.72
Moisture Content (%)	49.31
Unit Wet Weight (g/cm^3)	1.66
Unit Wet Weight (pcf)	103.52
Unit Dry Weight (g/cm^3)	**1.11**
Unit Dry Weight (pcf)	**69.3**

SOIL PROFILE AND SAMPLING

DEPTH (m)	ELEV ( )	SECTION No.	SOIL PROFILE	SOIL DESCRIPTION AND REMARKS	TEST PERFORMED
1.87					
2.02					
2.17					
2.32				SOFT GRAY CLAY	
2.47		1		Pocket Penetrometer 0.0 TSF	UNIT WGT, LIMITS WC

***Note**: When full recovery is not achieved, the elevation can not be accurately define*
Indicate each cut of the tube with an arrow
Indicate dividing line between soil types with a solid lin
Indicate wax by cross-hatching. Indicate soil types by standard symbols

Tested By *NJM* Date *10/27/15* Checked By KC Date 11/2/15

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

ATTERBERG LIMITS

ASTM D 4318-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-31
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.37-2.47
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-017	Soil Description:	GRAY LEAN CLAY

Note: The* USCS *symbol used with this test refers only to the minus No. 40 (Minus No. 40 sieve material, Airdried)

sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description .

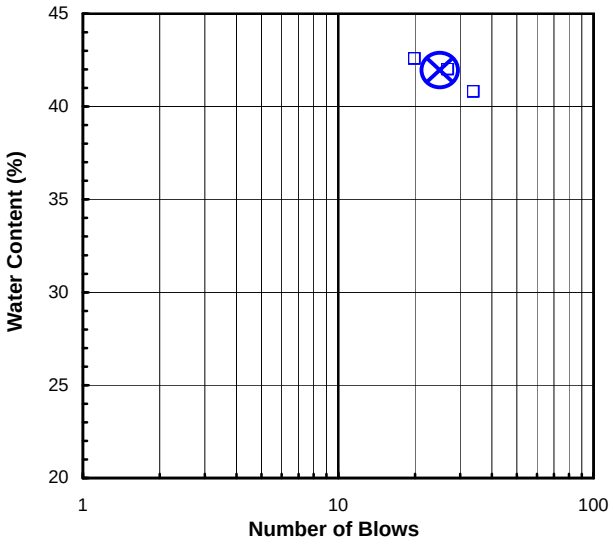
Liquid Limit Test	**1**	**2**	**3**	
				M
Tare Number:	120	240	455	**U**
Wt. of Tare & Wet Sample (g):	40.17	38.58	39.79	**L**
Wt. of Tare & Dry Sample (g):	33.71	32.47	32.56	**T**
Weight of Tare (g):	17.87	17.92	15.57	**I**
Weight of Water (g):	6.5	6.1	7.2	**P**
Weight of Dry Sample (g):	15.8	14.6	17.0	**O**
				I
Moisture Content (%):	**40.8**	**42.0**	**42.6**	**N**
Number of Blows:	**34**	**27**	**20**	**T**

Plastic Limit Test	**1**	**2**	**Range**
Tare Number:	1253	1291	
Wt. of Tare & Wet Sample (g):	26.97	24.35	
Wt. of Tare & Dry Sample (g):	26.01	23.27	
Weight of Tare (g):	20.97	17.54	
Weight of Water (g):	1.0	1.1	
Weight of Dry Sample (g):	5.0	5.7	
Moisture Content (%):	**19.0**	**18.8**	**0.2**

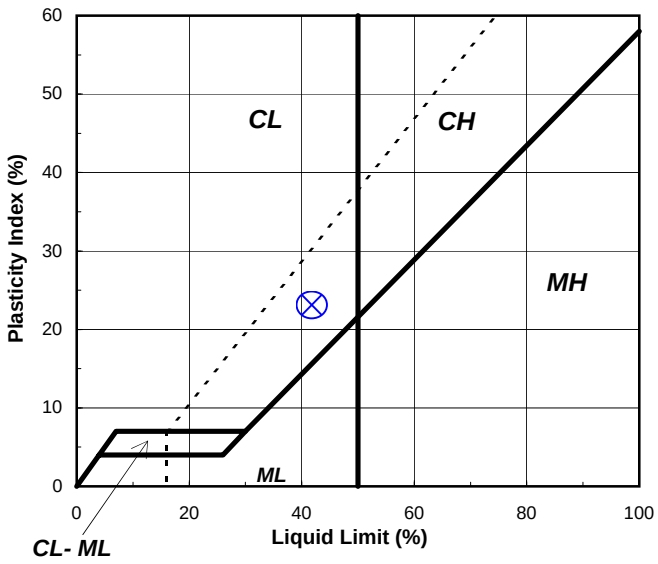
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%):	**42**
Plastic Limit (%):	**19**
Plasticity Index (%):	**23**
USCS Symbol:	**CL**

Flow Curve



Plasticity Chart



Tested By BS *Date* 10/28/15 *Checked By* CLK *Date* 10/30/15

S:\Excel\Excel QA\Spreadsheets\Limit 3Pt.xls

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

PHOTOGRAPHS

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-32
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.40-2.10
Project No.:	2015-538-001	Sample No.:	GT3
Lab ID:	2015-538-001-018		

Tested By *NJM* *Date* *10/27/15* *Checked By* *KC* *Date* *11/5/15*

S:\Excel\Excel QA\Spreadsheets\Photo

SHELBY TUBE UNIT WEIGHT

ASTM D2937-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-32
Client Reference:	Lake Erie Connector 185241	Depth Pushed (m):	1.40-2.10
Project No.:	2015-538-001	Shelby Tube No.:	GT3
Lab ID:	2015-538-001-018	Recovery (m):	0.7

MOISTURE CONTENT

Section Number	**1**
Tare Number	3009
Weight of Tare & Wet Sample (g)	354.50
Weight of Tare & Dry Sample (g)	268.14
Weight of Tare (g)	6.49
Moisture Content (%)	33.01

UNIT WEIGHT

Weight of Tube & Wet Sample (g)	1347.39
Weight of Tube (g)	90.46
Weight of Wet Sample (g)	1256.93
Length 1 (in)	3.773
Length 2 (in)	3.960
Length 3 (in)	4.012
Top Diameter (in)	3.641
Middle Diameter (in)	3.585
Bottom Diameter (in)	3.602
Sample Volume (cm^3)	656.41
Moisture Content (%)	33.01
Unit Wet Weight (g/cm^3)	1.91
Unit Wet Weight (pcf)	119.49
Unit Dry Weight (g/cm^3)	**1.44**
Unit Dry Weight (pcf)	**89.8**

SOIL PROFILE AND SAMPLING

DEPTH (m)	ELEV ( )	SECTION No.	SOIL PROFILE	SOIL DESCRIPTION AND REMARKS	TEST PERFORMED
1.50					
1.65					
1.80					
1.95				SOFT GRAY SILTY CLAY	
2.10		1		Pocket Penetrometer 0.0 TSF	UNIT WGT, LIMITS WC

***Note**: When full recovery is not achieved, the elevation can not be accurately define*
Indicate each cut of the tube with an arrow
Indicate dividing line between soil types with a solid lin
Indicate wax by cross-hatching. Indicate soil types by standard symbols

Tested By *NJM* Date *10/27/15* Checked By KC Date 11/2/15

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

ATTERBERG LIMITS

ASTM D 4318-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-32
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.0-2.10
Project No.:	2015-538-001	Sample No.:	GT3
Lab ID:	2015-538-001-018	Soil Description:	GRAY LEAN CLAY

Note: The* USCS *symbol used with this test refers only to the minus No. 40 (Minus No. 40 sieve material, Airdried)

sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description .

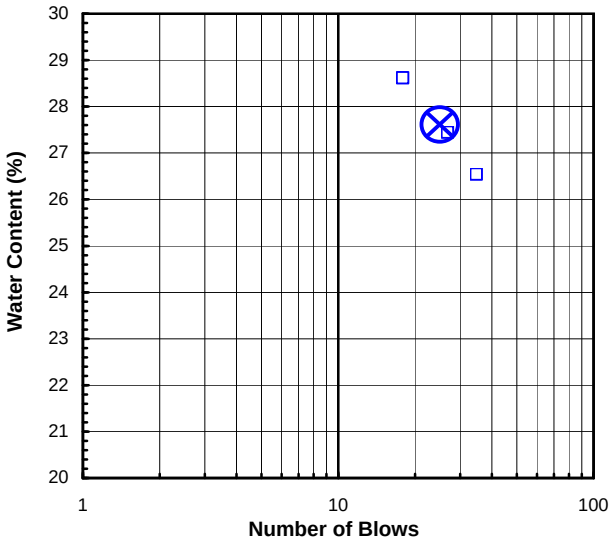
Liquid Limit Test	**1**	**2**	**3**	
				M
Tare Number:	4	111	172	**U**
Wt. of Tare & Wet Sample (g):	50.45	40.11	43.39	**L**
Wt. of Tare & Dry Sample (g):	43.84	35.62	38.09	**T**
Weight of Tare (g):	18.92	19.25	19.56	**I**
Weight of Water (g):	6.6	4.5	5.3	**P**
Weight of Dry Sample (g):	24.9	16.4	18.5	**O**
				I
Moisture Content (%):	**26.5**	**27.4**	**28.6**	**N**
Number of Blows:	**35**	**27**	**18**	**T**

Plastic Limit Test	**1**	**2**	**Range**
Tare Number:	221	224	
Wt. of Tare & Wet Sample (g):	25.98	26.85	
Wt. of Tare & Dry Sample (g):	25.15	25.99	
Weight of Tare (g):	19.24	19.76	
Weight of Water (g):	0.8	0.9	
Weight of Dry Sample (g):	5.9	6.2	
Moisture Content (%):	**14.0**	**13.8**	**0.2**

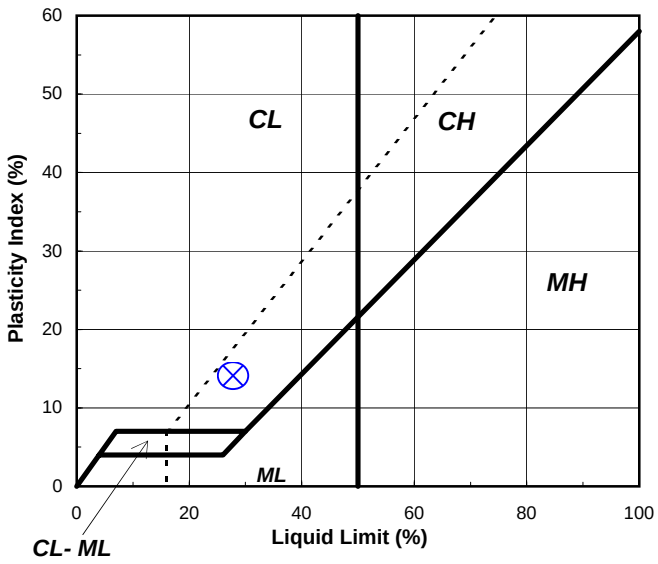
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%):	**28**
Plastic Limit (%):	**14**
Plasticity Index (%):	**14**
USCS Symbol:	**CL**

Flow Curve



Plasticity Chart



Tested By BS *Date* 10/27/15 *Checked By* CLK *Date* 10/28/15

S:\Excel\Excel QA\Spreadsheets\Limit 3Pt.xls

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

PHOTOGRAPHS

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-32
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.35-3.05
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-019		

Tested By JCM *Date* 11/18/15 *Checked By* KC *Date* 12/1/15

S:\Excel\Excel QA\Spreadsheets\Photo

SHELBY TUBE UNIT WEIGHT

ASTM D2937-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-32
Client Reference:	Lake Erie Connector 185241	Depth Pushed (m):	2.35-3.05
Project No.:	2015-538-001	Shelby Tube No.:	GT2
Lab ID:	2015-538-001-019	Recovery (m):	0.7

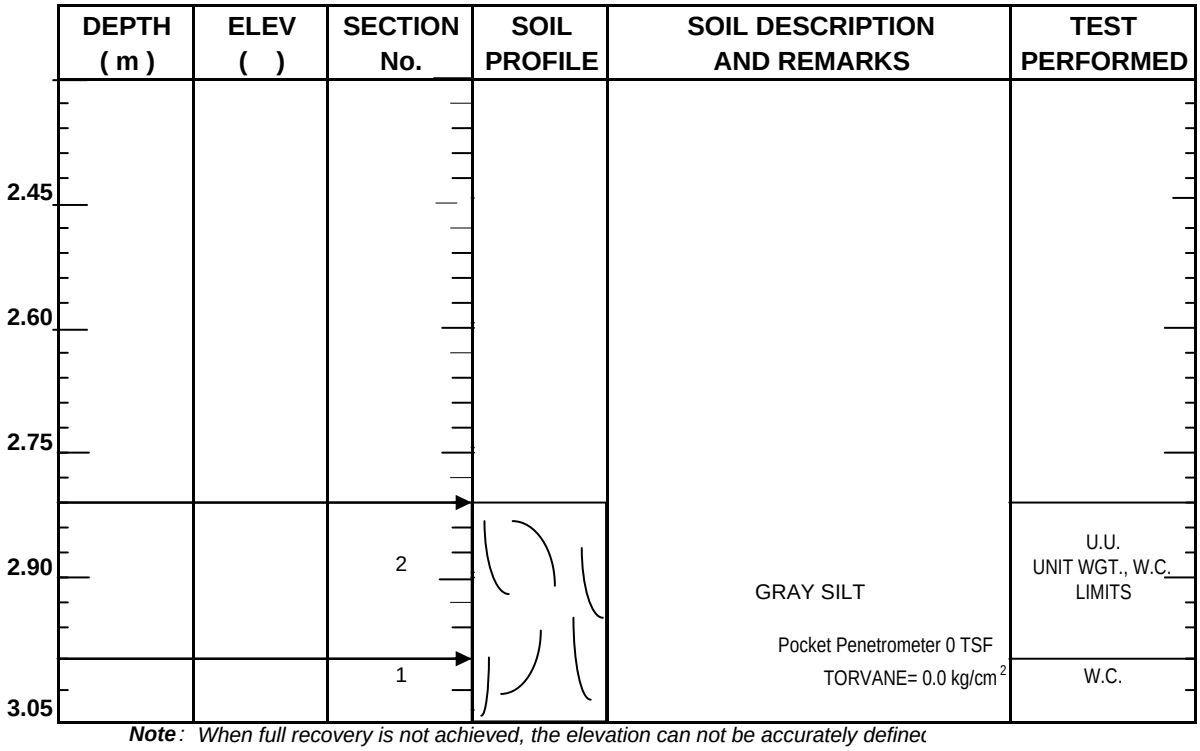
MOISTURE CONTENT — After U.U.

Section Number	**1**	**2**	**3**	**4**	**5**
Tare Number	917	1538			
Weight of Tare & Wet Sample (g)	428.06	1168.15			
Weight of Tare & Dry Sample (g)	340.38	902.32			
Weight of Tare (g)	109.70	147.61			
Moisture Content (%)	38.01	35.22			

UNIT WEIGHT

Weight of Tube & Wet Sample (g)	2334.30
Weight of Tube (g)	114.27
Weight of Wet Sample (g)	2220.03
Length 1 (in)	7.205
Length 2 (in)	7.184
Length 3 (in)	7.185
Top Diameter (in)	3.596
Middle Diameter (in)	3.675
Bottom Diameter (in)	3.616
Sample Volume (cm^3)	1218.92
Moisture Content (%)	35.22
Unit Wet Weight (g/cm^3)	1.82
Unit Wet Weight (pcf)	113.65
Unit Dry Weight (g/cm^3)	**1.35**
Unit Dry Weight (pcf)	**84.0**

SOIL PROFILE AND SAMPLING



***Note**: When full recovery is not achieved, the elevation can not be accurately define*
Indicate each cut of the tube with an arrow
Indicate dividing line between soil types with a solid lin
Indicate wax by cross-hatching. Indicate soil types by standard symbols

Tested By *JCM* Date *11/18/15* Checked By KC Date 12/1/15

ATTERBERG LIMITS

ASTM D 4318-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-32
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.81-2.99
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-019	Soil Description:	GRAY LEAN CLAY

Note: The* USCS *symbol used with this test refers only to the minus No. 40 (Minus No. 40 sieve material, Airdried)

sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description .

Liquid Limit Test	**1**	**2**	**3**
Tare Number:	242	2101	148
Wt. of Tare & Wet Sample (g):	39.73	39.27	40.30
Wt. of Tare & Dry Sample (g):	35.03	34.86	35.99
Weight of Tare (g):	19.14	18.47	19.60
Weight of Water (g):	4.7	4.4	4.3
Weight of Dry Sample (g):	15.9	16.4	16.4
Moisture Content (%):	**29.6**	**26.9**	**26.3**
Number of Blows:	**15**	**24**	**30**

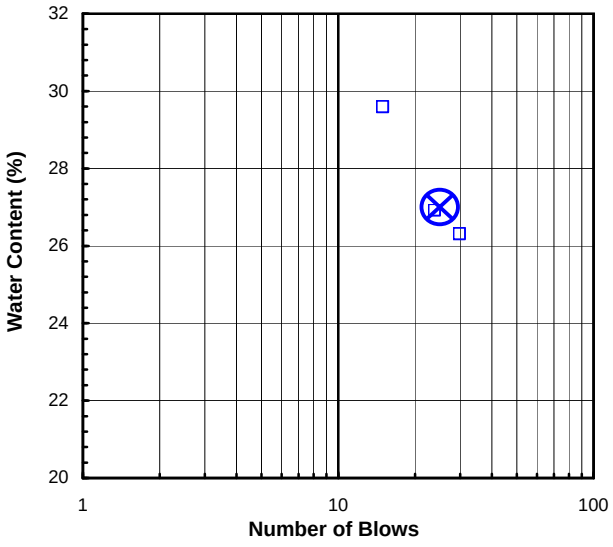
MULTI POINT

Plastic Limit Test	**1**	**2**	**Range**
Tare Number:	177	217	
Wt. of Tare & Wet Sample (g):	26.30	24.96	
Wt. of Tare & Dry Sample (g):	25.66	24.26	
Weight of Tare (g):	20.21	18.66	
Weight of Water (g):	0.6	0.7	
Weight of Dry Sample (g):	5.5	5.6	
Moisture Content (%):	**11.7**	**12.5**	**-0.8**

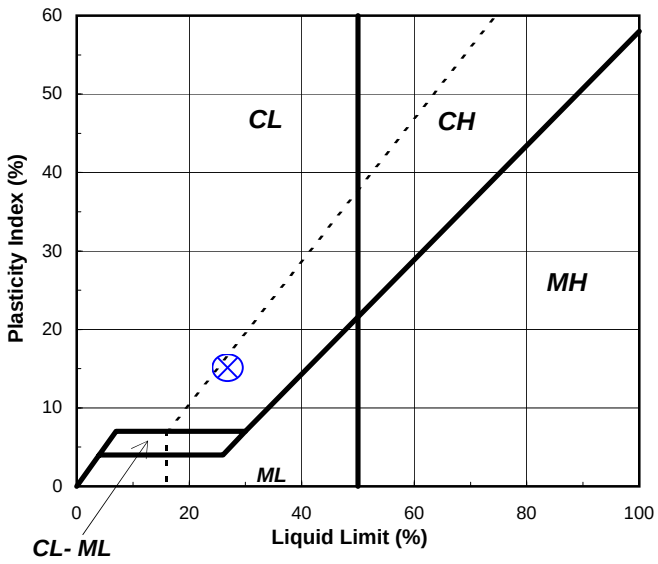
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%):	**27**
Plastic Limit (%):	**12**
Plasticity Index (%):	**15**
USCS Symbol:	**CL**

Flow Curve



Plasticity Chart



Tested By RAL *Date* 11/20/15 *Checked By* CLK *Date* 11/23/15

S:\Excel\Excel QA\Spreadsheets\Limit 3Pt.xls

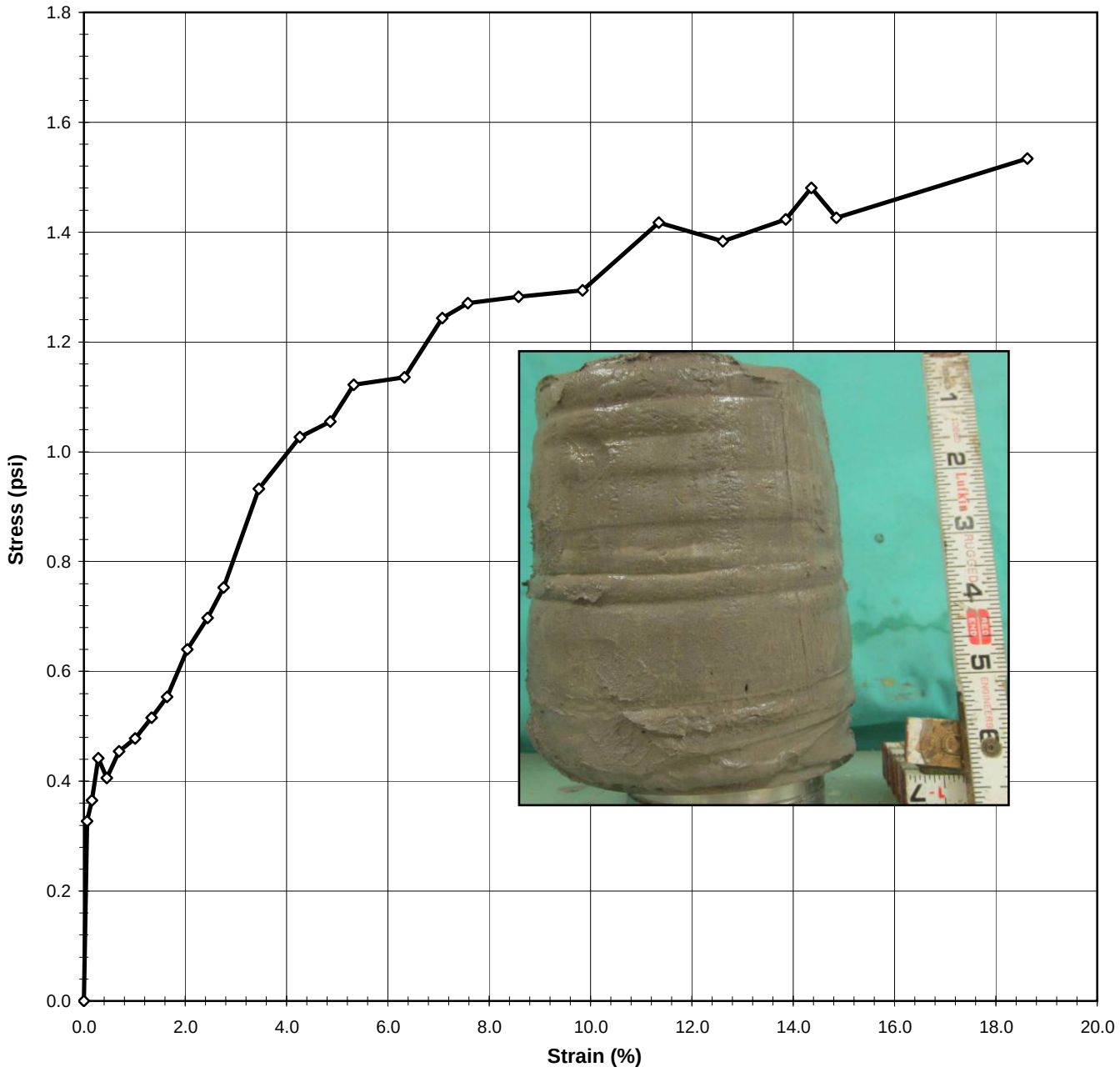
544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONSOLIDATED UNDRAINED TRIAXIAL

ASTM D2850-03a (2007)

Client:	Canadian Seabed Research, Ltd.	Boring No.:	VC-32
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.81-2.99
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-019	Visual:	Gray Silt

CONFINING STRESS (psi) 48.6



Tested By	JCM	Date	11/19/15	Input Checked By	KC	Date	11/30/15

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONSOLIDATED UNDRAINED TRIAXIAL

ASTM D2850-03a (2007)

Client:	Canadian Seabed Research, Ltd.	Boring No.:	VC-32
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.81-2.99
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-019	Visual:	Gray Silt

INITIAL SAMPLE DIMENSIONS

Length 1 (in):	7.205	Top Dia. (in):	3.596
Length 2 (in):	7.184	Mid. Dia. (in):	3.675
Length 3 (in):	7.185	Bot. Dia. (in):	3.616
Avg.Length (in)	**7.191**	**Area (in^2):**	**10.343**

WATER CONTENT (AFTER TEST)

Total Weight of Sample (g):	NA
Tare No.:	1538
Weight of Tare & Wet Sample (g):	1168.15
Weight of Tare & Dry Sample (g):	902.32
Weight of Tare (g):	147.61
% Moisture:	35.2

UNIT WEIGHT

Undisturbed Sample

Weight of Tube & Wet Sample (g):	2334.30	Sample Volume (cm^3):	1218.9
Weight of Tube (g):	114.27	Unit Wet Weight (g/cm^3):	1.82
Weight of Wet Sample (g):	2220.03	Unit Wet Weight (pcf):	113.65
Diameter (in):	3.63	Moisture Content (%):	35.2
Length (in):	7.18	Unit Dry Weight (pcf):	84.0
Length (cm):	18.27		

		Initial Dial Reading (mil)	63
CONFINING STRESS (psi)	**48.6**	Dial Reading Before Shearing (mil)	74

DEFORMATION (in)	*LOAD (lb)*	*ELAPSED TIME (min)*	*STRAIN (%)*	*STRESS (psi)*
0.000	19.2	0.0	0.0	0.000
0.005	22.6	0.08	0.1	0.327
0.011	23.0	0.17	0.2	0.366
0.020	23.8	0.28	0.3	0.442
0.033	23.4	0.47	0.5	0.406
0.050	23.9	0.70	0.7	0.455
0.072	24.2	1.02	1.0	0.478
0.096	24.6	1.33	1.3	0.515
0.118	25.0	1.65	1.6	0.554
0.147	25.9	2.05	2.0	0.640
0.176	26.6	2.45	2.4	0.698
0.198	27.2	2.75	2.8	0.753
0.248	29.2	3.45	3.5	0.933
0.306	30.3	4.25	4.3	1.027
0.349	30.6	4.85	4.9	1.055
0.382	31.4	5.32	5.3	1.122
0.454	31.7	6.30	6.3	1.135
0.508	33.0	7.05	7.1	1.244
0.544	33.4	7.55	7.6	1.270
0.616	33.7	8.55	8.6	1.283
0.707	34.0	9.82	9.8	1.294
0.815	35.7	11.32	11.4	1.417
0.905	35.5	12.57	12.6	1.383
0.995	36.3	13.82	13.9	1.423
1.031	37.1	14.32	14.4	1.481
1.067	36.5	14.82	14.9	1.426
1.337	38.7	18.55	18.6	1.533

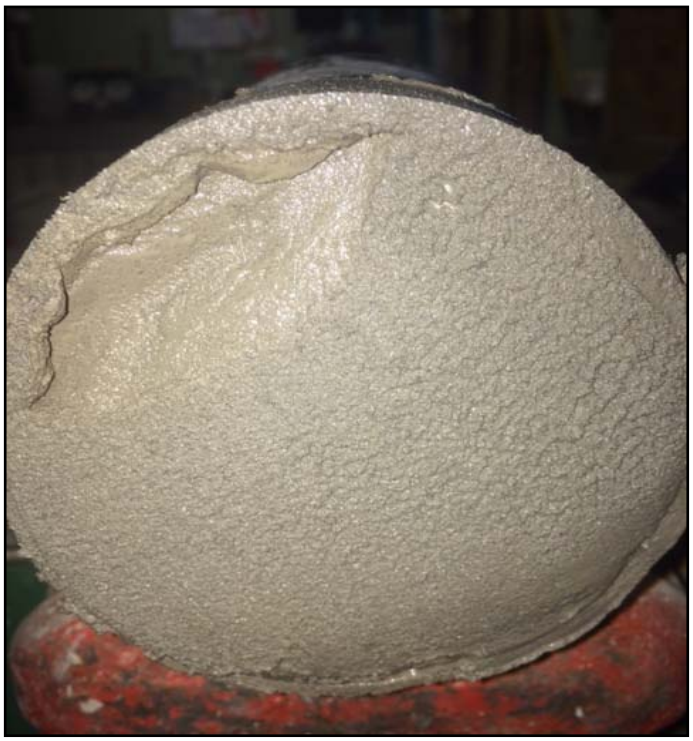
Tested By JCM Date 11/19/15 Input Checked By KC Date 11/30/15

DCN: CT-S29 DATE: 8-21-10 REVISION: 2

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

PHOTOGRAPHS

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-33
Client Reference:	Lake Erie Connector 185241	Depth (m):	0.00-0.27
Project No.:	2015-538-001	Sample No.:	GT4
Lab ID:	2015-538-001-020		



Tested By *NJM* *Date* *10/27/15* *Checked By* *KC* *Date* *11/5/15*

S:\Excel\Excel QA\Spreadsheets\Photo

SHELBY TUBE UNIT WEIGHT

ASTM D2937-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-33
Client Reference:	Lake Erie Connector 185241	Depth Pushed (m):	0.00-0.27
Project No.:	2015-538-001	Shelby Tube No.:	GT4
Lab ID:	2015-538-001-020	Recovery (m):	0.27

MOISTURE CONTENT

Section Number	**1**
Tare Number	2891
Weight of Tare & Wet Sample (g)	263.75
Weight of Tare & Dry Sample (g)	217.65
Weight of Tare (g)	6.79
Moisture Content (%)	21.86

UNIT WEIGHT

Weight of Tube & Wet Sample (g)	1401.45
Weight of Tube (g)	93.77
Weight of Wet Sample (g)	1307.68
Length 1 (in)	3.932
Length 2 (in)	3.725
Length 3 (in)	3.680
Top Diameter (in)	3.554
Middle Diameter (in)	3.606
Bottom Diameter (in)	3.565
Sample Volume (cm^3)	621.61
Moisture Content (%)	21.86
Unit Wet Weight (g/cm^3)	2.10
Unit Wet Weight (pcf)	131.27
Unit Dry Weight (g/cm^3)	**1.73**
Unit Dry Weight (pcf)	**107.7**

SOIL PROFILE AND SAMPLING

DEPTH (m)	ELEV ( )	SECTION No.	SOIL PROFILE	SOIL DESCRIPTION AND REMARKS	TEST PERFORMED
0.12				VERT SOFT/WET GRAY SILTY & SANDY CLAY Pocket Penetrometer 0.0 TSF	
0.27		1			UNIT WGT, LIMITS, WC

***Note**: When full recovery is not achieved, the elevation can not be accurately define*
Indicate each cut of the tube with an arrow
Indicate dividing line between soil types with a solid lin
Indicate wax by cross-hatching. Indicate soil types by standard symbols

Tested By *NJM* Date *10/27/15* Checked By KC Date 11/2/15

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

ATTERBERG LIMIT

ASTM D 4318-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-33
Client Reference:	Lake Erie Connector 185241	Depth (m):	0.17-0.27
Project No.:	2015-538-001	Sample No.:	GT4
Lab ID:	2015-538-001-020	Visual:	GRAY SILT
			(MInus No. 40 sieve material, Airdried)

NON - PLASTIC MATERIAL

Tested By BS *Date* 10/28/15 *Checked By* CLK *Date* 10/30/15

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

PHOTOGRAPHS

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-33
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.47-2.17
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-021		

Tested By *JCM* *Date* *11/19/15* *Checked By* *KC* *Date* *12/1/15*

S:\Excel\Excel QA\Spreadsheets\Photo

SHELBY TUBE UNIT WEIGHT

ASTM D2937-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-33
Client Reference:	Lake Erie Connector 185241	Depth Pushed (m):	1.47-2.17
Project No.:	2015-538-001	Shelby Tube No.:	GT2
Lab ID:	2015-538-001-021	Recovery (m):	0.7

MOISTURE CONTENT After U.U.

Section Number	**1**	**2**	**3**	**4**	**5**
Tare Number	886	1450			
Weight of Tare & Wet Sample (g)	359.59	1259.70			
Weight of Tare & Dry Sample (g)	310.01	1042.83			
Weight of Tare (g)	109.69	144.94			
Moisture Content (%)	24.75	24.15			

UNIT WEIGHT

Weight of Tube & Wet Sample (g)	2457.26
Weight of Tube (g)	110.61
Weight of Wet Sample (g)	2346.65
Length 1 (in)	7.127
Length 2 (in)	7.172
Length 3 (in)	7.166
Top Diameter (in)	3.611
Middle Diameter (in)	3.658
Bottom Diameter (in)	3.650
Sample Volume (cm^3)	1219.90
Moisture Content (%)	24.15
Unit Wet Weight (g/cm^3)	1.92
Unit Wet Weight (pcf)	120.04
Unit Dry Weight (g/cm^3)	**1.55**
Unit Dry Weight (pcf)	**96.7**

SOIL PROFILE AND SAMPLING

DEPTH (m)	ELEV ( )	SECTION No.	SOIL PROFILE	SOIL DESCRIPTION AND REMARKS	TEST PERFORMED
1.57					
1.72					
1.87					
2.02		2		GRAY SILT	U.U. UNIT WGT., W.C. LIMITS
				Pocket Penetrometer 0 TSF	
2.17		1		TORVANE= 0.1 kg/cm^2	W.C.

***Note**: When full recovery is not achieved, the elevation can not be accurately define*
Indicate each cut of the tube with an arrow
Indicate dividing line between soil types with a solid lin
Indicate wax by cross-hatching. Indicate soil types by standard symbols

Tested By *JCM* Date *11/19/15* Checked By KC Date 12/1/15

ATTERBERG LIMITS

ASTM D 4318-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-33
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.47-2.17
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-021	Soil Description:	GRAY SILT

Note: The* USCS *symbol used with this test refers only to the minus No. 40 (Minus No. 40 sieve material, Airdried)
sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description .

Liquid Limit Test	**1**	**2**	**3**
Tare Number:	159	194	166
Wt. of Tare & Wet Sample (g):	40.21	40.89	38.92
Wt. of Tare & Dry Sample (g):	36.42	37.47	35.81
Weight of Tare (g):	17.49	19.29	18.37
Weight of Water (g):	3.8	3.4	3.1
Weight of Dry Sample (g):	18.9	18.2	17.4
Moisture Content (%):	**20.0**	**18.8**	**17.8**
Number of Blows:	**16**	**23**	**29**

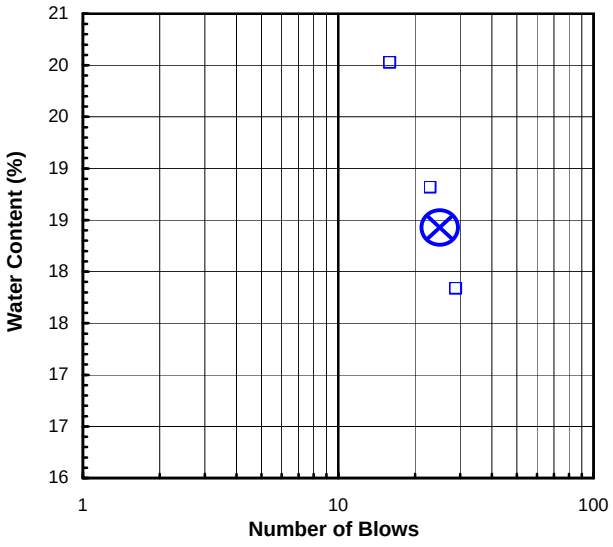
MULTI POINT

Plastic Limit Test	**1**	**2**	**Range**
Tare Number:	135	333	
Wt. of Tare & Wet Sample (g):	26.74	26.54	
Wt. of Tare & Dry Sample (g):	25.80	25.68	
Weight of Tare (g):	19.41	19.85	
Weight of Water (g):	0.9	0.9	
Weight of Dry Sample (g):	6.4	5.8	
Moisture Content (%):	**14.7**	**14.8**	**0.0**

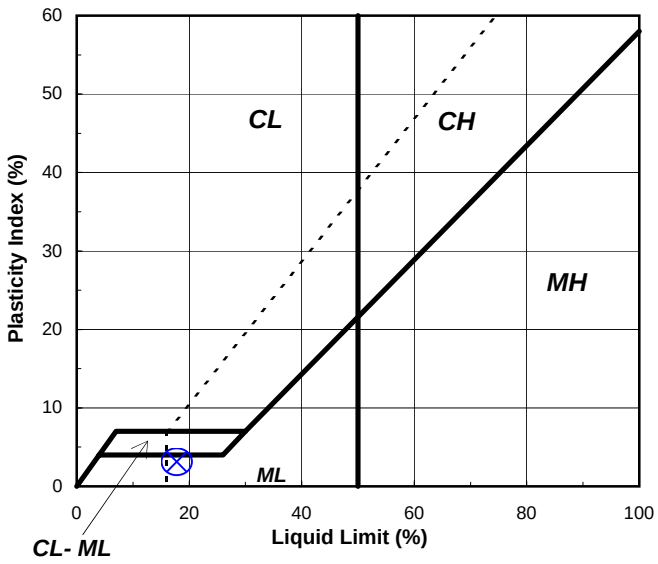
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%):	**18**
Plastic Limit (%):	**15**
Plasticity Index (%):	**3**
USCS Symbol:	**ML**

Flow Curve



Plasticity Chart



Tested By RAL *Date* 11/20/15 *Checked By* CLK *Date* 11/23/15

S:\Excel\Excel QA\Spreadsheets\Limit 3Pt.xls

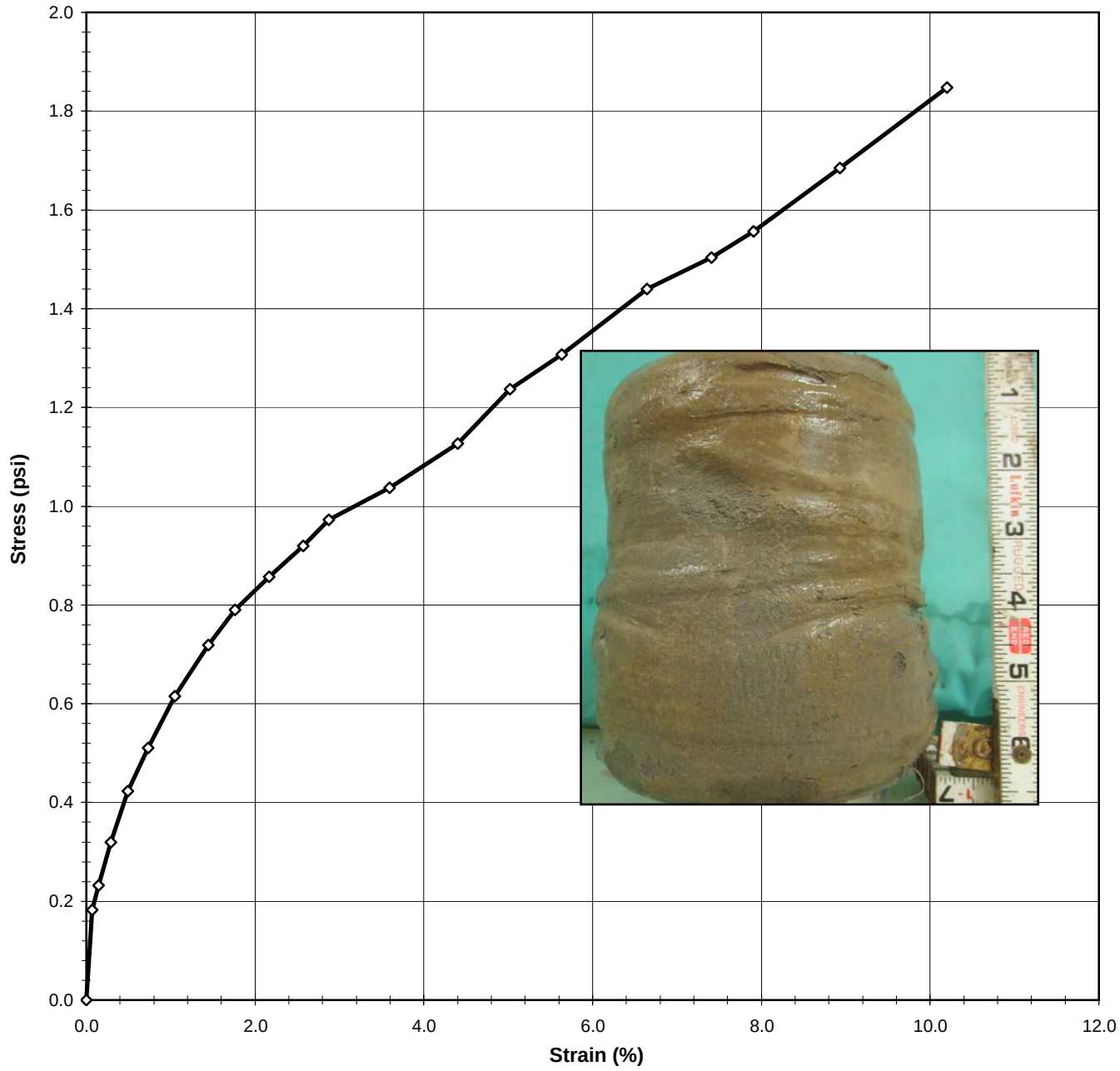
544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONSOLIDATED UNDRAINED TRIAXIAL

ASTM D2850-03a (2007)

Client:	Canadian Seabed Research, Ltd.	Boring No.:	VC-33
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.47-2.17
Project No.:	2015-538-001	Sample No.:	GT-2
Lab ID:	2015-538-001-021	Visual:	Gray Silt

CONFINING STRESS (psi) 34.7



Tested By	JCM	Date	11/19/15	Input Checked By	KC	Date	11/30/15

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONSOLIDATED UNDRAINED TRIAXIAL

ASTM D2850-03a (2007)

Client:	Canadian Seabed Research, Ltd.	Boring No.:	VC-33
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.47-2.17
Project No.:	2015-538-001	Sample No.:	GT-2
Lab ID:	2015-538-001-021	Visual:	Gray Silt

INITIAL SAMPLE DIMENSIONS

Length 1 (in):	7.127	Top Dia. (in):	3.611
Length 2 (in):	7.172	Mid. Dia. (in):	3.658
Length 3 (in):	7.166	Bot. Dia. (in):	3.650
Avg.Length (in)	**7.155**	**Area (in^2):**	**10.404**

WATER CONTENT (AFTER TEST)

Total Weight of Sample (g):	2223.73
Tare No.:	1450
Weight of Tare & Wet Sample (g):	1259.70
Weight of Tare & Dry Sample (g):	1042.83
Weight of Tare (g):	144.94
% Moisture:	24.2

UNIT WEIGHT

Undisturbed Sample

Weight of Tube & Wet Sample (g):	2457.26	Sample Volume (cm^3):	1219.9
Weight of Tube (g):	110.61	Unit Wet Weight (g/cm^3):	1.92
Weight of Wet Sample (g):	2346.65	Unit Wet Weight (pcf):	120.04
Diameter (in):	3.64	Moisture Content (%):	24.2
Length (in):	7.07	Unit Dry Weight (pcf):	96.7
Length (cm):	18.17		

		Initial Dial Reading (mil)	45
CONFINING STRESS (psi)	**34.7**	Dial Reading Before Shearing (mil)	126

DEFORMATION (in)	*LOAD (lb)*	*ELAPSED TIME (min)*	*STRAIN (%)*	*STRESS (psi)*
0.000	17.8	0.0	0.0	0.000
0.005	19.7	0.07	0.1	0.182
0.010	20.2	0.15	0.1	0.232
0.020	21.1	0.28	0.3	0.320
0.035	22.2	0.48	0.5	0.423
0.052	23.1	0.72	0.7	0.510
0.074	24.3	1.03	1.0	0.615
0.102	25.4	1.43	1.4	0.719
0.125	26.2	1.73	1.8	0.790
0.153	26.9	2.13	2.2	0.857
0.182	27.6	2.53	2.6	0.920
0.203	28.2	2.85	2.9	0.973
0.254	29.0	3.55	3.6	1.037
0.311	30.1	4.35	4.4	1.127
0.355	31.3	4.97	5.0	1.237
0.398	32.2	5.57	5.6	1.307
0.470	33.8	6.57	6.6	1.440
0.524	34.7	7.32	7.4	1.504
0.560	35.4	7.82	7.9	1.556
0.632	37.0	8.83	8.9	1.685
0.722	39.2	10.08	10.2	1.848

Tested By JCM Date 11/19/15 Input Checked By KC Date 11/30/15

DCN: CT-S29 DATE: 8-21-10 REVISION: 2

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

PHOTOGRAPHS

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-34
Client Reference:	Lake Erie Connector 185241	Depth (m):	0.65-1.35
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-022		

Tested By JCM *Date* 11/19/15 *Checked By* KC *Date* 12/1/15

S:\Excel\Excel QA\Spreadsheets\Photo

SHELBY TUBE UNIT WEIGHT

ASTM D2937-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-34
Client Reference:	Lake Erie Connector 185241	Depth Pushed (m):	0.65-1.35
Project No.:	2015-538-001	Shelby Tube No.:	GT2
Lab ID:	2015-538-001-022	Recovery (m):	0.7

MOISTURE CONTENT After U.C.

Section Number	**1**	**2**	**3**	**4**	**5**
Tare Number	673	1472			
Weight of Tare & Wet Sample (g)	592.18	1042.53			
Weight of Tare & Dry Sample (g)	490.63	861.66			
Weight of Tare (g)	72.52	144.21			
Moisture Content (%)	24.29	25.21			

UNIT WEIGHT

Weight of Tube & Wet Sample (g)	2439.76
Weight of Tube (g)	116.29
Weight of Wet Sample (g)	2323.47
Length 1 (in)	7.285
Length 2 (in)	7.283
Length 3 (in)	7.267
Top Diameter (in)	3.661
Middle Diameter (in)	3.665
Bottom Diameter (in)	3.662
Sample Volume (cm^3)	1256.66
Moisture Content (%)	25.21
Unit Wet Weight (g/cm^3)	1.85
Unit Wet Weight (pcf)	115.37
Unit Dry Weight (g/cm^3)	**1.48**
Unit Dry Weight (pcf)	**92.1**

SOIL PROFILE AND SAMPLING

DEPTH (m)	ELEV ( )	SECTION No.	SOIL PROFILE	SOIL DESCRIPTION AND REMARKS	TEST PERFORMED
0.75					
0.90					
1.05					
1.20		2		GRAY SILT	U.C. UNIT WGT., W.C. LIMITS
				Pocket Penetrometer .25 TSF	
		1		TORVANE= 0.1 kg/cm^2	W.C.
1.35					

***Note**: When full recovery is not achieved, the elevation can not be accurately define*
Indicate each cut of the tube with an arrow
Indicate dividing line between soil types with a solid lin
Indicate wax by cross-hatching. Indicate soil types by standard symbols

Tested By *JCM* Date *11/19/15* Checked By KC Date 12/1/15

ATTERBERG LIMIT

ASTM D 4318-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-34
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.15-1.29
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-022	Visual:	GRAY SILT
			(MInus No. 40 sieve material, Airdried)

NON - PLASTIC MATERIAL

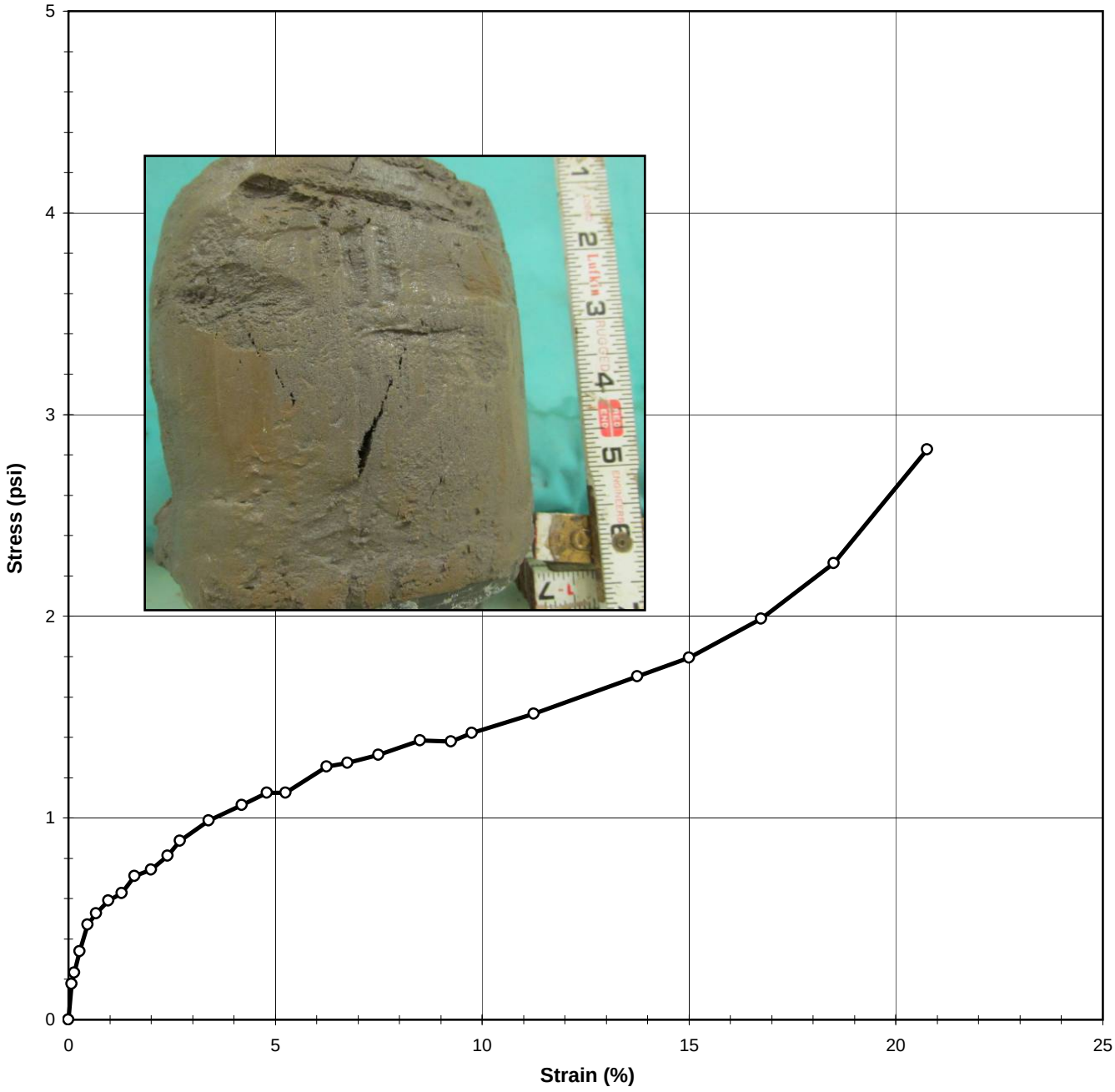
Tested By RAL *Date* 11/20/15 *Checked By* CLK *Date* 11/23/15

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONFINED COMPRESSIVE STRENGTH

ASTM D2166-13 / AASHTO T208-10 (SOP S-30)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-34
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.15-1.29
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-022	Visual:	Gray Silt



Tested By	JCM	Date	11/19/15	Approved By	KC	Date	11/30/15

DCN: CT-S30 Date: 11/09/09 Revision: 4

S:\Excel\Excel QA\Spreadsheets\UC Sigma.xls

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONFINED COMPRESSIVE STRENGTH

ASTM D2166-13 / AASHTO T208-10 (SOP S-30)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-34
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.15-1.29
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-022	Visual:	Gray Silt

INITIAL SAMPLE DIMENSIONS			
Length 1 (in):	7.285	Top Diameter (in):	3.661
Length 2 (in):	7.283	Middle Diameter (in):	3.665
Length 3 (in):	7.267	Bottom Diameter (in):	3.662
Avg. Length (in):	**7.278**	**Avg. Diameter (in):**	**3.663**
		Area (in^2):	**10.536**

WATER CONTENT AFTER TEST	
Tare No.:	1472
Weight of Tare & Wet Sample (g):	1042.53
Weight of Tare & Dry Sample (g):	861.66
Weight of Tare (g):	144.21
Moisture Content (%):	25.21

UNIT WEIGHT			
Weight of Tube & Wet Sample (g):	2439.76	Sample Volume (cm^3):	1256.7
Weight of Tube (g):	116.29	Unit Wet Weight (g/cm^3):	1.85
Weight of Wet Sample (g):	2323.47	Unit Wet Weight (pcf):	115.37
Average Diameter (in):	3.66	Moisture Content (%):	25.21
Average Length (in):	7.28	Unit Dry Weight (pcf):	92.14
Average Length (cm):	18.49		

ELECTRONIC DEVICE DEFORMATION (in)	*LOAD (lb)*	*ELAPSED TIME (min)*	*STRAIN (%)*	*STRESS (psi)*
0.000	0.0	0.00	0.000	0.000
0.005	1.9	0.08	0.073	0.177
0.010	2.5	0.15	0.142	0.232
0.020	3.6	0.28	0.271	0.338
0.034	5.0	0.48	0.469	0.472
0.048	5.6	0.68	0.666	0.526
0.070	6.3	0.98	0.967	0.590
0.094	6.7	1.30	1.294	0.628
0.116	7.6	1.60	1.594	0.713
0.145	8.0	2.00	1.998	0.743
0.174	8.8	2.40	2.394	0.812
0.196	9.6	2.70	2.694	0.887
0.247	10.8	3.40	3.399	0.987
0.306	11.7	4.20	4.198	1.065
0.349	12.5	4.80	4.800	1.125
0.382	12.5	5.25	5.247	1.126
0.454	14.1	6.25	6.244	1.255
0.491	14.4	6.75	6.751	1.273
0.546	15.0	7.50	7.499	1.313
0.618	15.9	8.48	8.495	1.383
0.673	16.0	9.23	9.243	1.379
0.710	16.6	9.73	9.750	1.421
0.818	18.0	11.23	11.245	1.517
1.001	20.8	13.73	13.746	1.702
1.092	22.3	14.98	15.001	1.796
1.219	25.2	16.72	16.746	1.989
1.346	29.3	18.47	18.499	2.263
1.510	37.6	20.72	20.751	2.826

Tested By JCM Date 11/19/15 Input Checked By KC Date 11/30/15

DCN: CT-S30 Date: 11/09/09 Revision: 4

S:\Excel\Excel QA\Spreadsheets\UC Sigma.xls

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

PHOTOGRAPHS

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-34
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.60-2.30
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-023		

Tested By NJM *Date* 10/29/15 *Checked By* KC *Date* 11/5/15

S:\Excel\Excel QA\Spr

SHELBY TUBE UNIT WEIGHT

ASTM D2937-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-34
Client Reference:	Lake Erie Connector 185241	Depth Pushed (m):	1.60-2.30
Project No.:	2015-538-001	Shelby Tube No.:	GT1
Lab ID:	2015-538-001-023	Recovery (m):	0.7

MOISTURE CONTENT

Section Number	**1**
Tare Number	3002
Weight of Tare & Wet Sample (g)	189.85
Weight of Tare & Dry Sample (g)	151.70
Weight of Tare (g)	6.56
Moisture Content (%)	26.28

UNIT WEIGHT

Weight of Tube & Wet Sample (g)	1310.64
Weight of Tube (g)	87.05
Weight of Wet Sample (g)	1223.59
Length 1 (in)	3.938
Length 2 (in)	3.868
Length 3 (in)	3.637
Top Diameter (in)	3.521
Middle Diameter (in)	3.576
Bottom Diameter (in)	3.512
Sample Volume (cm^3)	613.93
Moisture Content (%)	26.28
Unit Wet Weight (g/cm^3)	1.99
Unit Wet Weight (pcf)	124.37
Unit Dry Weight (g/cm^3)	**1.58**
Unit Dry Weight (pcf)	**98.5**

SOIL PROFILE AND SAMPLING

DEPTH (m)	ELEV ( )	SECTION No.	SOIL PROFILE	SOIL DESCRIPTION AND REMARKS	TEST PERFORMED
1.70					
1.85					
2.00					
2.15				GRAY FINE SAND & SILT	
2.30		1		Pocket Penetrometer 0.25 TSF TORVANE= 0 kg/cm^2	UNIT WGT, LIMITS, GRAIN SIZE, WC

***Note**: When full recovery is not achieved, the elevation can not be accurately define*
Indicate each cut of the tube with an arrow
Indicate dividing line between soil types with a solid lin
Indicate wax by cross-hatching. Indicate soil types by standard symbols

Tested By *NJM* Date *10/29/15* Checked By KC Date 11/2/15

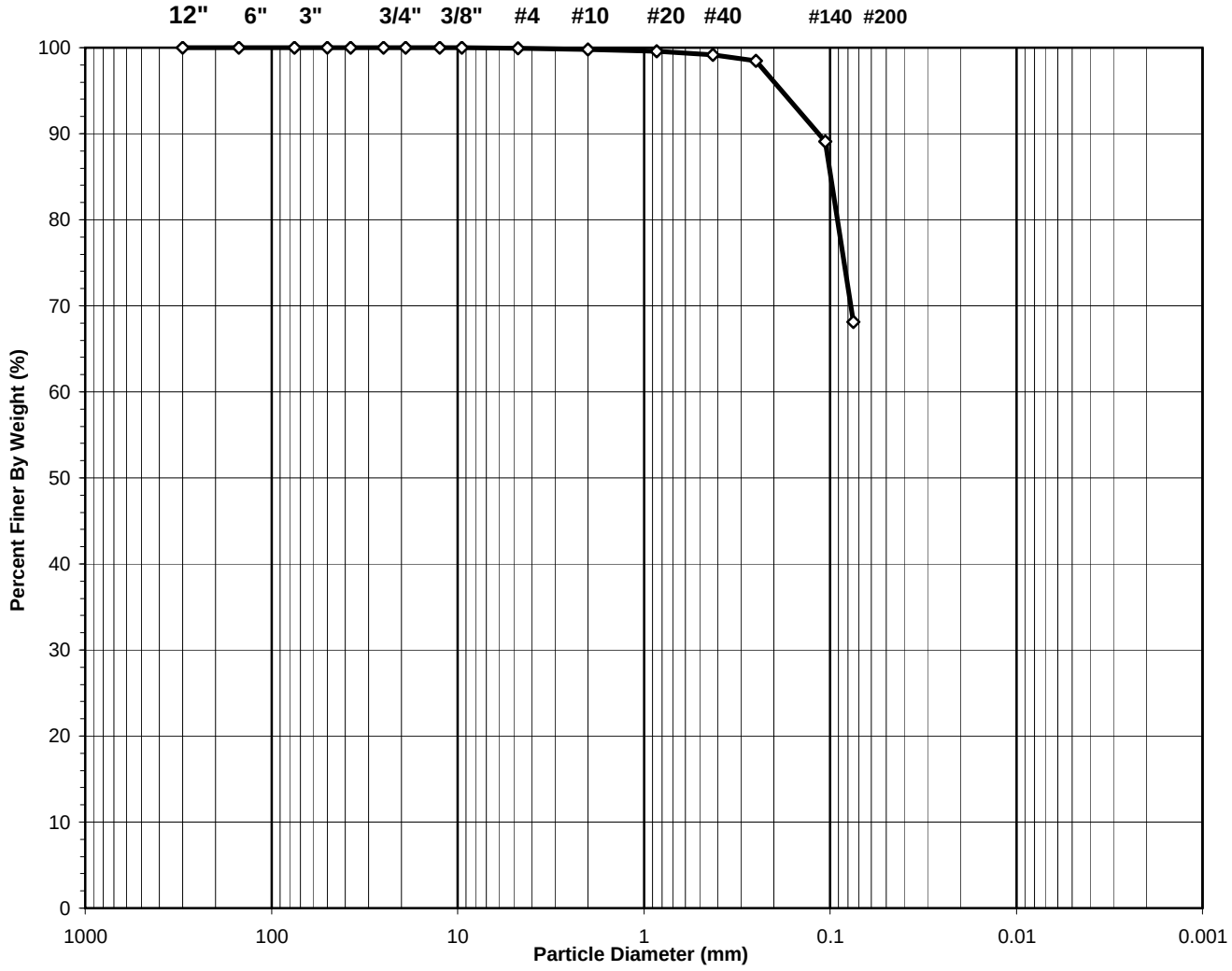
544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-34
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.2-2.3
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-023	Soil Color:	Gray

	SIEVE ANALYSIS		*HYDROMETER*
USCS	**gravel**	**sand**	**silt and clay**



USCS Symbol:
CL, TESTED

USCS Classification:
SANDY LEAN CLAY

Tested By	HL	Date	11/4/15	Checked By	KC	Date	11/6/15

DCN: CT-S3C DATE 3/20/13 REVISION: 3

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

WASH SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-34
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.2-2.3
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-023	Soil Color:	Gray

Moisture Content of Passing 3/4" Sample		Water Content of Retained 3/4" Sample	
Tare No.:	961	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	743.97	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	604.90	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	100.96	Weight of Tare (g):	NA
Weight of Water (g):	139.07	Weight of Water (g):	NA
Weight of Dry Sample (g):	503.94	Weight of Dry Sample (g):	NA
Moisture Content (%):	**27.6**	**Moisture Content (%):**	**NA**

Wet Weight of -3/4" Sample (g):	NA	Weight of the Dry Sample (g):	503.94
Dry Weight of - 3/4" Sample (g):	160.6	Weight of - #200 Material (g):	343.39
Wet Weight of +3/4" Sample (g):	NA	Weight of + #200 Material (g):	160.55
Dry Weight of + 3/4" Sample (g):	0.00		
Total Dry Weight of Sample (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.50	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	0.00	0.00	0.00	100.00	**100.00**
#4	4.75	0.22	0.04	0.04	99.96	**99.96**
#10	2.00	0.96	0.19	0.23	99.77	**99.77**
#20	0.850	1.02	0.20	0.44	99.56	**99.56**
#40	0.425	1.99	0.39	0.83	99.17	**99.17**
#60	0.250	3.63	0.72	1.55	98.45	**98.45**
#140	0.106	47.00	9.33	10.88	89.12	**89.12**
#200	0.075	105.73	20.98	31.86	68.14	**68.14**
Pan	-	343.39	68.14	100.00	-	**-**

Tested By HL Date 11/4/15 Checked By KC Date 11/6/15

DCN: CT-S3C DATE 3/20/13 REVISION: 3

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

ATTERBERG LIMITS

ASTM D 4318-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-34
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.2-2.3
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-023	Soil Description:	GRAY LEAN CLAY

Note: The* USCS *symbol used with this test refers only to the minus No. 40 (Minus No. 40 sieve material, Airdried)

sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description .

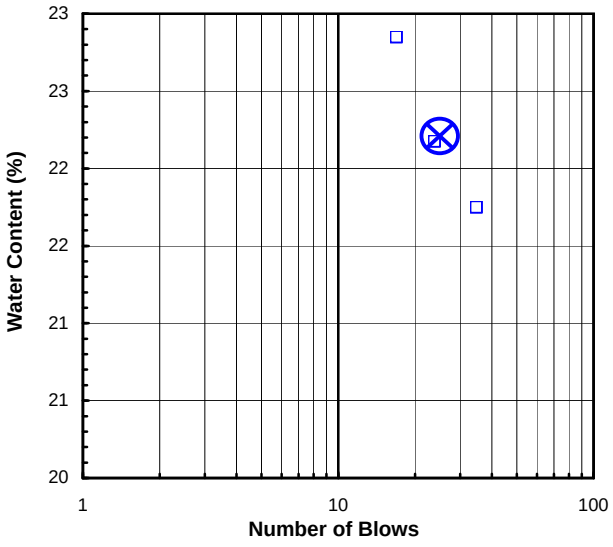
Liquid Limit Test	**1**	**2**	**3**	
				M
Tare Number:	194	203	209	**U**
Wt. of Tare & Wet Sample (g):	39.67	40.28	39.98	**L**
Wt. of Tare & Dry Sample (g):	35.88	36.48	36.29	**T**
Weight of Tare (g):	19.29	19.34	19.32	**I**
Weight of Water (g):	3.8	3.8	3.7	**P**
Weight of Dry Sample (g):	16.6	17.1	17.0	**O**
				I
Moisture Content (%):	**22.8**	**22.2**	**21.7**	**N**
Number of Blows:	**17**	**24**	**35**	**T**

Plastic Limit Test	**1**	**2**	**Range**
Tare Number:	171	218	
Wt. of Tare & Wet Sample (g):	25.56	26.13	
Wt. of Tare & Dry Sample (g):	24.79	25.35	
Weight of Tare (g):	19.11	19.32	
Weight of Water (g):	0.8	0.8	
Weight of Dry Sample (g):	5.7	6.0	
Moisture Content (%):	**13.6**	**12.9**	**0.6**

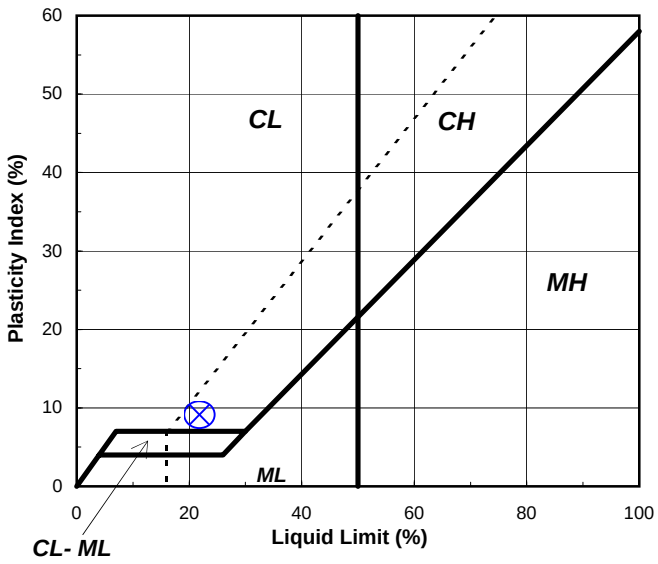
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%):	**22**
Plastic Limit (%):	**13**
Plasticity Index (%):	**9**
USCS Symbol:	**CL**

Flow Curve



Plasticity Chart



Tested By RAL *Date* 11/5/15 *Checked By* CLK *Date* 11/6/15

S:\Excel\Excel QA\Spreadsheets\Limit 3Pt.xls

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

PHOTOGRAPHS

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-35
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.20-1.90
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-024		

Tested By *JCM* *Date* *11/20/15* *Checked By* *KC* *Date* *12/1/15*

S:\Excel\Excel QA\Spreadsheets\Photo

SHELBY TUBE UNIT WEIGHT

ASTM D2937-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-35
Client Reference:	Lake Erie Connector 185241	Depth Pushed (m):	1.20-1.90
Project No.:	2015-538-001	Shelby Tube No.:	GT2
Lab ID:	2015-538-001-024	Recovery (m):	0.7

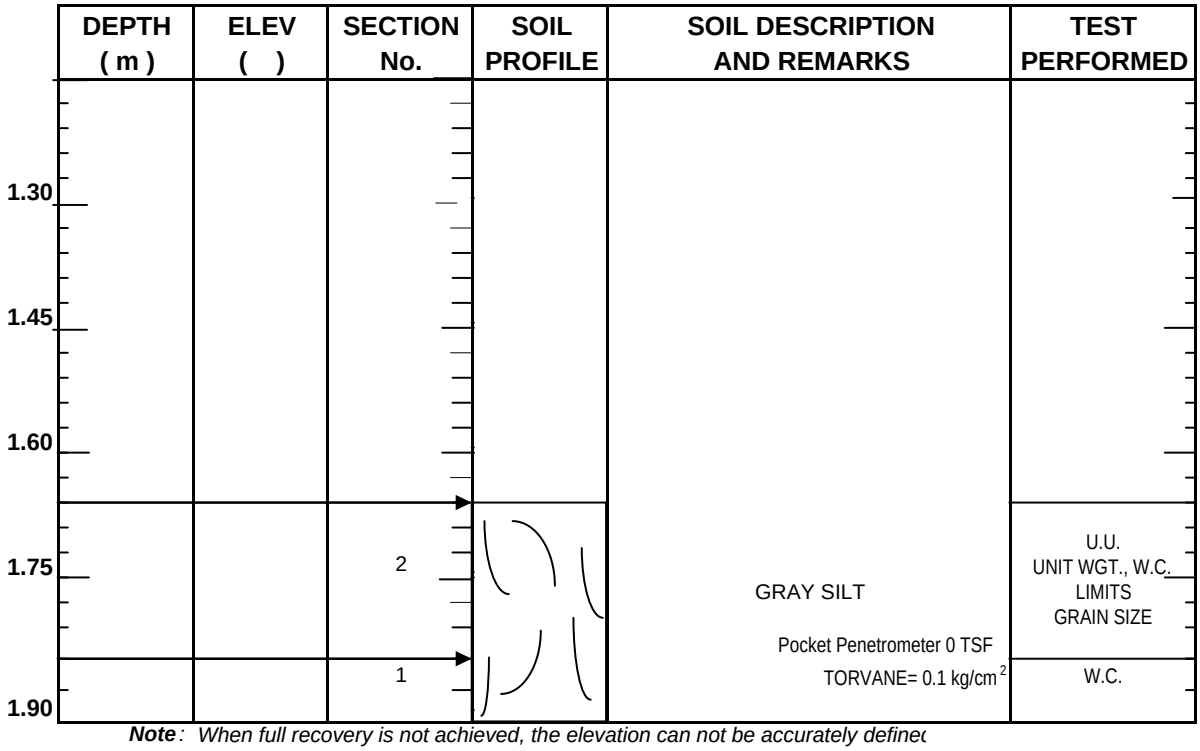
MOISTURE CONTENT After U.U.

Section Number	**1**	**2**	**3**	**4**	**5**
Tare Number	871	1530			
Weight of Tare & Wet Sample (g)	444.06	1385.31			
Weight of Tare & Dry Sample (g)	366.36	1077.50			
Weight of Tare (g)	110.35	148.54			
Moisture Content (%)	30.35	33.13			

UNIT WEIGHT

Weight of Tube & Wet Sample (g)	2345.95
Weight of Tube (g)	114.90
Weight of Wet Sample (g)	2231.05
Length 1 (in)	7.164
Length 2 (in)	7.198
Length 3 (in)	7.217
Top Diameter (in)	3.631
Middle Diameter (in)	3.580
Bottom Diameter (in)	3.643
Sample Volume (cm^3)	1211.82
Moisture Content (%)	33.13
Unit Wet Weight (g/cm^3)	1.84
Unit Wet Weight (pcf)	114.88
Unit Dry Weight (g/cm^3)	**1.38**
Unit Dry Weight (pcf)	**86.3**

SOIL PROFILE AND SAMPLING



***Note**: When full recovery is not achieved, the elevation can not be accurately definec*
Indicate each cut of the tube with an arrow
Indicate dividing line between soil types with a solid lin
Indicate wax by cross-hatching. Indicate soil types by standard symbols

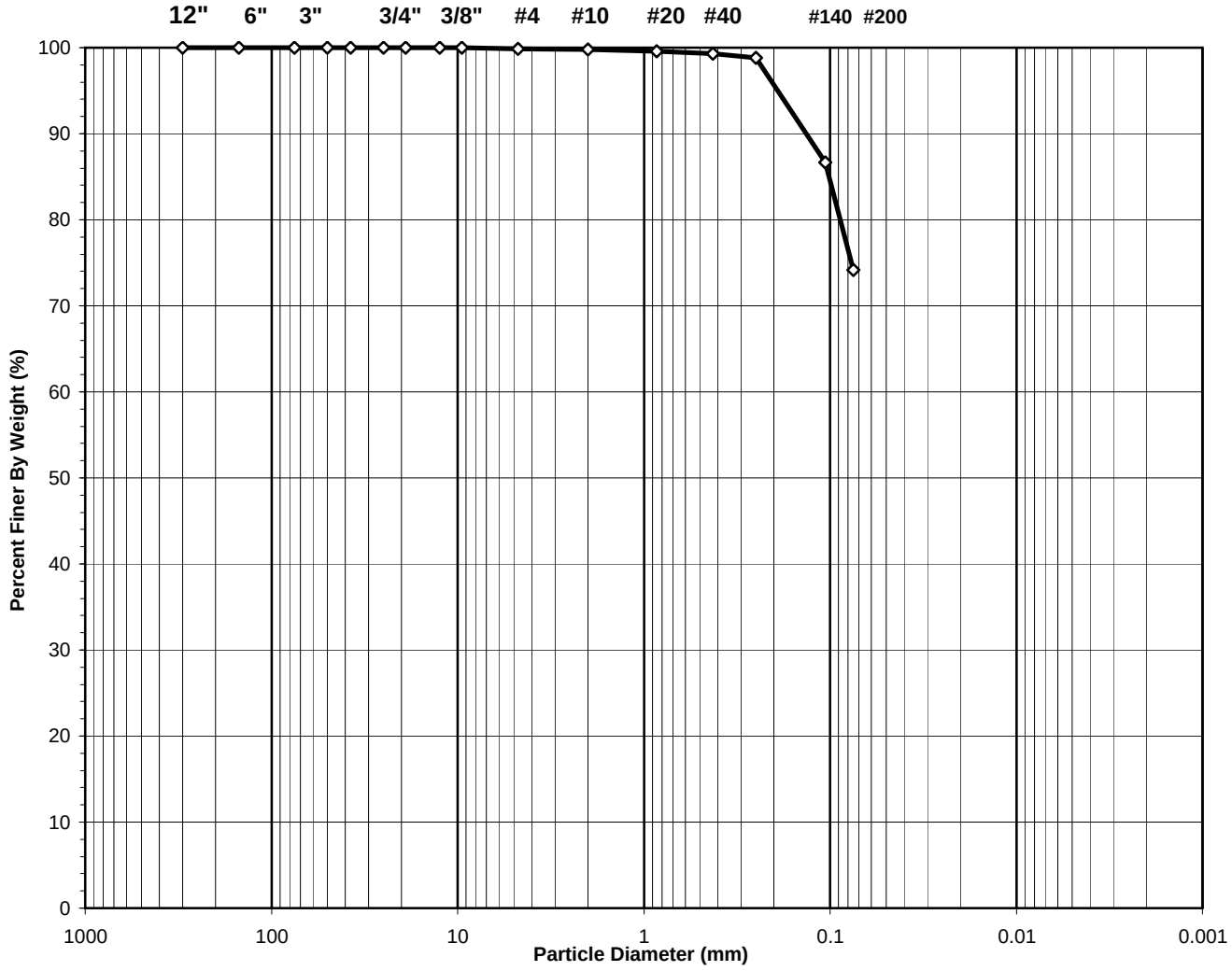
Tested By *JCM* Date *11/20/15* Checked By KC Date 12/1/15

SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-35
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.66-1.84
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-024	Soil Color:	Gray

	SIEVE ANALYSIS		*HYDROMETER*
USCS	**gravel**	**sand**	**silt and clay**



USCS Symbol:
CL, TESTED

USCS Classification:
LEAN CLAY WITH SAND

Tested By	HL	Date	11/24/15	Checked By	KC	Date	11/24/15

DCN: CT-S3C DATE 3/20/13 REVISION: 3

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

WASH SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-35
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.66-1.84
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-024	Soil Color:	Gray

Moisture Content of Passing 3/4" Sample		Water Content of Retained 3/4" Sample	
Tare No.:	1530	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	1385.31	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	1077.50	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	148.54	Weight of Tare (g):	NA
Weight of Water (g):	307.81	Weight of Water (g):	NA
Weight of Dry Sample (g):	928.96	Weight of Dry Sample (g):	NA
Moisture Content (%):	**33.1**	**Moisture Content (%):**	**NA**

Wet Weight of -3/4" Sample (g):	NA	Weight of the Dry Sample (g):	928.96
Dry Weight of - 3/4" Sample (g):	239.8	Weight of - #200 Material (g):	689.21
Wet Weight of +3/4" Sample (g):	NA	Weight of + #200 Material (g):	239.75
Dry Weight of + 3/4" Sample (g):	0.00		
Total Dry Weight of Sample (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.50	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	0.02	0.00	0.00	100.00	**100.00**
#4	4.75	1.32	0.14	0.14	99.86	**99.86**
#10	2.00	0.68	0.07	0.22	99.78	**99.78**
#20	0.850	1.53	0.16	0.38	99.62	**99.62**
#40	0.425	2.96	0.32	0.70	99.30	**99.30**
#60	0.250	4.34	0.47	1.17	98.83	**98.83**
#140	0.106	113.33	12.20	13.37	86.63	**86.63**
#200	0.075	115.57	12.44	25.81	74.19	**74.19**
Pan	-	689.21	74.19	100.00	-	**-**

Tested By HL Date 11/24/15 Checked By KC Date 11/24/15

DCN: CT-S3C DATE 3/20/13 REVISION: 3

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

ATTERBERG LIMITS

ASTM D 4318-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-35
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.66-1.84
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-024	Soil Description:	GRAY LEAN CLAY

Note: The* USCS *symbol used with this test refers only to the minus No. 40 (Minus No. 40 sieve material, Airdried)
sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description .

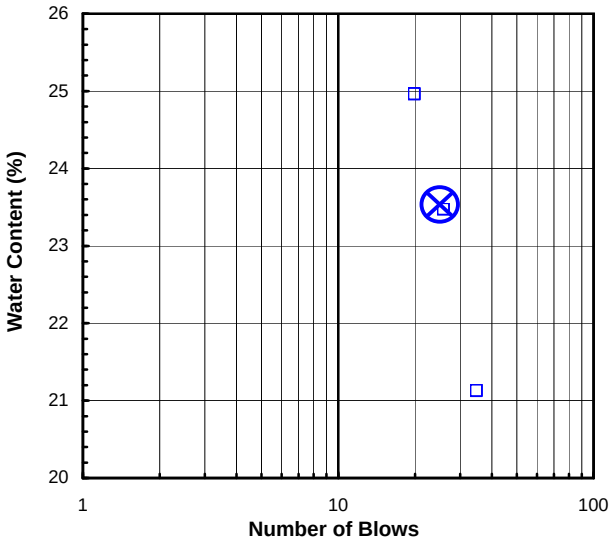
Liquid Limit Test	**1**	**2**	**3**	
				M
Tare Number:	196	250	210	**U**
Wt. of Tare & Wet Sample (g):	38.14	38.02	38.59	**L**
Wt. of Tare & Dry Sample (g):	34.06	34.12	35.08	**T**
Weight of Tare (g):	17.71	17.50	18.48	**I**
Weight of Water (g):	4.1	3.9	3.5	**P**
Weight of Dry Sample (g):	16.4	16.6	16.6	**O**
				I
Moisture Content (%):	**25.0**	**23.5**	**21.1**	**N**
Number of Blows:	**20**	**26**	**35**	**T**

Plastic Limit Test	**1**	**2**	**Range**
Tare Number:	1106	239	
Wt. of Tare & Wet Sample (g):	23.85	26.45	
Wt. of Tare & Dry Sample (g):	23.03	25.59	
Weight of Tare (g):	17.82	20.16	
Weight of Water (g):	0.8	0.9	
Weight of Dry Sample (g):	5.2	5.4	
Moisture Content (%):	**15.7**	**15.8**	**-0.1**

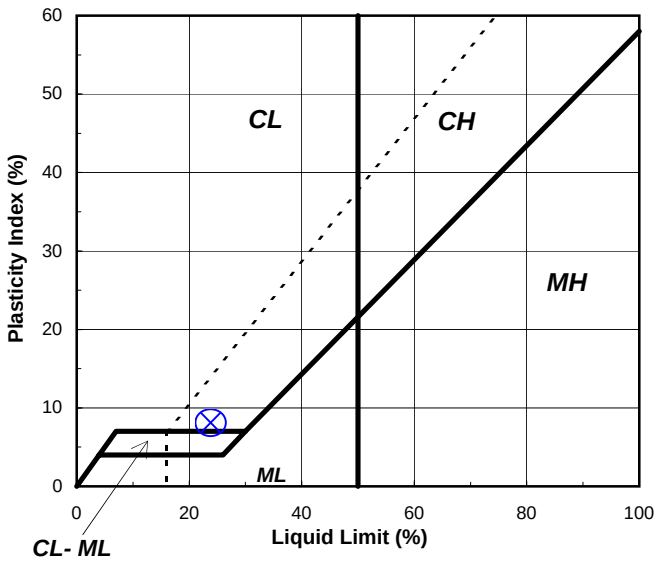
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%):	**24**
Plastic Limit (%):	**16**
Plasticity Index (%):	**8**
USCS Symbol:	**CL**

Flow Curve



Plasticity Chart



Tested By RAL *Date* 11/23/15 *Checked By* KC *Date* 11/24/15

S:\Excel\Excel QA\Spreadsheets\Limit 3Pt.xls

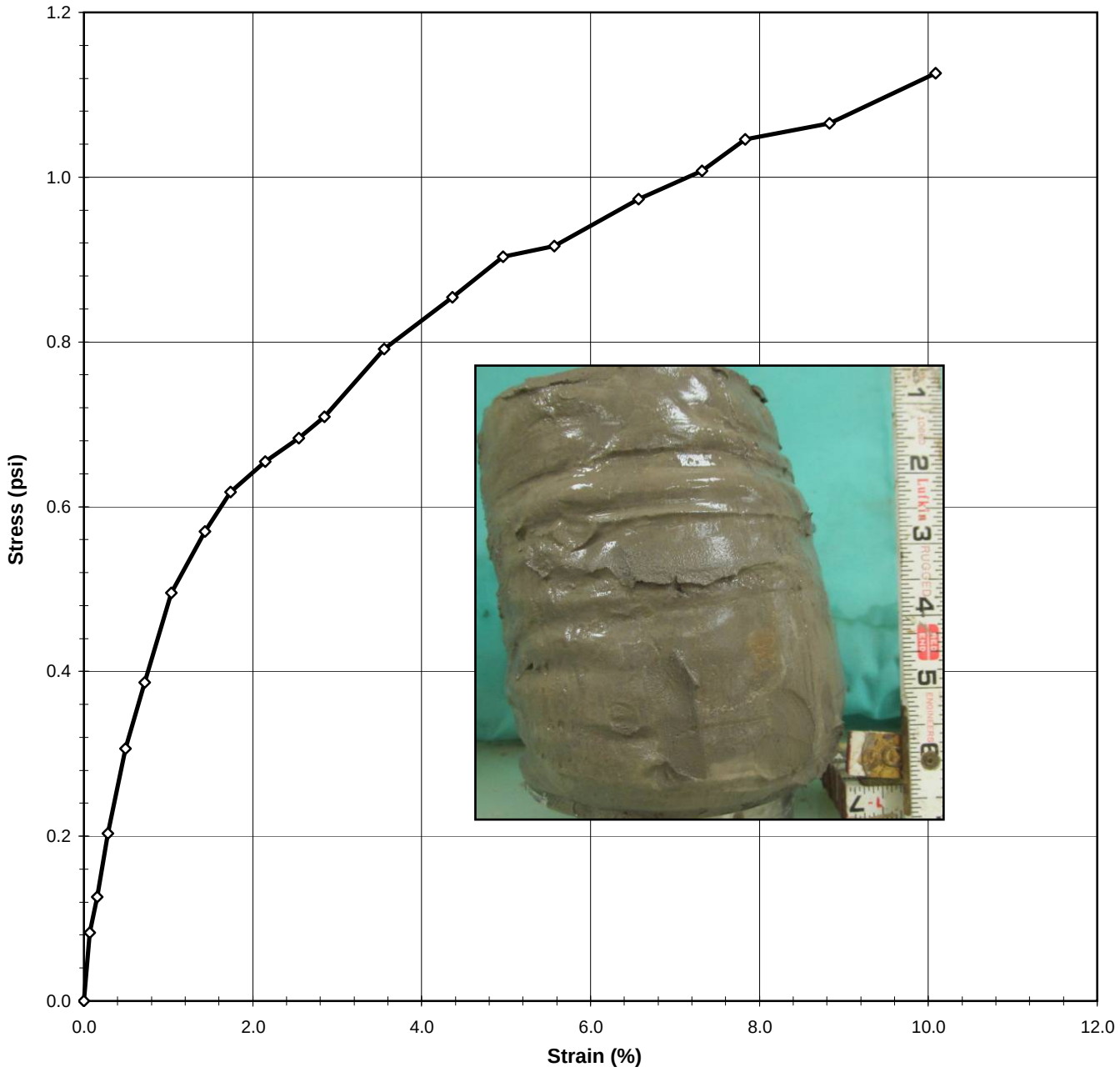
544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONSOLIDATED UNDRAINED TRIAXIAL

ASTM D2850-03a (2007)

Client:	Canadian Seabed Research, Ltd.	Boring No.:	VC-35
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.66-1.84
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-024	Visual:	Gray Silt

CONFINING STRESS (psi) 34.7



Tested By	JCM	Date	11/20/15	Input Checked By	KC	Date	11/30/15

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONSOLIDATED UNDRAINED TRIAXIAL

ASTM D2850-03a (2007)

Client:	Canadian Seabed Research, Ltd.	Boring No.:	VC-35
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.66-1.84
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-024	Visual:	Gray Silt

INITIAL SAMPLE DIMENSIONS

Length 1 (in):	7.164	Top Dia. (in):	3.631
Length 2 (in):	7.198	Mid. Dia. (in):	3.580
Length 3 (in):	7.217	Bot. Dia. (in):	3.643
Avg.Length (in)	**7.193**	**Area (in^2):**	**10.281**

WATER CONTENT (AFTER TEST)

Total Weight of Sample (g):	2155.73
Tare No.:	1530
Weight of Tare & Wet Sample (g):	1385.31
Weight of Tare & Dry Sample (g):	1077.50
Weight of Tare (g):	148.54
% Moisture:	33.1

UNIT WEIGHT

Undisturbed Sample

Weight of Tube & Wet Sample (g):	2345.95	Sample Volume (cm^3):	1211.8
Weight of Tube (g):	114.96	Unit Wet Weight (g/cm^3):	1.84
Weight of Wet Sample (g):	2230.99	Unit Wet Weight (pcf):	114.88
Diameter (in):	3.62	Moisture Content (%):	33.1
Length (in):	7.19	Unit Dry Weight (pcf):	86.3
Length (cm):	18.27		

		Initial Dial Reading (mil)	112
CONFINING STRESS (psi)	**34.7**	Dial Reading Before Shearing (mil)	120

DEFORMATION (in)	*LOAD (lb)*	*ELAPSED TIME (min)*	*STRAIN (%)*	*STRESS (psi)*
0.000	15.5	0.0	0.0	0.000
0.005	16.4	0.08	0.1	0.083
0.011	16.8	0.15	0.2	0.126
0.020	17.6	0.28	0.3	0.203
0.035	18.7	0.50	0.5	0.306
0.052	19.5	0.73	0.7	0.386
0.074	20.7	1.03	1.0	0.495
0.103	21.4	1.43	1.4	0.570
0.125	22.0	1.75	1.7	0.618
0.154	22.4	2.15	2.1	0.655
0.183	22.7	2.55	2.5	0.683
0.205	23.0	2.85	2.8	0.709
0.256	23.9	3.55	3.6	0.791
0.314	24.7	4.37	4.4	0.854
0.357	25.3	4.97	5.0	0.904
0.400	25.5	5.57	5.6	0.916
0.472	26.2	6.57	6.6	0.974
0.526	26.7	7.32	7.3	1.007
0.562	27.2	7.82	7.8	1.046
0.634	27.5	8.83	8.8	1.065
0.725	28.4	10.08	10.1	1.126

Tested By JCM Date 11/20/15 Input Checked By KC Date 11/30/15

DCN: CT-S29 DATE: 8-21-10 REVISION: 2

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

PHOTOGRAPHS

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-35
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.15-2.85
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-025		

Tested By NJM *Date* 10/29/15 *Checked By* KC *Date* 11/5/15

S:\Excel\Excel QA\Spr

SHELBY TUBE UNIT WEIGHT

ASTM D2937-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-35
Client Reference:	Lake Erie Connector 185241	Depth Pushed (m):	2.15-2.85
Project No.:	2015-538-001	Shelby Tube No.:	GT1
Lab ID:	2015-538-001-025	Recovery (m):	0.7

MOISTURE CONTENT

Section Number	**1**
Tare Number	2927
Weight of Tare & Wet Sample (g)	242.68
Weight of Tare & Dry Sample (g)	186.61
Weight of Tare (g)	6.65
Moisture Content (%)	31.16

UNIT WEIGHT

Weight of Tube & Wet Sample (g)	1429.24
Weight of Tube (g)	92.09
Weight of Wet Sample (g)	1337.15
Length 1 (in)	4.079
Length 2 (in)	4.195
Length 3 (in)	4.157
Top Diameter (in)	3.577
Middle Diameter (in)	3.576
Bottom Diameter (in)	3.649
Sample Volume (cm^3)	691.42
Moisture Content (%)	31.16
Unit Wet Weight (g/cm^3)	1.93
Unit Wet Weight (pcf)	120.68
Unit Dry Weight (g/cm^3)	**1.47**
Unit Dry Weight (pcf)	**92.0**

SOIL PROFILE AND SAMPLING

DEPTH (m)	ELEV ( )	SECTION No.	SOIL PROFILE	SOIL DESCRIPTION AND REMARKS	TEST PERFORMED
2.25					
2.40					
2.55					
2.70				OLIVE-GRAY SILT & CLAY with FINE SAND	
2.85		1		Pocket Penetrometer 0.0 TSF TORVANE= .07 kg/cm²	UNIT WGT, LIMITS, GRAIN SIZE, WC

***Note**: When full recovery is not achieved, the elevation can not be accurately define*
Indicate each cut of the tube with an arrow
Indicate dividing line between soil types with a solid lin
Indicate wax by cross-hatching. Indicate soil types by standard symbols

Tested By *NJM* Date *10/29/15* Checked By KC Date 11/2/15

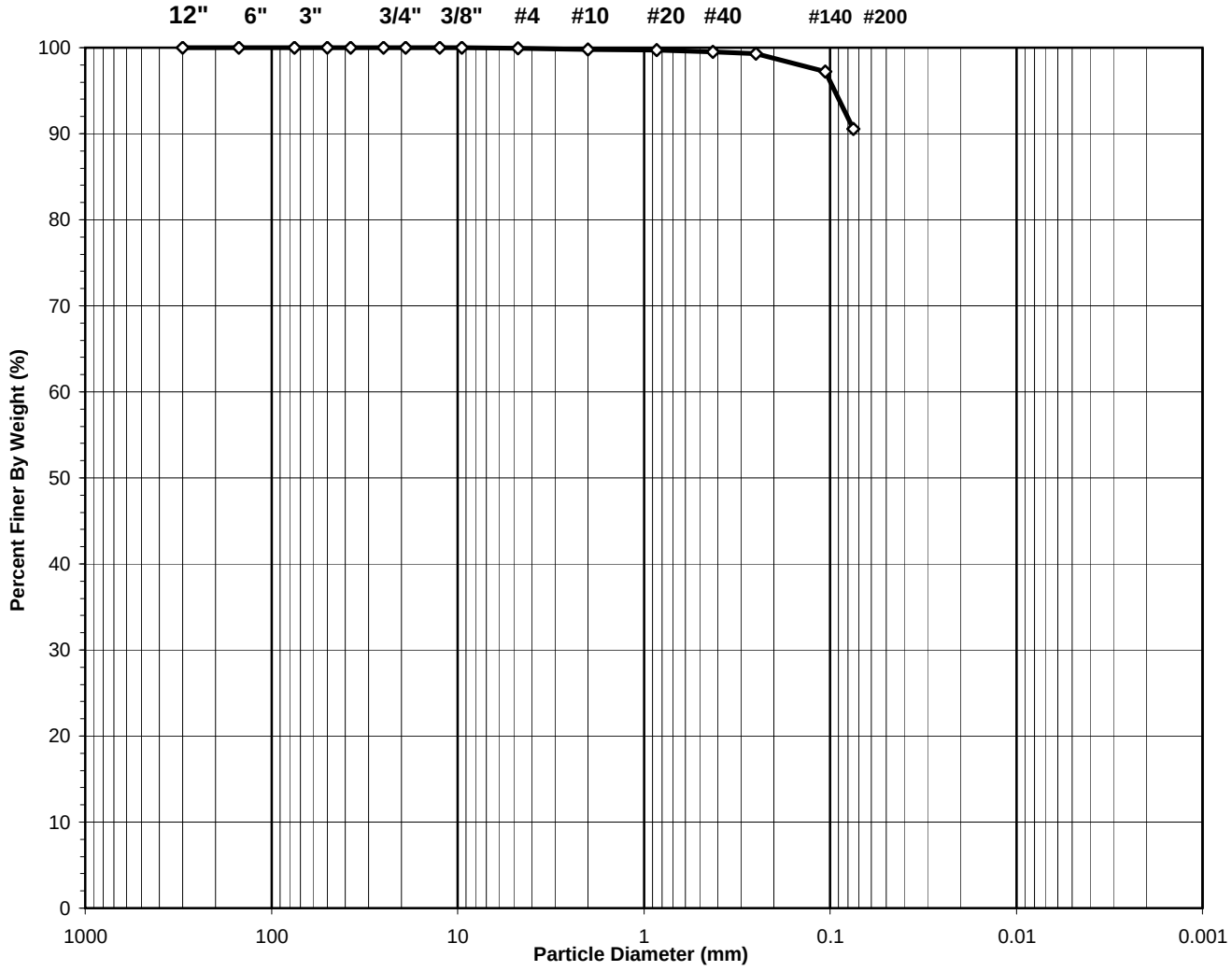
544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-35
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.75-2.85
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-025	Soil Color:	Olive Gray

	SIEVE ANALYSIS		*HYDROMETER*
USCS	**gravel**	**sand**	**silt and clay**



USCS Symbol:
CL, TESTED

USCS Classification:
LEAN CLAY

Tested By	HL	Date	11/4/15	Checked By	KC	Date	11/6/15

DCN: CT-S3C DATE 3/20/13 REVISION: 3

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

WASH SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-35
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.75-2.85
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-025	Soil Color:	Olive Gray

Moisture Content of Passing 3/4" Sample		Water Content of Retained 3/4" Sample	
Tare No.:	2471	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	821.08	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	655.40	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	98.36	Weight of Tare (g):	NA
Weight of Water (g):	165.68	Weight of Water (g):	NA
Weight of Dry Sample (g):	557.04	Weight of Dry Sample (g):	NA
Moisture Content (%):	**29.7**	**Moisture Content (%):**	**NA**

Wet Weight of -3/4" Sample (g):	NA	Weight of the Dry Sample (g):	557.04
Dry Weight of - 3/4" Sample (g):	52.8	Weight of - #200 Material (g):	504.25
Wet Weight of +3/4" Sample (g):	NA	Weight of + #200 Material (g):	52.79
Dry Weight of + 3/4" Sample (g):	0.00		
Total Dry Weight of Sample (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.50	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	0.00	0.00	0.00	100.00	**100.00**
#4	4.75	0.30	0.05	0.05	99.95	**99.95**
#10	2.00	0.71	0.13	0.18	99.82	**99.82**
#20	0.850	0.72	0.13	0.31	99.69	**99.69**
#40	0.425	1.10	0.20	0.51	99.49	**99.49**
#60	0.250	1.23	0.22	0.73	99.27	**99.27**
#140	0.106	11.37	2.04	2.77	97.23	**97.23**
#200	0.075	37.36	6.71	9.48	90.52	**90.52**
Pan	-	504.25	90.52	100.00	-	**-**

Tested By HL Date 11/4/15 Checked By KC Date 11/6/15

DCN: CT-S3C DATE 3/20/13 REVISION: 3

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

ATTERBERG LIMITS

ASTM D 4318-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-35
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.75-2.85
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-025	Soil Description:	GRAY LEAN CLAY

Note: The* USCS *symbol used with this test refers only to the minus No. 40 (Minus No. 40 sieve material, Airdried)
sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description .

Liquid Limit Test	**1**	**2**	**3**
Tare Number:	204	144	146
Wt. of Tare & Wet Sample (g):	39.19	37.99	39.56
Wt. of Tare & Dry Sample (g):	34.98	34.14	35.72
Weight of Tare (g):	18.50	17.99	18.95
Weight of Water (g):	4.2	3.9	3.8
Weight of Dry Sample (g):	16.5	16.2	16.8
Moisture Content (%):	**25.5**	**23.8**	**22.9**
Number of Blows:	**18**	**24**	**30**

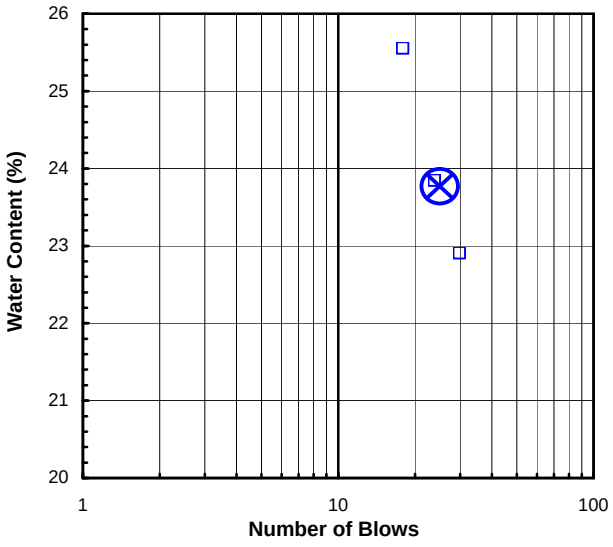
MULTI POINT

Plastic Limit Test	**1**	**2**	**Range**
Tare Number:	231	4	
Wt. of Tare & Wet Sample (g):	26.27	25.30	
Wt. of Tare & Dry Sample (g):	25.57	24.63	
Weight of Tare (g):	19.67	18.91	
Weight of Water (g):	0.7	0.7	
Weight of Dry Sample (g):	5.9	5.7	
Moisture Content (%):	**11.9**	**11.7**	**0.2**

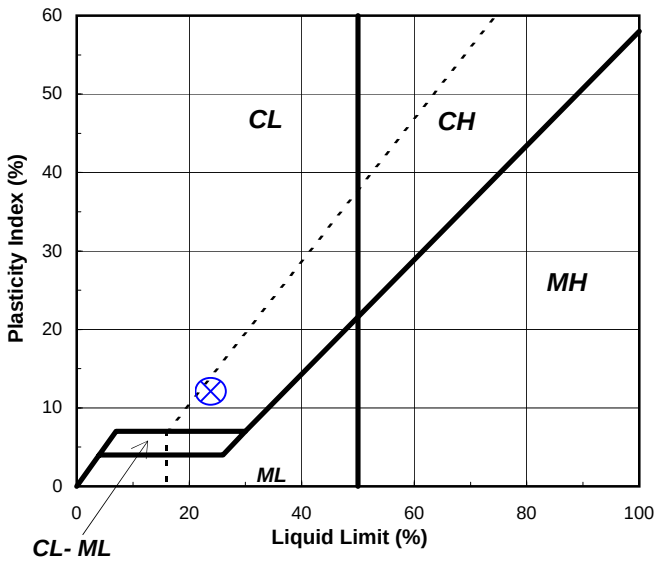
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%):	**24**
Plastic Limit (%):	**12**
Plasticity Index (%):	**12**
USCS Symbol:	**CL**

Flow Curve



Plasticity Chart



Tested By RAL *Date* 11/5/15 *Checked By* CLK *Date* 11/6/15

S:\Excel\Excel QA\Spreadsheets\Limit 3Pt.xls

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

PHOTOGRAPHS

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-36
Client Reference:	Lake Erie Connector 185241	Depth (m):	0.65-1.15
Project No.:	2015-538-001	Sample No.:	GT4
Lab ID:	2015-538-001-026		

Tested By *JCM* *Date* *11/24/15* *Checked By* *KC* *Date* *12/1/15*

S:\Excel\Excel QA\Spreadsheets\Photo

SHELBY TUBE UNIT WEIGHT

ASTM D2937-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-36
Client Reference:	Lake Erie Connector 185241	Depth Pushed (m):	0.65-1.15
Project No.:	2015-538-001	Shelby Tube No.:	GT4
Lab ID:	2015-538-001-026	Recovery (m):	0.5

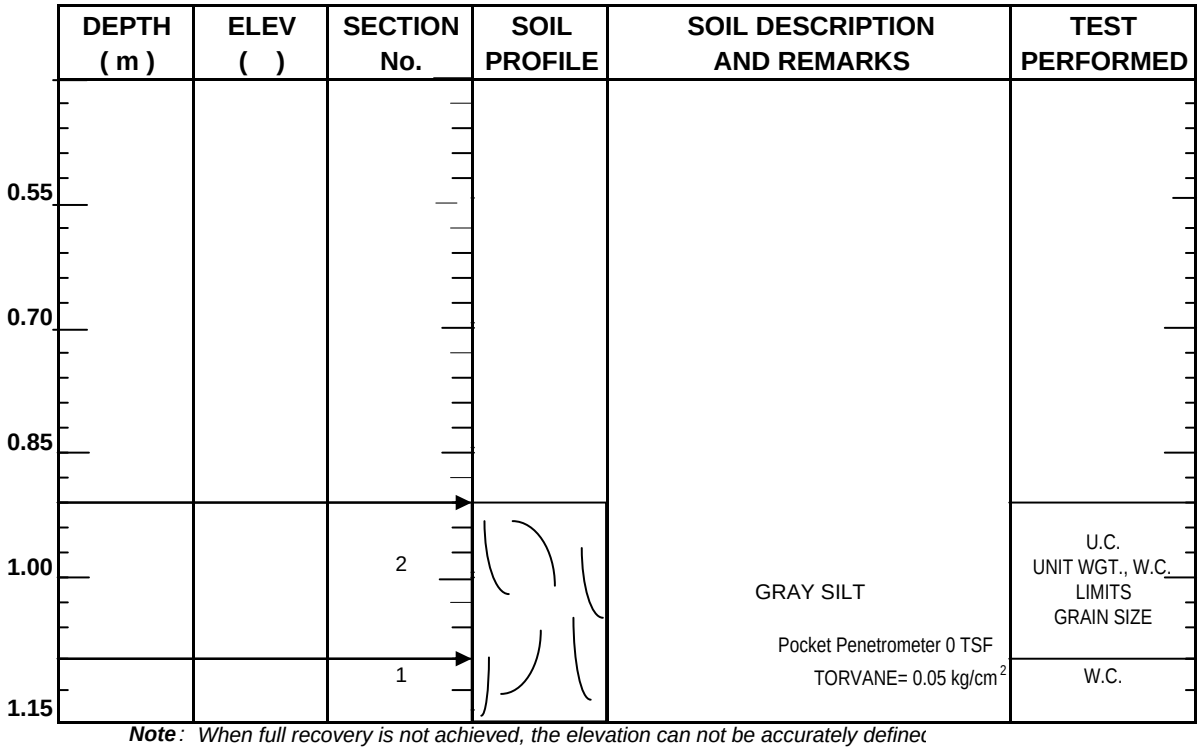
MOISTURE CONTENT

	After U.C.				
Section Number	**1**	**2**	**3**	**4**	**5**
Tare Number	599	1520			
Weight of Tare & Wet Sample (g)	375.44	1329.57			
Weight of Tare & Dry Sample (g)	300.74	1011.40			
Weight of Tare (g)	83.90	148.77			
Moisture Content (%)	34.45	36.88			

UNIT WEIGHT

Weight of Tube & Wet Sample (g)	2301.49
Weight of Tube (g)	127.50
Weight of Wet Sample (g)	2173.99
Length 1 (in)	7.156
Length 2 (in)	7.170
Length 3 (in)	7.156
Top Diameter (in)	3.617
Middle Diameter (in)	3.665
Bottom Diameter (in)	3.666
Sample Volume (cm^3)	1227.36
Moisture Content (%)	36.88
Unit Wet Weight (g/cm^3)	1.77
Unit Wet Weight (pcf)	110.53
Unit Dry Weight (g/cm^3)	**1.29**
Unit Dry Weight (pcf)	**80.7**

SOIL PROFILE AND SAMPLING



***Note**: When full recovery is not achieved, the elevation can not be accurately define*
Indicate each cut of the tube with an arrow
Indicate dividing line between soil types with a solid lin
Indicate wax by cross-hatching. Indicate soil types by standard symbols

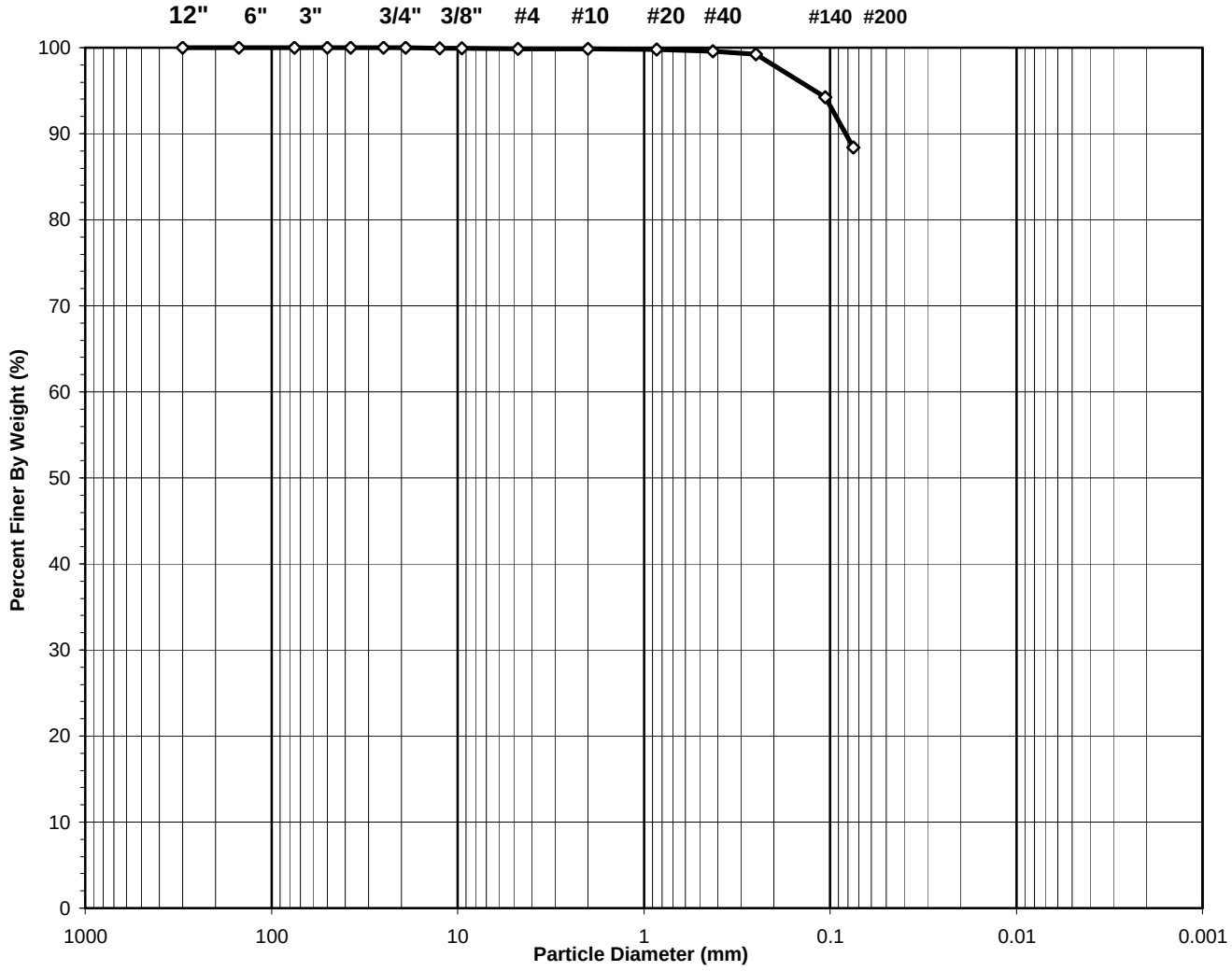
Tested By *JCM* Date *11/24/15* Checked By KC Date 12/1/15

SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-36
Client Reference:	Lake Erie Connector 185241	Depth (m):	0.91-1.09
Project No.:	2015-538-001	Sample No.:	GT4
Lab ID:	2015-538-001-026	Soil Color:	Gray

	SIEVE ANALYSIS		*HYDROMETER*
USCS	**gravel**	**sand**	**silt and clay**



USCS Symbol:
CL, TESTED

USCS Classification:
LEAN CLAY

Tested By	HL	Date	11/30/15	Checked By	KC	Date	11/30/15

DCN: CT-S3C DATE 3/20/13 REVISION: 3

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

WASH SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-36
Client Reference:	Lake Erie Connector 185241	Depth (m):	0.91-1.09
Project No.:	2015-538-001	Sample No.:	GT4
Lab ID:	2015-538-001-026	Soil Color:	Gray

Moisture Content of Passing 3/4" Sample		Water Content of Retained 3/4" Sample	
Tare No.:	1520	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	1329.57	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	1011.40	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	148.77	Weight of Tare (g):	NA
Weight of Water (g):	318.17	Weight of Water (g):	NA
Weight of Dry Sample (g):	862.63	Weight of Dry Sample (g):	NA
Moisture Content (%):	**36.9**	**Moisture Content (%):**	**NA**

Wet Weight of -3/4" Sample (g):	NA	Weight of the Dry Sample (g):	862.63
Dry Weight of - 3/4" Sample (g):	100.1	Weight of - #200 Material (g):	762.57
Wet Weight of +3/4" Sample (g):	NA	Weight of + #200 Material (g):	100.06
Dry Weight of + 3/4" Sample (g):	0.00		
Total Dry Weight of Sample (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.50	0.41	0.05	0.05	99.95	**99.95**
3/8"	9.50	0.10	0.01	0.06	99.94	**99.94**
#4	4.75	0.49	0.06	0.12	99.88	**99.88**
#10	2.00	0.45	0.05	0.17	99.83	**99.83**
#20	0.850	0.62	0.07	0.24	99.76	**99.76**
#40	0.425	1.45	0.17	0.41	99.59	**99.59**
#60	0.250	3.27	0.38	0.79	99.21	**99.21**
#140	0.106	42.97	4.98	5.77	94.23	**94.23**
#200	0.075	50.30	5.83	11.60	88.40	**88.40**
Pan	-	762.57	88.40	100.00	-	**-**

Tested By HL Date 11/30/15 Checked By KC Date 11/30/15

DCN: CT-S3C DATE 3/20/13 REVISION: 3

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

ATTERBERG LIMITS

ASTM D 4318-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-36
Client Reference:	Lake Erie Connector 185241	Depth (m):	0.91-1.09
Project No.:	2015-538-001	Sample No.:	GT4
Lab ID:	2015-538-001-026	Soil Description:	GRAY LEAN CLAY

Note: The* USCS *symbol used with this test refers only to the minus No. 40 (Minus No. 40 sieve material, Airdried)
sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description .

Liquid Limit Test	**1**	**2**	**3**
Tare Number:	202	291	103
Wt. of Tare & Wet Sample (g):	38.60	39.01	37.82
Wt. of Tare & Dry Sample (g):	34.03	34.86	33.83
Weight of Tare (g):	17.28	18.46	17.61
Weight of Water (g):	4.6	4.2	4.0
Weight of Dry Sample (g):	16.8	16.4	16.2
Moisture Content (%):	**27.3**	**25.3**	**24.6**
Number of Blows:	**15**	**28**	**35**

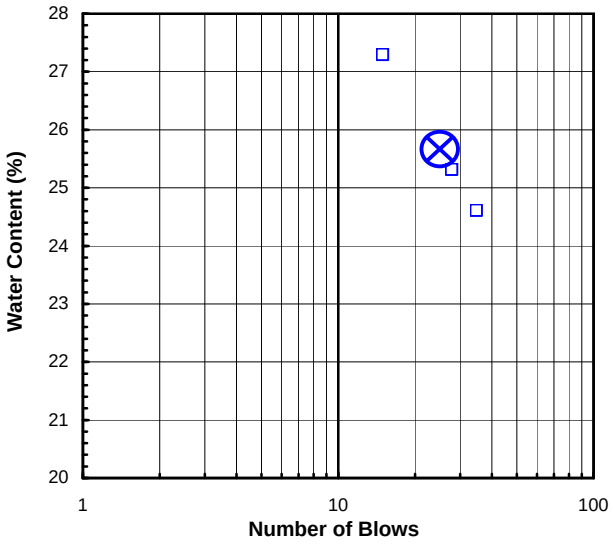
MULTI POINT

Plastic Limit Test	**1**	**2**	**Range**
Tare Number:	183	239	
Wt. of Tare & Wet Sample (g):	25.31	26.25	
Wt. of Tare & Dry Sample (g):	24.52	25.43	
Weight of Tare (g):	19.26	20.17	
Weight of Water (g):	0.8	0.8	
Weight of Dry Sample (g):	5.3	5.3	
Moisture Content (%):	**15.0**	**15.6**	**-0.6**

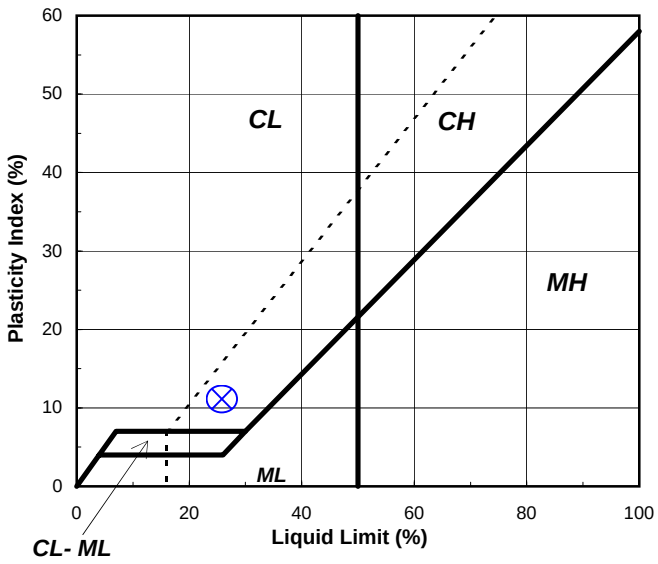
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%):	**26**
Plastic Limit (%):	**15**
Plasticity Index (%):	**11**
USCS Symbol:	**CL**

Flow Curve



Plasticity Chart



Tested By RAL *Date* 11/25/15 *Checked By* KC *Date* 11/30/15

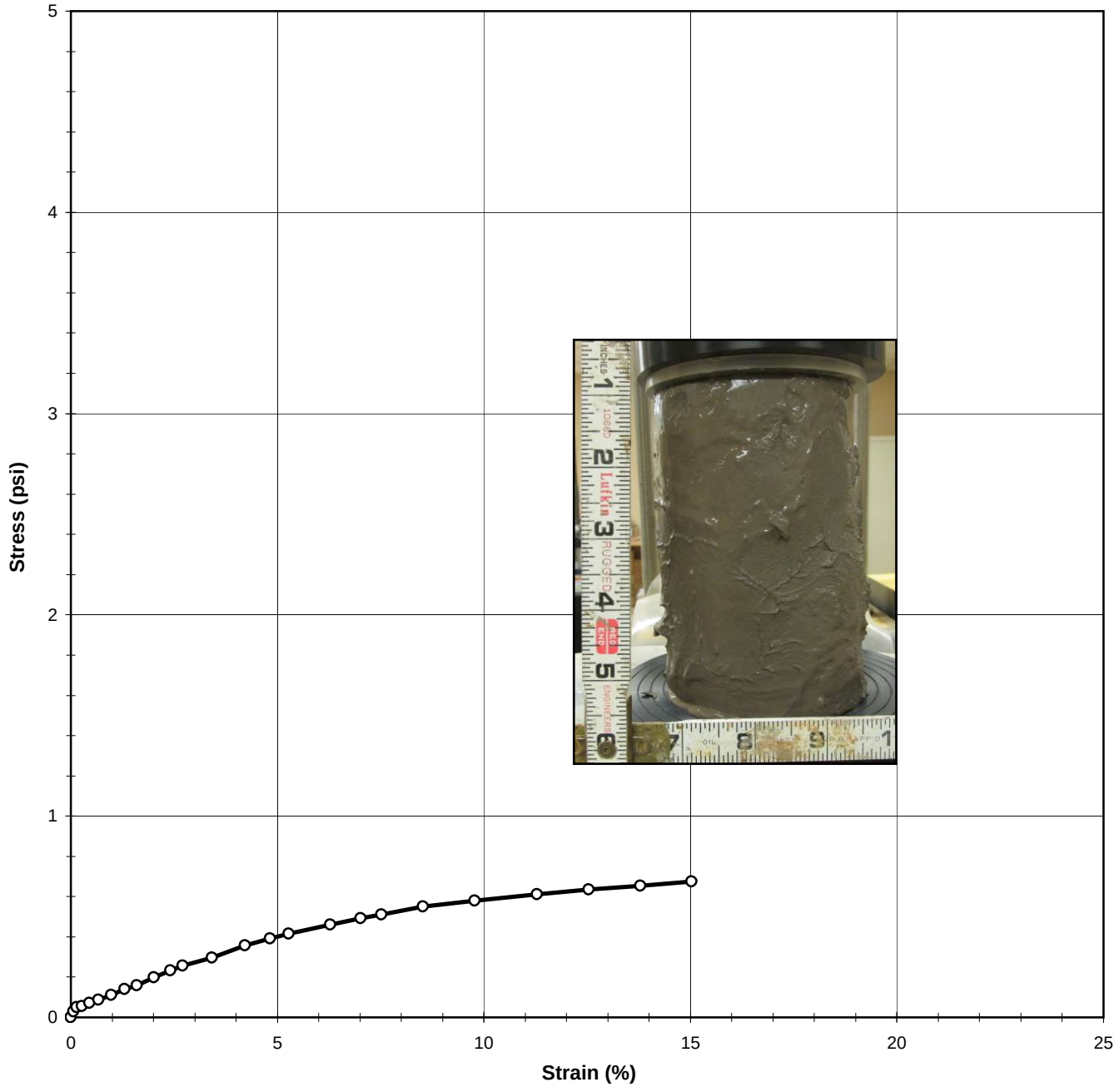
S:\Excel\Excel QA\Spreadsheets\Limit 3Pt.xls

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONFINED COMPRESSIVE STRENGTH

ASTM D2166-13 / AASHTO T208-10 (SOP S-30)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-36
Client Reference:	Lake Erie Connector 185241	Depth (m):	0.91-1.09
Project No.:	2015-538-001	Sample No.:	GT4
Lab ID:	2015-538-001-026	Visual:	Gray Silt



Tested By	JCM	Date	11/24/15	Approved By	KC	Date	11/30/15

DCN: CT-S30 Date: 11/09/09 Revision: 4

S:\Excel\Excel QA\Spreadsheets\UC Sigma.xls

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONFINED COMPRESSIVE STRENGTH

ASTM D2166-13 / AASHTO T208-10 (SOP S-30)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-36
Client Reference:	Lake Erie Connector 185241	Depth (m):	0.91-1.09
Project No.:	2015-538-001	Sample No.:	GT4
Lab ID:	2015-538-001-026	Visual:	Gray Silt

INITIAL SAMPLE DIMENSIONS				WATER CONTENT AFTER TEST	
Length 1 (in):	7.156	Top Diameter (in):	3.617	Tare No.:	1520
Length 2 (in):	7.170	Middle Diameter (in):	3.665	Weight of Tare & Wet Sample (g):	1329.57
Length 3 (in):	7.156	Bottom Diameter (in):	3.616	Weight of Tare & Dry Sample (g):	1011.40
Avg. Length (in):	**7.161**	**Avg. Diameter (in):**	**3.633**	Weight of Tare (g):	148.77
		Area (in^2):	**10.364**	Moisture Content (%):	36.88

UNIT WEIGHT			
Weight of Tube & Wet Sample (g):	2301.49	Sample Volume (cm^3):	1216.2
Weight of Tube (g):	127.50	Unit Wet Weight (g/cm^3):	1.79
Weight of Wet Sample (g):	2173.99	Unit Wet Weight (pcf):	111.54
Average Diameter (in):	3.63	Moisture Content (%):	36.88
Average Length (in):	7.16	Unit Dry Weight (pcf):	81.49
Average Length (cm):	18.19		

ELECTRONIC DEVICE DEFORMATION (in)	*LOAD (lb)*	*ELAPSED TIME (min)*	*STRAIN (%)*	*STRESS (psi)*
0.000	0.0	0.00	0.000	0.000
0.005	0.3	0.08	0.068	0.029
0.011	0.5	0.17	0.148	0.049
0.019	0.6	0.28	0.271	0.054
0.032	0.7	0.47	0.446	0.070
0.048	0.9	0.68	0.675	0.086
0.070	1.2	1.00	0.982	0.111
0.094	1.5	1.32	1.307	0.141
0.115	1.7	1.62	1.605	0.160
0.144	2.1	2.02	2.010	0.198
0.173	2.5	2.42	2.413	0.232
0.194	2.7	2.72	2.712	0.258
0.245	3.2	3.42	3.415	0.296
0.302	3.9	4.23	4.223	0.356
0.345	4.3	4.83	4.819	0.392
0.378	4.5	5.28	5.276	0.414
0.450	5.1	6.28	6.278	0.462
0.503	5.5	7.03	7.024	0.493
0.539	5.7	7.53	7.524	0.511
0.610	6.2	8.53	8.526	0.550
0.700	6.7	9.78	9.782	0.580
0.808	7.1	11.28	11.283	0.610
0.898	7.5	12.53	12.539	0.635
0.987	7.9	13.78	13.786	0.653
1.076	8.2	15.03	15.033	0.676

Tested By JCM Date 11/24/15 Input Checked By KC Date 11/30/15

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

PHOTOGRAPHS

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-36
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.35-3.05
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-027		

Tested By *NJM* *Date* *10/29/15* *Checked By* *KC* *Date* *11/5/15*

S:\Excel\Excel QA\Spr

SHELBY TUBE UNIT WEIGHT

ASTM D2937-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-36
Client Reference:	Lake Erie Connector 185241	Depth Pushed (m):	2.35-3.05
Project No.:	2015-538-001	Shelby Tube No.:	GT2
Lab ID:	2015-538-001-027	Recovery (m):	0.7

MOISTURE CONTENT

Section Number	**1**
Tare Number	3166
Weight of Tare & Wet Sample (g)	195.41
Weight of Tare & Dry Sample (g)	155.72
Weight of Tare (g)	6.76
Moisture Content (%)	26.64

UNIT WEIGHT

Weight of Tube & Wet Sample (g)	1342.23
Weight of Tube (g)	87.06
Weight of Wet Sample (g)	1255.17
Length 1 (in)	3.831
Length 2 (in)	3.903
Length 3 (in)	3.781
Top Diameter (in)	3.571
Middle Diameter (in)	3.603
Bottom Diameter (in)	3.594
Sample Volume (cm^3)	636.45
Moisture Content (%)	26.64
Unit Wet Weight (g/cm^3)	1.97
Unit Wet Weight (pcf)	123.06
Unit Dry Weight (g/cm^3)	**1.56**
Unit Dry Weight (pcf)	**97.2**

SOIL PROFILE AND SAMPLING

DEPTH (m)	ELEV ( )	SECTION No.	SOIL PROFILE	SOIL DESCRIPTION AND REMARKS	TEST PERFORMED
2.45					
2.60					
2.75				SOFT GRAY SILT & CLAY	
2.90				Pocket Penetrometer 0.0 TSF Torvane= 0.05 kg/cm²	
3.05		1		DARK GRAY SILT & FINE SAND Pocket Penetrometer 2.0 TSF Torvane= .38 kg/cm²	UNIT WGT, WC, LIMITS, GRAIN SIZE

***Note**: When full recovery is not achieved, the elevation can not be accurately definec*
Indicate each cut of the tube with an arrow
Indicate dividing line between soil types with a solid lin
Indicate wax by cross-hatching. Indicate soil types by standard symbols

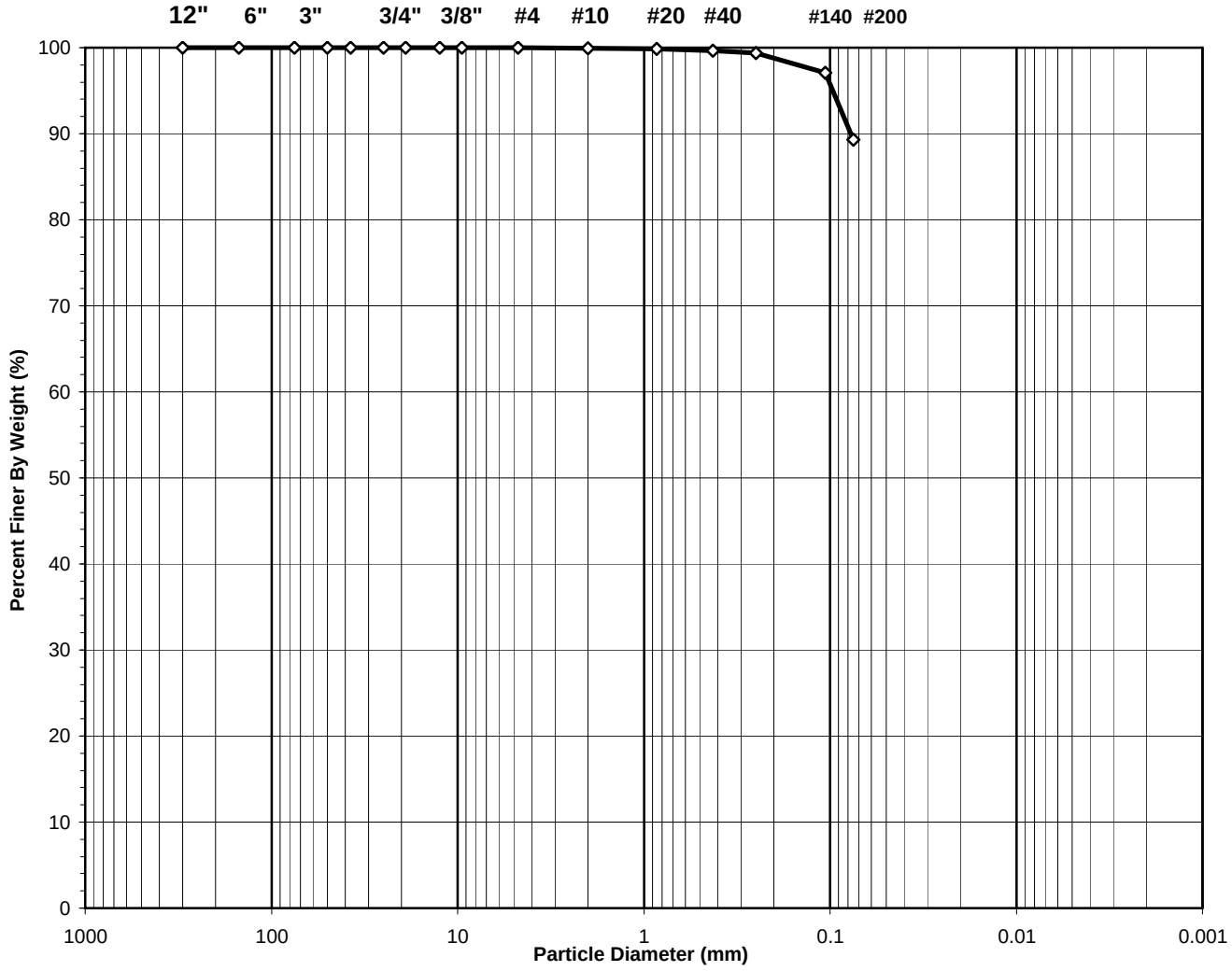
Tested By *NJM* Date *10/29/15* Checked By KC Date 11/2/15

SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-36
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.95-3.05
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-027	Soil Color:	Gray

	SIEVE ANALYSIS		*HYDROMETER*
USCS	**gravel**	**sand**	**silt and clay**



USCS Symbol:
ML, TESTED

USCS Classification:
SILT

Tested By	HL	Date	11/4/15	Checked By	KC	Date	11/6/15

DCN: CT-S3C DATE 3/20/13 REVISION: 3

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

WASH SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-36
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.95-3.05
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-027	Soil Color:	Gray

Moisture Content of Passing 3/4" Sample		Water Content of Retained 3/4" Sample	
Tare No.:	2333	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	755.11	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	619.30	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	96.74	Weight of Tare (g):	NA
Weight of Water (g):	135.81	Weight of Water (g):	NA
Weight of Dry Sample (g):	522.56	Weight of Dry Sample (g):	NA
Moisture Content (%):	**26.0**	**Moisture Content (%):**	**NA**

Wet Weight of -3/4" Sample (g):	NA	Weight of the Dry Sample (g):	522.56
Dry Weight of - 3/4" Sample (g):	56.1	Weight of - #200 Material (g):	466.50
Wet Weight of +3/4" Sample (g):	NA	Weight of + #200 Material (g):	56.06
Dry Weight of + 3/4" Sample (g):	0.00		
Total Dry Weight of Sample (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.50	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	0.00	0.00	0.00	100.00	**100.00**
#4	4.75	0.07	0.01	0.01	99.99	**99.99**
#10	2.00	0.18	0.03	0.05	99.95	**99.95**
#20	0.850	0.44	0.08	0.13	99.87	**99.87**
#40	0.425	0.96	0.18	0.32	99.68	**99.68**
#60	0.250	1.74	0.33	0.65	99.35	**99.35**
#140	0.106	11.67	2.23	2.88	97.12	**97.12**
#200	0.075	41.00	7.85	10.73	89.27	**89.27**
Pan	-	466.50	89.27	100.00	-	**-**

Tested By HL Date 11/4/15 Checked By KC Date 11/6/15

DCN: CT-S3C DATE 3/20/13 REVISION: 3

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

ATTERBERG LIMITS

ASTM D 4318-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-36
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.95-3.05
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-027	Soil Description:	GRAY SILT

Note: The* USCS *symbol used with this test refers only to the minus No. 40 (Minus No. 40 sieve material, Airdried)
sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description .

Liquid Limit Test	**1**	**2**	**3**
Tare Number:	196	438	162
Wt. of Tare & Wet Sample (g):	38.18	37.94	37.85
Wt. of Tare & Dry Sample (g):	34.53	34.29	34.34
Weight of Tare (g):	17.71	17.17	17.47
Weight of Water (g):	3.7	3.7	3.5
Weight of Dry Sample (g):	16.8	17.1	16.9
Moisture Content (%):	**21.7**	**21.3**	**20.8**
Number of Blows:	**15**	**22**	**28**

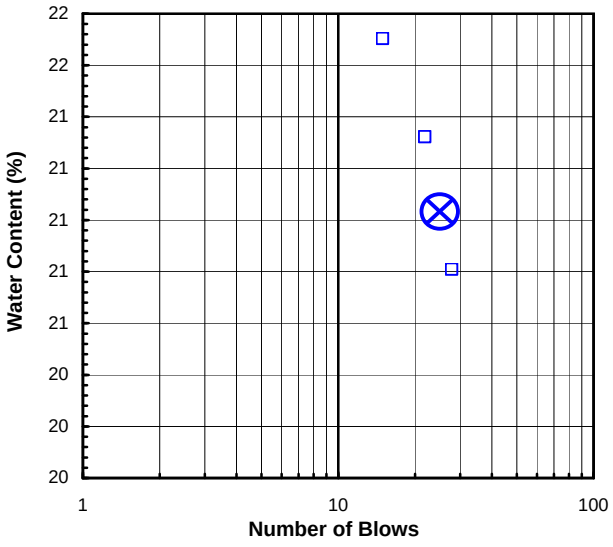
MULTIPOINT

Plastic Limit Test	**1**	**2**	**Range**
Tare Number:	235	367	
Wt. of Tare & Wet Sample (g):	24.94	27.10	
Wt. of Tare & Dry Sample (g):	23.95	26.07	
Weight of Tare (g):	18.76	20.40	
Weight of Water (g):	1.0	1.0	
Weight of Dry Sample (g):	5.2	5.7	
Moisture Content (%):	**19.1**	**18.2**	**0.9**

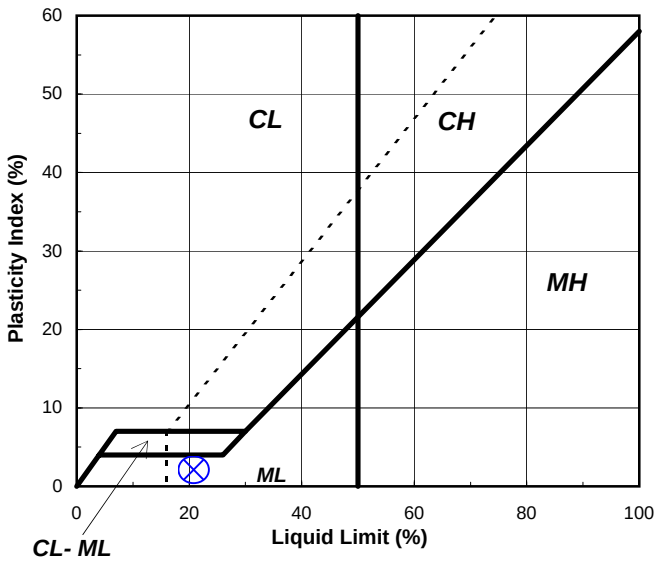
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%):	**21**
Plastic Limit (%):	**19**
Plasticity Index (%):	**2**
USCS Symbol:	**ML**

Flow Curve



Plasticity Chart



Tested By RAL *Date* 11/5/15 *Checked By* CLK *Date* 11/6/15

S:\Excel\Excel QA\Spreadsheets\Limit 3Pt.xls

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

PHOTOGRAPHS

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-36
Client Reference:	Lake Erie Connector 185241	Depth (m):	3.30-4.00
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-028		

Tested By JCM *Date* 11/24/15 *Checked By* KC *Date* 12/1/15

S:\Excel\Excel QA\Spreadsheets\Photo

SHELBY TUBE UNIT WEIGHT

ASTM D2937-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-36
Client Reference:	Lake Erie Connector 185241	Depth Pushed (m):	3.30-4.00
Project No.:	2015-538-001	Shelby Tube No.:	GT1
Lab ID:	2015-538-001-028	Recovery (m):	0.7

MOISTURE CONTENT — After U.C.

Section Number	**1**	**2**	**3**	**4**	**5**
Tare Number	1693	1439			
Weight of Tare & Wet Sample (g)	341.53	1033.39			
Weight of Tare & Dry Sample (g)	287.80	848.70			
Weight of Tare (g)	83.02	144.99			
Moisture Content (%)	26.24	26.25			

UNIT WEIGHT

Weight of Tube & Wet Sample (g)	2398.70
Weight of Tube (g)	113.41
Weight of Wet Sample (g)	2285.29
Length 1 (in)	7.199
Length 2 (in)	7.194
Length 3 (in)	7.143
Top Diameter (in)	3.651
Middle Diameter (in)	3.606
Bottom Diameter (in)	3.650
Sample Volume (cm^3)	1221.25
Moisture Content (%)	26.25
Unit Wet Weight (g/cm^3)	1.87
Unit Wet Weight (pcf)	116.77
Unit Dry Weight (g/cm^3)	**1.48**
Unit Dry Weight (pcf)	**92.5**

SOIL PROFILE AND SAMPLING

DEPTH (m)	ELEV ( )	SECTION No.	SOIL PROFILE	SOIL DESCRIPTION AND REMARKS	TEST PERFORMED
3.40					
3.55					
3.70					
3.85		2		GRAY SILT	U.C. UNIT WGT., W.C. LIMITS GRAIN SIZE
				Pocket Penetrometer 0 TSF	
				TORVANE= 0.15 kg/cm^2	
4.00		1			W.C.

***Note**: When full recovery is not achieved, the elevation can not be accurately define*
Indicate each cut of the tube with an arrow
Indicate dividing line between soil types with a solid lin
Indicate wax by cross-hatching. Indicate soil types by standard symbols

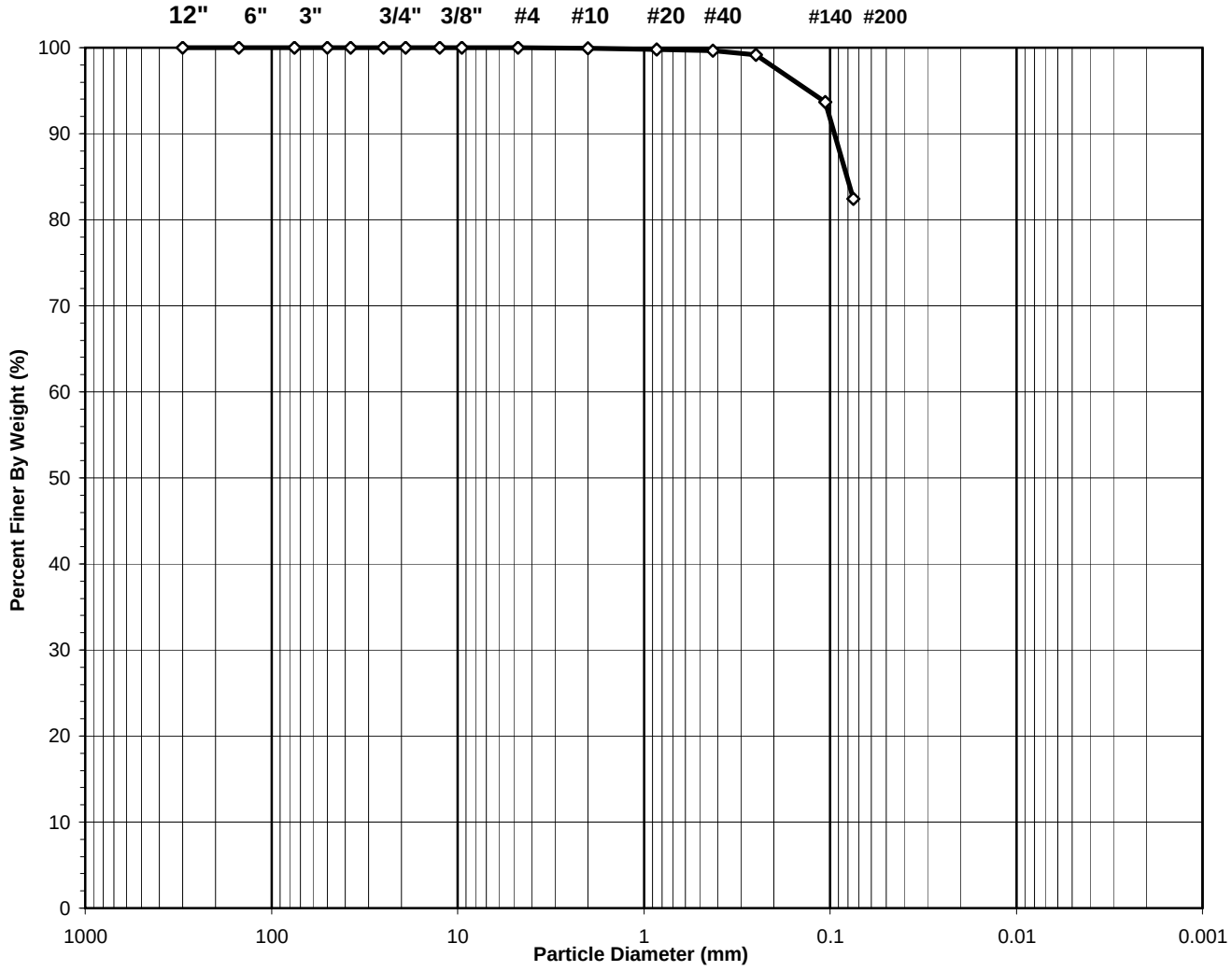
Tested By *JCM* Date *11/24/15* Checked By KC Date 12/1/15

SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-36
Client Reference:	Lake Erie Connector 185241	Depth (m):	3.37-3.94
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-028	Soil Color:	Gray

	SIEVE ANALYSIS		*HYDROMETER*
USCS	**gravel**	**sand**	**silt and clay**



USCS Symbol:
ml, ASSUMED

USCS Classification:
SILT WITH SAND

Tested By	HL	Date	11/30/15	Checked By	KC	Date	11/30/15

DCN: CT-S3C DATE 3/20/13 REVISION: 3

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

WASH SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-36
Client Reference:	Lake Erie Connector 185241	Depth (m):	3.37-3.94
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-028	Soil Color:	Gray

Moisture Content of Passing 3/4" Sample		Water Content of Retained 3/4" Sample	
Tare No.:	1439	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	1033.39	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	848.70	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	144.99	Weight of Tare (g):	NA
Weight of Water (g):	184.69	Weight of Water (g):	NA
Weight of Dry Sample (g):	703.71	Weight of Dry Sample (g):	NA
Moisture Content (%):	**26.2**	**Moisture Content (%):**	**NA**

Wet Weight of -3/4" Sample (g):	NA	Weight of the Dry Sample (g):	703.71
Dry Weight of - 3/4" Sample (g):	123.6	Weight of - #200 Material (g):	580.16
Wet Weight of +3/4" Sample (g):	NA	Weight of + #200 Material (g):	123.55
Dry Weight of + 3/4" Sample (g):	0.00		
Total Dry Weight of Sample (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.50	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	0.09	0.01	0.01	99.99	**99.99**
#4	4.75	0.14	0.02	0.03	99.97	**99.97**
#10	2.00	0.50	0.07	0.10	99.90	**99.90**
#20	0.850	0.65	0.09	0.20	99.80	**99.80**
#40	0.425	1.08	0.15	0.35	99.65	**99.65**
#60	0.250	3.46	0.49	0.84	99.16	**99.16**
#140	0.106	38.68	5.50	6.34	93.66	**93.66**
#200	0.075	78.95	11.22	17.56	82.44	**82.44**
Pan	-	580.16	82.44	100.00	-	**-**

Tested By HL Date 11/30/15 Checked By KC Date 11/30/15

DCN: CT-S3C DATE 3/20/13 REVISION: 3

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

ATTERBERG LIMIT

ASTM D 4318-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-36
Client Reference:	Lake Erie Connector 185241	Depth (m):	3.37-3.94
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-028	Visual:	GRAY SILT
			(MInus No. 40 sieve material, Airdried)

NON - PLASTIC MATERIAL

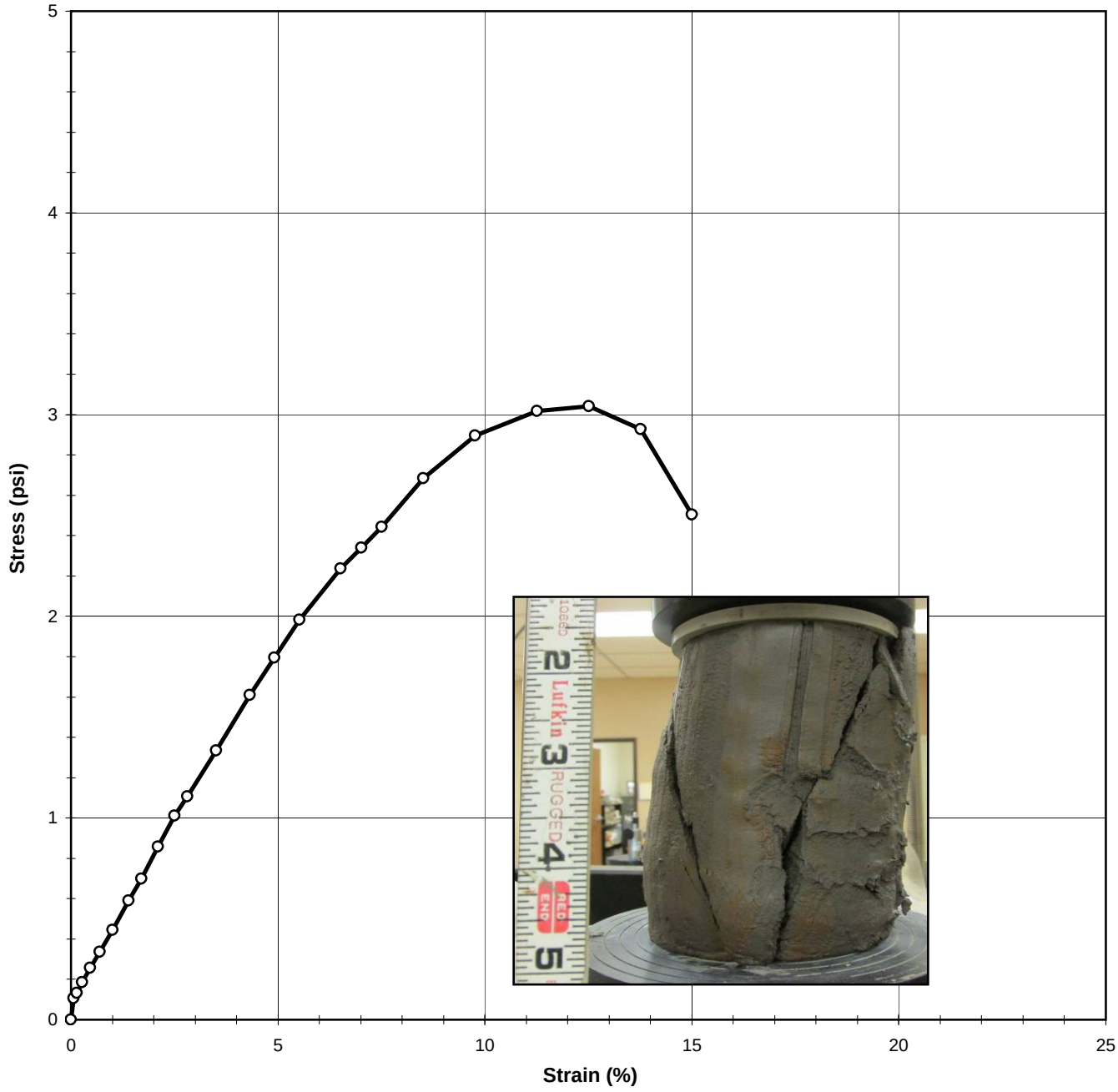
Tested By RAL *Date* 11/25/15 *Checked By* KC *Date* 11/30/15

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONFINED COMPRESSIVE STRENGTH

ASTM D2166-13 / AASHTO T208-10 (SOP S-30)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-36
Client Reference:	Lake Erie Connector 185241	Depth (m):	3.37-3.94
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-028	Visual:	Gray Silt



Tested By	JCM	Date	11/24/15	Approved By	KC	Date	11/30/15

DCN: CT-S30 Date: 11/09/09 Revision: 4

S:\Excel\Excel QA\Spreadsheets\UC Sigma.xls

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONFINED COMPRESSIVE STRENGTH

ASTM D2166-13 / AASHTO T208-10 (SOP S-30)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-36
Client Reference:	Lake Erie Connector 185241	Depth (m):	3.37-3.94
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-028	Visual:	Gray Silt

INITIAL SAMPLE DIMENSIONS				WATER CONTENT AFTER TEST	
Length 1 (in):	7.199	Top Diameter (in):	3.651	Tare No.:	1439
Length 2 (in):	7.194	Middle Diameter (in):	3.606	Weight of Tare & Wet Sample (g):	1033.39
Length 3 (in):	7.143	Bottom Diameter (in):	3.650	Weight of Tare & Dry Sample (g):	848.70
Avg. Length (in):	**7.179**	**Avg. Diameter (in):**	**3.636**	Weight of Tare (g):	144.99
		Area (in^2):	**10.381**	Moisture Content (%):	26.25

UNIT WEIGHT			
Weight of Tube & Wet Sample (g):	2398.70	Sample Volume (cm^3):	1221.2
Weight of Tube (g):	113.41	Unit Wet Weight (g/cm^3):	1.87
Weight of Wet Sample (g):	2285.29	Unit Wet Weight (pcf):	116.77
Average Diameter (in):	3.64	Moisture Content (%):	26.25
Average Length (in):	7.18	Unit Dry Weight (pcf):	92.49
Average Length (cm):	18.23		

ELECTRONIC DEVICE DEFORMATION (in)	*LOAD (lb)*	*ELAPSED TIME (min)*	*STRAIN (%)*	*STRESS (psi)*
0.000	0.0	0.00	0.000	0.000
0.005	1.1	0.07	0.068	0.105
0.011	1.4	0.15	0.147	0.132
0.019	1.9	0.27	0.269	0.186
0.034	2.7	0.48	0.471	0.257
0.050	3.5	0.70	0.698	0.336
0.072	4.7	1.00	1.005	0.444
0.100	6.2	1.40	1.399	0.591
0.122	7.4	1.72	1.705	0.700
0.151	9.1	2.12	2.108	0.858
0.180	10.8	2.52	2.502	1.010
0.202	11.8	2.82	2.809	1.108
0.252	14.4	3.52	3.510	1.334
0.310	17.5	4.32	4.316	1.609
0.353	19.6	4.93	4.911	1.795
0.396	21.8	5.53	5.516	1.983
0.468	24.8	6.53	6.514	2.237
0.503	26.1	7.03	7.013	2.341
0.539	27.4	7.53	7.513	2.442
0.611	30.5	8.53	8.511	2.685
0.701	33.3	9.78	9.763	2.895
0.808	35.3	11.28	11.261	3.016
0.898	36.1	12.53	12.513	3.040
0.988	35.2	13.78	13.765	2.926
1.077	30.6	15.05	15.008	2.504

Tested By JCM Date 11/24/15 Input Checked By KC Date 11/30/15

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

PHOTOGRAPHS

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-37
Client Reference:	Lake Erie Connector 185241	Depth (m):	0.00-0.55
Project No.:	2015-538-001	Sample No.:	GT4
Lab ID:	2015-538-001-029		

Tested By NJM *Date* 10/29/15 *Checked By* KC *Date* 11/5/15

S:\Excel\Excel QA\Spr

SHELBY TUBE UNIT WEIGHT

ASTM D2937-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-37
Client Reference:	Lake Erie Connector 185241	Depth Pushed (m):	0.00-0.55
Project No.:	2015-538-001	Shelby Tube No.:	GT4
Lab ID:	2015-538-001-029	Recovery (m):	0.55

MOISTURE CONTENT

Section Number	**1**
Tare Number	3116
Weight of Tare & Wet Sample (g)	283.72
Weight of Tare & Dry Sample (g)	217.37
Weight of Tare (g)	6.68
Moisture Content (%)	31.49

UNIT WEIGHT

Weight of Tube & Wet Sample (g)	1375.06
Weight of Tube (g)	93.86
Weight of Wet Sample (g)	1281.20
Length 1 (in)	3.967
Length 2 (in)	3.961
Length 3 (in)	3.929
Top Diameter (in)	3.593
Middle Diameter (in)	3.610
Bottom Diameter (in)	3.576
Sample Volume (cm^3)	656.69
Moisture Content (%)	31.49
Unit Wet Weight (g/cm^3)	1.95
Unit Wet Weight (pcf)	121.74
Unit Dry Weight (g/cm^3)	**1.48**
Unit Dry Weight (pcf)	**92.6**

SOIL PROFILE AND SAMPLING

DEPTH (m)	ELEV ( )	SECTION No.	SOIL PROFILE	SOIL DESCRIPTION AND REMARKS	TEST PERFORMED
-0.05					
0.10					
0.25					
0.40				GRAY SOFT CLAY WITH A TRACE OF FINE SAND & SHELLS	
0.55		1		Pocket Penetrometer 0.0 TSF TORVANE= .14 kg/cm²	UNIT WGT, LIMITS, GRAIN SIZE, WC

***Note**: When full recovery is not achieved, the elevation can not be accurately define*
Indicate each cut of the tube with an arrow
Indicate dividing line between soil types with a solid lin
Indicate wax by cross-hatching. Indicate soil types by standard symbols

Tested By *NJM* Date *10/29/15* Checked By KC Date 11/2/15

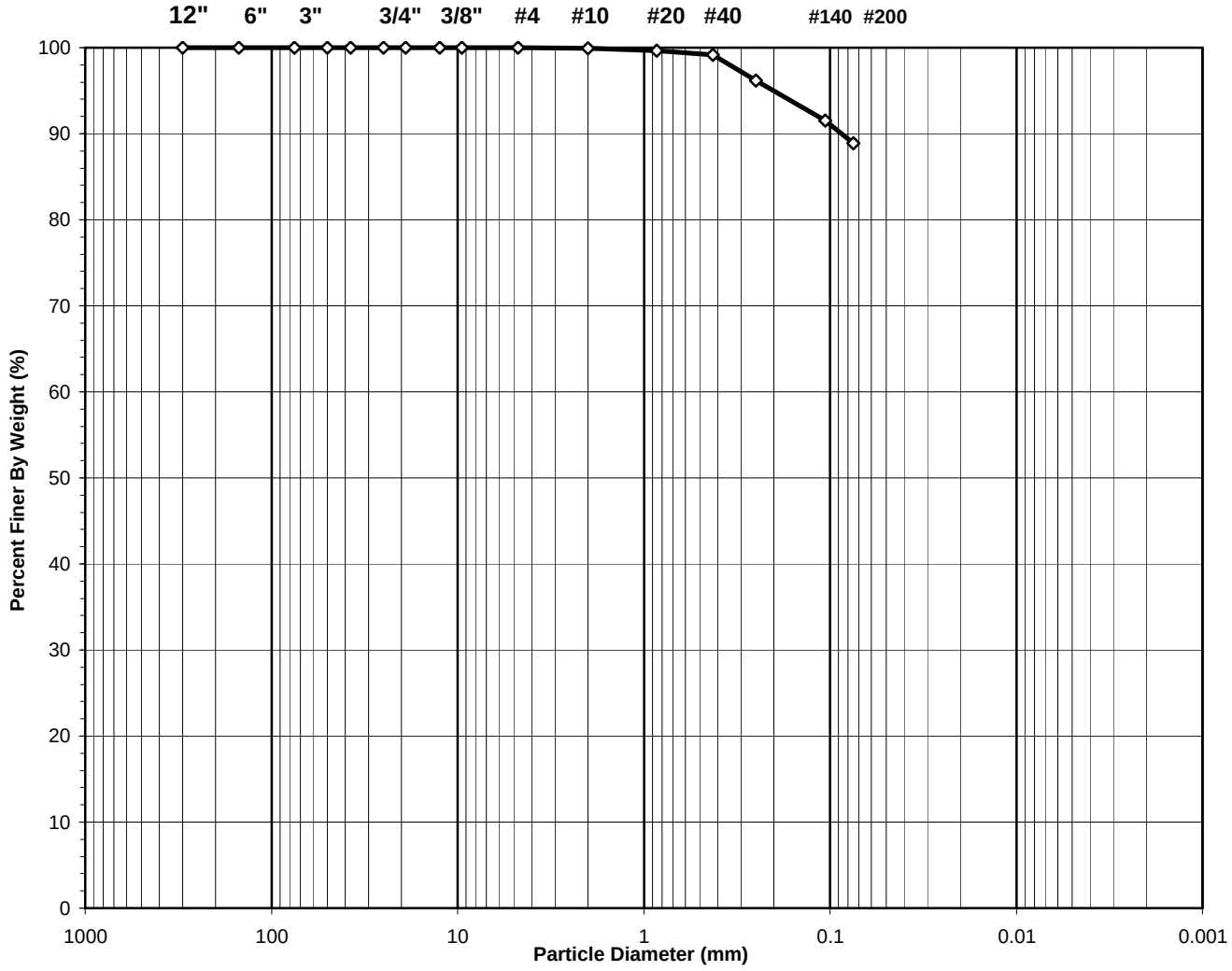
544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-37
Client Reference:	Lake Erie Connector 185241	Depth (m):	0.45-0.55
Project No.:	2015-538-001	Sample No.:	GT4
Lab ID:	2015-538-001-029	Soil Color:	Gray

	SIEVE ANALYSIS		*HYDROMETER*
USCS	**gravel**	**sand**	**silt and clay**



USCS Symbol:
CL, TESTED

USCS Classification:
LEAN CLAY

Tested By	HL	Date	11/4/15	Checked By	KC	Date	11/6/15

DCN: CT-S3C DATE 3/20/13 REVISION: 3

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

WASH SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-37
Client Reference:	Lake Erie Connector 185241	Depth (m):	0.45-0.55
Project No.:	2015-538-001	Sample No.:	GT4
Lab ID:	2015-538-001-029	Soil Color:	Gray

Moisture Content of Passing 3/4" Sample		Water Content of Retained 3/4" Sample	
Tare No.:	1463	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	684.13	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	543.90	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	100.58	Weight of Tare (g):	NA
Weight of Water (g):	140.23	Weight of Water (g):	NA
Weight of Dry Sample (g):	443.32	Weight of Dry Sample (g):	NA
Moisture Content (%):	**31.6**	**Moisture Content (%):**	**NA**

Wet Weight of -3/4" Sample (g):	NA	Weight of the Dry Sample (g):	443.32
Dry Weight of - 3/4" Sample (g):	49.1	Weight of - #200 Material (g):	394.18
Wet Weight of +3/4" Sample (g):	NA	Weight of + #200 Material (g):	49.14
Dry Weight of + 3/4" Sample (g):	0.00		
Total Dry Weight of Sample (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.50	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	0.00	0.00	0.00	100.00	**100.00**
#4	4.75	0.12	0.03	0.03	99.97	**99.97**
#10	2.00	0.30	0.07	0.09	99.91	**99.91**
#20	0.850	1.00	0.23	0.32	99.68	**99.68**
#40	0.425	2.28	0.51	0.83	99.17	**99.17**
#60	0.250	13.08	2.95	3.79	96.21	**96.21**
#140	0.106	20.71	4.67	8.46	91.54	**91.54**
#200	0.075	11.65	2.63	11.08	88.92	**88.92**
Pan	-	394.18	88.92	100.00	-	**-**

Tested By HL Date 11/4/15 Checked By KC Date 11/6/15

DCN: CT-S3C DATE 3/20/13 REVISION: 3

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

ATTERBERG LIMITS

ASTM D 4318-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-37
Client Reference:	Lake Erie Connector 185241	Depth (m):	0.45-0.55
Project No.:	2015-538-001	Sample No.:	GT4
Lab ID:	2015-538-001-029	Soil Description:	GRAY LEAN CLAY

Note: The* USCS *symbol used with this test refers only to the minus No. 40 (Minus No. 40 sieve material, Airdried)

sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description .

Liquid Limit Test	**1**	**2**	**3**
Tare Number:	200	315	206
Wt. of Tare & Wet Sample (g):	38.92	39.12	38.63
Wt. of Tare & Dry Sample (g):	34.63	34.88	34.62
Weight of Tare (g):	18.55	18.59	18.40
Weight of Water (g):	4.3	4.2	4.0
Weight of Dry Sample (g):	16.1	16.3	16.2
Moisture Content (%):	**26.7**	**26.0**	**24.7**
Number of Blows:	**15**	**24**	**35**

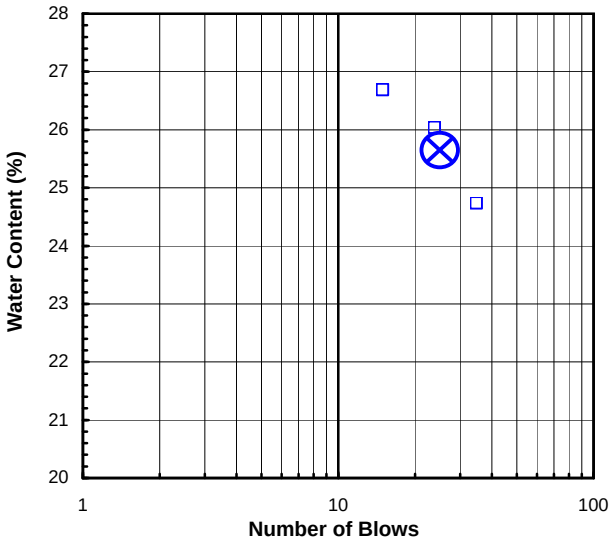
MULTIPOINT

Plastic Limit Test	**1**	**2**	**Range**
Tare Number:	217	227	
Wt. of Tare & Wet Sample (g):	24.97	23.86	
Wt. of Tare & Dry Sample (g):	24.21	23.11	
Weight of Tare (g):	18.66	17.66	
Weight of Water (g):	0.8	0.8	
Weight of Dry Sample (g):	5.6	5.5	
Moisture Content (%):	**13.7**	**13.8**	**-0.1**

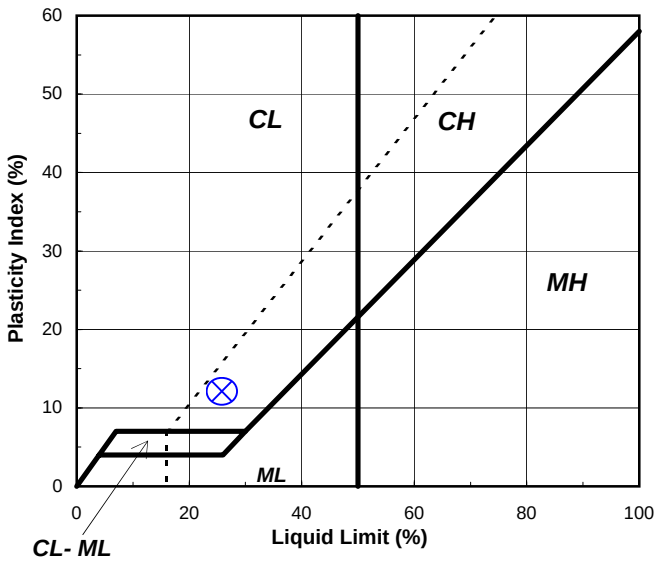
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%):	**26**
Plastic Limit (%):	**14**
Plasticity Index (%):	**12**
USCS Symbol:	**CL**

Flow Curve



Plasticity Chart



Tested By RAL *Date* 11/5/15 *Checked By* CLK *Date* 11/6/15

S:\Excel\Excel QA\Spreadsheets\Limit 3Pt.xls

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

PHOTOGRAPHS

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-37
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.75-2.45
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-030		

Tested By JCM *Date* 11/24/15 *Checked By* KC *Date* 12/1/15

S:\Excel\Excel QA\Spreadsheets\Photo

SHELBY TUBE UNIT WEIGHT

ASTM D2937-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-37
Client Reference:	Lake Erie Connector 185241	Depth Pushed (m):	1.75-2.45
Project No.:	2015-538-001	Shelby Tube No.:	GT2
Lab ID:	2015-538-001-030	Recovery (m):	0.7

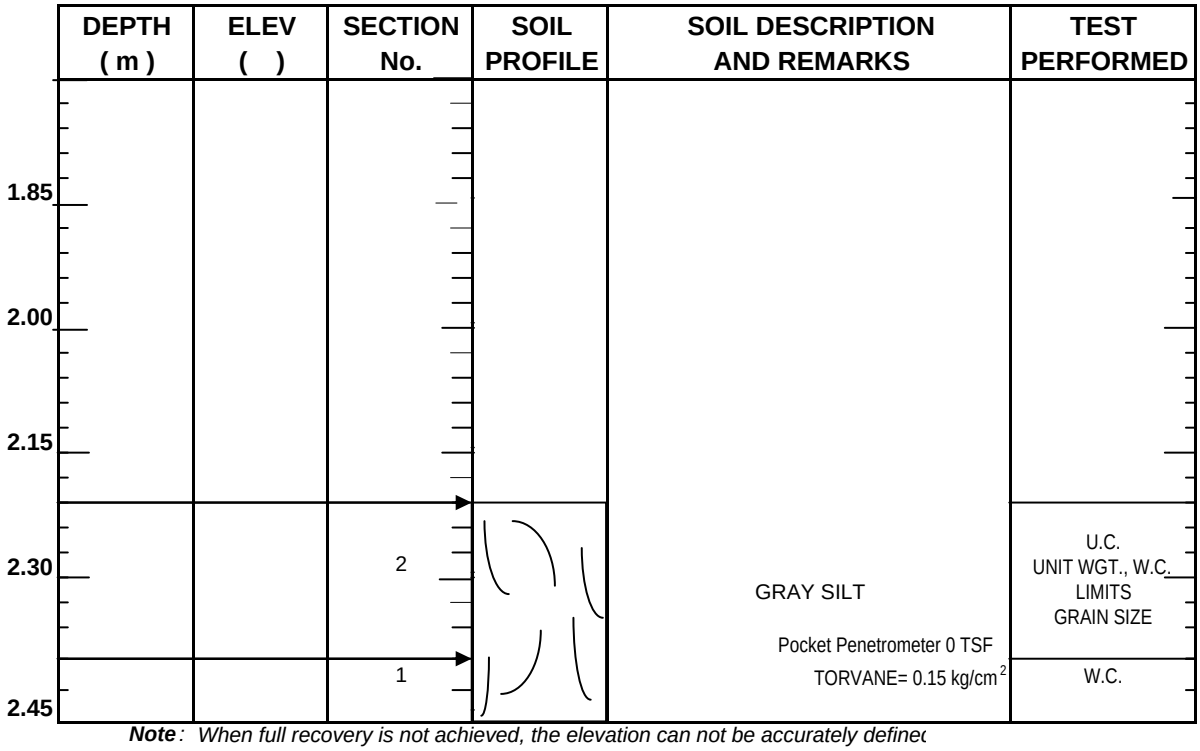
MOISTURE CONTENT — After U.C.

Section Number	**1**	**2**	**3**	**4**	**5**
Tare Number	1459	1531			
Weight of Tare & Wet Sample (g)	413.46	1257.82			
Weight of Tare & Dry Sample (g)	339.48	995.40			
Weight of Tare (g)	78.75	147.62			
Moisture Content (%)	28.37	30.95			

UNIT WEIGHT

Weight of Tube & Wet Sample (g)	2348.68
Weight of Tube (g)	113.44
Weight of Wet Sample (g)	2235.24
Length 1 (in)	7.027
Length 2 (in)	7.009
Length 3 (in)	7.031
Top Diameter (in)	3.648
Middle Diameter (in)	3.627
Bottom Diameter (in)	3.626
Sample Volume (cm^3)	1193.34
Moisture Content (%)	30.95
Unit Wet Weight (g/cm^3)	1.87
Unit Wet Weight (pcf)	116.88
Unit Dry Weight (g/cm^3)	**1.43**
Unit Dry Weight (pcf)	**89.3**

SOIL PROFILE AND SAMPLING



***Note**: When full recovery is not achieved, the elevation can not be accurately definec*
Indicate each cut of the tube with an arrow
Indicate dividing line between soil types with a solid lin
Indicate wax by cross-hatching. Indicate soil types by standard symbols

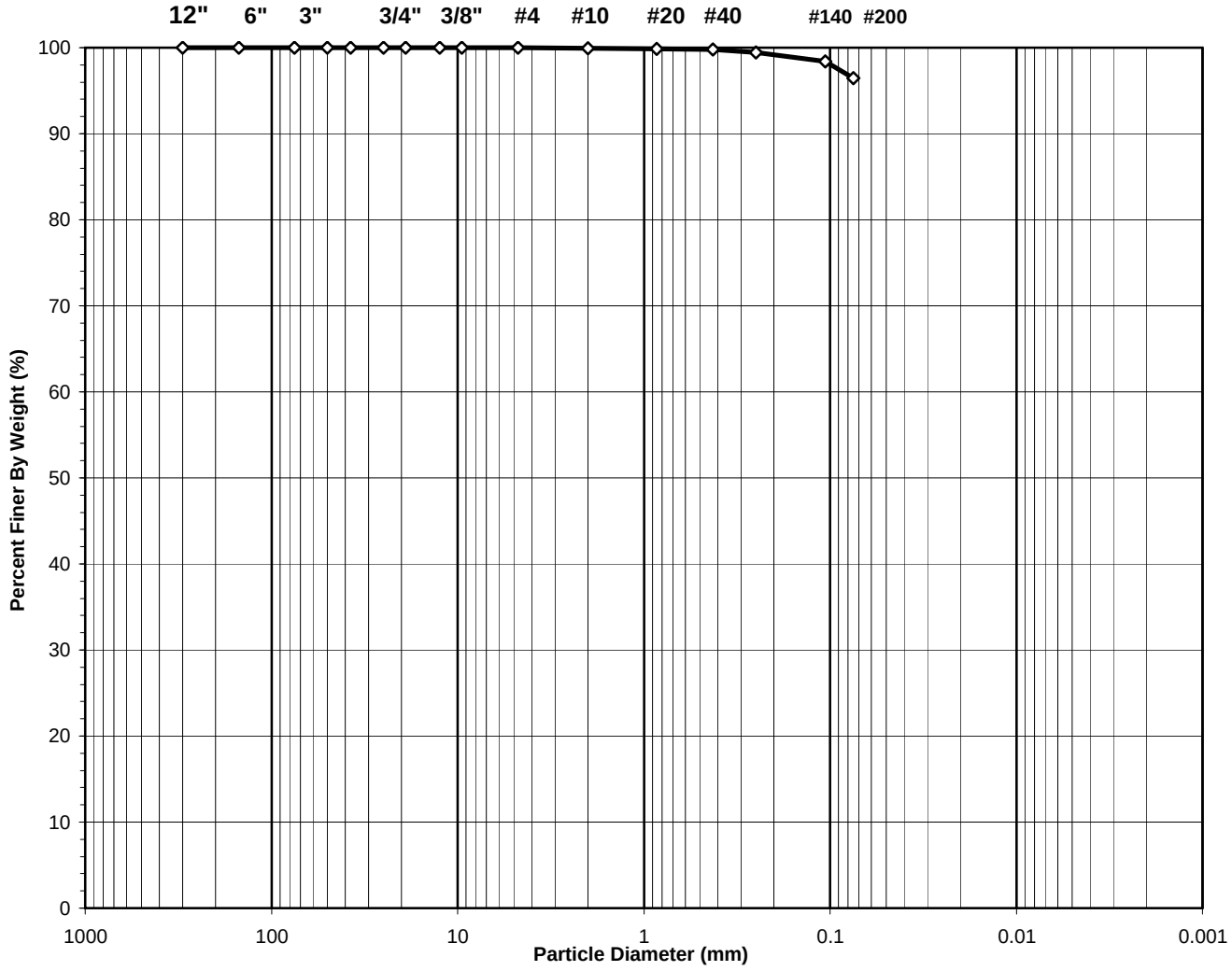
Tested By *JCM* Date *11/24/15* Checked By KC Date 12/1/15

SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-37
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.21-2.39
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-030	Soil Color:	Gray

	SIEVE ANALYSIS		*HYDROMETER*
USCS	**gravel**	**sand**	**silt and clay**



USCS Symbol:
CL, TESTED

USCS Classification:
LEAN CLAY

Tested By	HL	Date	11/30/15	Checked By	KC	Date	11/30/15

DCN: CT-S3C DATE 3/20/13 REVISION: 3

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

WASH SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-37
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.21-2.39
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-030	Soil Color:	Gray

Moisture Content of Passing 3/4" Sample		Water Content of Retained 3/4" Sample	
Tare No.:	1531	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	1257.82	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	995.40	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	147.62	Weight of Tare (g):	NA
Weight of Water (g):	262.42	Weight of Water (g):	NA
Weight of Dry Sample (g):	847.78	Weight of Dry Sample (g):	NA
Moisture Content (%):	**31.0**	**Moisture Content (%):**	**NA**

Wet Weight of -3/4" Sample (g):	NA	Weight of the Dry Sample (g):	847.78
Dry Weight of - 3/4" Sample (g):	29.8	Weight of - #200 Material (g):	817.98
Wet Weight of +3/4" Sample (g):	NA	Weight of + #200 Material (g):	29.80
Dry Weight of + 3/4" Sample (g):	0.00		
Total Dry Weight of Sample (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.50	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	0.02	0.00	0.00	100.00	**100.00**
#4	4.75	0.22	0.03	0.03	99.97	**99.97**
#10	2.00	0.49	0.06	0.09	99.91	**99.91**
#20	0.850	0.32	0.04	0.12	99.88	**99.88**
#40	0.425	0.82	0.10	0.22	99.78	**99.78**
#60	0.250	2.58	0.30	0.52	99.48	**99.48**
#140	0.106	9.20	1.09	1.61	98.39	**98.39**
#200	0.075	16.15	1.90	3.52	96.48	**96.48**
Pan	-	817.98	96.48	100.00	-	**-**

Tested By HL Date 11/30/15 Checked By KC Date 11/30/15

DCN: CT-S3C DATE 3/20/13 REVISION: 3

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

ATTERBERG LIMITS

ASTM D 4318-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-37
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.21-2.39
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-030	Soil Description:	GRAY LEAN CLAY

Note: The* USCS *symbol used with this test refers only to the minus No. 40 (Minus No. 40 sieve material, Airdried)

sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description .

Liquid Limit Test	**1**	**2**	**3**
Tare Number:	206	164	240
Wt. of Tare & Wet Sample (g):	39.00	37.73	38.25
Wt. of Tare & Dry Sample (g):	34.78	33.73	34.32
Weight of Tare (g):	18.42	17.38	17.92
Weight of Water (g):	4.2	4.0	3.9
Weight of Dry Sample (g):	16.4	16.4	16.4
Moisture Content (%):	**25.8**	**24.5**	**24.0**
Number of Blows:	**15**	**22**	**35**

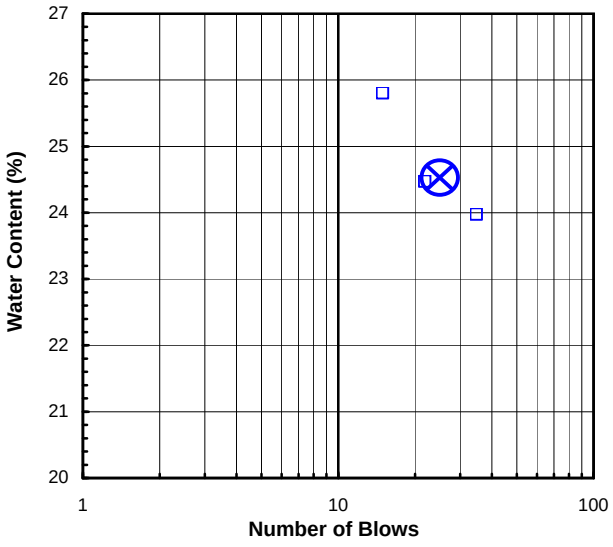
MULTIPOINT

Plastic Limit Test	**1**	**2**	**Range**
Tare Number:	320	185	
Wt. of Tare & Wet Sample (g):	26.33	25.72	
Wt. of Tare & Dry Sample (g):	25.48	24.89	
Weight of Tare (g):	19.90	19.39	
Weight of Water (g):	0.8	0.8	
Weight of Dry Sample (g):	5.6	5.5	
Moisture Content (%):	**15.2**	**15.1**	**0.1**

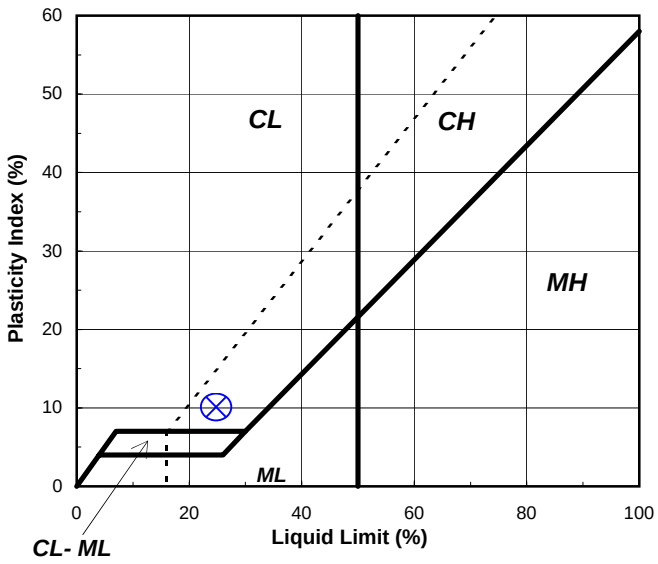
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%):	**25**
Plastic Limit (%):	**15**
Plasticity Index (%):	**10**
USCS Symbol:	**CL**

Flow Curve



Plasticity Chart



Tested By RAL *Date* 11/25/15 *Checked By* KC *Date* 11/30/15

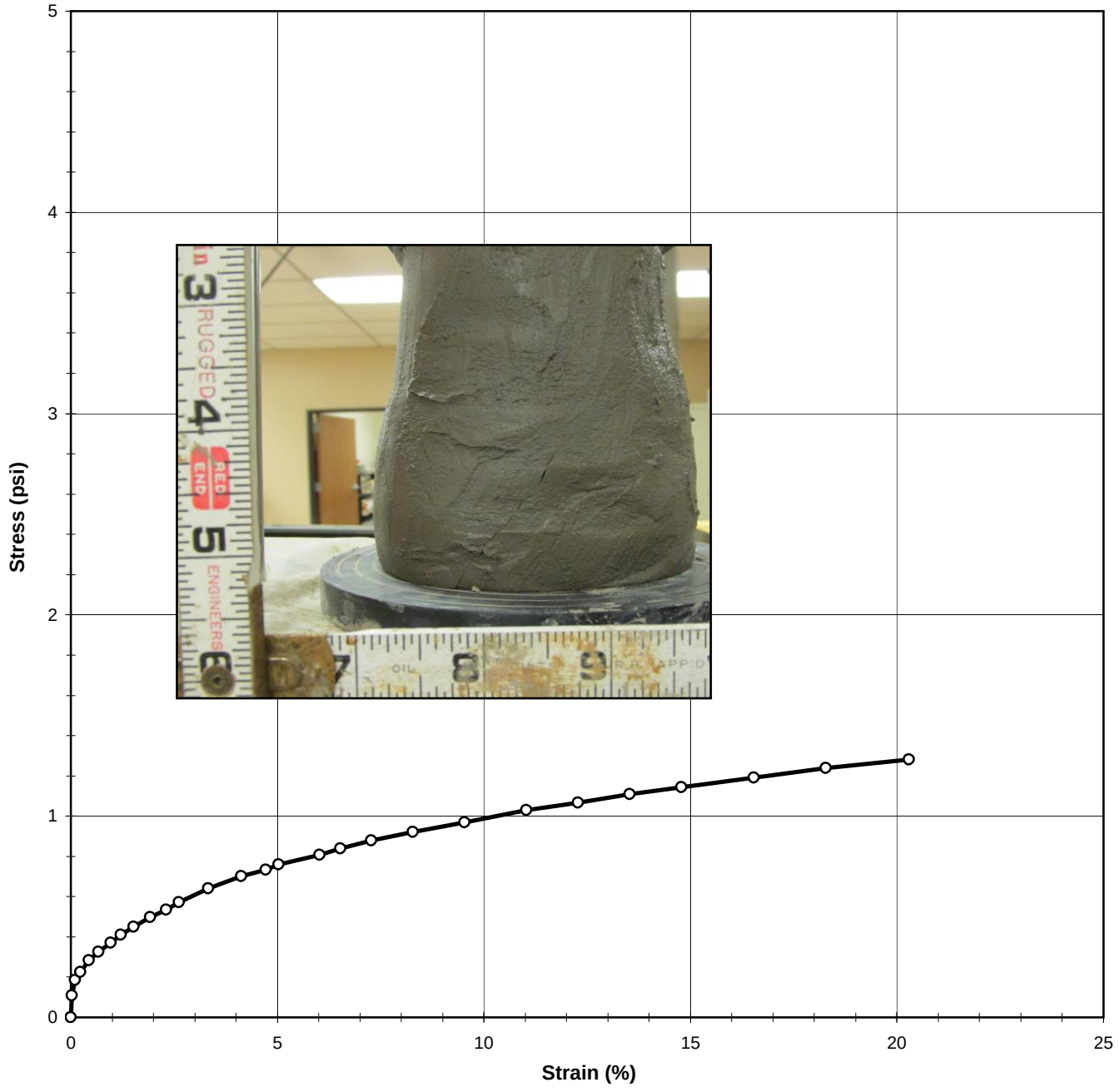
S:\Excel\Excel QA\Spreadsheets\Limit 3Pt.xls

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONFINED COMPRESSIVE STRENGTH

ASTM D2166-13 / AASHTO T208-10 (SOP S-30)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-37
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.21-2.39
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-030	Visual:	Gray Silt



Tested By	JCM	Date	11/24/15	Approved By	KC	Date	11/30/15

DCN: CT-S30 Date: 11/09/09 Revision: 4

S:\Excel\Excel QA\Spreadsheets\UC Sigma.xls

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONFINED COMPRESSIVE STRENGTH

ASTM D2166-13 / AASHTO T208-10 (SOP S-30)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-37
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.21-2.39
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-030	Visual:	Gray Silt

INITIAL SAMPLE DIMENSIONS				WATER CONTENT AFTER TEST	
Length 1 (in):	7.027	Top Diameter (in):	3.648	Tare No.:	1531
Length 2 (in):	7.009	Middle Diameter (in):	3.627	Weight of Tare & Wet Sample (g):	1257.82
Length 3 (in):	7.031	Bottom Diameter (in):	3.626	Weight of Tare & Dry Sample (g):	995.40
Avg. Length (in):	**7.022**	**Avg. Diameter (in):**	**3.634**	Weight of Tare (g):	147.62
		Area (in^2):	**10.370**	Moisture Content (%):	30.95

UNIT WEIGHT			
Weight of Tube & Wet Sample (g):	2348.68	Sample Volume (cm^3):	1193.3
Weight of Tube (g):	113.44	Unit Wet Weight (g/cm^3):	1.87
Weight of Wet Sample (g):	2235.24	Unit Wet Weight (pcf):	116.88
Average Diameter (in):	3.63	Moisture Content (%):	30.95
Average Length (in):	7.02	Unit Dry Weight (pcf):	89.25
Average Length (cm):	17.84		

ELECTRONIC DEVICE DEFORMATION (in)	*LOAD (lb)*	*ELAPSED TIME (min)*	*STRAIN (%)*	*STRESS (psi)*
0.000	0.0	0.00	0.000	0.000
0.002	1.1	0.12	0.032	0.109
0.007	1.9	0.18	0.104	0.185
0.016	2.3	0.32	0.226	0.224
0.031	2.9	0.52	0.437	0.283
0.047	3.4	0.75	0.665	0.326
0.068	3.9	1.05	0.963	0.370
0.086	4.3	1.30	1.218	0.410
0.106	4.7	1.60	1.516	0.449
0.135	5.3	2.00	1.920	0.497
0.163	5.7	2.40	2.314	0.535
0.184	6.1	2.70	2.621	0.571
0.233	6.9	3.42	3.323	0.641
0.289	7.6	4.22	4.122	0.701
0.332	8.0	4.82	4.728	0.735
0.353	8.3	5.12	5.026	0.760
0.423	8.9	6.12	6.026	0.807
0.458	9.3	6.62	6.526	0.840
0.511	9.8	7.37	7.272	0.878
0.582	10.4	8.37	8.281	0.922
0.669	11.1	9.62	9.527	0.970
0.774	12.0	11.12	11.027	1.029
0.862	12.6	12.37	12.282	1.067
0.950	13.3	13.62	13.528	1.109
1.038	13.9	14.87	14.782	1.144
1.161	14.8	16.63	16.537	1.192
1.284	15.7	18.38	18.283	1.239
1.425	16.7	20.38	20.292	1.281

Tested By JCM Date 11/24/15 Input Checked By KC Date 11/30/15

DCN: CT-S30 Date: 11/09/09 Revision: 4

S:\Excel\Excel QA\Spreadsheets\UC Sigma.xls

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

PHOTOGRAPHS

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-37
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.70-3.40
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-031		

Tested By JCM *Date* 11/24/15 *Checked By* KC *Date* 12/1/15

S:\Excel\Excel QA\Spreadsheets\Photo

SHELBY TUBE UNIT WEIGHT

ASTM D2937-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-37
Client Reference:	Lake Erie Connector 185241	Depth Pushed (m):	2.70-3.40
Project No.:	2015-538-001	Shelby Tube No.:	GT1
Lab ID:	2015-538-001-031	Recovery (m):	0.7

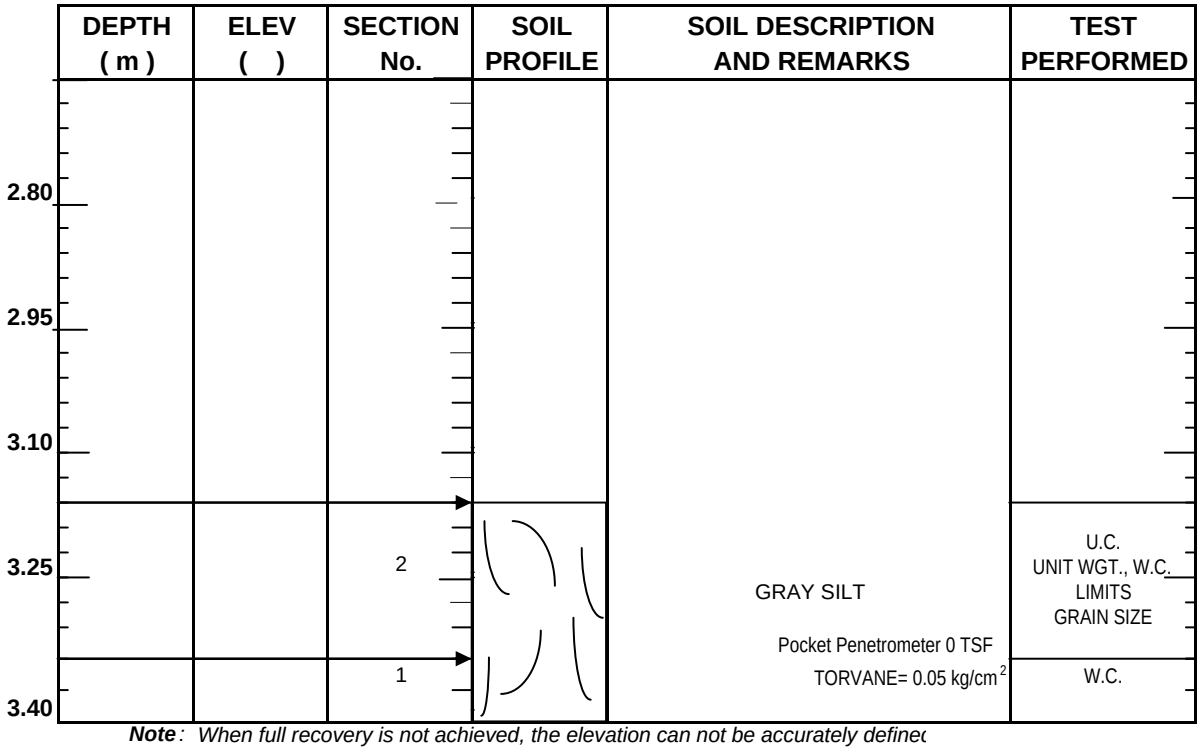
MOISTURE CONTENT After U.C.

Section Number	**1**	**2**	**3**	**4**	**5**
Tare Number	888	1458			
Weight of Tare & Wet Sample (g)	435.24	1128.29			
Weight of Tare & Dry Sample (g)	362.34	883.90			
Weight of Tare (g)	110.31	145.15			
Moisture Content (%)	28.93	33.08			

UNIT WEIGHT

Weight of Tube & Wet Sample (g)	2321.13
Weight of Tube (g)	109.95
Weight of Wet Sample (g)	2211.18
Length 1 (in)	7.011
Length 2 (in)	7.054
Length 3 (in)	7.050
Top Diameter (in)	3.659
Middle Diameter (in)	3.682
Bottom Diameter (in)	3.646
Sample Volume (cm^3)	1215.00
Moisture Content (%)	33.08
Unit Wet Weight (g/cm^3)	1.82
Unit Wet Weight (pcf)	113.56
Unit Dry Weight (g/cm^3)	**1.37**
Unit Dry Weight (pcf)	**85.3**

SOIL PROFILE AND SAMPLING



***Note**: When full recovery is not achieved, the elevation can not be accurately define*
Indicate each cut of the tube with an arrow
Indicate dividing line between soil types with a solid lin
Indicate wax by cross-hatching. Indicate soil types by standard symbols

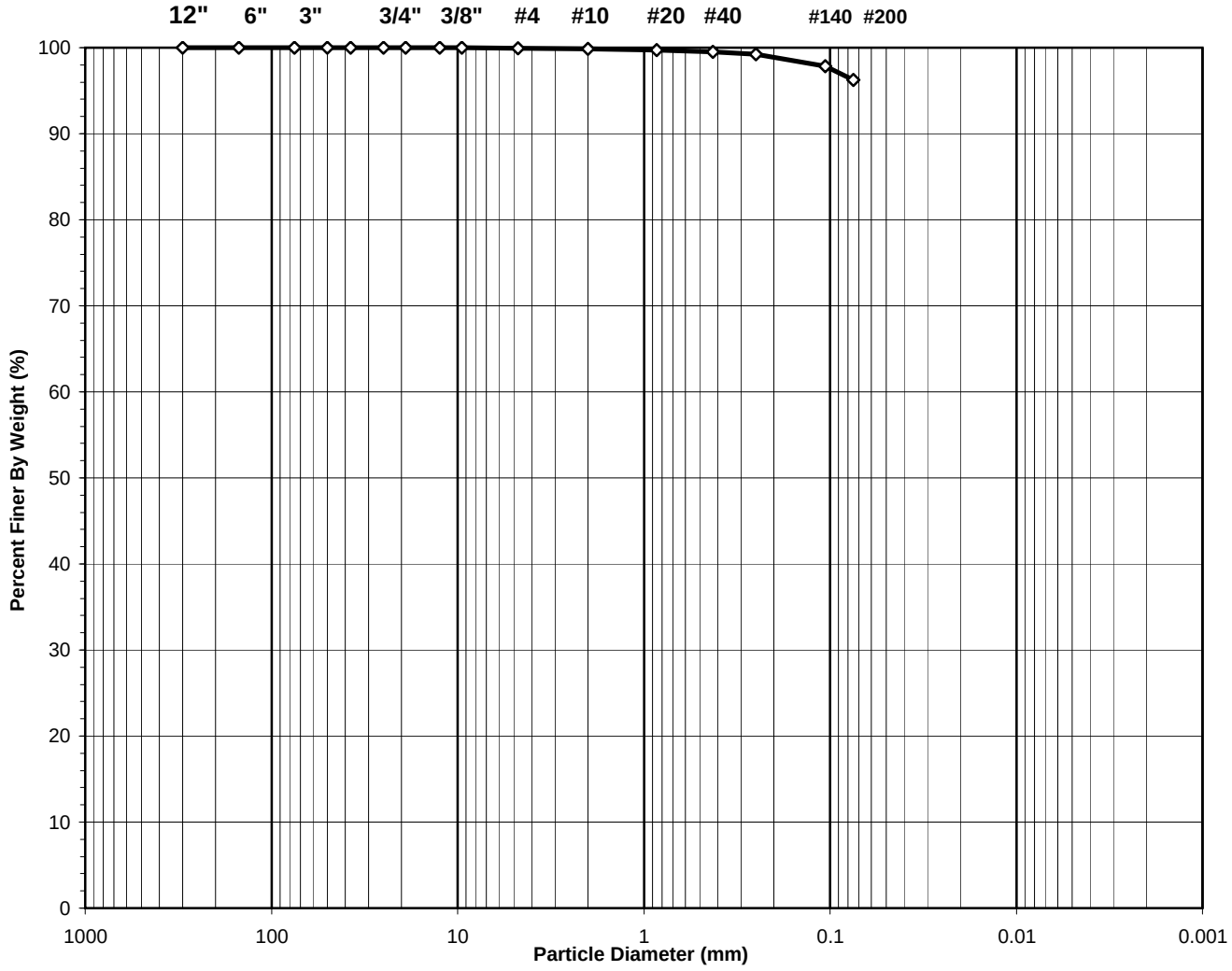
Tested By *JCM* Date *11/24/15* Checked By KC Date 12/1/15

SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-37
Client Reference:	Lake Erie Connector 185241	Depth (m):	3.16-3.34
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-031	Soil Color:	Gray

	SIEVE ANALYSIS		*HYDROMETER*
USCS	**gravel**	**sand**	**silt and clay**



USCS Symbol:
CL, TESTED

USCS Classification:
LEAN CLAY

Tested By	HL	Date	11/30/15	Checked By	KC	Date	11/30/15

DCN: CT-S3C DATE 3/20/13 REVISION: 3

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

WASH SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-37
Client Reference:	Lake Erie Connector 185241	Depth (m):	3.16-3.34
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-031	Soil Color:	Gray

Moisture Content of Passing 3/4" Sample		Water Content of Retained 3/4" Sample	
Tare No.:	1458	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	1128.29	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	883.90	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	145.15	Weight of Tare (g):	NA
Weight of Water (g):	244.39	Weight of Water (g):	NA
Weight of Dry Sample (g):	738.75	Weight of Dry Sample (g):	NA
Moisture Content (%):	**33.1**	**Moisture Content (%):**	**NA**

Wet Weight of -3/4" Sample (g):	NA	Weight of the Dry Sample (g):	738.75
Dry Weight of - 3/4" Sample (g):	27.6	Weight of - #200 Material (g):	711.18
Wet Weight of +3/4" Sample (g):	NA	Weight of + #200 Material (g):	27.57
Dry Weight of + 3/4" Sample (g):	0.00		
Total Dry Weight of Sample (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.50	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	0.00	0.00	0.00	100.00	**100.00**
#4	4.75	0.58	0.08	0.08	99.92	**99.92**
#10	2.00	0.54	0.07	0.15	99.85	**99.85**
#20	0.850	1.16	0.16	0.31	99.69	**99.69**
#40	0.425	1.25	0.17	0.48	99.52	**99.52**
#60	0.250	2.18	0.30	0.77	99.23	**99.23**
#140	0.106	10.02	1.36	2.13	97.87	**97.87**
#200	0.075	11.84	1.60	3.73	96.27	**96.27**
Pan	-	711.18	96.27	100.00	-	**-**

Tested By HL Date 11/30/15 Checked By KC Date 11/30/15

DCN: CT-S3C DATE 3/20/13 REVISION: 3

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

ATTERBERG LIMITS

ASTM D 4318-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-37
Client Reference:	Lake Erie Connector 185241	Depth (m):	3.16-3.34
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-031	Soil Description:	GRAY LEAN CLAY

Note: The* USCS *symbol used with this test refers only to the minus No. 40 (Minus No. 40 sieve material, Airdried)
sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description .

Liquid Limit Test	**1**	**2**	**3**
Tare Number:	1291	209	1253
Wt. of Tare & Wet Sample (g):	38.16	40.47	41.47
Wt. of Tare & Dry Sample (g):	33.84	36.15	37.46
Weight of Tare (g):	17.54	19.31	20.97
Weight of Water (g):	4.3	4.3	4.0
Weight of Dry Sample (g):	16.3	16.8	16.5
Moisture Content (%):	**26.5**	**25.7**	**24.3**
Number of Blows:	**16**	**28**	**35**

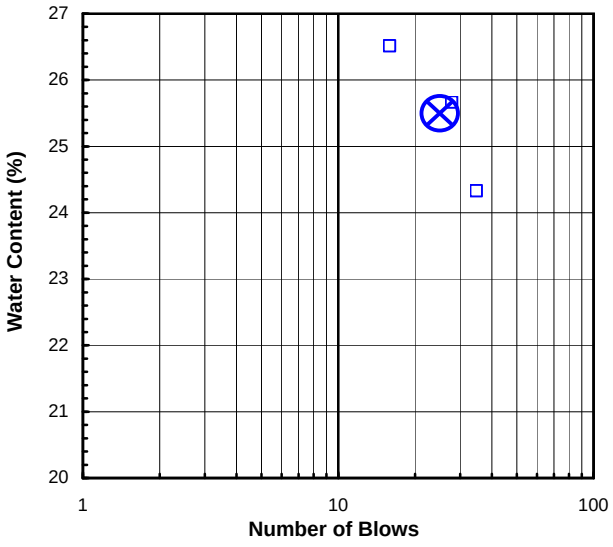
MULTI POINT

Plastic Limit Test	**1**	**2**	**Range**
Tare Number:	189	238	
Wt. of Tare & Wet Sample (g):	25.76	26.38	
Wt. of Tare & Dry Sample (g):	24.84	25.49	
Weight of Tare (g):	19.67	20.18	
Weight of Water (g):	0.9	0.9	
Weight of Dry Sample (g):	5.2	5.3	
Moisture Content (%):	**17.8**	**16.8**	**1.0**

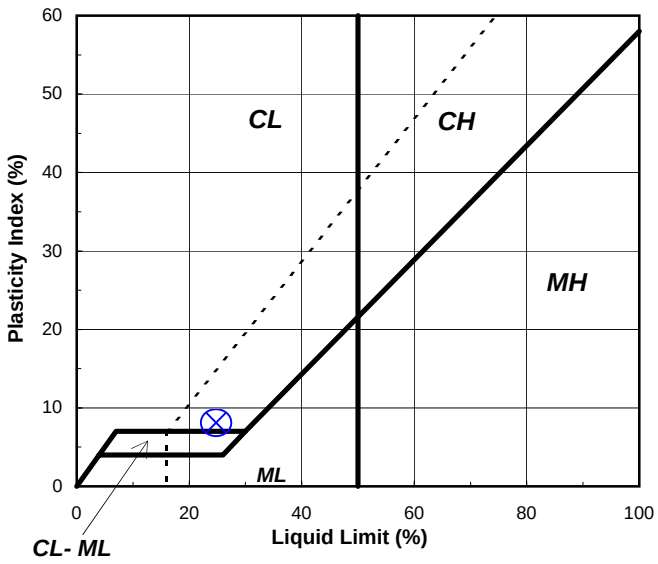
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%):	**25**
Plastic Limit (%):	**17**
Plasticity Index (%):	**8**
USCS Symbol:	**CL**

Flow Curve



Plasticity Chart



Tested By RAL *Date* 11/25/15 *Checked By* KC *Date* 11/30/15

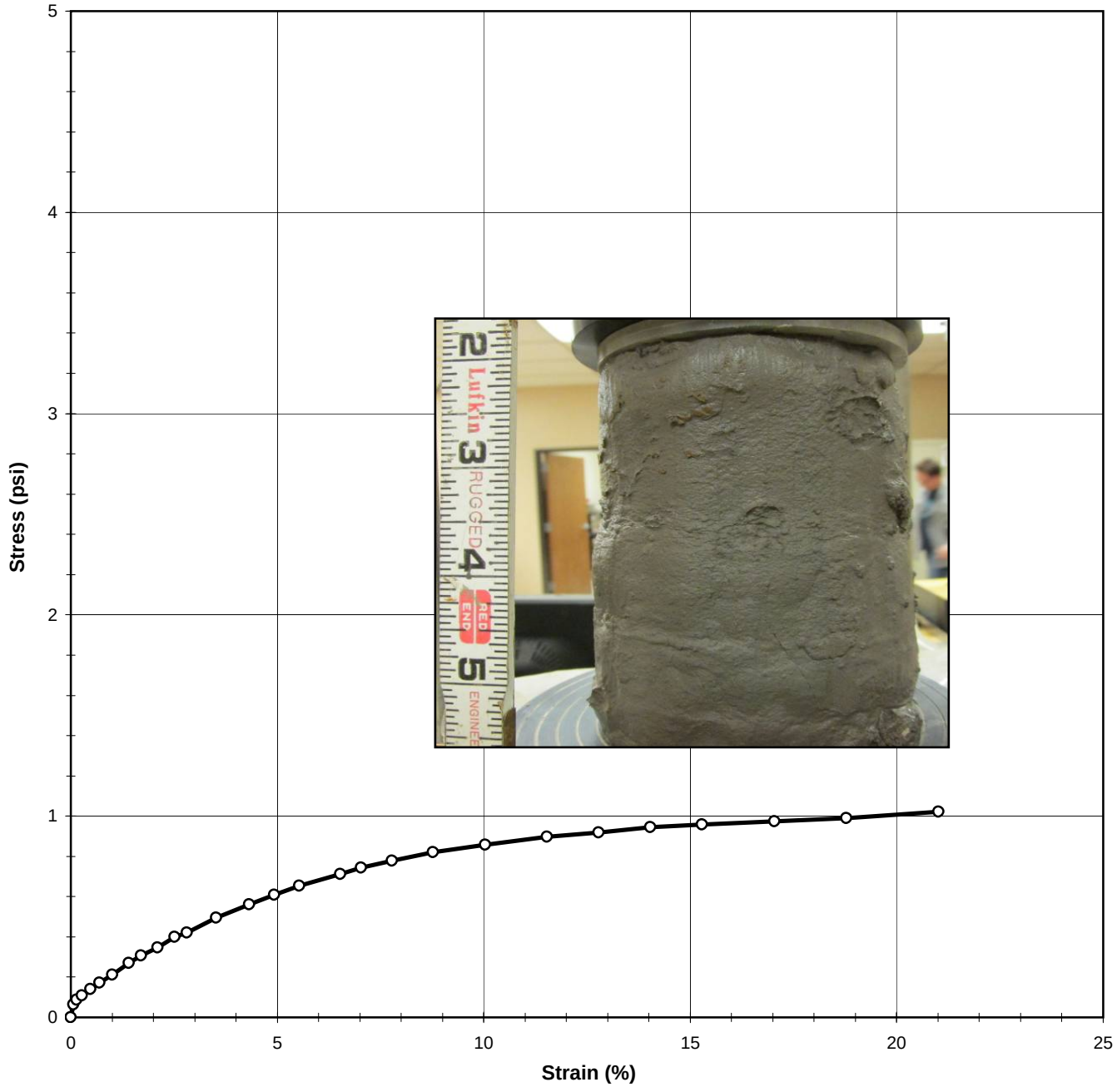
S:\Excel\Excel QA\Spreadsheets\Limit 3Pt.xls

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONFINED COMPRESSIVE STRENGTH

ASTM D2166-13 / AASHTO T208-10 (SOP S-30)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-37
Client Reference:	Lake Erie Connector 185241	Depth (m):	3.16-3.34
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-031	Visual:	Gray Silt



Tested By	JCM	Date	11/24/15	Approved By	KC	Date	11/30/15

DCN: CT-S30 Date: 11/09/09 Revision: 4

S:\Excel\Excel QA\Spreadsheets\UC Sigma.xls

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONFINED COMPRESSIVE STRENGTH

ASTM D2166-13 / AASHTO T208-10 (SOP S-30)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-37
Client Reference:	Lake Erie Connector 185241	Depth (m):	3.16-3.34
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-031	Visual:	Gray Silt

INITIAL SAMPLE DIMENSIONS				WATER CONTENT AFTER TEST	
Length 1 (in):	7.011	Top Diameter (in):	3.659	Tare No.:	1458
Length 2 (in):	7.054	Middle Diameter (in):	3.682	Weight of Tare & Wet Sample (g):	1128.29
Length 3 (in):	7.050	Bottom Diameter (in):	3.646	Weight of Tare & Dry Sample (g):	883.90
Avg. Length (in):	**7.038**	**Avg. Diameter (in):**	**3.662**	Weight of Tare (g):	145.15
		Area (in^2):	**10.534**	Moisture Content (%):	33.08

UNIT WEIGHT			
Weight of Tube & Wet Sample (g):	2321.13	Sample Volume (cm^3):	1215.0
Weight of Tube (g):	109.95	Unit Wet Weight (g/cm^3):	1.82
Weight of Wet Sample (g):	2211.18	Unit Wet Weight (pcf):	113.56
Average Diameter (in):	3.66	Moisture Content (%):	33.08
Average Length (in):	7.04	Unit Dry Weight (pcf):	85.33
Average Length (cm):	17.88		

ELECTRONIC DEVICE DEFORMATION (in)	*LOAD (lb)*	*ELAPSED TIME (min)*	*STRAIN (%)*	*STRESS (psi)*
0.000	0.0	0.00	0.000	0.000
0.005	0.7	0.07	0.071	0.064
0.010	0.9	0.15	0.141	0.088
0.019	1.2	0.27	0.273	0.110
0.033	1.5	0.47	0.474	0.142
0.049	1.8	0.70	0.703	0.171
0.070	2.3	1.00	1.001	0.212
0.099	2.9	1.40	1.405	0.271
0.120	3.3	1.70	1.703	0.308
0.148	3.7	2.12	2.107	0.346
0.177	4.3	2.52	2.510	0.399
0.198	4.6	2.82	2.817	0.421
0.248	5.4	3.52	3.520	0.496
0.304	6.2	4.32	4.318	0.561
0.347	6.8	4.92	4.924	0.610
0.389	7.3	5.53	5.529	0.654
0.460	8.0	6.53	6.530	0.713
0.495	8.4	7.03	7.030	0.744
0.547	8.9	7.78	7.775	0.779
0.618	9.5	8.78	8.776	0.820
0.706	10.0	10.03	10.031	0.857
0.812	10.7	11.53	11.531	0.898
0.900	11.1	12.78	12.786	0.920
0.988	11.6	14.03	14.032	0.945
1.076	11.9	15.28	15.287	0.957
1.199	12.4	17.03	17.042	0.973
1.322	12.9	18.78	18.788	0.991
1.479	13.6	21.00	21.008	1.021

Tested By JCM Date 11/24/15 Input Checked By KC Date 11/30/15

DCN: CT-S30 Date: 11/09/09 Revision: 4

S:\Excel\Excel QA\Spreadsheets\UC Sigma.xls

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

PHOTOGRAPHS

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-38
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.15-1.85
Project No.:	2015-538-001	Sample No.:	GT3
Lab ID:	2015-538-001-032		

Tested By JCM *Date* 11/20/15 *Checked By* KC *Date* 12/1/15

S:\Excel\Excel QA\Spreadsheets\Photo

SHELBY TUBE UNIT WEIGHT

ASTM D2937-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-38
Client Reference:	Lake Erie Connector 185241	Depth Pushed (m):	1.15-1.85
Project No.:	2015-538-001	Shelby Tube No.:	GT3
Lab ID:	2015-538-001-032	Recovery (m):	0.7

MOISTURE CONTENT — After U.U.

Section Number	**1**	**2**	**3**	**4**	**5**
Tare Number	555	1514			
Weight of Tare & Wet Sample (g)	463.46	1358.70			
Weight of Tare & Dry Sample (g)	365.27	1024.20			
Weight of Tare (g)	81.93	146.24			
Moisture Content (%)	34.65	38.10			

UNIT WEIGHT

Weight of Tube & Wet Sample (g)	2195.40
Weight of Tube (g)	0.00
Weight of Wet Sample (g)	2195.40
Length 1 (in)	7.346
Length 2 (in)	7.329
Length 3 (in)	7.353
Top Diameter (in)	3.632
Middle Diameter (in)	3.641
Bottom Diameter (in)	3.665
Sample Volume (cm^3)	1256.26
Moisture Content (%)	38.10
Unit Wet Weight (g/cm^3)	1.75
Unit Wet Weight (pcf)	109.05
Unit Dry Weight (g/cm^3)	**1.27**
Unit Dry Weight (pcf)	**79.0**

SOIL PROFILE AND SAMPLING

DEPTH (m)	ELEV ( )	SECTION No.	SOIL PROFILE	SOIL DESCRIPTION AND REMARKS	TEST PERFORMED
1.25					
1.40					
1.55					
1.70		2		GRAY SILT	U.U. UNIT WGT., W.C. LIMITS GRAIN SIZE
				Pocket Penetrometer 0 TSF	
		1		TORVANE= 0.075 kg/cm^2	W.C.
1.85					

***Note**: When full recovery is not achieved, the elevation can not be accurately define*
Indicate each cut of the tube with an arrow
Indicate dividing line between soil types with a solid lin
Indicate wax by cross-hatching. Indicate soil types by standard symbols

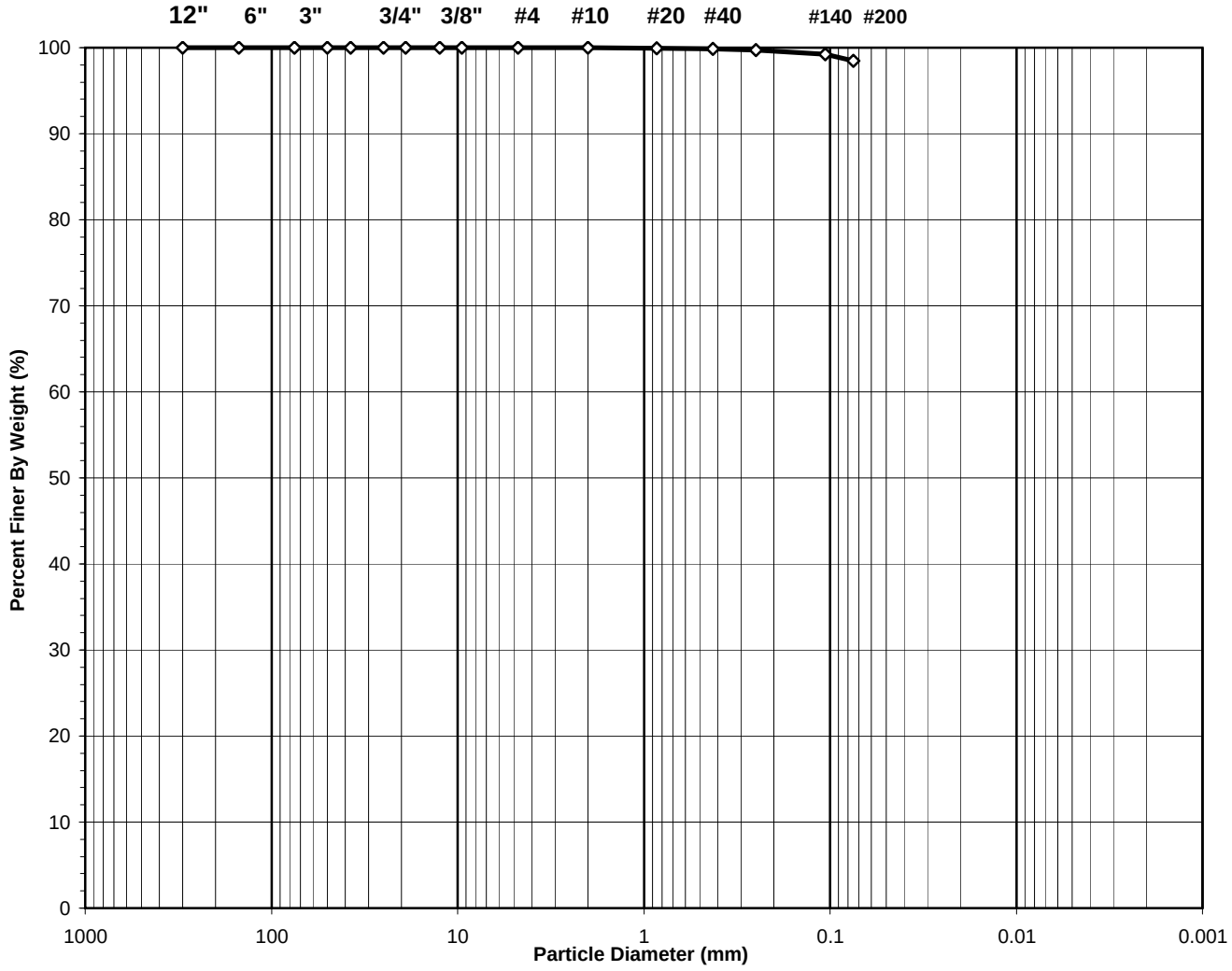
Tested By *JCM* Date *11/20/15* Checked By KC Date 12/1/15

SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-38
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.61-1.79
Project No.:	2015-538-001	Sample No.:	GT3
Lab ID:	2015-538-001-032	Soil Color:	Gray

	SIEVE ANALYSIS		*HYDROMETER*
USCS	**gravel**	**sand**	**silt and clay**



USCS Symbol:
CL, TESTED

USCS Classification:
LEAN CLAY

Tested By	HL	Date	11/24/15	Checked By	KC	Date	11/24/15

DCN: CT-S3C DATE 3/20/13 REVISION: 3

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

WASH SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-38
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.61-1.79
Project No.:	2015-538-001	Sample No.:	GT3
Lab ID:	2015-538-001-032	Soil Color:	Gray

Moisture Content of Passing 3/4" Sample		Water Content of Retained 3/4" Sample	
Tare No.:	1514	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	1358.70	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	1024.20	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	146.24	Weight of Tare (g):	NA
Weight of Water (g):	334.50	Weight of Water (g):	NA
Weight of Dry Sample (g):	877.96	Weight of Dry Sample (g):	NA
Moisture Content (%):	**38.1**	**Moisture Content (%):**	**NA**

Wet Weight of -3/4" Sample (g):	NA	Weight of the Dry Sample (g):	877.96
Dry Weight of - 3/4" Sample (g):	13.5	Weight of - #200 Material (g):	864.45
Wet Weight of +3/4" Sample (g):	NA	Weight of + #200 Material (g):	13.51
Dry Weight of + 3/4" Sample (g):	0.00		
Total Dry Weight of Sample (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.50	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	0.00	0.00	0.00	100.00	**100.00**
#4	4.75	0.07	0.01	0.01	99.99	**99.99**
#10	2.00	0.13	0.01	0.02	99.98	**99.98**
#20	0.850	0.36	0.04	0.06	99.94	**99.94**
#40	0.425	0.70	0.08	0.14	99.86	**99.86**
#60	0.250	1.15	0.13	0.27	99.73	**99.73**
#140	0.106	4.38	0.50	0.77	99.23	**99.23**
#200	0.075	6.72	0.77	1.54	98.46	**98.46**
Pan	-	864.45	98.46	100.00	-	**-**

Tested By HL Date 11/24/15 Checked By KC Date 11/24/15

DCN: CT-S3C DATE 3/20/13 REVISION: 3

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

ATTERBERG LIMITS

ASTM D 4318-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-38
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.61-1.79
Project No.:	2015-538-001	Sample No.:	GT3
Lab ID:	2015-538-001-032	Soil Description:	GRAY LEAN CLAY

Note: The* USCS *symbol used with this test refers only to the minus No. 40 (Minus No. 40 sieve material, Airdried)

sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description .

Liquid Limit Test	**1**	**2**	**3**
Tare Number:	246	159	103
Wt. of Tare & Wet Sample (g):	37.99	38.22	38.02
Wt. of Tare & Dry Sample (g):	33.33	33.30	32.93
Weight of Tare (g):	17.49	17.63	17.66
Weight of Water (g):	4.7	4.9	5.1
Weight of Dry Sample (g):	15.8	15.7	15.3
Moisture Content (%):	**29.4**	**31.4**	**33.3**
Number of Blows:	**30**	**23**	**15**

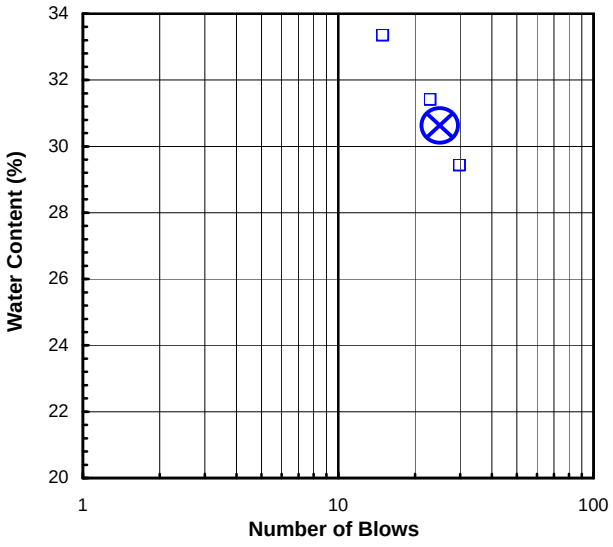
MULTI POINT

Plastic Limit Test	**1**	**2**	**Range**
Tare Number:	189	168	
Wt. of Tare & Wet Sample (g):	25.89	25.25	
Wt. of Tare & Dry Sample (g):	24.83	24.24	
Weight of Tare (g):	19.67	19.11	
Weight of Water (g):	1.1	1.0	
Weight of Dry Sample (g):	5.2	5.1	
Moisture Content (%):	**20.5**	**19.7**	**0.9**

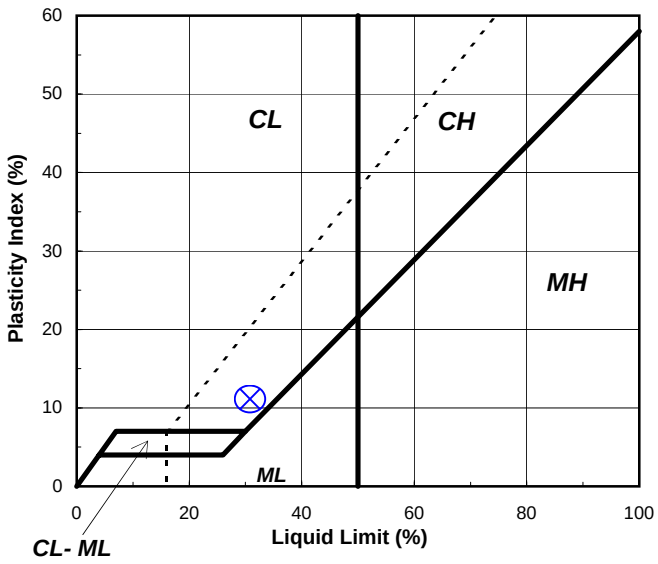
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%):	**31**
Plastic Limit (%):	**20**
Plasticity Index (%):	**11**
USCS Symbol:	**CL**

Flow Curve



Plasticity Chart



Tested By RAL *Date* 11/23/15 *Checked By* KC *Date* 11/24/15

S:\Excel\Excel QA\Spreadsheets\Limit 3Pt.xls

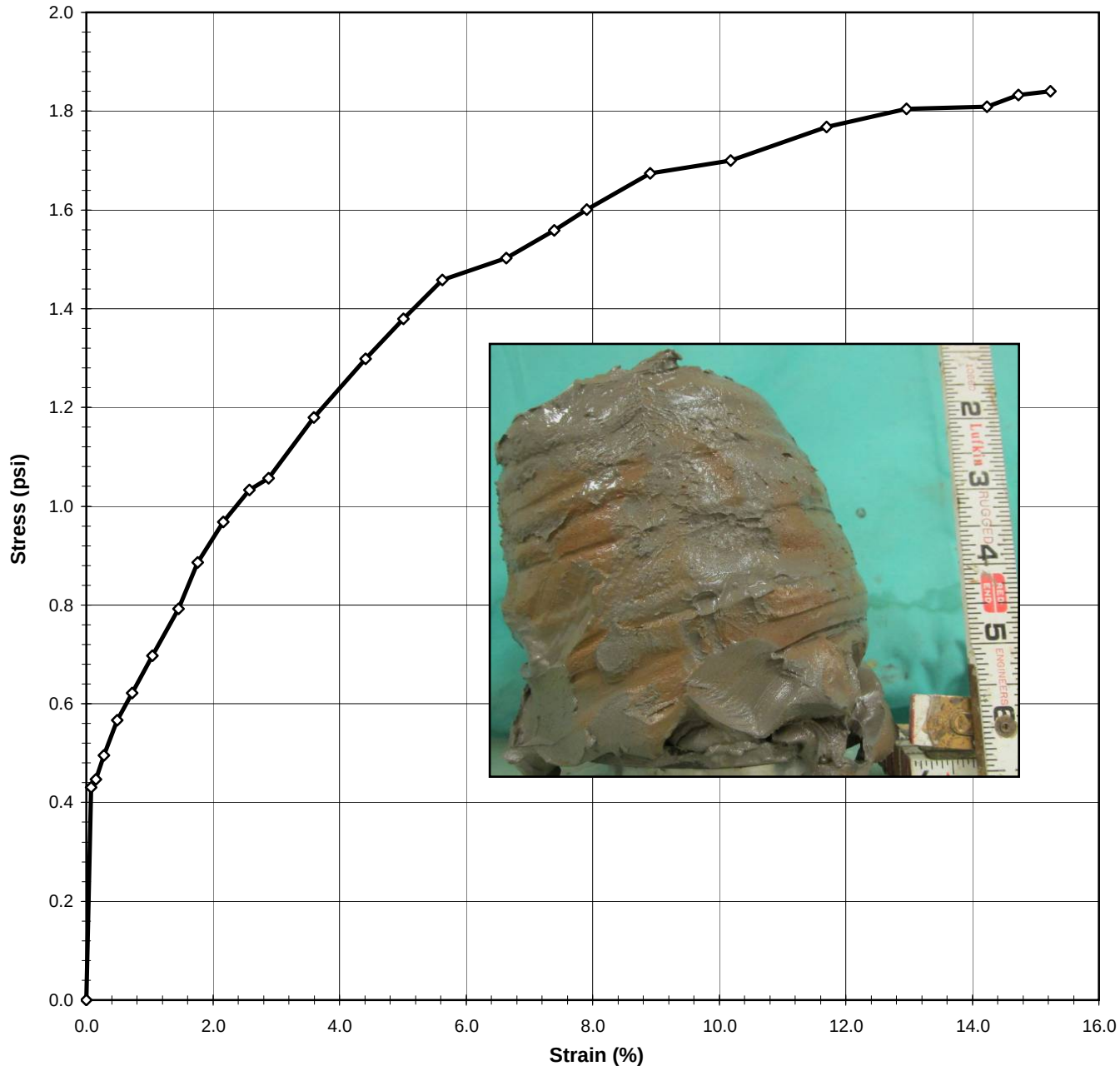
544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONSOLIDATED UNDRAINED TRIAXIAL

ASTM D2850-03a (2007)

Client:	Canadian Seabed Research, Ltd.	Boring No.:	VC-38
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.61-17.79
Project No.:	2015-538-001	Sample No.:	GT3
Lab ID:	2015-538-001-032	Visual:	Gray Silt

CONFINING STRESS (psi) 34.7



Tested By	JCM	Date	11/20/15	Input Checked By	KC	Date	11/30/15

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONSOLIDATED UNDRAINED TRIAXIAL

ASTM D2850-03a (2007)

Client:	Canadian Seabed Research, Ltd.	Boring No.:	VC-38
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.61-17.79
Project No.:	2015-538-001	Sample No.:	GT3
Lab ID:	2015-538-001-032	Visual:	Gray Silt

INITIAL SAMPLE DIMENSIONS

Length 1 (in):	7.346	Top Dia. (in):	3.632
Length 2 (in):	7.329	Mid. Dia. (in):	3.641
Length 3 (in):	7.353	Bot. Dia. (in):	3.665
Avg.Length (in)	**7.343**	**Area (in^2):**	**10.441**

WATER CONTENT (AFTER TEST)

Total Weight of Sample (g):	2171.80
Tare No.:	1514
Weight of Tare & Wet Sample (g):	1358.70
Weight of Tare & Dry Sample (g):	1024.20
Weight of Tare (g):	146.24
% Moisture:	38.1

UNIT WEIGHT

Undisturbed Sample

Weight of Tube & Wet Sample (g):	2195.4	Sample Volume (cm^3):	1256.3
Weight of Tube (g):	0.00	Unit Wet Weight (g/cm^3):	1.75
Weight of Wet Sample (g):	2195.4	Unit Wet Weight (pcf):	109.05
Diameter (in):	3.65	Moisture Content (%):	38.1
Length (in):	7.28	Unit Dry Weight (pcf):	79.0
Length (cm):	18.65		

		Initial Dial Reading (mil)	55
CONFINING STRESS (psi)	**34.7**	Dial Reading Before Shearing (mil)	120

DEFORMATION (in)	*LOAD (lb)*	*ELAPSED TIME (min)*	*STRAIN (%)*	*STRESS (psi)*
0.000	11.6	0.0	0.0	0.000
0.005	16.1	0.07	0.1	0.430
0.011	16.2	0.15	0.2	0.447
0.020	16.7	0.28	0.3	0.496
0.036	17.5	0.48	0.5	0.567
0.053	18.1	0.72	0.7	0.621
0.076	18.9	1.03	1.0	0.697
0.106	19.9	1.43	1.5	0.792
0.128	21.0	1.73	1.8	0.886
0.158	21.9	2.15	2.2	0.968
0.188	22.6	2.55	2.6	1.032
0.210	22.9	2.85	2.9	1.057
0.261	24.3	3.55	3.6	1.180
0.321	25.7	4.37	4.4	1.298
0.365	26.7	4.97	5.0	1.380
0.410	27.7	5.57	5.6	1.458
0.483	28.4	6.57	6.6	1.503
0.538	29.1	7.33	7.4	1.559
0.575	29.7	7.83	7.9	1.600
0.649	30.7	8.83	8.9	1.675
0.741	31.3	10.08	10.2	1.700
0.851	32.5	11.58	11.7	1.768
0.943	33.2	12.85	13.0	1.804
1.036	33.6	14.10	14.2	1.809
1.072	34.0	14.60	14.7	1.833
1.109	34.2	15.10	15.2	1.841

Tested By JCM Date 11/20/15 Input Checked By KC Date 11/30/15

DCN: CT-S29 DATE: 8-21-10 REVISION: 2

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

PHOTOGRAPHS

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-39
Client Reference:	Lake Erie Connector 185241	Depth (m):	0.52-1.02
Project No.:	2015-538-001	Sample No.:	GT3
Lab ID:	2015-538-001-033		

Tested By JCM *Date* 11/23/15 *Checked By* KC *Date* 12/1/15

S:\Excel\Excel QA\Spreadsheets\Photo

SHELBY TUBE UNIT WEIGHT

ASTM D2937-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-39
Client Reference:	Lake Erie Connector 185241	Depth Pushed (m):	0.52-1.02
Project No.:	2015-538-001	Shelby Tube No.:	GT3
Lab ID:	2015-538-001-033	Recovery (m):	0.5

MOISTURE CONTENT — After U.U.

Section Number	**1**	**2**	**3**	**4**	**5**
Tare Number	898	1430			
Weight of Tare & Wet Sample (g)	427.04	1463.58			
Weight of Tare & Dry Sample (g)	380.04	1223.60			
Weight of Tare (g)	109.87	145.33			
Moisture Content (%)	17.40	22.26			

UNIT WEIGHT

Weight of Tube & Wet Sample (g)	2605.03
Weight of Tube (g)	111.88
Weight of Wet Sample (g)	2493.15
Length 1 (in)	7.183
Length 2 (in)	7.199
Length 3 (in)	7.222
Top Diameter (in)	3.564
Middle Diameter (in)	3.569
Bottom Diameter (in)	3.651
Sample Volume (cm^3)	1197.63
Moisture Content (%)	22.26
Unit Wet Weight (g/cm^3)	2.08
Unit Wet Weight (pcf)	129.90
Unit Dry Weight (g/cm^3)	**1.70**
Unit Dry Weight (pcf)	**106.3**

SOIL PROFILE AND SAMPLING

DEPTH (m)	ELEV ( )	SECTION No.	SOIL PROFILE	SOIL DESCRIPTION AND REMARKS	TEST PERFORMED
0.42					
0.57					
0.72					
0.87		2		GRAY SANDY CLAY	U.U. UNIT WGT., W.C. LIMITS GRAIN SIZE
				Pocket Penetrometer 1.25 TSF	
		1		TORVANE= 0.15 kg/cm^2	W.C.
1.02					

***Note**: When full recovery is not achieved, the elevation can not be accurately define*
Indicate each cut of the tube with an arrow
Indicate dividing line between soil types with a solid lin
Indicate wax by cross-hatching. Indicate soil types by standard symbols

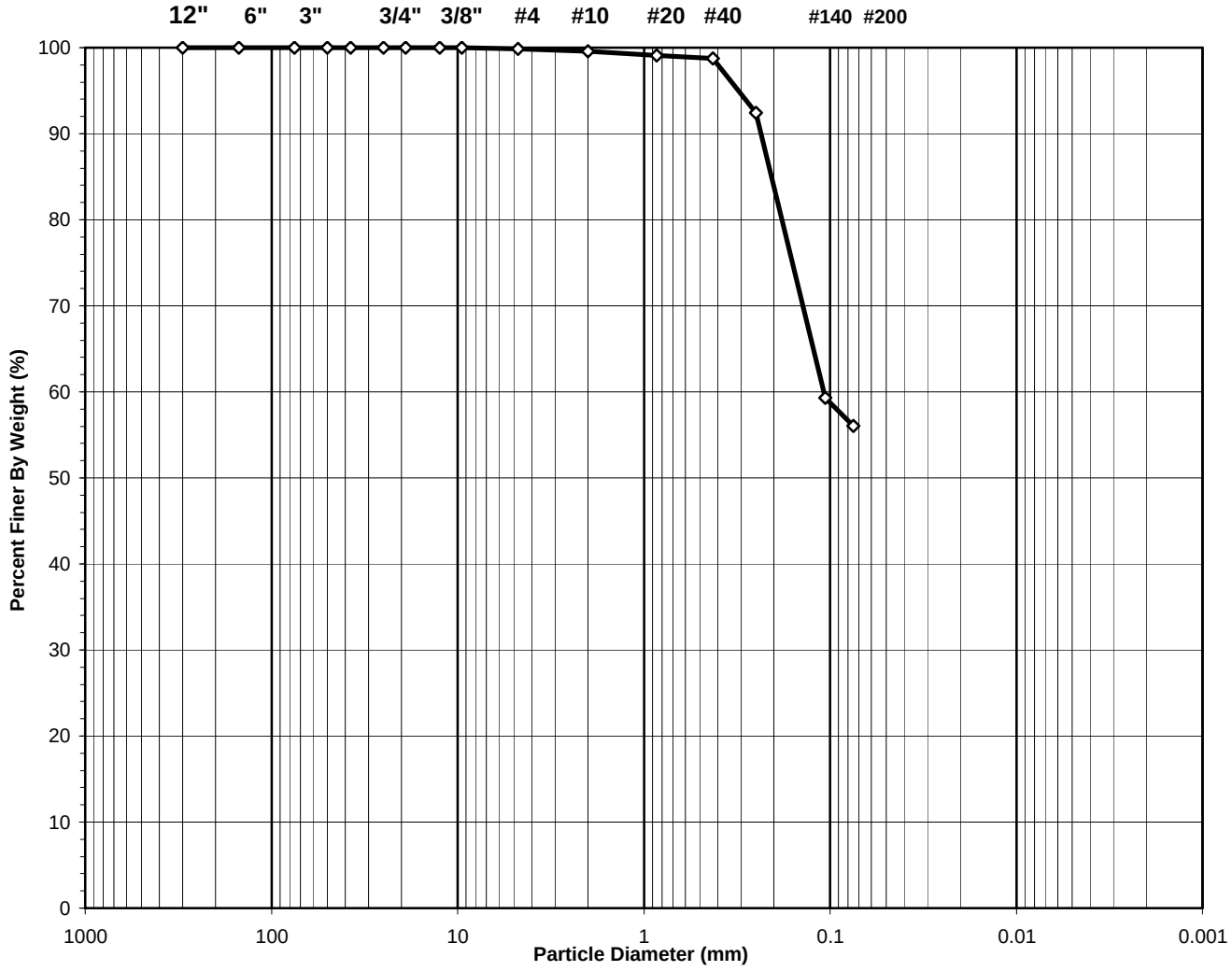
Tested By *JCM* Date *11/23/15* Checked By KC Date 12/1/15

SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-39
Client Reference:	Lake Erie Connector 185241	Depth (m):	0.78-0.96
Project No.:	2015-538-001	Sample No.:	GT3
Lab ID:	2015-538-001-033	Soil Color:	Gray

	SIEVE ANALYSIS		*HYDROMETER*
USCS	**gravel**	**sand**	**silt and clay**



USCS Symbol:
ML, TESTED

USCS Classification:
SANDY SILT
(NON-PLASTIC FINES)

Tested By HL Date 11/25/15 Checked By KC Date 11/30/15

DCN: CT-S3C DATE 3/20/13 REVISION: 3

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

WASH SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-39
Client Reference:	Lake Erie Connector 185241	Depth (m):	0.78-0.96
Project No.:	2015-538-001	Sample No.:	GT3
Lab ID:	2015-538-001-033	Soil Color:	Gray

Moisture Content of Passing 3/4" Sample		Water Content of Retained 3/4" Sample	
Tare No.:	1430	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	1463.58	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	1223.60	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	145.33	Weight of Tare (g):	NA
Weight of Water (g):	239.98	Weight of Water (g):	NA
Weight of Dry Sample (g):	1078.27	Weight of Dry Sample (g):	NA
Moisture Content (%):	**22.3**	**Moisture Content (%):**	**NA**

Wet Weight of -3/4" Sample (g):	NA	Weight of the Dry Sample (g):	1078.27
Dry Weight of - 3/4" Sample (g):	474.1	Weight of - #200 Material (g):	604.13
Wet Weight of +3/4" Sample (g):	NA	Weight of + #200 Material (g):	474.14
Dry Weight of + 3/4" Sample (g):	0.00		
Total Dry Weight of Sample (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.50	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	0.00	0.00	0.00	100.00	**100.00**
#4	4.75	1.70	0.16	0.16	99.84	**99.84**
#10	2.00	2.96	0.27	0.43	99.57	**99.57**
#20	0.850	4.96	0.46	0.89	99.11	**99.11**
#40	0.425	3.98	0.37	1.26	98.74	**98.74**
#60	0.250	68.37	6.34	7.60	92.40	**92.40**
#140	0.106	357.20	33.13	40.73	59.27	**59.27**
#200	0.075	34.97	3.24	43.97	56.03	**56.03**
Pan	-	604.13	56.03	100.00	-	**-**

Tested By HL Date 11/25/15 Checked By KC Date 11/30/15

DCN: CT-S3C DATE 3/20/13 REVISION: 3

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

ATTERBERG LIMIT

ASTM D 4318-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-39
Client Reference:	Lake Erie Connector 185241	Depth (m):	0.78-0.96
Project No.:	2015-538-001	Sample No.:	GT3
Lab ID:	2015-538-001-033	Visual:	GRAY SILT
			(MInus No. 40 sieve material, Airdried)

NON - PLASTIC MATERIAL

Tested By RAL *Date* 11/24/15 *Checked By* CLK *Date* 11/25/15

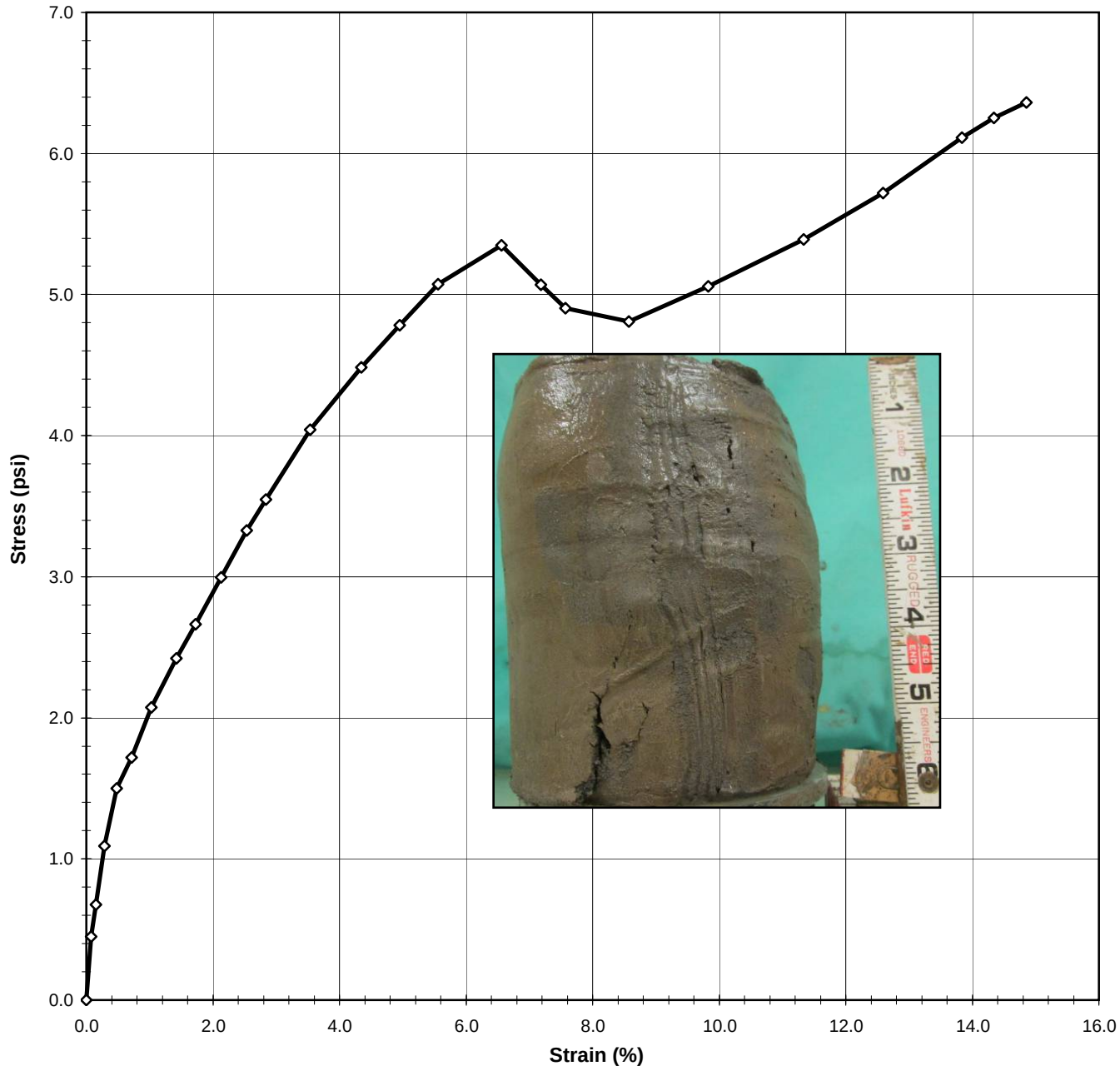
544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONSOLIDATED UNDRAINED TRIAXIAL

ASTM D2850-03a (2007)

Client:	Canadian Seabed Research, Ltd.	Boring No.:	VC-39
Client Reference:	Lake Erie Connector 185241	Depth (m):	0.78-0.96
Project No.:	2015-538-001	Sample No.:	GT3
Lab ID:	2015-538-001-033	Visual:	Gray Sandy Clay

CONFINING STRESS (psi) 27.8



Tested By	JCM	Date	11/23/15	Input Checked By	KC	Date	11/30/15

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONSOLIDATED UNDRAINED TRIAXIAL

ASTM D2850-03a (2007)

Client:	Canadian Seabed Research, Ltd.	Boring No.:	VC-39
Client Reference:	Lake Erie Connector 185241	Depth (m):	0.78-0.96
Project No.:	2015-538-001	Sample No.:	GT3
Lab ID:	2015-538-001-033	Visual:	Gray Sandy Clay

INITIAL SAMPLE DIMENSIONS

Length 1 (in):	7.183	Top Dia. (in):	3.564
Length 2 (in):	7.199	Mid. Dia. (in):	3.569
Length 3 (in):	7.222	Bot. Dia. (in):	3.651
Avg.Length (in)	**7.201**	**Area (in^2):**	**10.149**

WATER CONTENT (AFTER TEST)

Total Weight of Sample (g):	2374.52
Tare No.:	1430
Weight of Tare & Wet Sample (g):	1463.58
Weight of Tare & Dry Sample (g):	1223.60
Weight of Tare (g):	145.33
% Moisture:	22.3

UNIT WEIGHT

Undisturbed Sample

Weight of Tube & Wet Sample (g):	2605.03	Sample Volume (cm^3):	1197.6
Weight of Tube (g):	111.88	Unit Wet Weight (g/cm^3):	2.08
Weight of Wet Sample (g):	2493.15	Unit Wet Weight (pcf):	129.90
Diameter (in):	3.59	Moisture Content (%):	22.3
Length (in):	7.20	Unit Dry Weight (pcf):	106.3
Length (cm):	18.29		

		Initial Dial Reading (mil)	55
CONFINING STRESS (psi)	**27.8**	Dial Reading Before Shearing (mil)	61

DEFORMATION (in)	*LOAD (lb)*	*ELAPSED TIME (min)*	*STRAIN (%)*	*STRESS (psi)*
0.000	9.6	0.0	0.0	0.000
0.005	14.1	0.07	0.1	0.448
0.011	16.5	0.15	0.2	0.677
0.020	20.7	0.28	0.3	1.091
0.034	24.9	0.48	0.5	1.501
0.052	27.2	0.72	0.7	1.720
0.074	30.8	1.02	1.0	2.072
0.102	34.5	1.42	1.4	2.423
0.124	37.1	1.72	1.7	2.662
0.154	40.7	2.13	2.1	2.997
0.182	44.2	2.53	2.5	3.327
0.204	46.7	2.83	2.8	3.549
0.255	52.1	3.53	3.5	4.041
0.313	57.2	4.35	4.3	4.484
0.357	60.7	4.95	5.0	4.782
0.400	64.1	5.55	5.6	5.073
0.472	67.7	6.57	6.6	5.347
0.517	65.0	7.18	7.2	5.068
0.545	63.4	7.57	7.6	4.903
0.617	63.0	8.57	8.6	4.808
0.707	66.5	9.82	9.8	5.060
0.815	71.3	11.33	11.3	5.391
0.906	76.0	12.58	12.6	5.719
0.996	81.6	13.83	13.8	6.113
1.032	83.7	14.33	14.3	6.251
1.069	85.4	14.83	14.9	6.361

Tested By JCM Date 11/23/15 Input Checked By KC Date 11/30/15

DCN: CT-S29 DATE: 8-21-10 REVISION: 2

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

PHOTOGRAPHS

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-39
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.22 - 2.92
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-034		

Tested By JCM *Date* 11/12/15 *Checked By* KC *Date* 11/19/15

S:\Excel\Excel QA\Spr

SHELBY TUBE UNIT WEIGHT

ASTM D2937-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-39
Client Reference:	Lake Erie Connector 185241	Depth Pushed (m):	2.22 - 2.92
Project No.:	2015-538-001	Shelby Tube No.:	GT1
Lab ID:	2015-538-001-034	Recovery (m):	0.7

MOISTURE CONTENT		After U.C.
Section Number	**1**	**2**
Tare Number	913	17
Weight of Tare & Wet Sample (g)	438.09	1301.02
Weight of Tare & Dry Sample (g)	379.18	966.00
Weight of Tare (g)	110.55	204.29
Moisture Content (%)	21.93	43.98

UNIT WEIGHT	
Weight of Tube & Wet Sample (g)	2065.49
Weight of Tube (g)	0.00
Weight of Wet Sample (g)	2065.49
Length 1 (in)	7.240
Length 2 (in)	7.250
Length 3 (in)	7.234
Top Diameter (in)	3.671
Middle Diameter (in)	3.643
Bottom Diameter (in)	3.619
Sample Volume (cm^3)	1237.79
Moisture Content (%)	43.98
Unit Wet Weight (g/cm^3)	1.67
Unit Wet Weight (pcf)	104.13
Unit Dry Weight (g/cm^3)	**1.16**
Unit Dry Weight (pcf)	**72.3**

SOIL PROFILE AND SAMPLING

DEPTH (m)	ELEV ( )	SECTION No.	SOIL PROFILE	SOIL DESCRIPTION AND REMARKS	TEST PERFORMED
2.32					
2.47					
2.62					
2.77		2		GRAY SANDY CLAY AND WOOD Pocket Penetrometer 1.25 TSF TORVANE= 0.35 kg/cm^2	UNIT WGT. GRAIN SIZE U.C. LIMITS
2.92		1			W.C.

***Note**: When full recovery is not achieved, the elevation can not be accurately definec*
Indicate each cut of the tube with an arrow
Indicate dividing line between soil types with a solid lin
Indicate wax by cross-hatching. Indicate soil types by standard symbols

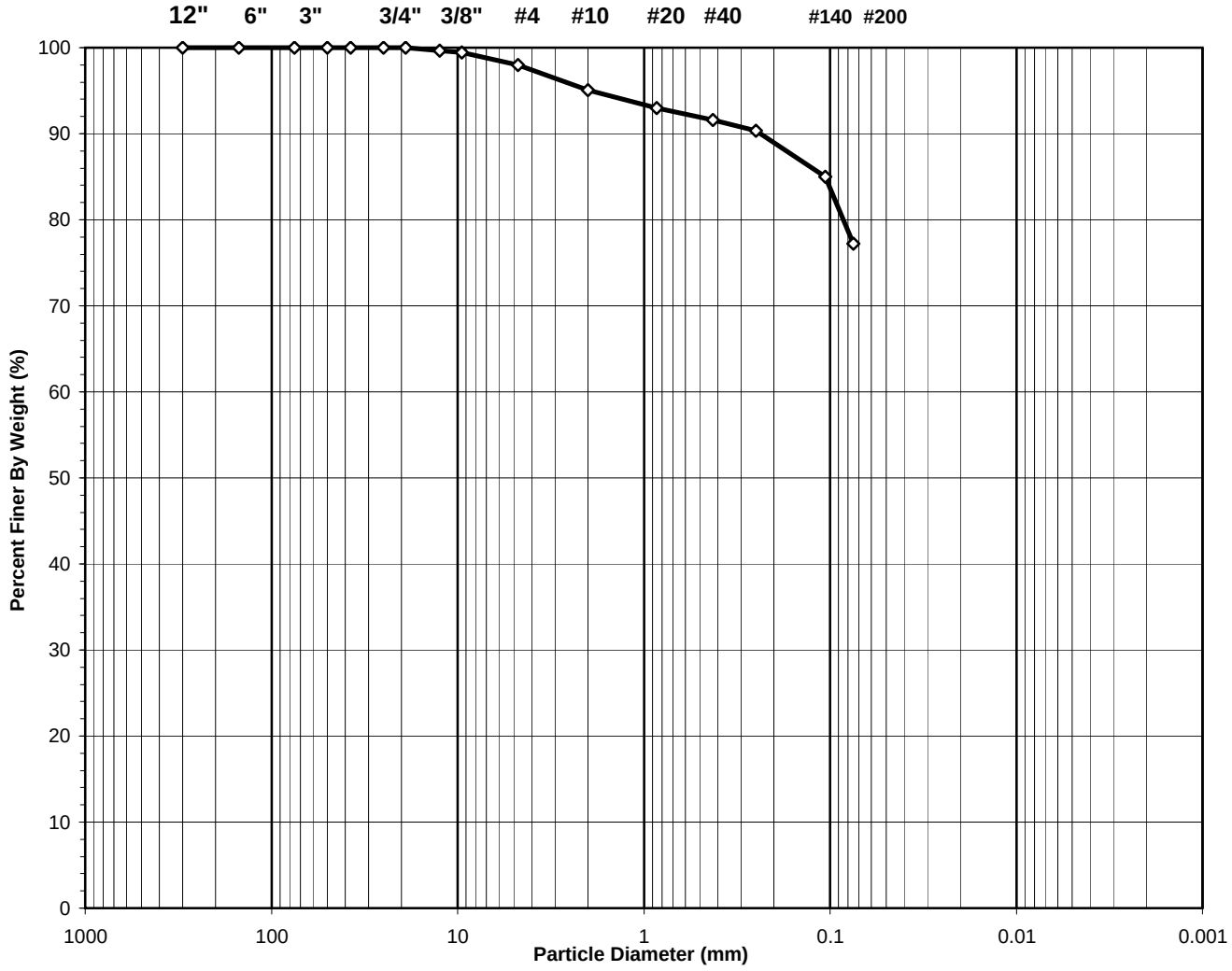
Tested By *JCM* Date *11/12/15* Checked By KC Date 11/19/15

SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-39
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.68-2.86
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-034	Soil Color:	Gray

	SIEVE ANALYSIS		*HYDROMETER*
USCS	**gravel**	**sand**	**silt and clay**



USCS Symbol:
ML, TESTED

USCS Classification:
SILT WITH SAND
(NON-PLASTIC FINES)

Tested By HL Date 11/17/15 Checked By KC Date 11/19/15

DCN: CT-S3C DATE 3/20/13 REVISION: 3

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

WASH SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-39
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.68-2.86
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-034	Soil Color:	Gray

Moisture Content of Passing 3/4" Sample		Water Content of Retained 3/4" Sample	
Tare No.:	17	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	1301.02	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	966.00	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	204.29	Weight of Tare (g):	NA
Weight of Water (g):	335.02	Weight of Water (g):	NA
Weight of Dry Sample (g):	761.71	Weight of Dry Sample (g):	NA
Moisture Content (%):	**44.0**	**Moisture Content (%):**	**NA**

Wet Weight of -3/4" Sample (g):	NA	Weight of the Dry Sample (g):	761.71
Dry Weight of - 3/4" Sample (g):	173.3	Weight of - #200 Material (g):	588.44
Wet Weight of +3/4" Sample (g):	NA	Weight of + #200 Material (g):	173.27
Dry Weight of + 3/4" Sample (g):	0.00		
Total Dry Weight of Sample (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.50	2.90	0.38	0.38	99.62	**99.62**
3/8"	9.50	1.43	0.19	0.57	99.43	**99.43**
#4	4.75	11.05	1.45	2.02	97.98	**97.98**
#10	2.00	22.11	2.90	4.92	95.08	**95.08**
#20	0.850	16.15	2.12	7.04	92.96	**92.96**
#40	0.425	10.44	1.37	8.41	91.59	**91.59**
#60	0.250	9.65	1.27	9.68	90.32	**90.32**
#140	0.106	40.59	5.33	15.01	84.99	**84.99**
#200	0.075	58.95	7.74	22.75	77.25	**77.25**
Pan	-	588.44	77.25	100.00	-	**-**

Tested By HL Date 11/17/15 Checked By KC Date 11/19/15

DCN: CT-S3C DATE 3/20/13 REVISION: 3

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

ATTERBERG LIMIT

ASTM D 4318-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-39
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.68-2.86
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-034	Visual:	GRAY SILT
			(MInus No. 40 sieve material, Airdried)

NON - PLASTIC MATERIAL

Tested By *RAL* *Date* *11/17/15* *Checked By* *CLK* *Date* *11/18/15*

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONFINED COMPRESSIVE STRENGTH

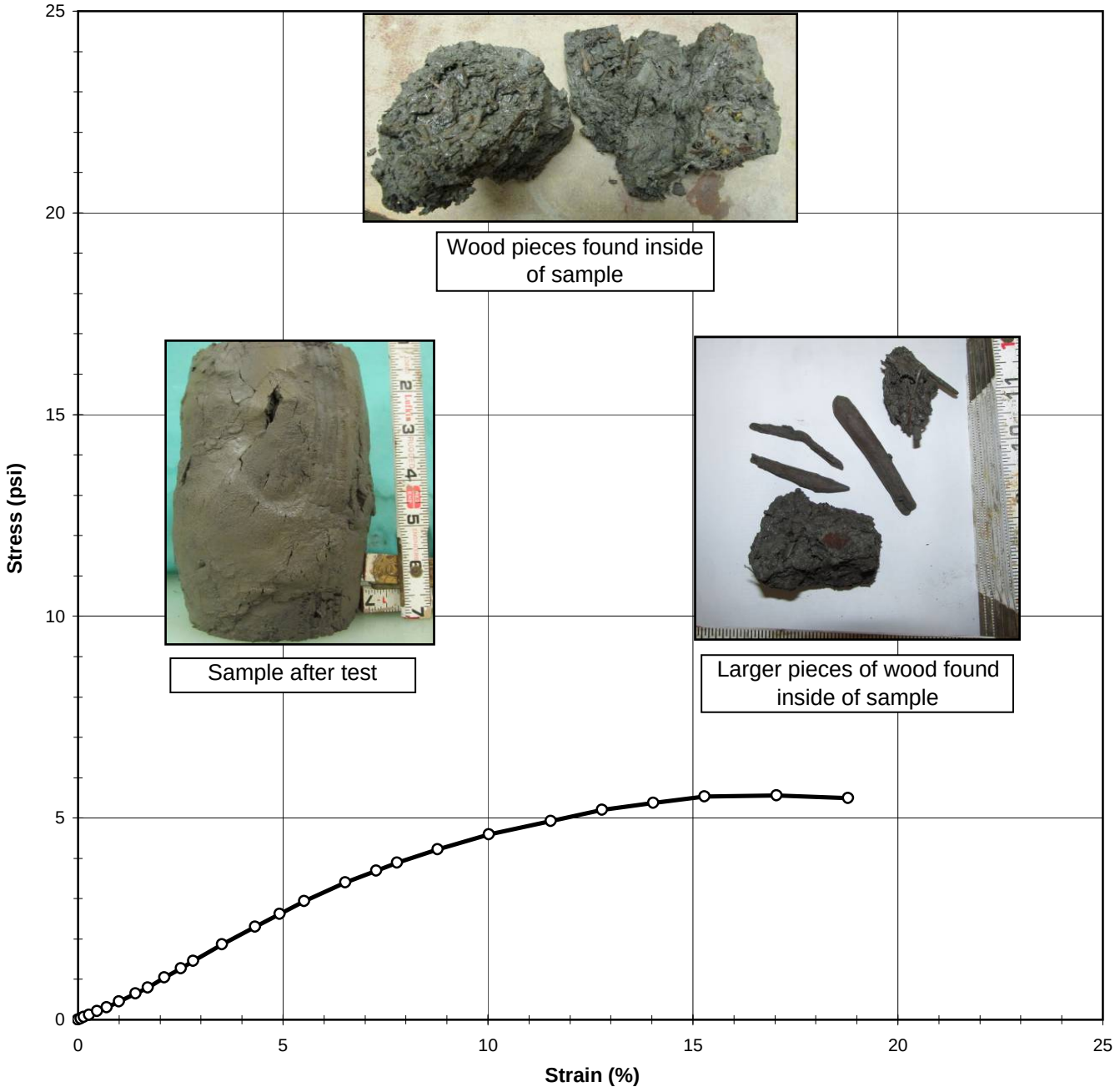
ASTM D2166-13 / AASHTO T208-10 (SOP S-30)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-39
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.68 - 2.86
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-034	Visual:	Gray Sandy Clay and Organic Material, Wood

Wood pieces found inside of sample

Sample after test

Larger pieces of wood found inside of sample



Tested By	JCM	Date	11/12/15	Approved By	KC	Date	11/13/15

DCN: CT-S30 Date: 11/09/09 Revision: 4

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONFINED COMPRESSIVE STRENGTH

ASTM D2166-13 / AASHTO T208-10 (SOP S-30)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-39
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.68 - 2.86
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-034	Visual:	Gray Sandy Clay and Organic Material, Wood

INITIAL SAMPLE DIMENSIONS				WATER CONTENT AFTER TEST	
Length 1 (in):	7.240	Top Diameter (in):	3.671	Tare No.:	17
Length 2 (in):	7.250	Middle Diameter (in):	3.643	Weight of Tare & Wet Sample (g):	1301.02
Length 3 (in):	7.234	Bottom Diameter (in):	3.619	Weight of Tare & Dry Sample (g):	966.00
Avg. Length (in):	**7.241**	**Avg. Diameter (in):**	**3.644**	Weight of Tare (g):	204.29
		Area (in^2):	**10.431**	Moisture Content (%):	43.98

UNIT WEIGHT

Weight of Tube & Wet Sample (g):	2065.5	Sample Volume (cm^3):	1237.8
Weight of Tube (g):	0.00	Unit Wet Weight (g/cm^3):	1.67
Weight of Wet Sample (g):	2065.49	Unit Wet Weight (pcf):	104.13
Average Diameter (in):	3.64	Moisture Content (%):	43.98
Average Length (in):	7.24	Unit Dry Weight (pcf):	72.32
Average Length (cm):	18.39		

ELECTRONIC DEVICE DEFORMATION (in)	*LOAD (lb)*	*ELAPSED TIME (min)*	*STRAIN (%)*	*STRESS (psi)*
0.000	0.0	0.00	0.000	0.000
0.005	0.3	0.08	0.069	0.026
0.011	0.7	0.15	0.148	0.066
0.020	1.2	0.28	0.271	0.118
0.034	2.2	0.48	0.472	0.213
0.051	3.2	0.72	0.700	0.308
0.073	4.8	1.02	1.008	0.456
0.102	6.8	1.42	1.402	0.642
0.124	8.5	1.72	1.709	0.797
0.153	11.2	2.12	2.113	1.050
0.182	13.6	2.53	2.516	1.271
0.204	15.6	2.83	2.815	1.451
0.255	20.2	3.53	3.517	1.871
0.313	25.2	4.33	4.324	2.307
0.356	28.7	4.93	4.921	2.618
0.400	32.4	5.53	5.527	2.937
0.473	37.9	6.53	6.527	3.400
0.527	41.6	7.28	7.281	3.698
0.563	44.0	7.78	7.781	3.886
0.636	48.3	8.80	8.782	4.224
0.726	53.3	10.05	10.027	4.597
0.835	58.1	11.55	11.536	4.924
0.926	62.1	12.80	12.785	5.195
1.017	65.2	14.05	14.040	5.373
1.107	68.1	15.30	15.286	5.533
1.234	69.8	17.05	17.041	5.554
1.360	70.5	18.80	18.787	5.490

Tested By JCM Date 11/12/15 Input Checked By KC Date 11/13/15

DCN: CT-S30 Date: 11/09/09 Revision: 4

S:\Excel\Excel QA\Spreadsheets\UC Sigma.xls

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

PHOTOGRAPHS

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-40
Client Reference:	Lake Erie Connector 185241	Depth (m):	0.59 - 1.09
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-035		

Tested By	*JCM*	*Date*	*11/12/15*	*Checked By*	*KC*	*Date*	*11/19/15*

S:\Excel\Excel QA\Spr

SHELBY TUBE UNIT WEIGHT

ASTM D2937-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-40
Client Reference:	Lake Erie Connector 185241	Depth Pushed (m):	0.59 - 1.09
Project No.:	2015-538-001	Shelby Tube No.:	GT1
Lab ID:	2015-538-001-035	Recovery (m):	0.5

MOISTURE CONTENT		After U.C.
Section Number	**1**	**1**
Tare Number	537	58
Weight of Tare & Wet Sample (g)	345.11	1412.71
Weight of Tare & Dry Sample (g)	301.80	1203.60
Weight of Tare (g)	82.37	198.47
Moisture Content (%)	19.74	20.80

UNIT WEIGHT	
Weight of Tube & Wet Sample (g)	2540.96
Weight of Tube (g)	0.00
Weight of Wet Sample (g)	2540.96
Length 1 (in)	7.228
Length 2 (in)	7.220
Length 3 (in)	7.236
Top Diameter (in)	3.605
Middle Diameter (in)	3.604
Bottom Diameter (in)	3.634
Sample Volume (cm^3)	1215.25
Moisture Content (%)	20.80
Unit Wet Weight (g/cm^3)	2.09
Unit Wet Weight (pcf)	130.47
Unit Dry Weight (g/cm^3)	**1.73**
Unit Dry Weight (pcf)	**108.0**

SOIL PROFILE AND SAMPLING

DEPTH (m)	ELEV ( )	SECTION No.	SOIL PROFILE	SOIL DESCRIPTION AND REMARKS	TEST PERFORMED
0.49					
0.64					
0.79					
0.94		2		GRAY CLAY Pocket Penetrometer 1.0 TSF	UNIT WGT. GRAIN SIZE U.C. LIMITS
		1		Torvane= 0.2 kg/cm^2	W.C.
1.09					

***Note**: When full recovery is not achieved, the elevation can not be accurately definec*
Indicate each cut of the tube with an arrow
Indicate dividing line between soil types with a solid lin
Indicate wax by cross-hatching. Indicate soil types by standard symbols

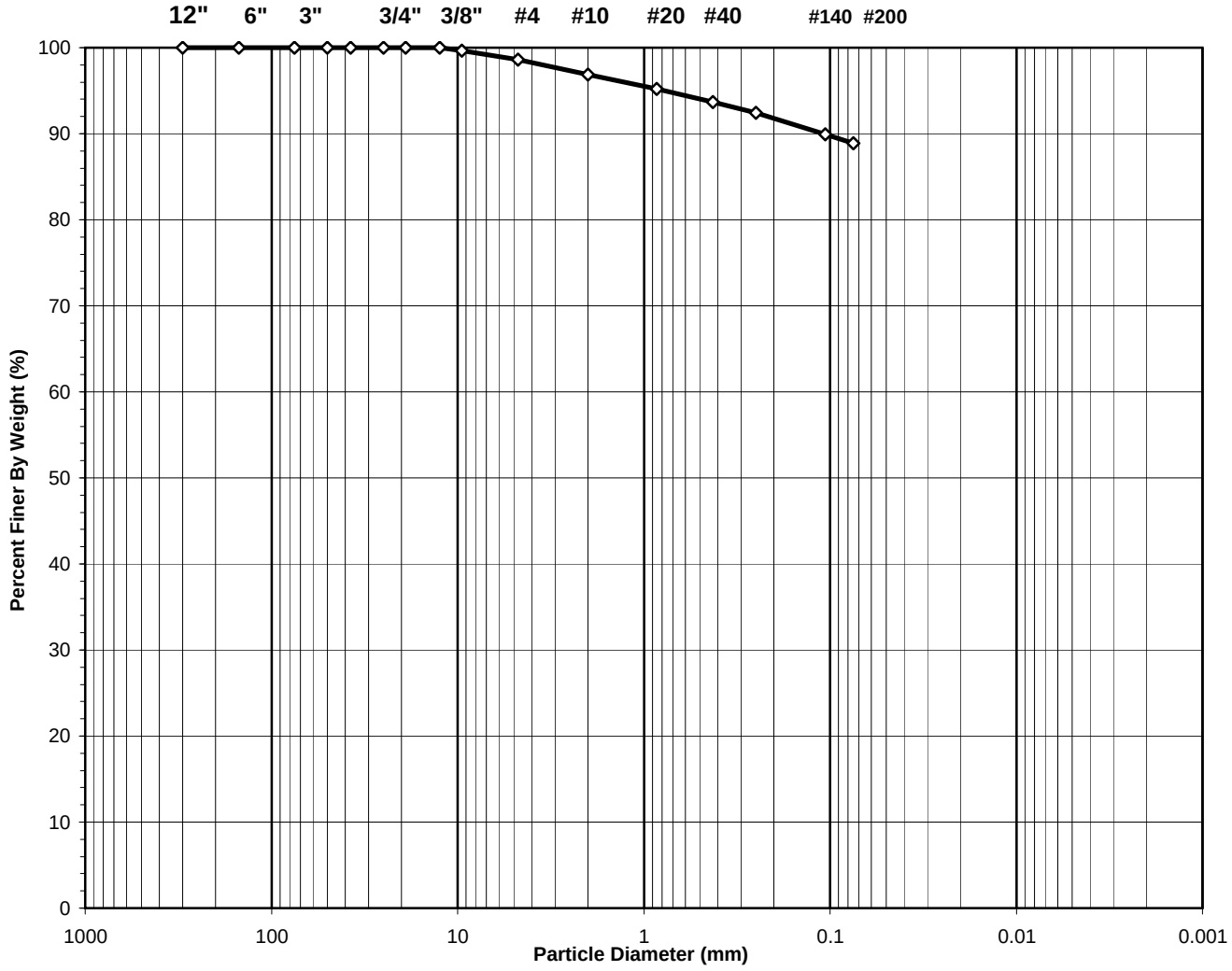
Tested By *JCM* Date *11/12/15* Checked By KC Date 11/19/15

SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-40
Client Reference:	Lake Erie Connector 185241	Depth (m):	0.86-1.03
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-035	Soil Color:	Gray

	SIEVE ANALYSIS		*HYDROMETER*
USCS	**gravel**	**sand**	**silt and clay**



USCS Symbol:
CL, TESTED

USCS Classification:
LEAN CLAY

Tested By	HL	Date	11/17/15	Checked By	KC	Date	11/19/15

DCN: CT-S3C DATE 3/20/13 REVISION: 3

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

WASH SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-40
Client Reference:	Lake Erie Connector 185241	Depth (m):	0.86-1.03
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-035	Soil Color:	Gray

Moisture Content of Passing 3/4" Sample		Water Content of Retained 3/4" Sample	
Tare No.:	58	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	1412.71	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	1203.60	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	198.47	Weight of Tare (g):	NA
Weight of Water (g):	209.11	Weight of Water (g):	NA
Weight of Dry Sample (g):	1005.13	Weight of Dry Sample (g):	NA
Moisture Content (%):	**20.8**	**Moisture Content (%):**	**NA**

Wet Weight of -3/4" Sample (g):	NA	Weight of the Dry Sample (g):	1005.13
Dry Weight of - 3/4" Sample (g):	111.9	Weight of - #200 Material (g):	893.19
Wet Weight of +3/4" Sample (g):	NA	Weight of + #200 Material (g):	111.94
Dry Weight of + 3/4" Sample (g):	0.00		
Total Dry Weight of Sample (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.50	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	3.24	0.32	0.32	99.68	**99.68**
#4	4.75	10.49	1.04	1.37	98.63	**98.63**
#10	2.00	17.60	1.75	3.12	96.88	**96.88**
#20	0.850	16.63	1.65	4.77	95.23	**95.23**
#40	0.425	15.55	1.55	6.32	93.68	**93.68**
#60	0.250	12.44	1.24	7.56	92.44	**92.44**
#140	0.106	25.17	2.50	10.06	89.94	**89.94**
#200	0.075	10.82	1.08	11.14	88.86	**88.86**
Pan	-	893.19	88.86	100.00	-	**-**

Tested By HL Date 11/17/15 Checked By KC Date 11/19/15

DCN: CT-S3C DATE 3/20/13 REVISION: 3

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

ATTERBERG LIMITS

ASTM D 4318-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-40
Client Reference:	Lake Erie Connector 185241	Depth (m):	0.86-1.03
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-035	Soil Description:	GRAY LEAN CLAY

Note: The* USCS *symbol used with this test refers only to the minus No. 40 (Minus No. 40 sieve material, Airdried)

sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description .

Liquid Limit Test	**1**	**2**	**3**
Tare Number:	1109	143	166
Wt. of Tare & Wet Sample (g):	39.02	40.36	38.64
Wt. of Tare & Dry Sample (g):	34.27	35.65	34.11
Weight of Tare (g):	18.76	19.97	18.39
Weight of Water (g):	4.8	4.7	4.5
Weight of Dry Sample (g):	15.5	15.7	15.7
Moisture Content (%):	**30.6**	**30.0**	**28.8**
Number of Blows:	**16**	**21**	**31**

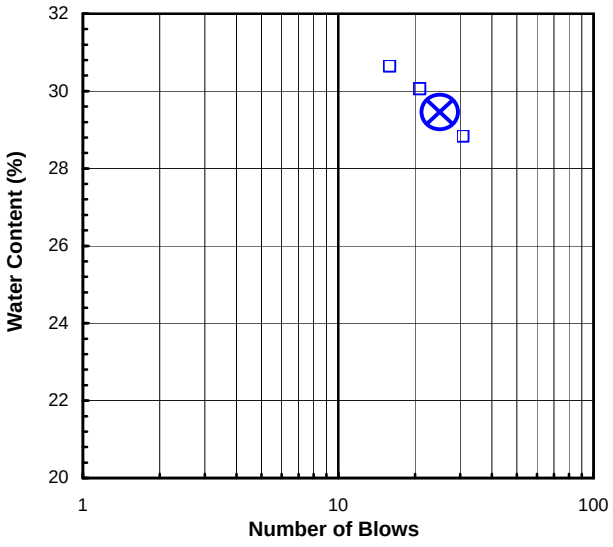
MULTIPOINT

Plastic Limit Test	**1**	**2**	**Range**
Tare Number:	185	239	
Wt. of Tare & Wet Sample (g):	25.55	26.78	
Wt. of Tare & Dry Sample (g):	24.80	25.96	
Weight of Tare (g):	19.38	20.18	
Weight of Water (g):	0.8	0.8	
Weight of Dry Sample (g):	5.4	5.8	
Moisture Content (%):	**13.8**	**14.2**	**-0.3**

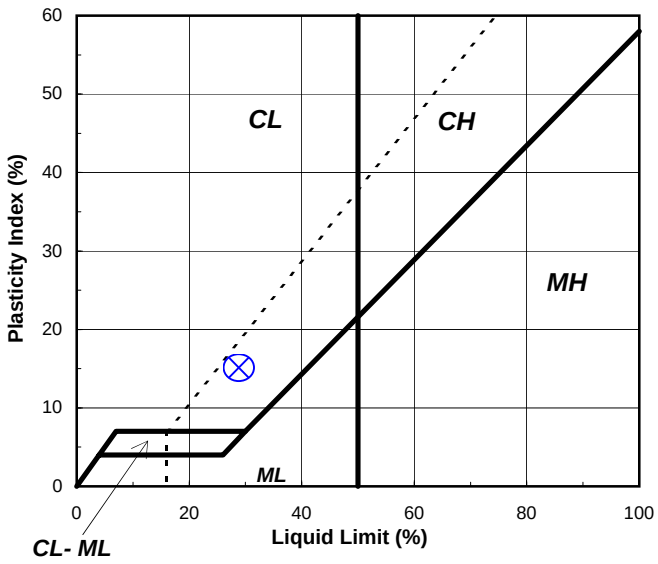
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%):	**29**
Plastic Limit (%):	**14**
Plasticity Index (%):	**15**
USCS Symbol:	**CL**

Flow Curve



Plasticity Chart



Tested By RAL *Date* 11/17/15 *Checked By* CLK *Date* 11/18/15

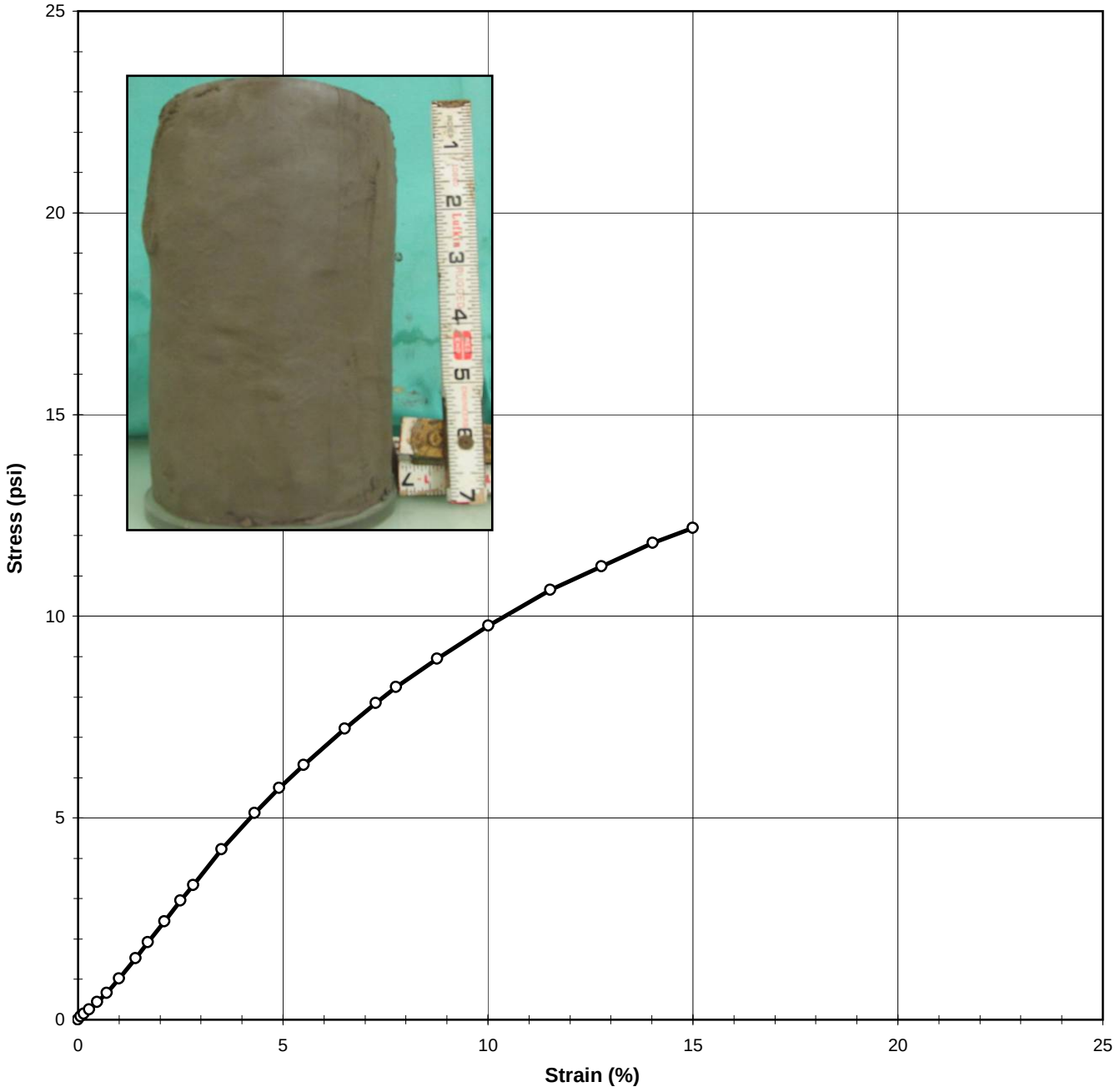
S:\Excel\Excel QA\Spreadsheets\Limit 3Pt.xls

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONFINED COMPRESSIVE STRENGTH

ASTM D2166-13 / AASHTO T208-10 (SOP S-30)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-40
Client Reference:	Lake Erie Connector 185241	Depth (m):	.86 - 1.03
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-035	Visual:	Gray Clay



Tested By	JCM	Date	11/12/15	Approved By	KC	Date	11/13/15

DCN: CT-S30 Date: 11/09/09 Revision: 4

S:\Excel\Excel QA\Spreadsheets\UC Sigma.xls

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONFINED COMPRESSIVE STRENGTH

ASTM D2166-13 / AASHTO T208-10 (SOP S-30)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-40
Client Reference:	Lake Erie Connector 185241	Depth (m):	.86 - 1.03
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-035	Visual:	Gray Clay

INITIAL SAMPLE DIMENSIONS				WATER CONTENT AFTER TEST	
Length 1 (in):	7.228	Top Diameter (in):	3.605	Tare No.:	58
Length 2 (in):	7.220	Middle Diameter (in):	3.604	Weight of Tare & Wet Sample (g):	1412.71
Length 3 (in):	7.236	Bottom Diameter (in):	3.634	Weight of Tare & Dry Sample (g):	1203.60
Avg. Length (in):	**7.228**	**Avg. Diameter (in):**	**3.614**	Weight of Tare (g):	198.47
		Area (in^2):	**10.260**	Moisture Content (%):	20.80

UNIT WEIGHT			
Weight of Tube & Wet Sample (g):	2541.0	Sample Volume (cm^3):	1215.2
Weight of Tube (g):	0.00	Unit Wet Weight (g/cm^3):	2.09
Weight of Wet Sample (g):	2540.96	Unit Wet Weight (pcf):	130.47
Average Diameter (in):	3.61	Moisture Content (%):	20.80
Average Length (in):	7.23	Unit Dry Weight (pcf):	108.00
Average Length (cm):	18.36		

ELECTRONIC DEVICE DEFORMATION (in)	*LOAD (lb)*	*ELAPSED TIME (min)*	*STRAIN (%)*	*STRESS (psi)*
0.000	0.0	0.00	0.000	0.000
0.005	0.8	0.07	0.069	0.079
0.011	1.5	0.15	0.148	0.146
0.020	2.6	0.27	0.271	0.255
0.034	4.5	0.48	0.473	0.436
0.051	6.8	0.70	0.701	0.658
0.072	10.5	1.00	1.000	1.017
0.101	15.8	1.40	1.403	1.518
0.123	20.0	1.70	1.701	1.914
0.152	25.5	2.10	2.105	2.432
0.181	31.0	2.50	2.500	2.949
0.203	35.2	2.80	2.807	3.337
0.254	44.8	3.52	3.509	4.217
0.311	54.9	4.32	4.308	5.120
0.355	62.0	4.92	4.913	5.748
0.398	68.5	5.52	5.510	6.313
0.471	79.2	6.52	6.510	7.214
0.525	86.8	7.27	7.265	7.848
0.561	91.7	7.77	7.765	8.245
0.634	100.6	8.77	8.766	8.946
0.724	111.3	10.02	10.012	9.766
0.833	123.5	11.52	11.521	10.649
0.923	132.1	12.77	12.767	11.231
1.014	141.0	14.02	14.022	11.814
1.085	147.2	15.00	15.005	12.193

Tested By JCM Date 11/12/15 Input Checked By KC Date 11/13/15

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

PHOTOGRAPHS

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-41
Client Reference:	Lake Erie Connector 185241	Depth (m):	0.85 - 1.55
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-036		

Tested By JCM *Date* 11/13/15 *Checked By* KC *Date* 11/19/15

S:\Excel\Excel QA\Spr

SHELBY TUBE UNIT WEIGHT

ASTM D2937-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-41
Client Reference:	Lake Erie Connector 185241	Depth Pushed (m):	0.85 - 1.55
Project No.:	2015-538-001	Shelby Tube No.:	GT1
Lab ID:	2015-538-001-036	Recovery (m):	0.7

MOISTURE CONTENT		After U.C.
Section Number	**1**	**2**
Tare Number	1699	1524
Weight of Tare & Wet Sample (g)	238.96	1406.40
Weight of Tare & Dry Sample (g)	211.66	1177.10
Weight of Tare (g)	83.48	145.19
Moisture Content (%)	21.30	22.22

UNIT WEIGHT	
Weight of Tube & Wet Sample (g)	2480.44
Weight of Tube (g)	0.00
Weight of Wet Sample (g)	2480.44
Length 1 (in)	7.162
Length 2 (in)	7.214
Length 3 (in)	7.104
Top Diameter (in)	3.600
Middle Diameter (in)	3.590
Bottom Diameter (in)	3.608
Sample Volume (cm^3)	1193.85
Moisture Content (%)	22.22
Unit Wet Weight (g/cm^3)	2.08
Unit Wet Weight (pcf)	129.65
Unit Dry Weight (g/cm^3)	**1.70**
Unit Dry Weight (pcf)	**106.1**

SOIL PROFILE AND SAMPLING

DEPTH (m)	ELEV ( )	SECTION No.	SOIL PROFILE	SOIL DESCRIPTION AND REMARKS	TEST PERFORMED
0.95					
1.10					
1.25					
1.40		2		BROWN CLAY Pocket Penetrometer .75 TSF TORVANE= 0.3 kg/cm^2	UNIT WGT. GRAIN SIZE U.C. LIMITS
		1			W.C.
1.55					

***Note**: When full recovery is not achieved, the elevation can not be accurately definec*
Indicate each cut of the tube with an arrow
Indicate dividing line between soil types with a solid lin
Indicate wax by cross-hatching. Indicate soil types by standard symbols

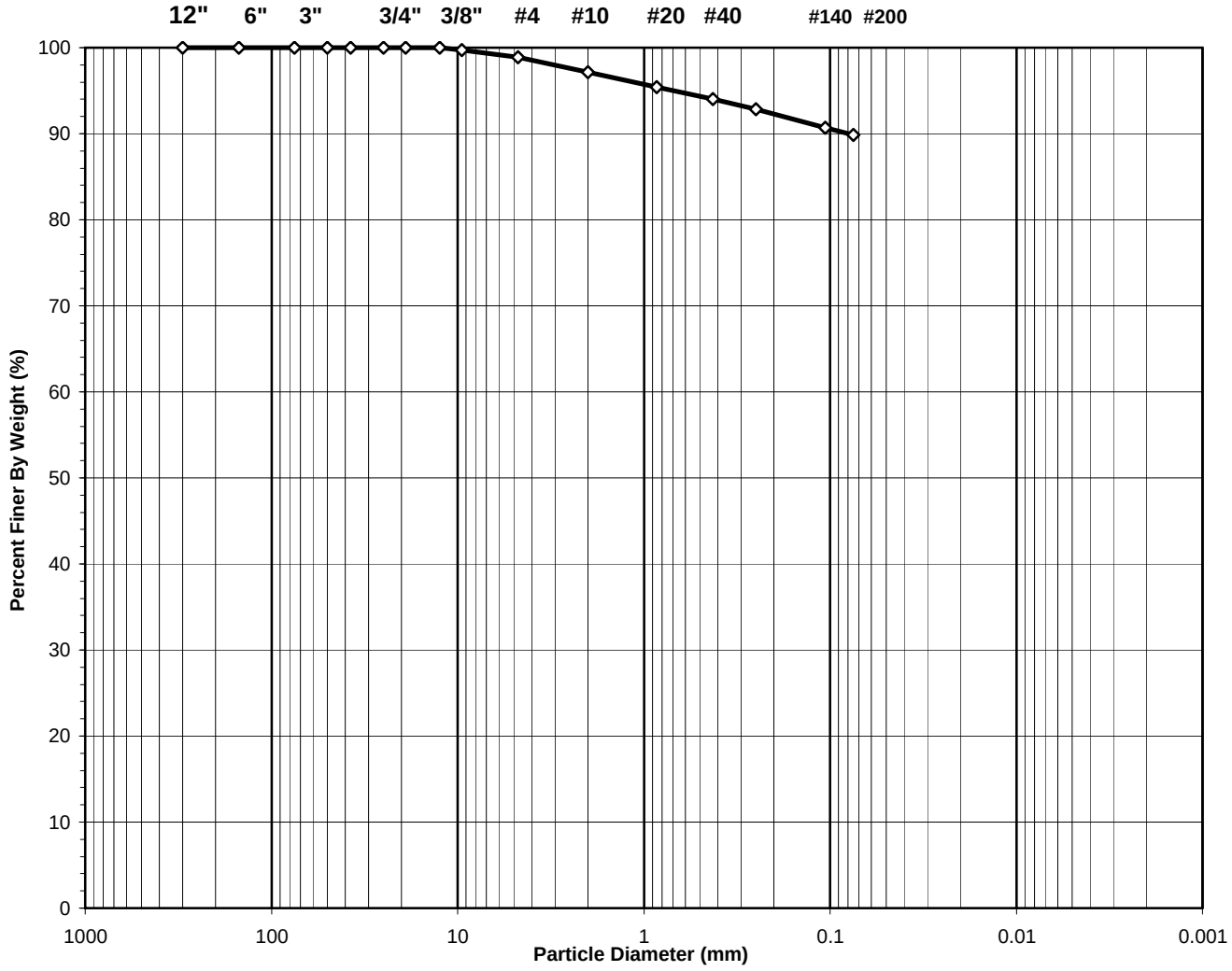
Tested By *JCM* Date *11/13/15* Checked By KC Date 11/19/15

SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-41
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.34-1.52
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-036	Soil Color:	Brown

	SIEVE ANALYSIS		*HYDROMETER*
USCS	**gravel**	**sand**	**silt and clay**



USCS Symbol:
CL, TESTED

USCS Classification:
LEAN CLAY

Tested By	HL	Date	11/17/15	Checked By	KC	Date	11/19/15

DCN: CT-S3C DATE 3/20/13 REVISION: 3

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

WASH SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-41
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.34-1.52
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-036	Soil Color:	Brown

Moisture Content of Passing 3/4" Sample		Water Content of Retained 3/4" Sample	
Tare No.:	1524	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	1406.40	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	1177.10	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	145.19	Weight of Tare (g):	NA
Weight of Water (g):	229.30	Weight of Water (g):	NA
Weight of Dry Sample (g):	1031.91	Weight of Dry Sample (g):	NA
Moisture Content (%):	**22.2**	**Moisture Content (%):**	**NA**

Wet Weight of -3/4" Sample (g):	NA	Weight of the Dry Sample (g):	1031.91
Dry Weight of - 3/4" Sample (g):	104.4	Weight of - #200 Material (g):	927.52
Wet Weight of +3/4" Sample (g):	NA	Weight of + #200 Material (g):	104.39
Dry Weight of + 3/4" Sample (g):	0.00		
Total Dry Weight of Sample (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.50	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	2.95	0.29	0.29	99.71	**99.71**
#4	4.75	8.58	0.83	1.12	98.88	**98.88**
#10	2.00	17.74	1.72	2.84	97.16	**97.16**
#20	0.850	18.13	1.76	4.59	95.41	**95.41**
#40	0.425	14.36	1.39	5.99	94.01	**94.01**
#60	0.250	12.08	1.17	7.16	92.84	**92.84**
#140	0.106	22.36	2.17	9.32	90.68	**90.68**
#200	0.075	8.19	0.79	10.12	89.88	**89.88**
Pan	-	927.52	89.88	100.00	-	**-**

Tested By HL Date 11/17/15 Checked By KC Date 11/19/15

DCN: CT-S3C DATE 3/20/13 REVISION: 3

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

ATTERBERG LIMITS

ASTM D 4318-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-41
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.34-1.52
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-036	Soil Description:	BROWN LEAN CLAY

Note: The* USCS *symbol used with this test refers only to the minus No. 40 (Minus No. 40 sieve material, Airdried)
sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description .

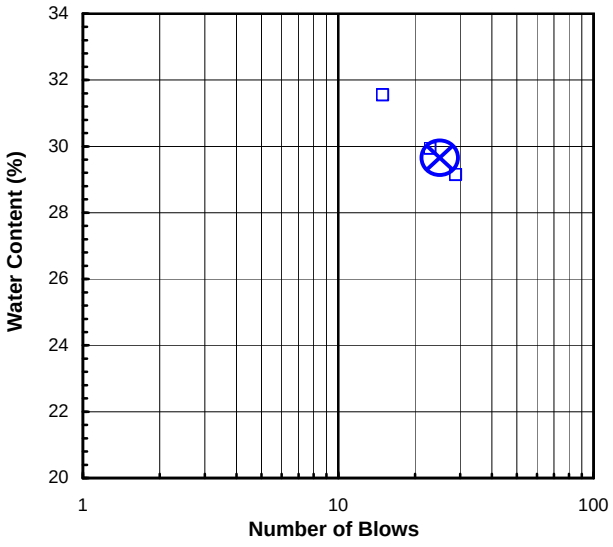
Liquid Limit Test	**1**	**2**	**3**	
				M
Tare Number:	156	455	248	**U**
Wt. of Tare & Wet Sample (g):	39.07	35.97	37.50	**L**
Wt. of Tare & Dry Sample (g):	34.23	31.27	32.88	**T**
Weight of Tare (g):	18.88	15.56	17.02	**I**
Weight of Water (g):	4.8	4.7	4.6	**P**
Weight of Dry Sample (g):	15.4	15.7	15.9	**O**
				I
Moisture Content (%):	**31.5**	**29.9**	**29.1**	**N**
Number of Blows:	**15**	**23**	**29**	**T**

Plastic Limit Test	**1**	**2**	**Range**
Tare Number:	178	366	
Wt. of Tare & Wet Sample (g):	24.93	23.10	
Wt. of Tare & Dry Sample (g):	24.10	22.33	
Weight of Tare (g):	18.41	17.08	
Weight of Water (g):	0.8	0.8	
Weight of Dry Sample (g):	5.7	5.3	
Moisture Content (%):	**14.6**	**14.7**	**-0.1**

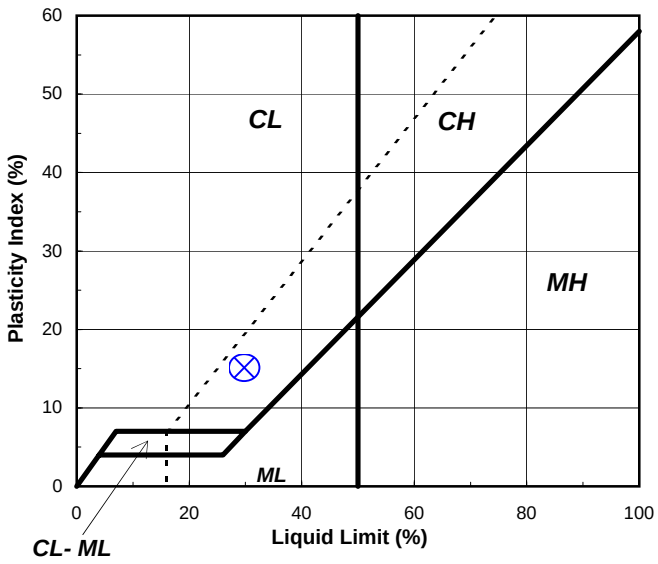
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%):	**30**
Plastic Limit (%):	**15**
Plasticity Index (%):	**15**
USCS Symbol:	**CL**

Flow Curve



Plasticity Chart



Tested By RAL *Date* 11/18/15 *Checked By* CLK *Date* 11/19/15

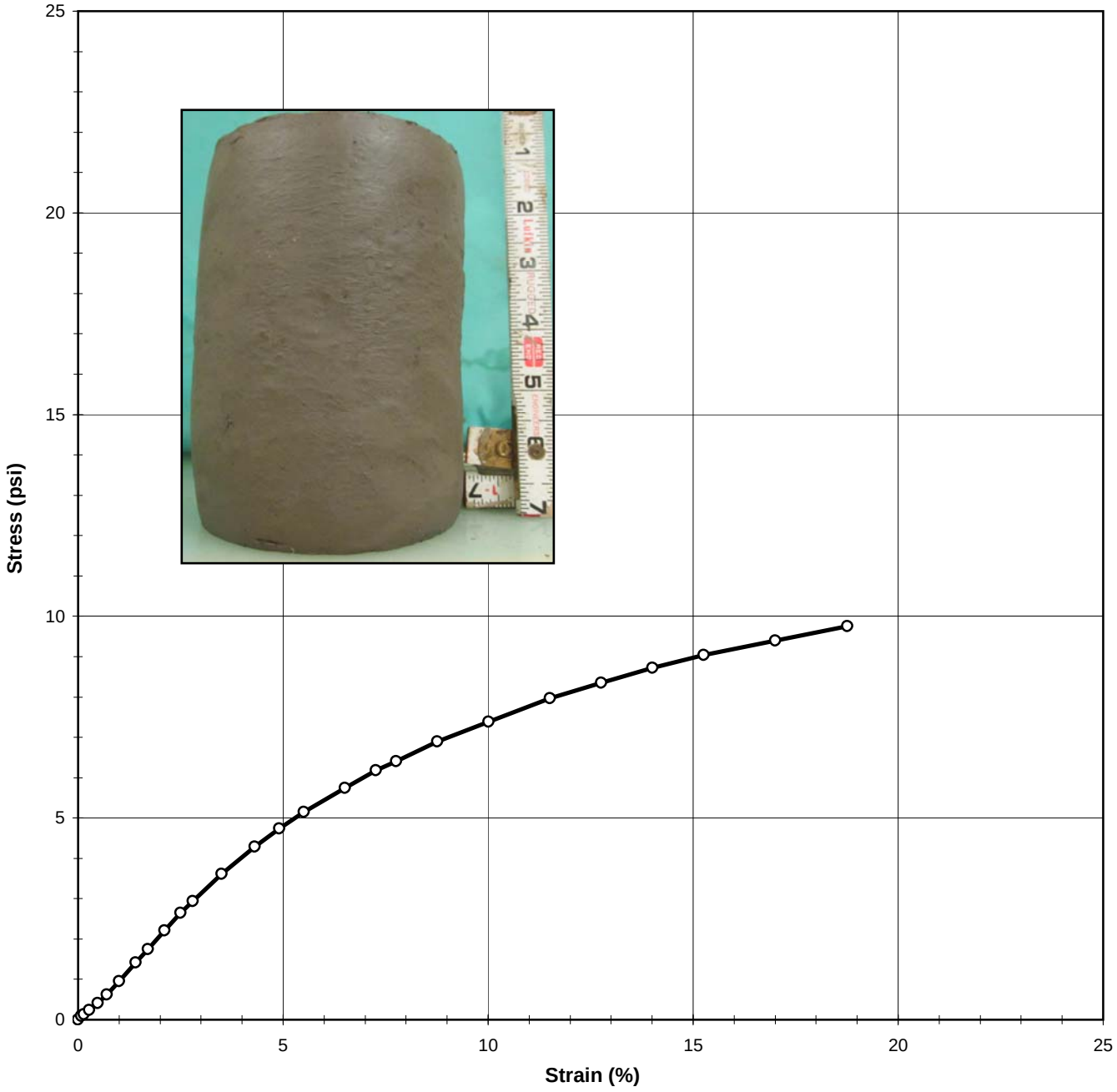
S:\Excel\Excel QA\Spreadsheets\Limit 3Pt.xls

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONFINED COMPRESSIVE STRENGTH

ASTM D2166-13 / AASHTO T208-10 (SOP S-30)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-41
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.34 - 1.52
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-036	Visual:	Brown Clay



Tested By	JCM	Date	11/13/15	Approved By	JAB	Date	11/16/15

DCN: CT-S30 Date: 11/09/09 Revision: 4

S:\Excel\Excel QA\Spreadsheets\UC Sigma.xls

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONFINED COMPRESSIVE STRENGTH

ASTM D2166-13 / AASHTO T208-10 (SOP S-30)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-41
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.34 - 1.52
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-036	Visual:	Brown Clay

INITIAL SAMPLE DIMENSIONS			
Length 1 (in):	7.162	Top Diameter (in):	3.600
Length 2 (in):	7.214	Middle Diameter (in):	3.590
Length 3 (in):	7.104	Bottom Diameter (in):	3.608
Avg. Length (in):	**7.160**	**Avg. Diameter (in):**	**3.599**
		Area (in^2):	**10.175**

WATER CONTENT AFTER TEST	
Tare No.:	1524
Weight of Tare & Wet Sample (g):	1406.40
Weight of Tare & Dry Sample (g):	1177.10
Weight of Tare (g):	145.19
Moisture Content (%):	22.22

UNIT WEIGHT			
Weight of Tube & Wet Sample (g):	2480.4	Sample Volume (cm^3):	1193.8
Weight of Tube (g):	0.00	Unit Wet Weight (g/cm^3):	2.08
Weight of Wet Sample (g):	2480.44	Unit Wet Weight (pcf):	129.65
Average Diameter (in):	3.60	Moisture Content (%):	22.22
Average Length (in):	7.16	Unit Dry Weight (pcf):	106.08
Average Length (cm):	18.19		

ELECTRONIC DEVICE DEFORMATION (in)	*LOAD (lb)*	*ELAPSED TIME (min)*	*STRAIN (%)*	*STRESS (psi)*
0.000	-0.4	0.00	0.000	0.000
0.005	0.5	0.08	0.074	0.090
0.010	0.9	0.15	0.145	0.128
0.020	2.0	0.28	0.276	0.244
0.034	3.7	0.48	0.478	0.407
0.051	5.9	0.72	0.706	0.624
0.072	9.4	1.02	1.005	0.954
0.101	14.1	1.42	1.409	1.410
0.122	17.7	1.72	1.707	1.753
0.151	22.5	2.12	2.111	2.206
0.179	27.1	2.52	2.505	2.644
0.201	30.3	2.82	2.803	2.935
0.251	37.6	3.52	3.506	3.609
0.309	45.2	4.32	4.313	4.290
0.352	50.3	4.92	4.910	4.742
0.394	55.0	5.52	5.506	5.148
0.466	62.1	6.52	6.507	5.747
0.520	67.4	7.27	7.261	6.180
0.556	70.2	7.77	7.762	6.407
0.627	76.4	8.77	8.762	6.890
0.717	83.1	10.02	10.008	7.391
0.824	91.2	11.52	11.509	7.967
0.914	96.9	12.77	12.763	8.346
1.003	102.8	14.02	14.010	8.721
1.093	108.1	15.27	15.264	9.039
1.218	114.7	17.02	17.011	9.391
1.344	121.7	18.77	18.766	9.753

Tested By JCM Date 11/13/15 Input Checked By JAB Date 11/16/15

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

PHOTOGRAPHS

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-42
Client Reference:	Lake Erie Connector 185241	Depth (m):	0.55-1.05
Project No.:	2015-538-001	Sample No.:	GT4
Lab ID:	2015-538-001-037		

Tested By JCM *Date* 11/23/15 *Checked By* KC *Date* 12/1/15

S:\Excel\Excel QA\Spreadsheets\Photo

SHELBY TUBE UNIT WEIGHT

ASTM D2937-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-42
Client Reference:	Lake Erie Connector 185241	Depth Pushed (m):	0.55-1.05
Project No.:	2015-538-001	Shelby Tube No.:	GT4
Lab ID:	2015-538-001-037	Recovery (m):	0.5

MOISTURE CONTENT

	After U.U.				
Section Number	**1**	**2**	**3**	**4**	**5**
Tare Number	610	1519			
Weight of Tare & Wet Sample (g)	444.30	1068.33			
Weight of Tare & Dry Sample (g)	318.90	761.50			
Weight of Tare (g)	83.22	147.56			
Moisture Content (%)	53.21	49.98			

UNIT WEIGHT

Weight of Tube & Wet Sample (g)	2078.80
Weight of Tube (g)	117.69
Weight of Wet Sample (g)	1961.11
Length 1 (in)	6.993
Length 2 (in)	7.049
Length 3 (in)	7.012
Top Diameter (in)	3.641
Middle Diameter (in)	3.595
Bottom Diameter (in)	3.665
Sample Volume (cm^3)	1192.60
Moisture Content (%)	49.98
Unit Wet Weight (g/cm^3)	1.64
Unit Wet Weight (pcf)	102.61
Unit Dry Weight (g/cm^3)	**1.10**
Unit Dry Weight (pcf)	**68.4**

SOIL PROFILE AND SAMPLING

DEPTH (m)	ELEV ( )	SECTION No.	SOIL PROFILE	SOIL DESCRIPTION AND REMARKS	TEST PERFORMED
0.45					
0.60					
0.75					
0.90		2		GRAY SILT	U.U. UNIT WGT., W.C. LIMITS
				Pocket Penetrometer 0 TSF	
		1		TORVANE= 0.05 kg/cm^2	W.C.
1.05					

***Note**: When full recovery is not achieved, the elevation can not be accurately define*
Indicate each cut of the tube with an arrow
Indicate dividing line between soil types with a solid lin
Indicate wax by cross-hatching. Indicate soil types by standard symbols

Tested By *JCM* Date *11/23/15* Checked By KC Date 12/1/15

ATTERBERG LIMITS

ASTM D 4318-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-42
Client Reference:	Lake Erie Connector 185241	Depth (m):	0.81-0.99
Project No.:	2015-538-001	Sample No.:	GT4
Lab ID:	2015-538-001-037	Soil Description:	GRAY SILT

Note: The* USCS *symbol used with this test refers only to the minus No. 40 (Minus No. 40 sieve material, Airdried)
sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description .

Liquid Limit Test	**1**	**2**	**3**
Tare Number:	204	194	202
Wt. of Tare & Wet Sample (g):	38.59	39.89	38.16
Wt. of Tare & Dry Sample (g):	33.80	35.13	33.38
Weight of Tare (g):	18.50	19.28	17.29
Weight of Water (g):	4.8	4.8	4.8
Weight of Dry Sample (g):	15.3	15.9	16.1
Moisture Content (%):	**31.3**	**30.0**	**29.7**
Number of Blows:	**15**	**24**	**31**

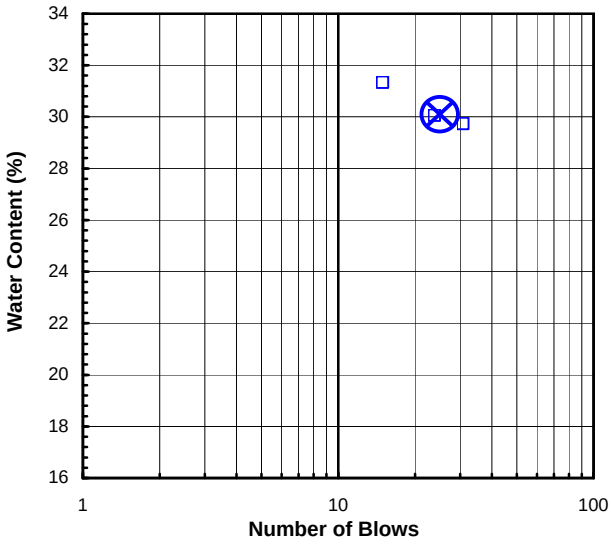
MULTIPOINT

Plastic Limit Test	**1**	**2**	**Range**
Tare Number:	182	178	
Wt. of Tare & Wet Sample (g):	25.60	24.48	
Wt. of Tare & Dry Sample (g):	24.42	23.34	
Weight of Tare (g):	19.38	18.40	
Weight of Water (g):	1.2	1.1	
Weight of Dry Sample (g):	5.0	4.9	
Moisture Content (%):	**23.4**	**23.1**	**0.3**

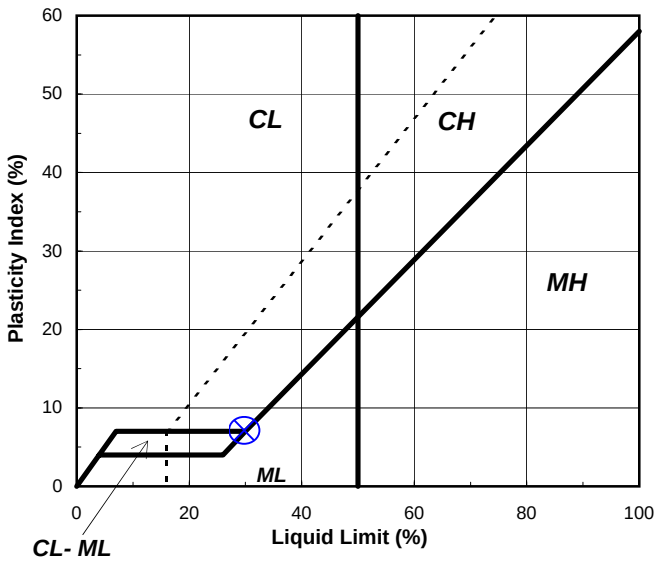
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%):	**30**
Plastic Limit (%):	**23**
Plasticity Index (%):	**7**
USCS Symbol:	**ML**

Flow Curve



Plasticity Chart



Tested By RAL *Date* 11/24/15 *Checked By* CLK *Date* 11/25/15

S:\Excel\Excel QA\Spreadsheets\Limit 3Pt.xls

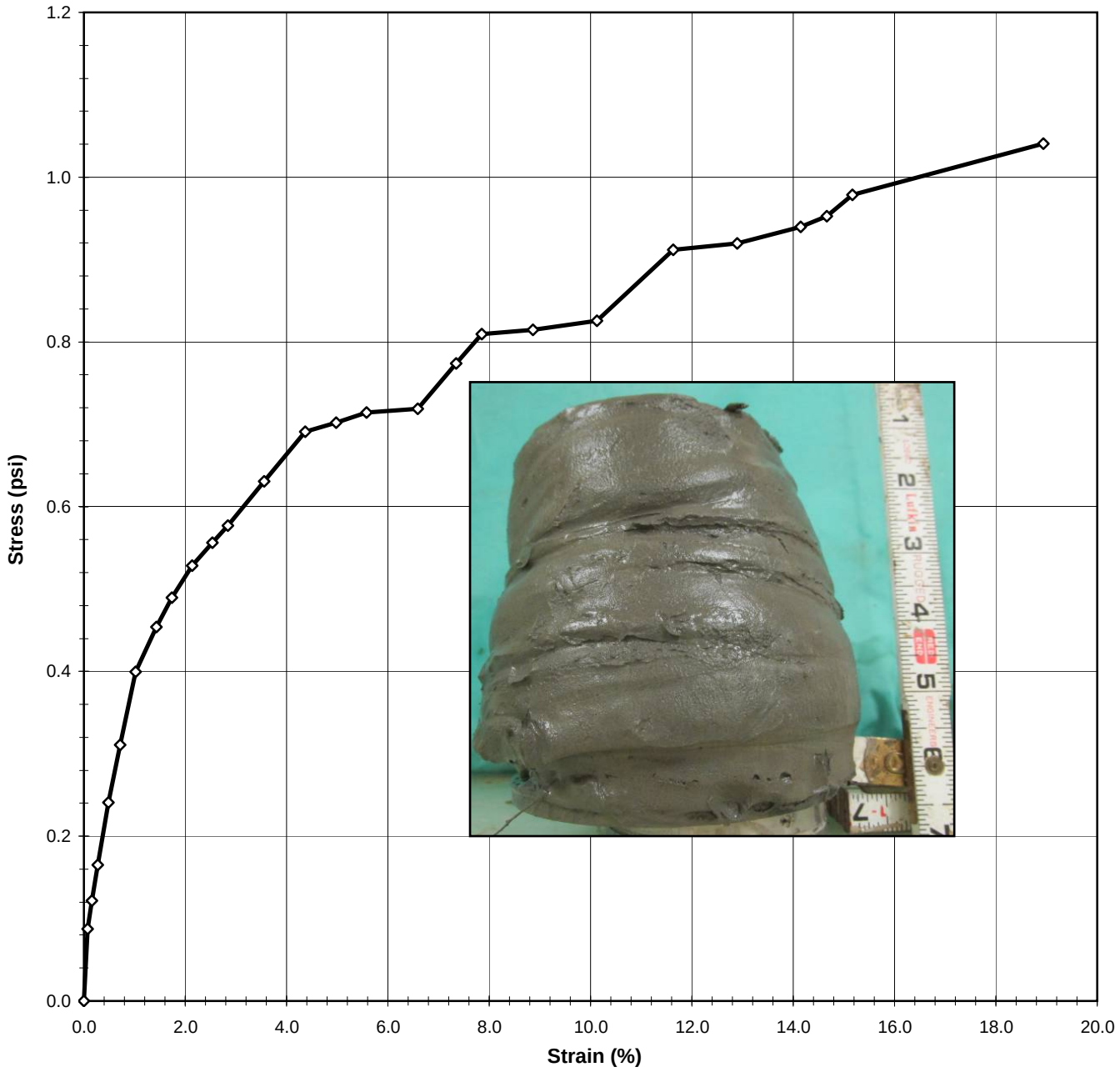
544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONSOLIDATED UNDRAINED TRIAXIAL

ASTM D2850-03a (2007)

Client:	Canadian Seabed Research, Ltd.	Boring No.:	VC-42
Client Reference:	Lake Erie Connector 185241	Depth (m):	0.81-0.99
Project No.:	2015-538-001	Sample No.:	GT4
Lab ID:	2015-538-001-037	Visual:	Gray Silt

CONFINING STRESS (psi) 27.8



Tested By	JCM	Date	11/23/15	Input Checked By	KC	Date	11/30/15

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONSOLIDATED UNDRAINED TRIAXIAL

ASTM D2850-03a (2007)

Client:	Canadian Seabed Research, Ltd.	Boring No.:	VC-42
Client Reference:	Lake Erie Connector 185241	Depth (m):	0.81-0.99
Project No.:	2015-538-001	Sample No.:	GT4
Lab ID:	2015-538-001-037	Visual:	Gray Silt

INITIAL SAMPLE DIMENSIONS

Length 1 (in):	6.993	Top Dia. (in):	3.641
Length 2 (in):	7.049	Mid. Dia. (in):	3.595
Length 3 (in):	7.012	Bot. Dia. (in):	3.665
Avg.Length (in)	**7.018**	**Area (in^2):**	**10.370**

WATER CONTENT (AFTER TEST)

Total Weight of Sample (g):	1901.87
Tare No.:	1519
Weight of Tare & Wet Sample (g):	1068.33
Weight of Tare & Dry Sample (g):	761.50
Weight of Tare (g):	147.56
% Moisture:	50.0

UNIT WEIGHT

Undisturbed Sample

Weight of Tube & Wet Sample (g):	2078.80	Sample Volume (cm^3):	1192.6
Weight of Tube (g):	117.69	Unit Wet Weight (g/cm^3):	1.64
Weight of Wet Sample (g):	1961.11	Unit Wet Weight (pcf):	102.61
Diameter (in):	3.63	Moisture Content (%):	50.0
Length (in):	6.98	Unit Dry Weight (pcf):	68.4
Length (cm):	17.83		

		Initial Dial Reading (mil)	42
CONFINING STRESS (psi)	**27.8**	Dial Reading Before Shearing (mil)	76

DEFORMATION (in)	*LOAD (lb)*	*ELAPSED TIME (min)*	*STRAIN (%)*	*STRESS (psi)*
0.000	13.6	0.0	0.0	0.000
0.005	14.5	0.08	0.1	0.087
0.011	14.8	0.15	0.2	0.122
0.019	15.3	0.28	0.3	0.165
0.034	16.1	0.48	0.5	0.241
0.050	16.8	0.72	0.7	0.311
0.071	17.8	1.03	1.0	0.399
0.100	18.3	1.43	1.4	0.454
0.121	18.7	1.73	1.7	0.489
0.150	19.2	2.13	2.1	0.528
0.178	19.5	2.53	2.5	0.556
0.199	19.7	2.83	2.8	0.577
0.248	20.4	3.55	3.6	0.631
0.305	21.1	4.35	4.4	0.691
0.348	21.2	4.97	5.0	0.702
0.390	21.4	5.57	5.6	0.714
0.460	21.6	6.57	6.6	0.719
0.513	22.2	7.32	7.3	0.774
0.549	22.7	7.82	7.9	0.809
0.619	22.8	8.82	8.9	0.815
0.707	23.1	10.08	10.1	0.826
0.813	24.3	11.58	11.6	0.912
0.901	24.5	12.83	12.9	0.919
0.988	24.9	14.08	14.2	0.940
1.024	25.1	14.58	14.7	0.953
1.059	25.5	15.08	15.2	0.979
1.323	26.9	18.85	18.9	1.040

Tested By JCM Date 11/23/15 Input Checked By KC Date 11/30/15

DCN: CT-S29 DATE: 8-21-10 REVISION: 2

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

PHOTOGRAPHS

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-42
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.25-2.95
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-038		

Tested By NJM *Date* 10/29/15 *Checked By* KC *Date* 11/5/15

S:\Excel\Excel QA\Spr

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

SHELBY TUBE UNIT WEIGHT

ASTM D2937-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-42
Client Reference:	Lake Erie Connector 185241	Depth Pushed (m):	2.25-2.95
Project No.:	2015-538-001	Shelby Tube No.:	GT2
Lab ID:	2015-538-001-038	Recovery (m):	0.7

MOISTURE CONTENT

Section Number	**1**	**2**	**3**	**4**
Tare Number	3022			3084
Weight of Tare & Wet Sample (g)	330.63			265.55
Weight of Tare & Dry Sample (g)	254.12			163.49
Weight of Tare (g)	6.55			6.67
Moisture Content (%)	30.90			65.08

UNIT WEIGHT

Weight of Tube & Wet Sample (g)	1328.60
Weight of Tube (g)	80.98
Weight of Wet Sample (g)	1247.62
Length 1 (in)	4.073
Length 2 (in)	3.811
Length 3 (in)	3.749
Top Diameter (in)	3.610
Middle Diameter (in)	3.595
Bottom Diameter (in)	3.635
Sample Volume (cm^3)	651.59
Moisture Content (%)	30.90
Unit Wet Weight (g/cm^3)	1.91
Unit Wet Weight (pcf)	119.48
Unit Dry Weight (g/cm^3)	**1.46**
Unit Dry Weight (pcf)	**91.3**

SOIL PROFILE AND SAMPLING

DEPTH (m)	ELEV ( )	SECTION No.	SOIL PROFILE	SOIL DESCRIPTION AND REMARKS	TEST PERFORMED
2.35					
		4		OLIVE GRAY SOFT CLAY	WC
2.50					
		3		GRAY SAND AND CLAY WITH TRACE OF SHELLS	NO TEST
2.65					
		2			NO TEST
2.80				BROWN CLAY WITH TRACE OF FINE SAND Pocket Penetrometer 0.25 TSF TORVANE= 0.35 kg/cm²	
		1			UNIT WGT, LIMITS, WC
2.95					

***Note**: When full recovery is not achieved, the elevation can not be accurately definec*
Indicate each cut of the tube with an arrow
Indicate dividing line between soil types with a solid lin
Indicate wax by cross-hatching. Indicate soil types by standard symbols

Tested By *NJM* Date *11/3/15* Checked By KC Date 11/4/15

ATTERBERG LIMITS

ASTM D 4318-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-42
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.85-2.95
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-038	Soil Description:	GRAY LEAN CLAY

Note: The* USCS *symbol used with this test refers only to the minus No. 40 (Minus No. 40 sieve material, Airdried)

sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description .

Liquid Limit Test	**1**	**2**	**3**
Tare Number:	301	257	241
Wt. of Tare & Wet Sample (g):	39.12	39.73	39.03
Wt. of Tare & Dry Sample (g):	33.34	34.25	33.60
Weight of Tare (g):	18.72	19.51	18.53
Weight of Water (g):	5.8	5.5	5.4
Weight of Dry Sample (g):	14.6	14.7	15.1
Moisture Content (%):	**39.5**	**37.2**	**36.0**
Number of Blows:	**20**	**28**	**35**

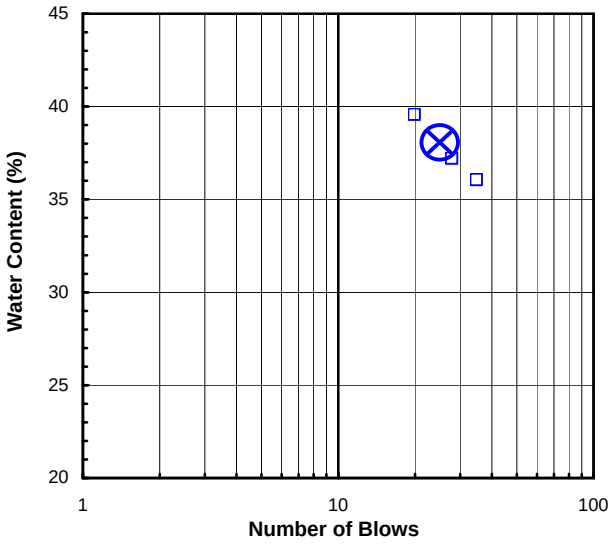
MULTIPOINT

Plastic Limit Test	**1**	**2**	**Range**
Tare Number:	176	357	
Wt. of Tare & Wet Sample (g):	25.84	26.84	
Wt. of Tare & Dry Sample (g):	24.91	25.92	
Weight of Tare (g):	19.42	20.46	
Weight of Water (g):	0.9	0.9	
Weight of Dry Sample (g):	5.5	5.5	
Moisture Content (%):	**16.9**	**16.8**	**0.1**

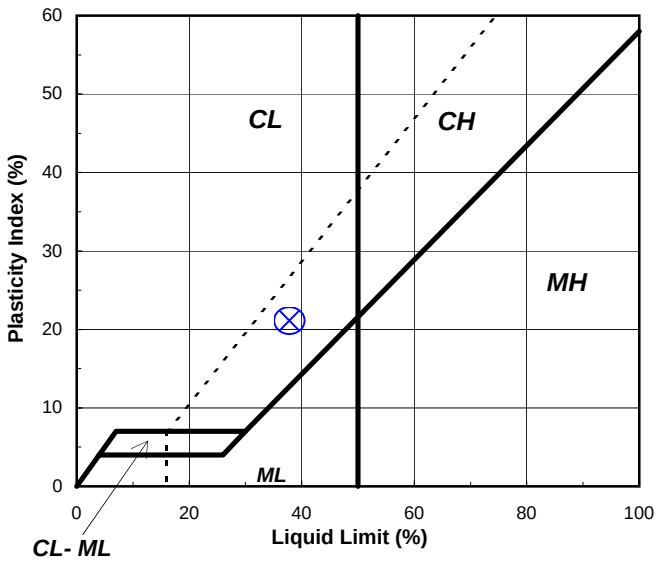
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%):	**38**
Plastic Limit (%):	**17**
Plasticity Index (%):	**21**
USCS Symbol:	**CL**

Flow Curve



Plasticity Chart



Tested By RAL *Date* 11/6/15 *Checked By* CLK *Date* 11/7/15

S:\Excel\Excel QA\Spreadsheets\Limit 3Pt.xls

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

PHOTOGRAPHS

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-43
Client Reference:	Lake Erie Connector 185241	Depth (m):	0.75-1.25
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-039		

Tested By	*JCM*	*Date*	*11/24/15*	*Checked By*	*KC*	*Date*	*12/1/15*

S:\Excel\Excel QA\Spreadsheets\Photo

SHELBY TUBE UNIT WEIGHT

ASTM D2937-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-43
Client Reference:	Lake Erie Connector 185241	Depth Pushed (m):	0.75-1.25
Project No.:	2015-538-001	Shelby Tube No.:	GT2
Lab ID:	2015-538-001-039	Recovery (m):	0.5

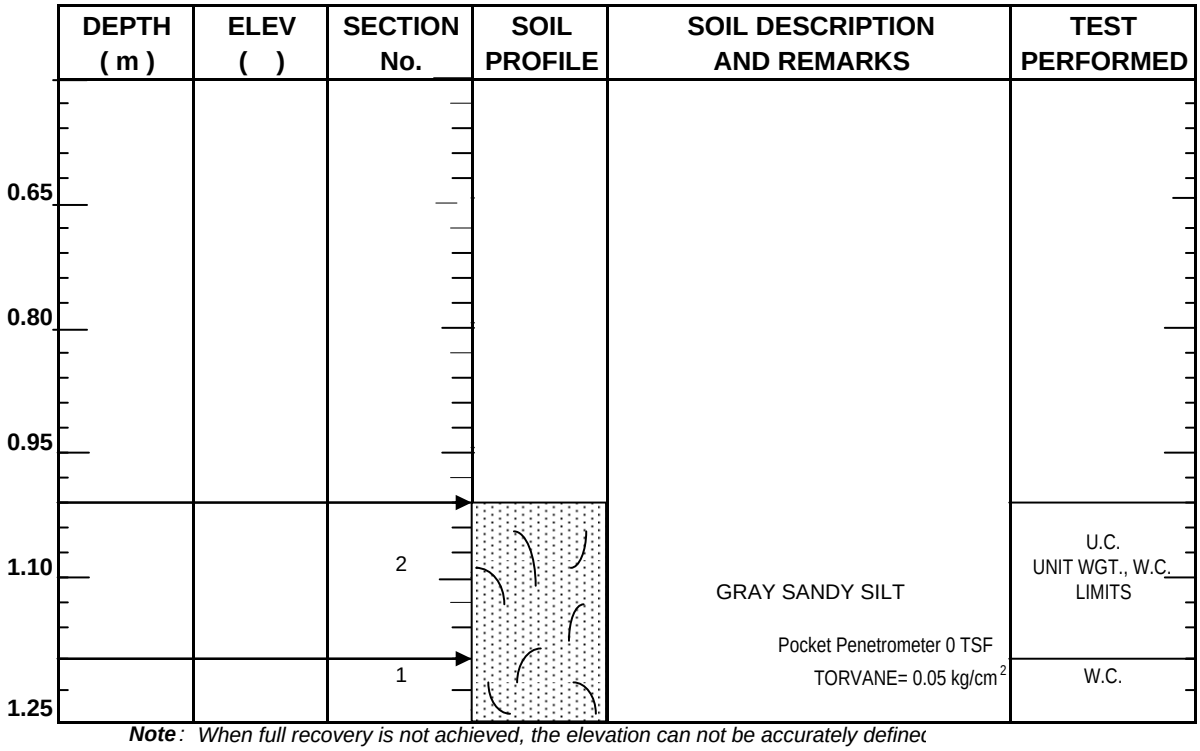
MOISTURE CONTENT

Section Number	**1**	**2**	**3**	**4**	**5**
		After U.C.			
Tare Number	ZY	1493			
Weight of Tare & Wet Sample (g)	597.92	1320.11			
Weight of Tare & Dry Sample (g)	513.20	1020.20			
Weight of Tare (g)	85.06	148.02			
Moisture Content (%)	19.79	34.39			

UNIT WEIGHT

Weight of Tube & Wet Sample (g)	2277.23
Weight of Tube (g)	120.95
Weight of Wet Sample (g)	2156.28
Length 1 (in)	7.028
Length 2 (in)	7.039
Length 3 (in)	7.102
Top Diameter (in)	3.642
Middle Diameter (in)	3.584
Bottom Diameter (in)	3.602
Sample Volume (cm^3)	1183.11
Moisture Content (%)	34.39
Unit Wet Weight (g/cm^3)	1.82
Unit Wet Weight (pcf)	113.73
Unit Dry Weight (g/cm^3)	**1.36**
Unit Dry Weight (pcf)	**84.6**

SOIL PROFILE AND SAMPLING



***Note**: When full recovery is not achieved, the elevation can not be accurately define*
Indicate each cut of the tube with an arrow
Indicate dividing line between soil types with a solid lin
Indicate wax by cross-hatching. Indicate soil types by standard symbols

Tested By *JCM* Date *11/24/15* Checked By KC Date 12/1/15

ATTERBERG LIMITS

ASTM D 4318-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-43
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.01-1.19
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-039	Soil Description:	GRAY SILT

Note: The* USCS *symbol used with this test refers only to the minus No. 40 (Minus No. 40 sieve material, Airdried)
sieve material. See the "Sieve and Hydrometer Analysis" graph page for the complete material description .

Liquid Limit Test	**1**	**2**	**3**
Tare Number:	242	159	160
Wt. of Tare & Wet Sample (g):	39.18	38.41	39.05
Wt. of Tare & Dry Sample (g):	34.72	33.94	34.79
Weight of Tare (g):	19.14	17.63	18.55
Weight of Water (g):	4.5	4.5	4.3
Weight of Dry Sample (g):	15.6	16.3	16.2
Moisture Content (%):	**28.6**	**27.4**	**26.2**
Number of Blows:	**19**	**27**	**34**

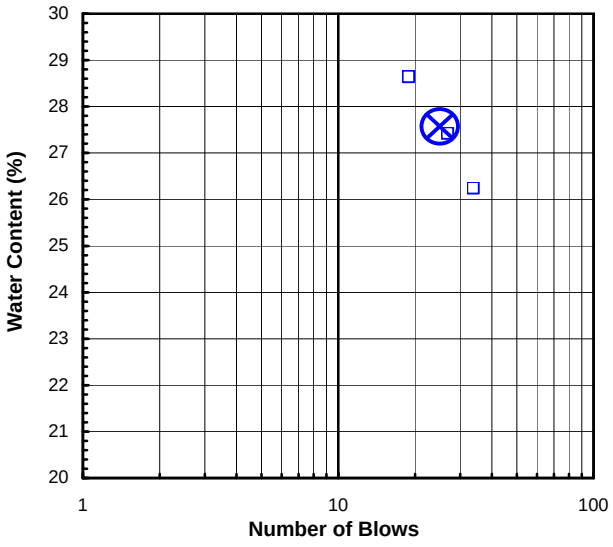
MULTIPOINT

Plastic Limit Test	**1**	**2**	**Range**
Tare Number:	173	216	
Wt. of Tare & Wet Sample (g):	25.85	25.25	
Wt. of Tare & Dry Sample (g):	24.69	24.14	
Weight of Tare (g):	19.61	19.22	
Weight of Water (g):	1.2	1.1	
Weight of Dry Sample (g):	5.1	4.9	
Moisture Content (%):	**22.8**	**22.6**	**0.3**

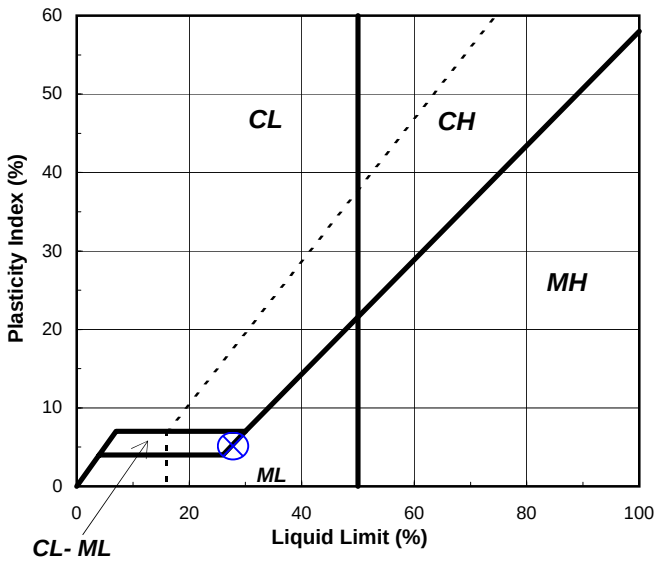
Note: The acceptable range of the two Moisture contents is ± 2.6

Test Results	
Liquid Limit (%):	**28**
Plastic Limit (%):	**23**
Plasticity Index (%):	**5**
USCS Symbol:	**ML**

Flow Curve



Plasticity Chart



Tested By RAL *Date* 11/25/15 *Checked By* KC *Date* 11/30/15

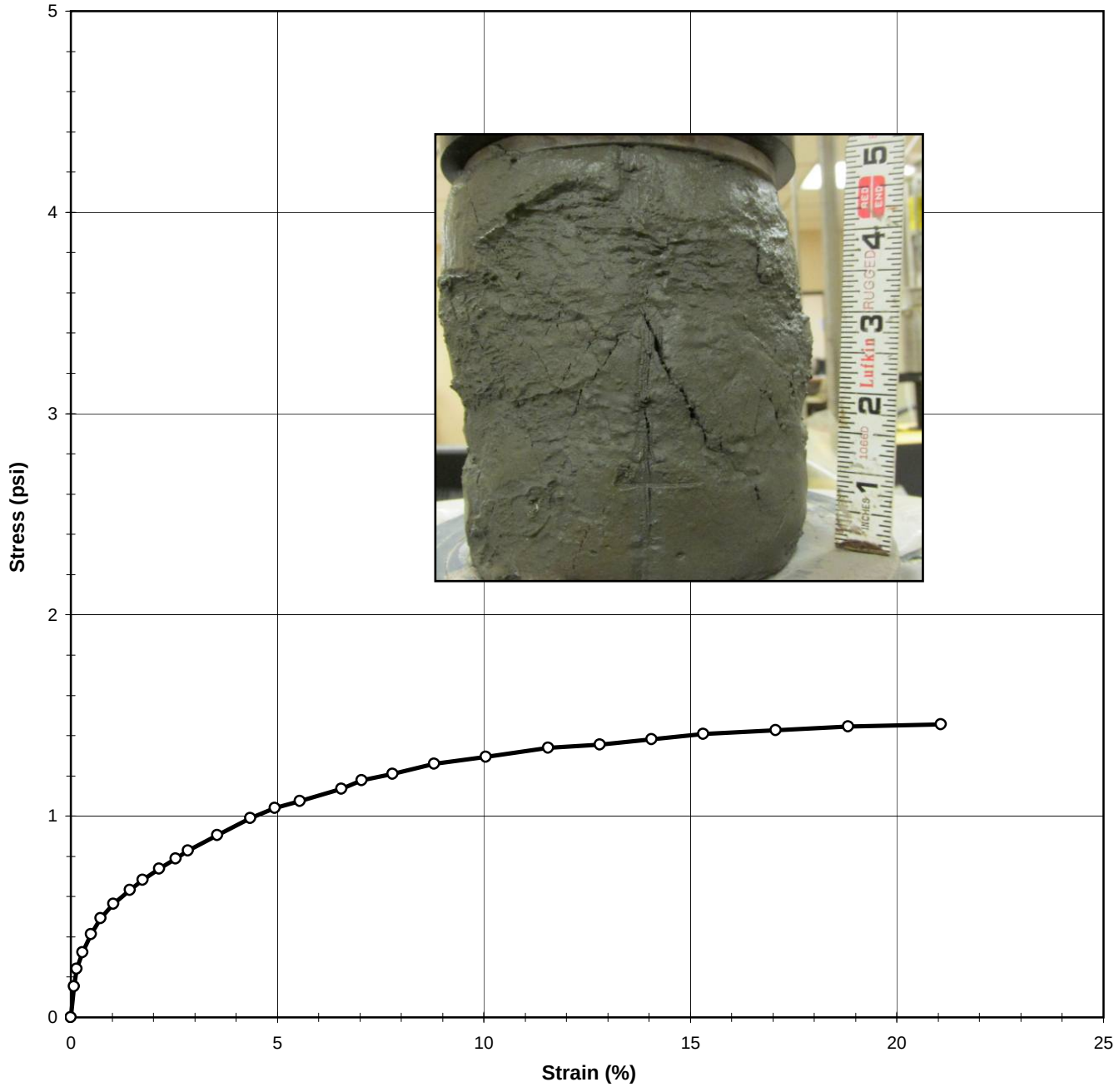
S:\Excel\Excel QA\Spreadsheets\Limit 3Pt.xls

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONFINED COMPRESSIVE STRENGTH

ASTM D2166-13 / AASHTO T208-10 (SOP S-30)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-43
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.01-1.19
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-039	Visual:	Gray Sandy Silt



Tested By	JCM	Date	11/24/15	Approved By	KC	Date	11/30/15

DCN: CT-S30 Date: 11/09/09 Revision: 4

S:\Excel\Excel QA\Spreadsheets\UC Sigma.xls

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONFINED COMPRESSIVE STRENGTH

ASTM D2166-13 / AASHTO T208-10 (SOP S-30)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-43
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.01-1.19
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-039	Visual:	Gray Sandy Silt

INITIAL SAMPLE DIMENSIONS				WATER CONTENT AFTER TEST	
Length 1 (in):	7.028	Top Diameter (in):	3.642	Tare No.:	1493
Length 2 (in):	7.039	Middle Diameter (in):	3.584	Weight of Tare & Wet Sample (g):	1320.11
Length 3 (in):	7.102	Bottom Diameter (in):	3.602	Weight of Tare & Dry Sample (g):	1020.20
Avg. Length (in):	**7.056**	**Avg. Diameter (in):**	**3.609**	Weight of Tare (g):	148.02
		Area (in^2):	**10.232**	Moisture Content (%):	34.39

UNIT WEIGHT			
Weight of Tube & Wet Sample (g):	2277.23	Sample Volume (cm^3):	1183.1
Weight of Tube (g):	120.95	Unit Wet Weight (g/cm^3):	1.82
Weight of Wet Sample (g):	2156.28	Unit Wet Weight (pcf):	113.73
Average Diameter (in):	3.61	Moisture Content (%):	34.39
Average Length (in):	7.06	Unit Dry Weight (pcf):	84.63
Average Length (cm):	17.92		

ELECTRONIC DEVICE DEFORMATION (in)	*LOAD (lb)*	*ELAPSED TIME (min)*	*STRAIN (%)*	*STRESS (psi)*
0.000	0.0	0.00	0.000	0.000
0.005	1.6	0.07	0.074	0.155
0.010	2.5	0.12	0.148	0.240
0.020	3.3	0.23	0.285	0.323
0.034	4.2	0.40	0.485	0.413
0.051	5.1	0.60	0.728	0.493
0.073	5.8	0.87	1.034	0.563
0.101	6.6	1.20	1.435	0.634
0.123	7.1	1.45	1.740	0.683
0.151	7.7	1.78	2.141	0.739
0.179	8.3	2.12	2.542	0.788
0.200	8.7	2.37	2.837	0.829
0.250	9.6	2.95	3.544	0.905
0.307	10.6	3.62	4.346	0.991
0.349	11.2	4.12	4.947	1.040
0.392	11.6	4.62	5.548	1.075
0.462	12.4	5.45	6.550	1.136
0.497	13.0	5.87	7.046	1.177
0.550	13.4	6.48	7.795	1.210
0.621	14.1	7.32	8.797	1.259
0.709	14.7	8.37	10.052	1.294
0.816	15.5	9.62	11.560	1.339
0.904	15.9	10.65	12.805	1.355
0.992	16.5	11.70	14.060	1.382
1.081	17.0	12.73	15.315	1.409
1.204	17.6	14.20	17.066	1.427
1.328	18.2	15.65	18.818	1.446
1.486	18.9	17.52	21.065	1.457

Tested By JCM Date 11/24/15 Input Checked By KC Date 11/30/15

DCN: CT-S30 Date: 11/09/09 Revision: 4

S:\Excel\Excel QA\Spreadsheets\UC Sigma.xls

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

PHOTOGRAPHS

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-43
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.50-2.0
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-040		

Tested By NJM *Date* 11/3/15 *Checked By* KC *Date* 11/5/15

S:\Excel\Excel QA\Spr

SHELBY TUBE UNIT WEIGHT

ASTM D2937-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-43
Client Reference:	Lake Erie Connector 185241	Depth Pushed (m):	1.50-2.0
Project No.:	2015-538-001	Shelby Tube No.:	GT1
Lab ID:	2015-538-001-040	Recovery (m):	0.5

MOISTURE CONTENT

Section Number	**1**	**2**
Tare Number		3022
Weight of Tare & Wet Sample (g)		330.63
Weight of Tare & Dry Sample (g)		254.12
Weight of Tare (g)		6.55
Moisture Content (%)		30.90

UNIT WEIGHT

Weight of Tube & Wet Sample (g)	1328.60
Weight of Tube (g)	80.98
Weight of Wet Sample (g)	1247.62
Length 1 (in)	4.073
Length 2 (in)	3.811
Length 3 (in)	3.749
Top Diameter (in)	3.610
Middle Diameter (in)	3.595
Bottom Diameter (in)	3.635
Sample Volume (cm^3)	651.59
Moisture Content (%)	30.90
Unit Wet Weight (g/cm^3)	1.91
Unit Wet Weight (pcf)	119.48
Unit Dry Weight (g/cm^3)	**1.46**
Unit Dry Weight (pcf)	**91.3**

SOIL PROFILE AND SAMPLING

DEPTH (m)	ELEV ( )	SECTION No.	SOIL PROFILE	SOIL DESCRIPTION AND REMARKS	TEST PERFORMED
1.40					
1.55					
1.70					
		2		Pocket Penetrometer 1.0 TSF TORVANE= 0.2 kg/cm^2	WC, UNIT WGT, GRAIN SIZE,
1.85				DARK GRAY FINE SAND	
		1		VOID	NO TEST
2.00					

***Note**: When full recovery is not achieved, the elevation can not be accurately define*
Indicate each cut of the tube with an arrow
Indicate dividing line between soil types with a solid lin
Indicate wax by cross-hatching. Indicate soil types by standard symbols

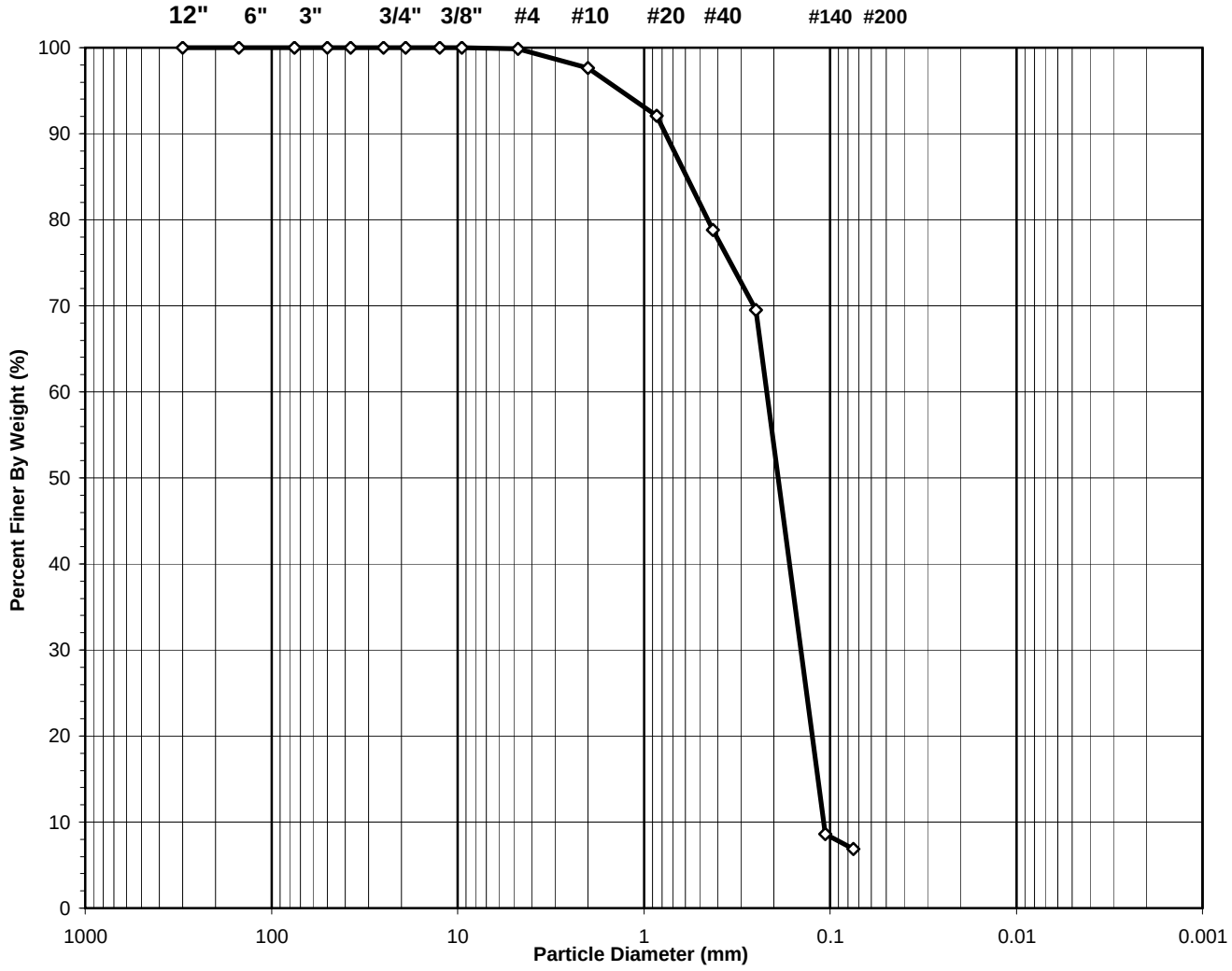
Tested By *NJM* Date *11/3/15* Checked By KC Date 11/4/15

SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-43
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.75-1.85
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-040	Soil Color:	Gray

	SIEVE ANALYSIS		*HYDROMETER*
USCS	**gravel**	**sand**	**silt and clay**



USCS Symbol:
sp-sm, ASSUMED

USCS Classification:
POORLY GRADED SAND WITH SILT

D60 = 0.22 **CC = 0.87**

D30 = 0.14 **CU = 2.02**

D10 = 0.11

Tested By NM Date 11/16/15 Checked By CLK Date 11/17/15

DCN: CT-S3C DATE 3/20/13 REVISION: 3

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

WASH SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-43
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.75-1.85
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-040	Soil Color:	Gray

Moisture Content of Passing 3/4" Sample		Water Content of Retained 3/4" Sample	
Tare No.:	57	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	1158.50	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	1015.90	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	201.24	Weight of Tare (g):	NA
Weight of Water (g):	142.60	Weight of Water (g):	NA
Weight of Dry Sample (g):	814.66	Weight of Dry Sample (g):	NA
Moisture Content (%):	**17.5**	**Moisture Content (%):**	**NA**

Wet Weight of -3/4" Sample (g):	NA	Weight of the Dry Sample (g):	814.66
Dry Weight of - 3/4" Sample (g):	758.4	Weight of - #200 Material (g):	56.24
Wet Weight of +3/4" Sample (g):	NA	Weight of + #200 Material (g):	758.42
Dry Weight of + 3/4" Sample (g):	0.00		
Total Dry Weight of Sample (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.50	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	0.00	0.00	0.00	100.00	**100.00**
#4	4.75	1.29	0.16	0.16	99.84	**99.84**
#10	2.00	17.82	2.19	2.35	97.65	**97.65**
#20	0.850	45.41	5.57	7.92	92.08	**92.08**
#40	0.425	108.07	13.27	21.19	78.81	**78.81**
#60	0.250	75.67	9.29	30.47	69.53	**69.53**
#140	0.106	496.30	60.92	91.40	8.60	**8.60**
#200	0.075	13.86	1.70	93.10	6.90	**6.90**
Pan	-	56.24	6.90	100.00	-	**-**

Tested By NM Date 11/16/15 Checked By CLK Date 11/17/15

DCN: CT-S3C DATE 3/20/13 REVISION: 3

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

PHOTOGRAPHS

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-68
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.33-2.83
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-043		

Tested By *NJM* *Date* *11/3/15* *Checked By* *KC* *Date* *11/5/15*

S:\Excel\Excel QA\Spr

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

SHELBY TUBE UNIT WEIGHT

ASTM D2937-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-68
Client Reference:	Lake Erie Connector 185241	Depth Pushed (m):	2.33-2.83
Project No.:	2015-538-001	Shelby Tube No.:	GT1
Lab ID:	2015-538-001-043	Recovery (m):	0.5

MOISTURE CONTENT

Section Number	**1**
Tare Number	3207
Weight of Tare & Wet Sample (g)	394.93
Weight of Tare & Dry Sample (g)	325.08
Weight of Tare (g)	6.53
Moisture Content (%)	21.93

UNIT WEIGHT

Weight of Tube & Wet Sample (g)	1873.60
Weight of Tube (g)	107.23
Weight of Wet Sample (g)	1766.37
Length 1 (in)	5.039
Length 2 (in)	5.179
Length 3 (in)	5.039
Top Diameter (in)	3.581
Middle Diameter (in)	3.591
Bottom Diameter (in)	3.608
Sample Volume (cm^3)	845.15
Moisture Content (%)	21.93
Unit Wet Weight (g/cm^3)	2.09
Unit Wet Weight (pcf)	130.42
Unit Dry Weight (g/cm^3)	**1.71**
Unit Dry Weight (pcf)	**107.0**

SOIL PROFILE AND SAMPLING

DEPTH (m)	ELEV ( )	SECTION No.	SOIL PROFILE	SOIL DESCRIPTION AND REMARKS	TEST PERFORMED
2.23					
2.38					
2.53					
2.68		1		DARK GRAY SAND Pocket Penetrometer 0.75 TSF TORVANE= 0.3 kg/cm²	WC, UNIT WGT, GRAIN SIZE,
2.83					

***Note**: When full recovery is not achieved, the elevation can not be accurately definec*
Indicate each cut of the tube with an arrow
Indicate dividing line between soil types with a solid lin
Indicate wax by cross-hatching. Indicate soil types by standard symbols

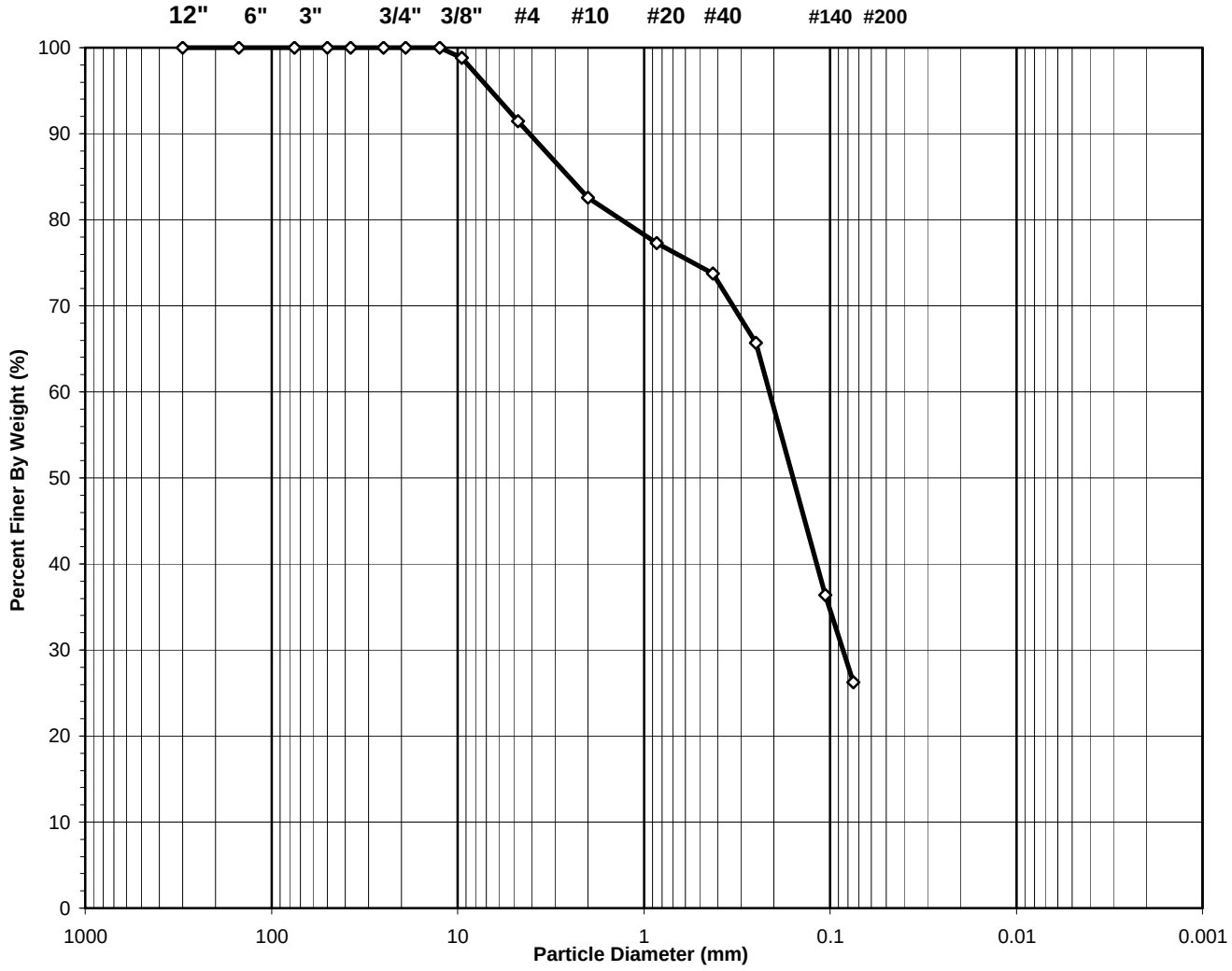
Tested By *NJM* Date *11/3/15* Checked By KC Date 11/4/15

SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-68
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.7-2.85
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-043	Soil Color:	Gray

	SIEVE ANALYSIS		*HYDROMETER*
USCS	**gravel**	**sand**	**silt and clay**



USCS Symbol:
sm, ASSUMED

USCS Classification:
SILTY SAND

Tested By HL Date 11/14/15 Checked By CLK Date 11/17/15

DCN: CT-S3C DATE 3/20/13 REVISION: 3

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

WASH SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-68
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.7-2.85
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-043	Soil Color:	Gray

Moisture Content of Passing 3/4" Sample		Water Content of Retained 3/4" Sample	
Tare No.:	47	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	1575.40	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	1361.90	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	202.61	Weight of Tare (g):	NA
Weight of Water (g):	213.50	Weight of Water (g):	NA
Weight of Dry Sample (g):	1159.29	Weight of Dry Sample (g):	NA
Moisture Content (%):	**18.4**	**Moisture Content (%):**	**NA**

Wet Weight of -3/4" Sample (g):	NA	Weight of the Dry Sample (g):	1159.29
Dry Weight of - 3/4" Sample (g):	855.4	Weight of - #200 Material (g):	303.92
Wet Weight of +3/4" Sample (g):	NA	Weight of + #200 Material (g):	855.37
Dry Weight of + 3/4" Sample (g):	0.00		
Total Dry Weight of Sample (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.50	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	13.50	1.16	1.16	98.84	**98.84**
#4	4.75	85.43	7.37	8.53	91.47	**91.47**
#10	2.00	103.37	8.92	17.45	82.55	**82.55**
#20	0.850	60.75	5.24	22.69	77.31	**77.31**
#40	0.425	41.65	3.59	26.28	73.72	**73.72**
#60	0.250	93.25	8.04	34.33	65.67	**65.67**
#140	0.106	339.70	29.30	63.63	36.37	**36.37**
#200	0.075	117.72	10.15	73.78	26.22	**26.22**
Pan	-	303.92	26.22	100.00	-	**-**

Tested By HL Date 11/14/15 Checked By CLK Date 11/17/15

DCN: CT-S3C DATE 3/20/13 REVISION: 3

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

PHOTOGRAPHS

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-68
Client Reference:	Lake Erie Connector 185241	Depth (m):	0.63-1.13
Project No.:	2015-538-001	Sample No.:	GT3
Lab ID:	2015-538-001-044		

Tested By NJM *Date* 11/3/15 *Checked By* KC *Date* 11/5/15

S:\Excel\Excel QA\Spr

SHELBY TUBE UNIT WEIGHT

ASTM D2937-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-68
Client Reference:	Lake Erie Connector 185241	Depth Pushed (m):	0.63-1.13
Project No.:	2015-538-001	Shelby Tube No.:	GT3
Lab ID:	2015-538-001-044	Recovery (m):	0.5

MOISTURE CONTENT

Section Number	**1**
Tare Number	3042
Weight of Tare & Wet Sample (g)	382.77
Weight of Tare & Dry Sample (g)	309.05
Weight of Tare (g)	6.53
Moisture Content (%)	24.37

UNIT WEIGHT

Weight of Tube & Wet Sample (g)	1757.10
Weight of Tube (g)	101.63
Weight of Wet Sample (g)	1655.47
Length 1 (in)	4.759
Length 2 (in)	4.936
Length 3 (in)	5.036
Top Diameter (in)	3.563
Middle Diameter (in)	3.573
Bottom Diameter (in)	3.543
Sample Volume (cm^3)	800.79
Moisture Content (%)	24.37
Unit Wet Weight (g/cm^3)	2.07
Unit Wet Weight (pcf)	129.00
Unit Dry Weight (g/cm^3)	**1.66**
Unit Dry Weight (pcf)	**103.7**

SOIL PROFILE AND SAMPLING

DEPTH (m)	ELEV ( )	SECTION No.	SOIL PROFILE	SOIL DESCRIPTION AND REMARKS	TEST PERFORMED
0.53					
0.68					
0.83					
0.98					
		1		DARK GRAY SAND Pocket Penetrometer 1.5 TSF TORVANE= 0.3 kg/cm²	WC, UNIT WGT, GRAIN SIZE
1.13					

***Note**: When full recovery is not achieved, the elevation can not be accurately defined*
Indicate each cut of the tube with an arrow
Indicate dividing line between soil types with a solid lin
Indicate wax by cross-hatching. Indicate soil types by standard symbols

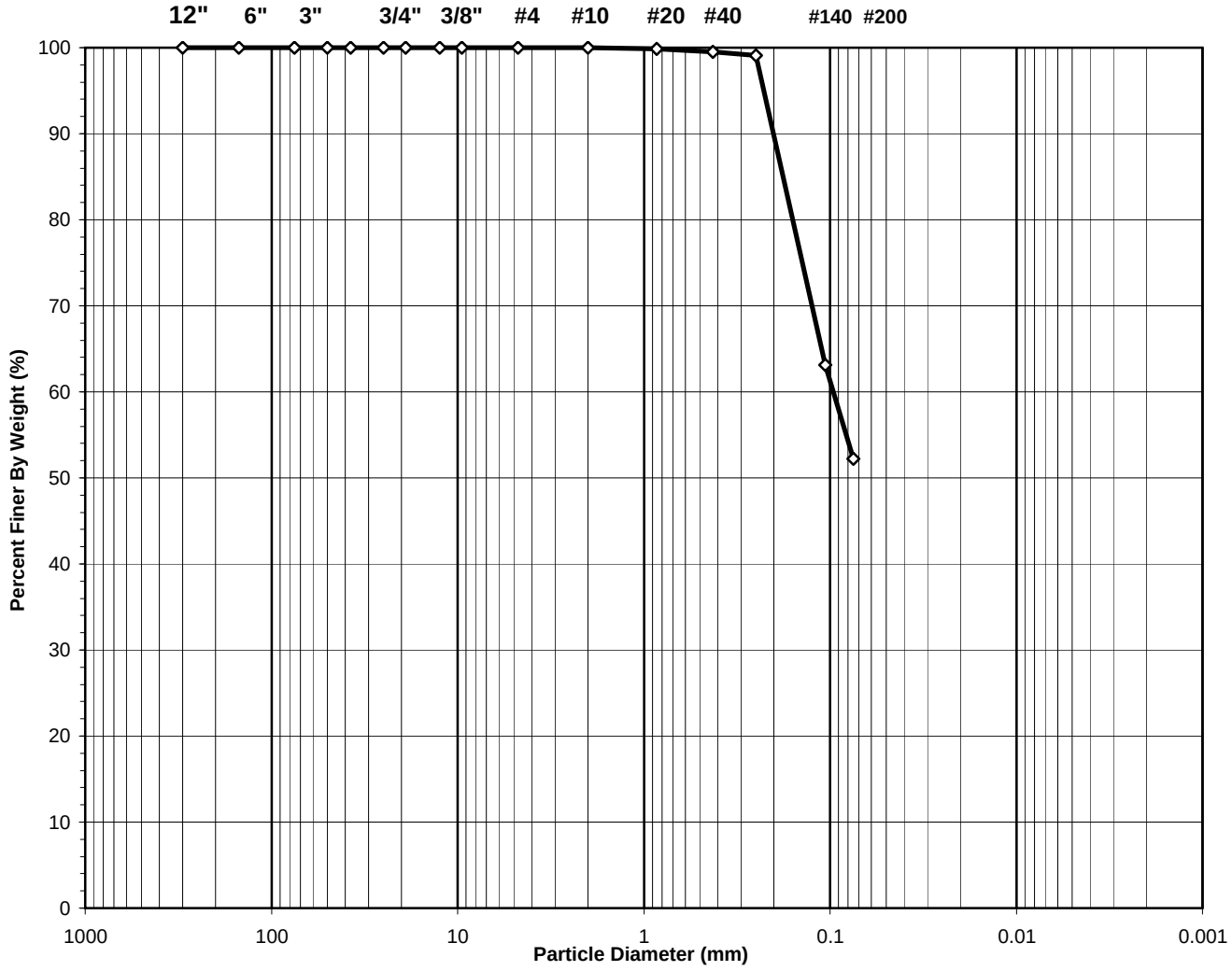
Tested By *NJM* Date *11/3/15* Checked By KC Date 11/4/15

SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-68
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.0-1.13
Project No.:	2015-538-001	Sample No.:	GT3
Lab ID:	2015-538-001-044	Soil Color:	Gray

	SIEVE ANALYSIS		*HYDROMETER*
USCS	**gravel**	**sand**	**silt and clay**



USCS Symbol:
ml, ASSUMED

USCS Classification:
SANDY SILT

Tested By	HL	Date	11/16/15	Checked By	CLK	Date	11/17/15

DCN: CT-S3C DATE 3/20/13 REVISION: 3

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

WASH SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-68
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.0-1.13
Project No.:	2015-538-001	Sample No.:	GT3
Lab ID:	2015-538-001-044	Soil Color:	Gray

Moisture Content of Passing 3/4" Sample		Water Content of Retained 3/4" Sample	
Tare No.:	55	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	1477.70	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	1218.40	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	204.03	Weight of Tare (g):	NA
Weight of Water (g):	259.30	Weight of Water (g):	NA
Weight of Dry Sample (g):	1014.37	Weight of Dry Sample (g):	NA
Moisture Content (%):	**25.6**	**Moisture Content (%):**	**NA**

Wet Weight of -3/4" Sample (g):	NA	Weight of the Dry Sample (g):	1014.37
Dry Weight of - 3/4" Sample (g):	485.0	Weight of - #200 Material (g):	529.41
Wet Weight of +3/4" Sample (g):	NA	Weight of + #200 Material (g):	484.96
Dry Weight of + 3/4" Sample (g):	0.00		
Total Dry Weight of Sample (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.50	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	0.00	0.00	0.00	100.00	**100.00**
#4	4.75	0.00	0.00	0.00	100.00	**100.00**
#10	2.00	0.34	0.03	0.03	99.97	**99.97**
#20	0.850	1.42	0.14	0.17	99.83	**99.83**
#40	0.425	2.84	0.28	0.45	99.55	**99.55**
#60	0.250	4.89	0.48	0.94	99.06	**99.06**
#140	0.106	364.50	35.93	36.87	63.13	**63.13**
#200	0.075	110.97	10.94	47.81	52.19	**52.19**
Pan	-	529.41	52.19	100.00	-	**-**

Tested By HL Date 11/16/15 Checked By CLK Date 11/17/15

DCN: CT-S3C DATE 3/20/13 REVISION: 3

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

PHOTOGRAPHS

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-69
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.27-1.87
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-045		

Tested By *NJM* *Date* *11/4/15* *Checked By* *KC* *Date* *11/5/15*

S:\Excel\Excel QA\Spr

SHELBY TUBE UNIT WEIGHT

ASTM D2937-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-69
Client Reference:	Lake Erie Connector 185241	Depth Pushed (m):	1.27-1.87
Project No.:	2015-538-001	Shelby Tube No.:	GT2
Lab ID:	2015-538-001-045	Recovery (m):	0.6

MOISTURE CONTENT

Section Number	**1**
Tare Number	2997
Weight of Tare & Wet Sample (g)	229.18
Weight of Tare & Dry Sample (g)	175.37
Weight of Tare (g)	6.73
Moisture Content (%)	31.91

UNIT WEIGHT

Weight of Tube & Wet Sample (g)	1571.80
Weight of Tube (g)	98.30
Weight of Wet Sample (g)	1473.50
Length 1 (in)	4.669
Length 2 (in)	4.726
Length 3 (in)	4.733
Top Diameter (in)	3.616
Middle Diameter (in)	3.565
Bottom Diameter (in)	3.548
Sample Volume (cm^3)	775.22
Moisture Content (%)	31.91
Unit Wet Weight (g/cm^3)	1.90
Unit Wet Weight (pcf)	118.61
Unit Dry Weight (g/cm^3)	**1.44**
Unit Dry Weight (pcf)	**89.9**

SOIL PROFILE AND SAMPLING

DEPTH (m)	ELEV ( )	SECTION No.	SOIL PROFILE	SOIL DESCRIPTION AND REMARKS	TEST PERFORMED
1.27					
1.42					
1.57					
1.72		1		GRAY SAND Pocket Penetrometer 1.25 TSF TORVANE= 0.3 kg/cm²	WC, UNIT WGT, GRAIN SIZE,
1.87					

***Note**: When full recovery is not achieved, the elevation can not be accurately definec*
Indicate each cut of the tube with an arrow
Indicate dividing line between soil types with a solid lin
Indicate wax by cross-hatching. Indicate soil types by standard symbols

Tested By *NJM* Date *11/4/15* Checked By KC Date 11/5/15

SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-69
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.75-1.87
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-045	Soil Color:	Gray

	SIEVE ANALYSIS		*HYDROMETER*
USCS	**gravel**	**sand**	**silt and clay**

USCS Symbol:
sm, ASSUMED

USCS Classification:
SILTY SAND

Tested By	HL	Date	11/16/15	Checked By	CLK	Date	11/17/15

DCN: CT-S3C DATE 3/20/13 REVISION: 3

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

WASH SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-69
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.75-1.87
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-045	Soil Color:	Gray

Moisture Content of Passing 3/4" Sample		Water Content of Retained 3/4" Sample	
Tare No.:	9	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	1442.60	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	1159.60	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	202.11	Weight of Tare (g):	NA
Weight of Water (g):	283.00	Weight of Water (g):	NA
Weight of Dry Sample (g):	957.49	Weight of Dry Sample (g):	NA
Moisture Content (%):	**29.6**	**Moisture Content (%):**	**NA**

Wet Weight of -3/4" Sample (g):	NA	Weight of the Dry Sample (g):	957.49
Dry Weight of - 3/4" Sample (g):	676.7	Weight of - #200 Material (g):	280.82
Wet Weight of +3/4" Sample (g):	NA	Weight of + #200 Material (g):	676.67
Dry Weight of + 3/4" Sample (g):	0.00		
Total Dry Weight of Sample (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.50	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	0.00	0.00	0.00	100.00	**100.00**
#4	4.75	0.71	0.07	0.07	99.93	**99.93**
#10	2.00	0.69	0.07	0.15	99.85	**99.85**
#20	0.850	2.79	0.29	0.44	99.56	**99.56**
#40	0.425	4.33	0.45	0.89	99.11	**99.11**
#60	0.250	4.55	0.48	1.37	98.63	**98.63**
#140	0.106	574.50	60.00	61.37	38.63	**38.63**
#200	0.075	89.10	9.31	70.67	29.33	**29.33**
Pan	-	280.82	29.33	100.00	-	**-**

Tested By HL Date 11/16/15 Checked By CLK Date 11/17/15

DCN: CT-S3C DATE 3/20/13 REVISION: 3

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

PHOTOGRAPHS

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-69
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.12-2.82
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-046		

Tested By JCM *Date* 11/24/15 *Checked By* KC *Date* 12/1/15

S:\Excel\Excel QA\Spreadsheets\Photo

SHELBY TUBE UNIT WEIGHT

ASTM D2937-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-69
Client Reference:	Lake Erie Connector 185241	Depth Pushed (m):	2.12-2.82
Project No.:	2015-538-001	Shelby Tube No.:	GT1
Lab ID:	2015-538-001-046	Recovery (m):	0.7

MOISTURE CONTENT After U.C.

Section Number	**1**	**2**	**3**	**4**	**5**
Tare Number	565	1498			
Weight of Tare & Wet Sample (g)	444.94	1331.29			
Weight of Tare & Dry Sample (g)	369.15	1070.10			
Weight of Tare (g)	82.66	149.34			
Moisture Content (%)	26.45	28.37			

UNIT WEIGHT

Weight of Tube & Wet Sample (g)	2317.18
Weight of Tube (g)	111.18
Weight of Wet Sample (g)	2206.00
Length 1 (in)	7.022
Length 2 (in)	7.042
Length 3 (in)	7.010
Top Diameter (in)	3.636
Middle Diameter (in)	3.616
Bottom Diameter (in)	3.659
Sample Volume (cm^3)	1195.92
Moisture Content (%)	28.37
Unit Wet Weight (g/cm^3)	1.84
Unit Wet Weight (pcf)	115.10
Unit Dry Weight (g/cm^3)	**1.44**
Unit Dry Weight (pcf)	**89.7**

SOIL PROFILE AND SAMPLING

DEPTH (m)	ELEV ( )	SECTION No.	SOIL PROFILE	SOIL DESCRIPTION AND REMARKS	TEST PERFORMED
2.22					
2.37					
2.52					
2.67		2		GRAY SILT, TRACE OF SAND Pocket Penetrometer .25 TSF	U.C. UNIT WGT., W.C. LIMITS
2.82		1		TORVANE= 0.1 kg/cm^2	W.C.

***Note**: When full recovery is not achieved, the elevation can not be accurately define*
Indicate each cut of the tube with an arrow
Indicate dividing line between soil types with a solid lin
Indicate wax by cross-hatching. Indicate soil types by standard symbols

Tested By *JCM* Date *11/24/15* Checked By KC Date 12/1/15

ATTERBERG LIMIT

ASTM D 4318-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-69
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.58-2.76
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-046	Visual:	GRAY SILT
			(MInus No. 40 sieve material, Airdried)

NON - PLASTIC MATERIAL

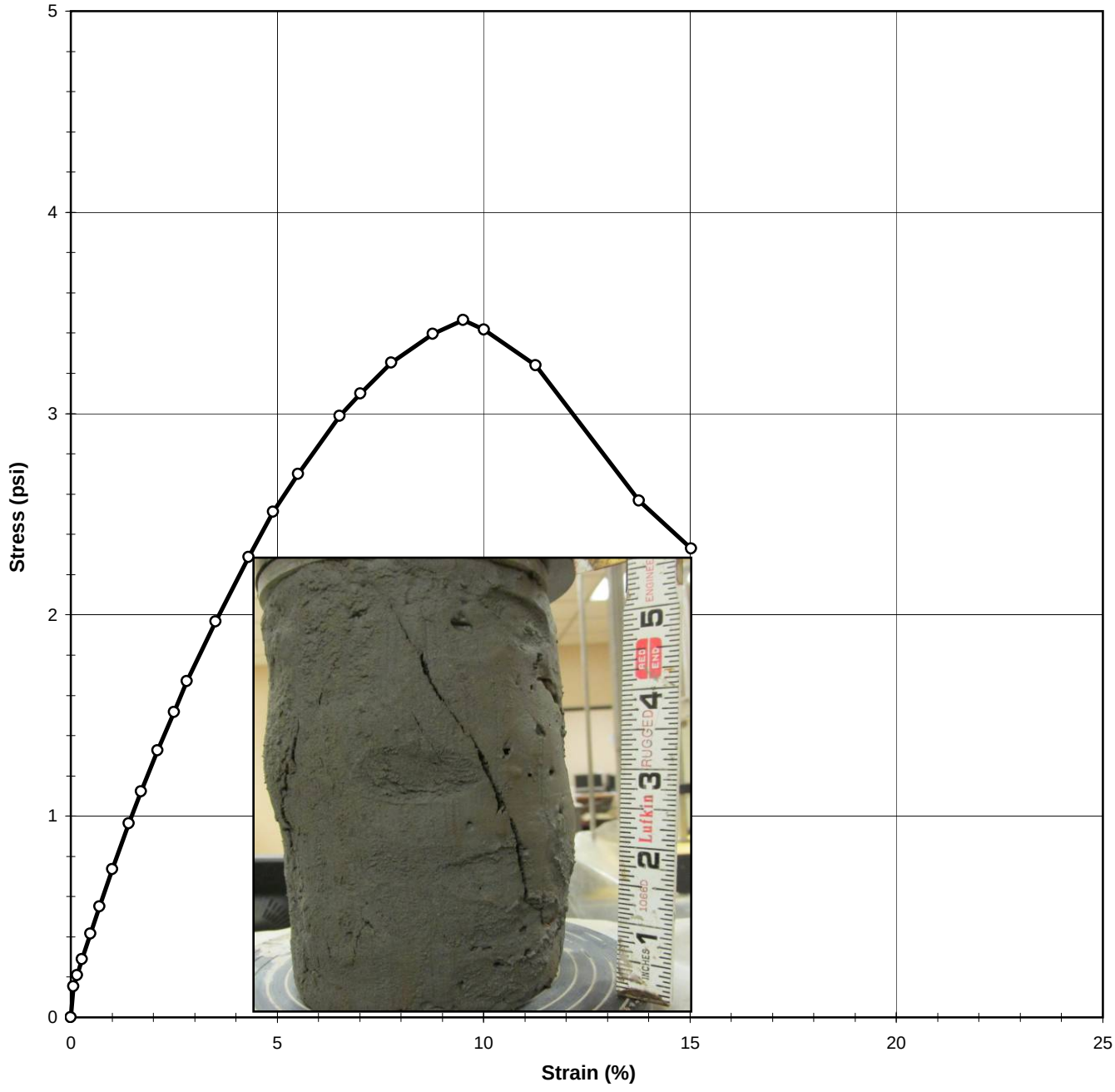
Tested By *RAL* *Date* *11/25/15* *Checked By* *KC* *Date* *11/30/15*

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONFINED COMPRESSIVE STRENGTH

ASTM D2166-13 / AASHTO T208-10 (SOP S-30)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-69
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.58-2.76
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-046	Visual:	Gray Silt, Trace of Sand



Tested By	JCM	Date	11/24/15	Approved By	KC	Date	11/30/15

DCN: CT-S30 Date: 11/09/09 Revision: 4

S:\Excel\Excel QA\Spreadsheets\UC Sigma.xls

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONFINED COMPRESSIVE STRENGTH

ASTM D2166-13 / AASHTO T208-10 (SOP S-30)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-69
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.58-2.76
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-046	Visual:	Gray Silt, Trace of Sand

INITIAL SAMPLE DIMENSIONS				WATER CONTENT AFTER TEST	
Length 1 (in):	7.022	Top Diameter (in):	3.636	Tare No.:	1498
Length 2 (in):	7.042	Middle Diameter (in):	3.616	Weight of Tare & Wet Sample (g):	1331.29
Length 3 (in):	7.010	Bottom Diameter (in):	3.659	Weight of Tare & Dry Sample (g):	1070.10
Avg. Length (in):	**7.025**	**Avg. Diameter (in):**	**3.637**	Weight of Tare (g):	149.34
		Area (in^2):	**10.389**	Moisture Content (%):	28.37

UNIT WEIGHT			
Weight of Tube & Wet Sample (g):	2317.18	Sample Volume (cm^3):	1195.9
Weight of Tube (g):	111.18	Unit Wet Weight (g/cm^3):	1.84
Weight of Wet Sample (g):	2206.00	Unit Wet Weight (pcf):	115.10
Average Diameter (in):	3.64	Moisture Content (%):	28.37
Average Length (in):	7.02	Unit Dry Weight (pcf):	89.67
Average Length (cm):	17.84		

ELECTRONIC DEVICE DEFORMATION (in)	*LOAD (lb)*	*ELAPSED TIME (min)*	*STRAIN (%)*	*STRESS (psi)*
0.000	0.0	0.00	0.000	0.000
0.005	1.6	0.08	0.070	0.152
0.010	2.2	0.15	0.149	0.210
0.019	3.0	0.28	0.272	0.290
0.033	4.3	0.48	0.474	0.416
0.049	5.8	0.72	0.702	0.550
0.070	7.7	1.02	1.000	0.735
0.099	10.1	1.42	1.404	0.962
0.120	11.9	1.72	1.702	1.123
0.148	14.1	2.12	2.106	1.325
0.176	16.2	2.52	2.501	1.517
0.197	17.8	2.82	2.808	1.669
0.247	21.2	3.52	3.510	1.967
0.303	24.8	4.32	4.309	2.287
0.345	27.5	4.92	4.905	2.513
0.387	29.7	5.52	5.511	2.700
0.457	33.2	6.52	6.511	2.987
0.493	34.6	7.02	7.012	3.099
0.546	36.6	7.77	7.766	3.252
0.616	38.7	8.77	8.767	3.396
0.668	39.8	9.53	9.513	3.466
0.703	39.5	10.03	10.013	3.418
0.792	37.9	11.28	11.268	3.239
0.967	30.9	13.78	13.769	2.567
1.055	28.5	15.03	15.023	2.328

Tested By JCM Date 11/24/15 Input Checked By KC Date 11/30/15

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

PHOTOGRAPHS

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-70
Client Reference:	Lake Erie Connector 185241	Depth (m):	0.7-1.20
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-047		

Tested By	*NJM*	*Date*	*11/4/15*	*Checked By*	*KC*	*Date*	*11/5/15*

S:\Excel\Excel QA\Spr

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

SHELBY TUBE UNIT WEIGHT

ASTM D2937-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-70
Client Reference:	Lake Erie Connector 185241	Depth Pushed (m):	0.7-1.20
Project No.:	2015-538-001	Shelby Tube No.:	GT2
Lab ID:	2015-538-001-047	Recovery (m):	0.5

MOISTURE CONTENT

Section Number	**1**
Tare Number	3066
Weight of Tare & Wet Sample (g)	140.86
Weight of Tare & Dry Sample (g)	114.70
Weight of Tare (g)	6.41
Moisture Content (%)	24.16

UNIT WEIGHT

Weight of Tube & Wet Sample (g)	1385.20
Weight of Tube (g)	78.43
Weight of Wet Sample (g)	1306.77
Length 1 (in)	3.886
Length 2 (in)	3.947
Length 3 (in)	3.877
Top Diameter (in)	3.597
Middle Diameter (in)	3.609
Bottom Diameter (in)	3.597
Sample Volume (cm^3)	651.44
Moisture Content (%)	24.16
Unit Wet Weight (g/cm^3)	2.01
Unit Wet Weight (pcf)	125.17
Unit Dry Weight (g/cm^3)	**1.62**
Unit Dry Weight (pcf)	**100.8**

SOIL PROFILE AND SAMPLING

DEPTH (m)	ELEV ( )	SECTION No.	SOIL PROFILE	SOIL DESCRIPTION AND REMARKS	TEST PERFORMED
0.60					
0.75					
0.90					
1.05					
1.20		1		GRAY SILTY FINE SAND TORVANE= 0.25 kg/cm² Pocket Penetrometer 1.75 TSF	WC, UNIT WGT, GRAIN SIZE, LIMITS

***Note**: When full recovery is not achieved, the elevation can not be accurately definec*
Indicate each cut of the tube with an arrow
Indicate dividing line between soil types with a solid lin
Indicate wax by cross-hatching. Indicate soil types by standard symbols

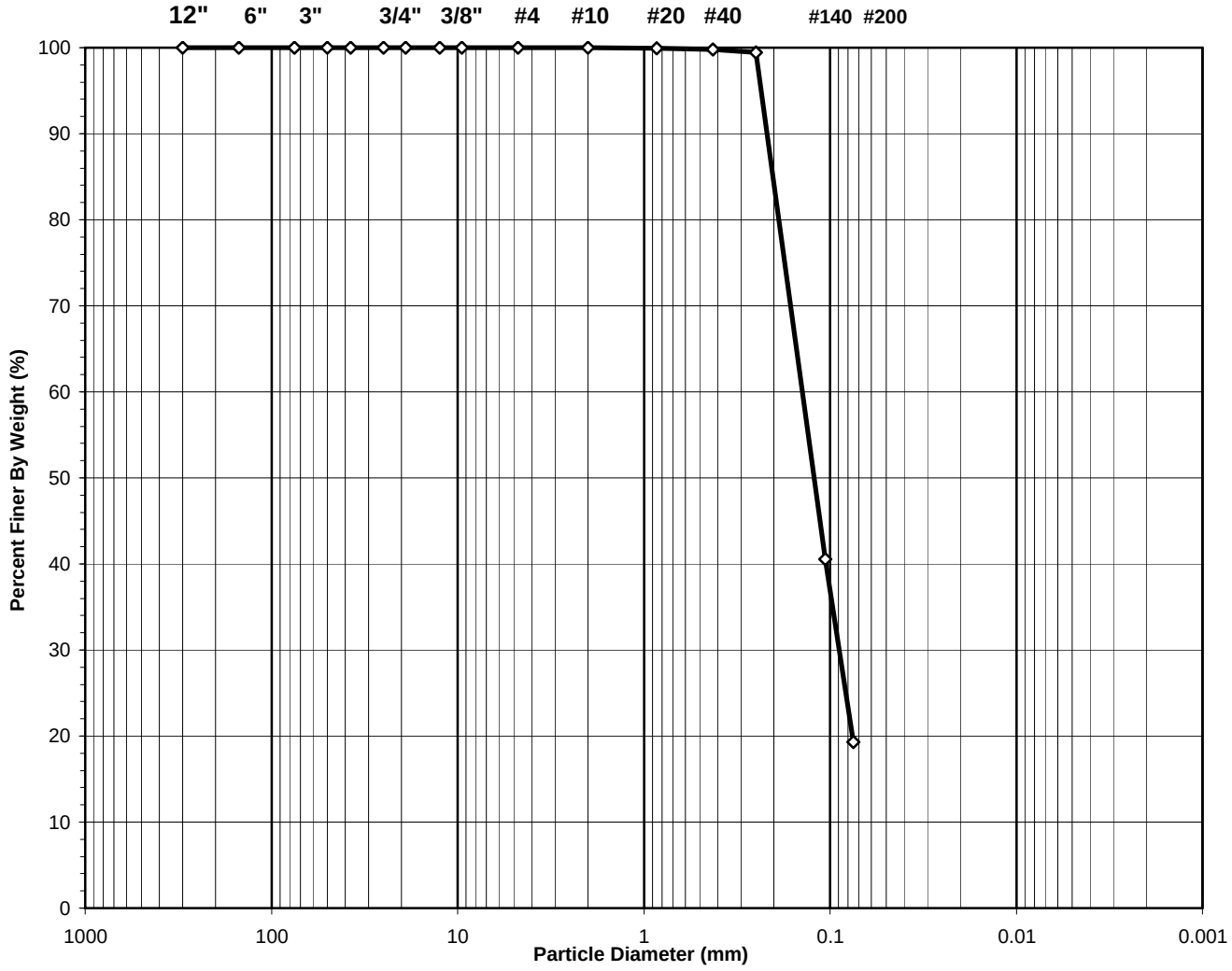
Tested By *NJM* Date *11/4/15* Checked By KC Date 11/5/15

SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-40
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.1-1.2
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-047	Soil Color:	Gray

	SIEVE ANALYSIS		*HYDROMETER*
USCS	**gravel**	**sand**	**silt and clay**



USCS Symbol:
SM, TESTED

USCS Classification:
SILTY SAND
(NON-PLASTIC FINES)

Tested By	HL	Date	11/6/15	Checked By	KC	Date	11/10/15

DCN: CT-S3C DATE 3/20/13 REVISION: 3

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

WASH SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-40
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.1-1.2
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-047	Soil Color:	Gray

Moisture Content of Passing 3/4" Sample		Water Content of Retained 3/4" Sample	
Tare No.:	35	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	1011.80	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	853.70	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	203.77	Weight of Tare (g):	NA
Weight of Water (g):	158.10	Weight of Water (g):	NA
Weight of Dry Sample (g):	649.93	Weight of Dry Sample (g):	NA
Moisture Content (%):	**24.3**	**Moisture Content (%):**	**NA**

Wet Weight of -3/4" Sample (g):	NA	Weight of the Dry Sample (g):	649.93
Dry Weight of - 3/4" Sample (g):	524.4	Weight of - #200 Material (g):	125.54
Wet Weight of +3/4" Sample (g):	NA	Weight of + #200 Material (g):	524.39
Dry Weight of + 3/4" Sample (g):	0.00		
Total Dry Weight of Sample (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.50	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	0.00	0.00	0.00	100.00	**100.00**
#4	4.75	0.00	0.00	0.00	100.00	**100.00**
#10	2.00	0.13	0.02	0.02	99.98	**99.98**
#20	0.850	0.30	0.05	0.07	99.93	**99.93**
#40	0.425	0.99	0.15	0.22	99.78	**99.78**
#60	0.250	2.19	0.34	0.56	99.44	**99.44**
#140	0.106	382.90	58.91	59.47	40.53	**40.53**
#200	0.075	137.88	21.21	80.68	19.32	**19.32**
Pan	-	125.54	19.32	100.00	-	**-**

Tested By HL Date 11/6/15 Checked By KC Date 11/10/15

DCN: CT-S3C DATE 3/20/13 REVISION: 3

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

ATTERBERG LIMIT

ASTM D 4318-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-70
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.1-1.2
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-047	Visual:	GRAY SILT
			(MInus No. 40 sieve material, Airdried)

NON - PLASTIC MATERIAL

Tested By	*RAL*	*Date*	*11/5/15*	*Checked By*	*CLK*	*Date*	*11/6/15*

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

PHOTOGRAPHS

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-70
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.45 - 1.95
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-048		

Tested By JCM *Date* 11/13/15 *Checked By* KC *Date* 11/19/15

S:\Excel\Excel QA\Spr

SHELBY TUBE UNIT WEIGHT

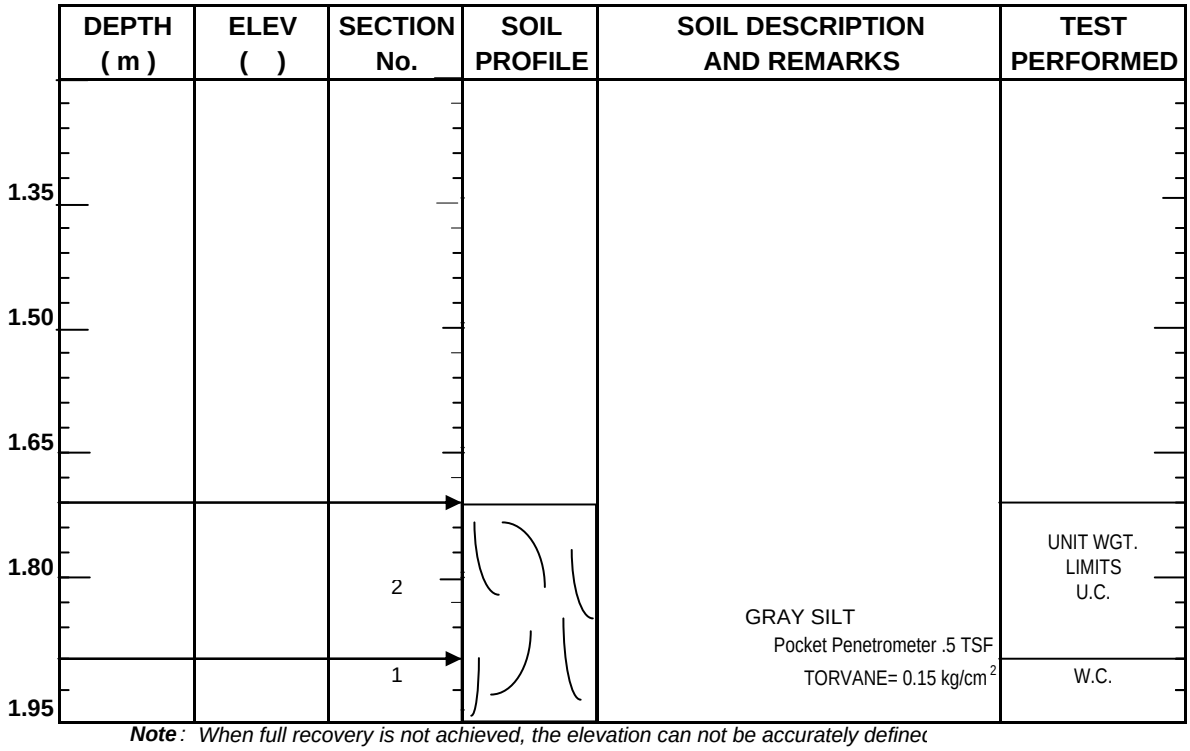
ASTM D2937-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-70
Client Reference:	Lake Erie Connector 185241	Depth Pushed (m):	1.45 - 1.95
Project No.:	2015-538-001	Shelby Tube No.:	GT1
Lab ID:	2015-538-001-048	Recovery (m):	0.5

MOISTURE CONTENT		After U.C.
Section Number	**1**	**2**
Tare Number	546	1526
Weight of Tare & Wet Sample (g)	339.60	1151.54
Weight of Tare & Dry Sample (g)	290.32	956.80
Weight of Tare (g)	85.03	146.23
Moisture Content (%)	24.01	24.03

UNIT WEIGHT	
Weight of Tube & Wet Sample (g)	2271.71
Weight of Tube (g)	0.00
Weight of Wet Sample (g)	2271.71
Length 1 (in)	6.636
Length 2 (in)	6.683
Length 3 (in)	6.675
Top Diameter (in)	3.627
Middle Diameter (in)	3.640
Bottom Diameter (in)	3.635
Sample Volume (cm^3)	1132.76
Moisture Content (%)	24.01
Unit Wet Weight (g/cm^3)	2.01
Unit Wet Weight (pcf)	125.14
Unit Dry Weight (g/cm^3)	**1.62**
Unit Dry Weight (pcf)	**100.9**

SOIL PROFILE AND SAMPLING



***Note**: When full recovery is not achieved, the elevation can not be accurately definec*
Indicate each cut of the tube with an arrow
Indicate dividing line between soil types with a solid lin
Indicate wax by cross-hatching. Indicate soil types by standard symbols

Tested By *JCM* Date *11/13/15* Checked By KC Date 11/19/15

ATTERBERG LIMIT

ASTM D 4318-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-70
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.71-1.89
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-048	Visual:	GRAY SILT
			(MInus No. 40 sieve material, Airdried)

NON - PLASTIC MATERIAL

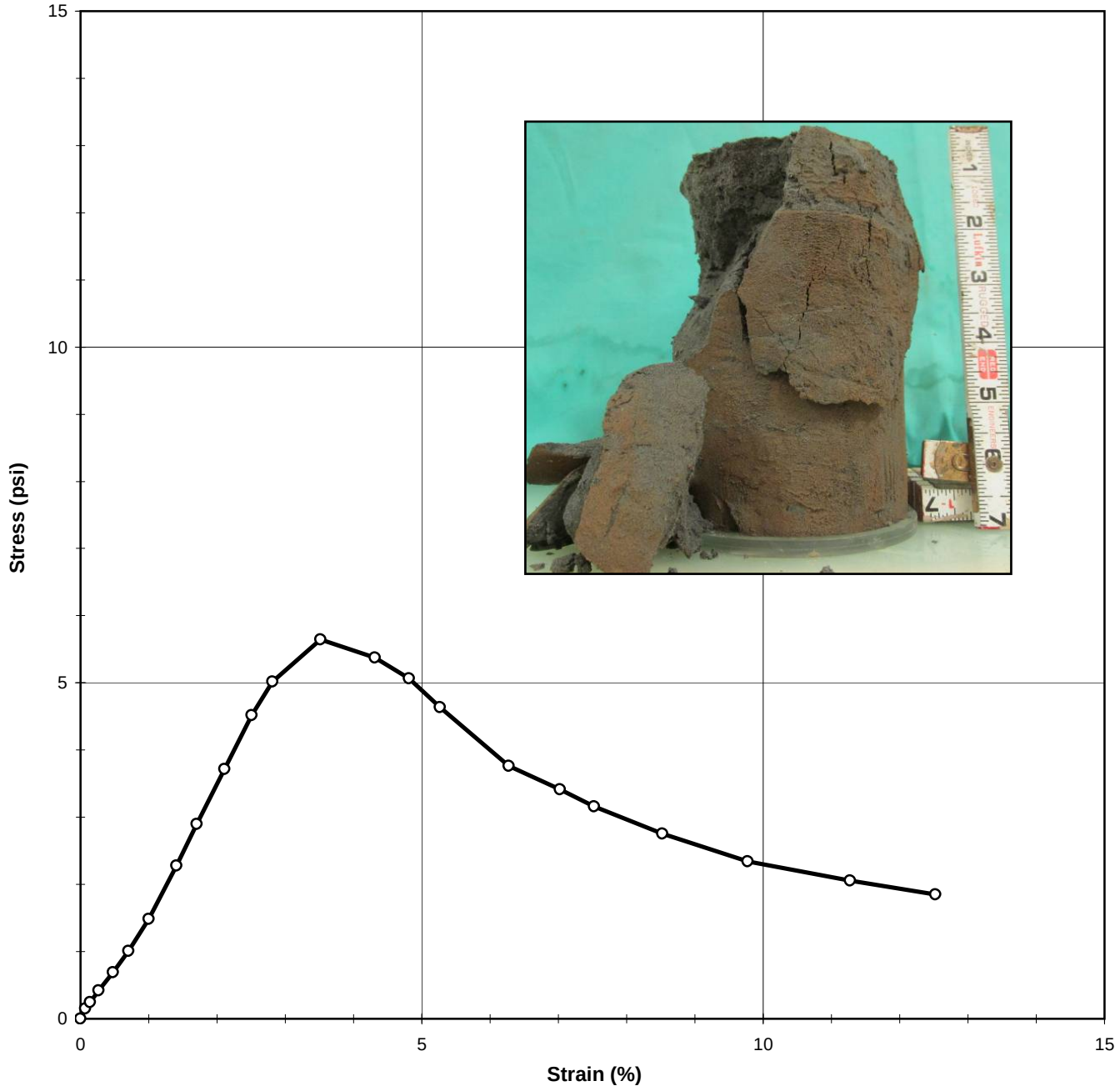
Tested By RAL *Date* 11/17/15 *Checked By* CLK *Date* 11/18/15

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONFINED COMPRESSIVE STRENGTH

ASTM D2166-13 / AASHTO T208-10 (SOP S-30)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-70
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.71 - 1.89
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-048	Visual:	Gray Silt



Tested By	JCM	Date	11/13/15	Approved By	JAB	Date	11/16/15

DCN: CT-S30 Date: 11/09/09 Revision: 4

S:\Excel\Excel QA\Spreadsheets\UC Sigma.xls

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONFINED COMPRESSIVE STRENGTH

ASTM D2166-13 / AASHTO T208-10 (SOP S-30)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-70
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.71 - 1.89
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-048	Visual:	Gray Silt

INITIAL SAMPLE DIMENSIONS				WATER CONTENT AFTER TEST	
Length 1 (in):	6.636	Top Diameter (in):	3.627	Tare No.:	1526
Length 2 (in):	6.683	Middle Diameter (in):	3.640	Weight of Tare & Wet Sample (g):	1151.54
Length 3 (in):	6.675	Bottom Diameter (in):	3.635	Weight of Tare & Dry Sample (g):	956.80
Avg. Length (in):	**6.665**	**Avg. Diameter (in):**	**3.634**	Weight of Tare (g):	146.23
		Area (in^2):	**10.372**	Moisture Content (%):	24.03

UNIT WEIGHT			
Weight of Tube & Wet Sample (g):	2271.7	Sample Volume (cm^3):	1132.8
Weight of Tube (g):	0.00	Unit Wet Weight (g/cm^3):	2.01
Weight of Wet Sample (g):	2271.71	Unit Wet Weight (pcf):	125.14
Average Diameter (in):	3.63	Moisture Content (%):	24.03
Average Length (in):	6.66	Unit Dry Weight (pcf):	100.90
Average Length (cm):	16.93		

ELECTRONIC DEVICE DEFORMATION (in)	*LOAD (lb)*	*ELAPSED TIME (min)*	*STRAIN (%)*	*STRESS (psi)*
0.000	0.0	0.00	0.000	0.000
0.005	1.6	0.08	0.074	0.152
0.010	2.6	0.15	0.144	0.249
0.018	4.4	0.28	0.267	0.420
0.032	7.2	0.48	0.477	0.687
0.047	10.5	0.72	0.706	1.007
0.067	15.6	1.02	1.004	1.486
0.094	24.0	1.42	1.407	2.280
0.114	30.6	1.72	1.706	2.898
0.141	39.4	2.12	2.110	3.719
0.167	48.1	2.52	2.505	4.520
0.187	53.6	2.82	2.812	5.022
0.234	60.7	3.52	3.514	5.642
0.287	58.3	4.33	4.313	5.374
0.321	55.2	4.83	4.813	5.063
0.351	50.8	5.28	5.269	4.638
0.418	41.7	6.28	6.270	3.767
0.468	38.1	7.03	7.024	3.413
0.501	35.5	7.53	7.524	3.163
0.568	31.3	8.53	8.525	2.757
0.651	26.9	9.78	9.771	2.342
0.751	24.0	11.28	11.272	2.053
0.835	21.9	12.53	12.527	1.846

Tested By JCM Date 11/13/15 Input Checked By JAB Date 11/16/15

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

PHOTOGRAPHS

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-70A
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.2 - 1.90
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-049		

Tested By JCM *Date* 11/13/15 *Checked By* KC *Date* 11/19/15

S:\Excel\Excel QA\Spr

SHELBY TUBE UNIT WEIGHT

ASTM D2937-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-70A
Client Reference:	Lake Erie Connector 185241	Depth Pushed (m):	1.2 - 1.90
Project No.:	2015-538-001	Shelby Tube No.:	GT2
Lab ID:	2015-538-001-049	Recovery (m):	0.7

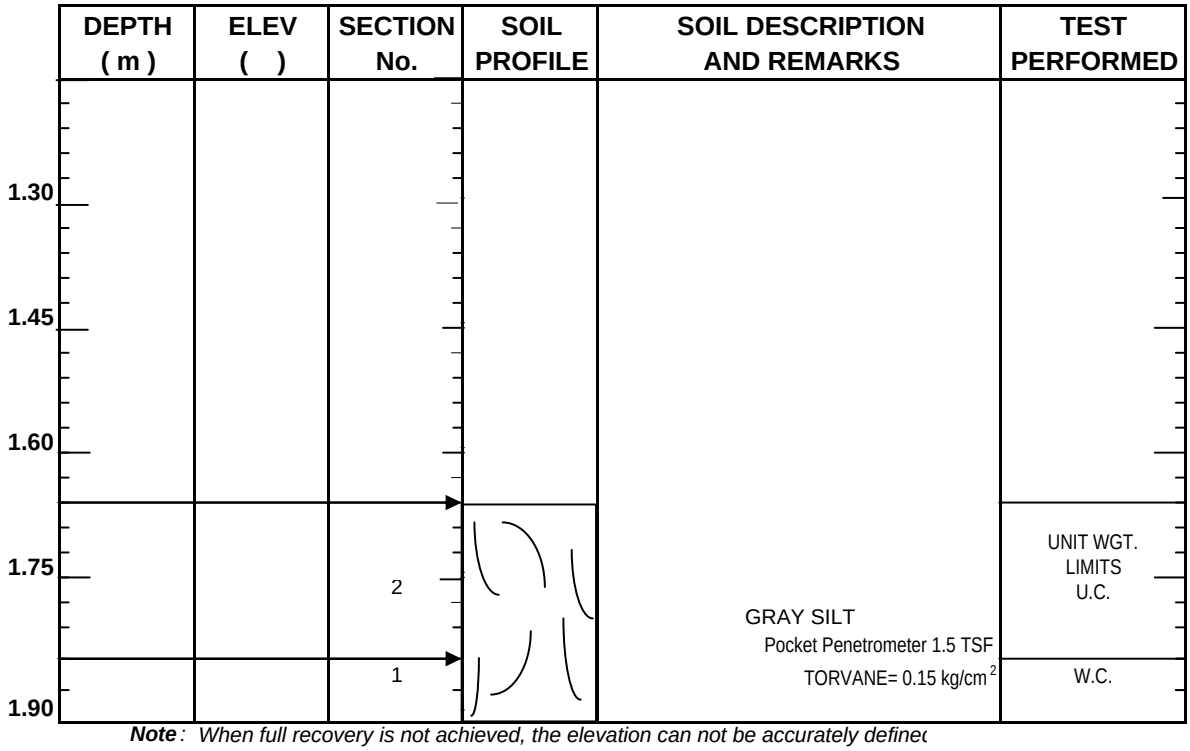
MOISTURE CONTENT

Section Number	**1**	**2**
Tare Number	590	1527
Weight of Tare & Wet Sample (g)	410.81	1157.80
Weight of Tare & Dry Sample (g)	345.45	957.00
Weight of Tare (g)	81.88	143.91
Moisture Content (%)	24.80	24.70

UNIT WEIGHT

Weight of Tube & Wet Sample (g)	2255.50
Weight of Tube (g)	0.00
Weight of Wet Sample (g)	2255.50
Length 1 (in)	6.908
Length 2 (in)	6.908
Length 3 (in)	6.833
Top Diameter (in)	3.688
Middle Diameter (in)	3.625
Bottom Diameter (in)	3.625
Sample Volume (cm^3)	1177.61
Moisture Content (%)	24.80
Unit Wet Weight (g/cm^3)	1.92
Unit Wet Weight (pcf)	119.52
Unit Dry Weight (g/cm^3)	**1.53**
Unit Dry Weight (pcf)	**95.8**

SOIL PROFILE AND SAMPLING



***Note**: When full recovery is not achieved, the elevation can not be accurately definec*
Indicate each cut of the tube with an arrow
Indicate dividing line between soil types with a solid lin
Indicate wax by cross-hatching. Indicate soil types by standard symbols

Tested By *JCM* Date *11/13/15* Checked By KC Date 11/19/15

ATTERBERG LIMIT

ASTM D 4318-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-70A
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.66-1.84
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-049	Visual:	GRAY SILT
			(MInus No. 40 sieve material, Airdried)

NON - PLASTIC MATERIAL

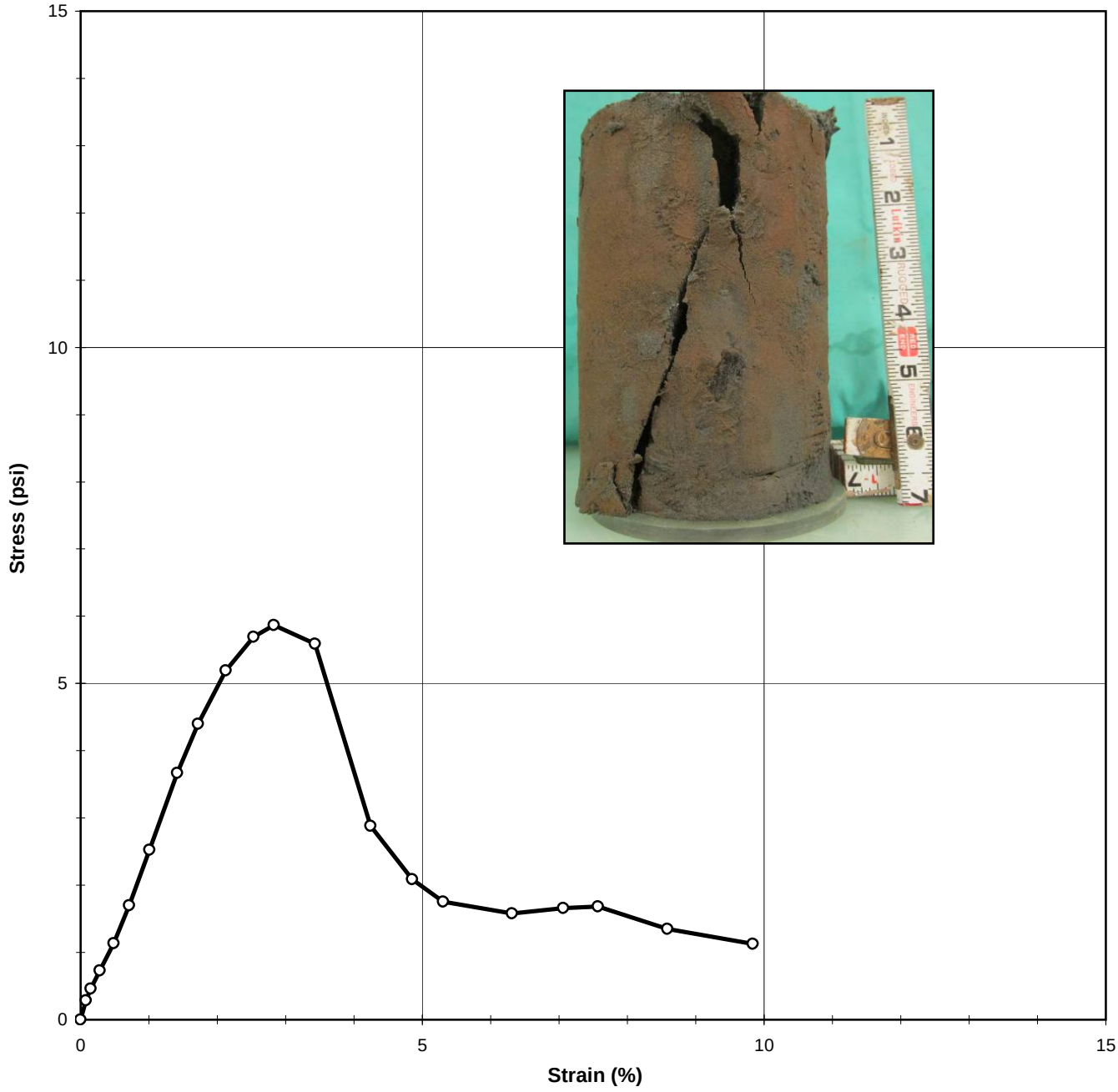
Tested By	*RAL*	*Date*	*11/18/15*	*Checked By*	*CLK*	*Date*	*11/19/15*

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONFINED COMPRESSIVE STRENGTH

ASTM D2166-13 / AASHTO T208-10 (SOP S-30)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-70A
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.66 - 1.84
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-049	Visual:	Gray Silt



Tested By	JCM	Date	11/13/15	Approved By	JAB	Date	11/16/15

DCN: CT-S30 Date: 11/09/09 Revision: 4

S:\Excel\Excel QA\Spreadsheets\UC Sigma.xls

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONFINED COMPRESSIVE STRENGTH

ASTM D2166-13 / AASHTO T208-10 (SOP S-30)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-70A
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.66 - 1.84
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-049	Visual:	Gray Silt

INITIAL SAMPLE DIMENSIONS				WATER CONTENT AFTER TEST	
Length 1 (in):	6.908	Top Diameter (in):	3.688	Tare No.:	1527
Length 2 (in):	6.908	Middle Diameter (in):	3.625	Weight of Tare & Wet Sample (g):	1157.80
Length 3 (in):	6.833	Bottom Diameter (in):	3.625	Weight of Tare & Dry Sample (g):	957.00
Avg. Length (in):	**6.883**	**Avg. Diameter (in):**	**3.646**	Weight of Tare (g):	143.91
		Area (in^2):	**10.441**	Moisture Content (%):	24.70

UNIT WEIGHT

Weight of Tube & Wet Sample (g):	2255.5	Sample Volume (cm^3):	1177.6
Weight of Tube (g):	0.00	Unit Wet Weight (g/cm^3):	1.92
Weight of Wet Sample (g):	2255.5	Unit Wet Weight (pcf):	119.52
Average Diameter (in):	3.65	Moisture Content (%):	24.70
Average Length (in):	6.88	Unit Dry Weight (pcf):	95.85
Average Length (cm):	17.48		

ELECTRONIC DEVICE DEFORMATION (in)	*LOAD (lb)*	*ELAPSED TIME (min)*	*STRAIN (%)*	*STRESS (psi)*
0.000	0.5	0.00	0.000	0.000
0.005	3.5	0.08	0.076	0.286
0.010	5.3	0.15	0.147	0.462
0.019	8.1	0.28	0.279	0.727
0.033	12.4	0.48	0.482	1.135
0.049	18.4	0.70	0.711	1.700
0.070	27.1	1.02	1.011	2.529
0.098	39.3	1.42	1.417	3.670
0.118	47.2	1.72	1.717	4.397
0.146	55.9	2.12	2.123	5.196
0.174	61.5	2.52	2.529	5.696
0.195	63.5	2.82	2.829	5.866
0.236	60.9	3.42	3.429	5.591
0.292	31.9	4.22	4.241	2.884
0.334	23.4	4.83	4.850	2.086
0.365	19.8	5.28	5.309	1.751
0.435	18.1	6.28	6.314	1.580
0.486	19.1	7.03	7.064	1.661
0.521	19.5	7.53	7.567	1.687
0.591	15.9	8.53	8.582	1.348
0.677	13.6	9.78	9.835	1.130

Tested By JCM Date 11/13/15 Input Checked By JAB Date 11/16/15

DCN: CT-S30 Date: 11/09/09 Revision: 4

S:\Excel\Excel QA\Spreadsheets\UC Sigma.xls

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

PHOTOGRAPHS

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-71
Client Reference:	Lake Erie Connector 185241	Depth (m):	0.83 - 1.53
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-050		

Tested By	*JCM*	*Date*	*11/13/15*	*Checked By*	*KC*	*Date*	*11/19/15*

S:\Excel\Excel QA\Spr

SHELBY TUBE UNIT WEIGHT

ASTM D2937-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-71
Client Reference:	Lake Erie Connector 185241	Depth Pushed (m):	0.83 - 1.53
Project No.:	2015-538-001	Shelby Tube No.:	GT1
Lab ID:	2015-538-001-050	Recovery (m):	0.7

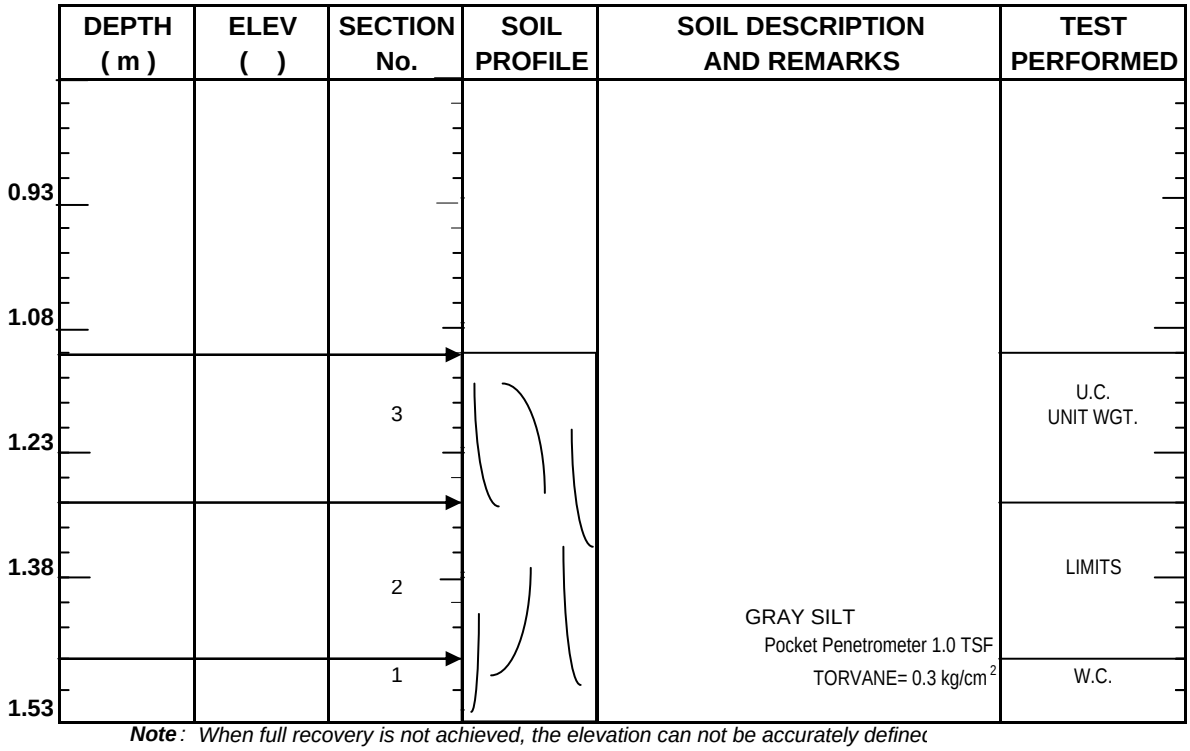
MOISTURE CONTENT

Section Number	**1**	**2**	**3**
Tare Number	575		1482
Weight of Tare & Wet Sample (g)	347.10		1384.21
Weight of Tare & Dry Sample (g)	292.52		1133.40
Weight of Tare (g)	82.33		147.64
Moisture Content (%)	25.97		25.44

UNIT WEIGHT

Weight of Tube & Wet Sample (g)	2213.95
Weight of Tube (g)	0.00
Weight of Wet Sample (g)	2213.95
Length 1 (in)	6.502
Length 2 (in)	6.490
Length 3 (in)	6.604
Top Diameter (in)	3.552
Middle Diameter (in)	3.714
Bottom Diameter (in)	3.781
Sample Volume (cm^3)	1139.94
Moisture Content (%)	25.44
Unit Wet Weight (g/cm^3)	1.94
Unit Wet Weight (pcf)	121.19
Unit Dry Weight (g/cm^3)	**1.55**
Unit Dry Weight (pcf)	**96.6**

SOIL PROFILE AND SAMPLING



***Note**: When full recovery is not achieved, the elevation can not be accurately definec*
Indicate each cut of the tube with an arrow
Indicate dividing line between soil types with a solid lin
Indicate wax by cross-hatching. Indicate soil types by standard symbols

Tested By *JCM* Date *11/13/15* Checked By KC Date 11/19/15

ATTERBERG LIMIT

ASTM D 4318-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-71
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.29-1.47
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-050	Visual:	GRAY SILT
			(MInus No. 40 sieve material, Airdried)

NON - PLASTIC MATERIAL

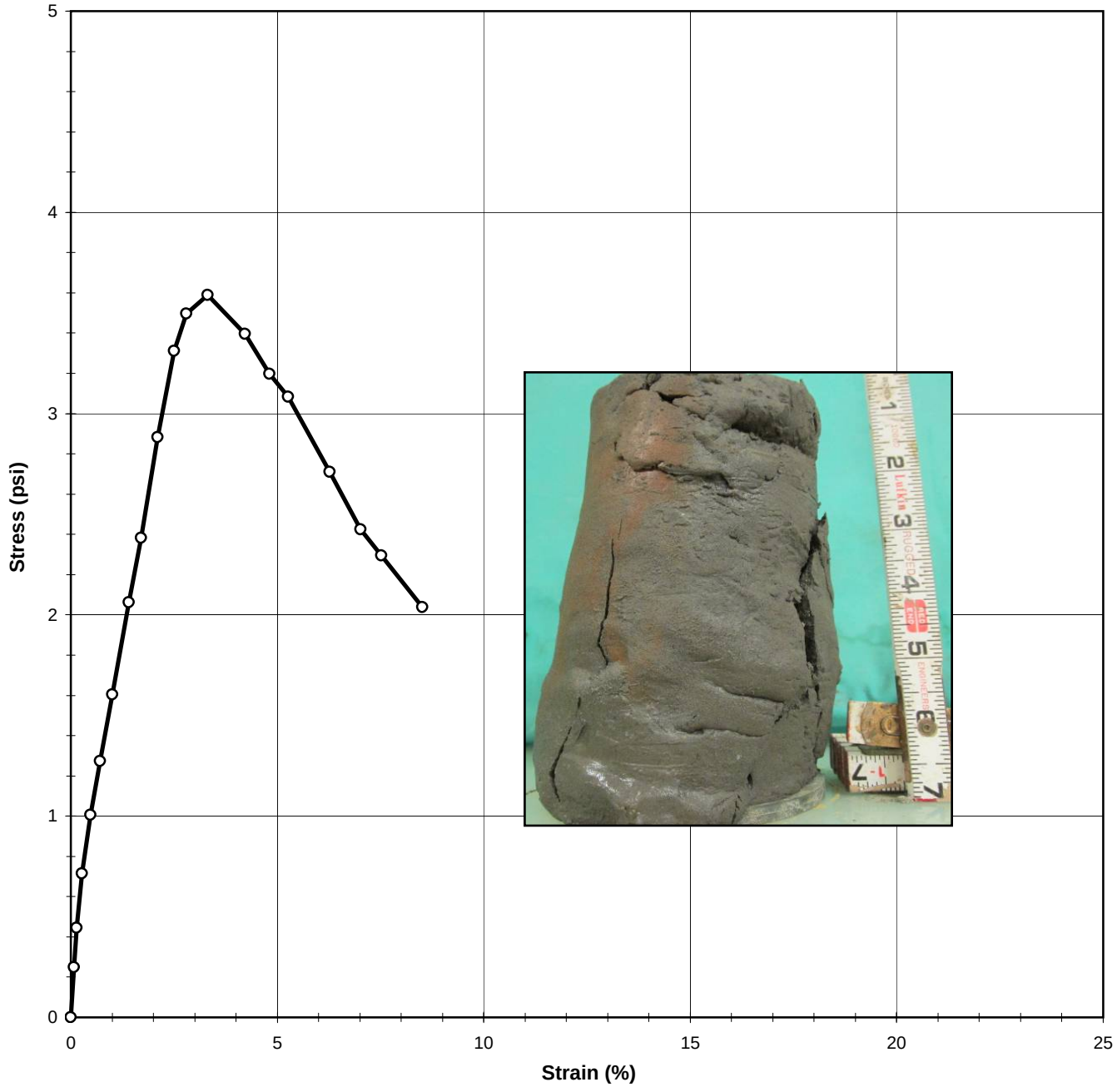
Tested By *RAL* *Date* *11/18/15* *Checked By* *CLK* *Date* *11/19/15*

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONFINED COMPRESSIVE STRENGTH

ASTM D2166-13 / AASHTO T208-10 (SOP S-30)

Client:	Canadian Seabed Reasearch Ltd.	Boring No.:	VC-71
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.11-1.29
Project No.:	2015-538-001	Sample No.:	GT-1
Lab ID:	2015-538-001-050	Visual:	Gray Silt



Tested By	JCM	Date	11/16/15	Approved By	KC	Date	11/18/15

DCN: CT-S30 Date: 11/09/09 Revision: 4

S:\Excel\Excel QA\Spreadsheets\UC Sigma.xls

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONFINED COMPRESSIVE STRENGTH

ASTM D2166-13 / AASHTO T208-10 (SOP S-30)

Client:	Canadian Seabed Reasearch Ltd.	Boring No.:	VC-71
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.11-1.29
Project No.:	2015-538-001	Sample No.:	GT-1
Lab ID:	2015-538-001-050	Visual:	Gray Silt

INITIAL SAMPLE DIMENSIONS				WATER CONTENT AFTER TEST	
Length 1 (in):	6.502	Top Diameter (in):	3.552	Tare No.:	1482
Length 2 (in):	6.490	Middle Diameter (in):	3.714	Weight of Tare & Wet Sample (g):	1384.21
Length 3 (in):	6.604	Bottom Diameter (in):	3.781	Weight of Tare & Dry Sample (g):	1133.40
Avg. Length (in):	**6.532**	**Avg. Diameter (in):**	**3.682**	Weight of Tare (g):	147.64
		Area (in^2):	**10.650**	Moisture Content (%):	25.44

UNIT WEIGHT			
Weight of Tube & Wet Sample (g):	2214.0	Sample Volume (cm^3):	1139.9
Weight of Tube (g):	0.00	Unit Wet Weight (g/cm^3):	1.94
Weight of Wet Sample (g):	2213.95	Unit Wet Weight (pcf):	121.19
Average Diameter (in):	3.68	Moisture Content (%):	25.44
Average Length (in):	6.53	Unit Dry Weight (pcf):	96.61
Average Length (cm):	16.59		

ELECTRONIC DEVICE DEFORMATION (in)	*LOAD (lb)*	*ELAPSED TIME (min)*	*STRAIN (%)*	*STRESS (psi)*
0.000	1.1	0.00	0.000	0.000
0.005	3.8	0.08	0.072	0.248
0.009	5.9	0.15	0.143	0.443
0.018	8.7	0.28	0.274	0.714
0.031	11.9	0.48	0.476	1.006
0.046	14.8	0.72	0.704	1.274
0.065	18.4	1.02	1.003	1.603
0.092	23.4	1.42	1.406	2.061
0.111	26.9	1.72	1.705	2.381
0.138	32.5	2.12	2.108	2.881
0.164	37.3	2.52	2.503	3.312
0.183	39.4	2.82	2.802	3.497
0.216	40.7	3.32	3.310	3.589
0.275	38.9	4.22	4.214	3.396
0.314	36.9	4.82	4.811	3.197
0.344	35.8	5.27	5.268	3.083
0.409	31.9	6.27	6.268	2.711
0.458	28.9	7.02	7.014	2.424
0.491	27.6	7.52	7.514	2.296
0.556	24.9	8.52	8.515	2.038

Tested By JCM Date 11/16/15 Input Checked By KC Date 11/18/15

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

PHOTOGRAPHS

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-71A
Client Reference:	Lake Erie Connector 185241	Depth (m):	0.89-1.39
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-051		

Tested By *NJM* *Date* *11/11/15* *Checked By* *KC* *Date* *11/12/15*

S:\Excel\Excel QA\Spreadsheets\Photo

SHELBY TUBE UNIT WEIGHT

ASTM D2937-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-71A
Client Reference:	Lake Erie Connector 185241	Depth Pushed (m):	0.89-1.39
Project No.:	2015-538-001	Shelby Tube No.:	GT2
Lab ID:	2015-538-001-051	Recovery (m):	0.5

MOISTURE CONTENT

Section Number	**1**
Tare Number	3170
Weight of Tare & Wet Sample (g)	366.89
Weight of Tare & Dry Sample (g)	293.78
Weight of Tare (g)	6.54
Moisture Content (%)	25.45

UNIT WEIGHT

Weight of Tube & Wet Sample (g)	1649.80
Weight of Tube (g)	92.29
Weight of Wet Sample (g)	1557.51
Length 1 (in)	4.717
Length 2 (in)	4.719
Length 3 (in)	4.600
Top Diameter (in)	3.594
Middle Diameter (in)	3.582
Bottom Diameter (in)	3.582
Sample Volume (cm^3)	774.34
Moisture Content (%)	25.45
Unit Wet Weight (g/cm^3)	2.01
Unit Wet Weight (pcf)	125.51
Unit Dry Weight (g/cm^3)	**1.60**
Unit Dry Weight (pcf)	**100.0**

SOIL PROFILE AND SAMPLING

DEPTH (m)	ELEV ( )	SECTION No.	SOIL PROFILE	SOIL DESCRIPTION AND REMARKS	TEST PERFORMED
0.79					
0.94					
1.09					
1.24				GRAY SILTY FINE SAND	WC, UNIT WGT, GRAIN SIZE
1.39		1		TORVANE= 0.29 kg/cm^2 Pocket Penetrometer 2.0 TSF	

***Note**: When full recovery is not achieved, the elevation can not be accurately define*
Indicate each cut of the tube with an arrow
Indicate dividing line between soil types with a solid lin
Indicate wax by cross-hatching. Indicate soil types by standard symbols

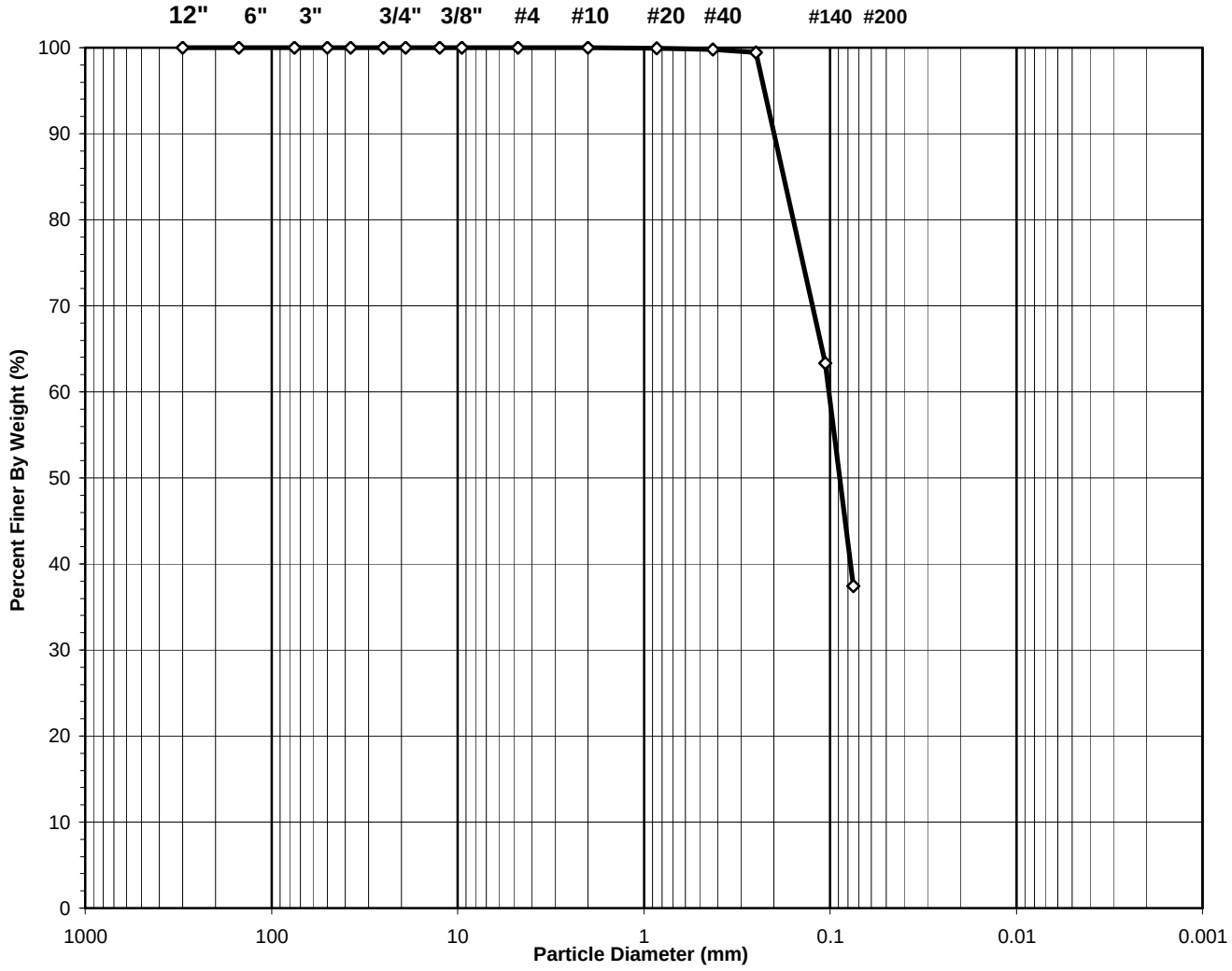
Tested By *NJM* Date *11/11/15* Checked By KC Date 11/12/15

SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-71A
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.27-1.39
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-051	Soil Color:	Gray

	SIEVE ANALYSIS		*HYDROMETER*
USCS	**gravel**	**sand**	**silt and clay**



USCS Symbol:
sm, ASSUMED

USCS Classification:
SILTY SAND

Tested By HL Date 11/16/15 Checked By CLK Date 11/17/15

DCN: CT-S3C DATE 3/20/13 REVISION: 3

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

WASH SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-71A
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.27-1.39
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-051	Soil Color:	Gray

Moisture Content of Passing 3/4" Sample		Water Content of Retained 3/4" Sample	
Tare No.:	56	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	1392.90	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	1154.60	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	204.72	Weight of Tare (g):	NA
Weight of Water (g):	238.30	Weight of Water (g):	NA
Weight of Dry Sample (g):	949.88	Weight of Dry Sample (g):	NA
Moisture Content (%):	**25.1**	**Moisture Content (%):**	**NA**

Wet Weight of -3/4" Sample (g):	NA	Weight of the Dry Sample (g):	949.88
Dry Weight of - 3/4" Sample (g):	594.1	Weight of - #200 Material (g):	355.80
Wet Weight of +3/4" Sample (g):	NA	Weight of + #200 Material (g):	594.08
Dry Weight of + 3/4" Sample (g):	0.00		
Total Dry Weight of Sample (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.50	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	0.00	0.00	0.00	100.00	**100.00**
#4	4.75	0.00	0.00	0.00	100.00	**100.00**
#10	2.00	0.23	0.02	0.02	99.98	**99.98**
#20	0.850	0.60	0.06	0.09	99.91	**99.91**
#40	0.425	1.28	0.13	0.22	99.78	**99.78**
#60	0.250	2.86	0.30	0.52	99.48	**99.48**
#140	0.106	343.00	36.11	36.63	63.37	**63.37**
#200	0.075	246.11	25.91	62.54	37.46	**37.46**
Pan	-	355.80	37.46	100.00	-	**-**

Tested By HL Date 11/16/15 Checked By CLK Date 11/17/15

DCN: CT-S3C DATE 3/20/13 REVISION: 3

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

PHOTOGRAPHS

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-71A
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.64-2.34
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-052		

Tested By JCM *Date* 11/23/15 *Checked By* KC *Date* 12/1/15

S:\Excel\Excel QA\Spreadsheets\Photo

SHELBY TUBE UNIT WEIGHT

ASTM D2937-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-71A
Client Reference:	Lake Erie Connector 185241	Depth Pushed (m):	1.64-2.34
Project No.:	2015-538-001	Shelby Tube No.:	GT1
Lab ID:	2015-538-001-052	Recovery (m):	0.7

MOISTURE CONTENT — After U.U.

Section Number	**1**	**2**	**3**	**4**	**5**
Tare Number	590	1435			
Weight of Tare & Wet Sample (g)	425.31	1387.91			
Weight of Tare & Dry Sample (g)	357.41	1129.40			
Weight of Tare (g)	81.89	145.40			
Moisture Content (%)	24.64	26.27			

UNIT WEIGHT

Weight of Tube & Wet Sample (g)	2410.07
Weight of Tube (g)	111.71
Weight of Wet Sample (g)	2298.36
Length 1 (in)	7.125
Length 2 (in)	7.141
Length 3 (in)	7.148
Top Diameter (in)	3.655
Middle Diameter (in)	3.589
Bottom Diameter (in)	3.661
Sample Volume (cm^3)	1213.88
Moisture Content (%)	26.27
Unit Wet Weight (g/cm^3)	1.89
Unit Wet Weight (pcf)	118.15
Unit Dry Weight (g/cm^3)	**1.50**
Unit Dry Weight (pcf)	**93.6**

SOIL PROFILE AND SAMPLING

DEPTH (m)	ELEV ( )	SECTION No.	SOIL PROFILE	SOIL DESCRIPTION AND REMARKS	TEST PERFORMED
1.74					
1.89					
2.04					
2.19		2		GRAY SILT	U.U. UNIT WGT., W.C. LIMITS
				Pocket Penetrometer .5 TSF	
2.34		1		TORVANE= 0.2 kg/cm^2	W.C.

***Note**: When full recovery is not achieved, the elevation can not be accurately define*
Indicate each cut of the tube with an arrow
Indicate dividing line between soil types with a solid lin
Indicate wax by cross-hatching. Indicate soil types by standard symbols

Tested By *JCM* Date *11/23/15* Checked By KC Date 12/1/15

ATTERBERG LIMIT

ASTM D 4318-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-71A
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.10-2.28
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-052	Visual:	GRAY SILT
			(MInus No. 40 sieve material, Airdried)

NON - PLASTIC MATERIAL

Tested By	*RAL*	*Date*	*11/25/15*	*Checked By*	*KC*	*Date*	*11/30/15*

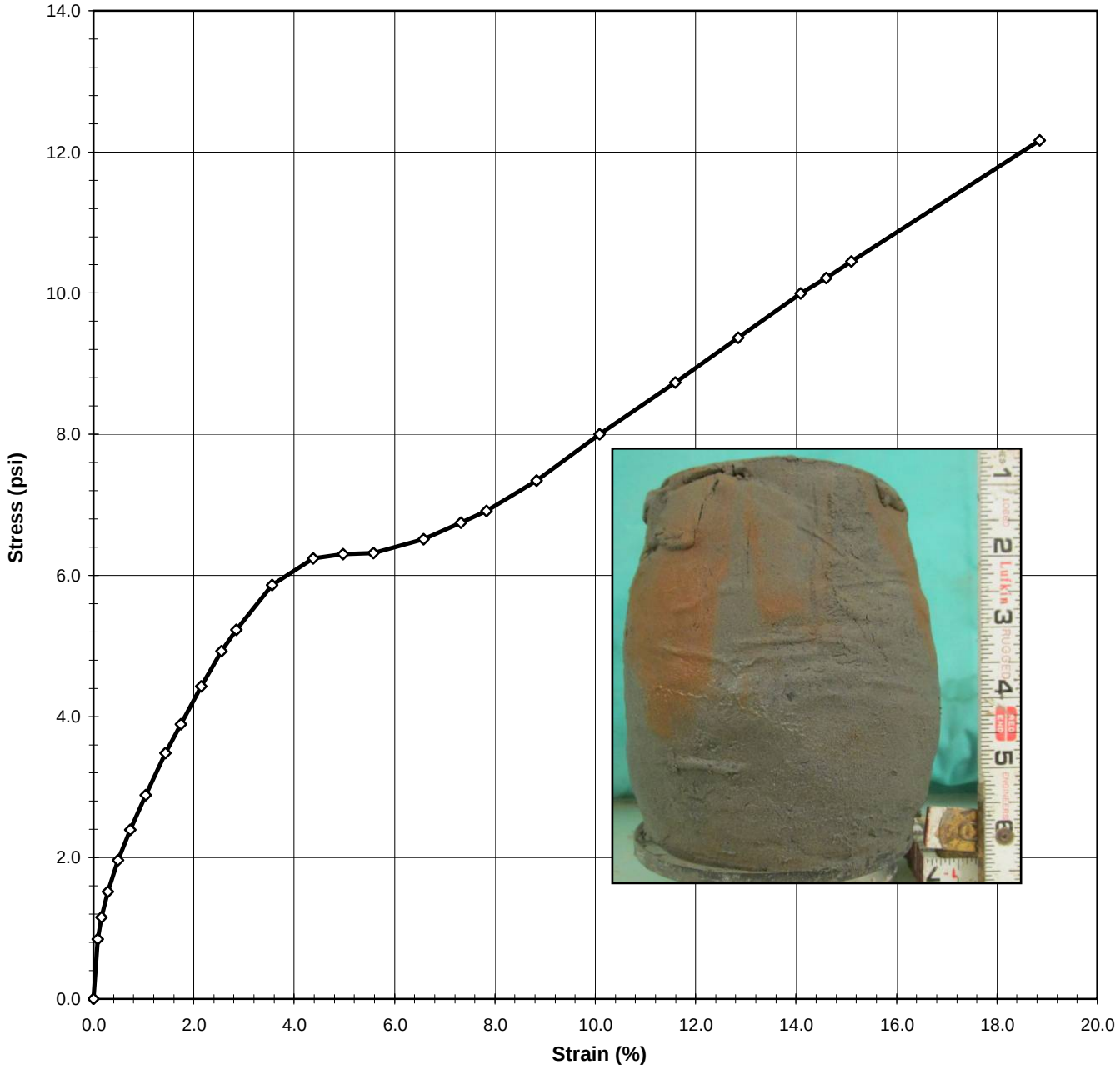
544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONSOLIDATED UNDRAINED TRIAXIAL

ASTM D2850-03a (2007)

Client:	Canadian Seabed Research, Ltd.	Boring No.:	VC-71A
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.10-2.28
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-052	Visual:	Gray Silt

CONFINING STRESS (psi) 27.8



Tested By	JCM	Date	11/23/15	Input Checked By	KC	Date	11/30/15

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONSOLIDATED UNDRAINED TRIAXIAL

ASTM D2850-03a (2007)

Client:	Canadian Seabed Research, Ltd.	Boring No.:	VC-71A
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.10-2.28
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-052	Visual:	Gray Silt

INITIAL SAMPLE DIMENSIONS

Length 1 (in):	7.125	Top Dia. (in):	3.655
Length 2 (in):	7.141	Mid. Dia. (in):	3.589
Length 3 (in):	7.148	Bot. Dia. (in):	3.661
Avg.Length (in)	**7.138**	**Area (in^2):**	**10.378**

WATER CONTENT (AFTER TEST)

Total Weight of Sample (g):	2168.10
Tare No.:	1435
Weight of Tare & Wet Sample (g):	1387.91
Weight of Tare & Dry Sample (g):	1129.40
Weight of Tare (g):	145.40
% Moisture:	26.3

UNIT WEIGHT

Undisturbed Sample

Weight of Tube & Wet Sample (g):	2410.07	Sample Volume (cm^3):	1213.9
Weight of Tube (g):	111.71	Unit Wet Weight (g/cm^3):	1.89
Weight of Wet Sample (g):	2298.36	Unit Wet Weight (pcf):	118.15
Diameter (in):	3.64	Moisture Content (%):	26.3
Length (in):	7.15	Unit Dry Weight (pcf):	93.6
Length (cm):	18.13		

		Initial Dial Reading (mil)	73
CONFINING STRESS (psi)	**27.8**	Dial Reading Before Shearing (mil)	66

DEFORMATION (in)	*LOAD (lb)*	*ELAPSED TIME (min)*	*STRAIN (%)*	*STRESS (psi)*
0.000	14.4	0.0	0.0	0.000
0.006	23.2	0.08	0.1	0.849
0.011	26.4	0.17	0.2	1.154
0.020	30.2	0.30	0.3	1.515
0.035	34.9	0.50	0.5	1.965
0.052	39.4	0.73	0.7	2.391
0.074	44.7	1.05	1.0	2.890
0.103	51.1	1.45	1.4	3.481
0.124	55.5	1.75	1.7	3.892
0.154	61.4	2.17	2.2	4.428
0.182	66.9	2.57	2.6	4.925
0.204	70.3	2.87	2.9	5.230
0.255	77.5	3.57	3.6	5.859
0.312	82.1	4.38	4.4	6.238
0.355	83.2	4.98	5.0	6.299
0.398	83.8	5.58	5.6	6.313
0.470	86.7	6.60	6.6	6.512
0.523	89.9	7.35	7.3	6.743
0.560	92.2	7.85	7.8	6.912
0.631	98.0	8.85	8.8	7.345
0.721	106.8	10.10	10.1	8.000
0.828	116.9	11.60	11.6	8.735
0.918	126.0	12.87	12.8	9.368
1.007	135.2	14.12	14.1	9.995
1.043	138.5	14.62	14.6	10.213
1.079	142.2	15.12	15.1	10.452
1.347	170.0	18.88	18.9	12.165

Tested By JCM Date 11/23/15 Input Checked By KC Date 11/30/15

DCN: CT-S29 DATE: 8-21-10 REVISION: 2

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

PHOTOGRAPHS

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-72
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.07 - 1.77
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-053		

Tested By *JCM* *Date* *11/13/15* *Checked By* *KC* *Date* *11/19/15*

S:\Excel\Excel QA\Spr

SHELBY TUBE UNIT WEIGHT

ASTM D2937-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-72
Client Reference:	Lake Erie Connector 185241	Depth Pushed (m):	1.07 - 1.77
Project No.:	2015-538-001	Shelby Tube No.:	GT2
Lab ID:	2015-538-001-053	Recovery (m):	0.7

MOISTURE CONTENT		After U.C.
Section Number	**1**	**2**
Tare Number	1459	1434
Weight of Tare & Wet Sample (g)	388.99	1568.46
Weight of Tare & Dry Sample (g)	326.25	1274.10
Weight of Tare (g)	78.81	144.97
Moisture Content (%)	25.36	26.07

UNIT WEIGHT	
Weight of Tube & Wet Sample (g)	2219.27
Weight of Tube (g)	0.00
Weight of Wet Sample (g)	2219.27
Length 1 (in)	6.473
Length 2 (in)	6.674
Length 3 (in)	6.495
Top Diameter (in)	3.625
Middle Diameter (in)	3.691
Bottom Diameter (in)	3.641
Sample Volume (cm^3)	1124.08
Moisture Content (%)	26.07
Unit Wet Weight (g/cm^3)	1.97
Unit Wet Weight (pcf)	123.20
Unit Dry Weight (g/cm^3)	**1.57**
Unit Dry Weight (pcf)	**97.7**

SOIL PROFILE AND SAMPLING

DEPTH (m)	ELEV ( )	SECTION No.	SOIL PROFILE	SOIL DESCRIPTION AND REMARKS	TEST PERFORMED
1.17					
1.32					
1.47					
1.62		2		GRAY SILT Pocket Penetrometer .75 TSF	U.C. LIMITS UNIT WGT.
1.77		1		TORVANE= 0.15 kg/cm^2	W.C.

***Note**: When full recovery is not achieved, the elevation can not be accurately definec*
Indicate each cut of the tube with an arrow
Indicate dividing line between soil types with a solid lin
Indicate wax by cross-hatching. Indicate soil types by standard symbols

Tested By *JCM* Date *11/17/15* Checked By KC Date 11/19/15

ATTERBERG LIMIT

ASTM D 4318-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-72
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.53-1.71
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-053	Visual:	GRAY SILT
			(MInus No. 40 sieve material, Airdried)

NON - PLASTIC MATERIAL

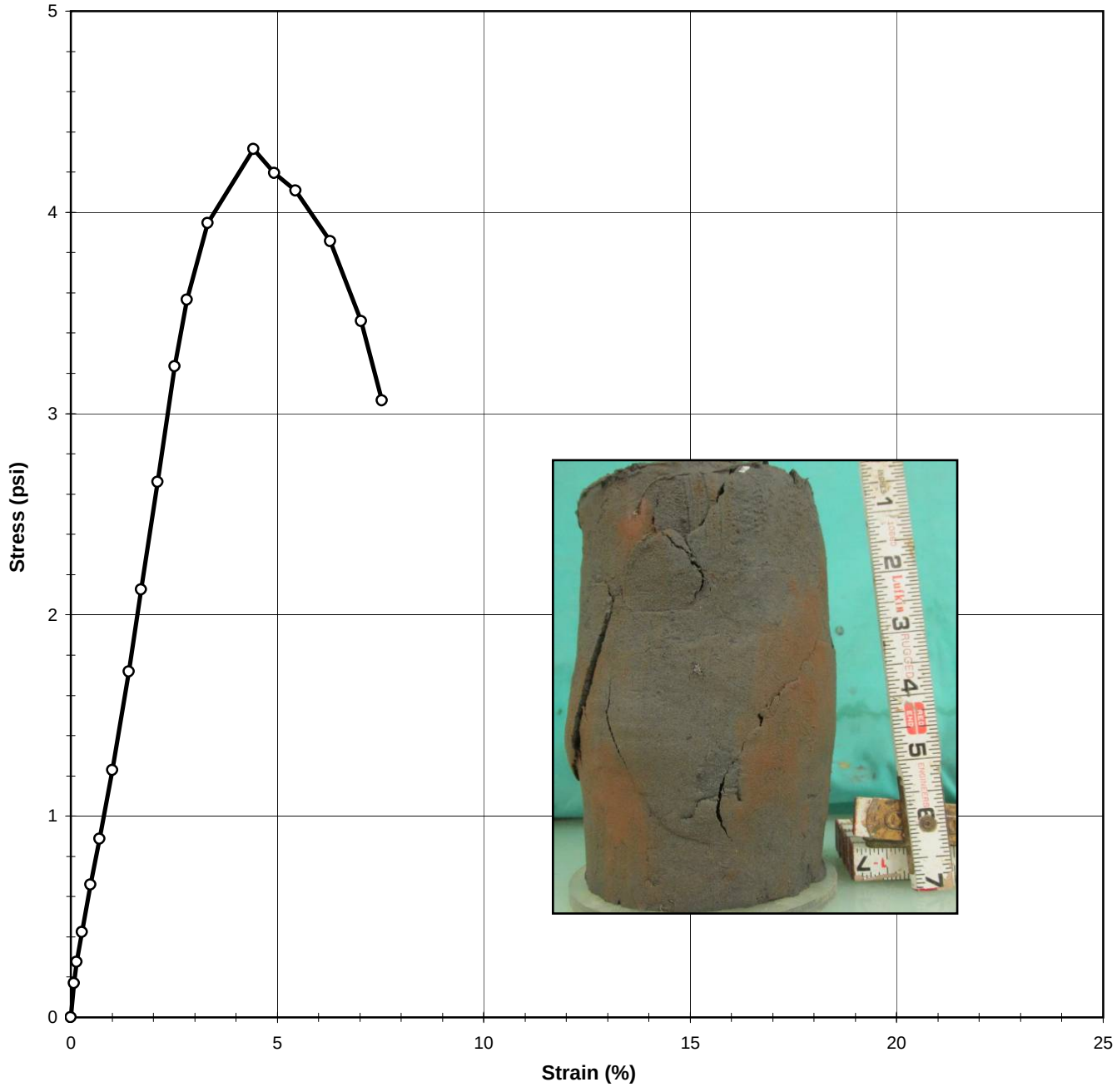
Tested By *RAL* *Date* *11/18/15* *Checked By* *CLK* *Date* *11/19/15*

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONFINED COMPRESSIVE STRENGTH

ASTM D2166-13 / AASHTO T208-10 (SOP S-30)

Client:	Canadian Seabed Reasearch Ltd.	Boring No.:	VC-72
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.53-1.71
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-053	Visual:	Gray Silt



Tested By	JCM	Date	11/17/15	Approved By	KC	Date	11/18/15

DCN: CT-S30 Date: 11/09/09 Revision: 4

S:\Excel\Excel QA\Spreadsheets\UC Sigma.xls

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONFINED COMPRESSIVE STRENGTH

ASTM D2166-13 / AASHTO T208-10 (SOP S-30)

Client:	Canadian Seabed Reasearch Ltd.	Boring No.:	VC-72
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.53-1.71
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-053	Visual:	Gray Silt

INITIAL SAMPLE DIMENSIONS				WATER CONTENT AFTER TEST	
Length 1 (in):	6.473	Top Diameter (in):	3.625	Tare No.:	1434
Length 2 (in):	6.674	Middle Diameter (in):	3.691	Weight of Tare & Wet Sample (g):	1568.46
Length 3 (in):	6.495	Bottom Diameter (in):	3.641	Weight of Tare & Dry Sample (g):	1274.10
Avg. Length (in):	**6.547**	**Avg. Diameter (in):**	**3.652**	Weight of Tare (g):	144.97
		Area (in^2):	**10.477**	Moisture Content (%):	26.07

UNIT WEIGHT			
Weight of Tube & Wet Sample (g):	2219.27	Sample Volume (cm^3):	1124.1
Weight of Tube (g):	0.00	Unit Wet Weight (g/cm^3):	1.97
Weight of Wet Sample (g):	2219.27	Unit Wet Weight (pcf):	123.20
Average Diameter (in):	3.65	Moisture Content (%):	26.07
Average Length (in):	6.55	Unit Dry Weight (pcf):	97.72
Average Length (cm):	16.63		

ELECTRONIC DEVICE DEFORMATION (in)	*LOAD (lb)*	*ELAPSED TIME (min)*	*STRAIN (%)*	*STRESS (psi)*
0.000	0.2	0.00	0.000	0.000
0.005	2.0	0.07	0.071	0.168
0.009	3.1	0.15	0.141	0.276
0.018	4.6	0.27	0.273	0.423
0.031	7.1	0.47	0.475	0.659
0.046	9.6	0.70	0.703	0.888
0.066	13.2	1.00	1.001	1.228
0.092	18.5	1.40	1.405	1.718
0.111	22.8	1.70	1.703	2.125
0.138	28.7	2.10	2.106	2.660
0.164	34.9	2.52	2.510	3.233
0.184	38.6	2.82	2.817	3.566
0.217	43.0	3.32	3.318	3.947
0.290	47.5	4.42	4.423	4.316
0.323	46.4	4.93	4.932	4.196
0.357	45.7	5.45	5.450	4.109
0.411	43.3	6.28	6.283	3.857
0.460	39.2	7.03	7.030	3.459
0.493	34.9	7.53	7.529	3.065

Tested By JCM Date 11/17/15 Input Checked By KC Date 11/18/15

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

PHOTOGRAPHS

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-72
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.02-2.72
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-054		

Tested By *NJM* *Date* *11/11/15* *Checked By* *KC* *Date* *11/12/15*

S:\Excel\Excel QA\Spreadsheets\Photo

SHELBY TUBE UNIT WEIGHT

ASTM D2937-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-72
Client Reference:	Lake Erie Connector 185241	Depth Pushed (m):	2.02-2.72
Project No.:	2015-538-001	Shelby Tube No.:	GT1
Lab ID:	2015-538-001-054	Recovery (m):	0.7

MOISTURE CONTENT

Section Number	**1**
Tare Number	3030
Weight of Tare & Wet Sample (g)	437.70
Weight of Tare & Dry Sample (g)	352.92
Weight of Tare (g)	6.64
Moisture Content (%)	24.48

UNIT WEIGHT

Weight of Tube & Wet Sample (g)	1631.80
Weight of Tube (g)	91.50
Weight of Wet Sample (g)	1540.30
Length 1 (in)	4.707
Length 2 (in)	4.632
Length 3 (in)	4.590
Top Diameter (in)	3.612
Middle Diameter (in)	3.638
Bottom Diameter (in)	3.619
Sample Volume (cm^3)	784.38
Moisture Content (%)	24.48
Unit Wet Weight (g/cm^3)	1.96
Unit Wet Weight (pcf)	122.54
Unit Dry Weight (g/cm^3)	**1.58**
Unit Dry Weight (pcf)	**98.4**

SOIL PROFILE AND SAMPLING

DEPTH (m)	ELEV ( )	SECTION No.	SOIL PROFILE	SOIL DESCRIPTION AND REMARKS	TEST PERFORMED
2.12					
2.27					
2.42					
2.57					
2.72		1		DARK GRAY SAND GRAY SILTY FINE SAND TORVANE= 0.27 kg/cm^2 Pocket Penetrometer 0.25 TSF	WC, UNIT WGT, LIMITS

***Note**: When full recovery is not achieved, the elevation can not be accurately define*
Indicate each cut of the tube with an arrow
Indicate dividing line between soil types with a solid lin
Indicate wax by cross-hatching. Indicate soil types by standard symbols

Tested By *NJM* Date *11/11/15* Checked By KC Date 11/12/15

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

ATTERBERG LIMIT

ASTM D 4318-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-72
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.6-2.72
Project No.:	2015-538-001	Sample No.:	GT1
Lab ID:	2015-538-001-054	Visual:	GRAY SILT
			(MInus No. 40 sieve material, Airdried)

NON - PLASTIC MATERIAL

Tested By *RAL* *Date* *11/14/15* *Checked By* *CLK* *Date* *11/16/15*

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

PHOTOGRAPHS

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-73
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.49-2.19
Project No.:	2015-538-001	Sample No.:	GT3
Lab ID:	2015-538-001-056		

Tested By *NJM* *Date* *11/11/15* *Checked By* *KC* *Date* *11/12/15*

S:\Excel\Excel QA\Spreadsheets\Photo

SHELBY TUBE UNIT WEIGHT

ASTM D2937-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-73
Client Reference:	Lake Erie Connector 185241	Depth Pushed (m):	1.49-2.19
Project No.:	2015-538-001	Shelby Tube No.:	GT3
Lab ID:	2015-538-001-056	Recovery (m):	0.7

MOISTURE CONTENT

Section Number	**1**
Tare Number	3025
Weight of Tare & Wet Sample (g)	376.37
Weight of Tare & Dry Sample (g)	309.94
Weight of Tare (g)	6.60
Moisture Content (%)	21.90

UNIT WEIGHT

Weight of Tube & Wet Sample (g)	1969.40
Weight of Tube (g)	102.94
Weight of Wet Sample (g)	1866.46
Length 1 (in)	5.543
Length 2 (in)	5.373
Length 3 (in)	5.182
Top Diameter (in)	3.638
Middle Diameter (in)	3.600
Bottom Diameter (in)	3.586
Sample Volume (cm^3)	899.03
Moisture Content (%)	21.90
Unit Wet Weight (g/cm^3)	2.08
Unit Wet Weight (pcf)	129.55
Unit Dry Weight (g/cm^3)	**1.70**
Unit Dry Weight (pcf)	**106.3**

SOIL PROFILE AND SAMPLING

DEPTH (m)	ELEV ( )	SECTION No.	SOIL PROFILE	SOIL DESCRIPTION AND REMARKS	TEST PERFORMED
1.59					
1.74					
1.89					
2.04					
2.19		1		GRAY FINE SAND TORVANE= 0.16 kg/cm^2 Pocket Penetrometer 2.0 TSF	WC, UNIT WGT, GRAIN SIZE

***Note**: When full recovery is not achieved, the elevation can not be accurately definec*
Indicate each cut of the tube with an arrow
Indicate dividing line between soil types with a solid lin
Indicate wax by cross-hatching. Indicate soil types by standard symbols

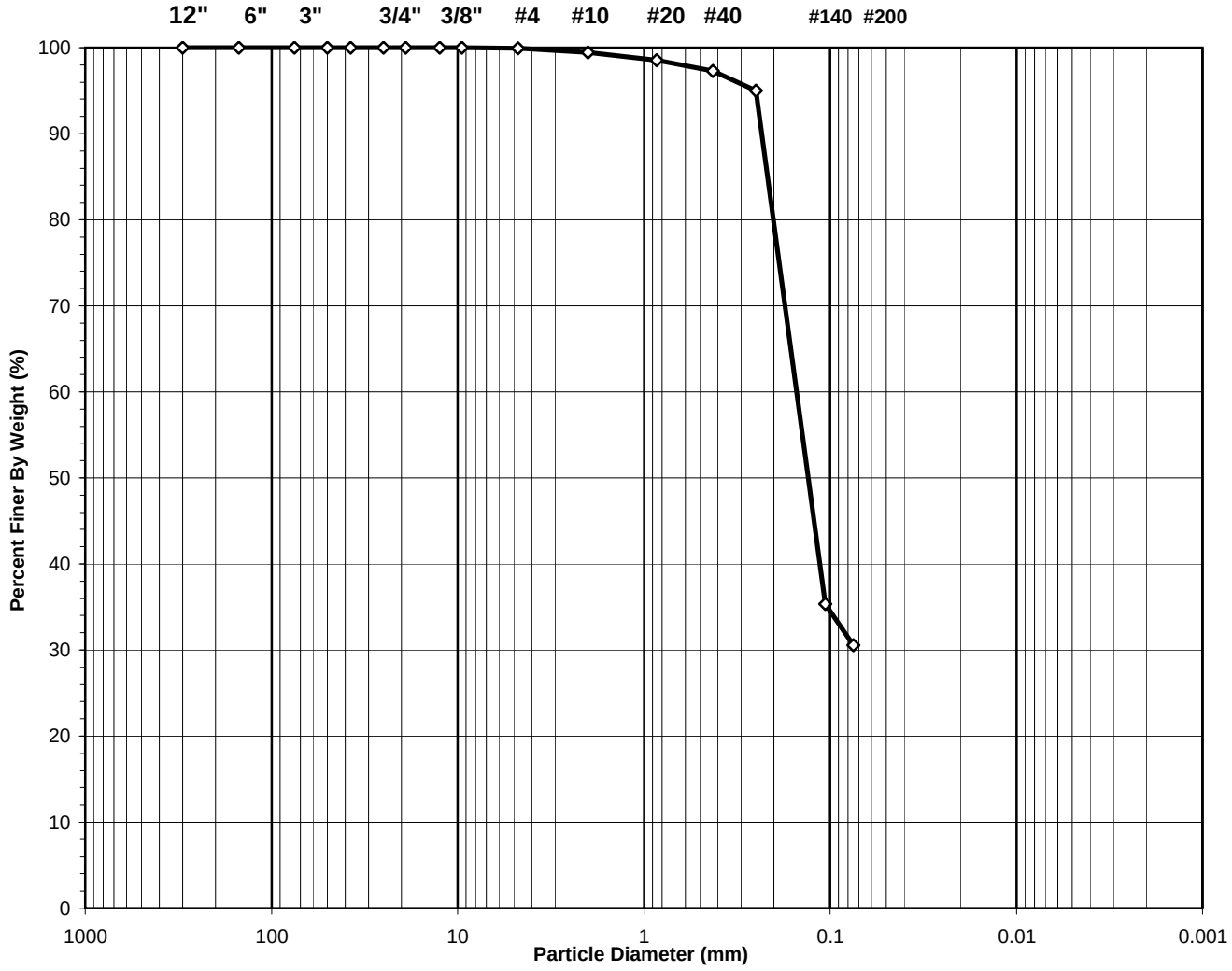
Tested By *NJM* Date *11/11/15* Checked By KC Date 11/12/15

SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-73
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.49-2.44
Project No.:	2015-538-001	Sample No.:	GT3
Lab ID:	2015-538-001-056	Soil Color:	Gray

	SIEVE ANALYSIS		*HYDROMETER*
USCS	**gravel**	**sand**	**silt and clay**



USCS Symbol:
sm, ASSUMED

USCS Classification:
SILTY SAND

Tested By HL Date 11/16/15 Checked By CLK Date 11/17/15

DCN: CT-S3C DATE 3/20/13 REVISION: 3

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

WASH SIEVE ANALYSIS

ASTM D 422-63 (2007)

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-73
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.49-2.44
Project No.:	2015-538-001	Sample No.:	GT3
Lab ID:	2015-538-001-056	Soil Color:	Gray

Moisture Content of Passing 3/4" Sample		Water Content of Retained 3/4" Sample	
Tare No.:	43	Tare No.:	NA
Wt. of Tare & Wet Sample (g):	1695.00	Weight of Tare & Wet Sample (g):	NA
Wt. of Tare & Dry Sample (g):	1432.80	Weight of Tare & Dry Sample (g):	NA
Weight of Tare (g):	202.19	Weight of Tare (g):	NA
Weight of Water (g):	262.20	Weight of Water (g):	NA
Weight of Dry Sample (g):	1230.61	Weight of Dry Sample (g):	NA
Moisture Content (%):	**21.3**	**Moisture Content (%):**	**NA**

Wet Weight of -3/4" Sample (g):	NA	Weight of the Dry Sample (g):	1230.61
Dry Weight of - 3/4" Sample (g):	855.0	Weight of - #200 Material (g):	375.65
Wet Weight of +3/4" Sample (g):	NA	Weight of + #200 Material (g):	854.96
Dry Weight of + 3/4" Sample (g):	0.00		
Total Dry Weight of Sample (g):	NA		

Sieve Size	Sieve Opening (mm)	Weight of Soil Retained (g)	Percent Retained (%)	Accumulated Percent Retained (%)	Percent Finer (%)	Accumulated Percent Finer (%)
12"	300	0.00	0.00	0.00	100.00	**100.00**
6"	150	0.00	0.00	0.00	100.00	**100.00**
3"	75	0.00	0.00	0.00	100.00	**100.00**
2"	50	0.00	0.00	0.00	100.00	**100.00**
1 1/2"	37.5	0.00	0.00	0.00	100.00	**100.00**
1"	25.0	0.00	0.00	0.00	100.00	**100.00**
3/4"	19.0	0.00	0.00	0.00	100.00	**100.00**
1/2"	12.50	0.00	0.00	0.00	100.00	**100.00**
3/8"	9.50	0.00	0.00	0.00	100.00	**100.00**
#4	4.75	0.72	0.06	0.06	99.94	**99.94**
#10	2.00	5.97	0.49	0.54	99.46	**99.46**
#20	0.850	11.16	0.91	1.45	98.55	**98.55**
#40	0.425	15.48	1.26	2.71	97.29	**97.29**
#60	0.250	28.41	2.31	5.02	94.98	**94.98**
#140	0.106	734.30	59.67	64.69	35.31	**35.31**
#200	0.075	58.92	4.79	69.47	30.53	**30.53**
Pan	-	375.65	30.53	100.00	-	**-**

Tested By HL Date 11/16/15 Checked By CLK Date 11/17/15

DCN: CT-S3C DATE 3/20/13 REVISION: 3

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

PHOTOGRAPHS

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-74
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.14 - 1.84
Project No.:	2015-538-001	Sample No.:	GT3
Lab ID:	2015-538-001-057		

Tested By JCM *Date* 11/17/15 *Checked By* KC *Date* 11/19/15

S:\Excel\Excel QA\Spr

SHELBY TUBE UNIT WEIGHT

ASTM D2937-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-74
Client Reference:	Lake Erie Connector 185241	Depth Pushed (m):	1.14 - 1.84
Project No.:	2015-538-001	Shelby Tube No.:	GT3
Lab ID:	2015-538-001-057	Recovery (m):	0.7

MOISTURE CONTENT		After U.C.
Section Number	**1**	**2**
Tare Number	886	2471
Weight of Tare & Wet Sample (g)	433.46	1774.66
Weight of Tare & Dry Sample (g)	372.13	1473.00
Weight of Tare (g)	109.85	98.33
Moisture Content (%)	23.38	21.94

UNIT WEIGHT	
Weight of Tube & Wet Sample (g)	2461.61
Weight of Tube (g)	0.00
Weight of Wet Sample (g)	2461.61
Length 1 (in)	7.123
Length 2 (in)	7.214
Length 3 (in)	7.141
Top Diameter (in)	3.625
Middle Diameter (in)	3.604
Bottom Diameter (in)	3.622
Sample Volume (cm^3)	1205.48
Moisture Content (%)	23.38
Unit Wet Weight (g/cm^3)	2.04
Unit Wet Weight (pcf)	127.42
Unit Dry Weight (g/cm^3)	**1.66**
Unit Dry Weight (pcf)	**103.3**

SOIL PROFILE AND SAMPLING

DEPTH (m)	ELEV ( )	SECTION No.	SOIL PROFILE	SOIL DESCRIPTION AND REMARKS	TEST PERFORMED
1.24					
1.39					
1.54					
1.69		2		GRAY SILT Pocket Penetrometer 1.75 TSF	U.C. LIMITS UNIT WGT.
1.84		1		TORVANE= 0.2 kg/cm^2	W.C.

***Note**: When full recovery is not achieved, the elevation can not be accurately definec*
Indicate each cut of the tube with an arrow
Indicate dividing line between soil types with a solid lin
Indicate wax by cross-hatching. Indicate soil types by standard symbols

Tested By *JCM* Date *11/17/15* Checked By KC Date 11/19/15

ATTERBERG LIMIT

ASTM D 4318-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-74
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.60-1.78
Project No.:	2015-538-001	Sample No.:	GT3
Lab ID:	2015-538-001-057	Visual:	GRAY SILT
			(MInus No. 40 sieve material, Airdried)

NON - PLASTIC MATERIAL

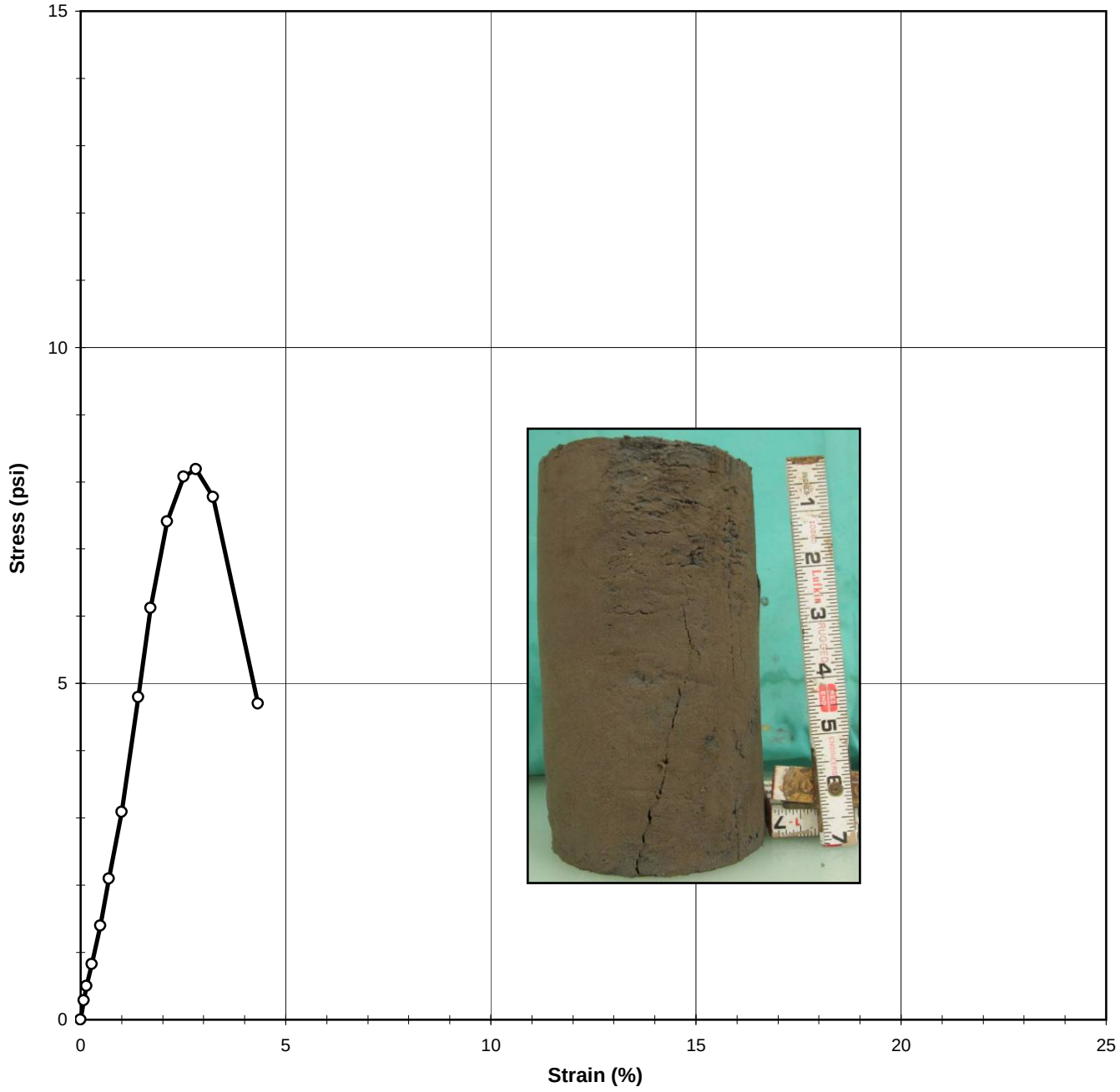
Tested By RAL *Date* 11/18/15 *Checked By* CLK *Date* 11/19/15

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONFINED COMPRESSIVE STRENGTH

ASTM D2166-13 / AASHTO T208-10 (SOP S-30)

Client:	Canadian Seabed Reasearch Ltd.	Boring No.:	VC-74
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.60-1.78
Project No.:	2015-538-001	Sample No.:	GT3
Lab ID:	2015-538-001-057	Visual:	Gray Silt



Tested By	JCM	Date	11/17/15	Approved By	KC	Date	11/18/15

DCN: CT-S30 Date: 11/09/09 Revision: 4

S:\Excel\Excel QA\Spreadsheets\UC Sigma.xls

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONFINED COMPRESSIVE STRENGTH

ASTM D2166-13 / AASHTO T208-10 (SOP S-30)

Client:	Canadian Seabed Reasearch Ltd.	Boring No.:	VC-74
Client Reference:	Lake Erie Connector 185241	Depth (m):	1.60-1.78
Project No.:	2015-538-001	Sample No.:	GT3
Lab ID:	2015-538-001-057	Visual:	Gray Silt

INITIAL SAMPLE DIMENSIONS			
Length 1 (in):	7.123	Top Diameter (in):	3.625
Length 2 (in):	7.214	Middle Diameter (in):	3.604
Length 3 (in):	7.141	Bottom Diameter (in):	3.622
Avg. Length (in):	**7.159**	**Avg. Diameter (in):**	**3.617**
		Area (in^2):	**10.275**

WATER CONTENT AFTER TEST	
Tare No.:	2471
Weight of Tare & Wet Sample (g):	1774.66
Weight of Tare & Dry Sample (g):	1473.00
Weight of Tare (g):	98.33
Moisture Content (%):	21.94

UNIT WEIGHT			
Weight of Tube & Wet Sample (g):	2461.61	Sample Volume (cm^3):	1205.5
Weight of Tube (g):	0.00	Unit Wet Weight (g/cm^3):	2.04
Weight of Wet Sample (g):	2461.61	Unit Wet Weight (pcf):	127.42
Average Diameter (in):	3.62	Moisture Content (%):	21.94
Average Length (in):	7.16	Unit Dry Weight (pcf):	104.49
Average Length (cm):	18.18		

ELECTRONIC DEVICE DEFORMATION (in)	*LOAD (lb)*	*ELAPSED TIME (min)*	*STRAIN (%)*	*STRESS (psi)*
0.000	0.2	0.00	0.000	0.000
0.005	3.1	0.07	0.073	0.283
0.010	5.4	0.15	0.143	0.503
0.020	8.7	0.27	0.275	0.823
0.034	14.6	0.47	0.477	1.395
0.050	21.9	0.70	0.696	2.097
0.072	32.3	1.00	1.003	3.092
0.101	50.1	1.40	1.407	4.792
0.122	64.2	1.70	1.705	6.122
0.151	77.9	2.10	2.109	7.407
0.180	85.3	2.52	2.512	8.076
0.201	86.7	2.82	2.811	8.185
0.231	82.8	3.22	3.223	7.778
0.309	50.7	4.32	4.323	4.699

Tested By JCM Date 11/17/15 Input Checked By KC Date 11/18/15

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

PHOTOGRAPHS

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-74
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.09 - 2.79
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-058		

Tested By *JCM* *Date* *11/17/15* *Checked By* *KC* *Date* *11/19/15*

S:\Excel\Excel QA\Spr

SHELBY TUBE UNIT WEIGHT

ASTM D2937-10

Client:	Canadian Seabed Research Ltd.	Boring No.:	VC-74
Client Reference:	Lake Erie Connector 185241	Depth Pushed (m):	2.09 - 2.79
Project No.:	2015-538-001	Shelby Tube No.:	GT2
Lab ID:	2015-538-001-058	Recovery (m):	0.7

MOISTURE CONTENT		After U.C.
Section Number	**1**	**2**
Tare Number	2728	2471
Weight of Tare & Wet Sample (g)	455.30	1774.66
Weight of Tare & Dry Sample (g)	408.50	1473.00
Weight of Tare (g)	85.09	98.33
Moisture Content (%)	14.47	21.94

UNIT WEIGHT	
Weight of Tube & Wet Sample (g)	2651.05
Weight of Tube (g)	0.00
Weight of Wet Sample (g)	2651.05
Length 1 (in)	6.942
Length 2 (in)	6.937
Length 3 (in)	7.049
Top Diameter (in)	3.605
Middle Diameter (in)	3.632
Bottom Diameter (in)	3.650
Sample Volume (cm^3)	1182.42
Moisture Content (%)	21.94
Unit Wet Weight (g/cm^3)	2.24
Unit Wet Weight (pcf)	139.90
Unit Dry Weight (g/cm^3)	**1.84**
Unit Dry Weight (pcf)	**114.7**

SOIL PROFILE AND SAMPLING

DEPTH (m)	ELEV ( )	SECTION No.	SOIL PROFILE	SOIL DESCRIPTION AND REMARKS	TEST PERFORMED
2.19					
2.34					
2.49					
2.64		2		GRAY SILTY CLAY Pocket Penetrometer 3.5 TSF TORVANE= 0.8 kg/cm^2	U.C. UNIT WGT.
2.79		1			W.C.

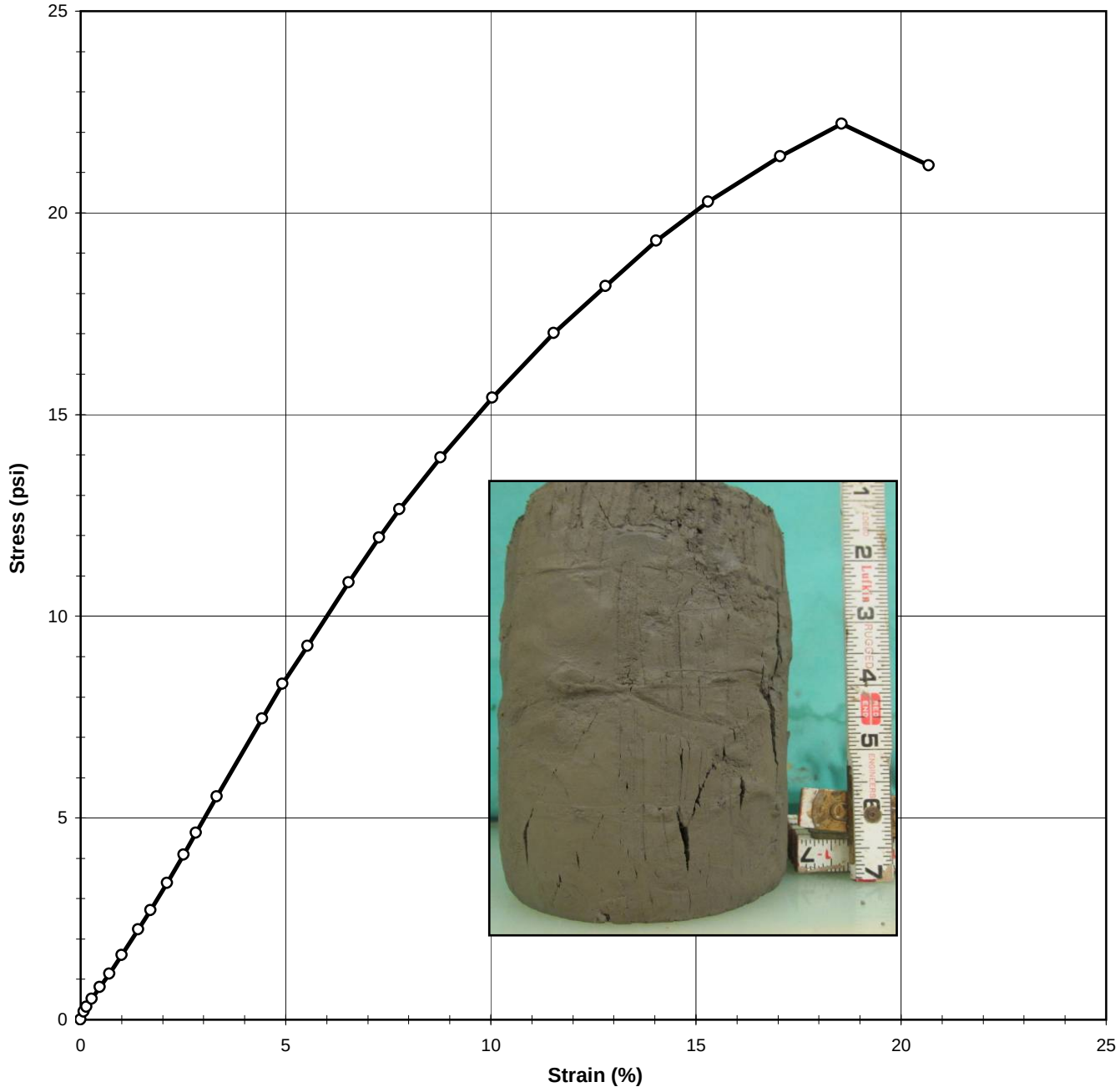
***Note**: When full recovery is not achieved, the elevation can not be accurately defined*
Indicate each cut of the tube with an arrow
Indicate dividing line between soil types with a solid lin
Indicate wax by cross-hatching. Indicate soil types by standard symbols

Tested By *JCM* Date *11/17/15* Checked By KC Date 11/19/15

UNCONFINED COMPRESSIVE STRENGTH

ASTM D2166-13 / AASHTO T208-10 (SOP S-30)

Client:	Canadian Seabed Reasearch Ltd.	Boring No.:	VC-74
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.55-2.73
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-058	Visual:	Gray Silty Clay



Tested By	JCM	Date	11/17/15	Approved By	KC	Date	11/18/15

DCN: CT-S30 Date: 11/09/09 Revision: 4

S:\Excel\Excel QA\Spreadsheets\UC Sigma.xls

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net

UNCONFINED COMPRESSIVE STRENGTH

ASTM D2166-13 / AASHTO T208-10 (SOP S-30)

Client:	Canadian Seabed Reasearch Ltd.	Boring No.:	VC-74
Client Reference:	Lake Erie Connector 185241	Depth (m):	2.55-2.73
Project No.:	2015-538-001	Sample No.:	GT2
Lab ID:	2015-538-001-058	Visual:	Gray Silty Clay

INITIAL SAMPLE DIMENSIONS				WATER CONTENT AFTER TEST	
Length 1 (in):	6.942	Top Diameter (in):	3.605	Tare No.:	687
Length 2 (in):	6.937	Middle Diameter (in):	3.632	Weight of Tare & Wet Sample (g):	1480.53
Length 3 (in):	7.049	Bottom Diameter (in):	3.650	Weight of Tare & Dry Sample (g):	1301.80
Avg. Length (in):	**6.976**	**Avg. Diameter (in):**	**3.629**	Weight of Tare (g):	96.35
		Area (in^2):	**10.343**	Moisture Content (%):	14.83

UNIT WEIGHT			
Weight of Tube & Wet Sample (g):	2651.05	Sample Volume (cm^3):	1182.4
Weight of Tube (g):	0.00	Unit Wet Weight (g/cm^3):	2.24
Weight of Wet Sample (g):	2651.05	Unit Wet Weight (pcf):	139.90
Average Diameter (in):	3.63	Moisture Content (%):	14.83
Average Length (in):	6.98	Unit Dry Weight (pcf):	121.84
Average Length (cm):	17.72		

ELECTRONIC DEVICE DEFORMATION (in)	*LOAD (lb)*	*ELAPSED TIME (min)*	*STRAIN (%)*	*STRESS (psi)*
0.000	0.2	0.00	0.000	0.000
0.005	2.2	0.07	0.074	0.195
0.010	3.5	0.15	0.146	0.320
0.019	5.5	0.27	0.269	0.513
0.033	8.6	0.48	0.471	0.809
0.049	12.1	0.70	0.700	1.138
0.070	17.0	1.00	0.999	1.604
0.098	23.6	1.40	1.403	2.235
0.119	28.8	1.72	1.710	2.720
0.147	36.0	2.12	2.114	3.386
0.175	43.5	2.52	2.510	4.084
0.196	49.5	2.82	2.808	4.634
0.231	59.4	3.32	3.318	5.530
0.309	81.0	4.42	4.425	7.469
0.344	90.8	4.93	4.925	8.331
0.386	101.7	5.53	5.531	9.268
0.456	120.2	6.53	6.532	10.844
0.508	133.5	7.28	7.279	11.945
0.543	142.0	7.78	7.780	12.646
0.613	158.2	8.78	8.781	13.937
0.700	177.4	10.03	10.037	15.414
0.805	199.2	11.53	11.539	17.015
0.893	215.9	12.78	12.795	18.183
0.980	232.6	14.03	14.042	19.315
1.067	247.8	15.28	15.298	20.272
1.190	267.1	17.03	17.054	21.402
1.294	282.2	18.55	18.556	22.205
1.443	276.3	20.67	20.682	21.175

Tested By JCM Date 11/17/15 Input Checked By KC Date 11/18/15

DCN: CT-S30 Date: 11/09/09 Revision: 4

S:\Excel\Excel QA\Spreadsheets\UC Sigma.xls

544 Braddock Avenue • East Pittsburgh, PA 15112 • Phone (412) 823-7600 • Fax (412) 823-8999 • www.geotechnics.net