

Boswick, Robert (SD)

From: Bredin, Dana [Dana.Bredin@wspgroup.com]
Sent: September-28-16 9:21 AM
To: Boswick, Robert (SD)
Cc: Webster, Ross
Subject: Pinawa Lagoon - Hydraulic Conductivity Test Results [WSP# 141-15176-00]
Attachments: Pinawa Lagoon Sample ST1 HC Test.pdf; Pinawa Lagoon Sample ST2 HC Test.pdf; Pinawa Lagoon Sample ST3 HC Test.pdf; Pinawa Lagoon Sample ST5 HC Test.pdf

Hi Rob,

Please find attached the four hydraulic conductivity test results for the Pinawa Lagoon, Cell #4. At this time, the LGD of Pinawa is requesting the use of this cell from MB Sustainable Development.

Regards,



Dana Bredin, P.Eng
Geotechnical / Civil Engineer

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Project No.	1000-004-02	Test Hole	ST1
Client	WSP Canada Inc.	Trek Sample #	L402
Project	Pinawa Lagoon	Depth (m)	N/A
		Sample Date	
		Test Date	July 22, 2016 to Aug 21, 2016
		Technician	Paul Bevel

Specimen Details

Visual Classification Clay, silty, trace silt pockets, trace silt lense, trace oxidation, firm, moist, high plasticity

Comments The specific gravity of the soil was assumed to be 2.75.

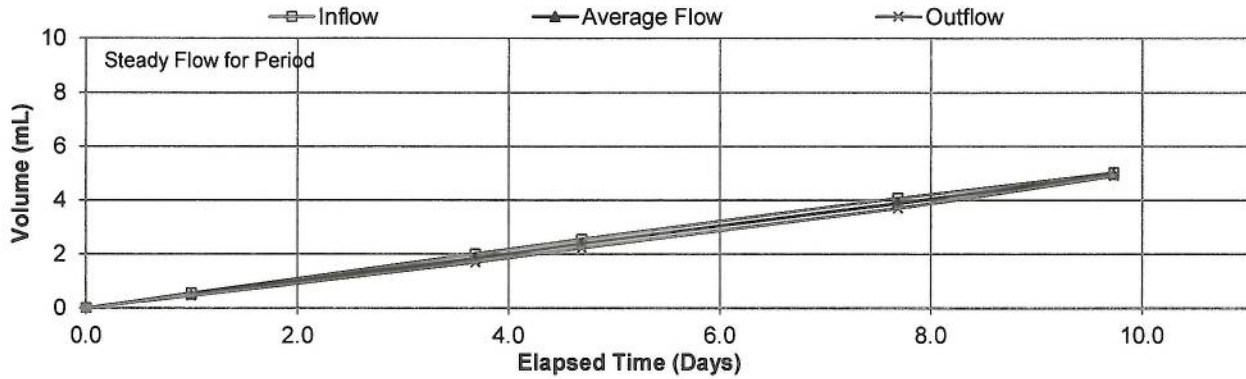
Atterberg Limits

Liquid Limit Not Requested
Plastic Limit Not Requested
Plasticity Index Not Requested

Test Details

Permeant Distilled, de-aired water
Method Constant Head
Cell Pressure 128.2 kPa
Influent Pressure 104.8 kPa
Effluent Pressure 90.3 kPa
Gradient 18.45

Permeation Graph



Steady Flow Permeation Data

Time Increment (Days)	Elapsed Time (Days)	Flow (Q)		Inflow / Outflow Ratio	Average Flow (mL)	Temperature Correction	Corrected Hydraulic Conductivity, k_{20} (m/s)
		Influent (mL)	Effluent (mL)				
2.69	3.69	1.43	1.23	1.16	1.33	0.94	7.07E-11
1.00	4.69	0.54	0.52	1.04	0.53	0.93	7.49E-11
3.00	7.69	1.53	1.46	1.05	1.50	0.95	7.21E-11
2.04	9.73	0.95	1.22	0.78	1.09	0.94	7.60E-11

Average Temperature Corrected Hydraulic Conductivity, k_{20} (m/s) 7.34E-11 (7.34x10⁻⁹ cm/s)

Consolidation Data

	Average Height (m)	Average Diameter (m)	Moisture Content (%)	Dry Density (kN/m ³)	Degree of Saturation (%)	Cell Pressure	Back Pressure
Initial	0.080	0.072	32.6	14.1	97.5	128.2	91.0
Final	0.080	0.073	36.7	13.5	101.5	128.2	91.0



Project No.	1000-004-02	Test Hole	ST2
Client	WSP Canada Inc.	Trek Sample #	L400
Project	Pinawa Lagoon	Depth (m)	N/A
		Sample Date	
		Test Date	June 29, 2016 to July 19, 2016
		Technician	Paul Bevel

Specimen Details

Visual Classification Clay, silty, trace silt inclusions, trace oxidation, mottled brown and dark brown, firm, high plasticity

Comments The specific gravity of the soil was assumed to be 2.75.

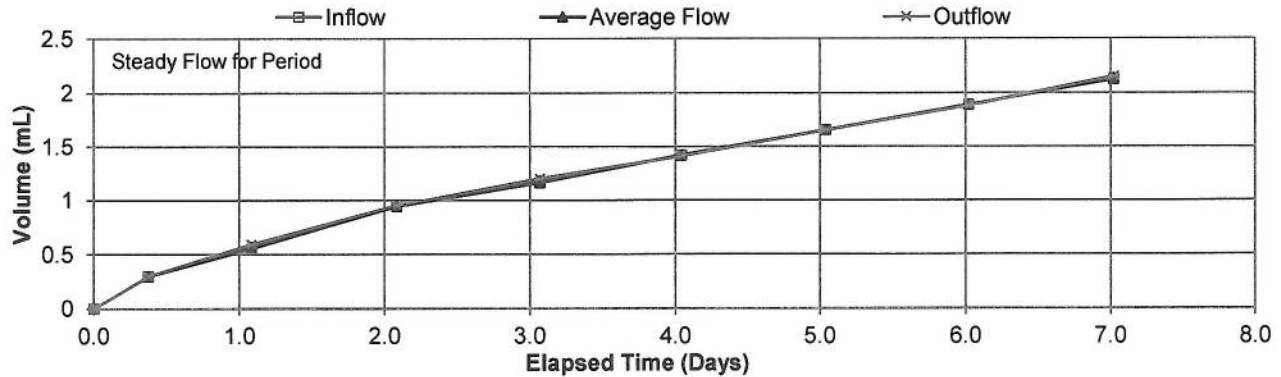
Atterberg Limits

Liquid Limit Not Requested
Plastic Limit Not Requested
Plasticity Index Not Requested

Test Details

Permeant Distilled, de-aired water
Method Constant Head
Cell Pressure 137.9 kPa
Influent Pressure 115.8 kPa
Effluent Pressure 102.0 kPa
Gradient 15.37

Permeation Graph



Steady Flow Permeation Data

Time Increment (Days)	Elapsed Time (Days)	Flow (Q)		Inflow / Outflow Ratio	Average Flow (mL)	Temperature Correction	Corrected Hydraulic Conductivity, k_{20} (m/s)
		Influent (mL)	Effluent (mL)				
0.97	4.04	0.26	0.21	1.24	0.24	0.95	4.19E-11
1.00	5.04	0.23	0.24	0.96	0.24	0.95	4.07E-11
0.98	6.02	0.24	0.23	1.04	0.24	0.95	4.16E-11
1.00	7.02	0.23	0.27	0.85	0.25	0.95	4.33E-11

Average Temperature Corrected Hydraulic Conductivity, k_{20} (m/s) 4.19E-11 (4.19x10⁻⁹ cm/s)

Consolidation Data

	Average Height (m)	Average Diameter (m)	Moisture Content (%)	Dry Density (kN/m ³)	Degree of Saturation (%)	Cell Pressure	Back Pressure
Initial	0.090	0.073	31.4	14.2	95.7	140.7	100.7
Final	0.092	0.073	33.7	14.2	103.3	140.7	100.7



Project No.	1000-004-02	Test Hole	ST3
Client	WSP Canada Inc.	Trek Sample #	L403
Project	Pinawa Lagoon	Depth (m)	N/A
		Sample Date	
		Test Date	Aug 25, 2016 to Sep 14, 2016
		Technician	Paul Bevel

Specimen Details

Visual Classification Clay, silty, trace silt pockets, trace oxidation, firm, moist, high plasticity

Comments The specific gravity of the soil was assumed to be 2.75.

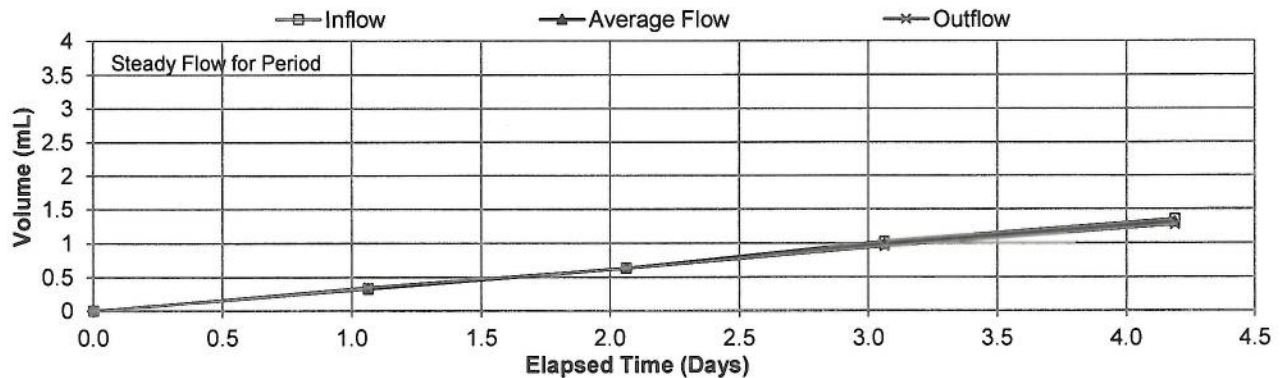
Atterberg Limits

Liquid Limit Not Requested
Plastic Limit Not Requested
Plasticity Index Not Requested

Test Details

Permeant Distilled, de-aired water
Method Constant Head
Cell Pressure 120.0 kPa
Influent Pressure 89.6 kPa
Effluent Pressure 71.7 kPa
Gradient 23.19

Permeation Graph



Steady Flow Permeation Data

Time Increment (Days)	Elapsed Time (Days)	Flow (Q)		Inflow / Outflow Ratio	Average Flow (mL)	Temperature Correction	Corrected Hydraulic Conductivity, k_{20} (m/s)
		Influent (mL)	Effluent (mL)				
1.06	1.06	0.33	0.35	0.94	0.34	0.95	3.80E-11
1.00	2.06	0.30	0.28	1.07	0.29	0.95	3.44E-11
1.00	3.06	0.39	0.32	1.22	0.36	0.95	4.21E-11
1.13	4.19	0.33	0.32	1.03	0.33	0.95	3.43E-11

Average Temperature Corrected Hydraulic Conductivity, k_{20} (m/s) 3.72E-11 (3.72x10⁻⁹ cm/s)

Consolidation Data

	Average Height (m)	Average Diameter (m)	Moisture Content (%)	Dry Density (kN/m ³)	Degree of Saturation (%)	Cell Pressure	Back Pressure
Initial	0.078	0.071	31.9	14.0	94.3	120.0	71.7
Final	0.079	0.071	37.8	13.3	100.5	120.0	71.7



Project No.	1000-004-02	Test Hole	ST5
Client	WSP Canada Inc.	Trek Sample #	L401
Project	Pinawa Lagoon	Depth (m)	N/A
		Sample Date	
		Test Date	July 22, 2016 to Aug 16, 2016
		Technician	Paul Bevel

Specimen Details

Visual Classification Clay, silty, trace silt/fine sand pockets, trace oxidation, firm, moist, high plasticity

Comments The specific gravity of the soil was assumed to be 2.75.

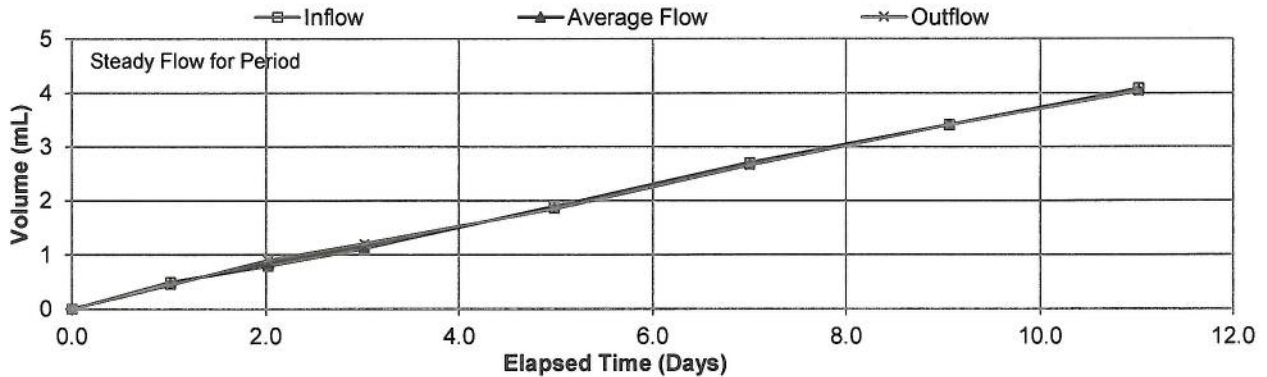
Atterberg Limits

Liquid Limit Not Requested
Plastic Limit Not Requested
Plasticity Index Not Requested

Test Details

Permeant Distilled, de-aired water
Method Constant Head
Cell Pressure 171.0 kPa
Influent Pressure 124.8 kPa
Effluent Pressure 111.0 kPa
Gradient 16.92

Permeation Graph



Steady Flow Permeation Data

Time Increment (Days)	Elapsed Time (Days)	Flow (Q)		Inflow / Outflow Ratio	Average Flow (mL)	Temperature Correction	Corrected Hydraulic Conductivity, k_{20} (m/s)
		Influent (mL)	Effluent (mL)				
1.96	4.98	0.78	0.64	1.22	0.71	0.95	5.71E-11
2.02	7.00	0.81	0.81	1.00	0.81	0.95	6.31E-11
2.06	9.06	0.70	0.75	0.93	0.73	0.95	5.53E-11
1.96	11.02	0.69	0.63	1.10	0.66	0.95	5.30E-11

Average Temperature Corrected Hydraulic Conductivity, k_{20} (m/s) 5.71E-11 (5.71x10⁻⁹ cm/s)

Consolidation Data

	Average Height (m)	Average Diameter (m)	Moisture Content (%)	Dry Density (kN/m ³)	Degree of Saturation (%)	Cell Pressure	Back Pressure
Initial	0.083	0.072	35.3	13.6	98.8	140.7	100.7
Final	0.083	0.073	37.0	13.5	101.2	140.7	100.7