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October 14, 2016

File No. 1000-027-02

Mr. Brad Boyd
Quantum Murray
201 Portage Avenue - 18th Floor
Winnipeg MB
R3B 3K6

RE Dauphin River First Nation Wastewater Lagoon Construction – Lab Testing for Shelby Tube Sample

On September 15, 2016 Quantum Murray LP (QM) delivered Shelby tube samples to Trek Geotechnical Inc. (Trek) for testing. Hydraulic conductivity testing was requested for Shelby tube identified as ST9, Re-test Cell 1. The sample from the Shelby tube was extruded and tested using a flexible wall permeameter following ASTM D5080-10. The test report is attached and the calculated hydraulic conductivity value is as follows:

ST9 1.13×10^{-10} m/s (1.13×10^{-8} cm/s)

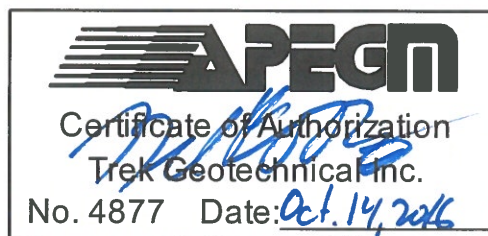
The test result presented is representative of the soil sample provided. The testing services undertaken by TREK constitutes testing services only and engineering evaluation or interpretation has not been undertaken, but is available upon request.

If you have any questions or require any additional information, please contact the undersigned.

TREK Geotechnical
Per:



Nelson Ferreira, M.Sc., P.Eng.
Geotechnical Engineer



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Project No. 1000-027-02
Client Quantum Murray
Project Dauphin River First Nation
 Wastewater Lagoon Construction

Test Hole Retest Cell 1, ST9
Trek Sample # L539a
Depth (m) 2.8m - 3.3m
Sample Date Sept 13, 2016
Test Date Sept 19, 2016 to Oct 12, 2016
Technician Paul Bevel

Specimen Details

Visual Classification Clay, silty, brown, firm, high plasticity

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

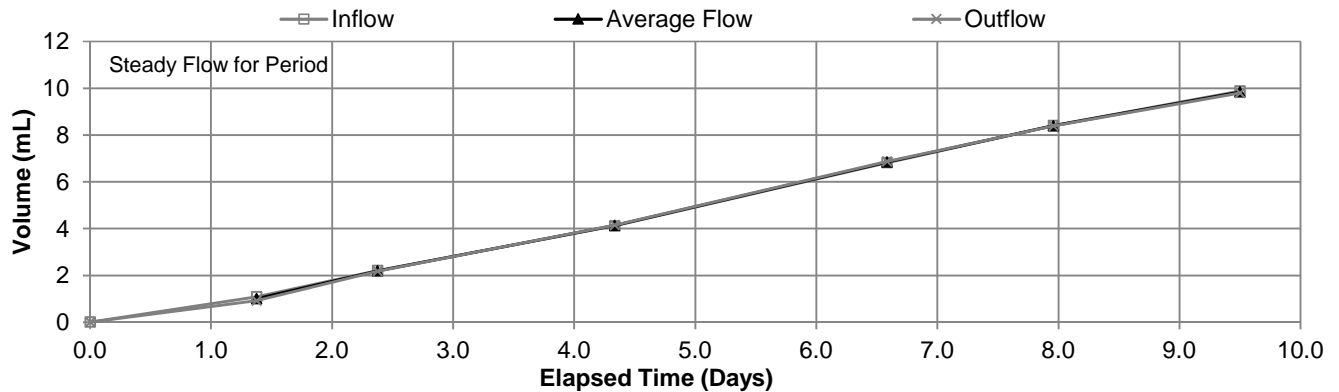
Atterberg Limits

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 116.5 kPa
Effluent Pressure 98.6 kPa
Gradient 25.34

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	4.33	1.91	1.97	0.97	1.94	0.95	1.05E-10
2.25	6.58	2.70	2.72	0.99	2.71	0.95	1.28E-10
1.38	7.96	1.59	1.52	1.05	1.56	0.95	1.20E-10
1.54	9.50	1.48	1.41	1.05	1.45	0.94	9.81E-11

Average Temperature Corrected Hydraulic Conductivity, k_{20} (m/s) 1.13E-10 (1.13×10^{-8} 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	0.0725	0.0722	25.3	15.7	96.3	137.9	98.6
Final	0.0721	0.0723	27.4	15.5	101.9	137.9	98.6