BURNS MAENDEL
CONSULTING ENGINEERS LTD.

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November 6, 2020

Director, Environmental Approvals Branch
Manitoba Conservation and Climate
1007 Century Street
Winnipeg, MB
R3H 0W4

Attention: Asit Dey, P.Eng.

Reference: Meadowbrook Village Lagoon

Subject: Request for Interim Use of Primary Cell

As discussed on our conference call on November 6, 2020 the Meadowbrook Lagoon is in the final stages of construction and close to being ready for commissioning. BMCE was present on site throughout construction and is confident construction of the Meadowbrook Village Lagoon is in general conformance with the detailed construction drawings and specifications issued. The primary cell requires the placement of rip rap to be completed. This task will be completed with in the next two weeks. BMCE has received the test results for the primary cell liner from ENG-TECH Consulting Limited. The results of the samples chosen for testing by Manitoba Conservation and Climate showed final hydraulic conductivity results of 7.95×10^{-9} and 7.65×10^{-9} cm/s. These values are in accordance with Clause 20 of the Environment Act License No. 3328. A summary of the results from ENG-TECH have been attached. The samples extracted from the secondary cell are currently in the lab with results anticipated within two weeks.

BMCE requests interim use of the primary cell of the lagoon due to a tie in issue encountered during construction. To transfer the waste from Meadowbrook Village to the newly constructed lagoon a connection must be made to the existing force main connecting the lift station in Meadowbrook Village to the existing lagoon. BMCE had planned to pinch the force main to complete the connection as it was understood to be HDPE pipe. During construction the force main was exposed, and it was determined the force main is PVC. No valves are present along this existing PVC force main to prevent the lagoon cells from draining backwards; therefore in order to safely connect the existing force main to the new lagoon force main the existing lagoon cells must be pumped to reduce the hydraulic head within the PVC pipe. This is the only feasible solution determined by BMCE therefore pumping the waste from the existing cells must occur before any force main connections occur.

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Due to the changing weather conditions BMCE requests approval for the interim use of the primary cell as soon as possible to ensure favorable pumping conditions and to ensure there is enough liquid in the new lagoon to prevent the inlet pipe from freezing. BMCE anticipates the pumping of the existing lagoon will commence immediately after the placement of the rip rap in the primary cell.

Yours truly,
BURNS MAENDEL CONSULTING ENGINEERS LTD.

Daniel Burns, P.Eng.
Civil Engineer

Enclosed ENG-TECH Hydraulic Conductivity Report.

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October 28, 2020

Project No. 20-398-02

Burns Maendel Consulting Engineers Ltd.
1331 Princess Avenue
Brandon, MB R7A 0R4

ATTENTION: Robyn Starycki

RE: Hydraulic Conductivity Test Results, Meadowbrook Lagoon Cell 1

ENG-TECH Consulting Limited (ENG-TECH) was provided with a total of four (4) Shelby tube samples from the above project on October 7, 2020. The Shelby tube samples (identified as ST1 to ST4) were extracted on October 9, 2020 at the ENG-TECH laboratory. The soil samples were prepared for testing in accordance with ASTM D5084-16a, *Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials using a Flexible Wall Permeameter.*

Two (2) hydraulic conductivity tests were performed on samples ST2 and ST4, which were selected by Manitoba Conservation and Climate. The final hydraulic conductivity values (k_{20}) for samples ST2 and ST4 were 7.95×10^{-9} and 7.65×10^{-9} cm/sec, respectively. The hydraulic conductivity test data is summarized in Table 1, while the graphical representations of the hydraulic conductivity versus elapsed time are shown in Charts 1 and 2. Photographs of the samples are attached.

ENG-TECH trusts this is all the information you require. If you have any questions or require additional information, please contact the undersigned.

Sincerely,
ENG-TECH Consulting Limited

[redacted]

Walter Holowka, C.E.T.
Senior Geoenvironmental Technologist

[redacted]

Clark Hryhoruk, M.Sc., P.Eng.
President

CDH/wgh

Attachments
Table 1 – Hydraulic Conductivity Test Data BMCE Meadowbrook Lagoon Cell 1
Chart 1 – Hydraulic Conductivity Versus Elapsed Time Meadowbrook Lagoon Cell 1: Sample ST2
Chart 2 – Hydraulic Conductivity Versus Elapsed Time Meadowbrook Lagoon Cell 2: Sample ST4
Photographs (1 & 2)

TABLE 1 HYDRAULIC CONDUCTIVITY TEST DATA MEADOWBROOK LAGOON CELL 1		
SAMPLE ID	**ST2**	**ST4**
INITIAL VALUES		
ENG-TECH Reference No.	20-398-2-58	20-398-2-59
Length of Sample in Tube (cm)	~60	~60
Length (cm)	7.20	7.24
Diameter (cm)	7.06	7.16
Area (cm^2)	39.1	40.2
Volume (cm^3)	281.7	291.4
Water Content (%)	20.8	22.0
Bulk Dry Density (kg/m^3)	1,701	1,664
Specific Gravity (G_s) (assumed)	2.70	2.70
Void Ratio	0.587	0.602
Degree of Saturation (%)	95.6	98.6
FINAL VALUES		
Length (cm)	7.14	7.35
Diameter (cm)	7.11	7.17
Area (cm^2)	39.7	40.4
Volume (cm^3)	283.3	296.6
Water Content (%)	22.0	23.3
Bulk Dry Density (kg/m^3)	1,681	1,659
Specific Gravity (G_s) (assumed)	2.70	2.70
Void Ratio	0.606	0.627
Degree of Saturation (%)	~100	~100
CONSOLIDATION PHASE		
Confining Pressure (kPa)	103.4	103.4
Pore Water Pressure (kPa)	82.7	82.7
Effective Stress (kPa)	20.7	20.7
PERMEATION PHASE		
Confining Pressure (kPa)	103.4	103.4
Pore Water Pressure (kPa)	82.7	82.7
Effective Stress (kPa)	20.7	20.7
Hydraulic Gradient	15.4	15.4
Permeant Fluid	Potable Tap Water	
HYDRAULIC CONDUCTIVITY AT TEST TEMPERATURE: 21°C (cm/sec)	8.15×10^{-9}	7.84×10^{-9}
HYDRAULIC CONDUCTIVITY TEMPERATURE CORRECTED TO 20°C (K_{20}) (cm/sec)	7.95×10^{-9}	7.65×10^{-9}

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Chart 1: Hydraulic Conductivity Versus Elapsed Time
Meadowbrook Lagoon Cell 1: Sample ST2

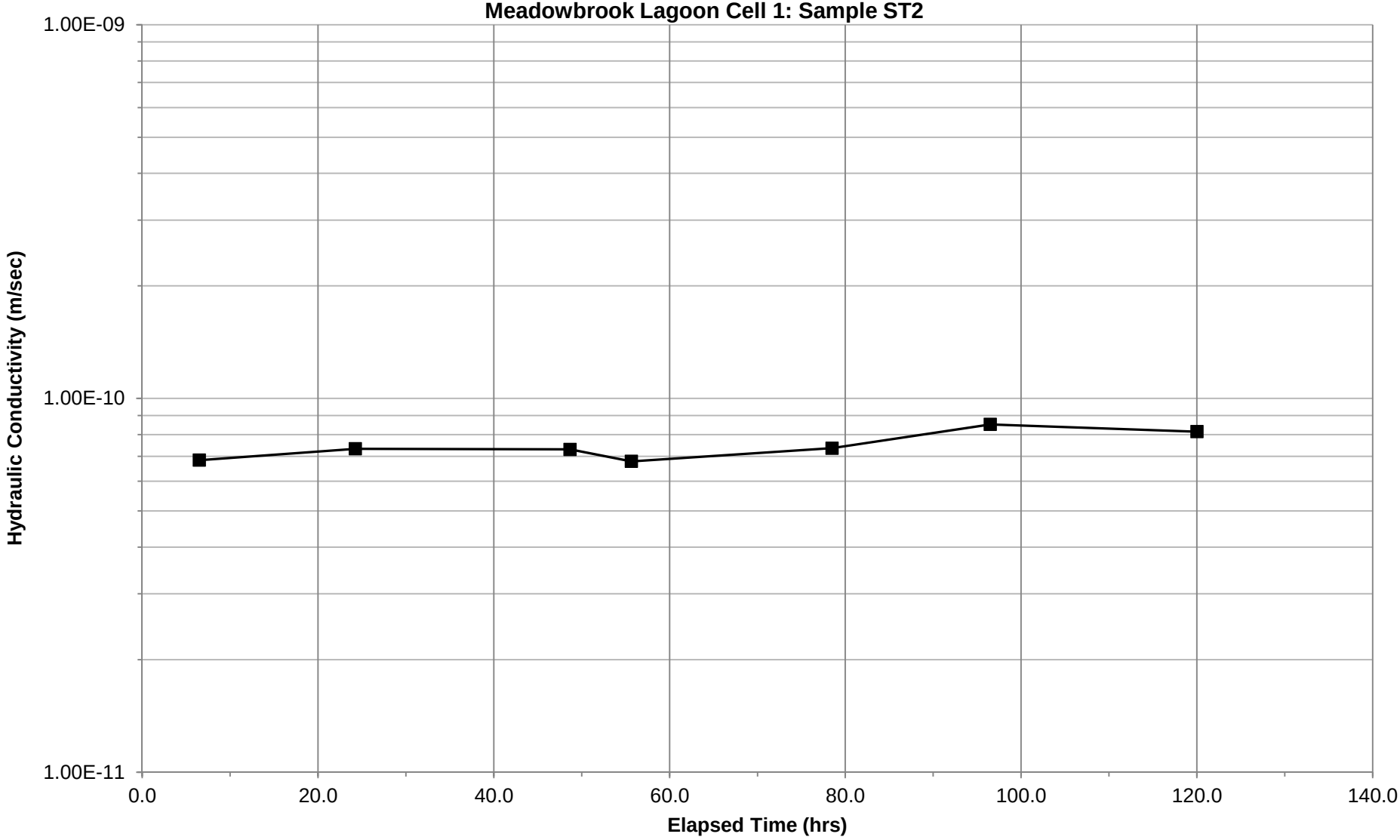

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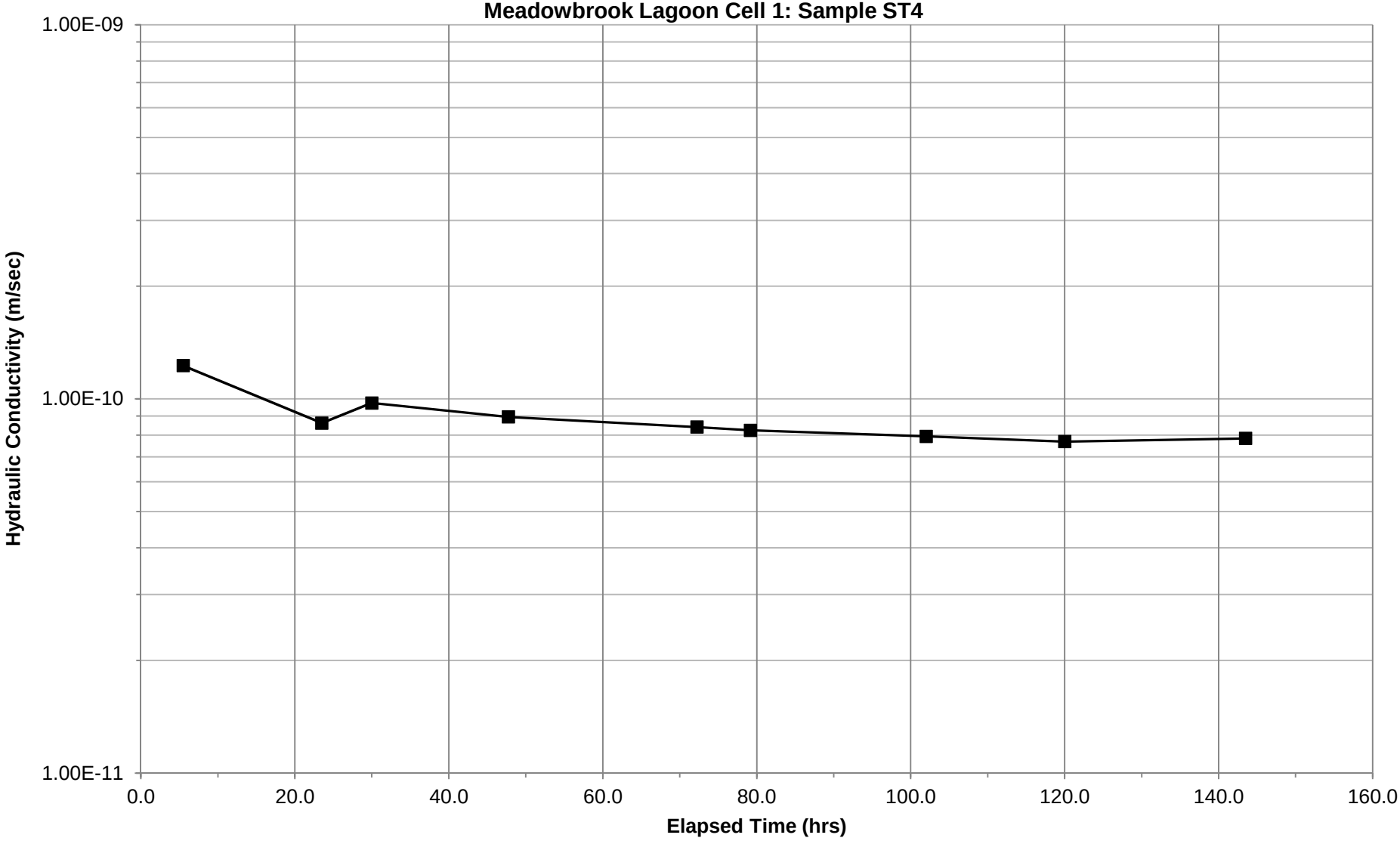
Chart 2: Hydraulic Conductivity Versus Elapsed Time
Meadowbrook Lagoon Cell 1: Sample ST4



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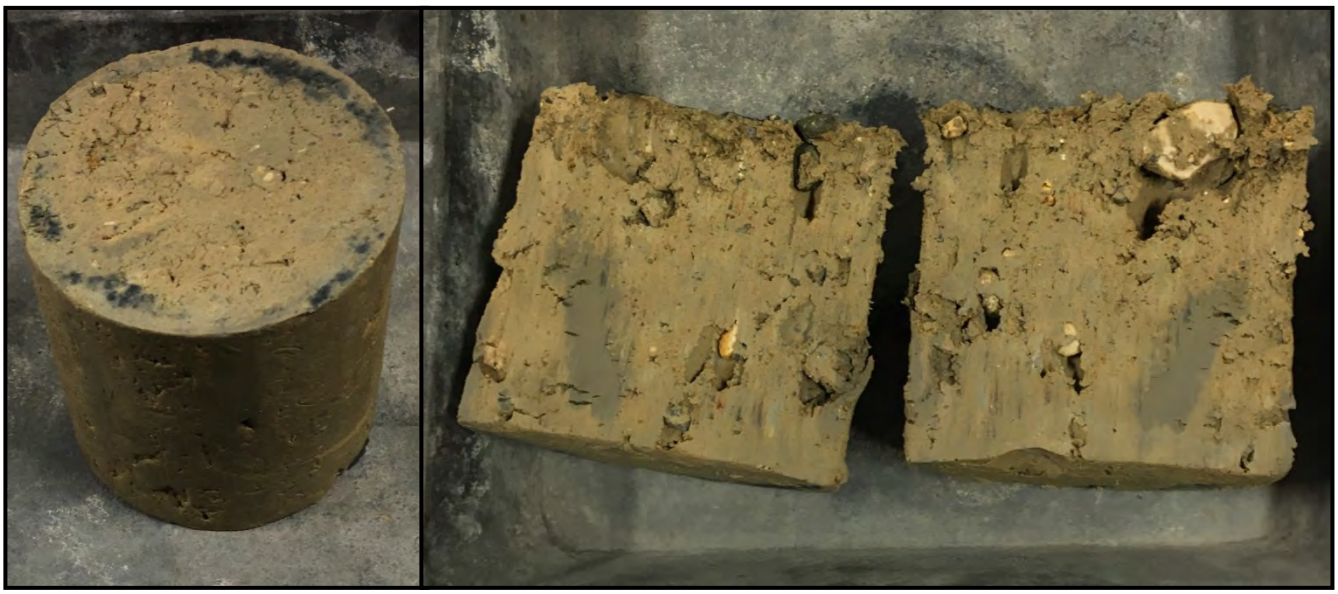

PHOTOGRAPH #1: Sample ST2 after completion of hydraulic conductivity testing.

PHOTOGRAPH #2: Sample ST4 after completion of hydraulic conductivity testing.

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