Notice of Alteration Form

Manitoba
Sustainable Development

Client File No.: 181.10	Environment Act Licence No.: 1142

Legal name of the Licencee: Municipality of Ethelbert

Name of the development: Municipality of Ethelbert Lagoon

Category and Type of development per Classes of Development Regulation:

Waste Treatment and Disposal <SELECT>

Licencee Contact Person: Shawna Low, Administrative Assistant

Mailing address of the Licencee: Box 115, 56 Second Ave. S.

City: Ethelbert Province: MB Postal Code: R0L 0T0

Phone Number: (204) 742-3212 Fax: (204) 742-3642 Email: ethelbert@mymts.net

Name of proponent contact person for purposes of the environmental assessment (e.g. consultant):
Oswald Wohlgemut, JR Cousin Consultants

Phone: (204) 489-0474 Fax: (204) 489-0487	Mailing address: 91 Scurfield Blvd, Winnipeg, MB R3Y 1M5

Email address: owohlgemut@jrcc.ca

Short Description of Alteration *(max 90 characters):*
cap and adhesive of pipe to ensure no water pentration, fill low spots with clay.

Alteration fee attached: Yes: ☐ No: ☑

If No, please explain: small repair

Date: 2021-10-20	Signature: [redacted] Printed name: Shawna Low

A complete Notice of Alteration **(NoA)** consists of the following components:

- ☑ **Cover letter**
- ☑ **Notice of Alteration Form**
- ☑ **2 hard copies and 1 electronic copy of the NoA detailed report** (see "Information Bulletin - Alteration to Developments with Environment Act Licences")
- ☐ **$500 Application fee, if applicable** (Cheque, payable to the Minister of Finance)

Submit the complete NoA to:

Director
Environmental Approvals Branch
Manitoba Sustainable Development
1007 Century Street
Winnipeg, Manitoba R3H 0W4

For more information:

Phone: (204) 945-8321
Fax: (204) 945-5229
http://www.gov.mb.ca/sd/eal

Note: Per Section 14(3) of the Environment Act, Major Notices of Alteration must be filed through submission of an Environment Act Proposal Form (see "Information Bulletin – Environment Act Proposal Report Guidelines")

Municipality of Ethelbert

56 Second Avenue S., Box 115, Ethelbert, MB. R0L 0T0 Phone: 204-742-3212, Fax: 204-742-3642 E-mail: rmethelbert@inetlink.ca

October 22, 2021

Director
Environmental Approvals Branch
Manitoba Sustainable Development
1007 Century St.
Winnipeg, MB
R3H 0W4

To Whom It May Concern;

Please find attached the Notice of Alteration Form and all required documentation in respect to attached Inspection Report for the Ethelbert Lagoon, dated October 16, 2020.

On October 9, 2020 the Municipal Water Supervisor observed a potential leak of cell #2 at the lagoon and reported it to the Environmental Officer, Dave Yunker. Mr. Yunker conducted a lagoon inspection and concluded that a Director's Order would be issued and the Municipality would need to have an Engineering Assessment conducted. On October 19, 2020, Mr. Yunker advised the Municipality that his superiors would not approve the Director's Order and it would not be issued, however an assessment was still necessary. The Municipality contacted Manitoba Water Services Board and secured cost share funding and JR Cousin Consulting was hired to conduct the inspection.

JR Cousin Consulting conducted their inspection this spring and released the report with their observations and recommendations, attached.

The Municipality of Ethelbert would like to conduct the repair to the abandoned pipe by way of capping with adhesive as suggested by Mr. Wohlgemut, Environmental Scientist from JR Cousin. We feel this will satisfactorily alleviate the issue of leakage. In addition, we will pack and fill any low lying areas with clay to alleviate any standing water issues going forward. With approval, we are hoping to have this work conducted as soon as possible and before we get too deep into winter.

Should you require anything further, please call me at your earliest convenience; I may be reached at ethelbert@mymts.net, office 204-742-3212 or by cell 204-648-3284. Many thanks for your attention herein.

Sincerely,

[redacted]

Shawna Low
Administrative Assistant

ENGINEERING CONSULTANTS

COPY

June 23, 2021

700\708\708.02\02\Ethelbert Lagoon Assessment Report.docx

Mr. Ranveer Katyal, M.A.Sc.
Water Services Branch
Department of Central Services
Unit 1A - 2010 Currie Blvd.
Brandon, Manitoba
R7B 4E7

Via email

P&R 8.390 JRCC

E-708.02

Dear Mr. Katyal,

RE: Ethelbert Lagoon Dike Assessment Letter Report

JR Cousin Consultants Ltd. (JRCC) has completed this letter report assessing the Ethelbert wastewater treatment lagoon dike condition in response to an inspection conducted by Manitoba Conservation and Climate in October 2020.

1.0 BACKGROUND AND SCOPE

The Ethelbert wastewater treatment lagoon was constructed in 1966 as a two-cell facultative lagoon. The lagoon was licensed in 1968 by The Provincial Sanitary Control Commission under the Pollution of Water Prevention Act. It is currently operating under the Clean Environment Commission Order 1142, which was issued in 1988. The Municipality indicated that no record drawings of the earthen lagoon construction were produced and no geotechnical investigation has been conducted on the lagoon dikes.

The lagoon is located at SW 32-29-21 WPM, approximately 380 m southeast of the community of Ethelbert. The lagoon is surrounded to the south, west and north with forest land and to the east is agricultural land used for crop production. The forested area to the north also consists of low lying swamp areas, while the forested area to the south contains some low lying streams and swampy areas. The Fork River Drain (Fifth Order Provincial Drain) is located approximately 130 m south of the existing lagoon cells and is used for the existing lagoon effluent discharge.

The lagoon operator noticed a potential issue with ponding water outside of the lagoon cell in 2020 and contacted Manitoba Conservation and Climate. The Environmental Compliance and Enforcement branch conducted an inspection of the Ethelbert wastewater treatment lagoon in October 2020 and a leak was detected at the base of the south dike (storage cell). The enforcement representative requested an engineering assessment of the lagoon leak and a Notice of Alteration if repair works are necessary.

2.0 EXISTING LAGOON DIKE GEOTECHNICAL ASSESSMENT

2.1 Background Information

JRCC completed a geotechnical investigation of the potential expansion area to the southwest of the Ethelbert wastewater treatment lagoon in October 2015. A total of seven test holes were excavated across the site to determine the suitability of the soils for use as a clay lagoon liner or a potential borrow site. The test holes indicated that the soils consisted of medium and high plastic clay with sand and silt to a depth of 5.0 m below grade. Bedrock was not encountered, but water infiltration

JRCC.ca

was observed in all of the test holes at depths ranging from 1.4 m to 2.5 m below the surface. Laboratory testing indicated that these soils would likely be suitable for use as a re-worked and compacted lagoon liner, meeting provincial requirements for permeability. Any sand seams encountered would not be suitable for construction of a lagoon liner.

2.2 Dike Investigation

A soils investigation of the existing lagoon dike, near the area of concern on the south dike of the storage cell, was conducted on June 1, 2021. The soils investigation was to determine the suitability of the soils in the dikes to form a liner meeting provincial requirements, and if there were any indications of a leak from the lagoon cell. Five test holes were drilled in the south dike, with two test holes located in the center of the dike and three located on the inner slope (see test hole location plan attached). The depth of the test holes varied between 3.0 m and 4.5 m below the top of dike, and the observed soil profile in each hole was recorded (see attached test hole logs).

The soil profile through the centre of the dike consisted of surficial sand, followed by a layer of medium plastic sandy clay to a depth of approximately 2.0 m below the top of dike. Underlying this is a layer of wet sand to a depth of approximately 3.0 m, followed by a layer of sandy clay. Groundwater was infiltrating through the sand layer at a depth of 2.0 m to 3.0 m below the top of dike.

The soil profile through the inner slope of the dike consisted of high plastic organic clay from the surface to a depth of 1.7 m, followed by a layer saturated sand and sandy clay. Groundwater was infiltrating through the sand layer at a depth of 1.7 m to 2.5 m below the surface.

The investigation occurred after the storage cell had been drained, to expose the inner slope of the storage cell. No significant erosion was observed along the inner slope of the south dike. However, an additional abandoned drainage pipe was located through the dike that the operator was unaware of. This pipe was located at a depth of approximately 1.5 m below the top of dike, near the location of the existing cell drainage pipe. Both ends of the pipe were observed and the pipe appeared to go through the dike at an angle, along with a second pipe observed sitting on top of the first pipe on the outer dike slope (see location plan). There was evidence of moist conditions near the exit of this additional pipe on the outer slope, however as the pipe was no longer submerged in liquid due to the cell being drained, there was no liquid actively draining from the pipe. Photos of the abandoned pipes have been attached.

2.3 Laboratory Results

The laboratory analysis was conducted to confirm the suitability of the soil layer along the inner slope of the lagoon cell, for use as a cell liner. A sample from the high plastic organic clay along the inner slope liner was submitted to Wood Environment and Infrastructure Laboratories for particle size analysis and Atterberg limits. The Wood Environment and Infrastructure laboratory report has been attached. In general, soils that meet the following parameters would be suitable for use as a cell liner, meeting a provincial permeability requirement of 1×10^{-7} cm/sec or less:

- Liquid limit of 30% or greater
- Plastic index of 10% or greater
- 30% or more passing a number 200 mesh sieve
- 20% or more of clay particles.

The laboratory results indicated that the soil is a high plastic clay material and met the above requirements for cell liner suitability.

3.0 RECOMMENDATIONS AND CONCLUDING REMARKS

From a review of the field observations and the laboratory results, it is likely that the storage cell was constructed with a liner of high plastic clay located along the inner slope of the cell which meets provincial permeability requirements and has a thickness greater than 1.0 m.

The source of the ponding liquid observed by Manitoba Conservation and Climate is unknown, as testing on this liquid has not been conducted. It is possible that this liquid is effluent permeating through the lagoon dike, or it is possible that this liquid is from a groundwater source, as a layer of saturated sandy soils was observed at a depth of approximately 2.0 m below the top of the dike.

If the ponding liquid observed outside of the south dike was lagoon effluent, then it is likely that the source of the leak was from the additional abandoned discharge pipes. The abandoned discharge pipes are likely creating a permeable channel through the dike and potentially releasing wastewater when the lagoon level reaches the pipe elevation, at a height of 1.5 m below the top of the dike, which is consistent with the operator's observations of the ponding.

It is recommended that the Municipality remove the potential source of a lagoon cell leak by removing the abandoned pipes. If the pipes are removed, the lagoon liner in the excavated dike would need to be restored with high plastic compacted clay soils. The Municipality can attempt to cap the discharge pipe on both ends, however this may not resolve the issue if the discharge pipe is damaged and effluent is permeating through the soils around the pipe. Therefore, pipe removal is recommended rather than pipe capping. The lagoon operator should make observations of the area of concern during the summer months while the lagoon storage cell fills up with effluent, to determine if the location of a leak can be further clarified.

A Notice of Alteration will need to be submitted to Manitoba Conservation and Climate describing the procedures for resolving the lagoon leakage issue prior to any earth works being conducted on the lagoon cell dike.

If you have any questions, please contact the undersigned.

Yours truly,

JR Cousin Consultants Ltd.

[redacted]

Oswald Wohlgemut, M.Sc.
Environmental Scientist

Attach: Site Photos
Test Hole Location Plan
Test Hole Logs
Particle Size Analysis, Wood Environment and Infrastructure

ATTACHMENTS

Site Photos

Test Hole Location Plan

Test Hole Logs

Particle Size Analysis, Wood Environment and Infrastructure

Site Photos

Photo 1: Abandoned discharge pipe on outer slope

Photo 2: Abandoned discharge pipes on outer slope

Test Hole Location Plan

Test Hole Logs

SCALE BAR ON METRIC

1:600

No.	REVISIONS	DATE	INITIALS

ELEVATIONS: U.N.K. EL.

LOCATION OF UNDERGROUND STRUCTURES/UTILITIES AS SHOWN ARE BASED ON AVAILABLE INFORMATION AND NO GUARANTEE IS GIVEN OR IMPLIED THAT ALL EXISTING UNDERGROUND STRUCTURES/UTILITIES ARE SHOWN OR IN THEIR EXACT LOCATION. IT IS THE RESPONSIBILITY OF CONTRACTOR TO CONFIRM THE EXISTENCE AND EXACT LOCATION OF ALL UNDERGROUND STRUCTURES/UTILITIES MUST BE OBTAINED FROM THE APPROPRIATE AUTHORITY/OWNER, BY THE CONTRACTOR, BEFORE PROCEEDING WITH CONSTRUCTION.

ENGINEER'S SEAL

PRELIMINARY

JR Cousin Consultants Ltd.
914 Scurfield Blvd. Winnipeg MB R3Y 1G4
p. (204) 489-0474
f. (204) 489-0487
www.jrcc.ca
ENGINEERING EXCELLENCE SINCE 1991

CODE: E-708.02
DESIGNED BY: CW
DRAWN BY: DT
REVIEWED BY: CW

PROJECT: MUNICIPALITY OF ETHELBERT WASTEWATER TREATMENT LAGOON BERM INTERGRITY INVESTIGATION

TITLE: TEST HOLE AND PIPING LOCATION PLAN

SCALE:	DATE:	PLAN:	SHEET:
1:600	21/08/21	XX	XX of YY

J. R. Cousin Consultants Ltd.

TEST HOLE LOGS

SYMBOL INDEX


GW. : Well graded gravels and gravel sand mixtures, little or no fines


GP. : Poorly graded gravels, gravel - sand mixtures, little or no fines


GM. : Silty gravels, gravel-sand-silt mixtures


GC. : Clayey gravels, gravel-sand-clay mixtures


SW. : Well graded sands, gravelly sands, little or no fines


SP. : Poorly graded sands, or gravelly sands, little or no fines


SM. : Silty sands, sand-silt mixtures


SC. : Clayey sands, sand-clay mixtures


ML. : Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, or clayey silts with slight plasticity


CL. : Inorganic clays of low plasticity, gravelly clays, sandy or silty clays, lean clays


OL. : Organic silts and organic silty clays of low plasticity


CI. : Inorganic clays of medium or intermediate plasticity


MH. : Inorganic silts, fine sandy or silty soils


CH. : Inorganic clays of high plasticity, fat clays


OH. : Organic clays of medium to high plasticity, organic silts


Pt. : Peat, humus, swamp soils with high organic contents

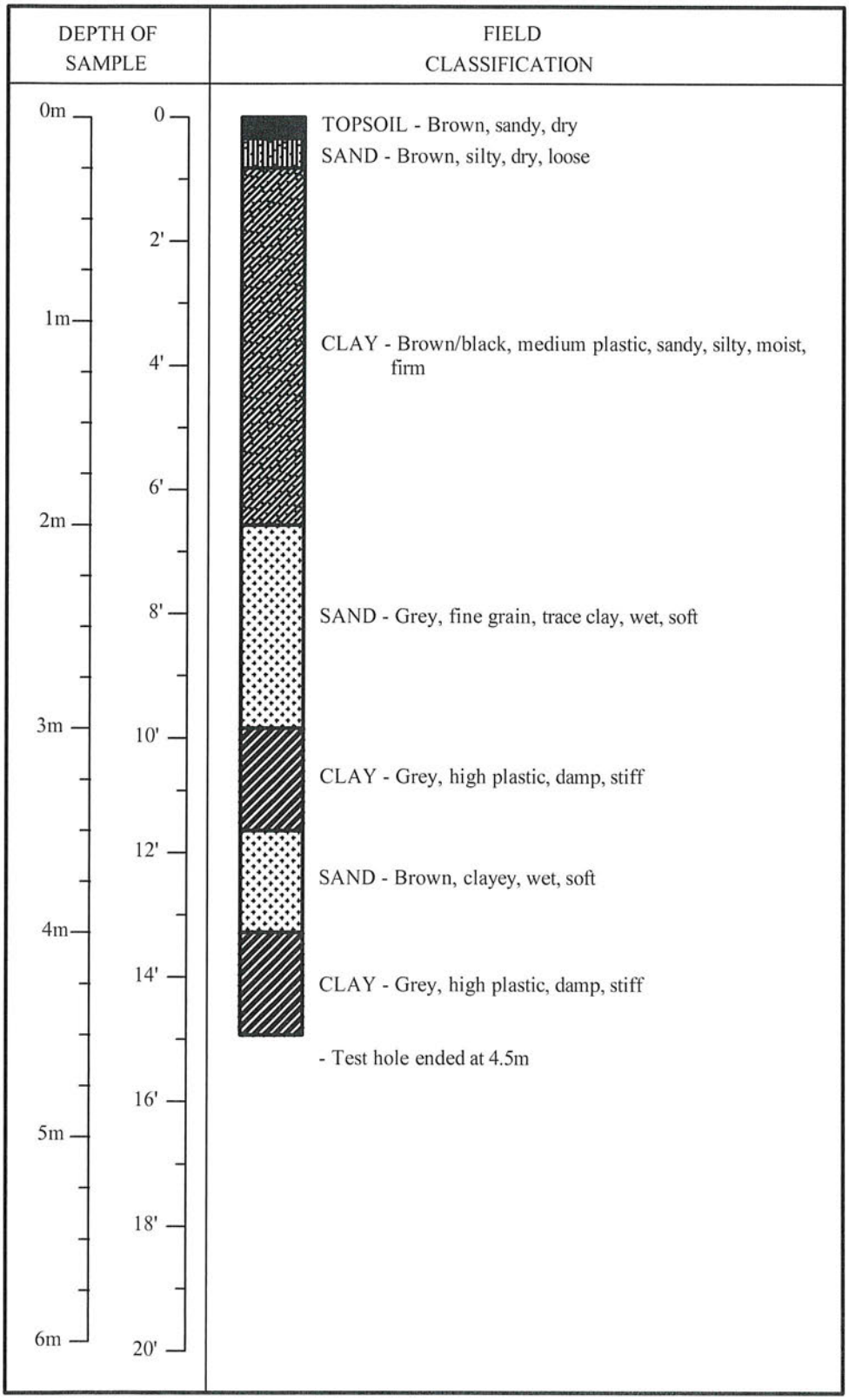

TOPSOIL

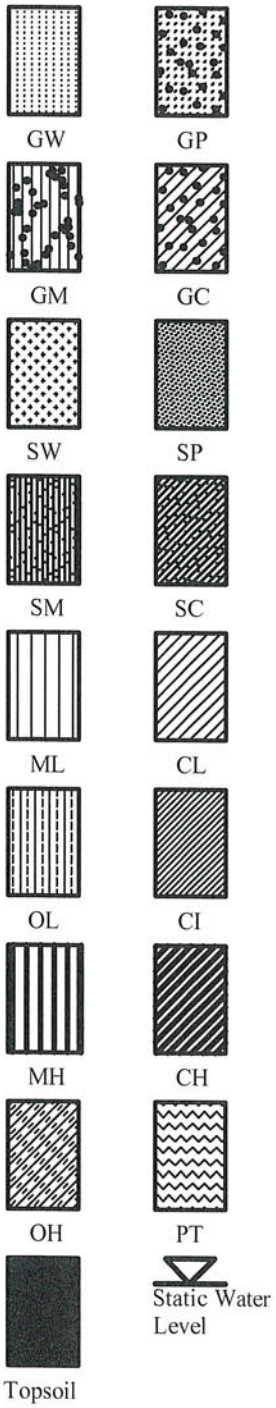
The soil logs are based upon objective data available to us at the time of forming our opinions. The soil logs indicate site specific soil characteristics and must not be generalized over larger areas due to the limited number of test holes as compared to that of an unlimited number of test holes. Every effort is made to evaluate the information by methods generally recognized. The soil logs represent our opinions. J. R. Cousin Consultants Ltd. cannot be responsible for actual site conditions proved to be materially at variance from our analysis or from the data generalization over untested areas.

J. R. Cousin Consultants Ltd.

TEST HOLE LOG SHEET

LOCATION : Ethelbert Lagoon South Dike
CODE: E-708.02
DATE : June 1, 2021
COORDINATES: 5708941N, 404115E
ELEVATION: 339.100m
PROJECT : Ethelbert Lagoon Dike Assessment
METHOD OF SAMPLING: Drill Rig
TEST HOLE # 1





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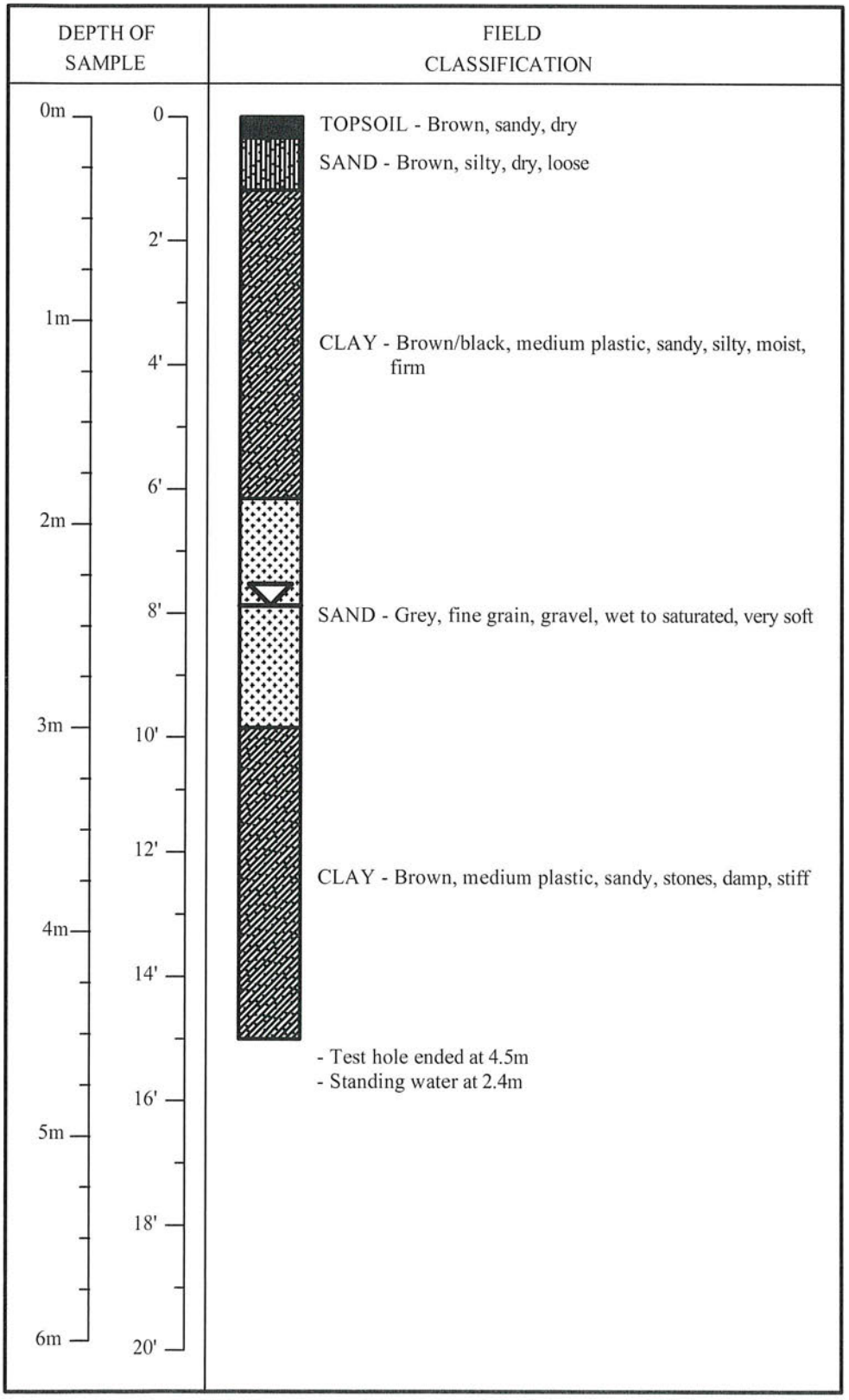
J. R. Cousin Consultants Ltd.

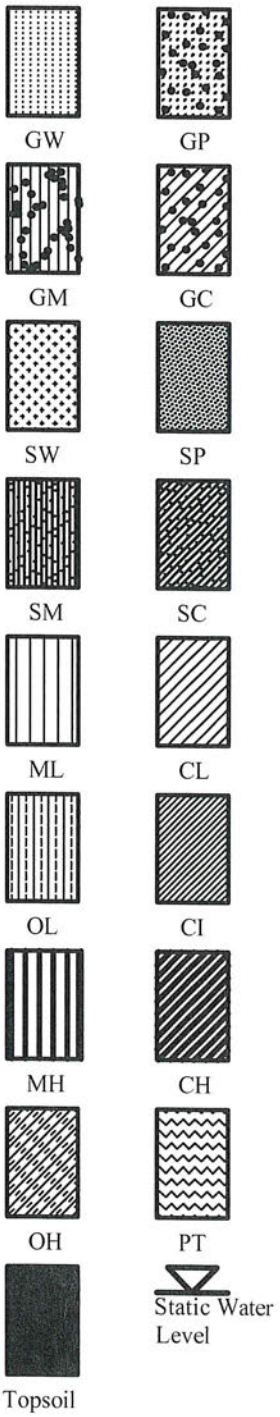
TEST HOLE LOG SHEET

LOCATION : Ethelbert Lagoon South Dike
CODE: E-708.02
DATE : June 1, 2021

COORDINATES: 5708941N, 404077E
ELEVATION: 339.200m

PROJECT : Ethelbert Lagoon Dike Assessment
METHOD OF SAMPLING: Drill Rig
TEST HOLE # 2





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J. R. Cousin Consultants Ltd.

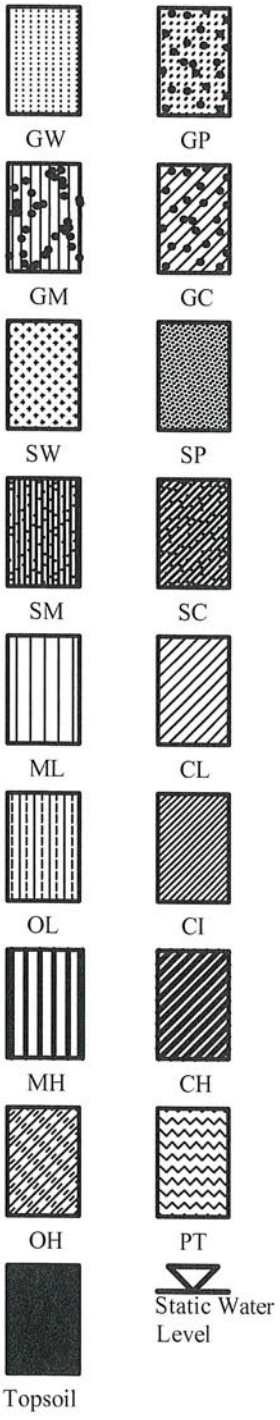
TEST HOLE LOG SHEET

LOCATION : Ethelbert Lagoon South Dike
CODE: E-708.02
DATE : June 1, 2021

COORDINATES: 5708945N, 404078E
ELEVATION: 338.900m

PROJECT : Ethelbert Lagoon Dike Assessment
METHOD OF SAMPLING: Drill Rig
TEST HOLE # 3

DEPTH OF SAMPLE	FIELD CLASSIFICATION
0m – 0	TOPSOIL - Black, clayey, moist, roots
2'	
1m	CLAY - Black, high plastic, moist, firm
4'	
6'	
2m	SAND - Grey, fine grain, gravel, wet to saturated, very soft
8'	
3m – 10'	CLAY - Grey, medium plastic, sandy, moist, firm
	- Test hole ended at 3.0m
12'	
4m – 14'	
16'	
5m	
18'	
6m – 20'	



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J. R. Cousin Consultants Ltd.

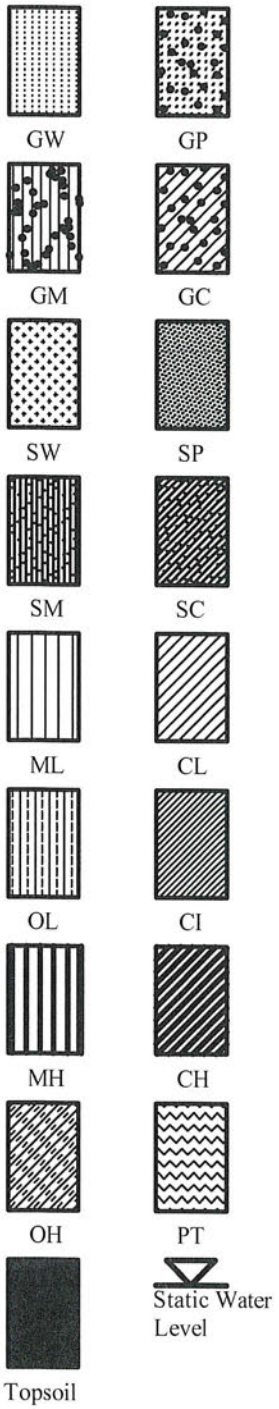
TEST HOLE LOG SHEET

LOCATION : Ethelbert Lagoon South Dike
CODE: E-708.02
DATE : June 1, 2021

COORDINATES: 5708946N, 404064E
ELEVATION: 338.900m

PROJECT : Ethelbert Lagoon Dike Assessment
METHOD OF SAMPLING: Drill Rig
TEST HOLE # 4

DEPTH OF SAMPLE	FIELD CLASSIFICATION
0m / 0	TOPSOIL - Black, clayey, moist, roots
2'	
1m	CLAY - Black, high plastic, moist, firm
4'	
6'	
2m	SAND - Grey, fine grain, gravel, wet to saturated, very soft
8'	
	CLAY - Grey, medium plastic, sandy, moist, firm
3m / 10'	
	- Test hole ended at 3.0m
12'	
4m	
14'	
16'	
5m	
18'	
6m / 20'	



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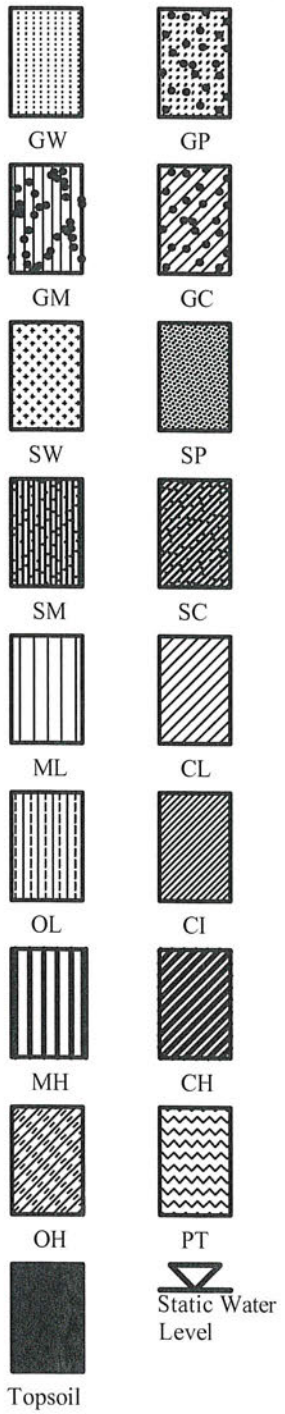
J. R. Cousin Consultants Ltd.

TEST HOLE LOG SHEET

LOCATION : Ethelbert Lagoon South Dike
CODE: E-708.02
DATE : June 1, 2021
COORDINATES: 5708945N, 404066E
ELEVATION: 338.900m
PROJECT : Ethelbert Lagoon Dike Assessment
METHOD OF SAMPLING: Drill Rig
TEST HOLE # 5

DEPTH OF SAMPLE	FIELD CLASSIFICATION
0m – 0	TOPSOIL - Black, clayey, moist, roots
2'	
1m – 4'	CLAY - Black, high plastic, moist, firm
6'	
2m – 8'	SAND - Black, fine grain, gravel, saturated, very soft
3m – 10'	CLAY - Brown, low plastic, sandy, gravel, wet, soft
12'	- Test hole ended at 3.0m
4m – 14'	
16'	
5m – 18'	
6m – 20'	



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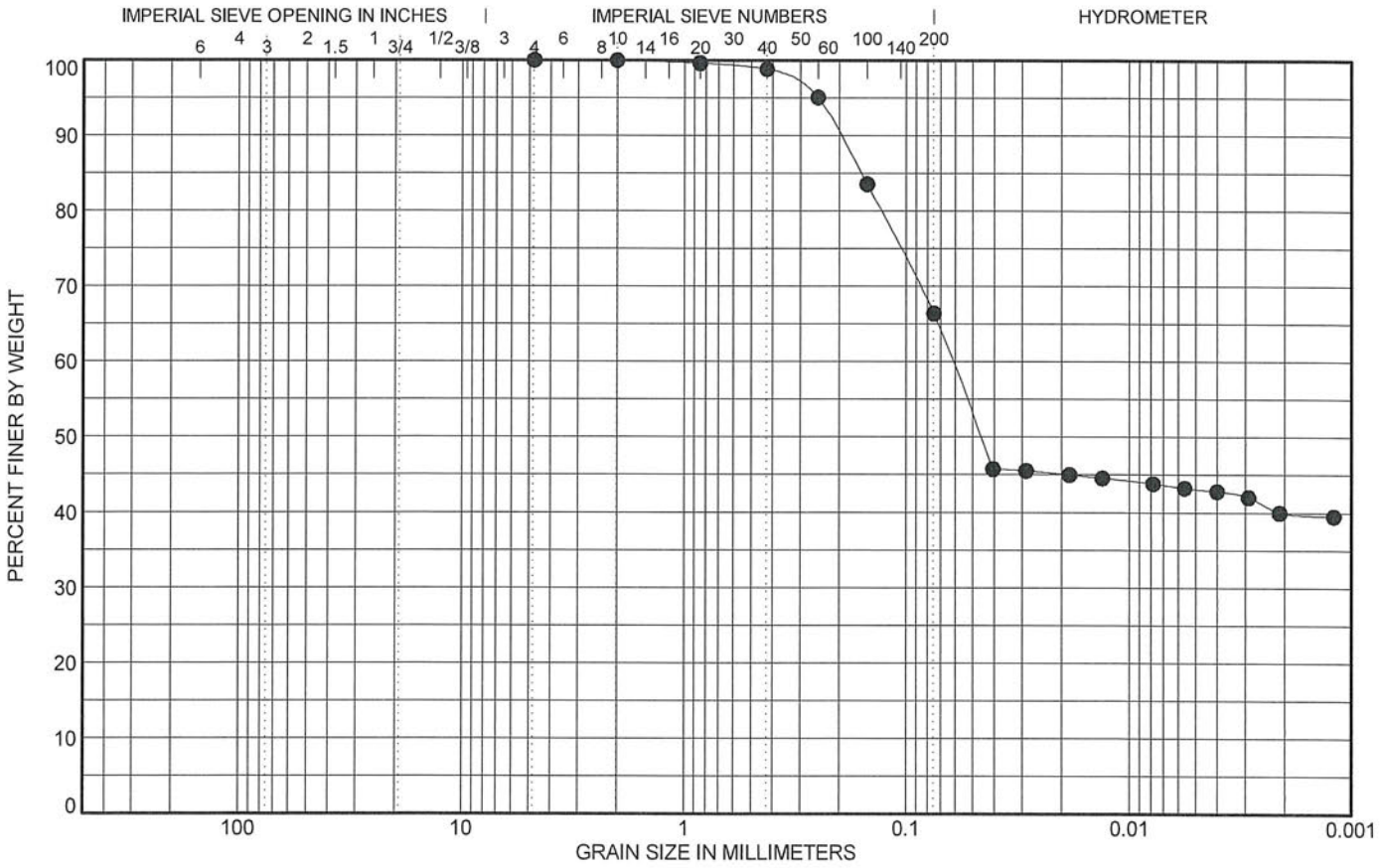
Particle Size Analysis, Wood Environment and Infrastructure

PARTICLE SIZE ANALYSIS

Report Date: 18 June 2021

Client		**Project**	
Name:	JR Cousin Consulting Ltd.	**Name:**	Ethelbert Lagoon
Address:		**Address:**	
Attention:		**Project No.:**	WX11334.4100
PO Number:		**Manager:**	JW

Gradation Specification:



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Sample ID	mUSCS	MC	D100	D60	D30	D10	LL	PL	% Gravel	% Sand	% Fines
● TH3 2021, 0.3 m	Cl	35.9	4.8	0.1			46	17	0	34	26 (Silt) : 40 (Clay)