CLEANUP AND RESTORATION OF THE MID-CANADA LINE SITE AT BEAR ISLAND, NUNAVUT

OPERATIONS AND MAINTENANCE PLAN FOR THE SEWAGE DISPOSAL FACILITIES

Final Version

(O/Ref.: TP-0654) (Y/Ref.: EW699-091300/001/NCS)

PUBLIC WORKS AND GOVERNMENT SERVICES CANADA

November 2010

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December 2010

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1 INTRODUCTION

In April 2010, Biogenie, a division of EnGlobe Corp. (hereinafter called "Biogenie") was awarded the contract for the remediation of the Bear Island Mid-Canada Line Site by Public Works and Government Services Canada (hereinafter called "PWGSC") on behalf of the Indian and Northern Affairs (INAC). This plan is intended to highlight the sewage treatment facilities to be constructed and operated on Bear Island throughout the course of the project. As per the Nunavut Water Board's Licence No. 1BR-BEA1015, this document will include:

a) 95% complete For-Construction Drawings of the Sewage Disposal Facilities stamped and signed by an Engineer (Figure 1);

b) Final discharge locations BEA-2a and BEA-2b identified on a map (Figure 2);

c) Monitoring Program;

d) Abandonment and Restoration information including sludge disposal instructions.

2 SEWAGE DISPOSAL FACILITIES DETAILS

The following sections provide details on the Sewage Disposal Facilities to be used during camp operation of the Bear Island Mid-Canada Line site remediation project.

2.1 SEWAGE LAGOONS

All sewage and wastewater generated from the operation of the camp on Bear Island are to be pumped to one of two temporary and independently operated sewage lagoons. The lagoons are to be located 100 m from the camp and a minimum of 100 m from drainage paths, and each lagoon will have a capacity of 400 m^3. All construction activities on the sewage lagoons will be carried out avoiding sedimentation of any surrounding water bodies. There will be no hazardous substances affiliated with the sewage disposal facility.

The design of the lagoons is based on a daily consumption of 200 L of water per person per day for a camp of 35 persons. Work season is schedule to last 60 days which will generate approximately 420 m^3 of sewage water. Based on this, each lagoon will need to hold a maximum of 210 m^3; with a total berm height of 1 m, the lagoon will maintain a minimum freeboard of 0.5 m.

Prior to entering the lagoons, sewage and wastewater will initially be drained to a sewage transfer tank adjacent to the camp. A multure pump will be installed in this tank, with the ability to grind any solids in the wastewater, creating a slurry, which will then be pumped to the lagoons. The lagoons will rely on natural processes of mainly bacteria and algae to reduce organic matter to acceptable levels, while allowing an appropriate amount of time for the solids to settle out as sludge. The settling section allows for the physical removal of solids and grease from the incoming wastewater. Heavy organic matter is settled out in the lagoons, with the lighter grease forming a scum layer on the water surface. It is to be noted that the lagoons will be operated in parallel configuration to reduce excessive BOD and fecal coliform and to

avoid the use of Calcium Hypochlorite. Detention time will also be maximized again to reduce excessive BOD and fecal coliform. Measures to implement security will include a sign clearly identifying the sewage lagoons. This area will also be explained and identified during the Worker Orientation Seminar (WOS) as being out of bound. Finally, the berms constructed will be high enough to prevent any accidental intrusion in the lagoons. A side profile of the sewage lagoon construction can be observed in Figure 1, Appendix A. The location of the sewage lagoons on the island are shown in Figure 2.

3 MONITORING PROGRAM

3.1 DISCHARGE CRITERIA

Prior to discharging from the lagoons, samples will be collected and analyzed in an approved laboratory for the parameters set out in the Water License. Wastewater treatment targets defined for this project by the Nunavut Water Board are listed in Table I hereafter:

Table I : Effluent Quality Limits for Wastes Discharged from the Sewage Disposal Facilities.

Parameter	Maximum Allowable Concentration
BOD	80 mg/L
Total Suspended Solids	100 mg/L
Fecal Coliforms	10,000 CFU/100 mL
pH	6.0 to 9.0
Oil and Grease	No visible sheen

Likewise, discharge of effluent will be done in compliance with section 36(3) of the Fisheries Act.

3.2 FINAL DISCHARGE POINTS

Wastes which meet the criteria set forth by the Nunavut Water Board will be discharged at one of two points dependant on which lagoon is being discharged. The two points are described below in Table II, including the monitoring requirements at each point. These discharge points are to be located 100 m from any drainage course or fish-bearing body of water, and their location is shown in Appendix A, Figure 2.

Once on site, the sampling stations and discharge point shall be surveyed and the coordinates will be provided to the Engineer.

Table II : Discharge Points from the Sewage Disposal Facilities and the Monitoring Requirements at Each Point.

Monitoring Program Station Number	Description	Status
BEA-2a	Final Discharge Point from Sewage Disposal Facilities, Lagoon 1	Active (Volume and Water Quality)
BEA-2b	Final Discharge Point from Sewage Disposal Facilities, Lagoon 2	Active (Volume and Water Quality)

3.3 ABNORMAL OPERATING CONDITIONS

This section describes the procedure to address abnormal operating conditions. The lagoons will be monitored daily to check the fluid level and to prevent inadvertent seepage of effluent through the lagoon berms. If short-circuiting within the lagoons or inadvertent seepage occur, discharge of effluent in the lagoon will be stopped. Biogenie will maintain a sufficient amount of HDPE liner to construct a temporary lagoon with a 10-day capacity. This delay will allocate enough time for ordering the required amount of liner to correct the situation.

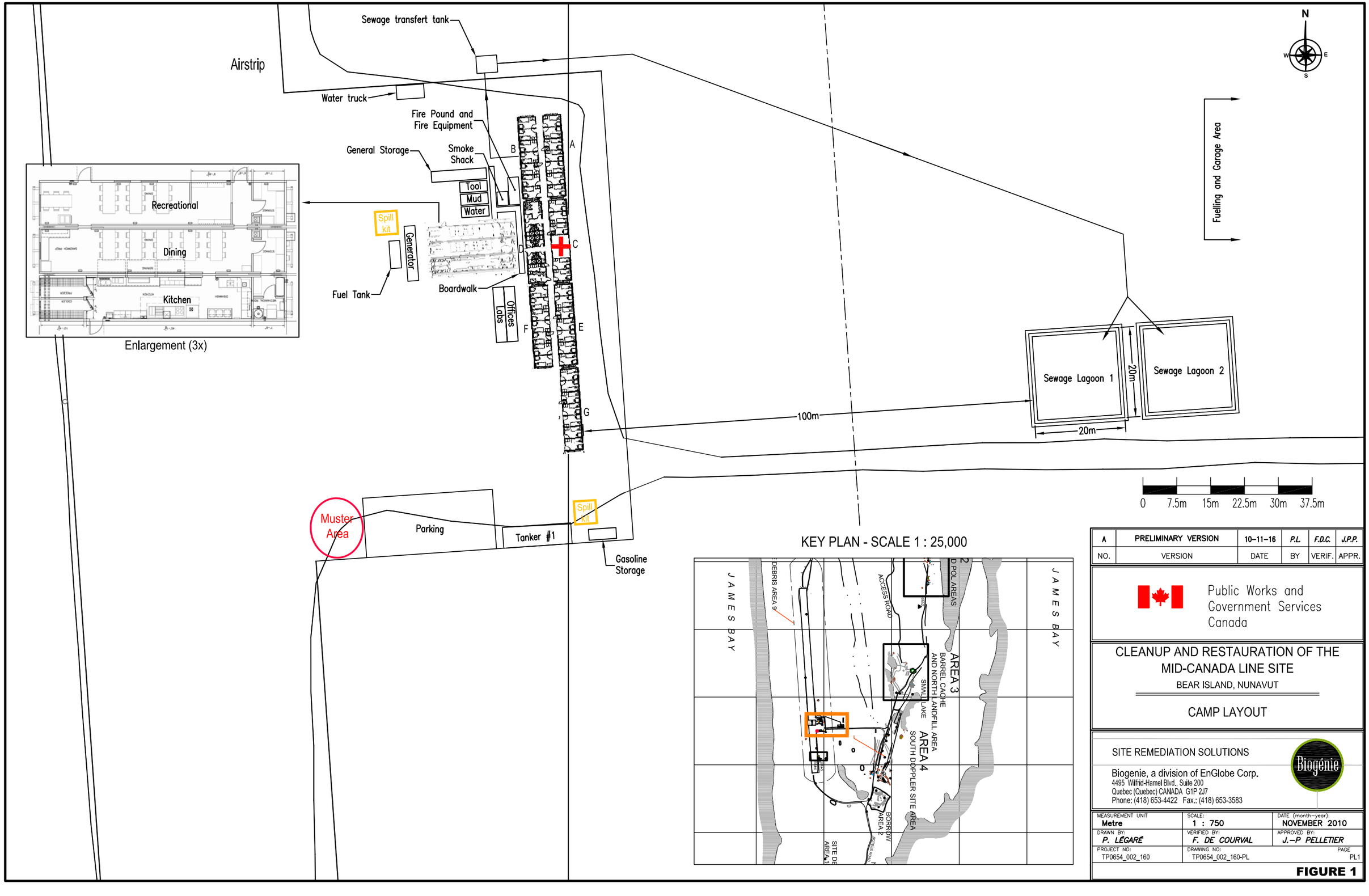
Finally, the concept of multure pump installed in the sludge tank will enable considerable accumulation of sludge in the tank which should lead to a minimal sludge accumulation in the lagoon.

4 ABANDONMENT AND RESTORATION

At conclusion of the work on Bear Island, all materials imported to the island, including the camp, will be removed. This includes the sewage lagoons, which will be closed and restored back to natural conditions. This work will include treating the solids remaining in the lagoons, known as sludge, and backfilling/grading the lagoons. The sewage sump which will be used during the camp and sewage lagoon construction will be treated with lime and covered with native material. Lime will also be added to the sludge from the two sewage lagoons at the end of the project and the lagoons will be backfilled and covered/graded with native materials to achieve the pre-existing natural contours of the land.

APPENDIX A

Figures



KEY PLAN - SCALE 1 : 25,000

NO.	VERSION	DATE	BY	VERIF.	APPR.
A	PRELIMINARY VERSION	10-11-16	P.L.	F.D.C.	J.P.P.

Public Works and Government Services Canada

CLEANUP AND RESTAURATION OF THE MID-CANADA LINE SITE

BEAR ISLAND, NUNAVUT

CAMP LAYOUT

SITE REMEDIATION SOLUTIONS

Biogenie, a division of EnGlobe Corp.
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Phone: (418) 653-4422 Fax.: (418) 653-3583

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Metre	1 : 750	NOVEMBER 2010
DRAWN BY: P. LÉGARÉ	VERIFIED BY: F. DE COURVAL	APPROVED BY: J.-P PELLETIER
PROJECT NO: TP0654_002_160	DRAWING NO: TP0654_002_160-PL	PAGE PL1

FIGURE 1

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N

W E

S

Camp

KEY PLAN - SCALE 1 : 25,000

Small Generator

Work Tools

Garage Work Area

Parts

Tools

Spill Kit

Incinerator

0 5m 10m 15m 20m 25m

A	PRELIMINARY VERSION	10-11-16	P.L.	F.D.C.	J.P.P.
NO.	VERSION	DATE	BY	VERIF.	APPR.

Public Works and Government Services Canada

CLEANUP AND RESTAURATION OF THE MID-CANADA LINE SITE

BEAR ISLAND, NUNAVUT

FUEL STORAGE AND GARAGE AREA

SITE REMEDIATION SOLUTIONS

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PROJECT NO: TP0654_002_160	DRAWING NO: TP0654_002_160-PL	PAGE PL2

FIGURE 2

APPENDIX B

Emergency Contact List

EMERGENCY CONTACT LIST

RESOURCE	CONTACT/LOCATION	PHONE NUMBER
Sat-Phones		**011-8816-316-55722**
	Sat phone #1	**TBC**
	Sat phone #2	**TBC**
Air Transportation		
Wabusk Air	Moosonee	**1-888-463-5999**
Whapchiwem Helicopters	Radisson	**819-638-7904**
Fire		
Local Fire Department	Wemindji	**819-973-3773** **819-978-3911** **(Emergency)**
	Chisasibi	**819-855-2444** **819-855-2911** **(Emergency)**
	Waskaganish	**819-895-8720** **819-895-9000** **(Emergency)**
Police		
Police Department	Wemindji	**819-978-3655** **819-978-0320** **(Emergency)**
	Chisasibi	**819-855-3499** **819-855-2882** **(Emergency)**
	Waskaganish	**819-895-2029** **819-895-8961** **(Emergency)**
Hospitals		
Wemindji Clinic	Wemindji	**819-978-0225** **819-978-3117** **(Emergency)**
Chisasibi Hospital	Chisasibi	**819-855-2844** **819-855-9011** **(Emergency)**
Waskaganish Clinic	Waskaganish	**819-895-8871**
Environmental Emergency		
24h Environment Canada Environmetal Emergencies		**1-866-845-6037**
24h Environment Canada Environmental Enforcement		**1-867-766-3737**
Environment Canada Enforcement Office	Curtis Didham	**867-975-4644** **867-222-1925 (Cell)**
GN-DOE	Rob Eno	**867-975-7700**
Fisheries and Oceans Canada	Gary Cooper, Habitat Management Biologist	**905-639-4396**
Nunavut Water Board		**867-360-6338**
QIA	John Amagoalik, Director of Lands and Resources	**867-975-8417**
INAC's Manager of Field Operations	Peter Kusugak	**867-975-4295**
24-hour Spill Line	NWT/Nunavut	**867-920-8130**
Canadian Transport Emergency Centre	24 hour service (CANUTEC)	**613-996-6666**
Department of Sustainable Development, Government of Nunavut	Robert Eno Manager, Pollution Control Environmental Protection Service	**867-975-5907**
INAC Water Resources	Iqaluit	**867-975-4550**

EMERGENCY CONTACT LIST

Health and Safety		
WSCC 24-hour Accident Reporting Line	Barron Building/1091 Box 669 Iqaluit, NU X0A 0H0	**1-877-404-4407**
Commission de la Santé et de la Sécurité du Travail du Québec	425, Rue du Pont Case postale 4900 Succursale Terminus Québec, QC Q1K 7S6	**1-866-302-2778**
Cree Human Resources Development	32 Amisk Street Mistissini, QC G0W 1C0	**418-923-2525**
Wildlife Management		
Nunavut Wildlife Management Board	P.O. Box 1379, Lot 924 Parnaivik Building Iqaluit, NU X0A 0H0	**867-975-7300**
Cree Trappers Association	Eastmain	**418-923-3276 (Manager)** **819-977-2165 (Secretary Eastmain)**
Heritage Resources		
Inuit Heritage Trust Incorporated	P.O. Box 2080 Iqaluit, NU X0A 0H0	**867-979-0731**
Aanischaaukamikw Cree Cultural Institute	205 Opemiska Meskino Oujé-Bougoumou, QC, G0W 3C0	**418-745-3911**
Avataq Cultural Institute	Inukjuak, QC J0M 1M0	**819-254-8919**
Management		
INAC	Mark Yetman (Contaminated Sites Project Manager)	**867-975-4733**
PWGSC	Matthew McElwaine (Environmental Engineer)	**780-497-3690**
Biogenie S.R.D.C. Inc Project Management	Jean-Pierre Pelletier, Team Leader Quebec Office	**418-653-4422 Ext 5431** **418-953-4422**
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