Englobe
Soils Materials Environment

Public Services and Procurement Canada

CAM-C Site Remediation
Matheson Point, Nunavut
(Ref.: EW699-172531)

Wastewater Treatment Plan

Final Version

Date: September 2017
Ref. N°: P-0012811-0-01-001

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Wastewater Treatment Plan

Final Version | P-0012811-0-01-001

Submitted to:

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Public Services and Procurement Canada

Submitted by:

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Appendix

Property and Confidentiality

REVISION AND PUBLICATION REGISTER		
Revision N°	Date	Modification And/Or Publication Details
0A	2017-06-28	Preliminary Version
00	2017-09-07	Final Version

1 INTRODUCTION

Two types of wastewater will be produced during the site remediation of CAM-C:

- Wastewater from camp operations; and,
- Wastewater from work activities.

Wastewater from camp operations will include grey water, kitchen sumps, and black water (sewage). Wastewater from work activities will include wastewater streams from dewatering work areas, decontamination, process water, contact water, and wash/rinse water. Englobe Corp. (Englobe) has designed two separate systems to treat this wastewater on-site.

2 CAMP WASTEWATER MANAGEMENT

The site's wastewater system will be composed of two sets of sewage lagoons. This system has proven successful on previous large-scale remediation projects such as CAM-F, CAM-5, Bear Island, FOX-3, FOX-E and Padloping Island.

All sewage and wastewater generated from the operation of the camp (grey water, kitchen water, black water etc.) will be pumped to one of two temporary and independently-operated sewage lagoons with a total capacity of 200 m^3. Only one lagoon will be in use at a given time for a duration of one month, after which the wastewater will be pumped into the second lagoon to allow for the sewage in the first lagoon to settle. The lagoons will be located a minimum of 100 m from the camp and a minimum of 100 m from drainage paths. Refer to Appendix A for the proposed sewage lagoon design. It is important to note that the location will be identified once on site and is subject to Departmental Representative (DR) approval.

The lagoons will take approximately six hours to build. An excavator will be used to dig the lagoon basins since they are below grade and the excavated material will be used to construct the 0.5 m berms around the lagoons. All construction activities on the sewage lagoons will be done in such a way as to avoid sedimentation of any surrounding water bodies. There will be no hazardous substances affiliated with the sewage disposal facility.

Prior to entering the lagoons, all wastewater will initially be transferred to a sludge tank adjacent to the camp. A mulcher pump will be installed in this tank, with the ability to grind any solids in the wastewater, creating slurry, which will then be pumped to the lagoons. The lagoons will rely on natural processes of 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 will settle in the lagoons, with the lighter grease forming a scum layer on the water

surface. The lagoons will operate in parallel configuration to reduce excessive Biological Oxygen Demand (BOD) and fecal coliform and to avoid the use of calcium hypochlorite as a treatment method. Detention time will also be maximized to again reduce excessive BOD and fecal coliform.

Lastly, the mulcher pump installed in the sludge tank will enable considerable accumulation of sludge in the tank. This should lead to a minimal sludge accumulation in the lagoon which can then be disposed of off-site.

To ensure worker safety, signage clearly identifying the sewage lagoons will be erected and access will be restricted. This area will also be explained and identified during the worker orientation seminar (WOS) as a restricted area. The berms constructed will be high enough to prevent any accidental intrusion in the lagoons.

To ensure the integrity of the berms and prevent leakage, the Health and Safety officer will inspect the lagoon during his daily rounds.

2.1 ESTIMATED WATER DISCHARGE FOR CAMP OPERATIONS

Over the course of a month, it is estimated that the camp will generate approximately 75 m^3 of wastewater based on a daily water consumption of 2,500 L. Sewage lagoons will be discharged monthly after appropriate testing and settling takes place.

3 TREATMENT OF PROCESS/CONTACT GENERATED WASTEWATER

Wastewater from work activities can be generated from the landfarm facility, during barrel processing, from contact water from landfill excavation, pipe and tank cleaning, decontamination and excavation activities. A two lagoon system (or tank) in conjunction with the Water Treatment Unit (WTU) will be used to treat contaminated water.

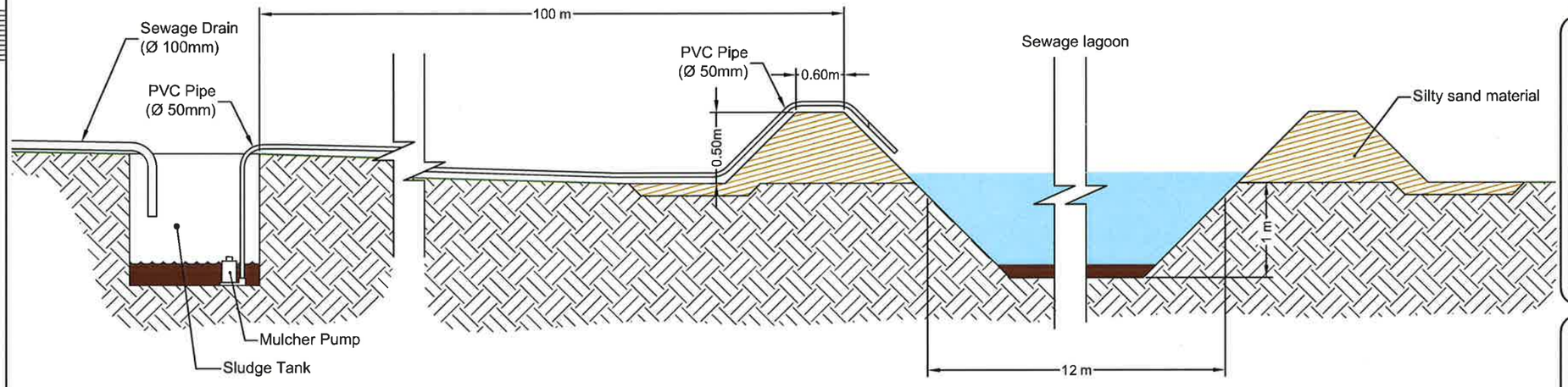
The lagoons will be constructed adjacent to the Material Processing Area (MPA). The Barrel Processing Area will be located in the MPA providing an area for barrels to be consolidated, cleaned and crushed. Wash water will be pumped into the first lagoon and allowed to stand to promote settling of sediment and metals. Absorbent booms will be deployed to absorb any oil or grease. The water will be pumped into the second lagoon while avoiding disturbance to the settled sediments. From the second lagoon, water will be circulated through the WTU. Please refer to Appendix B for design details of the WTU. The WTU is designed so that different filtration media (such as activated carbon, organo-clays and ion exchange resins) can be used in the filtration units to capture various types of contaminants. The filtration components can be arranged in various configurations to adapt the flow rates and the treatment to a specific contaminant. As an example, for hydrocarbons contamination, activated carbon is used. It is

anticipated that, from the soil and drum contamination profiles detailed in the characterization data, the water treatment unit proposed will meet the requirements of this site. Used filter media will be containerized in a Quatrex-type bag. Wash water will be circulated until sample results indicate that the water complies with discharge criteria. Treated water will be discharged with DR approval at a location of least 31 m from all water courses. The WTU requires little maintenance beyond the periodic checking for leaks and deficiencies and the changing of filter media.

3.1 DISCHARGE LOCATIONS

Prior to discharge from the lagoons, samples will be collected and analyzed at a CALA-approved laboratory (Maxxam Analytics International Corporation [Maxxam] in Edmonton, Alberta) for the parameters set out in the Water License. Wastes that meet the criteria set forth by the Nunavut Water Board will be discharged at one of two points depending on which lagoon is being discharged. These discharge points will be located 100 m from any drainage course or fish-bearing body of water. Once on-site, the sampling stations and discharge point shall be identified, surveyed and the coordinates will be provided to the DR.

Appendix A Proposed Sewage Lagoon Design



STAMP

REGISTERED PROFESSIONAL ENGINEER
A. LECLAIR
LICENSEE
NT/NU
2017-09-07

Client's References
EW699 - 172531

REV.	Y - M - D DATE	DESCRIPTION	Prepared By	Checked By
00	2017-08-07	ISSUED FOR CONSTRUCTION	M.-A.G.	A.L.
00	2017-06-26	PRELIMINARY	M.-A.G.	A.L.
00	2016-08-22	PRELIMINARY	S.D.	A.L.

ISSUES / REVISIONS

ALL DIMENSIONS MUST BE TAKEN AND CHECKED BEFORE BEGINNING THE WORKS

Public Works and Government Services Canada
Travaux publics et Services gouvernementaux Canada

CAM-C MATHESON POINT REMEDIATION PROJECT

Nunavut

Title

WASTEWATER TREATMENT PLAN

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Prepared **A. Leclair**
Drawn **M.-A. Girard**
Verified **A. Leclair**

Discipline **Geoenvironment Northern Canada**
Scale **None**
Date **2017-06-28**

Project Manager **A. Leclair**
Plan **01 de 01**

Serv. resp.	Projet	Otp			Disc.	Type	Nº Dessin	Rév.
043	P-0012811	0	01	001	EN	D	0300	00

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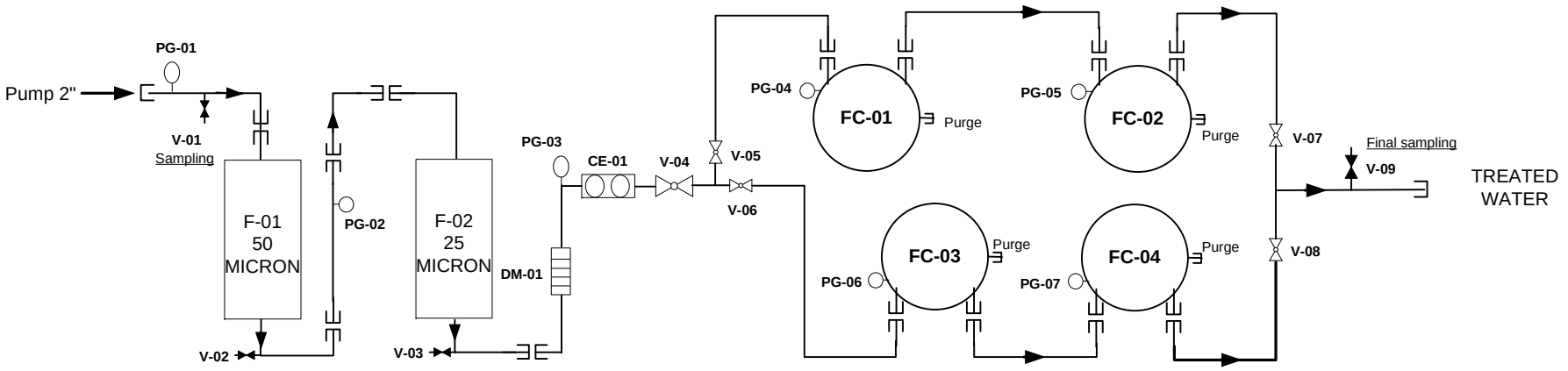
Imprimé le: 09/07/2017 01:15

Appendix B Design Details of Water Treatment Unit

MAXIMUM OPERATING FLOW: 20 GPM

PROJECT NUMBER:
P-0012811

OPERATED BY:



Date	Time	PG-01 (psi)	PG-02 (psi)	PG-03 (psi)	PG-04 (psi)	PG-05 (psi)	PG-06 (psi)	PG-07 (psi)	DM-01 (gpm)	CE-01 (m^3)

: V-00 : normally closed valve

: V-00 : normally open valve

DM-00 : Flowmeter

PG-00 : Pressure gauge

CE-00 : Water meter

FC-00 : Carbon filter

F-00 : Bag filter

Inlet sampling (V-01)

Time _____ # Sample _____

_____ _____

Outlet sampling (V-09)

Time _____ # Sample _____

_____ _____

PURGE :

☐ YES

☐ NO

☐ See Observations

EQUIPMENTS CHECK-UP

ITEM	CHECK-UP	CLEANING	REPLACEMENT
F-01 Filter (bag filter)	☐	N/A	☐
F-02 Filter (bag filter)	☐	N/A	☐
FC-01 Filter	☐	N/A	☐
FC-02 Filter	☐	N/A	☐
FC-03 Filter	☐	N/A	☐
FC-04 Filter	☐	N/A	☐

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CAM-C SITE REMEDIATION
MATHESON POINT, NUNAVUT

Water Treatment Unit
Piping Diagram and Follow-up Sheet

Units:	Scale	Date:
None	None	2017-06-27
Drawn by: M.-A. Girard	Verified by: A. Leclair	Approved by: A. Leclair
Project: P-0012811-0-01-001	Identification Code : 1560-300-EN05	Drawing No: SUIVI4374_ang.pdf Page: 1/1