

**From:** [Susan Christie](#)  
**To:** [Erica Janes](#)  
**Subject:** FW: KBL - Sludge Survey  
**Date:** Monday, October 23, 2023 2:58:31 PM  
**Attachments:** [20230705 - Fort Providence SDF Sludge Survey Results.pdf](#)

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**From:** Susan Christie  
**Sent:** Monday, October 23, 2023 2:49 PM  
**To:** Wendy\_Bidwell@gov.nt.ca  
**Subject:** FW: KBL - Sludge Survey

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**From:** Enerio, Annriza <[Annriza.Enerio@colliersprojectleaders.com](mailto:Annriza.Enerio@colliersprojectleaders.com)>  
**Sent:** Wednesday, July 5, 2023 2:54 PM  
**To:** Susan Christie <[sao@fortprovidence.ca](mailto:sao@fortprovidence.ca)>; Finance <[finance@fortprovidence.ca](mailto:finance@fortprovidence.ca)>  
**Subject:** KBL - Sludge Survey

Hi Susan and Albertine,

Please find the lagoon/sludge survey report attached. The survey indicated that none of the cells exceed the SDF O&M Plan sludge removal guideline of 30%.

Regards,

**Annriza Enerio** (she/her)  
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July 5, 2023

Hamlet of Fort Providence  
L242 C St.  
Fort Providence, NT

ATTN: Susan Christie, Senior Administrative Officer, Hamlet of Fort Providence

**RE: 2023 Sewage Disposal Facility Sludge Survey  
Hamlet of Fort Providence**

## 1.0 INTRODUCTION

The Hamlet of Fort Providence (Hamlet) operates a Sewage Disposal Facility (SDF), an Engineered Lagoon system. The treatment system comprised of five cells with cell #5 commissioned in 2000. The sewage treatment facility is a five-celled national drainage system where the wastewater would flow from cell #1, to #2, #3, #4, and then to #5.

The sludge accumulated in the sewage lagoons generated as a product of the biological degradation of the organic matter and nutrients present in the wastewater is removed from the primary lagoons cells and transferred to the sludge lagoon for further stabilization and thickening.

General sludge management activities are required very infrequently. Historically 20 years may pass between sludge clean-out activities. In 2012, a temporary sludge bed was constructed adjacent to the sewage lagoons for sludge removed. The sludge was kept in a drying bed until testing allowed it to be used for cover at SWDF.

In accordance with the Sewage Disposal Facility Operations and Maintenance Plan, Water Licence MV2016L3-0001, a sludge survey was completed at the cells on June 27 and 28, 2023 by KBL Environmental.

## 2.0 METHODOLOGY

A sludge survey involves two steps: locating the top of the sludge layer and measuring its thickness at several locations in a lagoon.

The sludge survey was conducted from a boat on the lagoon. The sludge layer is generally a "mobile" fluid, but it may form peaks and valleys within the lagoon. Small lagoons, such as the Fort Providence Lagoon, seem to have more variation in sludge layer thickness. For this reason, at least eight depth measurements were taken for each cell of the lagoon in a uniform grid. Due to accessibility constraints, only two measurements were obtained from the two smallest cells, cells #1 and #2.



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The basic sludge survey approach measures the depth from the liquid surface to the top of the sludge layer and then measures the depth from the liquid surface to the lagoon bottom (soil contact); calculates the difference to obtain the thickness of the sludge layer.

A disk-on-rope ban was used for detecting the top of the sludge layer utilizing a disk that sinks through the liquid and settles on the sludge. The rope by which the disks are lowered into the lagoon were marked using metric measurements of 10 cm. The disk was lowered slowly to keep it from swaying off the vertical line. Holes should were drilled in the disk to allow liquid to pass through and reduce swaying. The rope was attached to the disk at the center or at 2 symmetrically placed locations to keep the disk more stable. The depth of the sludge layer was be measured with the disk before using a pole to measure the depth to the lagoon bottom because the pole may disturb the sludge layer.

The sludge survey points are included in Figure 2.

### 3.0 RESULTS

The results of the sludge survey are included in the table below.

Cell #	Average Sludge Thickness (m)	Sludge Volume (m3)	Percent of Total Volume Occupied by Sludge
1	0.075	46.98	5.87%
2	0.100	59.67	7.19%
3	0.319	1,152.54	18.29%
4	0.386	4,158.10	19.43%
5	0.189	844.24	5.86%
<b>Total</b>		6,261.53	14.3%

### 4.0 CLOSURE

This report was prepared by KBL Environmental Ltd. on behalf of the Hamlet of Fort Providence. The conclusions in this report were developed in a manner consistent with the level of skill normally exercised by professionals currently practicing under similar conditions and reflect KBL's best judgement based on information available at the time of preparation of this report. No other warranties, either expressed or implied are made as to the professional services included in this report.

Any use, reliance on, or decision made by a third party based on this report is the sole responsibility of this third party. KBL accepts no liability or responsibility for any damage that may be suffered or incurred by any third party as a result of the use of, reliance on, or any decision made based on this report.

Should you have any questions, please contact the undersigned at your convenience.

Sincerely,

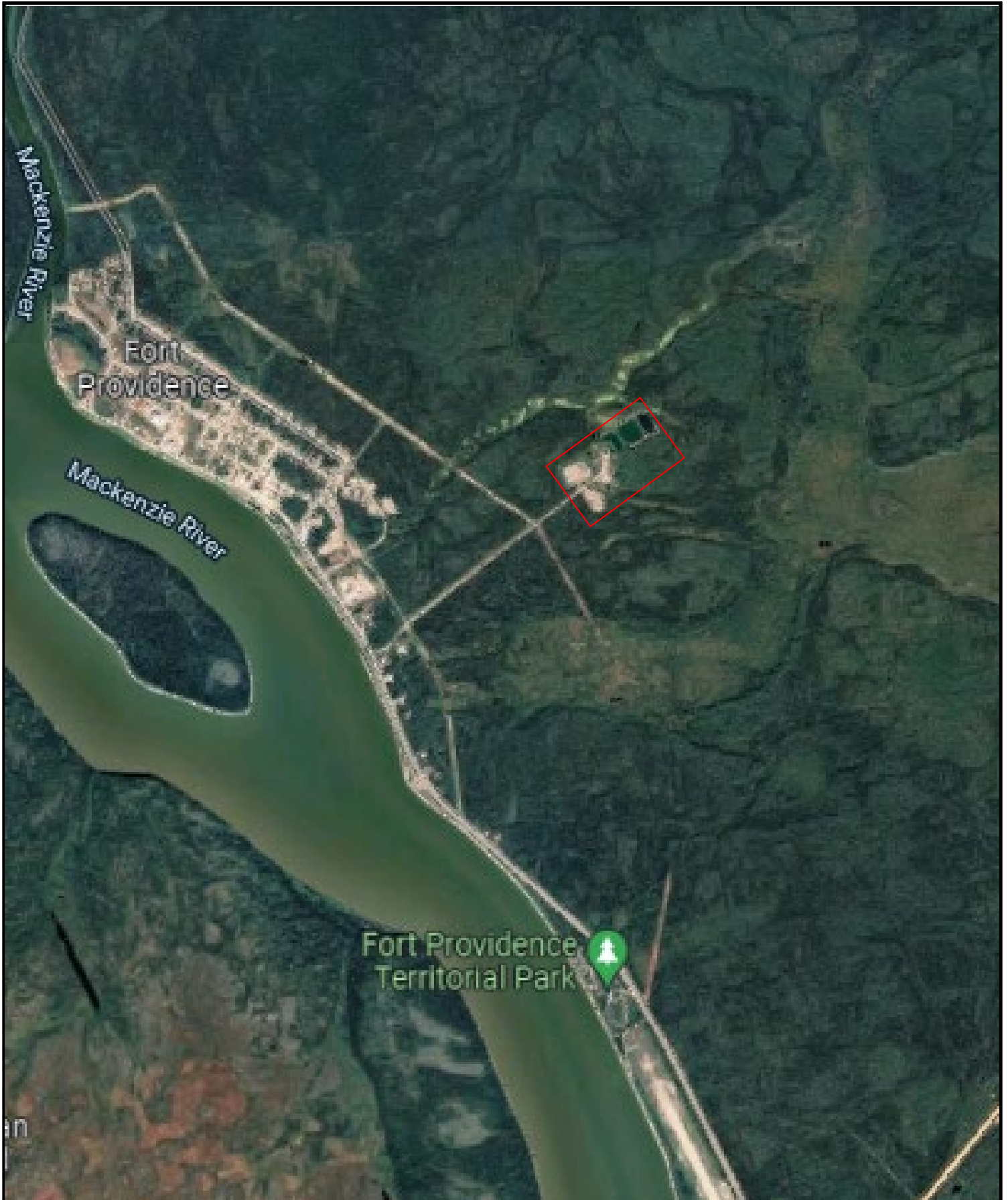


Katie Oliver, CEM PMP

General Manager, Environmental Consulting

**Attachments:**

Figures



Date: 2023-07-05



## SITE LOCATION MAP

Image Source: Google Maps

Figure #:

1



● Sludge Survey Points

