Trow

# Review of Wastewater Treatment Facility

## Pond Inlet, Nunavut

Prepared For:
Community Government Services
Government of Nunavut
P.O. Box 379
Pond Inlet, NU X0A 0S0

Trow Associates Inc.
100-2650 Queensview Drive
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**Project No: OTT-00020662-A0**
**Report date: January 21, 2011**

Trow

Since 1957

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January 21, 2011

Ref: OTT-00020662-A0

Mr. Patricio Fuentes
Community Government Services
Government of Nunavut
P.O. Box 379
Pond Inlet, NU X0A 0S0

**Review of Wastewater Treatment Facility**
**Pond Inlet, Nunavut**

Dear Mr. Fuentes:

We have completed a preliminary review of the Wastewater Treatment Facility located in Pond Inlet, Nunavut. This work was requested by the Department of Community and Government Services via an award letter dated October 15, 2010. The purpose of this project was to determine causes of water bubbling up close to the toe of the east berm and ponding of water close to the toe of the south berm at the east end. In addition, preliminary recommendations regarding remedial measures were also to be provided.

## 1.0 Background Information

The Wastewater Treatment Facility in Pond Inlet comprises of an irregularly shaped lagoon with overall equivalent dimensions of 300 m x 150 m.

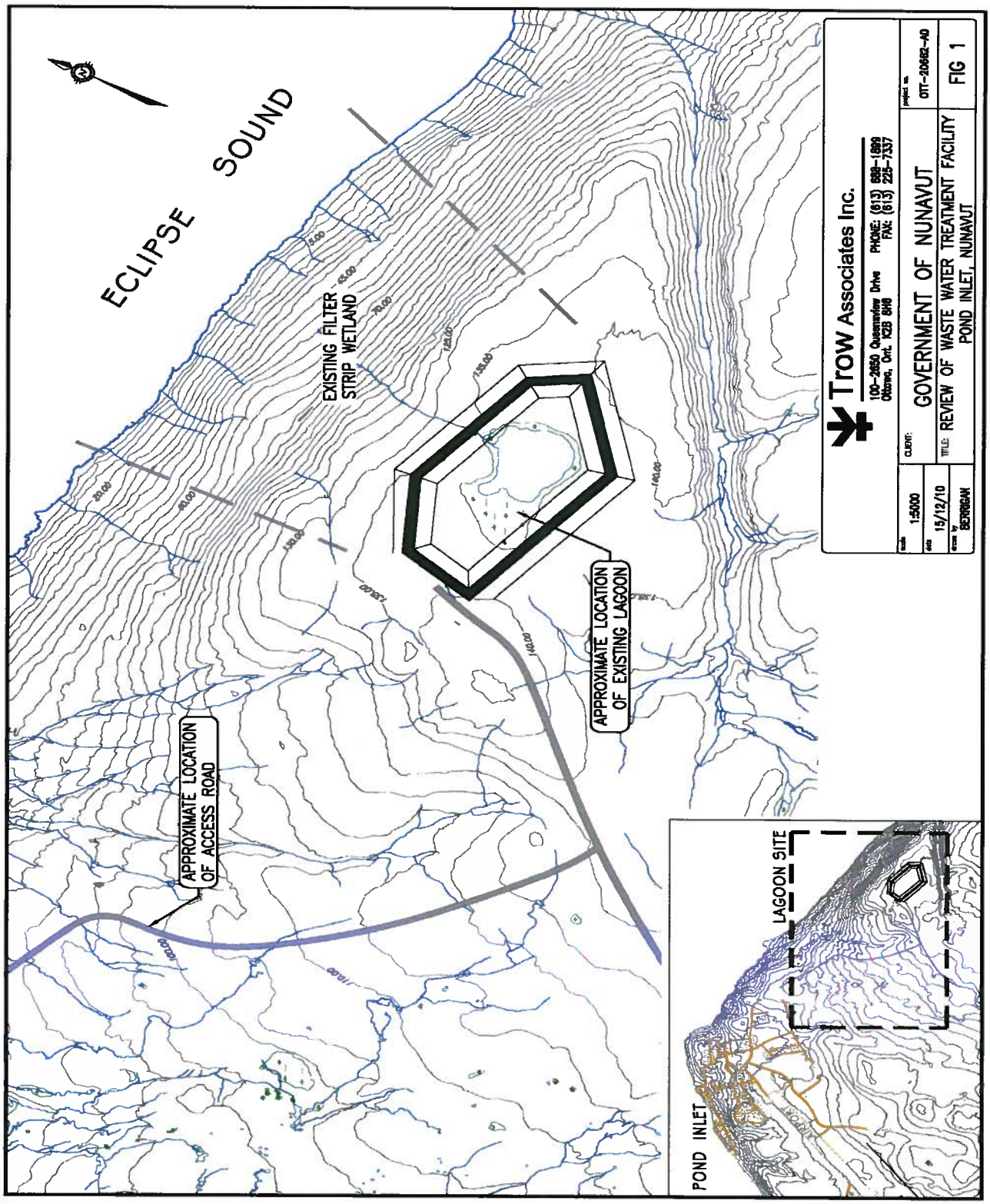
It is understood that the lagoon was built around 1993 and has experienced progressive problems since approximately 1995. The lagoon was rehabilitated in 2003/2004 by Mosher Engineering Ltd. of Halifax under the supervision of Dillon Consulting.

Available information indicates that the lagoon is located in a low spot with higher ground on the east, south and west sides. The site was previously a natural pond prior to the construction of the lagoon. The pond had an overflow to the north which drained to the Ocean (Figure 1). It is noted that prior to the 2003/2004 rehabilitation, ponding of the water immediately outside the east end of the south dyke was observed.

The 2003/2004 rehabilitation program required draining of the existing lagoon, placement of a sufficient thickness of granular material to stabilize the accumulated sludge, placement of 0.3 m thick layer of sand, a geocomposite clay liner (GCL) and 0.3 m of surficial sand layer on top of the liner. Recompaction of the north dyke and raising of all perimeter dykes was also part of the rehabilitation program.



Trow


ECLIPSE SOUND
EXISTING FILTER STRIP WETLAND
APPROXIMATE LOCATION OF ACCESS ROAD
APPROXIMATE LOCATION OF EXISTING LAGOON
POND INLET
LAGOON SITE
Trow Associates Inc.
100-2650 Queensview Drive Ottawa, Ont. K2B 8H6
PHONE: (613) 829-1899
FAX: (613) 225-7337
CLIENT: GOVERNMENT OF NUNAVUT
TITLE: REVIEW OF WASTE WATER TREATMENT FACILITY POND INLET, NUNAVUT
project no. OTT-20662-A0
FIG 1
scale 1:5000
date 15/12/10
drawn by BERRIGAN

Problems were encountered by the contractor during rehabilitation in obtaining a stable base. The contractor concluded that placement of 500 mm to 1000 mm of cobbly gravel and sand onto the existing lagoon base was necessary in order to obtain a firm base and that it was necessary to place this material in one lift and that this fill could not be compacted to the specified degree of compaction. The contractor also observed that the water that had accumulated adjacent to the lagoon at the south east corner disappeared when he pumped the water from the central portion of the lagoon indicating that there was a direct connection between the lagoon and the area outside of the lagoon. The contractor also reported that there was an inflow of water into the lagoon and that daily pumping was required to maintain the water level in the lagoon. Areas of water infiltration were recorded by contractor and are shown in Figure 2.

Golder Associates were consulted by Dillon Consulting to provide recommendations to facilitate rehabilitation of the lagoon. Golder Associates reviewed the geotechnical investigation report for the original construction of the lagoon prepared by Thurber Consultants and excavated some test pits at the site. Golder Associates concluded that preferential channels capable of carrying large flows of water could exist within the active layer of the permafrost. Golder Associates further concluded that water inflow problems would continue to prevail within localized areas of the pond base for remainder of the construction period. Golder Associates opined that the wet areas encountered in the pond base were due to the fact that the lagoon was built in a low lying area combined with natural pockets or tongues of high permeability material within the active layer of the permafrost and the lack of perimeter drains outside the pond.

Golder Associates supported the contractor's suggestion of adding French drains or ditches in specific areas within the pond. Golder Associates recommended that such drains should connect any wet zones occurring within the lagoon to the central low point of the basin. A similar drain or open ditch should then connect the pond central low point to the exterior topography north of the north dyke. The location of the subsurface drains installed as a result of the Golder recommendations are shown on Figure 3.

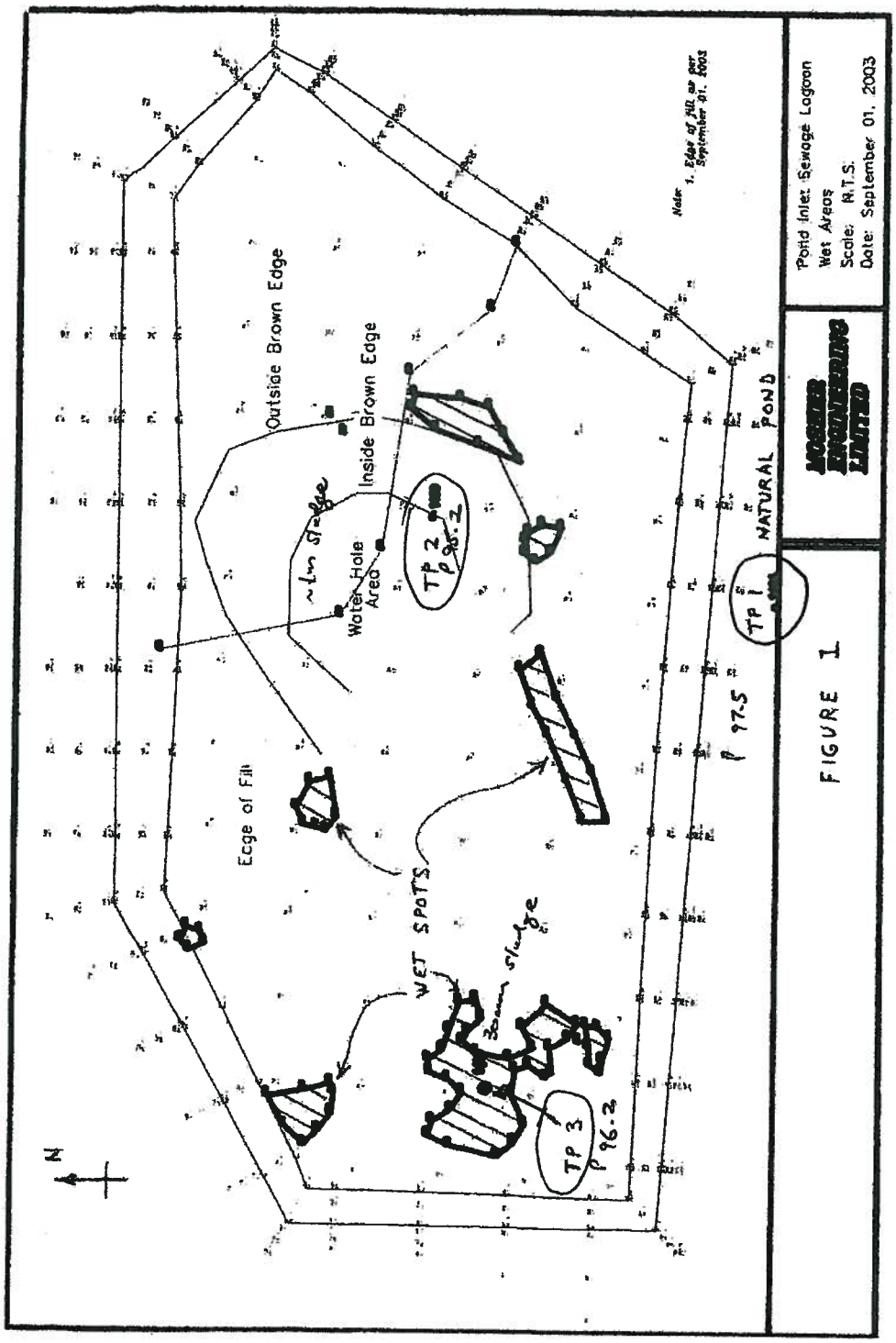



**Figure 2 - Areas of Water Infiltration**

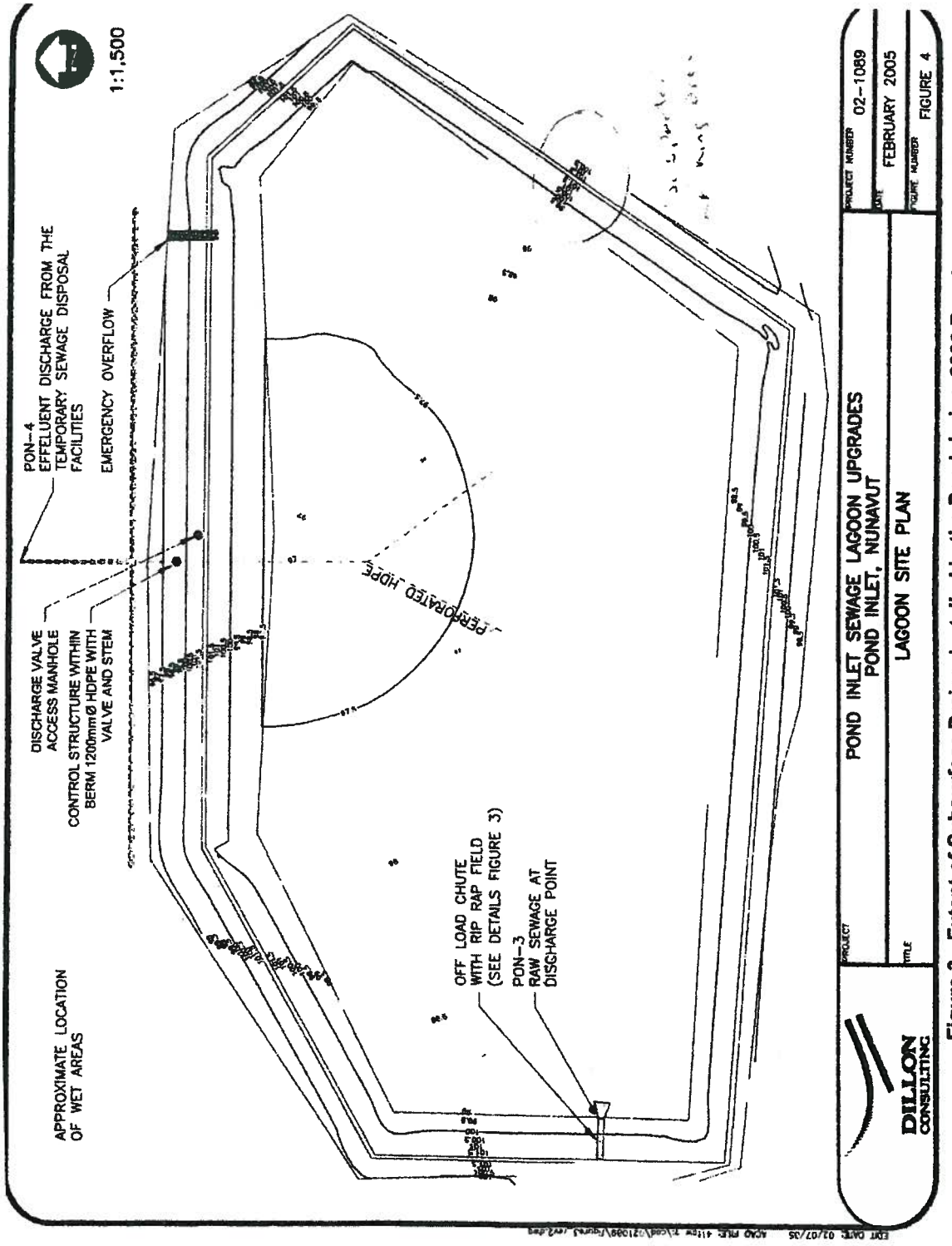



**Figure 3 - Extent of Subsurface Drains Installed in the Pond during 2003 Repairs**

## 2.0 Methodology

The work undertaken comprised of a review of the available information, site visit, meetings with representatives of Hamlet of Pond Inlet and representative of the Government of Nunavut in Pond Inlet and preparation of this preliminary report. The following documents were made available for this assignment.

(1) Pond Inlet, Nunavut Sewage Lagoon Upgrade and Expansion, Tender Drawings prepared by Ferguson, Simek, Clark (FSC);

(2) A site visit and recommendations report prepared by Golder Associates Reference 03-1221-310 dated September 10, 2003;

(3) Results of chemical tests on Wastewater from the lagoon and the vicinity sampled by Government of Nunavut and Environment Canada; and,

(4) Results of chemical tests on wastewater samples from the lagoon and the vicinity sampled by Hamlet of Nunavut.

In addition, the geotechnical investigation report prepared by Thurber Associates for the original construction of the lagoon was requested. However, we were informed that this document was not available.

## 3.0 Site Meeting

The site was visited by the writer on November 3, 2010. Meetings were held with representatives of Government of Nunavut. They indicted that the following observations have been made by them.

(1) Water was observed to bubble out of the ground close to the mid length of the east berm (see Figure 3, Photos 1 and 2) during decanting of the lagoon. This water then flows in the southerly direction (Photo 3) and ponds in a low lying area at the site (labelled as ditch on Figure 4, Photos 4 to 6). It is reported that the water stopped bubbling when the water level in the lagoon was lowered.

(2) The representatives also indicated that installation of the liner was suspect due to the following reasons:

   (a) Their observations indicated that the bottom of the lagoon at the north east corner was exposed during decanting of the lagoon. This area appeared to be original ground. A liner was not visible in this area.

   (b) It is reported that some 26 rolls of the liner were left over on completion of the lagoon. It is not known whether this was due to procuring greater quantity of the liner than was required or whether the liner was not installed over the entire lagoon area.

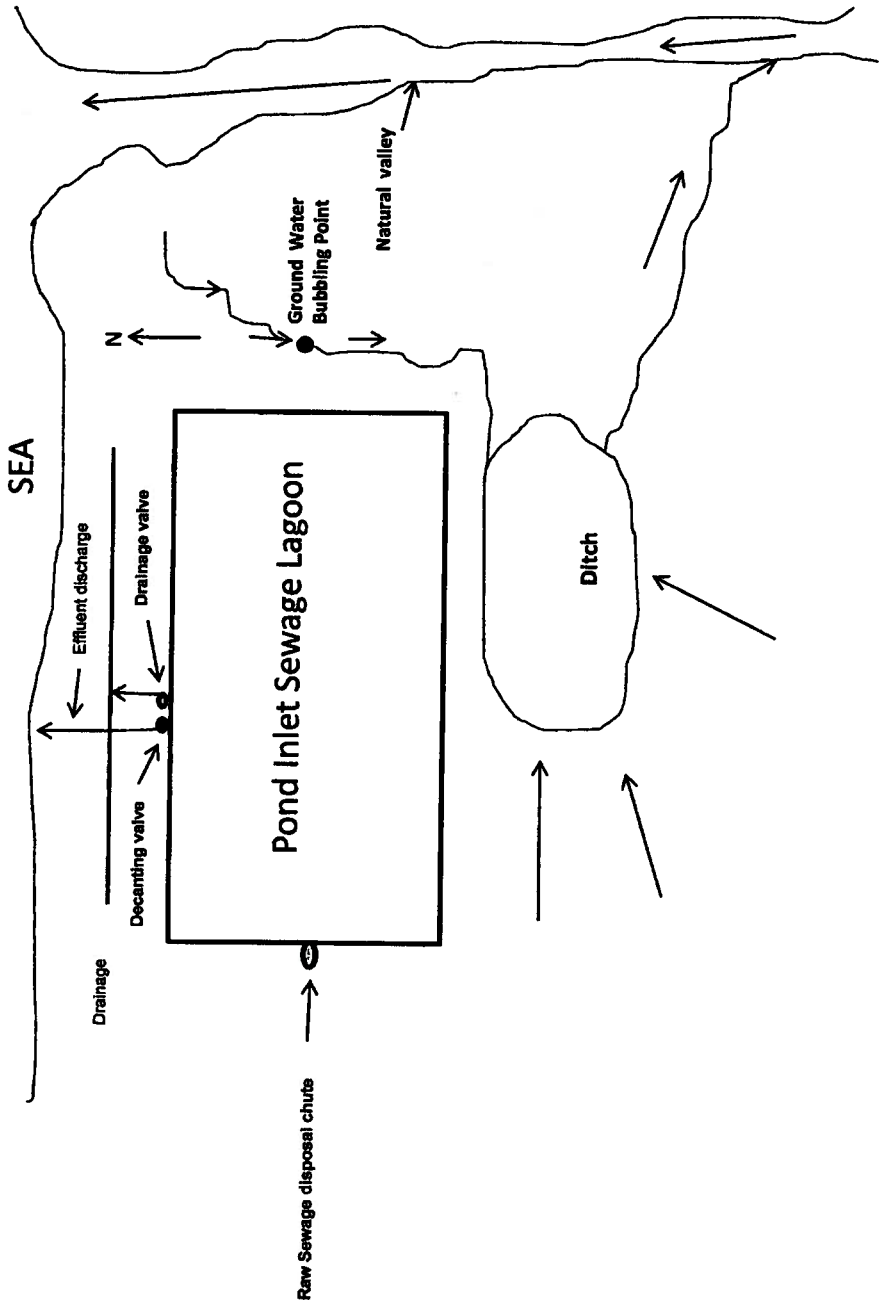



**Figure 4 - Location of Groundwater Bubbling Point and Ponded Water**

## 4.0 Meeting with Hamlet of Nunavut Representatives

A meeting was also held with Mr. Mike Richards, Senior Administrative Officer of the Hamlet of Nunavut. Mr. Richards indicated that in their opinion, the north berm was sliding. He indicated that they had observed that the surface of the north berm was undulating and that several ridges had formed. The locations where the Hamlet suspects downhill movement of the north berm are shown on Figure 5.

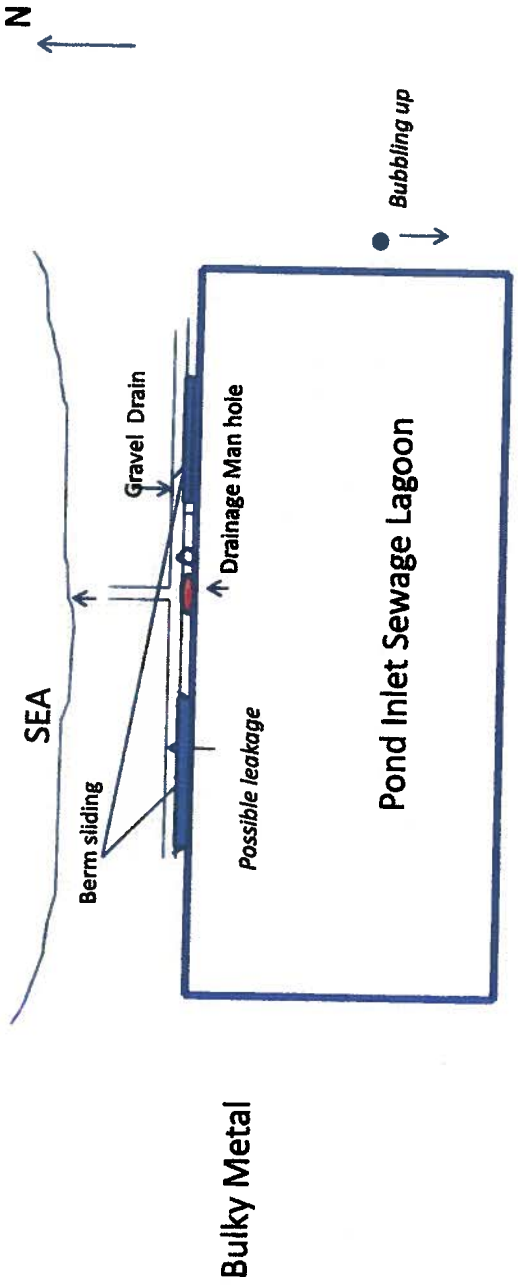



**Figure 5 - Locations of Berm Sliding Suspected by Hamlet of Pond Inlet**

## 5.0 Site Visit

The site was visited by the writer on November 3, 2010 in the company of Mr. Patricio Fuentes, Baffin Regional Projects Manager and Mr. Bhabesh Roy, P.Eng., Baffin Regional Planning Engineer. At the time of the visit, water level in the lagoon had been lowered and effluent was not being discharged from the lagoon. The site was snow covered. The reported bubbling of the water at the mid length of the east dyke was not visible at the time of the visit. This may have stopped due to lowering of the water level in the lagoon or due to surficial freezing of the ground. Ponded water was visible adjacent to the south east corner of the lagoon.

## 6.0 Review of Chemical Test Results of Water Samples

The Hamlet of Pond Inlet and the Government of Nunavut have been obtaining water samples from the site and having them tested. The location from where the water samples were obtained are shown on Figure 5 and have been described below:

| Location Designation # | Location Description |
|---|---|
| 1 | Location of water bubbling out of the ground adjacent to east berm |
| 2 | Lagoon effluent |
| 3 | Water ponding adjacent to the south berm |

The results of the chemical tests on water samples were made available to Trow to assist in determination of the source of water bubbling. These results have been summarized on Table I. The laboratory test results have been included in Appendix 'A'.

**Table I – Results of Chemical Tests on Water Samples**

| Sampling Date | Location of Water Samples | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Sewage Lagoon (Location #2) | | | Bubbling Point (Location #1) | | | Ponded Water South of South Berm (Location #3) | | |
| | BOD | TDS | E Coli | BOD | TDS | E Coli | BOD | TDS | E Coli |
| Oct 12/07 | | | >200,000 | | | <10 | | | |
| Aug 9/09 | 103 | 48 | | 78 | 112 | | 6 | 17 | |
| Oct 9/09 | 56 | 40 | | | | | | | |
| Aug 12/10 | 120 | 44 | 126,000 | 112 | 37 | 2300 | 66 | 18 | 800 |

A review of Table I indicates that samples from the three locations under consideration were taken on August 9, 2009 and on August 12, 2010. The samples collected in 2009 were tested for Biochemical Oxygen Demand ($BOD_5$) and Total Dissolved Solids (TDS) whereas the samples obtained in 2010 were tested for $BOD_5$, TDS and E Coli. It is noted that generally the concentration of $BOD_5$, TDS and E Coli in the effluent decreases from the lagoon to the point where the water bubbling up from the ground was observed to the location where the water ponds south of the lagoon. The exception to this is the one TDS sample obtained from the bubbling point which contained a higher concentration of TDS compared to the effluent from the lagoon.

Considering that the E Coli count in the ponded water was 800 cfu/100 ml, would tend to indicate that this water may be the effluent that leaked from the lagoon. However, it is noted that a dump site is located upstream of the ponded water. Therefore, it is possible that the ponded water may have been affected by runoff from the dump site which may also contain E Coli. Therefore, it was not possible to draw conclusions as to whether the ponded water south of the south berm was water from under the lagoon or the leachate from the lagoon.

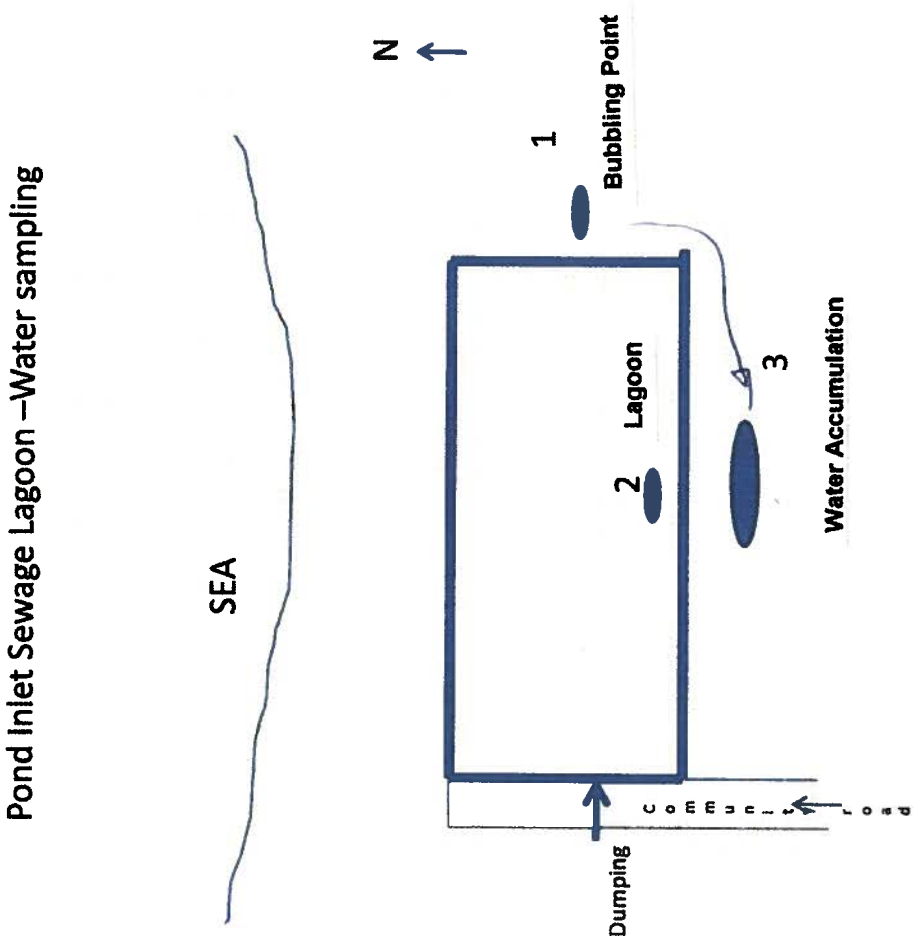



**Figure 6 - Effluent Sampling Locations**

## 7.0 Complete Chemical Analyses of Effluent

In addition to the above test results, results of complete chemical analysis performed on samples obtained from the site by Environment Canada and Government of Nunavut in 2009 were made available to Trow. These results have also been included in Appendix 'B'.

An attempt was made to compare some of the elements in the effluent (Table II).

**Table II – Comparison of Chemical Test Results Undertaken by Environment Canada and Government of Nunavut**

| Parameter | Influent Sampled by Environment Canada on September 14 & 18, 2009 | Effluent Sampled by Government of Nunavut on July 13, 2009 | |
|---|---|---|---|
| | From Lagoon | From Lagoon | Leachate |
| Chloride | 65.13 | 19.0 | 21.4 |
| Sulphate | 3.197 | 3 | 32 |
| Silver ug/litre | 0.39 | <0.1 | 0.1 |
| Aluminum ug/litre | 274 | 70 | 77 |
| Barium ug/litre | 5.96 | 34.6 | 68.4 |
| Calcium ug/litre | 0.076 | 0.5 | 1.7 |
| Copper ug/litre | 66.43 | 6.0 | 8.9 |
| Manganese ug/litre | 103.33 | 164 | 44.4 |
| Nickel ug/litre | 5.327 | 5.8 | 3.6 |
| Lead ug/litre | 1.16 | 168 | 503 |
| Potassium ug/litre | 24.6 | 32 | 4.8 |
| Titanium ug/litre | 14.5 | 3.1 | 7.9 |
| Zinc ug/litre | 48 | 6.0 | 129 |
| Chlorides | 65.13 | 19.0 | 21.4 |
| Sulphates | 3.197 | 3 | 32 |
| Ammonia | 80.5 | 1.0 | 0.02 |

It is noted that Environment Canada obtained samples of the sewage as it was discharged into the lagoon (i.e. influent, raw sewage), effluent samples as it was being discharge from the lagoon and from the wetland. The Government of Nunavut tested effluent samples and leachate samples. The Government of Nunavut did not indicate the locations from where the samples were obtained. It has been assumed that the effluent samples were from the sewage lagoon where as the leachate samples are of the effluent that was leaking out of the east berms of the lagoon. It can be seen that the sampling locations by Environment Canada and Government of Nunavut were different. In addition, it is likely that Government of Nunavut obtained samples from the lagoon prior to decanting of the lagoon in 2009. Environment Canada may have obtained the samples subsequent to the annual decanting of the lagoon. Consequently, it was not possible to draw any meanful conclusions by comparison of the test results of sampling undertaken by Environment Canada and Government of Nunavut representatives.

## 8.0 Discussion

At the time of the visit, the site was snow covered. In addition, bubbling up of the water at mid length of the east berm had stopped since the lagoon had been decanted. It is understood that the discharge of the waste into the lagoon was resumed only one or two weeks prior to our visit. However, ponding of the water in the south east corner of the lagoon was visible.

The comments and recommendations provided in this report are preliminary and would need to be confirmed by undertaking additional fieldwork during the summer of 2011. The reason for this is that the source of the leakage could not be positively established. It was proposed that the subsurface drainage valve which is currently frozen should be opened in the summer of 2011 to drain any subsurface water that may have accumulated under the liner. It was proposed that on opening the drainage valve, if the bubbling of the water close to the toe of the east berm ceases, it would indicate that the lagoon is not leaking and that the bubbling was caused by artesian pressure. If the bubbling does not stop, it would indicate that the liner is leaking. However, it is considered that once the subsurface drainage valve is opened, the bubbling is expected to stop irrespective of whether the liner is leaking or not. The reason for this is that once the drainage valve is opened, the preferred flow path will be in the direction of the down gradient to the ocean. It is therefore considered that there is no positive way of establishing whether the liner is leaking unless the liner is physically examined.

It is considered that irrespective of the whether the lagoon is currently leaking or not, remedial action would be required. Subsurface seepage of water under the berms whether the source of the water is leakage from the lagoon or subsurface water that has accumulated under the liner is not desirable. Long term continued flow of subsurface water may result in piping of the soil and undermining of the berms and their eventual failure. In addition, continuous flow of subsurface water would degrade the permafrost under the lagoon as well as the berms. This would be accompanied by settlements of the berms as well as of the lagoon bottom. Differential settlements may result in separation of the liner at the joints. It is noted that GLC liner joints are made by merely overlapping 300 mm of the liner with placement of bentonite between the two layers. As a result, this type of joint construction is more vulnerable to opening due to settlement etc. than is the case of a liner with welded joints.

## 9.0 Remedial Measures

It is considered that there are a number of remedial measures available. These include:

(1) Making the lagoon impervious by permanently freezing the berms and the underlying active layer;

(2) Installing liner in the berms which is anchored into the permafrost below the active layer;

(3) Constructing a new lagoon and abandoning the existing lagoon; and,

(4) Doing nothing.

A brief discussion of each option is provided below.

### 9.1 Making the Lagoon Impervious by Permanently Freezing the Berms

Consideration may be given to making the berms of the lagoon and the underlying active layer impervious by permanently freezing them which would prevent seepage out of the berms as well as subsurface flow of water under the berms. As a result, neither the effluent from the lagoon will leak nor will there by any subsurface flow of water under the lagoon which may infiltrate into the lagoon. This may be achieved by installation of thermosyphons to maintain the berms and the soil underneath in a

continuously frozen state. A geothermal analysis would be required to assess the feasibility of this option.

### 9.2 Making the Lagoon Impervious by Installation of Liner in the Berms

Alternatively, the berms and the active layer may be rendered impervious by the installation of a suitable liner such as Geosynthetic Clay Liner, High Density Polyethylene (HDPE) etc. which is keyed into the permafrost below the active layer.

A geothermal analysis would be required for this option as well to assess its feasibility and make appropriate recommendations.

### 9.3 Construct New Lagoon

Alternatively, a properly engineered new lagoon may be constructed at a suitable site. This lagoon would have to be designed to prevent seepage out of the lagoon since the on-site soils that would be available for construction of the lagoons are expected to be permeable. A geothermal analysis would be required in this case as well.

### 9.4 Do Nothing

The 4$^{th}$ option is to do nothing. However, this option is not recommended since the problems currently being experienced with the lagoon are likely to become worse with time. Long term flow of water under the lagoons will degrade the permafrost, resulting in settlements of the berms and the lagoon, opening of the joints and increase seepage out of the lagoons. This may eventually results in failure of the berms.

## 10.0 Sliding of North Berm

At the time of the site visit, the berm was snow covered and the ground had frozen. Therefore, it was not possible to observe any undulations in the north berm or observe any other signs of movement of the berms, such as development of any tension cracks close to the crest of the berm, sloughing of the slope etc.

The slope is currently frozen and likely will remain so until the late spring or early summer of next year. It is recommended that this slope should be examined once the ground thaws to look for any signs of potential movement of the berms.

It is noted that potential does exist for movement of the north berm due to the following reasons:

(1) The north berm has been constructed on sloping ground and would therefore be more vulnerable compared to a berm constructed on level ground.

(2) The subsurface drainage at the site is towards the north from the higher ground to the south of the lagoon. Flow of subsurface water would degrade the permafrost resulting in settlements and possibly lateral movement of the north berm.

(3) The drainage ditch located north of the north berm drains surface runoff from higher ground to the south, east and west. It is therefore possible that the flow of water in this ditch may contribute to further deterioration of the permafrost. Deterioration of the permafrost close to the toe of the berm may result in instability of the berm.

## 11.0 Review of Subsurface Drains

A review of the subsurface drains installed under the lagoon during the 2003/2004 remediation program was undertaken. The review indicated that the subsurface drains do not link (or drain) all the areas where seepage of water in the bottom of the lagoon was observed by the contractor.

In addition, it is noted that drainage ditches should have been provided along the south, east and west lagoon berms in order to adequately drain any surface runoff from the surrounding higher areas. The ditches should have been lined with a geomembrane such as polyvinyl chloride (PVC), Polypropylene or High Density Polyethylene (HDPE). Lining of the ditches will prevent seepage of water in the ground which may lead to deterioration of the permafrost and associated problems.

It is recommended that the drainage ditch located north of the north berm should also be lined to prevent seepage of water into the underlying soil which may degrade the permafrost.

We trust the information contained in this letter is satisfactory for your purposes. Should you have any questions, please contact this office.

Yours truly,

**Trow Associates Inc.**

REGISTERED PROFESSIONAL ENGINEER
Jan 21/11
S.K. AGGARWAL
LICENSEE

Surinder K. Aggarwal, M.Sc., P.Eng.
Senior Project Manager
Earth and Environment

Ismail M. Taki, M.Eng., P.Eng.
Manager, Geotechnical Services
Earth and Environment

# Photographs

Photo #1

Water seepage under east berm close to north end of the berm.

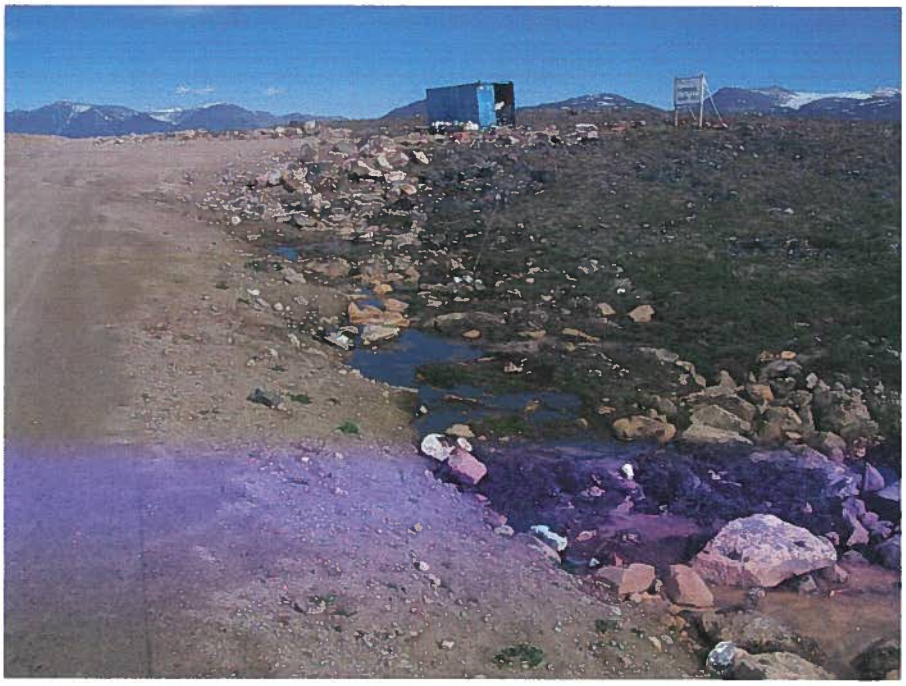


Photo #2

Water seepage under east berm of the lagoon.

Photo #3

Water flowing along the south berm to the ponded area.

Photo #4

Water ponding south of the south berm close to the east end of the berm.

Photo #5

Another view of water ponding adjacent to the south berm.

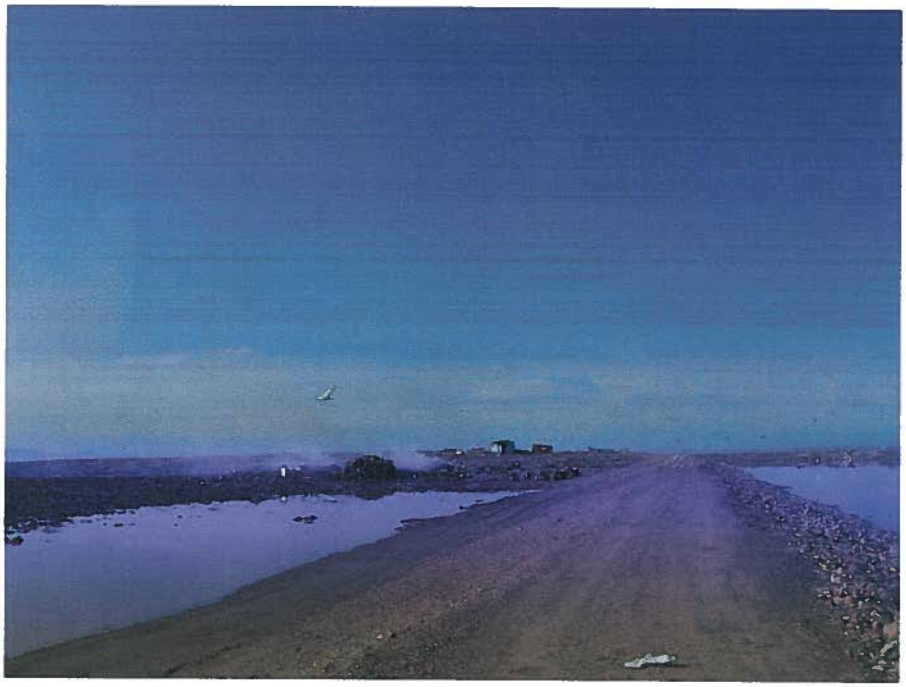


Photo #6

Ponded water south of south berm of the lagoon.

# Appendix A

CADUCEON™ ENVIRONMENTAL LABORATORIES

# CERTIFICATE OF ANALYSIS

Preliminary Report

**C.O.C.:** ---

**REPORT No. B07-31475**


**Report To:**

**Hamlet of Pond Inlet**
P.O Box 379
Pond Inlet, Nunavut, X0A 0S0
**Attention:** Bhabesh Roy

**Caduceon Environmental Laboratories**
2378 Holly Lane
Ottawa, Ontario, K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244


DATE RECEIVED: 12-Oct-07
DATE REPORTED: 15-Oct-07
SAMPLE MATRIX: Water

JOB/PROJECT NO.:
P.O. NUMBER:
WATERWORKS NO.

| | Parameter: | | Total Coliform | E coli | | | |
|---|---|---|---|---|---|---|---|
| | Units: | | cts/100mL | cts/100mL | | | |
| | M.D.L.: | | 1 | 1 | | | |
| | Reference Method: | | MOE E3371 | MOE E3371 | | | |
| | Date Analyzed: | | 12-Oct-07 | 12-Oct-07 | | | |
| **Client I.D.** | **Sample I.D.** | **Date Collected** | | | | | |
| Lagoon Raw Water | B07-31475-1 | | > 200000 | > 200000 | | | |
| Leakage Water | B07-31475-2 | | 53000 | < 10 [1] | | | |
| Fresh Water from Water Reservoir | B07-31475-3 | | 5 | < 1 | | | |
| Treated Water from Supply Line | B07-31475-4 | | 1 | < 1 | | | |

1. Diluted due to matrix interference

Gord Murphy
Lab Supervisor

M.D.L. = Method Detection Limit

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# CERTIFICATE OF ANALYSIS

## Final Report

**C.O.C.: ---**

**REPORT No. B08-35297**

**Report To:**

**Hamlet of Pond Inlet**
P.O Box 379
Pond Inlet, Nunavut, X0A 0S0
**Attention:** Jonah Koonark

**Caduceon Environmental Laboratories**
2378 Holly Lane
Ottawa, Ontario, K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 22-Oct-08
DATE REPORTED: 27-Oct-08
SAMPLE MATRIX: Water

JOB/PROJECT NO.:
P.O. NUMBER:
WATERWORKS NO.

| | | | Client I.D.: | | Beach Sample | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Sample I.D.: | | B08-35297-1 | | | |
| | | | Date Collected: | | | | | |
| **Parameter** | **Units** | **M.D.L.** | **Reference Method** | **Date/Site Analyzed** | | | | |
| Total Suspended Solids | mg/L | 3 | SM 2540 | 23-Oct-08/O | 36 | | | |
| BOD | mg/L | 3 | SM 5210 | 22-Oct-08/O | 67 | | | |

Gord Murphy
Lab Supervisor

M.D.L. = Method Detection Limit
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,P-Peterborough,M-Moncton

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# CERTIFICATE OF ANALYSIS

## Final Report

**C.O.C.: C18408**

**REPORT No. B09-30931**

**Report To:**
**Hamlet of Pond Inlet**
P.O Box 379
Pond Inlet, Nunavut, X0A 0S0
**Attention:** Jonah Koonark

**Caduceon Environmental Laboratories**
2378 Holly Lane
Ottawa, Ontario, K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 02-Oct-09
DATE REPORTED: 07-Oct-09
SAMPLE MATRIX: Waste Water

JOB/PROJECT NO.:
P.O. NUMBER:
WATERWORKS NO.

| | Parameter: | | Oil and Grease-Anim/Veg. | Oil and Grease-Mineral | Oil & Grease-Total | | |
|---|---|---|---|---|---|---|---|
| | Units: | | mg/L | mg/L | mg/L | | |
| | M.D.L.: | | 1.0 | 1.0 | 1.0 | | |
| | Reference Method: | | SM 5520 | SM 5520 | SM 5520 | | |
| | Date/Site Analyzed: | | 07-Oct-09/K | 07-Oct-09/K | 07-Oct-09/K | | |
| **Client I.D.** | **Sample I.D.** | **Date Collected** | | | | | |
| Dump Site | B09-30931-1 | 30-Sep-09 | 39.6 | 2.9 | 42.5 | | |
| #2 Middle | B09-30931-2 | 30-Sep-09 | 4.0 | < 1.0 | 4.3 | | |

K. Pipin

Krystyna Pipin , M. Sc.
Lab Supervisor

M.D.L. = Method Detection Limit
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,P-Peterborough,M-Moncton

CADUCEON™ ENVIRONMENTAL LABORATORIES
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# CERTIFICATE OF ANALYSIS

Final Report

**C.O.C.: C18494**

**REPORT No. B09-32860**

**Report To:**

**Hamlet of Pond Inlet**
P.O Box 379
Pond Inlet, Nunavut, X0A 0S0
**Attention:** Jonah Koonark

**Caduceon Environmental Laboratories**
2378 Holly Lane
Ottawa, Ontario, K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 20-Oct-09
DATE REPORTED: 26-Oct-09
SAMPLE MATRIX: Waste Water

JOB/PROJECT NO.:
P.O. NUMBER:
WATERWORKS NO.

| | Client I.D.: | | Dumping Site | Sewage Lagoon | | |
|---|---|---|---|---|---|---|
| | Sample I.D.: | | B09-32860-1 | B09-32860-2 | | |
| | Date Collected: | | 09-Oct-09 | 09-Oct-09 | | |
| Parameter | Reference Method | Date/Site Analyzed | | | | |
| BOD | SM 5210 | 21-Oct-09/O | 276 | 56 | | |
| Total Suspended Solids | SM 2540 | 24-Oct-09/O | 170 | 40 | | |

| Parameter | Units | M.D.L. |
|---|---|---|
| BOD | mg/L | 3 |
| Total Suspended Solids | mg/L | 3 |

Gord Murphy
Lab Supervisor

M.D.L. = Method Detection Limit
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,P-Peterborough,M-Moncton

CADUCEON™ ENVIRONMENTAL LABORATORIES

# CERTIFICATE OF ANALYSIS

Final Report

**C.O.C.:** —

**REPORT No. B07-34682**


**Report To:**

**Hamlet of Pond Inlet**
P.O Box 379
Pond Inlet, Nunavut, X0A 0S0
**Attention:** Jonah Koonark

**Caduceon Environmental Laboratories**
2378 Holly Lane
Ottawa, Ontario, K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244


DATE RECEIVED: 12-Nov-07
DATE REPORTED: 20-Nov-07
SAMPLE MATRIX: Water

JOB/PROJECT NO.:
P.O. NUMBER:
WATERWORKS NO.

| | | | Client I.D.: | | Truck Dumping Place | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Sample I.D.: | | B07-34682-1 | | | |
| | | | Date Collected: | | | | | |
| **Parameter** | **Units** | **M.D.L.** | **Reference Method** | **Date Analyzed** | | | | |
| Total Suspended Solids | mg/L | 3 | SM 2540 | 18-Nov-07 | 180 | | | |
| BOD | mg/L | 3 | SM 5210 | 13-Nov-07 | 427 | | | |

Gord Murphy
Lab Supervisor

M.D.L. = Method Detection Limit

CADUCEON ENVIRONMENTAL LABORATORIES
*Client committed. Quality assured.*

# CERTIFICATE OF ANALYSIS

## Final Report

**C.O.C.: C17339**

**REPORT No. B09-25910**

**Report To:**

**Hamlet of Pond Inlet**
P.O Box 379
Pond Inlet, Nunavut, X0A 0S0
**Attention:** Jonah Koonark

**Caduceon Environmental Laboratories**
2378 Holly Lane
Ottawa, Ontario, K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 21-Aug-09
DATE REPORTED: 27-Aug-09
SAMPLE MATRIX: Waste Water

JOB/PROJECT NO.:
P.O. NUMBER:
WATERWORKS NO.

| Parameter: | | | BOD | Total Suspended Solids | | | |
|---|---|---|---|---|---|---|---|
| Units: | | | mg/L | mg/L | | | |
| M.D.L.: | | | 3 | 3 | | | |
| Reference Method: | | | SM 5210 | SM 2540 | | | |
| Date/Site Analyzed: | | | 22-Aug-09/O | 23-Aug-09/O | | | |
| **Client I.D.** | **Sample I.D.** | **Date Collected** | | | | | |
| Sewage Lagoon | B09-25910-1 | 19-Aug-09 | 103 | 48 | | | |
| Bubling, Sewage Lagoon | B09-25910-2 | 19-Aug-09 | 78 | 112 | | | |
| Leaking, Sewage Lagoon | B09-25910-3 | 19-Aug-09 | 6 | 17 | | | |

Gord Murphy
Lab Supervisor

M.D.L. = Method Detection Limit
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,P-Peterborough,M-Moncton

CADUCEON™ ENVIRONMENTAL LABORATORIES
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# CERTIFICATE OF ANALYSIS

Final Report

**C.O.C.: ---**

**REPORT No. B09-32686**

**Report To:**

**Hamlet of Pond Inlet**
P.O Box 379
Pond Inlet, Nunavut, X0A 0S0
**Attention:** Jonah Koonark

**Caduceon Environmental Laboratories**
2378 Holly Lane
Ottawa, Ontario, K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 19-Oct-09
DATE REPORTED: 26-Oct-09
SAMPLE MATRIX: Water

JOB/PROJECT NO.:
P.O. NUMBER:
WATERWORKS NO.

| | | | Client I.D.: | | Middle of Beach and Land | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Sample I.D.: | | B09-32686-1 | | | |
| | | | Date Collected: | | 30-Sep-09 | | | |
| **Parameter** | **Units** | **M.D.L.** | **Reference Method** | **Date/Site Analyzed** | | | | |
| BOD | mg/L | 3 | SM 5210 | 21-Oct-09/O | 14 | | | |
| Total Suspended Solids | mg/L | 3 | SM 2540 | 22-Oct-09/O | 18 | | | |

Gord Murphy
Lab Supervisor

M.D.L. = Method Detection Limit
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,P-Peterborough,M-Moncton

CADUCEON™ ENVIRONMENTAL LABORATORIES
*Client committed. Quality assured.*

# CERTIFICATE OF ANALYSIS

## Final Report

**C.O.C.: G07429**

**REPORT No. B10-23686**

**Report To:**

**Hamlet of Pond Inlet**
P.O Box 379,
Pond Inlet Nunavut X0A 0S0 Canada
**Attention:** Bhabesh Roy

**Caduceon Environmental Laboratories**
2378 Holly Lane
Ottawa Ontario K1V 7P1
Tel: 613-526-0123
Fax: 613-526-1244

DATE RECEIVED: 12-Aug-10
DATE REPORTED: 18-Aug-10
SAMPLE MATRIX: Water

JOB/PROJECT NO.: Pond Inlet Sewage Lagoon
P.O. NUMBER:
WATERWORKS NO.

| | | | Client I.D. | | Outside the Lagoon (Eastern) | Inside the Lagoon | Outside the Lagoon (Southern) | |
|---|---|---|---|---|---|---|---|---|
| | | | Sample I.D. | | B10-23686-1 | B10-23686-2 | B10-23686-3 | |
| | | | Date Collected | | 10 Aug 2010 | 10 Aug 2010 | 10 Aug 2010 | |
| Parameter | Units | M.D.L. | Reference Method | Date/Site Analyzed | | | | |
| BOD | mg/L | 3 | SM 5210 | 13-Aug-10/O | 112 | 120 | 66 | |
| Total Suspended Solids | mg/L | 3 | SM 2540 | 14-Aug-10/O | 37 | 44 | 18 | |
| E coli | cfu/100ml | 1 | MOE E3371 | 12-Aug-10/O | 2300 | 126000 | 800 | |

Gord Murphy
Lab Supervisor

M.D.L. = Method Detection Limit
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,P-Peterborough,M-Moncton

From: Rob Jamieson [mailto:JAMIESRC@Dal.Ca]
Sent: Monday, September 27, 2010 9:29 AM
To: Lam, Bu
Subject: Re: FW: Pond Inlet sampling

Hi Bu,
Things are fine here. How was the conference?

The average concentration of E.coli in the toe seepage was 8 x 10^3 CFU/100 mL

The average concentration of E.coli in the lagoon was 2 x 10^5 CFU/100 mL

So, there was only about one order of magnitude difference between the lagoon and the toe seepage.

I heard that you guys have a little fire in Iqaluit...

Rob

# Appendix B

# WASTEWATER SAMPLING IN POND INLET SEWAGE LAGOON

## BURLINGTON RESEARCH CENTRE, ENVIRONMENT CANADA

## 2009

Environmental Protection Operations (EPO)
5019- 52nd Street, 4th Floor
P.O. Box 2310
Yellowknife, NT X1A 2P7


February 15, 2010

Hamlet of Pond Inlet
P.O. Box 180
Pond Inlet, NU X0A 0S0

Email: hamletpond_sao@qiniq.com

Attention: Mike Richards, Senior Administrative Officer

**Re: Water Sample Results from Wastewater System**

Following Environment Canada's visit to Pond Inlet in September of 2009, please find enclosed the lab results from the water quality samples we collected. The purpose of our site visit to Pond Inlet was to gather information on the community's wastewater system. The details of Pond Inlet's wastewater system will be used for research to assess the performance of lagoons and wetlands in the treatment of municipal wastewater in Canada's Far North.

You may be aware that the Canadian Council of Ministers of the Environment (CCME) endorsed the Canada-wide Strategy for the Management of Municipal Wastewater Effluent on February 17, 2009. The CCME Strategy sets out a harmonized framework to manage the discharges from wastewater facilities in Canada, many of which are currently in need of repair and upgrading.

Due to the climactic conditions in Canada's Far North, the CCME Strategy has established a period of up to 5 years to undertake research into factors that affect performance of wastewater treatment facilities in northern conditions. Environment Canada's principal instruments to implement the CCME Strategy are regulations under the Fisheries Act, as outlined in Environment Canada's Proposed Regulatory Framework (October 2007). Following the research on factors affecting performance of northern systems, Environment Canada is planning to amend the regulations to include the North.

We thank you, Jonah Terry and the sewage truck drivers for the assistance you provided while we were in the community. In the spirit of increasing our collaborative understanding of northern wastewater systems, the information and sample data collected throughout this field research would be shared with several organizations, including Indian and Northern Affairs Canada, water boards and various territorial government departments. If you have any further questions or comments, please do not hesitate to contact me at (905) 319-7201 or jane.challen-urbanic@ec.gc.ca

Yours truly,

Jane Challen-Urbanic
Process Development Engineer

Enclosed:
Community report
Laboratory report

Pond Inlet, Lagoon Sampling

Pond Inlet is located on the shores of north Baffin Island, Nunavut at UTM 18N 401759 E, 8069408 N. Pond Inlet employs a single cell, engineered wastewater lagoon which has been in use for seven years since 2003. This wastewater lagoon services a population of approximately 1315 people. All of the sewage generated in Pond Inlet is trucked to the sewage lagoon (rather than piped) and the lagoon discharges annually in the fall. Wastewater effluent exiting the lagoon is further treated by a small wetland which discharges into Eclipse Bay.

Sampling of Pond Inlet's sewage lagoon occurred over several days during late September of 2009. Samples were collected of various forms of wastewater from various locations including:

1. *Raw sewage influent* deposited into the lagoon via a sewage truck at UTM 18N 403967mE, 8068960mN. Influent samples were collected as grab samples directly from the outlet pipe of the truck while the sewage truck was dumping. Each influent sample was collected from a different truck load of sewage. These collections took place three times on September 14 and once on September 18.

2. *Treated wastewater effluent* exiting the lagoon. Effluent samples were collected using an automated sampler which took samples every hour over a 24h period. The hourly samples were combined into two sample sets. Three-hour composite samples ($Effluent_{3h}$) were produced by combining 3 consecutive hourly samples, for a total of 8 samples over a 24h period. $Effluent_{24h}$ (24-hour composite) samples were produced by combining all of the samples taken over a 24-hour period (See **Figure 1** for a diagram demonstrating effluent sampling). Both sets of samples were analyzed for water quality. Both $Effluent_{24h}$ and $Effluent_{3h}$ were collected on three separate days- September 15, 17 and 18th. Effluent sampling took place at UTM 18N 404240E, 8069047N.

3. *Further (wetland) treated effluent* from locations along the wetland course at UTM 18N 402993mE, 8071798mN. Ten samples were collected from the wetland site on September 13th.

4. *In-situ water samples* taken directly from the lagoon. In-situ water sample were collected using an automated sampler which took samples every hour over a 15h period. The hourly samples were combined into two sample sets. Three-hour composite samples ($Effluent_{3h}$) were produced by combining 3 consecutive hourly samples, for a total of 5 samples over a 24h period. $Effluent_{24h}$ (15-hour composite) samples were produced by combining all of the samples taken over the 15-hour period (See **Figure 1** for a diagram demonstrating effluent sampling). Both sets of samples were analyzed for water quality. Both $Effluent_{24h}$ and $Effluent_{3h}$ were collected on September 15th. Effluent sampling took place at UTM 18N 403154mE, 8068968mN.

5. *Sludge samples* from the lagoon. A sludge sample was collected as a grab sample from the bottom of the lagoon. One sample was collected on September 14$^{th}$ at UTM 18N 404248mE, 8068948mN.

6. *Ponded water samples.* A grab sample was taken of some ponded water on the north side of the lagoon. This sample was taken on September 18th at UTM 18N 404253mE, 8068870mN.

See **Figure 2** for site locations and **Figures 3-6** for site pictures.

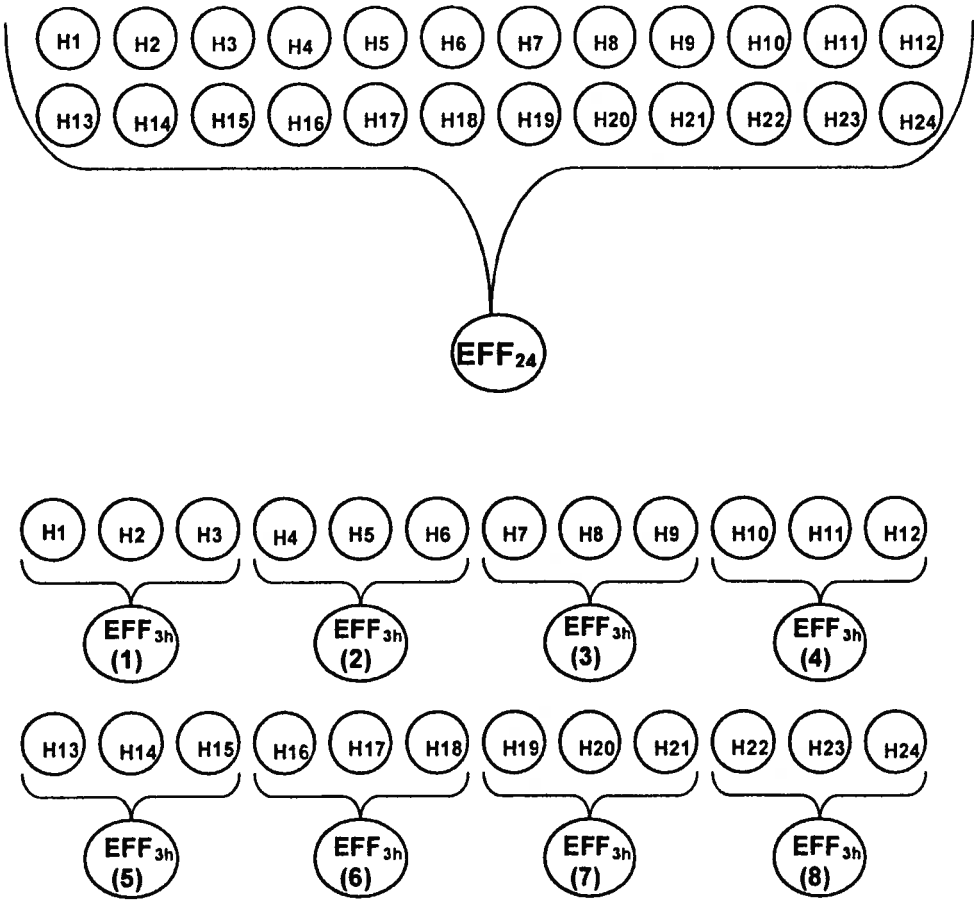


**Figure 1**: A diagram showing the sampling design for collecting $Effluent_{24h}$ and $Effluent_{3h}$. Small green circles represent hourly (h) wastewater samples collected by the autosampler. The larger blue circles represent the composite 24h and 3h effluent samples which were submitted for laboratory analysis.

## Water Quality Parameters

Wastewater samples from Pond Inlet's sewage lagoon were tested for a variety of physical and chemical parameters as well as nutrients, major ions and metals. All parameters and their associated concentrations in wastewater may be viewed in **Table 1**.

**Table 1.** Water quality results from September wastewater sampling. Concentration results represent the average concentrations measured during the sampling period.

| Pond Inlet, Nunavut | | | | | | |
|---|---|---|---|---|---|---|
| | | | Results | | | |
| Parameter | Units | MDL[1] | INF | $EFF_{24h}$ | $EFF_{3h}$ | Wetland |
| TSS | mg/L | 5.18 | 460.00 | 98.67 | 60.17 | |
| VSS | mg/L | 5.77 | 354.00 | 60.00 | 55.00 | |
| cBOD5 | mg/L | 1.12 | 396.50 | 71.00 | 109.04 | 62.04 |
| COD | mg/L | 2.75 | 1469.75 | 388.33 | 378.42 | |
| Phenols | mg/L | 0.022 | | 0.374 | | |
| Oils & Grease | mg/L | 0.726 | | 16.200 | | |
| Conductivity | uS/cm | 0.085 | 1239.000 | 1136.667 | 1121.250 | |
| Hardness | mg/L | 0.781 | 65.400 | 56.400 | 57.096 | |
| Total Phosphorus | mg/L as P | 0.063 | 11.778 | 7.733 | 7.868 | |
| Ammonia | mg/L as N | 0.011 | 168.875 | 80.500 | 74.488 | |
| TKN | mg/L as N | 0.021 | 129.725 | 90.167 | 89.800 | |
| pH | | pH units | | 7.49 | | |
| Alkalinity | mg/L | 0.555 | 478.000 | 440.667 | 453.958 | |
| Chloride | mg/L | 0.032 | 67.425 | 65.133 | 65.550 | |
| Fluoride | mg/L | 0.054 | 0.790* | 0.027* | 0.032* | |
| Sulphate | mg/L | 0.042 | 19.400 | 3.197 | 3.701 | |
| Silver | µg/L | 0.02 | 21.96* | 0.39 | | |
| Aluminum | µg/L | 0.067 | 6059.750 | 274.000 | | |
| Arsenic | µg/L | 0.2 | 0.9 | 0.8 | | |
| Barium | µg/L | 0.039 | 40.975 | 5.960 | | |
| Beryllium | µg/L | 0.029 | 0.042* | 0.015* | | |
| Calcium | µg/L | | 12107.5 | 7593.3 | | |
| Cadmium | µg/L | 0.067 | 0.591 | 0.076 | | |
| Cobalt | µg/L | 0.006 | 1.196 | 1.110 | | |
| Chromium | µg/L | 0.038 | 3.333 | 1.483 | | |
| Copper | µg/L | 0.03 | 234.25 | 66.43 | | |
| Iron | µg/L | 0.661 | 1508.500 | 663.333 | | |
| Mercury | µg/L | 0.009 | 0.172* | 0.005* | | |
| Potassium | µg/L | | 24875 | 24600 | | |
| Lithium | µg/L | 0.02 | 2.05* | 0.01* | | |
| Magnesium | µg/L | 0.052 | 5730.000 | 5790.000 | | |

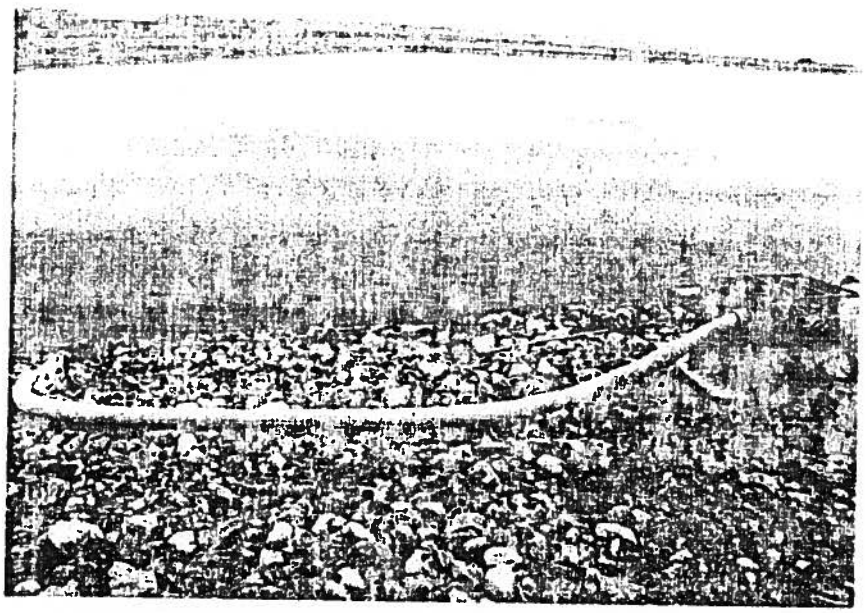

**Figure 5.** Pump for effluent decant at location UTM 18N 404278mE, 8069045mN.

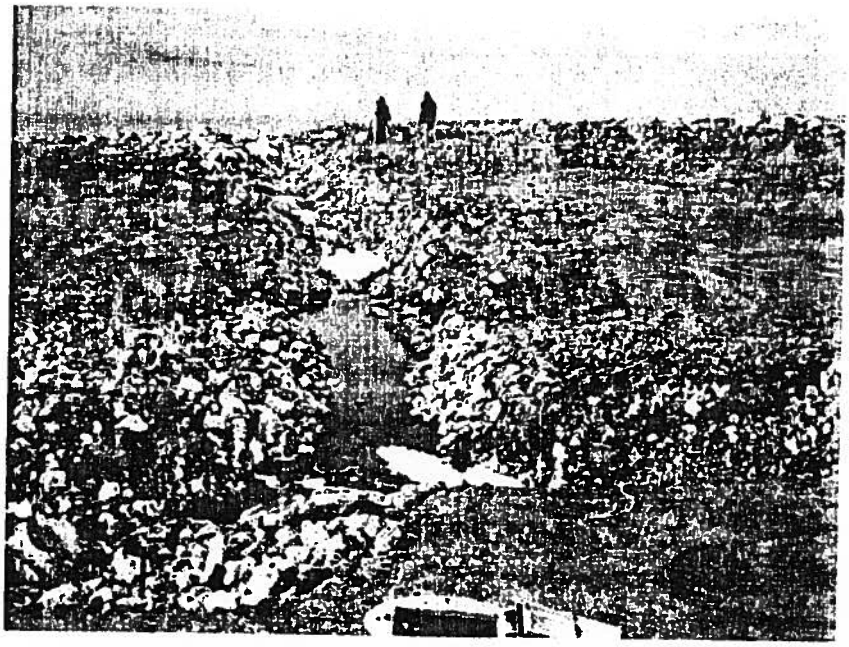

**Figure 6.** Flow path of wastewater through wetland. Wetland samples were collected at location UTM 18N 402993mE, 8071798mN.

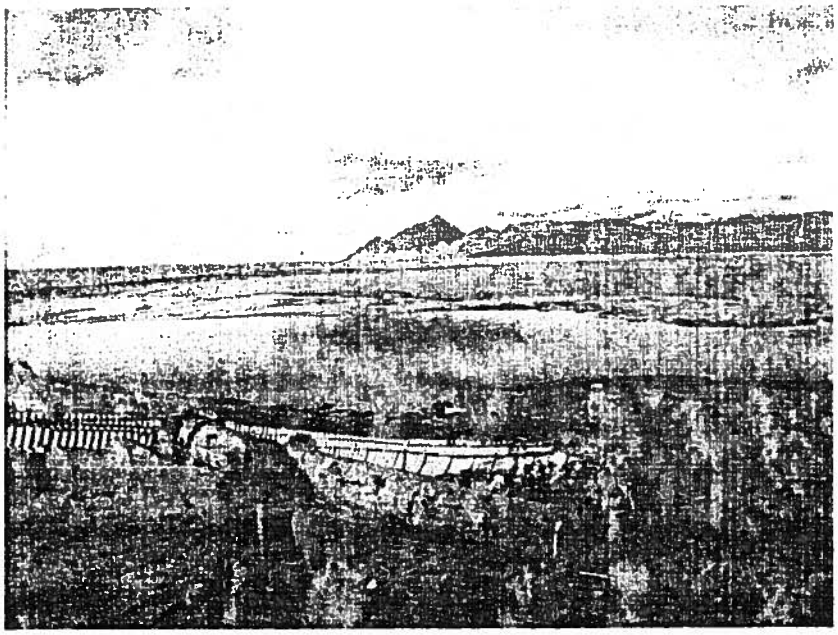

**Figure 3.** Sewage chute where influent samples were taken at location UTM 18N 403967mE, 8068960mN.

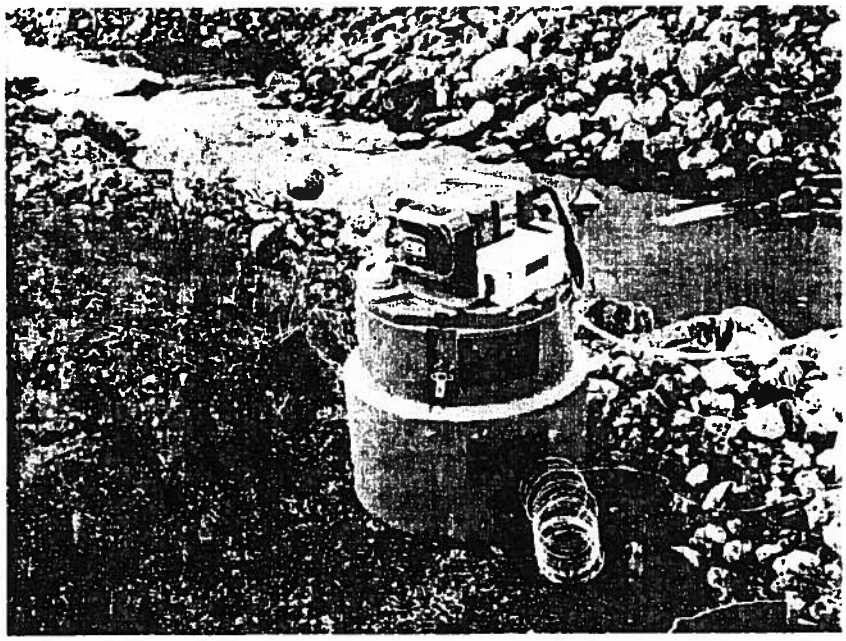

**Figure 4.** Autosampler for effluent collection at location UTM 18N 404240mE, 8069047mN.

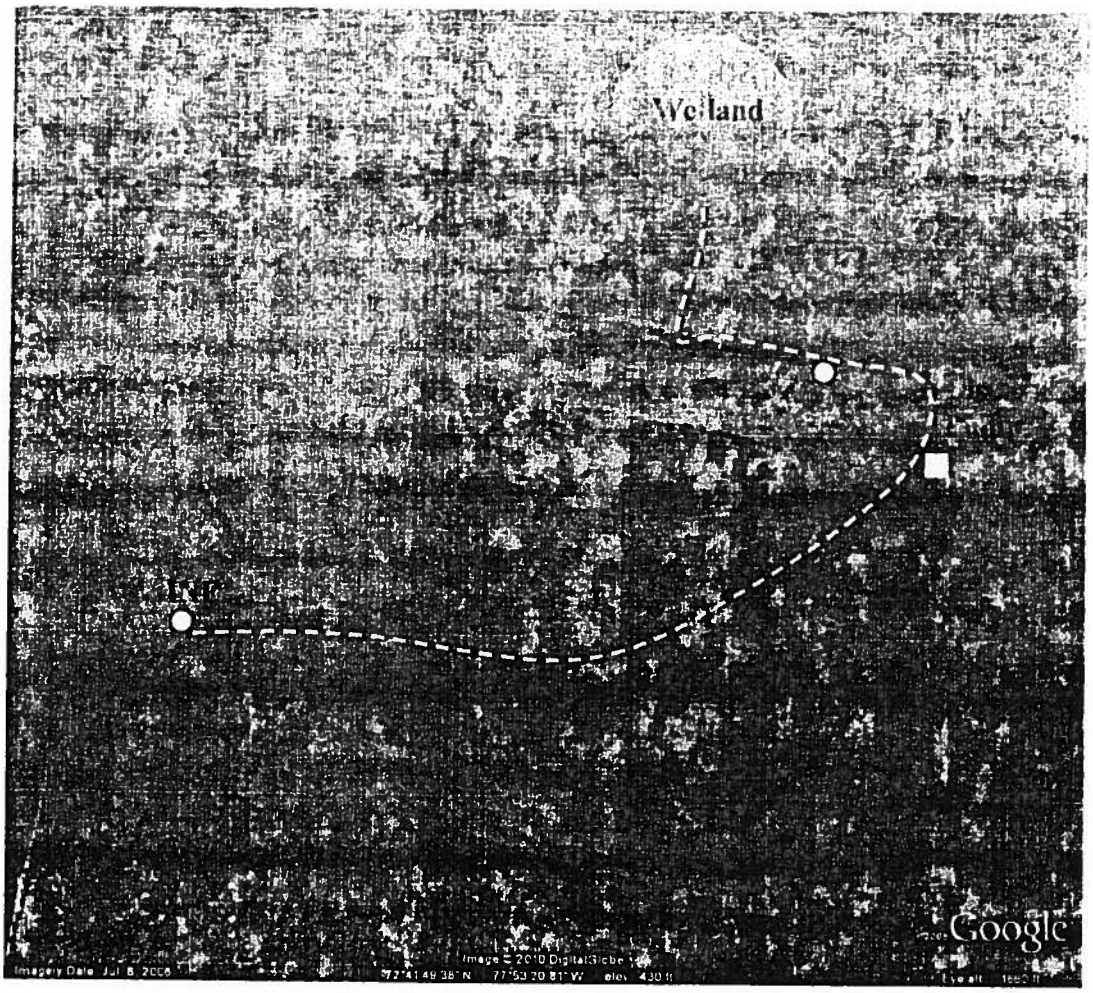


**Figure 2.** The different site locations where wastewater was sampled from Pond Inlet's sewage lagoon. Influent samples were taken at the point marked "INF", $Effluent_{3h}$ and $Effluent_{24h}$ were taken at the point marked "EFF" and the wetland sampling took place in the area marked "Wetland". The dotted line represents the flow path of wastewater.

| Pond Inlet, Nunavut | | | | | | |
|---|---|---|---|---|---|---|
| | | | Results | | | |
| Parameter | Units | MDL[1] | INF | $EFF_{24h}$ | $EFF_{3h}$ | Wetland |
| Manganese | µg/L | 0.008 | 69.300 | 103.330 | | |
| Molybdenum | µg/L | 0.017 | 1.780 | 0.639 | | |
| Sodium | µg/L | 0.043 | 68825.000 | 80433.330 | | |
| Nickel | µg/L | 0.017 | 7.080 | 5.327 | | |
| Lead | µg/L | 0.013 | 7.748 | 1.160 | | |
| Antimony | µg/L | 0.024 | 1.893 | 0.487 | | |
| Strontium | µg/L | 0.014 | 38.100 | 18.400 | | |
| Titanium | µg/L | 0.064 | 59.825 | 14.500 | | |
| Thallium | µg/L | 0.01 | 0.005* | 0.005* | | |
| Vanadium | µg/L | 0.019 | 1.831 | 1.233 | | |
| Zinc | µg/L | 0.087 | 335.500 | 48.000 | | |

[1] MDL refers to minimum detection limit

* Average values incorporating data points below MDL. Data points which fell below the MDL were calculated as half of the MDL (i.e. for a parameter with an MDL of 0.5, any sample which fell below this MDL would be quantified as 0.25).

## Data Plots

To visually understand trends in the data, total suspended solids (TSS), carbonaceous biochemical oxygen demand (cBOD) and ammonia data were plotted below. **Figure 7** demonstrates the differences in TSS concentrations measured from the influent samples and three hour composite effluent samples. This figure shows that TSS concentrations decreased from the influent treatment level to the effluent treatment level.

**Figure 8** demonstrates the difference in cBOD concentrations measured from the influent samples, three hour composite effluent samples and wetland samples. This figure shows that cBOD concentrations tended to decrease as wastewater moved from the influent stage through to the wetland location where the highest level of treatment had been achieved.

**Figure 9** demonstrates the differences in ammonia concentrations measured from the influent samples and three hour composite effluent samples. With the exception of one high outlier point from the influent samples, influent and effluent ammonia concentrations tended to be similar.

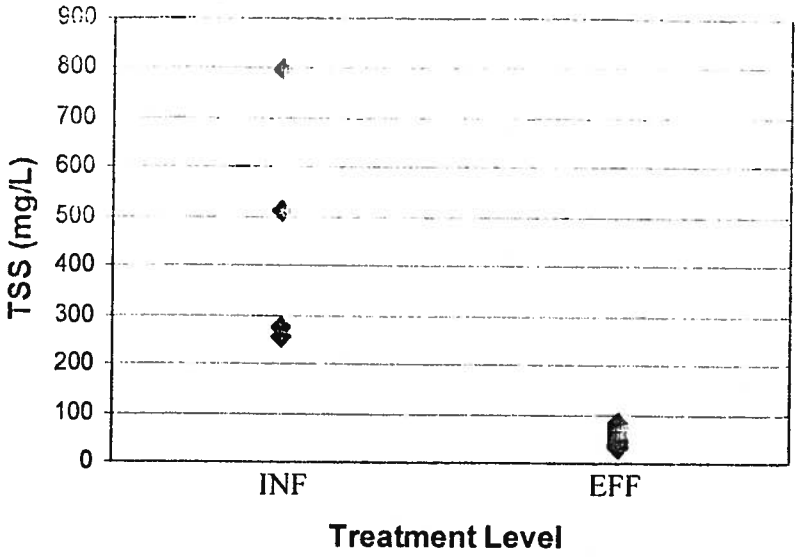


**Figure 7.** Total suspended solids (TSS) concentrations from two different treatment levels including: raw influent (INF) and effluent (EFF) (from three hour composite effluent samples).

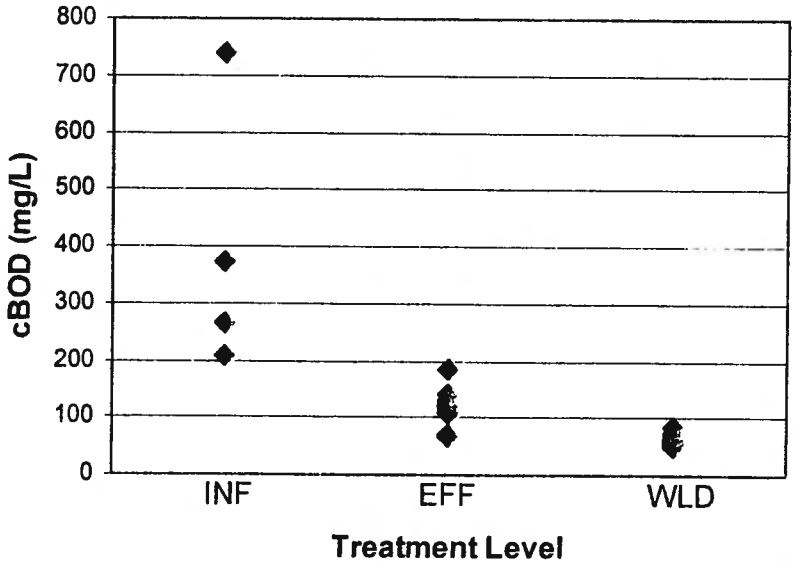


**Figure 8.** Carbonaceous biochemical oxygen demand ($cBOD_5$) concentrations from different treatment levels including: raw influent (INF), effluent (EFF) (from three hour composite effluent samples) and effluent from the wetland location (WLD).

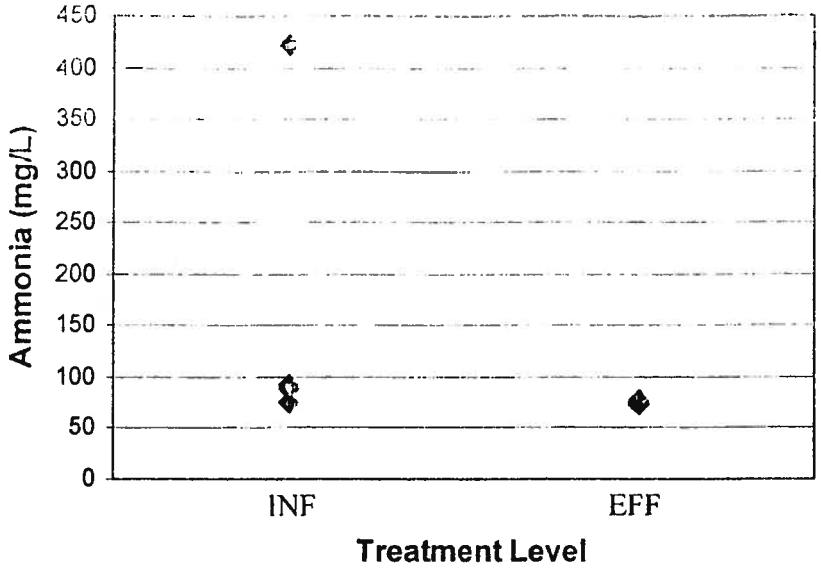


**Figure 9.** Ammonia concentrations from two different treatment levels including: raw influent (INF) and effluent (EFF) (from three hour composite effluent samples). Note that all ammonia concentrations (24 in total) recorded from effluent samples fell within 3.8 mg/L of one another and therefore appear as one data point on the figure.

**The subsequent pages in this document contain the official water quality reports from laboratory analysis.**

| Client Name | Taiga Sample ID | Client Sample ID | Sample Type | Sampling Location | Sample Collect Date | Sample Received Date | Test Group Name | Lab Section | Parameter Name | Result Flag | Reported Result | Units | Calc MDL | Sample Result Qualifier | Analysis Result Qualifier | Analysis Date | Prep Method | Test Method | Report Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nunavut District Office | 290412-001 | | Potable | Pond Inlet | 7/13/2009 | 16-Jul-09 | Ammonia as N | Inorganics - Nutrients | Ammonia as Nitrogen | < | 0.01 | mg/L | 0.01 | | | 7/17/2009 | Lab Split/Preserved | SM4500-NH3:G | Final |
| Nunavut District Office | 290412-001 | | Potable | Pond Inlet | 7/13/2009 | 16-Jul-09 | Biochemical Oxygen Demand | Inorganics - Nutrients | Biochemical Oxygen Demand | | | mg/L | | 105 | | | None | SM5210:B | Final |
| Nunavut District Office | 290412-001 | | Potable | Pond Inlet | 7/13/2009 | 16-Jul-09 | Chemical Oxygen Demand | Inorganics - Nutrients | Chemical Oxygen Demand, Preserved | < | 5 | mg/L | 5 | | | 7/16/2009 | None | SM5220:D | Final |
| Nunavut District Office | 290412-001 | | Potable | Pond Inlet | 7/13/2009 | 16-Jul-09 | Nitrates+Nitrites as N | Inorganics - Nutrients | Nitrate+Nitrite as Nitrogen | < | 0.01 | mg/L | 0.01 | | | 7/16/2009 | None | SM4110:B | Final |
| Nunavut District Office | 290412-001 | | Potable | Pond Inlet | 7/13/2009 | 16-Jul-09 | Alkalinity | Inorganics - Physicals | Alkalinity, Total (as CaCO3) | | 20.8 | mg/L | 0.4 | | | 7/16/2009 | None | SM2320:B | Final |
| Nunavut District Office | 290412-001 | | Potable | Pond Inlet | 7/13/2009 | 16-Jul-09 | Apparent Colour | Inorganics - Physicals | Colour, Apparent | | 17 | CU | 2 | | | 7/16/2009 | None | SM2120:B | Final |
| Nunavut District Office | 290412-001 | | Potable | Pond Inlet | 7/13/2009 | 16-Jul-09 | Conductivity, Specific (@ 25°C) | Inorganics - Physicals | Conductivity, Specific (@ 25°C) | | 58.7 | µS/cm | 0.4 | | | 7/16/2009 | None | SM2510:B | Final |
| Nunavut District Office | 290412-001 | | Potable | Pond Inlet | 7/13/2009 | 16-Jul-09 | pH | Inorganics - Physicals | pH | | 7.49 | pH units | | | | 7/16/2009 | None | SM4500-H:B | Final |
| Nunavut District Office | 290412-001 | | Potable | Pond Inlet | 7/13/2009 | 16-Jul-09 | Solids, Total Suspended | Inorganics - Physicals | Solids, Total Suspended | | 4 | mg/L | 3 | | | 7/18/2009 | None | SM2540:D | Final |
| Nunavut District Office | 290412-001 | | Potable | Pond Inlet | 7/13/2009 | 16-Jul-09 | Turbidity | Inorganics - Physicals | Turbidity | | 1.35 | NTU | 0.05 | | | 7/16/2009 | None | SM2130:B | Final |
| Nunavut District Office | 290412-001 | | Potable | Pond Inlet | 7/13/2009 | 16-Jul-09 | IC Cation Suite | Major Ions | Calcium | | 7.6 | mg/L | 0.1 | | | 7/16/2009 | None | SM4110:B | Final |
| Nunavut District Office | 290412-001 | | Potable | Pond Inlet | 7/13/2009 | 16-Jul-09 | IC Anion Suite | Major Ions | Chloride | | 4.7 | mg/L | 0.7 | | | 7/16/2009 | None | SM4110:B | Final |
| Nunavut District Office | 290412-001 | | Potable | Pond Inlet | 7/13/2009 | 16-Jul-09 | IC Anion Suite | Major Ions | Fluoride | < | 0.1 | mg/L | 0.1 | | | 7/16/2009 | None | SM4110:B | Final |
| Nunavut District Office | 290412-001 | | Potable | Pond Inlet | 7/13/2009 | 16-Jul-09 | Hardness | Major Ions | Hardness | | 31.4 | mg/L | 0.7 | | | 7/16/2009 | None | SM2340:B | Final |
| Nunavut District Office | 290412-001 | | Potable | Pond Inlet | 7/13/2009 | 16-Jul-09 | IC Cation Suite | Major Ions | Magnesium | | 3.0 | mg/L | 0.1 | | | 7/16/2009 | None | SM4110:B | Final |

| Client Name | Taiga Sample ID | Client Sample ID | Sample Type | Sampling Location | Sample Collect Date | Sample Received Date | Test Group Name | Lab Section | Parameter Name | Result Flag | Reported Result | Units | Calc MDL | Sample Result Qualifier | Analysis Result Qualifier | Analysis Date | Prep Method | Test Method | Report Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nunavut District Office | 290412-001 | | Potable | Pond Inlet | 7/13/2009 | 16-Jul-09 | IC Anion Suite | Major Ions | Nitrate | < | 0.01 | mg/L | 0.01 | | | 7/16/2009 | None | SM4110:B | Final |
| Nunavut District Office | 290412-001 | | Potable | Pond Inlet | 7/13/2009 | 16-Jul-09 | IC Anion Suite | Major Ions | Nitrite | < | 0.01 | mg/L | 0.01 | | | 7/16/2009 | None | SM4110:B | Final |
| Nunavut District Office | 290412-001 | | Potable | Pond Inlet | 7/13/2009 | 16-Jul-09 | IC Cation Suite | Major Ions | Potassium | | 0.7 | mg/L | 0.1 | | | 7/16/2009 | None | SM4110:B | Final |
| Nunavut District Office | 290412-001 | | Potable | Pond Inlet | 7/13/2009 | 16-Jul-09 | IC Cation Suite | Major Ions | Sodium | | 2.9 | mg/L | 0.1 | | | 7/16/2009 | None | SM4110:B | Final |
| Nunavut District Office | 290412-001 | | Potable | Pond Inlet | 7/13/2009 | 16-Jul-09 | IC Anion Suite | Major Ions | Sulphate | | 3 | mg/L | 1 | | | 7/16/2009 | None | SM4110:B | Final |
| Nunavut District Office | 290412-001 | | Potable | Pond Inlet | 7/13/2009 | 16-Jul-09 | Fecal Coliforms in Drinking Water | Microbiology | Coliforms, Fecal | | | CFU/100 mL | | 105 | | | None | SM9222:D | Final |
| Nunavut District Office | 290412-001 | | Potable | Pond Inlet | 7/13/2009 | 16-Jul-09 | Individual BTEX Water Analysis | Organics | Benzene | < | 0.005 | mg/L | 0.005 | | | 7/24/2009 | EPA5030B | EPA8260B | Final |
| Nunavut District Office | 290412-001 | | Potable | Pond Inlet | 7/13/2009 | 16-Jul-09 | Individual BTEX Water Analysis | Organics | Ethylbenzene | < | 0.005 | mg/L | 0.005 | | | 7/24/2009 | EPA5030B | EPA8260B | Final |
| Nunavut District Office | 290412-001 | | Potable | Pond Inlet | 7/13/2009 | 16-Jul-09 | Hexane Extractable Material (O&G) | Organics | Hexane Extractable Material | < | 2.0 | mg/L | 2.0 | | | 7/27/2009 | None | EPA1664A | Final |
| Nunavut District Office | 290412-001 | | Potable | Pond Inlet | 7/13/2009 | 16-Jul-09 | Individual BTEX Water Analysis | Organics | m/p-xylene | < | 0.005 | mg/L | 0.005 | | | 7/24/2009 | EPA5030B | EPA8260B | Final |
| Nunavut District Office | 290412-001 | | Potable | Pond Inlet | 7/13/2009 | 16-Jul-09 | Oil & Grease, Visible | Organics | Oil and Grease, visible | | non-visual | | | | | 7/17/2009 | None | Visual Exam | Final |
| Nunavut District Office | 290412-001 | | Potable | Pond Inlet | 7/13/2009 | 16-Jul-09 | Individual BTEX Water Analysis | Organics | o-xylene | < | 0.005 | mg/L | 0.005 | | | 7/24/2009 | EPA5030B | EPA8260B | Final |
| Nunavut District Office | 290412-001 | | Potable | Pond Inlet | 7/13/2009 | 16-Jul-09 | Individual BTEX Water Analysis | Organics | Toluene | < | 0.005 | mg/L | 0.005 | | | 7/24/2009 | EPA5030B | EPA8260B | Final |
| Nunavut District Office | 290412-001 | | Potable | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Aluminum | | 79.4 | µg/L | 0.6 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-001 | | Potable | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Antimony | | 2.3 | µg/L | 0.1 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |

| Client Name | Taiga Sample ID | Client Sample ID | Sample Type | Sampling Location | Sample Collect Date | Sample Received Date | Test Group Name | Lab Section | Parameter Name | Result Flag | Reported Result | Units | Calc MDL | Sample Result Qualifier | Analysis Result Qualifier | Analysis Date | Prep Method | Test Method | Report Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nunavut District Office | 290412-001 | | Potable | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Arsenic | < | 0.2 | µg/L | 0.2 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-001 | | Potable | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Barium | | 23.4 | µg/L | 0.1 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-001 | | Potable | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Beryllium | < | 0.1 | µg/L | 0.1 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-001 | | Potable | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Cadmium | | 0.69 | µg/L | 0.05 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-001 | | Potable | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Cesium | < | 0.1 | µg/L | 0.1 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-001 | | Potable | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Chromium | | 66.3 | µg/L | 0.1 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-001 | | Potable | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Cobalt | < | 0.1 | µg/L | 0.1 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-001 | | Potable | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Copper | | 0.3 | µg/L | 0.2 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-001 | | Potable | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Iron | | 178 | µg/L | 5 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-001 | | Potable | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Lead | | 266 | µg/L | 0.1 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-001 | | Potable | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Lithium | | 0.3 | µg/L | 0.2 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-001 | | Potable | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Manganese | | 7.0 | µg/L | 0.1 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-001 | | Potable | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Mercury | < | 0.01 | µg/L | 0.01 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-001 | | Potable | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Molybdenum | | 5.2 | µg/L | 0.1 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-001 | | Potable | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Nickel | | 0.6 | µg/L | 0.1 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |

| Client Name | Taiga Sample ID | Client Sample ID | Sample Type | Sampling Location | Sample Collect Date | Sample Received Date | Test Group Name | Lab Section | Parameter Name | Result Flag | Reported Result | Units | Calc MDL | Sample Result Qualifier | Analysis Result Qualifier | Analysis Date | Prep Method | Test Method | Report Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nunavut District Office | 290412-001 | | Potable | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Rubidium | | 0.8 | µg/L | 0.1 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-001 | | Potable | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Selenium | < | 0.3 | µg/L | 0.3 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-001 | | Potable | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Silver | < | 0.1 | µg/L | 0.1 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-001 | | Potable | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Strontium | | 18.4 | µg/L | 0.1 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-001 | | Potable | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Thallium | < | 0.1 | µg/L | 0.1 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-001 | | Potable | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Titanium | | 9.4 | µg/L | 0.1 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-001 | | Potable | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Uranium | < | 0.1 | µg/L | 0.1 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-001 | | Potable | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Vanadium | | 0.3 | µg/L | 0.1 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-001 | | Potable | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Zinc | | 6.2 | µg/L | 0.4 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-002 | | Leachate | Pond Inlet | 7/13/2009 | 16-Jul-09 | Ammonia as N | Inorganics - Nutrients | Ammonia as Nitrogen | | 0.02 | mg/L | 0.01 | | | 7/17/2009 | Lab Split/Preserved | SM4500-NH3:G | Final |
| Nunavut District Office | 290412-002 | | Leachate | Pond Inlet | 7/13/2009 | 16-Jul-09 | Chemical Oxygen Demand | Inorganics - Nutrients | Chemical Oxygen Demand | | | mg/L | | | 105 | | None | SM5220:D | Final |
| Nunavut District Office | 290412-002 | | Leachate | Pond Inlet | 7/13/2009 | 16-Jul-09 | Nitrates+Nitrites as N | Inorganics - Nutrients | Nitrate+Nitrite as Nitrogen | < | 0.01 | mg/L | 0.01 | | | 7/16/2009 | None | SM4110:B | Final |
| Nunavut District Office | 290412-002 | | Leachate | Pond Inlet | 7/13/2009 | 16-Jul-09 | Conductivity, Specific (@ 25°C) | Inorganics - Physicals | Conductivity, Specific (@ 25°C) | | 315 | µS/cm | 0.4 | | | 7/16/2009 | None | SM2510:B | Final |
| Nunavut District Office | 290412-002 | | Leachate | Pond Inlet | 7/13/2009 | 16-Jul-09 | pH | Inorganics - Physicals | pH | | 8.24 | pH units | | | | 7/16/2009 | None | SM4500-H:B | Final |
| Nunavut District Office | 290412-002 | | Leachate | Pond Inlet | 7/13/2009 | 16-Jul-09 | IC Cation Suite | Major Ions | Calcium | | 37.0 | mg/L | 0.1 | | | 7/16/2009 | None | SM4110:B | Final |

| Client Name | Taiga Sample ID | Client Sample ID | Sample Type | Sampling Location | Sample Collect Date | Sample Received Date | Test Group Name | Lab Section | Parameter Name | Result Flag | Reported Result | Units | Calc MDL | Sample Result Qualifier | Analysis Result Qualifier | Analysis Date | Prep Method | Test Method | Report Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nunavut District Office | 290412-002 | | Leachate | Pond Inlet | 7/13/2009 | 16-Jul-09 | IC Anion Suite | Major Ions | Chloride | | 21.4 | mg/L | 0.7 | | | 7/16/2009 | None | SM4110:B | Final |
| Nunavut District Office | 290412-002 | | Leachate | Pond Inlet | 7/13/2009 | 16-Jul-09 | IC Anion Suite | Major Ions | Fluoride | | 0.1 | mg/L | 0.1 | | | 7/16/2009 | None | SM4110:B | Final |
| Nunavut District Office | 290412-002 | | Leachate | Pond Inlet | 7/13/2009 | 16-Jul-09 | IC Cation Suite | Major Ions | Magnesium | | 17.5 | mg/L | 0.1 | | | 7/16/2009 | None | SM4110:B | Final |
| Nunavut District Office | 290412-002 | | Leachate | Pond Inlet | 7/13/2009 | 16-Jul-09 | IC Anion Suite | Major Ions | Nitrate | < | 0.01 | mg/L | 0.01 | | | 7/16/2009 | None | SM4110:B | Final |
| Nunavut District Office | 290412-002 | | Leachate | Pond Inlet | 7/13/2009 | 16-Jul-09 | IC Anion Suite | Major Ions | Nitrite | < | 0.01 | mg/L | 0.01 | | | 7/16/2009 | None | SM4110:B | Final |
| Nunavut District Office | 290412-002 | | Leachate | Pond Inlet | 7/13/2009 | 16-Jul-09 | IC Cation Suite | Major Ions | Potassium | | 4.8 | mg/L | 0.1 | | | 7/16/2009 | None | SM4110:B | Final |
| Nunavut District Office | 290412-002 | | Leachate | Pond Inlet | 7/13/2009 | 16-Jul-09 | IC Cation Suite | Major Ions | Sodium | | 12.2 | mg/L | 0.1 | | | 7/16/2009 | None | SM4110:B | Final |
| Nunavut District Office | 290412-002 | | Leachate | Pond Inlet | 7/13/2009 | 16-Jul-09 | IC Anion Suite | Major Ions | Sulphate | | 32 | mg/L | 1 | | | 7/16/2009 | None | SM4110:B | Final |
| Nunavut District Office | 290412-002 | | Leachate | Pond Inlet | 7/13/2009 | 16-Jul-09 | Individual BTEX Water Analysis | Organics | Benzene | < | 0.005 | mg/L | 0.005 | | | 7/24/2009 | EPA5030B | EPA8260B | Final |
| Nunavut District Office | 290412-002 | | Leachate | Pond Inlet | 7/13/2009 | 16-Jul-09 | Individual BTEX Water Analysis | Organics | Ethylbenzene | < | 0.005 | mg/L | 0.005 | | | 7/24/2009 | EPA5030B | EPA8260B | Final |
| Nunavut District Office | 290412-002 | | Leachate | Pond Inlet | 7/13/2009 | 16-Jul-09 | Hexane Extractable Material (O&G) | Organics | Hexane Extractable Material | < | 2.0 | mg/L | 2.0 | | | 7/27/2009 | None | EPA1664A | Final |
| Nunavut District Office | 290412-002 | | Leachate | Pond Inlet | 7/13/2009 | 16-Jul-09 | Individual BTEX Water Analysis | Organics | m/p-xylene | < | 0.005 | mg/L | 0.005 | | | 7/24/2009 | EPA5030B | EPA8260B | Final |
| Nunavut District Office | 290412-002 | | Leachate | Pond Inlet | 7/13/2009 | 16-Jul-09 | Oil & Grease, Visible | Organics | Oil and Grease, visible | | non-visual | | | | | 7/17/2009 | None | Visual Exam | Final |
| Nunavut District Office | 290412-002 | | Leachate | Pond Inlet | 7/13/2009 | 16-Jul-09 | Individual BTEX Water Analysis | Organics | o-xylene | < | 0.005 | mg/L | 0.005 | | | 7/24/2009 | EPA5030B | EPA8260B | Final |
| Nunavut District Office | 290412-002 | | Leachate | Pond Inlet | 7/13/2009 | 16-Jul-09 | Individual BTEX Water Analysis | Organics | Toluene | < | 0.005 | mg/L | 0.005 | | | 7/24/2009 | EPA5030B | EPA8260B | Final |

| Client Name | Taiga Sample ID | Client Sample ID | Sample Type | Sampling Location | Sample Collect Date | Sample Received Date | Test Group Name | Lab Section | Parameter Name | Result Flag | Reported Result | Units | Calc MDL | Sample Result Qualifier | Analysis Result Qualifier | Analysis Date | Prep Method | Test Method | Report Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nunavut District Office | 290412-002 | | Leachate | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Aluminum | | 77 | µg/L | 5 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-002 | | Leachate | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Antimony | | 5.9 | µg/L | 0.1 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-002 | | Leachate | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Arsenic | | 0.3 | µg/L | 0.2 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-002 | | Leachate | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Barium | | 68.4 | µg/L | 0.1 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-002 | | Leachate | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Beryllium | < | 0.1 | µg/L | 0.1 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-002 | | Leachate | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Cadmium | | 1.7 | µg/L | 0.1 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-002 | | Leachate | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Cesium | < | 0.1 | µg/L | 0.1 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-002 | | Leachate | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Chromium | | 142 | µg/L | 0.1 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-002 | | Leachate | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Cobalt | | 0.2 | µg/L | 0.1 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-002 | | Leachate | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Copper | | 8.9 | µg/L | 0.2 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-002 | | Leachate | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Iron | | 583 | µg/L | 5 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-002 | | Leachate | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Lead | | 503 | µg/L | 0.1 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-002 | | Leachate | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Lithium | | 1.1 | µg/L | 0.2 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-002 | | Leachate | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Manganese | | 44.4 | µg/L | 0.1 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-002 | | Leachate | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Mercury | < | 0.01 | µg/L | 0.01 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |

| Client Name | Taiga Sample ID | Client Sample ID | Sample Type | Sampling Location | Sample Collect Date | Sample Received Date | Test Group Name | Lab Section | Parameter Name | Result Flag | Reported Result | Units | Calc MDL | Sample Result Qualifier | Analysis Result Qualifier | Analysis Date | Prep Method | Test Method | Report Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nunavut District Office | 290412-002 | | Leachate | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Molybdenum | | 11.3 | µg/L | 0.1 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-002 | | Leachate | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Nickel | | 3.6 | µg/L | 0.1 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-002 | | Leachate | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Rubidium | | 1.4 | µg/L | 0.1 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-002 | | Leachate | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Selenium | < | 0.5 | µg/L | 0.5 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-002 | | Leachate | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Silver | < | 0.1 | µg/L | 0.1 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-002 | | Leachate | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Strontium | | 79.7 | µg/L | 0.1 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-002 | | Leachate | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Thallium | < | 0.1 | µg/L | 0.1 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-002 | | Leachate | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Titanium | | 7.9 | µg/L | 0.1 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-002 | | Leachate | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Uranium | | 1.1 | µg/L | 0.1 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-002 | | Leachate | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Vanadium | | 0.6 | µg/L | 0.1 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-002 | | Leachate | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Zinc | | 129 | µg/L | 5 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-003 | | Effluent | Pond Inlet | 7/13/2009 | 16-Jul-09 | Ammonia as N | Inorganics - Nutrients | Ammonia as Nitrogen | | 1.00 | mg/L | 0.01 | | | 7/17/2009 | Lab Split/Preserved | SM4500-NH3:G | Final |
| Nunavut District Office | 290412-003 | | Effluent | Pond Inlet | 7/13/2009 | 16-Jul-09 | Biochemical Oxygen Demand | Inorganics - Nutrients | Biochemical Oxygen Demand | | | mg/L | | 105 | | | None | SM5210:B | Final |
| Nunavut District Office | 290412-003 | | Effluent | Pond Inlet | 7/13/2009 | 16-Jul-09 | Chemical Oxygen Demand | Inorganics - Nutrients | Chemical Oxygen Demand, Preserved | | 42 | mg/L | 5 | | | 7/16/2009 | None | SM5220:D | Final |
| Nunavut District Office | 290412-003 | | Effluent | Pond Inlet | 7/13/2009 | 16-Jul-09 | Nitrates+Nitrites as N | Inorganics - Nutrients | Nitrate+Nitrite as Nitrogen | < | 0.01 | mg/L | 0.01 | | | 7/16/2009 | None | SM4110:B | Final |

| Client Name | Taiga Sample ID | Client Sample ID | Sample Type | Sampling Location | Sample Collect Date | Sample Received Date | Test Group Name | Lab Section | Parameter Name | Result Flag | Reported Result | Units | Calc MDL | Sample Result Qualifier | Analysis Result Qualifier | Analysis Date | Prep Method | Test Method | Report Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nunavut District Office | 290412-003 | | Effluent | Pond Inlet | 7/13/2009 | 16-Jul-09 | Ortho-Phosphate as P | Inorganics - Nutrients | Ortho-Phosphate as Phosphorus | | 0.008 | mg/L | 0.002 | | | 7/21/2009 | Lab Split/Filtered | SM4500-P:D | Final |
| Nunavut District Office | 290412-003 | | Effluent | Pond Inlet | 7/13/2009 | 16-Jul-09 | Conductivity, Specific (@ 25°C) | Inorganics - Physicals | Conductivity, Specific (@ 25°C) | | 200 | µS/cm | 0.4 | | | 7/16/2009 | None | SM2510:B | Final |
| Nunavut District Office | 290412-003 | | Effluent | Pond Inlet | 7/13/2009 | 16-Jul-09 | pH | Inorganics - Physicals | pH | | 7.50 | pH units | | | | 7/16/2009 | None | SM4500-H:B | Final |
| Nunavut District Office | 290412-003 | | Effluent | Pond Inlet | 7/13/2009 | 16-Jul-09 | Solids, Total Suspended | Inorganics - Physicals | Solids, Total Suspended | < | 3 | mg/L | 3 | | | 7/18/2009 | None | SM2540:D | Final |
| Nunavut District Office | 290412-003 | | Effluent | Pond Inlet | 7/13/2009 | 16-Jul-09 | IC Cation Suite | Major Ions | Calcium | | 12.7 | mg/L | 0.1 | | | 7/16/2009 | None | SM4110:B | Final |
| Nunavut District Office | 290412-003 | | Effluent | Pond Inlet | 7/13/2009 | 16-Jul-09 | IC Anion Suite | Major Ions | Chloride | | 19.0 | mg/L | 0.7 | | | 7/16/2009 | None | SM4110:B | Final |
| Nunavut District Office | 290412-003 | | Effluent | Pond Inlet | 7/13/2009 | 16-Jul-09 | IC Anion Suite | Major Ions | Fluoride | | 0.1 | mg/L | 0.1 | | | 7/16/2009 | None | SM4110:B | Final |
| Nunavut District Office | 290412-003 | | Effluent | Pond Inlet | 7/13/2009 | 16-Jul-09 | IC Cation Suite | Major Ions | Magnesium | | 6.2 | mg/L | 0.1 | | | 7/16/2009 | None | SM4110:B | Final |
| Nunavut District Office | 290412-003 | | Effluent | Pond Inlet | 7/13/2009 | 16-Jul-09 | IC Anion Suite | Major Ions | Nitrate | < | 0.01 | mg/L | 0.01 | | | 7/16/2009 | None | SM4110:B | Final |
| Nunavut District Office | 290412-003 | | Effluent | Pond Inlet | 7/13/2009 | 16-Jul-09 | IC Anion Suite | Major Ions | Nitrite | < | 0.01 | mg/L | 0.01 | | | 7/16/2009 | None | SM4110:B | Final |
| Nunavut District Office | 290412-003 | | Effluent | Pond Inlet | 7/13/2009 | 16-Jul-09 | IC Cation Suite | Major Ions | Potassium | | 3.2 | mg/L | 0.1 | | | 7/16/2009 | None | SM4110:B | Final |
| Nunavut District Office | 290412-003 | | Effluent | Pond Inlet | 7/13/2009 | 16-Jul-09 | IC Cation Suite | Major Ions | Sodium | | 24.0 | mg/L | 0.1 | | | 7/16/2009 | None | SM4110:B | Final |
| Nunavut District Office | 290412-003 | | Effluent | Pond Inlet | 7/13/2009 | 16-Jul-09 | IC Anion Suite | Major Ions | Sulphate | | 3 | mg/L | 1 | | | 7/16/2009 | None | SM4110:B | Final |
| Nunavut District Office | 290412-003 | | Effluent | Pond Inlet | 7/13/2009 | 16-Jul-09 | Fecal Coliform | Microbiology | Coliforms, Fecal | | | CFU/100 mL | | 105 | | | None | SM9222:D | Final |
| Nunavut District Office | 290412-003 | | Effluent | Pond Inlet | 7/13/2009 | 16-Jul-09 | Individual BTEX Water Analysis | Organics | Benzene | < | 0.005 | mg/L | 0.005 | | | 7/24/2009 | EPA5030B | EPA8260B | Final |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nunavut District Office | 290412-003 | | Effluent | Pond Inlet | 7/13/2009 | 16-Jul-09 | Individual BTEX Water Analysis | Organics | Ethylbenzene | < | 0.005 | mg/L | 0.005 | | | 7/24/2009 | EPA5030B | EPA8260B | Final |
| Nunavut District Office | 290412-003 | | Effluent | Pond Inlet | 7/13/2009 | 16-Jul-09 | Hexane Extractable Material (O&G) | Organics | Hexane Extractable Material | < | 2.0 | mg/L | 2.0 | | | 7/27/2009 | None | EPA1664A | Final |
| Nunavut District Office | 290412-003 | | Effluent | Pond Inlet | 7/13/2009 | 16-Jul-09 | Individual BTEX Water Analysis | Organics | m/p-xylene | < | 0.005 | mg/L | 0.005 | | | 7/24/2009 | EPA5030B | EPA8260B | Final |
| Nunavut District Office | 290412-003 | | Effluent | Pond Inlet | 7/13/2009 | 16-Jul-09 | Oil & Grease, Visible | Organics | Oil and Grease, visible | | non-visual | | | | | 7/17/2009 | None | Visual Exam | Final |
| Nunavut District Office | 290412-003 | | Effluent | Pond Inlet | 7/13/2009 | 16-Jul-09 | Individual BTEX Water Analysis | Organics | o-xylene | < | 0.005 | mg/L | 0.005 | | | 7/24/2009 | EPA5030B | EPA8260B | Final |
| Nunavut District Office | 290412-003 | | Effluent | Pond Inlet | 7/13/2009 | 16-Jul-09 | Individual BTEX Water Analysis | Organics | Toluene | < | 0.005 | mg/L | 0.005 | | | 7/24/2009 | EPA5030B | EPA8260B | Final |
| Nunavut District Office | 290412-003 | | Effluent | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Aluminum | | 70 | µg/L | 5 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-003 | | Effluent | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Antimony | | 1.9 | µg/L | 0.1 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-003 | | Effluent | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Arsenic | | 0.6 | µg/L | 0.2 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-003 | | Effluent | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Barium | | 34.6 | µg/L | 0.1 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-003 | | Effluent | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Beryllium | < | 0.1 | µg/L | 0.1 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-003 | | Effluent | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Cadmium | | 0.5 | µg/L | 0.1 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-003 | | Effluent | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Cesium | < | 0.1 | µg/L | 0.1 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-003 | | Effluent | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Chromium | | 40.2 | µg/L | 0.1 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-003 | | Effluent | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Cobalt | | 2.6 | µg/L | 0.1 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nunavut District Office | 290412-003 | | Effluent | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Copper | | 6.0 | µg/L | 0.2 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-003 | | Effluent | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Iron | | 2580 | µg/L | 5 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-003 | | Effluent | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Lead | | 168 | µg/L | 0.1 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-003 | | Effluent | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Lithium | | 0.3 | µg/L | 0.2 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-003 | | Effluent | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Manganese | | 164 | µg/L | 0.1 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-003 | | Effluent | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Mercury | < | 0.01 | µg/L | 0.01 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-003 | | Effluent | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Molybdenum | | 4.4 | µg/L | 0.1 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-003 | | Effluent | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Nickel | | 5.8 | µg/L | 0.1 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-003 | | Effluent | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Rubidium | | 3.4 | µg/L | 0.1 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-003 | | Effluent | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Selenium | < | 0.5 | µg/L | 0.5 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-003 | | Effluent | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Silver | < | 0.1 | µg/L | 0.1 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-003 | | Effluent | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Strontium | | 38.3 | µg/L | 0.1 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-003 | | Effluent | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Thallium | < | 0.1 | µg/L | 0.1 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-003 | | Effluent | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Titanium | | 3.1 | µg/L | 0.1 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-003 | | Effluent | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Uranium | < | 0.1 | µg/L | 0.1 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |

| Client Name | Taiga Sample ID | Client Sample ID | Sample Type | Sampling Location | Sample Collect Date | Sample Received Date | Test Group Name | Lab Section | Parameter Name | Result Flag | Reported Result | Units | Calc MDL | Sample Result Qualifier | Analysis Result Qualifier | Analysis Date | Prep Method | Test Method | Report Status |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nunavut District Office | 290412-003 | | Effluent | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Vanadium | | 1.4 | µg/L | 0.1 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |
| Nunavut District Office | 290412-003 | | Effluent | Pond Inlet | 7/13/2009 | 16-Jul-09 | Trace Metals, Total | Trace Metals, Total | Zinc | | 6 | µg/L | 5 | | | 7/22/2009 | Acid Digest | EPA200.8 | Final |