

**Resolute Bay Airport Sewage Lagoon Environment Monitoring Program**  
(QA/QC Plan)

**Hamlet of Resolute Bay Airport Sewage Lagoon**  
**Quality Assurance/Quality Control Plan**  
**Water License # 3BM-YRB 2126, TYPE B.**

**REVISED IN APRIL 2026**

**TRANSPORTATION AND INFRASTRUCTURE NUNAVUT**  
**GOVERNMENT OF NUNAVUT**

**Resolute Bay Airport Sewage Lagoon Environment Monitoring Program**  
(QA/QC Plan)

**Table of Contents**

<b>1.0</b>	<b>Introduction</b>	
1.1	Background-----	03
1.2	Monitoring and Regulatory-----	03
1.3	Objectives-----	03
1.4	Scope of Works-----	04
1.5	Definitions-----	04
<b>2.0</b>	<b>Field sampling-----</b>	<b>04</b>
2.1	Sampling Procedures-----	04
2.2	Sampling collection -----	05
2.2.1	Locations-----	05
2.2.2	Sampling Equipment-----	06
2.2.3	Sampling Methods-----	06
2.2.3.1	Waste water sampling-----	06
2.3	Sample Handling-----	07
2.4	Quality assurance and quality Control Program-----	07
<b>3.0</b>	<b>Laboratory Analysis -----</b>	<b>08</b>
3.1	Laboratory Accreditation-----	08
3.2	Method Detention Limits-----	08
<b>4.0</b>	<b>Reporting Requirements -----</b>	<b>09</b>
4.1	General submission-----	09
<b>5.0</b>	<b>References -----</b>	<b>10</b>

**Appendices**

**Appendix A: Site Plan**

**Appendix B: Environmental Monitoring Program: Sample Bottle Requirements and Laboratory Accreditation**

**Appendix-C: A Chain of Custody Sheet**

**Appendix-D: Capacity of Sample bottles: Monitoring Program**

**Resolute Bay Airport Sewage Lagoon Environment Monitoring Program**  
(QA/QC Plan)

## **1.0 Introduction**

The purpose of the QA/QC Plan of the Resolute Airport Sewage Lagoon water licence is to ensure that samples taken in the field as part of the Monitoring Program will maintain a high quality, so as to accurately represent the physical and chemical nature of the samples being taken. It should also be noted that while minimum sampling requirements have been imposed, additional sampling may be requested by an inspector.

### **1.1 Background**

Resolute Airport maintains Municipal Type B license # 3BM-YRB 0308 issued on November 30, 2003, and expired on November 30, 2008. A renewal application was submitted on November 28, 2008. Additional information was requested by NWB on July 20, 2010, to ED&T but was not provided on the due date August 20, 2010. September 24, 2012, NWB was informed about the change of licensee from GN-ED&T to GN-CGS in a letter signed by Art Stewart, Acting Director, Transportation and Planning, ED&T. Due to delays of the WWTP construction, the lagoons are required to keep active and at the same time GN-ED&T, now it is GN-TIN remains as the licensee.

The drinking water supply system was changed from the conditions and criteria established in the initial licence. Initially fresh water was supposed to be extracted from the Strip Lake but now from Char Lake. They stopped this process long time ago due to contamination of the source. Currently Char Lake is the Fresh water source. Currently treated water is collected from the Water Treatment Plant located at Signal Hill and trucked to the Airport facilities. And wastewater is collected from the Airport facilities and truck discharges to the Airport Sewage Lagoon located in an area adjacent to the Airport Terminal

The Sewage Lagoon can only be decommissioned once Mechanical wastewater Treatment plant for Utilidor system is built and commissioned. This facility might not be ready before 2030. Therefore, the Airport water licence is required to be renewed in order to use sewage lagoon.

### **1.2 Monitoring and Regulatory Requirement**

Item 3 of Part H water licence requires that the Licensee shall conform to the Quality Assurance/Quality Control (QA/QC) Plan, which shall be provided to the licensee by the NWB within 6 months of the issuance of this licence.

### **1.3 Objectives**

The objectives of this QA/QC plan are to (i) to ensure the reliability of the data collected during monitoring activities at the locations specified in the water licence, and (ii) satisfy the requirement of the water licence.

**Resolute Bay Airport Sewage Lagoon Environment Monitoring Program**  
(QA/QC Plan)

## **1.4 Scope of work**

The QA/QC Plan covers the environmental monitoring undertaken at the Water treatment plant of the Utilidor system at Signal Hill and the Airport Sewage Lagoon disposal facility as shown in the Site Plan.

## **1.6 Definitions**

The following definitions that are relevant to this plan include:

**Quality Assurance** is a system that ensures that quality control procedures are correctly performed and documented.

**Quality control** refers to the established procedures observed both in the field and in the laboratory, designed to ensure that the resulting end data meets intended quality objectives.

**Trip Blank** is a sample of clean water that was prepared by the analytical laboratory and shipped to the sample site in the cooler along with the empty sample bottles. This trip blank sample remains unopened and is transported back to the laboratory with the monitoring samples. The trip blank is analyzed by the Laboratory along with the monitoring program samples. The purpose of the trip is to assess contamination introduced during shipping and field handling procedures.

**CALA** refers to the Canadian Association for Laboratory Accreditation, formally known as the Canadian Association of Environmental Analytical laboratories (CAEAL).

**Chain of Custody Documentation** refers to the documentation that accompanies samples set to an analytical laboratory. It is a legal document which ensures that the sample taken at a specific site is the sample received in the laboratory. It also provides information on the sample condition and integrity as received by the laboratory.

## **2.0 Field Sampling**

### **2.1 Sampling procedures**

All sampling, sample preservation and analyses shall be conducted in accordance with methods prescribed in the current edition of Standard Methods for the examination of Water and Wastewater, or by such other methods approved by the Board. All analyses shall be performed in a Laboratory certified by the Canadian Association of Environmental Analytical Laboratories (CAEAL) or as otherwise approved by NWB.

To obtain meaningful results from the analyses, the following six factors are of particular importance:

- Sample collection as per schedule and location
- Correct usage of container/sample bottle for parameter being tested.
- Correct labeling of sample bottles and filling out record/field sheet

**Resolute Bay Airport Sewage Lagoon Environment Monitoring Program**  
(QA/QC Plan)

- Correct procedure for field sampling
- Proper and timely shipment of samples to the laboratory
- Timely delivery of samples to the laboratory from the air cargo facility.

## 2.2 Sampling Collection

Refer to the Environmental Monitoring Program Checklist, found in **Appendix C**, for specific details on the sampling locations, equipment and sampling methods.

### 2.2.1

The water License issued to the Resolute Airport Authority represented by GN-ED&T by the NWB specifies three monitoring stations across the licensed facilities:

YRB- 1a: Raw water supply prior to Treatment. from Char Lake. (Currently the Contractor ATCO is getting treated water only from the Utilidor water treatment plant located at Signal Hill and volume recorded daily);

YRB-1b : Effluent from the Sewage Disposal

YRB-2: Effluent within the wetland

YRB- 3: Effluent within the wetland.

YRb-4:Effluent at the final discharge point/downstream of the wetland.

The following table includes the geographic coordinates for the three monitoring stations described above:

#### Sampling locations

<b>Monitoring Station</b>	<b>Latitude (N)</b>	<b>Longitude(W)</b>
<b>YRB-1 a</b>	74.7027 <sup>0</sup>	94.8886 <sup>0</sup>
<b>YRB-1b</b>	<b>74.7397<sup>0</sup></b>	<b>94.9833<sup>0</sup></b>
<b>YRB-2</b>	<b>74.6734<sup>0</sup></b>	<b>94.9209<sup>0</sup></b>
<b>YRB -3</b>	<b>74.6995<sup>0</sup></b>	<b>94.9316<sup>0</sup></b>
<b>YRB-4</b>	<b>To be determined</b>	<b>To be determined</b>

**Resolute Bay Airport Sewage Lagoon Environment Monitoring Program**  
(QA/QC Plan)

### **2.2.2 Sampling Equipment**

Dedicated latex or nitrile gloves (i.e., one pair per sample) are to be used during sample handling. Dedicated sampling equipment such as sampling poles (see photo below for an example) are to be cleaned with soap and water after each sample is collected to prevent cross-contamination. Environmental monitoring samples collected for analysis of selected chemical parameters are to be placed directly into new pre-cleaned, laboratory-supplied sample bottles. All monitoring samples are to be placed in clean coolers for transportation to the subcontract laboratory. The samples are transported/submitted under Chain of Custody documentation. Included on a Chain of Custody form is the client information, the sample information, the analyses requested, the relevant regulations, the turnaround time for the analytical results, comments, and temperature of the samples at the time they arrived in the laboratory. An example of a completed Chain of Custody form is included in **Appendix D**.



### **2.2.3 Sampling Methods**

Please see Appendix E for the Environmental Monitoring Program Schedule. As a general recommendation, please refrain from using insect repellent, disinfection hand gel or other chemical products before and during sample collection. Also, please refrain from smoking during sample collection.

#### **2.2.3.1 Wastewater Sampling**

Wastewater influent samples are collected from the active sewage disposal facility at station YRB-1(a). Wastewater influent samples are collected from the lagoon by immersing the sample bottle into the lagoon neck first to a depth of 0.20 to 0.50 m if possible). The sampling container is filled with influent wastewater, and the sample bottle is raised neck first to prevent sample spillage.

The Licensee shall advise an inspector at least ten (ten) days prior to initiating any decant of the Sewage Lagoon.

From May to August, samples will be collected from the stations at YRB-1(a) , YRB-2 . YRB-3 and YRB-4. as long as the flow is observed. Preference sampling at the beginning, at the middle and at the end of the decanting period if possible.

**Resolute Bay Airport Sewage Lagoon Environment Monitoring Program**  
(QA/QC Plan)

### **2.3 Sample Handling**

All water samples are to be collected in laboratory-supplied containers with the proper preservative where applicable. All sample containers are to be tightly sealed and properly labeled with the sample ID, date and time of sample collection, location of sample collection and parameters to be analyzed. The outside of the bottles is to be cleaned with soap and water after sampling and dried off prior to placing the samples in the cooler. The samples are to be stored on ice in a cooler until delivery to the laboratory. A chain of custody form is to be filled out completely and is used to track the samples and placed in the cooler with the samples, in a zip lock bag. Keep the last page of the Chain of Custody and give it to the Hamlet Foreman for their records.

The following checks are generally performed by the laboratory upon receipt:

- Verification of the integrity and condition of all sample coolers.
- Verification of the integrity and condition of all sample containers.
- Checks for leakage, cracked or broken closures or containers, evidence of grossly contaminated container exteriors or shipping cooler interiors, and obvious odors, etc.
- Verification of receipt of complete documentation for each container.
- Verification that sample identification numbers on sample transmittal forms corresponds to sample identification numbers on the sample containers.
- Verifications that holding times were met and samples were kept cool during transit.

### **2.4 Quality Assurance and Quality Control Program**

Cross contamination is a common source of error in sampling procedures. QC samples help identify when and how contamination might occur. There are various types of QC samples. For the purposes of Hamlet's environmental monitoring, TIN recommends the use of trip blanks if and where applicable.

**It is essential to request a trip blank sample to be prepared when placing the bottle order with the contract laboratory.**

**Resolute Bay Airport Sewage Lagoon Environment Monitoring Program**  
(QA/QC Plan)

**3.0 Laboratory Analyses**

**3.1 Laboratory Accreditation**

As indicated in the Guidelines, the GN-ED&T (currently TIN) should use an analytical laboratory accredited by the Canadian Association for Laboratory Accreditation (CALA); formally known as the Canadian Association for Environmental Analytical Laboratories (CAEAL) for the monitoring program for NWB Licence 3MB-YRB2126. Appendix B includes a copy of the laboratory's CALA accreditation certificate.

**3.2 Method Detection Limits**

The method detection limits (MDLs) are provided on the contract laboratory's Certificates of Analysis.

**Resolute Bay Airport Sewage Lagoon Environment Monitoring Program**  
(QA/QC Plan)

#### **4.0 Reporting Requirements**

##### **4.1 General Submissions**

As a condition of NWB Licence # 3BM-YRB 2126, the GN-ED&T currently GN-TIN is required to submit an Annual Report to the NWB, no later than March 31 of the year following the calendar year reported which shall contain the information of item 1 of Part B of the Water Licence. The annual lab results are attached to the Annual Report.

#### **References**

Quality Assurance (QA) and Quality Control (QC) Guidelines for use by Class “B” Licensees in Collecting Representative Water Samples in the Field and for Submission of a QA/QC Plan, Department of Indian and Northern Affairs Canada, July 1996.

Standard Methods for the Examination of Water and Wastewater, American Public Health Association, American Water Works Association, and Water Environment Federation, 22nd Edition, 2012.

exp Services Inc. (2013); QA/QC Plan for Cape Dorset, Kimmirut and Hall Beach

#### **Appendices:**

##### **Appendix-A: Site Plan**

##### **Appendix-B: Environmental Monitoring Program Checklist, Summary of Sample Bottles requirements and Subcontract Laboratory Accreditation**

##### **Appendix-C: Chain of Custody Sheet**

##### **Appendix-D: Designated sample bottles and their capacities: Monitoring Program**

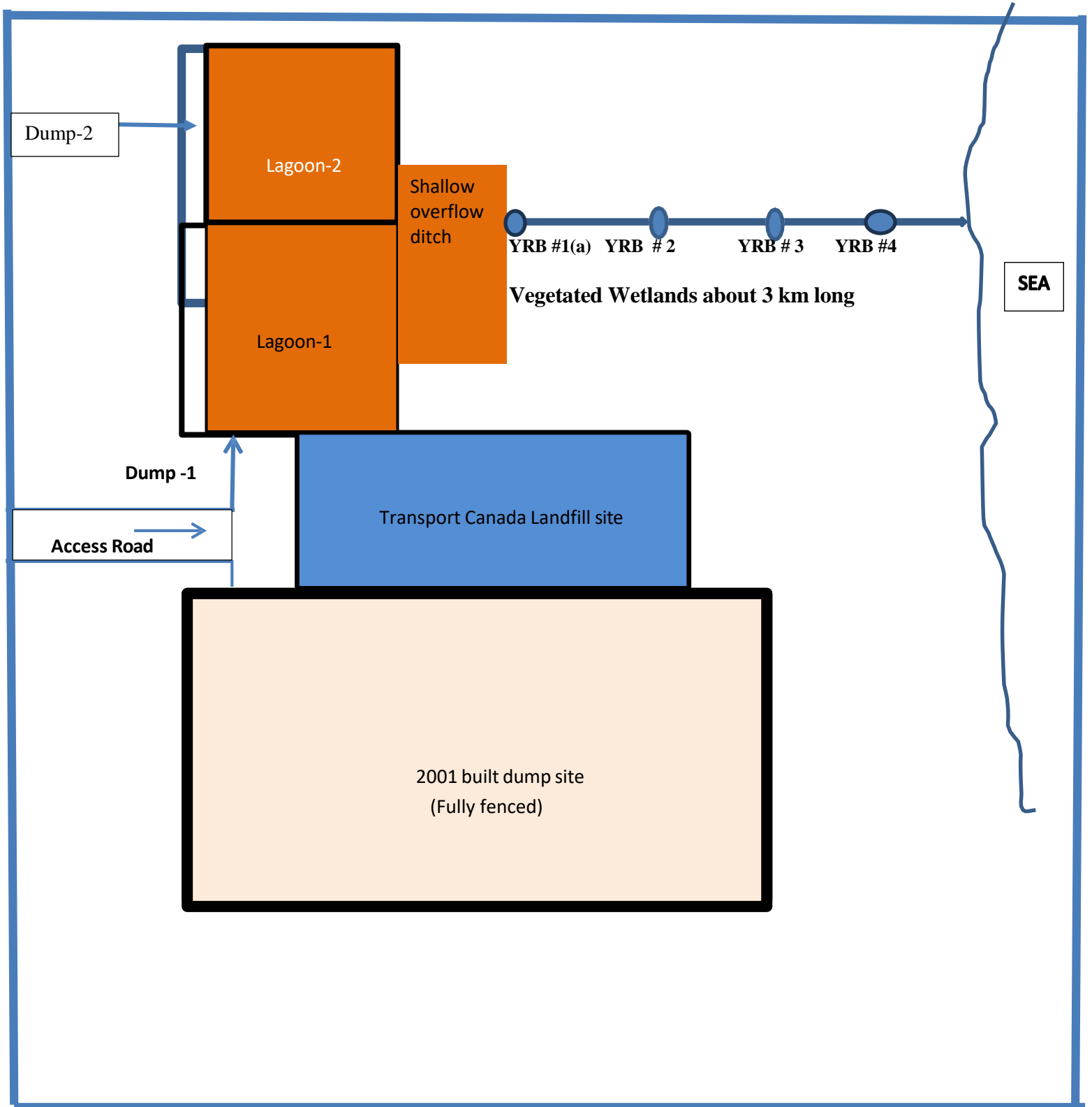
**Resolute Bay Airport Sewage Lagoon Environment Monitoring Program**  
(QA/QC Plan)

APPENDIX- A

SITE PLAN

Resolute Bay Airport Sewage Lagoon Environment Monitoring Program  
(QA/QC Plan)

(This is not in scale, and this is not engineered Lagoon )



**Resolute Bay Airport Sewage Lagoon Environment Monitoring Program**  
(QA/QC Plan)

**APPENDIX-B**  
**ENVIRONMENTAL MONITORING PROGRAM**  
**AND**  
**SAMPLE BOTTLE REQUIREMENTS**

**Resolute Bay Airport Sewage Lagoon Environment Monitoring Program**  
(QA/QC Plan)

Bottle Order	At least two weeks before upcoming environmental sampling, send a request to the contract laboratory for the appropriate sample sets (bottles) for the required sampling test groups (see conditions 2 of Part H of Nunavut Water Board Licence #NWB3YRB0308).	
Personal Procedure Equipment	Ensure that the required personal protective equipment (PPE), such as latex gloves, is on hand before commencing the environmental monitoring program.	
Bottle shipment	Ensure that bottles shipment has arrived from the laboratory in time for the sampling program and verify the integrity of all sampling containers. Report any missing bottles or broken bottles to the lab as soon as possible so that the replacement bottles may be shipped.	
Sampling Location Inspections	Perform an initial inspection of all the monitoring sampling program stations before the commencement of the monitoring program. Make sure of any equipment damage or conditions that may prevent the collection of the Environmental monitoring program samples.	
<b>General sampling Instructions</b>		
Prevention of cross Contamination	Ensure that any laboratory provided sampling instructions are strictly followed. Latex or nitrile gloves should be worn during sampling and should be replaced with fresh gloves after all sampling containers are filled at each location. Dedicated sampling equipment such as sampling poles should be cleaned with soap and water after each sample is collected to prevent cross-contamination. As a general recommendation, please refrain from using insect repellent, disinfection hand gel or other chemical products before and during sample collection. Also refrain from smoking during sampling.	
Sample Care(including packing of Cooler)	All the sample containers should be tightly sealed and properly labeled with sample ID, date and time of sample collection, location of sample collection and parameters to be analyzed. The outside of the bottles should be cleaned with soap and water and dried prior to placing the samples in the cooler. The samples should be stored on ice in a cooler until delivery to the laboratory. A chain of Custody form should be filled out completely and be used to track the samples and placed in the cooler with the samples, in a Zip lock bag. Keep the last page of the chain of Custody and retain in the Hamlet garage for their records.	
<b>Raw Water Supply</b>		
Sampling station YRB-1	This station has been changed to Signal Hill Water Treatment Plant. Raw water prior to chlorination can be collected from the intake pipe coming from the Pump station located at Char Lake.	
<b>Sewage Disposal Facility.</b>		
Sampling Station YRB-2	The Licensee shall measure and record in cubic meters the monthly and annual quantities of sewage discharged at Monitoring Program Station YRB-2 for all purposes.	
Sampling Station YRB-3	Effluent discharge is collected from the Final effluent discharge point of the Sewage Disposal Facilities upon providing notice to the INAC inspector, at the beginning, at the middle and at the end of decanting the lagoon.	

Name:

Signature:

Date:

**Resolute Bay Airport Sewage Lagoon Environment Monitoring Program**  
(QA/QC Plan)

Laboratory Accreditation & Supporting  
Documentation



## CALA Directory of Laboratories

Canadian Association for  
Laboratory Accreditation Inc.

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Membership Number: 2644

Laboratory Name: **Caduceon Environmental Laboratories (Ottawa)**  
Parent Institution: Caduceon Enterprises Inc.

Address: 2378 Holly Lane Ottawa ON K1V 7P1  
Contact: Mr. Greg Clarkin

Phone: (613) 526-0123; Fax: (613) 526-1244; Email: gclarkin@caduceonlabs.com

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Standard: Conforms with requirements of ISO/IEC

17025 Clients Served: Revised On: May 9, 2013

Valid To: October 25, 2015

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### Note:

**1. The Licensee shall sample monthly at Monitoring Station YRB-3 during the months of May to August , inclusive and analyze samples for the following parameters:**

**BOD, pH, Total Suspended Solids, Nitrate-Nitrite, Total Phenols, Sodium, Magnesium, Total Arsenic, Total Copper, Total Iron, Total Mercury, Total Zinc, Faecal Coliform, Conductivity, Ammonia Nitrogen, Oil and Grease (Visual), Sulphate, Potassium, Calcium, Total Cadmium, Total Chromium, Total Lead and Total Nickel.**

**2. The Licensee shall conform to the Quality Assurance and Quality Control (QA/QC) Plan attached.**

**APPENDIX-C**  
**A CHAIN OF CUSTODY SHEET**



## **APPENDIX-D**

### **Guidelines for Water, Wastewater and Leachate sampling Baffin Communities**

## **Drinking water:**

### **Monthly Sampling: (Bacteria analysis)**

1. Collect five samples (**200 ml each**) from five different locations and send to Iqaluit Health Lab through your local health center. One of the five samples should be raw water sample.  
Once in a month for Resolute Bay.

### **Annual Sampling: (Microbiological and Chemical Analysis)**

2. Send samples to Caducean Environmental Lab, Ottawa, Ontario.

Caducean Environmental Lab

Gord Murphy/Rebecca Marshall, Lab Supervisor

2378 Holly Lane

Ottawa, ON, K1V 7V1

Ph-613-526-0123

Fax-613-526-1244

### **Precautions of Sampling:**

1. Be careful not to let the mouth of the bottle or lid touch anything including sampler's fingers.
2. Do not overfill the bottle or rinse out
3. Fill the bottle to the 200ml line from water tap, valve or water truck delivery hose nozzle. When sampling from a water tap, remove screen, aerator or other attachment from tap and allow the cold water to run for 2-3 minutes before collecting. Do not dip into the filled water truck tank to take a sample.
4. Ensure each bottle label information is filled for:
  - Date and time sample was taken
  - Sample point location
  - Sampler's name
5. Persons' name and contact address where to send sample Test results and invoice.
6. Samples must arrive at the Labs either Iqaluit or Ottawa within 24 hrs. from the time of sampling.

## **Wastewater:**

1. Collect five treated samples from the first point of discharge of Sewage (YRB-3).
2. Collect Five raw samples directly from the truck discharge (YRB-2)

## **Sample bottles specifications for Wastewater and leachate:**

All the wastewater and Leachate samples will be sent to Caducean Lab, Ottawa, ON.

### **Waste water you get 8 bottles / sample with 3 samples / cooler.**

2 Pet 500 ml  
1 O& G 1000 ml  
1Metals red Cap 125 ml  
1 TKN/TP Yellow 125 ml  
1 Phenol Glass 125 ml  
1 300 ml Bacteria  
2 TOC 40 ml x 2

### **Raw Drinking Water 7 Bottles per sample**

1 L amber 1000 ml for surfactants  
1Metals red Cap 125 ml  
1 Phenol Glass 125 ml  
1 GWC clear 500 ml  
2 x 250 ml TSS Raw and Treated  
1 Green cap CN 125 ml

### **Precautions of sampling:**

1. Use hand gloves
2. Ensure each bottle level information is filled:
  1. Date and time sample taken
  2. Location with GPS coordinates
  3. Sampler's name
  4. Person's name and contact information where to send sample Test Results and invoice.
5. Samples must be arrived Ottawa Lab within 24 hours from the time of sampling.



April 7, 2016

Bhabesh Roy  
Government of Nunavut  
PO BOX 379  
Pond Inlet, NU  
XOAOSO

Dear Bhabesh Roy,

Caduceon Environmental Laboratories looks forward to aiding Hamlet of Resolute Bay in their environmental analysis. The Caduceon staff has reviewed the PDF document entitled "*QA/QC for the Wastewater Treatment Facility of Resolute Bay*" that was provided to our Ottawa Laboratory.

Our staff has read and understands the requirements found within this document and see no issues with providing you quality service and analysis. In addition, it has been noted that it is necessary all testing be completed under GALA accreditation. Caduceon Environmental Laboratories are accredited for all of the parameters listed within the document.

I believe you have already been provided with our GALA Scopes of Accreditation for your records. Should you require any further information please call either Gord Murphy (Lab Supervisor) or myself (Greg Clarkin, Lab Manager) at the Ottawa office and we will be more than happy to help you out.

Again, thanks for the opportunity to work with the Hamlet of Resolute Bay.

Regards,

A handwritten signature in black ink, appearing to read "G. Clarkin".

Greg Clarkin, Lab Manager- Ottawa District  
Caduceon Environmental Laboratories  
Tel: (613) 526-0123  
Fax: (613) 526-1244  
E-mail: [gclarkin@caduceonlabs.com](mailto:gclarkin@caduceonlabs.com)

cc: Gord Murphy, Lab Supervisor  
Damien Gilbert, CEO

2025 Lab results



**CERTIFICATE OF ANALYSIS**

**Final Report**

C.O.C.: -

REPORT No: 25-027768 - Rev. 0

**Report To:**  
Government of Nunavut Department of Transportation and Infrastructure  
PO Box 30  
Resolute Bay, Nu X0A 0V0

**CADUCEON Environmental Laboratories**  
2378 Holly Lane  
Ottawa, ON K1V 7P1

**Attention: Philip Manik**

DATE RECEIVED: 2025-Sep-11  
DATE REPORTED: 2025-Sep-18  
SAMPLE MATRIX: Surface Water

CUSTOMER PROJECT:  
P.O. NUMBER:

Analyses	Qty	Site Analyzed	Authorized	Date Analyzed	Lab Method	Reference Method
Anions (Liquid)	1	OTTAWA	STAILLON	2025-Sep-11	A-IC-01	SM 4110B
BOD5 (Liquid)	1	KINGSTON	JWOLFE2	2025-Sep-12	BOD-001	SM 5210B
Cond/pH/Alk Auto (Liquid)	1	OTTAWA	SBOUDREAU	2025-Sep-11	COND-02/PH-02/A LK-02	SM 2510B/4500H/ 2320B
Fecal Coliforms (Liquid)	1	OTTAWA	HALIPDA	2025-Sep-11	FC-001	SM 9222D
ICP/MS Total (Liquid)	1	OTTAWA	GFENTON	2025-Sep-12	D-ICPMS-01	EPA 6020
ICP/OES Total (Liquid)	1	OTTAWA	SGORMAN	2025-Sep-15	D-ICP-01	SM 3120B
Mercury (Liquid)	1	OTTAWA	TBENNETT	2025-Sep-12	D-HG-02	SM 3112B
Ammonia (Liquid)	1	KINGSTON	DCASSIDY	2025-Sep-17	NH3-001	SM 4500NH3
Oil & Grease (Liquid)	1	KINGSTON	TMCBRYDE	2025-Sep-15	O&G-001	SM 5520
Phenols (Liquid)	1	KINGSTON	EHINCH	2025-Sep-15	PHEN-01	MECP E3179
Total Organic Carbon (TOC)	1	OTTAWA	SLOZO	2025-Sep-15	C-OC-01	EPA 415.2
TSS (Liquid)	1	KINGSTON	MCLOSS	2025-Sep-15	TSS-001	SM 2540D

R.L. = Reporting Limit

NC = Not Calculated

Test methods may be modified from specified reference method unless indicated by an \*

**Michelle Dublin**  
Data Specialist

The analytical results reported herein refer to the samples as received and relate only to the items tested. Reproduction of this analytical report in full or in part is prohibited without prior consent from Caduceon Environmental Laboratories.



## CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: -

REPORT No: 25-027196 - Rev. 0

Report To:  
Government of Nunavut Department of Transportation and Infrastructure  
PO Box 30  
Resolute Bay, Nu X0A 0V0

CADUCEON Environmental Laboratories  
2378 Holly Lane  
Ottawa, ON K1V 7P1

Attention: Philip Manik

DATE RECEIVED: 2025-Sep-08  
DATE REPORTED: 2025-Sep-15  
SAMPLE MATRIX: Waste Water

CUSTOMER PROJECT:  
P.O. NUMBER:

Analyses	Qty	Site Analyzed	Authorized	Date Analyzed	Lab Method	Reference Method
Anions (Liquid)	5	OTTAWA	LMACGREGOR	2025-Sep-09	A-IC-01	SM 4110B
BOD5 (Liquid)	5	KINGSTON	DCASSIDY	2025-Sep-10	BOD-001	SM 5210B
Cond/pH/Alk Auto (Liquid)	5	OTTAWA	SBOUDREAU	2025-Sep-09	COND-02/PH-02/A LK-02	SM 2510B/4500H/ 2320B
ICP/MS Total (Liquid)	5	OTTAWA	GFENTON	2025-Sep-10	D-ICPMS-01	EPA 6020
ICP/OES Total (Liquid)	5	OTTAWA	SGORMAN	2025-Sep-09	D-ICP-01	SM 3120B
Mercury (Liquid)	4	OTTAWA	TBENNETT	2025-Sep-09	D-HG-02	SM 3112B
Ammonia (Liquid)	5	KINGSTON	VHAMMOND	2025-Sep-12	NH3-001	SM 4500NH3
Oil & Grease (Liquid)	2	KINGSTON	DCHAUDHARI	2025-Sep-11	O&G-001	SM 5520
Phenols (Liquid)	3	KINGSTON	EHINCH	2025-Sep-11	PHEN-01	MECP E3179
Total Organic Carbon (TOC)	5	OTTAWA	LMACGREGOR	2025-Sep-08	C-OC-01	EPA 415.2
TSS (Liquid)	5	KINGSTON	MCLOSS	2025-Sep-10	TSS-001	SM 2540D

R.L. = Reporting Limit

NC = Not Calculated

Test methods may be modified from specified reference method unless indicated by an \*

Michelle Dublin  
Data Specialist

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