City of Iqaluit

Environmental Monitoring Program and Quality Assurance/ Quality Control Plan

Type of Document
Final

Project Name
Water Licence 3AM-IQA1626

Prepared By: Robert Renaud, M.Sc., P.Geo. (2013)

Reviewed By: Chris Kimmerly, M.Sc., P.Geo. (ON) (2013)

exp Services Inc.
100-2650 Queensview Drive
Ottawa, ON K2B 7H6
Canada

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City of Iqaluit

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0	Original	EXP	March 2013
1	Updated per NWB comments	Richard J. Sparham	March 2017
2	Updated per NWB/ ECCC comments	Josip Deronja	March 2019

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1 Introductions

The Environmental Monitoring Program and Quality Assurance/ Quality Control (QA/QC) Plan for the City of Iqaluit (City) was prepared as a requirement of the Nunavut Water Board (NWB) Licence No. 3AM-IQA0611, issued on May 15, 2006, which expires on June 16, 2016. This Plan applies specifically to the Water Treatment Plant (WTP), Waste Water Treatment Plant (WWTP), and West 40 Landfill operated by the City. This Plan has been updated for the renewal of NWB Licence No. 3AM-IQA1626, issued on June 17, 2016, and expiring on June 16, 2026. Although this plan was prepared as a condition of the past Licence, it reflects the current condition of water and sewage facilities and outlines the Environmental Monitoring Program and QA/QC Plan for the Renewal Application which has been approved. This document is being provided as a condition of the new Licence.

2 Background

The City of Iqaluit is the capital of the Territory of Nunavut and is located at the south end of Baffin Island, Frobisher Bay 64°31'N latitude and 68°31'W longitude (Figure 1, Appendix A: Site Plan). Access to Iqaluit is provided by regular scheduled commercial aircraft year-round, snowmobile trails from Baffin Island communities in the winter, and sealift from the port of Montreal in the summer. Iqaluit is the largest community in Nunavut, with a population of approximately 7,082 (2016 Statistics Canada). Having been ranked as the fastest growing community in Nunavut, the Nunavut Bureau of Statistics, population projections estimate a 5.5% population increase in Iqaluit over the next five years, from 2018 to 2022.

Iqaluit's location is above the tree line and within the continuous permafrost zone of Canada. The region generally consists of glacially scoured igneous/ metamorphic terrain. The City has an arctic climate with January and July high and low mean temperatures of -21.5°C/ -29.7°C (high/ low) and 11.4°C/ 3.7°C (high/ low) respectively. The annual precipitation is made up of 19.2 cm of rainfall and 255.0 cm of snowfall for a total of 43.0 cm precipitation. It is recognized that Iqaluit, like many other northern communities are susceptible to significant climate change impacts.

Raw water is supplied to the municipality from the Lake Geraldine water reservoir. During the spring and summer, runoff from the surrounding watershed fills the lake. Water is stored for over-winter consumption by a dam on Lake Geraldine. From the dam outfall, water is transmitted by gravity to the water treatment plant (WTP) where it is treated by UV, filtration, chlorination, and fluorination. Treated water is stored in two storage reservoirs located next to the WTP prior to entering the main distribution system.

The City's wastewater receives primary treatment at the wastewater treatment plant (WWTP) before being disposed into Frobisher Bay. The sewage lagoon is used as a backup facility only.

Landfill runoff is collected in the on-site detention ponds. The run-off is then pumped to the retention pond located across the road from the landfill. When the retention pond is decanted, a 4" pump is then connected to a Geotube dewatering bag and the retention pond is decanted through the Geotube. The City is presently coordinating the decommissioning of the Landfill, in anticipation of a new Solid Waste Facility. As part of the decommissioning process, upgrades to the existing Landfill will be executed in the summer of 2019 to further mitigate runoff.

The various site locations can be found in Appendix A: Site Plan.

3 Environmental Monitoring and Quality Assurance/ Quality Control Plan

3.1 Definitions

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 meet intended quality objectives.

Monitoring Program refers to the program to collect data on surface water and groundwater quality to assess impacts to the environment of an appurtenant undertaking.

3.2 Monitoring and Regulatory Requirement Program

Conditions 2 and 5 of Part I of the Water Licence 3AM-IQA1626 issued to the City of Iqaluit requires that the Licensee:

- The Submit to the Board for approval in writing an updated Monitoring Program that addresses monitoring requirements for the Water Treatment Facility and Waste Treatment Facilities. The Monitoring Program shall address, among other items, the requirements outlined in Schedule I.
- Submit to the Board for review an updated Quality Assurance/ Quality Control (QA/QC) Plan prepared in accordance with *Quality Assurance (QA) and Quality Control (QC) Guidelines for use by Class "A" Licensees in Meeting SNP Requirements and for Submission of a QA/QC Plan* (Department of Indian and Northern Affairs Canada, 1996). The submission shall include a covering letter from an accredited laboratory confirming acceptance of the Plan for analyses to be performed under this Licence.

3.3 Scope and Objective of Environmental Monitoring Program and QA/QC Plan

The scope and objective of this document is to provide guidance to ensure that the monitoring program samples collected in the field are done so with a high degree of quality and reliability, in order to confirm that the data collected during monitoring activities at the various sites accurately reflect the physical and chemical nature of the matrix being tested.

Under the conditions of the Water Licence 3AM-IQA1626, the Licence requires an Environmental Monitoring Program and Quality Assurance/ Quality Control (QA/QC) Plan. The QA/QC Plan has been prepared to achieve the following objectives:

- Ensure that the collection of samples taken in the field follow required procedures and controls to maintain a high-level quality and reliability, while ensuring that the data obtained is indicative of the physical and chemical nature of the water at the various sampling sites;
- Ensure best management practices are executed as part of the monitoring program;
- Ensure all samples are delivered and analyzed by an accredited laboratory;

The Environmental Monitoring Program and QA/QC Plan describes the necessary procedures and controls to be used by the City Operations staff when performing the work described herein.

4 Field Sampling

4.1 Field Measurements

Field measurements of various water quality parameters (including pH, temperature, conductivity and oxidation-reduction potential (ORP)) are recorded using a multi meter instrument. The instrument probes are calibrated prior to use following manufacturer's procedures using analytical grade reagents.

4.2 Sampling Procedures

All sampling, sample preservation and analyses is conducted in accordance with methods described in the current edition of *Standard Methods for the Examination of Water and Wastewater* (American Public Health Association, American Water Works Association, and Water Environment Federation, most current edition).

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

- Sample collection as per schedule and location.
- Correct usage of container/sample bottle for parameter being tested.
- Correct labelling of sample bottles and filling out record/field sheet.
- Correct procedure for field sampling.
- Proper and timely shipment of samples to the laboratory (City controlled).
- Timely delivery of samples to the laboratory (not City controlled).

4.3 Sampling Collection

Effluent and surface water sampling is conducted to provide the City with effective environmental management information and to monitor regulatory compliance requirements.

The collection of samples in the field must follow the recommendation established by the CALA laboratory selected to do the analysis. These should conform to the protocols outlined in the Canadian Environmental Quality Guidelines (CCME, 2007). In order to ensure the quality and reliability of the monitoring and sampling work, staff must be adequately trained.

Refer to the checklists found in Appendix B: Environmental Monitoring Program Checklists for specific details on the sampling locations, equipment and sampling methods.

4.3.1 Locations

The Water Licence issued to the City (3AM-IQA1626) by the NWB specifies nine monitoring stations across the following City facilities:

- Water Treatment Plant;
- Waste Water Treatment Plant;
- West 40 Landfill;

The Monitoring Program created by Water Licence 3AM-IQA1626 includes specific requirements regarding sampling locations, sampling frequency, parameters to be analyzed, and effluent quality. The Monitoring Program is summarized in Table 1.

Table 1 – 3AM-IQA1626 Monitoring Program Locations

Station ID	Description	Status	Parameters	Testing/ Measurement Frequency	Reporting Frequency
IQA-01	Lake Geraldine Reservoir, Raw Water	Active	R, PW	Monthly	Biannually
			F	Monthly	
IQA-02	Sewage Lagoon, Effluent Discharge Point	Active	B, N, E, ICP	Once prior discharge; once during discharge; and once prior to the completion of discharge	Annually
			F	During decant	
IQA-03	*Sewage Lagoon, Influent*	*Inactive*	*N/A*	*N/A*	*N/A*
IQA-04	Wastewater Treatment Plant, Effluent	Active	B, N, E, ICP	Quarterly – prior to commissioning of WWTP	Annually
			B, N, E, ICP	Monthly – following commissioning of the WWTP	
			AL	Annually – following commissioning of the WWTP	
			F	During discharge	
IQA-05	Wastewater Treatment Plant, Influent	Active	B, E, N, ICP	Biannually – prior to commissioning of the WWTP	Annually
				No testing requirements following commissioning of the WWTP	N/A
IQA-06	Sludge from WWTP	Active	B, E, N, ICP	Quarterly	Annually
IQA-07	*Surface water entering West 40 Landfill*	*Inactive*	*N/A*	*N/A*	*N/A*
IQA-08	West 40 Landfill – Effluent Discharge Point	Active	B, E, N, ICP, F, LS	Once prior to discharge; once during discharge; and once prior to completion of discharge	Annually
			F	During Discharge	
IQA-08A	Station situated up-gradient of West 40 Landfill	Active	B, E, N, ICP, F, LS	Annually	Annually
IQA-08B	Station situated down-gradient of West 40 Landfill	Active			
IQA-09	*Contaminated soil accepted at West 40 Landfill*	*Inactive*	*N/A*	*N/A*	*N/A*

The geographic coordinates for the various sampling locations are identified below in Table 2.

Table 2 – 3AM-IQA1626 Monitoring Program Geographic Coordinates

Station ID	Latitude*	Longitude*
IQA-01	63°45'12'' N	68°30'22'' W
IQA-02	63°44'43'' N	68°32'18'' W
IQA-03	*N/A*	*N/A*
IQA-04	63°44'43'' N	68°32'20'' W
IQA-05	63°44'45'' N	68°32'20'' W
IQA-06	63°44'45'' N	68°32'20'' W
IQA-07	*N/A*	*N/A*
IQA-08	63°43'47'' N	68°32'11'' W
IQA-08A	63°44'10" N	68°32'13" W
IQA-08B	63°43'51" N	68°32'09" W
IQA-09	*N/A*	*N/A*

4.3.2 Parameters

As per Schedule I Table 1 – Water Quality Parameters of the Licence, Table 3 below provides a detailed list of all parameters that require to be tested, per the Monitoring Program identified in Table 1. A detailed summary of the Monitoring Program sampling schedule can be found in Appendix C: Monitoring Program Sampling Schedule.

Table 3 – Water Quality Parameters

Test Group	Analytical Parameters	Units
Routine (R)	Alkalinity, Acidity, Chloride, Carbonate, Bicarbonate, Total Hardness, Hydroxide, Sulphate, Total Suspended Solids (TSS), Total Dissolved Solids (TDS), Total Organic Carbon (TOC), Total Inorganic Cabon (TIC)	mg/L
	pH (field and lab)	pH units
	Oxidation-Reduction Potential (ORP) (field)	mV
	Conductivity (field and lab)	uS/cm
	Temperature (field)	°C
	Turbidity	NTU
Effluent (E)	Total Suspended Solids (TSS)	mg/L
	Temperature (field)	°C
	Conductivity (field and lab)	uS/cm
	pH (field and lab)	pH units
Acute Lethality (AL)	Based on Environmental Canada's Procedure for pH Stabilization During the Testing of Acute Lethality of Wastewater Effluent to Rainbow Trout (EPS 1/RM/50,	"Pass" / "Fail"

	March 2008), if single concentration test fails and unionized ammonia concentration is less than or equal to 1.25 mg/L	
ICP – Metals Scan (Total)	Al, Sb, As, Ba, Cd, Cr, Co, Cu, Fe, Pb, Li, Mn, Mo, Ni, Se, Sn, Tl, Ti, U, V, Zn, Hg	mg/L
Nutrients (N)	Ammonia-N, Nitrate-N, Nitrile-N	mg N/L
	Total Phosphorous, Orthophosphate	mg/L
Biological (B)	Biochemical Oxygen Demand	mg/L
	Total and Fecal Coliform	CFU/100 mL
Potable Water (PW)	Fecal Coliform	CFU/100 mL
	ICP Metals (Total and dissolved)	mg/L
	Total Suspended Solids – TSS	mg/L
Flow (F)	Volume	m^3
Landfill Specific (LS)	Polychlorinated Biphenyls (PCBs), Benzene, Toluene, Ethylbenzene, Xylene (BTEX)	mg/L

4.3.3 Sampling Equipment

Dedicated latex or nitrile gloves (i.e., one pair per sample) are used during sample handling. Sampling equipment such as sampling poles are 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 placed directly into new pre-cleaned, laboratory-supplied sample bottles. All monitoring samples are placed in clean coolers prior to and during transportation to the subcontract laboratory. The samples are transported/submitted under Chain of Custody documentation.

4.3.4 Sampling Methods

4.3.4.1 *Water and Wastewater Treatment Plant Sampling*

Raw water samples are collected from the valve at the gravity intake pipe from the dam at Lake Geraldine, just as it enters the WTP. Samples of influent wastewater to the WWTP are collected from a valve located just before the wastewater enters the screw screen tanks. Effluent wastewater samples are collected from a valve located just after the wastewater passes through the Salsnes filter.

4.3.4.2 *Sewage Sludge Sampling*

Sewage sludge collected in a trailer located beneath the filter room of the WWTP. Sewage sludge samples are collected directly from the trailer by immersing the sample bottle into the sludge neck first to a depth of 5 to 10 cm. The sampling container is filled with sludge and the sample bottle is raised neck first to prevent sample spillage.

4.3.4.3 *West 40 Landfill Runoff Sampling*

Landfill run-off is collected in the on-site detention ponds. The run-off is then pumped to the retention pond located across the road from the landfill. The landfill runoff sample bottles are filled with the discharge during the decanting period. When a Geotube is used, the samples are taken from the geotube discharge (after filtration). Three water samples are collected during each decant, including a sample at the start, mid-point and at the end.

4.4 Sample Handling, Preservation, and Shipping

All water samples are collected in laboratory-supplied containers with the proper preservative, where applicable. A complete list of parameters for handling and preservation can be found in Appendix B: Environmental Monitoring Program Checklists.

All sample containers are tightly sealed and properly labelled with the following information:

- Sample ID;
- Date and time of sample collection;
- Location of sample collection (i.e. location and monitoring station number);
- Parameters to be analyzed;

The main objective of the sampler is to minimize any chemical changes to the sample between the time it is collected and delivery to the laboratory. The outside of the bottles are cleaned with soap and water after sampling and prior to placing the samples in the cooler. The samples are stored on ice in a cooler until delivery to the laboratory. Upon arrival at the laboratory, samples shall be refrigerated as soon as possible. A chain of custody form is filled out completely and is used to track the samples.

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 odours, 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.

4.5 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 including: blind duplicates, field blanks, and trip blanks. A blind duplicate is a duplicate sample that is not labelled as such. The purpose of the blind duplicate sample is to ensure analytical precision. A field blank is a sample of analyte free (i.e., clean) water poured into the container in the field, preserved and shipped to the laboratory with field samples and is analyzed along with field samples to check contamination from field conditions during sampling. A trip blank is a clean water sample that stays unopened and that remains with collected samples during transportation and is analyzed along with field samples to check residual contamination (i.e., to determine if cross contamination occurs during shipping).

The following number of quality control samples have been recommended based on the number of samples collected:

- One trip blank per cooler.
- One field blank per cooler.
- 10% blind duplicates.

If the total number of samples collected is less than five, include at a minimum, one blind duplicate.

5 Lab Analysis

5.1 Lab Information

The Laboratory the City uses to analyze the samples to fulfill the Monitoring Program requirements is Caduceon Environmental Laboratories (Ottawa). Their contact information is as follows:

Caduceon Environmental Laboratories (Ottawa)
2378 Holly Lane
Ottawa, ON
K1V 7P1
Tel: 613-526-0123

5.2 Lab Accreditation

As previously indicated, the City of Iqaluit uses an analytical laboratory accredited by the Canadian Association for Laboratory Accreditation (CALA); formally known as the Canadian Association for Environmental Analytical Laboratories (CAEAL) in Ottawa, Ontario for the monitoring program for NWB Licence 3AM-IQA1626. Appendix D: Laboratory Accreditation & Supporting Documentation includes a copy of the laboratory's CALA accreditation certificate and a list of the parameters for which they are certified, as well as a letter of support confirming the laboratories testing capabilities.

5.3 Detection Limits

Details on the calculation of the Method Detection Limits (MDLs) and the establishment of the Method Reporting Limits (MRLs) can be found in Appendix D: Laboratory Accreditation & Supporting Documentation.

5.4 Methodology

Current (2012) standard methodology is used by the contract laboratory. Details on the methods used can be found in the Accreditation documentation found in Appendix D: Laboratory Accreditation & Supporting Documentation.

6 Reporting Requirements

6.1 General Submissions

As a condition of NWB Licence 3AM-IQA1626 (Appendix E: City of Iqaluit Water Licence), the City is required to submit an Annual Report formulated in accordance with the requirements under Schedule B of the Licence to the NWB. The objective of the Annual Report is to document the environmental monitoring, pursuant to the NWB licence, undertaken by the City during the period. A copy of the 2017 Annual Report is included in Appendix F: 2017 Annual Report for reference.

Appendix A: Site Plan

FIGURE 1
SITE LOCATION

FIGURE 2
SITE LOCATION – WATER TREATMENT PLANT

FIGURE 3
SITE LOCATION – WASTE WATER TREATMENT PLANT

FIGURE 4
SITE LOCATION - WEST 40 LANDFILL

Appendix B: Environmental Monitoring Program Checklists

CITY OF IQALUIT
WTP RAW WATER MONITORING PROGRAM CHECKLIST

PRE-SAMPLING ACTIVITIES		
Bottling 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 Table 1 of Schedule I of Nunavut Water Board Licence 3AM-IQA1626)	☐
Personal Protective 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 the bottle shipment has arrived from the contract laboratory in time for the sampling program and verify the integrity of all sampling containers. Report any missing or broken bottles to the contract laboratory as soon as possible, so that replacement bottles may be shipped.	☐
Sampling Location Inspection	Perform an initial inspection of the sampling location before the commencement of the monitoring program. Make note of any equipment damage or conditions that may prevent the collection of the environmental monitoring program samples.	☐
GENERAL SAMPLING INSTRUCTIONS		
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 sample containers are filled at each sampling location. Sampling equipment such as sampling poles should be cleaned with soap and water after each sample is collected to prevent cross-contamination.	☐
Sample Care	All sample containers should be tightly sealed and properly labelled with the 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 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. Keep the last page and give it to the Foreman.	☐
WATER TREATMENT PLANT (IQA-01) SAMPLING INSTRUCTIONS		
Note	**Complete the list below by 9:30 AM to ensure that the sampling package can be shipped to Ottawa in the same day.**	☐
Step 1	Obtain the test kit from the Purchasing Department the day before sample collection.	☐
Step 2	Label all sample bottles with the sample ID, date and time of sample collection, location of sample collection and parameters to be analyzed.	☐
Step 3	Locate the valve on the intake pipe into the Water Treatment Plant (see Photo below).	☐
Step 4	Fill all sample bottles to top (no headspace). Ensure that the valve is fully closed after collecting the water sample.	☐
Step 5	Wipe clean the outside of the sample bottles before packing the samples in the cooler for shipment to the laboratory.	☐
Step 6	Use ice or freezer packs to ensure that the samples are maintained below 10°C in the cooler during shipment to the laboratory.	☐
Step 7	Complete the Chain of Custody form, keep the last page for the Foreman and put the form into the cooler with the samples. Place Custody seals across the lip of the cooler lid and ensure you sign and date the seals.	☐

Step 8	Return the sampling package to the Purchasing Department.	☐
POST-SAMPLING ACTIVITIES		
Sample Shipment	Ensure all samples are shipped to the contract laboratory by priority freight immediately after the completion of the environmental monitoring event to ensure that the hold times are respected for the various parameters. Follow-up with the contract laboratory on the day after the samples were shipped to ensure that the samples were collected from the air cargo facility and received by the contract laboratory for analysis.	☐
Analytical Results	Ensure that the analytical results for the environmental monitoring program samples are received within the specified turn-around time. Follow-up with the contract laboratory if the results are not provided as expected to ensure timely reporting to the Nunavut Water Board (as required by Water Licence 3AM-IQA1626).	☐

Checklist Performed By:

Name	Signature	Date

CITY OF IQALUIT
SEWAGE LAGOON EFFLUENT DISCHARGE MONITORING PROGRAM CHECKLIST

PRE-SAMPLING ACTIVITIES		
Bottling 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 Table 1 of Schedule I of Nunavut Water Board Licence 3AM-IQA1626)	☐
Personal Protective 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 the bottle shipment has arrived from the contract laboratory in time for the sampling program and verify the integrity of all sampling containers. Report any missing or broken bottles to the contract laboratory as soon as possible, so that replacement bottles may be shipped.	☐
Sampling Location Inspection	Perform an initial inspection of the sampling location before the commencement of the monitoring program. Make note of any equipment damage or conditions that may prevent the collection of the environmental monitoring program samples.	☐
GENERAL SAMPLING INSTRUCTIONS		
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 sample containers are filled at each sampling location. Sampling equipment such as sampling poles should be cleaned with soap and water after each sample is collected to prevent cross-contamination.	☐
Sample Care	All sample containers should be tightly sealed and properly labelled with the 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 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. Keep the last page and give it to the Foreman.	☐
WATER TREATMENT PLANT (IQA-02) SAMPLING INSTRUCTIONS		
Note	**Complete the list below by 9:30 AM to ensure that the sampling package can be shipped to Ottawa in the same day.**	☐
Step 1	Obtain the test kit from the Purchasing Department the day before sample collection.	☐
Step 2	Label all sample bottles with the sample ID, date and time of sample collection, location of sample collection and parameters to be analyzed.	☐
Step 3	Locate the valve on the intake pipe into the Water Treatment Plant (see Photo below).	☐
Step 4	Fill all sample bottles to top (no headspace). Ensure that the valve is fully closed after collecting the water sample.	☐
Step 5	Wipe clean the outside of the sample bottles before packing the samples in the cooler for shipment to the laboratory.	☐
Step 6	Use ice or freezer packs to ensure that the samples are maintained below 10°C in the cooler during shipment to the laboratory.	☐
Step 7	Complete the Chain of Custody form, keep the last page for the Foreman and put the form into the cooler with the samples. Place Custody seals across the lip of the cooler lid and ensure you sign and date the seals.	☐

Step 8	Return the sampling package to the Purchasing Department.	☐
POST-SAMPLING ACTIVITIES		
Sample Shipment	Ensure all samples are shipped to the contract laboratory by priority freight immediately after the completion of the environmental monitoring event to ensure that the hold times are respected for the various parameters. Follow-up with the contract laboratory on the day after the samples were shipped to ensure that the samples were collected from the air cargo facility and received by the contract laboratory for analysis.	☐
Analytical Results	Ensure that the analytical results for the environmental monitoring program samples are received within the specified turn-around time. Follow-up with the contract laboratory if the results are not provided as expected to ensure timely reporting to the Nunavut Water Board (as required by Water Licence 3AM-IQA1626).	☐

Checklist Performed By:

Name	Signature	Date

CITY OF IQALUIT
WWTP EFFLUENT MONITORING PROGRAM CHECKLIST

PRE-SAMPLING ACTIVITIES		
Bottling 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 Table 1 of Schedule I of Nunavut Water Board Licence 3AM-IQA1626)	☐
Personal Protective 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 the bottle shipment has arrived from the contract laboratory in time for the sampling program and verify the integrity of all sampling containers. Report any missing or broken bottles to the contract laboratory as soon as possible, so that replacement bottles may be shipped.	☐
Sampling Location Inspection	Perform an initial inspection of the sampling location before the commencement of the monitoring program. Make note of any equipment damage or conditions that may prevent the collection of the environmental monitoring program samples.	☐
GENERAL SAMPLING INSTRUCTIONS		
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 sample containers are filled at each sampling location. Sampling equipment such as sampling poles should be cleaned with soap and water after each sample is collected to prevent cross-contamination.	☐
Sample Care	All sample containers should be tightly sealed and properly labelled with the 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 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. Keep the last page and give it to the Foreman.	☐
WATER TREATMENT PLANT (IQA-04) SAMPLING INSTRUCTIONS		
Note	**Complete the list below by 9:30 AM to ensure that the sampling package can be shipped to Ottawa in the same day.**	☐
Step 1	Obtain the test kit from the Purchasing Department the day before sample collection.	☐
Step 2	Label all sample bottles with the sample ID, date and time of sample collection, location of sample collection and parameters to be analyzed.	☐
Step 3	Locate the valve on the intake pipe into the Water Treatment Plant (see Photo below).	☐
Step 4	Fill all sample bottles to top (no headspace). Ensure that the valve is fully closed after collecting the water sample.	☐
Step 5	Wipe clean the outside of the sample bottles before packing the samples in the cooler for shipment to the laboratory.	☐
Step 6	Use ice or freezer packs to ensure that the samples are maintained below 10°C in the cooler during shipment to the laboratory.	☐
Step 7	Complete the Chain of Custody form, keep the last page for the Foreman and put the form into the cooler with the samples. Place Custody seals across the lip of the cooler lid and ensure you sign and date the seals.	☐

Step 8	Return the sampling package to the Purchasing Department.	☐
POST-SAMPLING ACTIVITIES		
Sample Shipment	Ensure all samples are shipped to the contract laboratory by priority freight immediately after the completion of the environmental monitoring event to ensure that the hold times are respected for the various parameters. Follow-up with the contract laboratory on the day after the samples were shipped to ensure that the samples were collected from the air cargo facility and received by the contract laboratory for analysis.	☐
Analytical Results	Ensure that the analytical results for the environmental monitoring program samples are received within the specified turn-around time. Follow-up with the contract laboratory if the results are not provided as expected to ensure timely reporting to the Nunavut Water Board (as required by Water Licence 3AM-IQA1626).	☐

Checklist Performed By:

Name	Signature	Date

CITY OF IQALUIT
WWTP INFLUENT MONITORING PROGRAM CHECKLIST

PRE-SAMPLING ACTIVITIES		
Bottling 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 Table 1 of Schedule I of Nunavut Water Board Licence 3AM-IQA1626)	☐
Personal Protective 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 the bottle shipment has arrived from the contract laboratory in time for the sampling program and verify the integrity of all sampling containers. Report any missing or broken bottles to the contract laboratory as soon as possible, so that replacement bottles may be shipped.	☐
Sampling Location Inspection	Perform an initial inspection of the sampling location before the commencement of the monitoring program. Make note of any equipment damage or conditions that may prevent the collection of the environmental monitoring program samples.	☐
GENERAL SAMPLING INSTRUCTIONS		
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 sample containers are filled at each sampling location. Sampling equipment such as sampling poles should be cleaned with soap and water after each sample is collected to prevent cross-contamination.	☐
Sample Care	All sample containers should be tightly sealed and properly labelled with the 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 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. Keep the last page and give it to the Foreman.	☐
WATER TREATMENT PLANT (IQA-05) SAMPLING INSTRUCTIONS		
Note	**Complete the list below by 9:30 AM to ensure that the sampling package can be shipped to Ottawa in the same day.**	☐
Step 1	Obtain the test kit from the Purchasing Department the day before sample collection.	☐
Step 2	Label all sample bottles with the sample ID, date and time of sample collection, location of sample collection and parameters to be analyzed.	☐
Step 3	Locate the valve on the intake pipe into the Water Treatment Plant (see Photo below).	☐
Step 4	Fill all sample bottles to top (no headspace). Ensure that the valve is fully closed after collecting the water sample.	☐
Step 5	Wipe clean the outside of the sample bottles before packing the samples in the cooler for shipment to the laboratory.	☐
Step 6	Use ice or freezer packs to ensure that the samples are maintained below 10°C in the cooler during shipment to the laboratory.	☐
Step 7	Complete the Chain of Custody form, keep the last page for the Foreman and put the form into the cooler with the samples. Place Custody seals across the lip of the cooler lid and ensure you sign and date the seals.	☐

Step 8	Return the sampling package to the Purchasing Department.	☐
POST-SAMPLING ACTIVITIES		
Sample Shipment	Ensure all samples are shipped to the contract laboratory by priority freight immediately after the completion of the environmental monitoring event to ensure that the hold times are respected for the various parameters. Follow-up with the contract laboratory on the day after the samples were shipped to ensure that the samples were collected from the air cargo facility and received by the contract laboratory for analysis.	☐
Analytical Results	Ensure that the analytical results for the environmental monitoring program samples are received within the specified turn-around time. Follow-up with the contract laboratory if the results are not provided as expected to ensure timely reporting to the Nunavut Water Board (as required by Water Licence 3AM-IQA1626).	☐

Checklist Performed By:

Name	Signature	Date

CITY OF IQALUIT
SEWAGE SLUDGE MONITORING PROGRAM CHECKLIST

PRE-SAMPLING ACTIVITIES		
Bottling 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 Table 1 of Schedule I of Nunavut Water Board Licence 3AM-IQA1626)	☐
Personal Protective 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 the bottle shipment has arrived from the contract laboratory in time for the sampling program and verify the integrity of all sampling containers. Report any missing or broken bottles to the contract laboratory as soon as possible, so that replacement bottles may be shipped.	☐
Sampling Location Inspection	Perform an initial inspection of the sampling location before the commencement of the monitoring program. Make note of any equipment damage or conditions that may prevent the collection of the environmental monitoring program samples.	☐
GENERAL SAMPLING INSTRUCTIONS		
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 sample containers are filled at each sampling location. Sampling equipment such as sampling poles should be cleaned with soap and water after each sample is collected to prevent cross-contamination.	☐
Sample Care	All sample containers should be tightly sealed and properly labelled with the 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 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. Keep the last page and give it to the Foreman.	☐
WATER TREATMENT PLANT (IQA-06) SAMPLING INSTRUCTIONS		
Note	**Complete the list below by 9:30 AM to ensure that the sampling package can be shipped to Ottawa in the same day.**	☐
Step 1	Obtain the test kit from the Purchasing Department the day before sample collection.	☐
Step 2	Label all sample bottles with the sample ID, date and time of sample collection, location of sample collection and parameters to be analyzed.	☐
Step 3	Locate the valve on the intake pipe into the Water Treatment Plant (see Photo below).	☐
Step 4	Fill all sample bottles to top (no headspace). Ensure that the valve is fully closed after collecting the water sample.	☐
Step 5	Wipe clean the outside of the sample bottles before packing the samples in the cooler for shipment to the laboratory.	☐
Step 6	Use ice or freezer packs to ensure that the samples are maintained below 10°C in the cooler during shipment to the laboratory.	☐
Step 7	Complete the Chain of Custody form, keep the last page for the Foreman and put the form into the cooler with the samples. Place Custody seals across the lip of the cooler lid and ensure you sign and date the seals.	☐

Step 8	Return the sampling package to the Purchasing Department.	☐
POST-SAMPLING ACTIVITIES		
Sample Shipment	Ensure all samples are shipped to the contract laboratory by priority freight immediately after the completion of the environmental monitoring event to ensure that the hold times are respected for the various parameters. Follow-up with the contract laboratory on the day after the samples were shipped to ensure that the samples were collected from the air cargo facility and received by the contract laboratory for analysis.	☐
Analytical Results	Ensure that the analytical results for the environmental monitoring program samples are received within the specified turn-around time. Follow-up with the contract laboratory if the results are not provided as expected to ensure timely reporting to the Nunavut Water Board (as required by Water Licence 3AM-IQA1626).	☐

Checklist Performed By:

Name	Signature	Date

CITY OF IQALUIT
WEST 40 LANDFILL MONITORING PROGRAM CHECKLIST

PRE-SAMPLING ACTIVITIES		
Bottling 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 Table 1 of Schedule I of Nunavut Water Board Licence 3AM-IQA1626)	☐
Personal Protective 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 the bottle shipment has arrived from the contract laboratory in time for the sampling program and verify the integrity of all sampling containers. Report any missing or broken bottles to the contract laboratory as soon as possible, so that replacement bottles may be shipped.	☐
Sampling Location Inspection	Perform an initial inspection of the sampling location before the commencement of the monitoring program. Make note of any equipment damage or conditions that may prevent the collection of the environmental monitoring program samples.	☐
GENERAL SAMPLING INSTRUCTIONS		
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 sample containers are filled at each sampling location. Sampling equipment such as sampling poles should be cleaned with soap and water after each sample is collected to prevent cross-contamination.	☐
Sample Care	All sample containers should be tightly sealed and properly labelled with the 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 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. Keep the last page and give it to the Foreman.	☐
WATER TREATMENT PLANT (IQA-08) SAMPLING INSTRUCTIONS		
Note	**Complete the list below by 9:30 AM to ensure that the sampling package can be shipped to Ottawa in the same day.**	☐
Step 1	Obtain the test kit from the Purchasing Department the day before sample collection.	☐
Step 2	Label all sample bottles with the sample ID, date and time of sample collection, location of sample collection and parameters to be analyzed.	☐
Step 3	Locate the valve on the intake pipe into the Water Treatment Plant (see Photo below).	☐
Step 4	Fill all sample bottles to top (no headspace). Ensure that the valve is fully closed after collecting the water sample.	☐
Step 5	Wipe clean the outside of the sample bottles before packing the samples in the cooler for shipment to the laboratory.	☐
Step 6	Use ice or freezer packs to ensure that the samples are maintained below 10°C in the cooler during shipment to the laboratory.	☐
Step 7	Complete the Chain of Custody form, keep the last page for the Foreman and put the form into the cooler with the samples. Place Custody seals across the lip of the cooler lid and ensure you sign and date the seals.	☐

Step 8	Return the sampling package to the Purchasing Department.	☐
POST-SAMPLING ACTIVITIES		
Sample Shipment	Ensure all samples are shipped to the contract laboratory by priority freight immediately after the completion of the environmental monitoring event to ensure that the hold times are respected for the various parameters. Follow-up with the contract laboratory on the day after the samples were shipped to ensure that the samples were collected from the air cargo facility and received by the contract laboratory for analysis.	☐
Analytical Results	Ensure that the analytical results for the environmental monitoring program samples are received within the specified turn-around time. Follow-up with the contract laboratory if the results are not provided as expected to ensure timely reporting to the Nunavut Water Board (as required by Water Licence 3AM-IQA1626).	☐

Checklist Performed By:

Name	Signature	Date

CITY OF IQALUIT
LANDFILL UP-GRADIENT STATION MONITORING PROGRAM CHECKLIST

PRE-SAMPLING ACTIVITIES		
Bottling 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 Table 1 of Schedule I of Nunavut Water Board Licence 3AM-IQA1626)	☐
Personal Protective 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 the bottle shipment has arrived from the contract laboratory in time for the sampling program and verify the integrity of all sampling containers. Report any missing or broken bottles to the contract laboratory as soon as possible, so that replacement bottles may be shipped.	☐
Sampling Location Inspection	Perform an initial inspection of the sampling location before the commencement of the monitoring program. Make note of any equipment damage or conditions that may prevent the collection of the environmental monitoring program samples.	☐
GENERAL SAMPLING INSTRUCTIONS		
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 sample containers are filled at each sampling location. Sampling equipment such as sampling poles should be cleaned with soap and water after each sample is collected to prevent cross-contamination.	☐
Sample Care	All sample containers should be tightly sealed and properly labelled with the 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 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. Keep the last page and give it to the Foreman.	☐
WATER TREATMENT PLANT (IQA-08A) SAMPLING INSTRUCTIONS		
Note	**Complete the list below by 9:30 AM to ensure that the sampling package can be shipped to Ottawa in the same day.**	☐
Step 1	Obtain the test kit from the Purchasing Department the day before sample collection.	☐
Step 2	Label all sample bottles with the sample ID, date and time of sample collection, location of sample collection and parameters to be analyzed.	☐
Step 3	Locate the valve on the intake pipe into the Water Treatment Plant (see Photo below).	☐
Step 4	Fill all sample bottles to top (no headspace). Ensure that the valve is fully closed after collecting the water sample.	☐
Step 5	Wipe clean the outside of the sample bottles before packing the samples in the cooler for shipment to the laboratory.	☐
Step 6	Use ice or freezer packs to ensure that the samples are maintained below 10°C in the cooler during shipment to the laboratory.	☐
Step 7	Complete the Chain of Custody form, keep the last page for the Foreman and put the form into the cooler with the samples. Place Custody seals across the lip of the cooler lid and ensure you sign and date the seals.	☐

Step 8	Return the sampling package to the Purchasing Department.	☐
POST-SAMPLING ACTIVITIES		
Sample Shipment	Ensure all samples are shipped to the contract laboratory by priority freight immediately after the completion of the environmental monitoring event to ensure that the hold times are respected for the various parameters. Follow-up with the contract laboratory on the day after the samples were shipped to ensure that the samples were collected from the air cargo facility and received by the contract laboratory for analysis.	☐
Analytical Results	Ensure that the analytical results for the environmental monitoring program samples are received within the specified turn-around time. Follow-up with the contract laboratory if the results are not provided as expected to ensure timely reporting to the Nunavut Water Board (as required by Water Licence 3AM-IQA1626).	☐

Checklist Performed By:

Name	Signature	Date

CITY OF IQALUIT LANDFILL DOWN-GRADIENT STATION MONITORING PROGRAM CHECKLIST		
PRE-SAMPLING ACTIVITIES		
Bottling 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 Table 1 of Schedule I of Nunavut Water Board Licence 3AM-IQA1626)	☐
Personal Protective 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 the bottle shipment has arrived from the contract laboratory in time for the sampling program and verify the integrity of all sampling containers. Report any missing or broken bottles to the contract laboratory as soon as possible, so that replacement bottles may be shipped.	☐
Sampling Location Inspection	Perform an initial inspection of the sampling location before the commencement of the monitoring program. Make note of any equipment damage or conditions that may prevent the collection of the environmental monitoring program samples.	☐
GENERAL SAMPLING INSTRUCTIONS		
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 sample containers are filled at each sampling location. Sampling equipment such as sampling poles should be cleaned with soap and water after each sample is collected to prevent cross-contamination.	☐
Sample Care	All sample containers should be tightly sealed and properly labelled with the 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 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. Keep the last page and give it to the Foreman.	☐
WATER TREATMENT PLANT (IQA-08B) SAMPLING INSTRUCTIONS		
Note	**Complete the list below by 9:30 AM to ensure that the sampling package can be shipped to Ottawa in the same day.**	☐
Step 1	Obtain the test kit from the Purchasing Department the day before sample collection.	☐
Step 2	Label all sample bottles with the sample ID, date and time of sample collection, location of sample collection and parameters to be analyzed.	☐
Step 3	Locate the valve on the intake pipe into the Water Treatment Plant (see Photo below).	☐
Step 4	Fill all sample bottles to top (no headspace). Ensure that the valve is fully closed after collecting the water sample.	☐
Step 5	Wipe clean the outside of the sample bottles before packing the samples in the cooler for shipment to the laboratory.	☐
Step 6	Use ice or freezer packs to ensure that the samples are maintained below 10°C in the cooler during shipment to the laboratory.	☐
Step 7	Complete the Chain of Custody form, keep the last page for the Foreman and put the form into the cooler with the samples. Place Custody seals across the lip of the cooler lid and ensure you sign and date the seals.	☐

Step 8	Return the sampling package to the Purchasing Department.	☐
POST-SAMPLING ACTIVITIES		
Sample Shipment	Ensure all samples are shipped to the contract laboratory by priority freight immediately after the completion of the environmental monitoring event to ensure that the hold times are respected for the various parameters. Follow-up with the contract laboratory on the day after the samples were shipped to ensure that the samples were collected from the air cargo facility and received by the contract laboratory for analysis.	☐
Analytical Results	Ensure that the analytical results for the environmental monitoring program samples are received within the specified turn-around time. Follow-up with the contract laboratory if the results are not provided as expected to ensure timely reporting to the Nunavut Water Board (as required by Water Licence 3AM-IQA1626).	☐

Checklist Performed By:

Name	Signature	Date

Sample Bottle Requirements

Water					
Parameter	**Bottle**	**Bottle Size (mL)**	**Preservative/Instructions**	**Store**	**Hold Time**
Acidity	P, G	250-1000		C	14d
Alkalinity	P, G	250-1000		C	7d
Anions	P, G	250-1000		C	7d
BOD5/CBOD5	P, G	1000		C	5d
Chlorine, residual	P, G	250-1000	No headspace	C	N.S.
Chromium VI	P	125	NaOH	C	24h
Chromium VI - O.Reg 153	P	125	(NH4)2SO4/NH4OH field filter for GW	C	28d
COD	A, TL	125	H2SO4 to pH < 2	C	28d
Colour	P, G	250-1000		C	7d
Conductivity	P, G	250-1000		C	14d
Cyanide, Total or Free	P	125	NaOH to pH > 12	C	14d
DOC/DIC	A, TL	125		C	28d
Hardness	P, G	250-1000			28d
HPLC Parameters	P	1000	Na2S2O3	C	14d
Mercury	P, G	125	HCl to pH < 2, field filter for GW or SW		14d
Metals, general	P	125	HNO3 to pH < 2, field filter for GW		28d
Microbiology	P, S	300	Na2S2O3, 100mL min. vol./parameter	C	48h
Minerals - Ca, Mg, Na, K	P, G	250-1000			28d
Nitrogen, Total Ammonia or TKN	P	125	H2SO4 to pH < 2	C	14d
OC Pesticides	A, TL	1000		C	14d
Oil & Grease	A, TL	1000		C	14d
OP Pesticides	A, TL	1000		C	14d
Petroleum Hydrocarbons - F1	A, ST	2 x 40	No headspace	C	7d
Petroleum Hydrocarbons - F2 - F4	A, TL	1000		C	7d
pH	P, G	250-1000	14-day hold time for DW/GW, 4-day for other	C	14d/4d
Phenols, colourmetric	A, TL	125	H2SO4 to pH < 2	C	28d
Phosphorus, dissolved reactive	P, G	250-1000	Field filter for GW or SW	C	28d
Phosphorus, total	P	125	H2SO4 to pH < 2	C	28d
Polychlorinated Biphenyls (PCBs)	A, TL	1000		C	14d
Semi-Volatiles, incl. PAH	A, TL	1000		C	14d
Solids	P, G	250-1000		C	28d
Sulphide	P	125	NaOH/zinc acetate to pH >9	C	14d
Triazine Herbicides	A, TL	1000		C	14d
Turbidity	P, G	250-1000		C	48h
Volatiles, BTEX, 624	A, ST	2 x 40	No headspace	C	7d
Soil/Solids					
Parameter	**Jar**	**Jar Size (mL)**	**Preservative**	**Store**	**Hold Time**
Agricultural Soil - Nutrients	P, G	250-1000			28d
Carbon, Organic - TOC	P, G	250		C	28d
Chromium VI	P, G	250			28d
Cyanide, Total and Free	P, G	250		C	14d
Hydrometer	P, G	500			28d
Mercury	P, G	250			28d
Metals, general	P, G	250			28d
TKN	P, G	250		C	14d
Nitrogen, Total Ammonia	P, G	250		C	28d
OC Pesticides	A, TL	250		C	14d
Oil & Grease	A, TL	250		C	14d
Petroleum Hydrocarbons - F1	A, ST	2 x 40 + 250	Methanol in glass vials, extra 250mL for moisture	C	14d
Petroleum Hydrocarbons - F2 - F4	A, TL	250		C	14d
pH	P, G	250			7d
Phosphorus, total or extractable	P, G	250		C	28d
Polychlorinated Biphenyls (PCBs)	A, TL	250		C	14d
Regulation 347/558 - Metals	A, TL	250			28d
Regulation 347/558 - PCBs	A, TL	250		C	14d
Regulation 347/558 - Semi-Volatiles	A, TL	250		C	14d
Regulation 347/558 - Volatiles	A, TL	250		C	14d
Semi-Volatiles, incl. PAH	A, TL	250		C	14d
Sieve Analysis	P, G	500			28d
Triazine Herbicides	A, TL	250		C	14d
Volatiles, BTEX, 624	A, ST	2 x 40 + 250	Methanol in glass vials, extra 250mL for moisture	C	14d

G=Glass P=Plastic A=Amber Glass TL=Teflon Lined ST=Septum Top S=Sterile C=Cold N.S=No Storage All volumes are listed in mL. Please contact the laboratory for parameters not listed. It is recommended that all samples be kept between 4 and 10°C to ensure sample integrity. Please do not freeze samples unless otherwise instructed. Bottles may be shared provided that the minimum sample volumes are met. Please contact the lab for further information.

Appendix C: Monitoring Program Sampling Schedule

Station ID	Description	Parameters	Testing/ Measurement Frequency
IQA-01	Lake Geraldine Reservoir, Raw Water	Alkalinity, Acidity, Chloride, Carbonate, Bicarbonate, Total Hardness, Hydroxide, Sulphate, TSS, TDS, TOC, TIC, Fecal Coliform, ICP Metals, TSS, Volume	Monthly
IQA-02	Sewage Lagoon, Effluent Discharge Point	Biochemical Oxygen Demand, Total and Fecal Coliform, Ammonia-N, Nitrate-N, Nitrile-N, Total Phosphorous, Orthophosphate, TSS, Temperature, Conductivity, pH, Full Metals Scan	Once prior discharge; once during discharge; and once prior to the completion of discharge
		Volume	During decant
IQA-04	Wastewater Treatment Plant, Effluent	Biochemical Oxygen Demand, Total and Fecal Coliform, Ammonia-N, Nitrate-N, Nitrile-N, Total Phosphorous, Orthophosphate, TSS, Temperature Conductivity, pH, Full Metal Scan	Quarterly – prior to commissioning of WWTP
		Biochemical Oxygen Demand, Total and Fecal Coliform, Ammonia-N, Nitrate-N, Nitrile-N, Total Phosphorous, Orthophosphate, TSS, Temperature Conductivity, pH	Monthly – following commissioning of the WWTP
		pH (unionized ammonia concentration)	Annually – following commissioning of the WWTP
		Volume	During discharge
IQA-05	Wastewater Treatment Plant, Influent	Biochemical Oxygen Demand, Total and Fecal Coliform, TSS, Temperature Conductivity, pH, Ammonia-N, Nitrate-N, Nitrile-N, Total Phosphorous, Orthophosphate, Full Metal Scan	Biannually – prior to commissioning of the WWTP *(No testing requirements following commissioning of the WWTP)*
IQA-06	Sludge from WWTP	Biochemical Oxygen Demand, Total and Fecal Coliform, TSS, Temperature Conductivity, pH, Ammonia-N, Nitrate-N, Nitrile-N, Total Phosphorous, Orthophosphate, Full Metal Scan	Quarterly
IQA-08	West 40 Landfill – Effluent Discharge Point	Biochemical Oxygen Demand, Total and Fecal Coliform, TSS, Temperature Conductivity, pH, Ammonia-N, Nitrate-N, Nitrile-N, Total Phosphorous, Orthophosphate, Full Metal Scan, Volume, PCBs, Benzene, Toluene, Ethylbenzene, BTEX	Once prior to discharge; once during discharge; and once prior to completion of discharge
		Volume	During Discharge
IQA-08A	Station situated up-gradient of West 40 Landfill	Biochemical Oxygen Demand, Total and Fecal Coliform, TSS, Temperature Conductivity, pH, Ammonia-N, Nitrate-N, Nitrile-N, Total Phosphorous, Orthophosphate, Full Metal Scan, Volume, PCBs, Benzene, Toluene, Ethylbenzene, BTEX	Annually
IQA-08B	Station situated down-gradient of West 40 Landfill		

Appendix D: Laboratory Accreditation & Supporting Documentation

Method Detection Limit (MDL)

The Method Detection Limit (MDL) is calculated based on procedures as published by the Ontario Ministry of Environment in various documents. The MDL is a statistically derived level where measured results above this value indicate the presence of an analyte with a specified probability (confidence limit) and assumes there are no known sources of error in identification or biases in measurement. The confidence limit for this determination is 99% and is used to determine the multiplication factor used from Student's t-tables. The t-value depends on the amount of data used for the MDL determination with 8 being the minimum number of replicates for the calculation. The MDL must initially be estimated by the analyst based on, but not limited to the following; instrument sensitivity (e.g. a concentration that corresponds to a signal to noise value of 3:1), instrumental reproducibility, analyte recovery, sample types (matrices/interference), anticipated analyte levels, and any applicable regulatory requirements.

Method Reporting Limit (MRL)

The Method Reporting Limit (MRL) is be established as the lowest practical level of quantification for an analyte. The value of the MRL will be established at a level equal to or greater than the MDL. At no time can the MRL be lower than the MDL. The MRL will be established based on, but not limited to the following criteria:

- MDL & IDL.
- Sample matrix.
- Instrument operating conditions – stability, sensitivity etc.
- End use of data – historical data considerations.
- Regulatory reporting requirements.
- Analytical considerations – multi-parameter scan vs. single-parameter method.
- Consistency between analytical techniques – e.g. IC vs. Electrode, ICP-MS vs. ICP-AES.
- Preparation procedures – analyte recovery etc.

The MRL will be set at a level between 1 and 10 times the MDL as required. The MRL must be a measurable quantity and will be verified by analysis of a standard solution at the level of the MRL on a regular basis, generally, but not limited to, weekly analysis. This solution will typically be lower than the lowest calibration standard used, which must be < 10X the MRL, but in some cases may be the lowest calibration standard. The frequency and acceptable deviation of the verification solution will be method dependent and will be included in the individual SOPs. Any results below the MRL will be reported as <MRL. There will be no further indicators of results that are below the MRL but above the MDL.

CADUCEON™
ENVIRONMENTAL LABORATORIES
Client committed. Quality assured.

March 11th, 2019

Josip Deronja P. Eng.
Project Manager
Colliers Project Leaders
Suite 700, 150 Isabella Street
Ottawa, ON.
K1S 1V7

Dear Josip Deronja,

Caduceon Environmental Laboratories looks forward to aiding the City of Iqaluit in their environmental analysis. Caduceon staff have reviewed the PDF document entitled *"Quality Assurance/Quality Control Plan City of Iqaluit"* 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 by a CALA accredited Laboratory. Caduceon Environmental Laboratories are accredited for the majority of the parameters listed within the document. Those parameters for which Caduceon is not currently accredited will be subcontracted to an accredited lab.

Should you require any further information please feel to contact me at the coordinates listed in my signature below.

Thank you for providing us with the opportunity to work with the City of Iqaluit.

Regards,

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

cc: Tahir Yapici, Lab Supervisor
Ryan O'Donnell, Customer Service Representative
Damien Gilbert, CEO

CALA
Canadian Association for Laboratory Accreditation Inc.

CALA Directory of Laboratories

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; sburrows@caduceonlabs.com

Standard: Conforms with requirements of ISO/IEC 17025
Clients Served:
Revised On: February 25, 2019
Valid To: August 1, 2021

Scope of Accreditation

Air (Inorganic)
Metals - Air [Filter] (012)
D-ICP-02; modified from NIOSH 7303 and SM 3120 B
- ICP - DIGESTION
- Cadmium
- Copper
- Lead
- Zinc

Air (Inorganic)
Total Suspended Particulates - Air [Filter, Particulate] (018)
A-TSP-01; modified from ON MOECC E3288A
- GRAVIMETRIC
- Total Suspended Particulates

Dustfall
Dustfall - Dustfall (020)
A-DF-01; modified from ON MOECC E3043A
- FILTRATION - GRAVIMETRIC
- Insoluble Dustfall
- Total Dustfall

Fluoride Candles
Fluoride - Fluoride Candles (019)
A-FISE-01; modified from ON MOECC FSIE-1983D
- DIGESTION - ISE
- Fluoride

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Solids (Inorganic)
Anions - Solids [Biosolid, Soil] (069)
A-IC-01; modified from SM 4110 C
ION CHROMATOGRAPHY - EXTRACTION
Chloride
Nitrate
Nitrite
Sulphate

Solids (Inorganic)
Boron (Hot Water Soluble) - Solids [Soil] (098)
D-ICP-02; ON MOECC E3470
ICP/AES - EXTRACTION
Boron

Solids (Inorganic)
Conductivity - Solids [Sediment, Soil] (099)
A-COND-03; modified from ON MOECC E3530 and SM 2510 B
CONDUCTIVITY METER - EXTRACTION
Conductivity

Solids (Inorganic)
Extractable Anions - Solids (090)
A-IC-01; modified from EPA 1311 (PREPARATION) and SM 4110 C (ANALYSIS)
ION CHROMATOGRAPHY - TCLP
Nitrate
Nitrite

Solids (Inorganic)
Extractable Metals - Solids (091)
D-ICP-01; modified from EPA 1311 (PREPARATION) and SM 3120 B (ANALYSIS)
ICP/AES - TCLP
Arsenic
Barium
Beryllium
Boron
Cadmium
Chromium
Lead
Nickel
Silver
Zinc

Solids (Inorganic)
Extractable Metals - Solids (092)
D-ICPMS-01; modified from EPA 1311 (PREPARATION) and EPA 200.8 (ANALYSIS)
ICP/MS - TCLP
Antimony
Arsenic
Selenium
Uranium

Solids (Inorganic)
Extractable Metals - Solids (093)
D-HG-02; modified from EPA 1311 (PREPARATION) and SM 3112 B (ANALYSIS)
COLD VAPOUR AA - TCLP
Mercury

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Solids (Inorganic)
Flashpoint - Solids [Ash, Soil] (096)
C-FPCC-01; modified from ASTM D93
CLOSED CUP FLASH POINT TESTER
Flashpoint

Solids (Inorganic)
Hexavalent Chromium - Solids [Soil] (094)
D-CRVI-02; modified from EPA 3060A and EPA 7196A
COLORIMETRIC - MANUAL
Chromium VI

Solids (Inorganic)
Mercury - Solids [Biosolid, Soil] (017)
D-HG-01; modified from EPA 7471A
COLD VAPOUR AA - DIGESTION
Mercury

Solids (Inorganic)
Metals - Solids [Biosolid, Soil] (015)
D-ICP-02; modified from EPA 6010
ICP/OES - DIGESTION
Aluminum
Antimony
Arsenic
Barium
Beryllium
Boron
Cadmium
Calcium
Chromium
Cobalt
Copper
Iron
Lead
Magnesium
Manganese
Molybdenum
Nickel
Potassium
Silver
Sodium
Strontium
Tin
Titanium
Tungsten
Vanadium
Zinc

Solids (Inorganic)
pH - Solids [Sediment, Sludge, Soil] (100)
A-pH-03; modified from ON MOECC E3530 and SM 4500-H+
pH METER - EXTRACTION
pH

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Solids (Inorganic)
Total Metals - Solids [Biosolid, Soil] (070)
D-ICPMS-01; modified from EPA 6020
ICP/MS - DIGESTION
Antimony
Arsenic
Selenium
Silver
Thallium
Uranium

Solids (Organic)
Extractable Volatile Organic Compounds (VOC) - Solids (089)
C-VOC-02, C-VOC-01; modified from EPA 1311 (PREPARATION) and EPA 5030 (ANALYSIS) and EPA 8260 (ANALYSIS)
GC/MS - PURGE AND TRAP - TCLP
1,1-Dichloroethylene
1,2-Dichlorobenzene
1,2-Dichloroethane
1,4-Dichlorobenzene
Benzene
Carbon tetrachloride
Chlorobenzene
Chloroform
Dichloromethane
Methyl ethyl ketone
Tetrachloroethylene
Trichloroethylene
Vinyl chloride

Water (Inorganic) OSDWA †
Alkalinity - Water (088)
A-ALK-03; modified from SM 2320 B
AUTO TITRIMETRIC
Alkalinity (pH 4.5)

Water (Inorganic) OSDWA †
Anions - Water [Liquid Biosolid, Wastewater] (002)
A-IC-01; modified from SM 4110 C
ION CHROMATOGRAPHY
Bromide
Chloride
Fluoride
Nitrate
Nitrite
Sulfate

Water (Inorganic) OSDWA †
Carbon - Water (054)
C-OC-01; modified from EPA 415.2 and SM 5310 C
IR-UV-PERSULFATE
Organic Carbon

Water (Inorganic) OSDWA †
Chemical Oxygen Demand (COD) - Water (083)
C-COD-01; modified from SM 5220 D
COLORIMETRIC
COD

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Water (Inorganic) OSDWA †
Colour - Water (027)
A-COL-01; modified from SM 2120 C
SPECTROPHOTOMETRIC
True Colour

Water (Inorganic) OSDWA †
Conductivity - Water (003)
A-COND-01; modified from SM 2510 B
CONDUCTIVITY METER
Conductivity (25°C)

Water (Inorganic) OSDWA †
Conductivity - Water (087)
A-COND-02; modified from SM 2510 B
AUTO CONDUCTIVITY METER
Conductivity (25°C)

Water (Inorganic) OSDWA †
Dissolved and Extractable Metals - Water (004)
D-ICP-01; modified from SM 3120 B
ICP
Aluminum
Barium
Beryllium
Bismuth
Boron
Cadmium
Calcium
Chromium
Cobalt
Copper
Iron
Lead
Lithium
Magnesium
Manganese
Molybdenum
Nickel
Potassium
Silicon
Silver
Sodium
Strontium
Tin
Titanium
Tungsten
Vanadium
Yttrium
Zinc
Zirconium

Water (Inorganic) OSDWA †
Dissolved Metals - Water (049)
D-ICPMS-01; modified from EPA 200.8
ICP/MS
Antimony

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Arsenic
Barium
Beryllium
Cadmium
Chromium
Cobalt
Copper
Lead
Molybdenum
Selenium
Silver
Thallium
Uranium
Vanadium

Water (Inorganic)
Hexavalent Chromium - Water (095)
D-CRVI-01; modified from ON MOECC E3056
COLORIMETRIC - MANUAL
Hexavalent Chromium

Water (Inorganic) OSDWA †
Mercury - Water [Wastewater] (025)
D-HG-02; modified from SM 3112 B
COLD VAPOUR AA - DIGESTION
Mercury

Water (Inorganic) OSDWA †
pH - Water (086)
A-pH-02; modified from SM 4500-H+ B
AUTO - pH METER
pH

Water (Inorganic) OSDWA †
pH - Water [Liquid Biosolid, Wastewater] (005)
A-pH-01; modified from SM 4500-H+
pH METER
pH

Water (Inorganic)
Total Metals - Water [Liquid Biosolid, Wastewater] (067)
D-ICP-01; modified from SM 3120 B
ICP/AES - DIGESTION
Aluminum
Antimony
Arsenic
Barium
Beryllium
Bismuth
Boron
Cadmium
Calcium
Chromium
Cobalt
Copper
Iron
Lead
Lithium

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Magnesium
Manganese
Molybdenum
Nickel
Potassium
Silver
Sodium
Strontium
Tin
Titanium
Tungsten
Vanadium
Yttrium
Zinc
Zirconium

Water (Inorganic)
Total Metals - Water [Liquid Biosolid, Wastewater] (071)
D-ICPMS-01; modified from EPA 6020
ICP/MS - DIGESTION
Antimony
Arsenic
Barium
Beryllium
Cadmium
Chromium
Cobalt
Copper
Lead
Molybdenum
Selenium
Silver
Vanadium

Water (Inorganic) OSDWA †
Turbidity - Water (026)
A-TURB-01; modified from SM 2130 B
NEPHELOMETRY
Turbidity

Water (Microbiology) OSDWA †
Coliforms - Water (050)
B-ECTC-01; modified from ON MOECC E3407
MEMBRANE FILTRATION (DC)
Background Bacteria
Escherichia coli (E. coli)
Total Coliforms

Water (Microbiology) OSDWA †
Escherichia coli (E. coli) - Water (010)
B-MFEC-01; modified from ON MOECC E3371
MEMBRANE FILTRATION (EC)
Escherichia coli (E. coli)

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Water (Microbiology) OSDWA †
Fecal (Thermotolerant) Coliforms - Water (065)
B-MFFC-01; modified from ON MOECC E3371
MEMBRANE FILTRATION (mFC)
Fecal (Thermotolerant) Coliforms

Water (Microbiology) OSDWA †
Heterotrophic Plate Count (HPC) - Water (021)
B-HPC-01; modified from SM 9215 C
SPREAD PLATE
Heterotrophic Plate Count (HPC)

Water (Microbiology) OSDWA †
Total Coliforms - Water (066)
B-MFTC-01; modified from ON MOECC E3371
MEMBRANE FILTRATION (mENDO)
Background Counts
Total Coliforms

Water (Organic) OSDWA †
Volatile Organic Compounds (VOC) - Water (041)
C-VOC-01, C-VOC-02; modified from EPA 5030 and EPA 8260
GC/MS - PURGE AND TRAP
1,1-Dichloroethane
1,1-dichloroethylene
1,1-Dichloropropene
1,1,1-Trichloroethane
1,1,1,2-Tetrachloroethane
1,1,2-Trichloroethane
1,1,2,2-Tetrachloroethane
1,2-Dibromo-3-chloropropane (DBCP)
1,2-dichlorobenzene
1,2-dichloroethane
1,2-Dichloropropane
1,2,3-Trichlorobenzene
1,2,3-Trichloropropane
1,2,4-Trichlorobenzene
1,2,4-Trimethylbenzene
1,3-Dichlorobenzene
1,3-Dichloropropane
1,3,5-Trimethylbenzene
1,4-dichlorobenzene
2-Chlorotoluene
2-Hexanone (MBK)
2,2-Dichloropropane
4-Chlorotoluene
4-Isopropyltoluene
Acetone (2-Propanone)
Benzene
Bromobenzene
Bromodichloromethane
Bromoform
Bromomethane
Carbon Tetrachloride
Chlorobenzene
Chlorodibromomethane

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Chloroform
Chloromethane
cis-1,2-Dichloroethylene
cis-1,3-Dichloropropene
Dibromomethane
Dichlorodifluoromethane
Dichloromethane
Ethylbenzene
Ethylene Dibromide
Hexachlorobutadiene
Hexane
Isopropylbenzene
m/p-xylene
Methyl Ethyl Ketone
Methyl isobutyl Ketone
Methyl t-butyl ether
n-Butylbenzene
n-Propylbenzene
Naphthalene
o-xylene
sec-Butylbenzene
Styrene
tert-Butylbenzene
Tetrachloroethylene
Toluene
trans-1,2-Dichloroethylene
trans-1,3-Dichloropropene
Trichloroethylene
Trichlorofluoromethane
Vinyl Chloride

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Fax: (416) 235 - 6519

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Ontario

Drinking-Water Testing Licence

Under the Drinking-Water Testing Services Regulation, O. Reg. 248/03 and the Safe Drinking Water Act, 2002

Licence #: 2232
This supercedes licence issued: Aug 31, 2018
Licensee: Caduceon Enterprises Inc.

Located at: 2378 Holly Lane
Ottawa ON K1V 7P1
Canada

The licensee is authorized to conduct the following drinking-water tests at the laboratory:

Class: Inorganic	Technique - Sub-Technique:
Alkalinity	Titrimetry-Automated titration Method
Lab Method Code: A-ALK-03	**Appendix #:** C088
Aluminum	ICP-AES, (Total-non-digested)
Lab Method Code: D-ICP-01	**Appendix #:** C004
Anions	Calculation-Sum
Lab Method Code: CP-028	**Appendix #:** N/A
Antimony	ICP-MS, (Total-non-digested)
Lab Method Code: D-ICPMS-01	**Appendix #:** C049
Arsenic	ICP-MS, (Total-non-digested)
Lab Method Code: D-ICPMS-01	**Appendix #:** C049
Barium	ICP-MS, (Total-non-digested)
Lab Method Code: D-ICPMS-01	**Appendix #:** C049
Barium	ICP-AES, (Total-non-digested)
Lab Method Code: D-ICP-01	**Appendix #:** C004
Beryllium	ICP-AES, (Total-non-digested)
Lab Method Code: D-ICP-01	**Appendix #:** C004
Beryllium	ICP-MS, (Total-non-digested)
Lab Method Code: D-ICPMS-01	**Appendix #:** C049

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Class: Inorganic	Technique - Sub-Technique:
Bismuth	ICP-AES, (Total-non-digested)
Lab Method Code: D-ICP-01	**Appendix #:** C004
Boron	ICP-AES, (Total-non-digested)
Lab Method Code: D-ICP-01	**Appendix #:** C004
Bromide	IC
Lab Method Code: A-IC-01	**Appendix #:** C002
Cadmium	ICP-MS, (Total-non-digested)
Lab Method Code: D-ICPMS-01	**Appendix #:** C049
Calcium	ICP-AES, (Total-non-digested)
Lab Method Code: D-ICP-01	**Appendix #:** C004
Carbon; dissolved organic	-IR- automated
Lab Method Code: C-OC-01	**Appendix #:** C054
Carbon; total organic	-IR- automated
Lab Method Code: C-OC-01	**Appendix #:** C054
Cations	Calculation-Sum
Lab Method Code: CP-028	**Appendix #:** N/A
Chloride	IC
Lab Method Code: A-IC-01	**Appendix #:** C002
Chromium	ICP-AES, (Total-non-digested)
Lab Method Code: D-ICP-01	**Appendix #:** C004
Chromium	ICP-MS, (Total-non-digested)
Lab Method Code: D-ICPMS-01	**Appendix #:** C049
Cobalt	ICP-AES, (Total-non-digested)
Lab Method Code: D-ICP-01	**Appendix #:** C004
Cobalt	ICP-MS, (Total-non-digested)
Lab Method Code: D-ICPMS-01	**Appendix #:** C049
Conductivity Estimated	Calculation
Lab Method Code: CP-028	**Appendix #:** N/A

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Class: Inorganic	Technique - Sub-Technique:
Copper	ICP-MS, (Total-non-digested)
Lab Method Code: D-ICPMS-01	**Appendix #:** C049
Copper	ICP-AES, (Total-non-digested)
Lab Method Code: D-ICP-01	**Appendix #:** C004
Fluoride	IC
Lab Method Code: A-IC-01	**Appendix #:** C002
Ion Sum	Calculation-% Difference
Lab Method Code: CP-028	**Appendix #:** N/A
Iron	ICP-AES, (Total-non-digested)
Lab Method Code: D-ICP-01	**Appendix #:** C004
Lead	ICP-MS, (Total-non-digested)
Lab Method Code: D-ICPMS-01	**Appendix #:** C049
Lithium	ICP-AES, (Total-non-digested)
Lab Method Code: D-ICP-01	**Appendix #:** C004
Magnesium	ICP-AES, (Total-non-digested)
Lab Method Code: D-ICP-01	**Appendix #:** C004
Manganese	ICP-AES, (Total-non-digested)
Lab Method Code: D-ICP-01	**Appendix #:** C004
Mercury	AA-Flameless, Cold Vapour
Lab Method Code: D-HG-02	**Appendix #:** C025
Molybdenum	ICP-AES, (Total-non-digested)
Lab Method Code: D-ICP-01	**Appendix #:** C004
Molybdenum	ICP-MS, (Total-non-digested)
Lab Method Code: D-ICPMS-01	**Appendix #:** C049
Nickel	ICP-AES, (Total-non-digested)
Lab Method Code: D-ICP-01	**Appendix #:** C004
Nitrate (as nitrogen)	IC
Lab Method Code: A-IC-01	**Appendix #:** C002

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Class: Inorganic	Technique - Sub-Technique:
Nitrite (as nitrogen)	IC
Lab Method Code: A-IC-01	**Appendix #:** C002
Nitrogen; nitrate+nitrite	Calculation
Lab Method Code: A-IC-01	**Appendix #:** NA
Potassium	ICP-AES, (Total-non-digested)
Lab Method Code: D-ICP-01	**Appendix #:** C004
Selenium	ICP-MS, (Total-non-digested)
Lab Method Code: D-ICPMS-01	**Appendix #:** C049
Silica	Calculation-ICP-AES, (Total-non-digested)
Lab Method Code: D-ICP-01	**Appendix #:** C004
Silicon	ICP-AES, (Total-non-digested)
Lab Method Code: D-ICP-01	**Appendix #:** C004
Silver	ICP-MS, (Total-non-digested)
Lab Method Code: D-ICPMS-01	**Appendix #:** C049
Sodium	ICP-AES, (Total-non-digested)
Lab Method Code: D-ICP-01	**Appendix #:** C004
Strontium	ICP-AES, (Total-non-digested)
Lab Method Code: D-ICP-01	**Appendix #:** C004
Sulphate	IC
Lab Method Code: A-IC-01	**Appendix #:** C002
Thallium	ICP-MS, (Total-non-digested)
Lab Method Code: D-ICPMS-01	**Appendix #:** C049
Tin	ICP-AES, (Total-non-digested)
Lab Method Code: D-ICP-01	**Appendix #:** C004
Titanium	ICP-AES, (Total-non-digested)
Lab Method Code: D-ICP-01	**Appendix #:** C004
Tungsten	ICP-AES, (Total-non-digested)
Lab Method Code: D-ICP-01	**Appendix #:** C004

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Class: Inorganic	Technique - Sub-Technique:	
Uranium	ICP-MS, (Total-non-digested)	
Lab Method Code: D-ICPMS-01	**Appendix #:** C049	
Vanadium	ICP-MS, (Total-non-digested)	
Lab Method Code: D-ICPMS-01	**Appendix #:** C049	
Vanadium	ICP-AES, (Total-non-digested)	
Lab Method Code: D-ICP-01	**Appendix #:** C004	
Yttrium	ICP-AES, (Total-non-digested)	
Lab Method Code: D-ICP-01	**Appendix #:** C004	
Zinc	ICP-AES, (Total-non-digested)	
Lab Method Code: D-ICP-01	**Appendix #:** C004	
Zirconium	ICP-AES, (Total-non-digested)	
Lab Method Code: D-ICP-01	**Appendix #:** C004	

Class: Microbiological	Technique - Sub-Technique:	
E. coli	MF-ec broth	
Lab Method Code: B-MFEC-01	**Appendix #:** C010	
E. coli	MF-DC	
Lab Method Code: B-ECTC-01	**Appendix #:** C050	
Fecal coliforms	MF-mFC	
Lab Method Code: B-MFFC-01	**Appendix #:** C065	
HPC	Spread Plate	
Lab Method Code: B-HPC-01	**Appendix #:** C021	
Total coliform	MF-DC	
Lab Method Code: B-ECTC-01	**Appendix #:** C050	
Total coliform	MF-mEndo	
Lab Method Code: B-MFTC-01	**Appendix #:** C066	
Total coliform background	MF-DC	
Lab Method Code: B-ECTC-01	**Appendix #:** C050	
Total coliform background	MF-mEndo	
Lab Method Code: B-MFTC-01	**Appendix #:** C066	

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Class: Organic	Technique - Sub-Technique:	
1,1,1,2-tetrachloroethane	PTGC-MS	
Lab Method Code: C-VOC-01		**Appendix #:** C041
1,1,1-trichloroethane	PTGC-MS	
Lab Method Code: C-VOC-01		**Appendix #:** C041
1,1,2,2-tetrachloroethane	PTGC-MS	
Lab Method Code: C-VOC-01		**Appendix #:** C041
1,1,2-trichloroethane	PTGC-MS	
Lab Method Code: C-VOC-01		**Appendix #:** C041
1,1-dichloroethane	PTGC-MS	
Lab Method Code: C-VOC-01		**Appendix #:** C041
1,1-dichloroethene	PTGC-MS	
Lab Method Code: C-VOC-01		**Appendix #:** C041
1,2,4-trichlorobenzene	PTGC-MS	
Lab Method Code: C-VOC-01		**Appendix #:** C041
1,2-dibromoethane	PTGC-MS	
Lab Method Code: C-VOC-01		**Appendix #:** C041
1,2-dichlorobenzene	PTGC-MS	
Lab Method Code: C-VOC-01		**Appendix #:** C041
1,2-dichloroethane	PTGC-MS	
Lab Method Code: C-VOC-01		**Appendix #:** C041
1,2-dichloropropane	PTGC-MS	
Lab Method Code: C-VOC-01		**Appendix #:** C041
1,3-dichlorobenzene	PTGC-MS	
Lab Method Code: C-VOC-01		**Appendix #:** C041
1,4-dichlorobenzene	PTGC-MS	
Lab Method Code: C-VOC-01		**Appendix #:** C041
Benzene	PTGC-MS	
Lab Method Code: C-VOC-01		**Appendix #:** C041

Ministry of the Environment, Conservation and Parks

Compliance, Promotion and Support Branch
Laboratory Licensing and Compliance Program

125 Resources Rd.
Etobicoke ON M9P 3V6
Tel: (416) 235 - 6370
Fax: (416) 235 - 6519

Ministère de l'Environnement, de la Protection de la nature et des Parcs

Direction de la promotion de la conformité et du soutien
Programme de délivrance des permis et de conformité des laboratoires

125, Chemin Resources
Etobicoke ON M9P 3V6
Tél: (416) 235 - 6370
Téléc: (416) 235 - 6519

Ontario

Class: Organic	Technique - Sub-Technique:	
Bromobenzene	PTGC-MS	
Lab Method Code: C-VOC-01		**Appendix #:** C041
Bromodichloromethane	PTGC-MS	
Lab Method Code: C-VOC-01		**Appendix #:** C041
Bromoform	PTGC-MS	
Lab Method Code: C-VOC-01		**Appendix #:** C041
Carbon tetrachloride	PTGC-MS	
Lab Method Code: C-VOC-01		**Appendix #:** C041
Chloroform	PTGC-MS	
Lab Method Code: C-VOC-01		**Appendix #:** C041
cis-1,2-dichloroethene	PTGC-MS	
Lab Method Code: C-VOC-01		**Appendix #:** C041
cis-1,3-dichloropropene	PTGC-MS	
Lab Method Code: C-VOC-01		**Appendix #:** C041
Dibromochloromethane	PTGC-MS	
Lab Method Code: C-VOC-01		**Appendix #:** C041
Dichloromethane	PTGC-MS	
Lab Method Code: C-VOC-01		**Appendix #:** C041
Ethylbenzene	PTGC-MS	
Lab Method Code: C-VOC-01		**Appendix #:** C041
m/p-Xylene	PTGC-MS	
Lab Method Code: C-VOC-01		**Appendix #:** C041
Monochlorobenzene	PTGC-MS	
Lab Method Code: C-VOC-01		**Appendix #:** C041
Naphthalene	PTGC-MS	
Lab Method Code: C-VOC-01		**Appendix #:** C041
o-Xylene	PTGC-MS	
Lab Method Code: C-VOC-01		**Appendix #:** C041

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Etobicoke ON M9P 3V6
Tél: (416) 235 - 6370
Téléc: (416) 235 - 6519

Ontario

Class: Organic	Technique - Sub-Technique:	
Styrene	PTGC-MS	
Lab Method Code: C-VOC-01		**Appendix #:** C041
Tetrachloroethylene	PTGC-MS	
Lab Method Code: C-VOC-01		**Appendix #:** C041
Toluene	PTGC-MS	
Lab Method Code: C-VOC-01		**Appendix #:** C041
trans-1,2-dichloroethene	PTGC-MS	
Lab Method Code: C-VOC-01		**Appendix #:** C041
trans-1,3-dichloropropene	PTGC-MS	
Lab Method Code: C-VOC-01		**Appendix #:** C041
Trichloroethylene	PTGC-MS	
Lab Method Code: C-VOC-01		**Appendix #:** C041
Trihalomethanes; total	Calculation	
Lab Method Code: C-VOC-01		**Appendix #:** NA
Vinyl chloride	PTGC-MS	
Lab Method Code: C-VOC-01		**Appendix #:** C041
Xylene; total	Calculation	
Lab Method Code: C-VOC-01		**Appendix #:** NA
Class: Physical/Others	**Technique - Sub-Technique:**	
COD	Colourimetry	
Lab Method Code: C-COD-01		**Appendix #:** C083
Conductivity	Meter-Auto conductivity Meter	
Lab Method Code: A-COND-02		**Appendix #:** C087
Conductivity	Meter	
Lab Method Code: A-COND-01		**Appendix #:** C003
Hardness (as CaCO3)	Calculation-ICP-AES, (Total-non-digested)	
Lab Method Code: D-ICP-01		**Appendix #:** C004
pH	Meter	
Lab Method Code: A-pH-01		**Appendix #:** C005

Ministry of the Environment, Conservation and Parks

Compliance, Promotion and Support Branch
Laboratory Licensing and Compliance Program

125 Resources Rd.
Etobicoke ON M9P 3V6
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Ministère de l'Environnement, de la Protection de la nature et des Parcs

Direction de la promotion de la conformité et du soutien
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Etobicoke ON M9P 3V6
Tél: (416) 235 - 6370
Téléc: (416) 235 - 6519

Ontario

Class: Physical/Others	Technique - Sub-Technique:
pH	Meter-Auto - pH Meter
Lab Method Code: A-pH-02	**Appendix #:** C086
Solids; total dissolved	Calculation
Lab Method Code: CP-028	**Appendix #:** N/A
True colour	Spectrophotometric
Lab Method Code: A-COL-01	**Appendix #:** C027
Turbidity	Nephelometry
Lab Method Code: A-TURB-01	**Appendix #:** C026

Subject to the following terms and conditions:
Terms and conditions are specified in Appendix 1.

Expiry Date: Sep 30, 2023

February 11, 2019
Date Issued

C. Mauitt
Director

Licence Number: 2232
Date Issued: February 11, 2019

Appendix 1 - Conditions

Pursuant to the *Safe Drinking Water Act, 2002*, S.O. 2002, c. 32, and the regulations made thereunder, this drinking-water testing services licence is issued subject to the following conditions.

Part I: Definitions

1.1 In this licence, unless the context otherwise requires, words and phrases shall be given the same meaning as those set out in the *Safe Drinking Water Act, 2002*, S.O. 2002, c. 32 and any regulations made in accordance with that Act.

1.2 In this licence

"accreditation body" means any body designated or established pursuant to section 64 of the SDWA;

"director" means a director appointed pursuant to s. 6 of the SDWA for the purposes of Part VII of the SDWA;

"laboratory" means the drinking-water testing laboratory located at 2378 Holly Lane, Ottawa, ON;

"licence" means this entire drinking water testing licence document, issued in accordance with Part VII of the SDWA, and includes this appendix, any schedules to it, and the application and other supporting documents listed in schedule "A" that are attached to and form part of this licence, except as otherwise specified in the conditions contain herein;

"licensee" means the Caduceon Environmental Laboratories - Ottawa;

"Ministry" means the Ministry of the Environment Conservation & Parks;

"protocol" means the document published by and available from the Ministry entitled "Protocol of Accepted Drinking-Water Testing Methods", Version 2.0 dated May 31, 2010.

"provincial officer" means a provincial officer designated pursuant to s. 8 of the SDWA;

"SDWA" means the *Safe Drinking Water Act, 2002*, S.O. 2002, c. 32, as amended.

Part II – Authorized Tests

2.1 Subject to the conditions of this licence, the licensee is authorized to provide a drinking-water testing service at the laboratory.

2.2 The licensee is only authorized to conduct drinking-water tests at the laboratory for the class and for the parameters set out in the licence.

2.3 Subject to conditions 2.4 and 2.5, the licensee shall only conduct drinking water tests at the laboratory for parameters using the methods that were listed in the application, and approved by this licence.

[Where applicable]

2.4 Despite condition 2.3, where the licensee listed a method for a parameter in the application for this licence, but the method is not designated as an acceptable testing method for that parameter in the protocol, the licensee is not authorized to use the method listed in the application for this licence, unless the method is specifically authorized under condition 2.5.

[Where applicable]

2.5 The licensee is specifically authorized to conduct drinking-water tests for the parameters listed below using the corresponding method listed below, despite the method not being designated as an acceptable testing method for that parameter in the protocol:

None

Accreditation

2.6 Except as authorized by condition 2.7, the licensee shall only conduct a drinking-water test if the laboratory is accredited by an accreditation body for the conduct of that test.

Non-accredited Tests [Where applicable]

2.7 In accordance with section 74 of the SDWA, the licensee is authorized to conduct the following tests for which the laboratory is not accredited by an accreditation body, using the method specified.

None

Part III: Operational Requirements

3.1. A copy of this licence shall be made readily available for reference by all persons responsible for all or part of the operation of the drinking-water testing laboratory.

3.2. A copy of this licence shall be made readily available to laboratory clients and for Ministry inspection.

3.3. The Certificate of Drinking Water Testing Licence shall be conspicuously displayed in a location at the laboratory which maximizes the likelihood of a client seeing it upon entry to the laboratory's sample receiving area.

Part IV: General

Compliance

4.1 The licensee shall operate the laboratory in accordance with the SDWA, including the statutory conditions enumerated in 75(3), any applicable regulations made thereunder, and this licence.

4.2 The licensee shall ensure that any person authorized to carry out a drinking-water test or any aspect of a drinking-water test at a laboratory has been informed of the SDWA, all applicable regulations made in accordance with that Act, and this licence and shall take all reasonable measures to ensure any such person complies with the same.

Interpretation

4.3 Where there is a conflict between the provisions of this licence and any other document, the following hierarchy shall be used to determine the provision that takes precedence:

i. the SDWA;
ii. any regulation made under the SDWA;
iii. this licence;
iv. any application or supporting documents listed in Schedule "A".

4.4 The conditions of this licence are severable. If any requirement of this licence, or the application of any requirement of this licence to any circumstance, is held invalid or unenforceable, the application of such requirement to other circumstances and the remainder of this licence shall not be affected thereby.

Other Legal Obligations

4.5 The issuance of, and compliance with the conditions of, this licence does not:

i. relieve any person of any obligation to comply with any provision of any applicable statute, regulation or other legal requirement; or
ii. limit in any way the authority of the ministry to require certain steps be taken or to require the licensee to furnish any further information related to compliance with this licence.

Change of Licensee's Information

4.6 The licensee shall notify the director, in writing, of any of the following changes within 30 days of the change occurring,

i. change of address of the laboratory; or
ii. change of business name, and the notification shall include a copy of the most recent documentation filed under the *Business Names Act*, R.S.O. 1990, c. B17 or *Corporations Information Act*, R.S.O. 1990, c. C.39.

4.7 The licensee shall notify the director, in writing, of any changes to the following personnel identified on the licence application form whenever staffing changes are made

(a) Owner of the Laboratory;
(b) Laboratory Administrator;
(c) Laboratory Operator;
(d) Laboratory Director, and
(e) Laboratory Director Designate

4.8 As per section 73(6) of the SDWA this licence is not transferable without the consent of the Director.

Information

4.9 Any information requested, by the Ministry, concerning the drinking-water testing laboratory and its operation under this licence, including but not limited to any records required to be kept by this licence shall be provided to the Ministry, upon request.

4.10 Records required by or created in accordance with the SDWA, any regulations under the SDWA, or this licence shall be retained for at least 5 years in a location where a provincial officer who is inspecting the laboratory can conveniently view them.

4. 11 The receipt of any information by the Ministry or the failure of the Ministry to prosecute any person or to require any person to take any action, under this licence or under any statute, regulation or other legal requirement, in relation to the information, shall not be construed as an approval, waiver, or justification by the Ministry of any act or omission of any person that contravenes any term or condition of this approval or any statute, regulation or other legal requirement.

Part V: Special Conditions

1 . Pursuant to subsection 10(1), clause (d) of O. Reg. 248/03, the chain of custody procedures submitted by the licensee as part of the application for this licence are approved.

2. When a sample is submitted to the licensee for a drinking-water test for a microbiological parameter, the licensee shall ensure that the test is conducted in a standardized timely manner and that microbiological plates are processed and read without extended overnight refrigerated incubation.

3. The licensee is authorized to report the results of more than one parameter (such as total THMs) as an aggregate result in order to comply with reporting requirements provided that that licensee conducts a separate test for each parameter using a method otherwise authorized by this licence, and the means by which the aggregate is calculated is documented and kept available for inspection by the Ministry.

4. The licensee shall not filter drinking water samples prior to analyses unless dictated by non-routine analytical contingencies.

4.1 The licensee shall collect and handle drinking water samples in accordance with the Ministry's Protocol.

5. Licensed laboratories shall report all adverse water quality results as per the drinking water legislation, without any regard to calculated uncertainty estimations.

6. Drinking water samples shall be retained until either;

a. The day the result of the drinking water test has been reported in accordance with section 12 or 12.0.1 of Ontario Regulation 248/03; or

b. Sample requirements are no longer met as outlined in the ministry's document entitled "*Practices for the Collection and Handling of Drinking Water Samples*" and dated April 1, 2009, as amended from time to time.

Note to the Licensee Regarding Reviewable Decisions

All or part of this licence may be reviewable in accordance with the provisions of Part X of the SDWA. *In accordance with Section 129(1) of the SDWA, you may by written notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal.* ***Section 129(2) sets out a procedure upon which the 15 days may be extended by the Tribunal.*** *Section 129(3) of the SDWA provides that the Notice requiring the hearing shall state:*

1. The aspect of the decision, including the portion of the permit, licence, approval, order or notice of administrative penalty in respect of which the hearing is required; and
2. The grounds for review to be relied on by the person at the hearing.

Except with leave of the Tribunal, a person requiring a hearing in relation to a reviewable decision is not entitled to,

(a) a review of an aspect of the decision other than that stated in the notice requiring the hearing; or

(b) a review of the decision other than on the grounds stated in the notice

The Notice should also include:

1. The name of the appellant;
2. The address of the appellant;
3. The Licence number;
4. The date of the Licence;
5. The name of the Director;

The Notice should be signed and dated by the appellant. This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
2300 Yonge St., 12th Floor
P.O. Box 2382
Toronto, Ontario
M4P 1E4

AND

The Director
Part VII, Safe Drinking Water Act, 2002
Compliance, Promotion & Support Branch
Ministry of Environment Conservation & Parks
125 Resources Road
Toronto, Ontario
M9P 3V6

** If the Director believes that a reviewable decision that he or she is about to make in respect of a drinking-water testing licence, if stayed by an appeal, would endanger, or likely endanger, public health, the Director shall include in the decision the reasons for his or her belief and shall also serve a copy of the decision on the Chief Medical Officer of Health. In the case of a reviewable decision in respect of a drinking-water testing licence, if the Chief Medical Officer of Health advises the Tribunal, the licensee and the Director that in his or her opinion the staying of the decision would endanger, or likely endanger, public health, the Tribunal may not stay the operation of a reviewable decision.*

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 314-4600, Fax: (416) 314-4506 or www.ert.gov.on.ca**

Schedule "A"
Application and Supporting Documentation

The following documents are incorporated into and constitute part of this licence:

1. Application received by the Director on 07/25/08, 04/27/09, 01/19/10, 10/01/12, 11/07/12, 04/14/14 and 01/22/2019.

Ontario

Ministry of the Environment Conservation & Parks

Assistant Director's Office
Compliance, Promotion & Support Branch
Laboratory Licensing and Compliance Program

Certificate of Drinking Water Testing Licence
Certificat du permis d'analyse de l'eau potable

Made under O. Reg. 248/03, the Drinking Water Testing Services regulation under the Safe Drinking Water Act, 2002

Établi en vertu du règlement sur les services d'analyse de l'eau potable (Règl. De l'Ont. 248/03) pris en application de la Loi de 2002 sur la salubrité de l'eau potable

This is to certify that

Nous attestons par la presente que

Caduceon Environmental Laboratories - Ottawa

2378 Holly Lane, Ottawa, Ontario, K1V 7P1

Having met the requirements under the Safe Drinking Water Act, 2002, and the Drinking Water Testing Services regulation, O. Reg. 248/03, is issued this Certificate of Drinking Water Testing Licence. This laboratory is licensed to carry out drinking water testing for specific parameters within the following classes.

Ayant satisfait aux prescriptions de la Loi de 2002 sur la salubrité de l'eau potable et du règlement sur les services d'analyse de l'eau potable (Règl. de l'Ont. 248/03) est admissible à recevoir le présent certificat. Ce laboratoire est autorisé à analyser des paramètres précis de l'eau potable dans les catégories indiquées ci-dessous

Year / Année	classes / catégories				
1	MICROBIOLOGICAL / MICROBIOLOGIQUE — Valid Until / Valide jusqu'au: Sept 30, 2019	radiological/chemical radiochimie et analytique	PHYSICAL/OTHER / PROPRIÉTÉS PHYSIQUES ET AUTRES — Valid Until / Valide jusqu'au: Sept 30, 2019	ORGANIC CHEMICAL / PRODUITS CHIMIQUES ORGANIQUES — Valid Until / Valide jusqu'au: Sept 30, 2019	INORGANIC CHEMICAL / PRODUITS CHIMIQUES INORGANIQUES — Valid Until / Valide jusqu'au: Sept 30, 2019
2	microbiological microbiologique	radiological/chemical radiochimie et analytique	physical/other propriétés physiques et autre	organic chemical produits chimiques organiques	inorganic chemical produits chimiques inorganiques
3	microbiological microbiologique	radiological/chemical radiochimie et analytique	physical/other propriétés physiques et autre	organic chemical produits chimiques organiques	inorganic chemical produits chimiques inorganiques
4	microbiological microbiologique	radiological/chemical radiochimie et analytique	physical/other propriétés physiques et autre	organic chemical produits chimiques organiques	inorganic chemical produits chimiques inorganiques
5	microbiological microbiologique	radiological/chemical radiochimie et analytique	physical/other propriétés physiques et autre	organic chemical produits chimiques organiques	inorganic chemical produits chimiques inorganiques

C. Mouatt

Director, Compliance, Promotion & Support Branch
Directeur, Direction du contrôle de la qualité de l'eau potable

Signature of Laboratory Owner
Signature du propriétaire du laboratoire

Laboratory Licence No. / Numéro du permis du laboratoire	Date Issued / Date de déliverance
2232	August 31, 2018

Canadian Association for Laboratory Accreditation Inc.

CALA

Certificate of Accreditation

Caduceon Environmental Laboratories (Ottawa)
Caduceon Enterprises Inc.
2378 Holly Lane
Ottawa, Ontario

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).

CALA

Accreditation No.: A2644
Issued On: February 1, 2019
Accreditation Date: January 3, 2005
Expiry Date: August 1, 2021

Andrew M. Adams
President & CEO

ilac-MRA CALA

Appendix E: City of Iqaluit Water Licence

NUNAVUT WATER BOARD

TYPE "A" WATER LICENCE NO. 3AM-IQA1626

TABLE OF CONTENTS

Licence No. 3AM-IQA1626

Pursuant to the Nunavut Waters and Nunavut Surface Rights Tribunal Act and the Agreement Between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in Right of Canada, the Nunavut Water Board, hereinafter referred to as the Board, hereby grants to the

CITY OF IQALUIT

(Licensee)

P.O. BOX 460 IQALUIT, NU X0A OHO

(Mailing Address)

hereinafter called the Licensee, the right to alter, divert or otherwise use Water or deposit Waste for a period subject to restrictions and conditions contained within this Licence:

Licence Number / Type:	**3AM-IQA1626 / TYPE "A"**
Water Management Area:	**FROBISHER BAY WATERSHED (53)**
Location:	**WITHIN CITY OF IQALUIT'S MUNICIPAL BOUNDARIES, QIKIQTANI REGION, NUNAVUT**
Classification:	**MUNICIPAL UNDERTAKING**
Purpose:	**USE OF WATERS AND DEPOSIT OF WASTE**
Quantity of Water not to be Exceeded:	**1,100,000 CUBIC METRES ANNUALLY**
Date Licence Issuance:	**JUNE 17, 2016**
Expiry of Licence:	**JUNE 16, 2026**

This Licence issued **(Motion Number: 2016-02-P6-14)** and recorded at Goji Haven, Nunavut, includes and is subject to the annexed conditions.

Norman Mike
Nunavut Water Board,
Hearing Chair

APPROVED BY: Minister of Indigenous and Northern Affairs Canada

APPROVAL DATE:

PART A: **SCOPE, DEFINITIONS, AND ENFORCEMENT**

1. SCOPE

a. This Type "A" Water Licence No. 3AM-IQA1626 ("Replacement and Amended Licence" or "Licence") authorizes the City of Iqaluit ("Licensee" or the "City") to use Water and deposit Waste in support of a Municipal undertaking, as classified under Schedule 1 of the *Regulations*, within the City's municipal boundaries at the following approximate geographic coordinates:

Undertaking	Latitude	Longitude
Overall Extents	63° 50' 56.31" N	68° 39' 49.87" W
	63° 50' 57.30" N	68° 33' 41.94" W
	63° 43' 48.91" N	68° 18' 12.53" W
	63° 41' 06.60" N	68° 18' 18.82" W
	63° 41' 04.08" N	68° 32' 44.20" W
	63° 44' 46.02" N	68° 39' 43.1 0" W
West 40 Landfill	63° 43' 58.15" N	68° 32' 08.54" W
Water Treatment Plant	63° 45' 12.24" N	68° 30' 22.79" W
Wastewater Treatment Plant	63° 44' 45.15" N	68° 32' 19.80" W

The scope of activities, works, and undertakings authorized in accordance with the terms and conditions of this Replacement and Amended Licence is as follows:

a. Use, management, and protection of the Lake Geraldine drainage basin;
b. Management and protection of Waters surrounding the West 40 Landfill site;
c. Management, collection, and monitoring of leachate from the West 40 Landfill site and adjacent Sludge Management Facility;
d. Management of improved drainage works at the West 40 Landfill site;
e. Management, operation, and eventual closure and reclamation of the current West 40 Landfill site and associated solid waste disposal facilities;
f. Upgrades, operation, maintenance, monitoring, and eventual closure and reclamation of a Wastewater Treatment Plant (WWTP);
g. Operation, maintenance, monitoring, and eventual closure and reclamation of a Sludge Management Facility;
h. Operation, maintenance, monitoring and eventual closure and reclamation of a Sewage Lagoon Facility;
i. Implementation of contingency measures for the Wastewater and Landfill management facilities; and
j. Implementation of changes to the monitoring requirements including frequency, parameters, and stations being monitored.

b. This Licence is issued subject to conditions contained herein with respect to the taking of Waters and the depositing of Waste of any type in any Waters or in any place under any

conditions where such Waste or any other Waste that results from the deposits of such Waste may enter any Waters. Whenever new Regulations are made or existing Regulations are amended by the Governor in Council under the Act, or other statutes imposing more stringent conditions relating to the quantity, type or manner under which any such Waste may be so deposited, this Licence shall be deemed to be subject to such requirements; and

c. Compliance with the terms and conditions of this Licence does not absolve the Licensee from the responsibility for compliance with all applicable legislation, guidelines, and directives.

2. DEFINITIONS

a. The Licensee shall refer to Schedule A for definitions of terms used in this Licence.

3. ENFORCEMENT

a. Failure to comply with this Licence shall be a violation of the Act, subjecting the Licensee to the enforcement measures and the penalties provided for in the Act.

b. All inspection and enforcement services regarding this Licence will be provided by Inspectors appointed under the Act.

c. For the purpose of enforcing the terms and conditions of this Licence with respect to the use of Water and deposit or Discharge of Waste in Waters, Inspectors appointed under the Act, hold all powers, privileges, and protections that are conferred upon them by the Act or by other applicable laws.

PART B: GENERAL CONDITIONS

1. The Licensee shall file, with the Board for review, no later than the 31st of March of the year following the calendar year being reported, an Annual Report formulated in accordance with the requirements under Schedule B of this Licence.

2. The Licensee shall maintain a copy of this Licence at the Municipal Office, potable Water Treatment Facility, and the Waste Treatment Facilities at all times.

3. The Licensee shall file an application for renewal of this Licence at least one (1) year prior to the Licence expiry.

4. The Licensee shall, to the satisfaction of an Inspector, install, operate, and maintain metres, devices or other appropriate methods for measuring the volumes of Water used and Waste Discharged or deposited.

5. The Licensee shall post the necessary signs to identify the stations of the Monitoring Program included under Schedule I of this Licence. All signage shall be in the Official Languages of Nunavut.

6. The Licensee shall, for all Plans submitted under this Licence, include a proposed timetable for implementation. Plans submitted cannot be undertaken without subsequent written approval and/or directions from the Board. The Board may alter or modify a Plan if necessary to achieve legislative objectives and will notify the Licensee in writing of acceptance, rejection, or alteration of the Plan.

7. The Licensee shall, for all Plans submitted under this Licence, implement the Plan as approved by the Board in writing.

8. The Licensee shall, within thirty (30) days of notification or within the timeframe specified by the Board, submit for review and/or Board's approval revisions for any plan found to be unacceptable to the Board.

9. Every Plan to be carried out pursuant to the terms and conditions of this Licence shall become a part of the Licence, and any additional terms and conditions imposed upon approval of a Plan by the Board shall also become part of the Licence. All relevant terms and conditions of the Licence should be contemplated in the development of a Plan where appropriate.

10. The Licensee shall review the Plans referred to in this Licence as required by changes in operation and/or technology and modify the Plans accordingly. Revisions to any Plan shall be submitted in the form of an addendum to be included within the Annual Report required under Part B, Item 1, complete with the lists of revisions detailing where significant content changes are made.

11. The Licensee shall immediately report to the NWT/NU 24-Hour Spill Report Line (867-920-8130) any spills of Waste associated with the Undertakings under this Licence including the potable Water Treatment Facility and Waste Treatment Facilities, which are reported to or observed by the Licensee.

12. Any communication with respect to this Licence shall be made in writing to the attention of:

Manager of Licensing
Nunavut Water Board
P. O. Box 119
Goji Haven, NU X0B 1J0
Telephone: (867) 360-6338
Fax: (867) 360-6369
Email: licensing@nwb-oen.ca

13. Any notice made to an Inspector shall be made in writing to the attention of:

Water Resources Officer
Nunavut District, Nunavut Region
P.O. Box 100
Iqaluit, NU X0A 0H0
Telephone: (867) 975-4295
Fax: (867) 979-6445

14. The Licensee shall submit, to the Board for information or as otherwise directed, one (1) paper copy and one (1) electronic copy of all reports, studies, and Plans generated for the works, activities, and undertakings under this Licence. All Reports, studies or Plans submitted to the Board by the Licensee shall include an executive summary in English, Inuktitut, and French.

15. The Licensee shall ensure that any document(s) or correspondence submitted by the Licensee to the Board is received by the Board and maintain on file a copy of the acknowledgment of receipt issued by the Manager of Licensing or his/her designate.

16. This Licence is assignable as provided for in section 44 of the Act.

17. The expiry or cancellation of this Licence does not relieve the Licensee from any obligation imposed by the Licence, or any other regulatory requirement.

PART C: CONDITIONS APPLYING TO SECURITY

1. The Licensee is not required to post reclamation security for the activities, works, and undertakings authorized under this Licence.

PART D: CONDITIONS APPLYING TO THE USE OF WATERS AND WATER MANAGEMENT PLANS

1. The Licensee is authorized to withdraw, from the Lake Geraldine Reservoir at Monitoring Station No. IQA-01, up to 1,100,000 cubic metres of Water annually for the relevant activities, works, and undertakings authorized under the scope of this Licence.

2. The Licensee shall submit to the Board for approval, within sixty (60) days of the Effective Date of the Licence, an updated manual for the potable Water Treatment Facility. The Manual shall be prepared in accordance with relevant aspects of the format outlined in the *Guidelines for the Preparation of an Operation and Maintenance Manual for Sewage and Solid Waste Disposal Facilities in the Northwest Territories* (GNWT, 1996). The manual shall, address among other items, the following:

    a. Purpose of facility;
    b. Site setting;

c. Operational procedures for storage, treatment and distribution of potable Water; Waste generated and hazardous substances associated with the facility; site inspections; and personnel training;
d. Maintenance procedures including equipment servicing;
e. Sampling and monitoring requirements; and
f. Emergency response measures.

3. The Licensee shall equip all freshwater intake structures with screens of appropriate mesh size that meet the requirements of Fisheries and Oceans (DFO) Canada's *Freshwater Intake End-of-Pipe Fish Screen Guidelines* (1995 or the most current) so as to prevent the entrainment of fish and control Water withdrawal rates such that fish do not become impinged within the screens.

4. The Licensee shall undertake Dam Safety Inspections (DSI) and/or Dam Safety Reviews (DSR) of the Lake Geraldine water supply facility in accordance with requirements of the Canadian Dam Association (CDA), *Dam Safety Guidelines* (2007, or the most current version). The Licensee shall submit for the Board's review, within the Annual Report required under Part B, Item 1, the report generated for the DSIs or DSRs along with the Licensee's recommended actions to address any deficiencies identified in the inspections and/or reviews.

5. The Licensee shall not remove any material from below the ordinary High Water Mark of any Water body unless otherwise approved by the Board in writing.

6. The Licensee shall not cause erosion to the banks of any body of Water and shall provide the necessary controls to prevent such erosion.

7. The Licensee shall implement necessary measures to control sediment and erosion prior to and during operations to prevent entry of sediments into Water.

8. The Licensee shall maintain the potable Water Treatment Facility in accordance with applicable guidelines, procedures, and regulations and to the satisfaction of an Inspector.

9. The Licensee shall, as part of any proposal to supplement the Lake Geraldine Reservoir, evaluate the potential impact on freshwater resources, including fish and fish habitat. The results of the evaluation must be included as part of any application to augment the Lake Geraldine Reservoir with Water from proximal water bodies.

PART E: CONDITIONS APPLYING TO THE DEPOSIT OF WASTE AND WASTE MANAGEMENT PLANS

1. The Licensee is authorized to use the Sewage Lagoon Facility and the Wastewater Treatment Plant to treat and dispose of Wastewater generated by the Undertaking authorized under this Licence until such time that the Upgraded Wastewater Treatment Plant authorized by the

Licensee is constructed and commissioned, or as otherwise approved by the Board in writing.

2. The Licensee shall provide written notice to an Inspector and the Board at least ten (10) days prior to any planned Discharges from the Solid Waste Facility, Sewage Lagoon Facility, Wastewater Treatment Plant, and the Upgraded Wastewater Treatment Plant once commissioned.

3. The Licensee shall establish the relevant monitoring stations for the facilities authorized under this Licence in accordance with Schedule I.

4. The Licensee shall ensure that Surface Drainage or surface Water runoff associated with site activities or generated during the construction of any facility designed to withhold, divert, or retain Water or Waste, does not exceed the following Effluent criteria:

Parameter	Maximum Average Concentration	Maximum concentration of Any Grab Sample
Total Suspended Solids (TSS)	50.0 mg/L	100.0 mg/L
pH	Between 6 and 9.	

5. Upon commissioning of the Upgraded Wastewater Treatment Plant, the Sewage Lagoon Facility shall be used as a back-up facility or closed and reclaimed in accordance in Part J, Item 4.

6. The Licensee shall submit to the Board for approval in writing, within four (4) months of the Effective Date of the Licence, an Operation and Maintenance Manual for the Sewage Lagoon Facility that addresses requirements for both the Sewage Lagoon and Sludge Management Facilities. The manual shall be prepared in accordance with the *Guidelines for the Preparation of an Operation and Maintenance Manual for Sewage and Solid Waste Disposal Facilities in the Northwest Territories* (GNWT, 1996).

7. The Licence shall submit to the Board for approval in writing, by December 21, 2018 or as otherwise directed by the Board in writing, an Operations and Maintenance Manual for the Upgraded Wastewater Treatment Plant that incorporates the requirements of Part E, Item 6. The manual shall be prepared in accordance with the *Guidelines for the Preparation of an Operation and Maintenance Manual for Sewage and Solid Waste Disposal Facilities in the Northwest Territories* (GNWT, 1996).

8. The manual referred to in Part E, Item 7 shall supersede the manual referenced in Part E, Item 6, following approval by the Board in writing.

9. The Licensee shall submit to the Board for approval in writing, by December 31, 2018, an updated version of the plan entitled *City of Iqaluit Solid Waste Management Plan*, dated January 2014 that addresses relevant intervener's comments and recommendations made during the licensing process, such as inclusion of details related to future uses of the landfill, timeframe for closure, and ongoing activities within the scope of this Licence.

10. The Licensee shall undertake Dam Safety Inspections (DSI) and/or Dam Safety Reviews (DSR) of the Wastewater Treatment Facilities in accordance with requirements of the Canadian Dam Association (CDA), *Dam Safety Guidelines* (2007, or most current version). The Licensee shall submit for the Board's review, within the Annual Report required under Part B, Item 1, the report generated for the DSIs or DSRs along with the Licensee's recommended actions to address any deficiencies identified in the inspections and/or reviews.

11. The Licensee shall dispose of and contain all municipal solid waste generated by the City at the West 40 Landfill as associated site(s) authorized under this licence or as otherwise approved by the Board in writing.

12. The Licensee shall submit to the Board for approval, within sixty (60) days of the Effective Date of the Licence, an updated Landfill Operation and Maintenance Manual that addresses concerns raised by intervening parties during the licensing process including the following:

    a. Management of Leachate from the facility;
    b. Updated sampling and monitoring requirements; and
    c. Open burning practices.
    d. Ongoing activities within

13. The Licensee shall collect and contain all leachate generated by the West 40 Landfill within the Landfill.

14. The Licensee shall submit to the Board for review, by December 31, 2017, an updated version of the document entitled *West 40 Landfill Drainage Management Review*, dated September 16, 2011, that addresses the concerns raised by intervening parties including information on the absence of permafrost related data.

15. The Inspector may authorize an emergency Discharge ,following the Licensee's written submission to the Inspector and to the Board, at least fifteen (15) days prior to discharge or as instructed by the Inspector, that includes the following information:

    a. Proposed quantity of discharge;
    b. Reason for discharge;
    c. Identification of the Final Discharge Location;
    d. Proposed sampling and analysis to be conducted; and
    e. Proposed mitigation measures to implemented.

16. The Licensee shall submit to the Board and the Inspector for review, within sixty (60) days following any emergency Discharge authorized by the Inspector, a report that includes, among other items, an analysis of results for the emergency Discharge.

17. The Licensee shall maintain the Licensed Facilities to the satisfaction of an Inspector.

18. The Licensee shall remove from the site associated with the undertaking, all Hazardous Wastes, waste oil and non-combustible waste generated through the course of the operation, for disposal at a licensed waste disposal facility.

19. The Licensee shall maintain records of all Waste removed from site and records of confirmation of proper disposal of removed Waste. These records shall be made available to an Inspector or the Board upon request.

PART F: CONDITIONS APPLYING TO CONSTRUCTION

1. The Licensee shall, submit to the Board for review, within thirty (30) days prior to commencing construction of any facilities or infrastructure authorized under this Licence, for-construction designs and drawings, signed and stamped by an Engineer.

2. The Licensee shall ensure that all relevant approved facilities are designed and constructed to engineering standards such that, at a minimum, they comply with the most current version of the *Canadian Dam Safety Guidelines*.

3. The Licensee shall implement measures to ensure that all materials used in the construction of relevant facilities or infrastructure included under the scope of this Licence are free of contaminants, to the extent that they do not cause harmful or significant effects to Water.

4. The Licensee shall maintain shoreline stability during construction.

5. The Licensee shall ensure that all final designs and drawings are qualified by an Engineer confirming that:

    a. Works are designed under sound engineering principles;
    b. Design limitations are understood and communicated within the report; and
    c. Measures are implemented to minimize impact to Water.

6. The Licensee shall, submit to the Board for review, within ninety (90) days of completion of any structure authorized under this licence, to contain, withhold, divert or retain Water or Wastes; a construction summary report prepared by an Engineer that includes, among other relevant information, as-built drawings, documentation of field decisions that deviated from original plans, and any data used to support these decisions.

7. The Licensee shall, if contamination of surface and/or ground water is encountered during construction and excavation, notify the Inspector immediately and implement the Spill Contingency Plan.

8. The Licensee shall develop and implement measures necessary to prevent and mitigate erosion and/or the release of sediment into Water during the construction of the Upgraded Wastewater Treatment Plant or during any construction activities associated with the Undertaking.

PART G: CONDITIONS APPLYING TO MODIFICATIONS

1. The Licensee may, without written consent from the Board, carry out Modifications to the potable Water Treatment Facility and Waste Treatment Facilities provided that such Modifications are consistent with the terms of this Licence and the following requirements are met:

   a. the Licensee has notified the Board in writing of such proposed Modifications at least sixty (60) days prior to beginning the Modifications;
   b. Such Modifications are consistent with the NPC Land Use Planning (NPC) Conformity Determination and the NIRB Screening Decision;
   c. such Modifications do not place the Licensee in contravention of the Licence or the *Act*;
   d. the Board has not, during the sixty (60) days following notification of the proposed Modifications, informed the Licensee that review of the proposal will require more than sixty (60) days; and
   e. The Board has not rejected the proposed Modifications.

2. Modifications for which all of the conditions referred to in Part G, Item 1 have not been met can be carried out only with written approval from the Board.

3. The Licensee shall provide as-built plans and drawings of the Modifications referred to in this Licence within ninety (90) days of completion of the Modifications. These plans and drawings shall be stamped by an Engineer.

PART H: CONDITIONS APPLYING TO SPILL CONTINGENCY PLANNING

1. The Licensee shall, submit to the Board for approval in writing, within thirty (30) days of the Effective Date of this Licence, an amalgamated and updated Spill Contingency Plan. The Plan shall address spill contingency planning requirements for all relevant aspects of works, activities, and undertakings associated with the scope of this Licence including the Sewage Lift Station.

2. The Licensee shall, subject to section 16 of the Regulations, report any unauthorized deposits of Waste or foreseeable unauthorized deposits of waste and/or Discharges of Effluent, and:

   a Employ, as required, the approved Spill Contingency Plan;
   b Report the incident immediately via the NWT/NU 24-Hour Spill Reporting Line (867) 920-8130 and to the Inspector at (867) 975-4295; and
   c For each spill occurrence, submit a detailed report to the Inspector, no later than thirty (30) days after initially reporting the event. The report shall include the amount and

type of spilled product, the GPS location of the spill, and the measures taken to contain, clean up and restore the spill site.

3. The Licensee shall, in addition to Part H, Item 2, regardless of the quantity of release of a harmful substance, report to the NWT/NU Spill Line if the release is near or into a Water body.

PART I: CONDITIONS APPLYING TO MONITORING

1. The Licensee shall monitor the relevant potable Water Treatment Facility and Waste Treatment Facilities authorized under this Licence in accordance with requirements included under Schedule I.

2. The Licensee shall, submit Board for approval in writing, within sixty (60) days of the Effective Date of this Licence, an updated Monitoring Program that addresses monitoring requirements for the Water Treatment Facility and Waste Treatment Facilities. The Monitoring Program shall address, among other items, the requirements outlined in Schedule I.

3. All analyses required under Schedule I shall be conducted using methods as described in the most recent edition of "*Standard Methods for the Examination of Water and Wastewater*", or by such other methods as approved by the Board in writing.

4. All laboratory analyses shall be performed at a laboratory accredited according to ISO/IEC Standard 17025. The accreditation shall be current and in good standing.

5. The Licensee shall, submit to the Board for review, within sixty (60) days of the Effective Date of the Licence, an updated Quality Assurance/Quality Control (QA/QC) Plan prepared in accordance with *Quality Assurance (QA) and Quality Control (QC) Guidelines for Use by Class "A" Licensees in Meeting SNP Requirements and for Submission of a QA/QC Plan* (INAC, 1996 or most current version). The updated plan shall be accompanied by a letter from an Analyst of an accredited laboratory confirming acceptability of the Plan.

6. The Licensee shall measure by instrument and record in cubic metres, the monthly quantities of freshwater extracted from the Lake Geraldine Reservoir, at Monitoring Program Station No. IQA-01, used for all purposes under this Licence.

7. The Licensee shall measure, by instrument and record in cubic metres, the quantities of Effluent released from the Sewage Lagoon Facility at Monitoring Station No. IQA-02, Wastewater Treatment Plant and/or Upgraded Wastewater Treatment Plant at Monitoring Station No. IQA-04 and the West 40 Landfill at Monitoring Station No. IQA-08.

8. The Licensee shall measure and record in cubic metres, the monthly and annual volumes of sludge removed from the Wastewater Treatment Facilities.

9. The Licensee shall provide the GPS co-ordinates (in degrees, minutes and seconds of latitude and longitude) of all locations of sources of Water utilized and Waste deposited under this Licence.

10. The Licensee shall include all of the data and information required by the Monitoring Program under Schedule I within the Annual Report required under Part B, Item 1 of the Licence or as otherwise requested by an Inspector and/or the Board.

11. Additional Monitoring may be requested by the Board and/or the Inspector.

12. The Monitoring Program and compliance dates specified in the Licence may be modified at the discretion of the Board in writing and do not constitute an application for Amendment as defined in the *Act*.

PART J: CONDITIONS APPLYING TO CLOSURE AND RECLAMATION

1. The Board has accepted the document entitled *Iqaluit Solid Waste Management Plan West 40 Landfill Decommissioning Technical Memorandum*, dated January 2014, submitted as additional information with the Application.

2. The Licensee shall submit to the Board for approval in writing, at least one (1) year prior to commencing the decommissioning of the West 40 Landfill, a Final Closure and Reclamation Plan prepared by an Engineer in accordance with industry's best practices and relevant guidelines.

3. The Licensee shall, for the Plan required under Part J, Item 2, include a presentation of data and a discussion of environmental conditions existing before the use of the site by the Licensee as a municipal landfill, as well as remediation objectives.

4. The Licensee shall notify the Board in writing, at least one year prior to the implementation of final closure, of its intentions to proceed with final closure of any Water use or Waste disposal facilities included within the scope of this Licence, excluding the Facility under Part J, Item 2.

SCHEDULES

Schedule A: Definitions

In this Licence, 3AM-IQA1626:

"**Act**" means the *Nunavut Waters and Nunavut Surface Rights Tribunal Act*;

"**Addendum**" means the supplemental text that is added to a full plan, manual, or report, usually included at the end of the document and is not intended to require a full resubmission of the revised report. It may also be considered as an appendix or supplement;

"**Amendment**" means a change to any terms and conditions of this Licence through application to the NWB, requiring a change, addition, or deletion of specific terms and conditions of the Licence not considered as a modification;

"**Analyst**" means an Analyst designated by the Minister under section 85 (1) of the *Act*;

"**Annually**" means, in the context of monitoring frequency, one sampling event occurring every 365 days with a minimum of 200 days between sampling events;

"**Application**" means, for the purposes of this License, the totality of the NWB Public Register opened as a result of the filing of the application to replace and amend expired Water Licence 3AM-IQA0611(3AM-IQA0612);

"**Biannually**" means, in the context of the monitoring frequency, two sampling events occurring per calendar year, with a minimum of 150 days and a maximum of 210 days between sampling events;

"**Board**" means the Nunavut Water Board established under Article 13 of the *Nunavut Land Claims Agreement* and under section 14 of the Act;

"**Discharge**" means the release of any Water or Waste to the receiving environment;

"**Effective Date**" means the date on which the Minister of Indigenous and Northern Affairs Canada approves the Licence;

"**Effluent**" means treated or untreated liquid Waste material that is Discharged into the environment from the site water management facilities such as a settling pond or a treatment plant;

"**Engineer**" means a professional engineer registered to practice in Nunavut in accordance with the *Consolidation of Engineers and Geoscientists Act S. Nu 2008, c.2* and the *Engineering and Geoscience Professions Act S.N.W.T. 2006, c.16 Amended by S.N.W.T. 2009, c.12*;

"**Engineered Structure**" means any facility, designed and approved by a Professional Engineer who is registered with the Association of Professional Engineers, Geologists and Geophysicists of Nunavut;

"**Grab Sample**" means an undiluted quantity of material collected at a particular time and place that may be representative of the total substance being sampled at the time and place it was collected;

"**Greywater**" means the component of Effluent produced from domestic use (i.e. washing, bathing, food preparation and laundering), excluding Sewage;

"**Hazardous Waste**" means materials or contaminants categorized as dangerous goods under the *Transportation of Dangerous Good Act* (1992), no longer used for their original purpose and intended for recycling, treatment, disposal or storage at appropriate facilities;

"**High Water Mark**" means the usual or average level to which a body of water rises at its highest point and remains for sufficient time so as to change the characteristics of the land (ref. *Department of Fisheries and Oceans Canada, Operational Statement: Mineral Exploration Activities*);

"**Inspector**" means an Inspector designated by the Minister under section 85 (1) of the Act;

"**Licence**" means this Type "A" Water Licence No. 3AM-IQA1626, issued by the Nunavut Water Board to the City of Iqaluit in accordance with the Act;

"**Licensee**" means the entity to whom Licence No. 3AM-IQA1626 is issued or assigned;

"**Minister**" means the Minister of Indigenous and Northern Affairs Canada (INAC);

"**Modification**" means an alteration to a physical work that may introduce a new structure or eliminates an existing structure and does not alter the purpose or function of the work;

"**Monitoring Program**" means the program to collect data on surface water and groundwater quality to assess impacts to the environment of an appurtenant undertaking;

"**Monthly**" means, in the context of monitoring frequency, one sampling event occurring within calendar month with a minimum of twenty-one (21) days between sampling events;

"**Nunavut Land Claims Agreement**" (NLCA) means the "*Agreement Between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in Right of Canada*," including its preamble and schedules, and any Amendments to that agreement made pursuant to it;

"**Quality Assurance / Quality Control (QA/QC)**" Quality Assurance means the system of activities designed to better ensure that quality control is done effectively; Quality Control means the use of established procedures to achieve standards of measurement for the three principle components of quality: precision, accuracy and reliability;

"**Quarterly**" means divisions of the calendar year, comprised of three month intervals from January to December, inclusive (January – March, April – June, July – September and October – December);

"**Regulations**" means the *Nunavut Waters Regulations* (SOR/2013/669 18th April, 2013);

"**Sewage**" means all toilet wastes and greywater;

"**Sewage Lagoon Facility**" refers to the waste disposal facility and associated structures designed and constructed to treat Sewage in the City of Iqaluit since 1978, which has also been upgraded in subsequent years;

"**Sludge Management Facility**" means the facility located within the West 40 Landfill that is used for the disposal and treatment of sludge generated by the Wastewater Treatment Plant;

"**Solid Waste Facility**" means the West 40 Landfill, Sludge Management Facility and all other facilities identified in the Application that are designed and constructed to manage solid waste generated by the City of Iqaluit;

"**Surface Drainage**" means all surface waters resulting from the flow over, through or out of an operations area and is collected by means of Engineered structures;

"**Undertaking or Undertakings**" means an undertaking or undertakings in respect of which Water is to be used or Waste is to be deposited, as classified in Schedule 1 of the *Regulations*;

"**Upgraded Wastewater Treatment Plant (UWWTP)**" means the current Wastewater Treatment Plant, which was designed, constructed, and commissioned under Phase 1, for the preliminary treatment of Wastewater, in addition to the infrastructure scheduled for construction and commissioning by December 2018, under Phase 2, for the secondary treatment of Wastewater as described in the Application;

"**Use**" means use as defined in section 4 of the Act;

"**Waste**" means Water as defined in section 4 of the Act;

"**Waste Treatment Facilities**" refers to all facilities constructed and operated by the City of Iqaluit to manage solid and liquid Waste associated with this licence.

"**Wastewater**" means the water generated by site activities or originates on-site that requires treatment or any other water management activity;

"**Wastewater Treatment Facilities**" means the Sewage Lagoon, Wastewater Treatment Plant, Upgraded Wastewater Treatment Plant and associated facilities authorized under this Licence;

"**Wastewater Treatment Plant**" means the engineered system, located adjacent to the Sewage Lagoon Facility that is designed for the containment and preliminary treatment of Sewage generated by the City of Iqaluit as described in the Application;

"**Water or Waters**" means water as defined in section 4 of the *Act*;

"**Water Treatment Facility**" means the engineered facilities and appurtenances designed and constructed for the withdrawal storage treatment and distribution of fresh water for domestic purposes, described in the Application; and

"**West 40 Landfill**" means the Solid Waste Facility or original landfill facility along with its Northern Expansion and Sludge Management Facility that is designed to manage solid waste generated by the City of Iqaluit.

Schedule B: Annual Reporting Requirements

The Annual Report referred to in Part B, Item 1, shall include the following:

a. The monthly and annual quantities in cubic metres of fresh Water withdrawn from the Lake Geraldine Reservoir at Monitoring Station No. IQA-01;
b. The monthly and annual quantities in cubic metres of any Discharges from the Wastewater Treatment Facilities at Monitoring Stations IQA-02, IQA-04, and IQA-08;
c. Copy of reports generated from Dam Safety Inspections and Dam Safety Reviews along with the Licensee's proposed actions to address issues identified and/or updates on continuing actions to address issues;
d. The monthly and annual quantities in cubic metres of sludge removed from the Wastewater Treatment Facilities;
e. The monthly and annual quantities of Wastes disposed of at the West 40 landfill;
f. A summary report which includes all data and information generated under the Monitoring Program, including the QA/QC program, in electronic and printed formats acceptable to the Board;
g. A summary of all construction activities carried out for facilities under the Licence;
h. A summary of modifications and/or major maintenance work carried out on the potable Water Treatment and Waste Treatment Facilities, including all associated structures;
i. A progress report and revisions (if applicable) to any studies requested by the Board that relate to Waste management, Water use or reclamation and a brief description of any future studies planned by the Licensee including, a non-technical executive summary for the general public, translated into Inuktitut;
j. Any revisions required, in the form of addenda, to Plans, Manuals and Reports approved under the Licence;
k. A list and description, including volumes and Spill Report Line Identification Number, of all un-authorized Discharges, spills and summaries of follow-up action taken;
l. A summary of any closure and reclamation work undertaken and an outline of any work anticipated for the next year, including any changes to implementation and scheduling;
m. A summary of actions taken to address concerns or deficiencies listed in the inspection reports and/or compliance reports filed by an Inspector;
n. A brief update on the implementation plan of all facilities within the scope of this Licence including changes projected implementation and status of the Upgraded Wastewater Treatment Plant;
o. A summary of any studies, reports and plans requested by the Board that relate to Waste disposal, Water use or reclamation and a brief description of any future studies planned; and
p. Any other details on the use of Water or Waste disposal requested by the Board by November 1st of the year being reported.

Schedule I: Condition Applying to Monitoring

Table 1 – Water Quality Parameters		
Test Groups	**Analytical Parameters**	**Units**
Routine (R)	Alkalinity, Acidity, Chloride, Carbonate, Bicarbonate, Total Hardness, Hydroxide, Sulphate, Total Suspended Solids (TSS), Total Dissolved Solids (TDS), Total Organic Carbon (TOC), Total Inorganic Carbon (TIC)	mg/L
	pH (field and lab)	pH units
	Oxidation-Reduction Potential (ORP) (field)	mV
	Conductivity (field and lab)	uS/cm
	Temperature (field)	°C
	Turbidity	NTU
Effluent (E)	Total Suspended Solids (TSS)	mg/L
	Temperature (field)	°C
	Conductivity (field and lab)	uS/cm
	pH (field and lab)	pH units
Acute Lethality (AL)	Based on Environment Canada's *Procedure for pH Stabilization During the Testing of Acute Lethality of Wastewater Effluent to Rainbow Trout* (EPS 1/RM/50, March 2008), if single concentration test fails and un-ionized ammonia concentration is less than or equal to 1.25 mg/L	"Pass" / "Fail"
ICP- Metals Scan (Total)	Al, Sb, As, Ba, Be, Cd, Cr, Co, Cu, Fe, Pb, Li, Mn, Mo, Ni, Se, Sn, Ag, Sr, Tl, Ti, U, V, Zn, Hg	mg/L
Nutrients (N)	Ammonia-N, Nitrate-N, Nitrite-N	mg N/L
	Total Phosphorus, Orthophosphate	mg/L
Biological (B)	Biochemical Oxygen Demand	mg/L
	Total and Fecal Coliform	CFU/100 mL
Potable Water (PW)	Fecal Coliform	CFU/100 mL
	ICP Metals (Total and dissolved)	mg/L
	Total Suspended Solids –TSS	mg/L
Flow (F)	Volume	m^3
Landfill Specific (LS)	Polychlorinated Biphenyls (PCBs) Benzene, Toluene, Ethylbenzene and Xylene (BTEX)	mg/L

Table 2[1] - Water Quality Monitoring Criteria

Station ID	Description	Status	Parameter	Testing / Measurement Frequency	Reporting Frequency
IQA-01	Lake Geraldine Reservoir – Raw Water	Active	R, PW	Monthly	Biannually
			F	Monthly	
IQA-01(#)	Based on Part I, Item 4 of Expired Licence	Inactive	N/A	N/A	N/A
IQA-02	Sewage Lagoon – Effluent Discharge Point	Active	B, N, E, ICP	Once prior to discharge; once during discharge; and once prior to the completion of discharge	Annually
			F	During decant	
IQA-03	Sewage Lagoon – Influent	Inactive	N/A	N/A	N/A
IQA-04	Wastewater Treatment Plant - Effluent	Active	B, N, E, ICP	Quarterly – Prior to commissioning of the WWTP	Annually
			B, N, E, ICP	Monthly – Following commissioning of the WWTP	
			AL	Annually – following commissioning of the WWTP	
			F	During Discharge	
IQA-05	Wastewater Treatment Plant - Influent	Active	B, E, N, ICP	Biannually – Prior to commissioning of the WWTP	Annually
				No testing requirements following commissioning of the WWTP	N/A
IQA-06	Sludge – From WWTP	Active	B, E, N, ICP	Quarterly	Annually
IQA-07	Surface Water entering West 40 Landfill – Based on Part E, Item 4 of the Expired Licence	Inactive	N/A	N/A	N/A

Station ID	Description	Status	Parameter	Testing / Measurement Frequency	Reporting Frequency
IQA-08	West 40 Landfill – Effluent Discharge Point, Based on Part E, Item 4 of the Expired Licence	Active	B, E, N, ICP, F, LS	Once prior to discharge; once during discharge; and once prior to the completion of discharge	Annually
			F	During Discharge	
IQA-08(#)	Based on E, Item 17, Part F, Item 10 & Part I, Item 4 of the Expired Licence	Inactive	N/A[2]	N/A	N/A
IQA-08A	Station situated up-gradient of West 40 Landfill	Active	B, E, N, ICP, F, LS	Annually	Annually
IQA-08B	Station situated down-gradient of West 40 Landfill	Active			
IQA-09	Contaminated soil accepted at the West 40 Landfill	Inactive	NA	N/A	N/A

[1] Table 2 may be modified by the Board and re-issued where necessary. Re-issuance is not considered an Amendment to the application or Licence as defined in the *Act*.
[2] Means not applicable

Appendix F: 2017 Annual Report

City of Iqaluit
2017 Annual Water Licence Report
Executive Summary

Under Water Licence 3AM-IQA1626 (the Licence), the City of Iqaluit (the City):

- Extracts water from Lake Geraldine for municipal use,
- Discharges Landfill run-off from the West 40 Landfill, and
- Discharges wastewater from the West 40 Wastewater Treatment Plant and backup Sewage Lagoon.

This Licence was issued by the Nunavut Water Board (NWB) in 2016 and expires on June 16, 2026. In compliance with requirements of Schedule B of the Licence, this Annual Water Licence Report summarizes the activities conducted by the City in 2017.

Monitoring Program

New monitoring conditions were provided as a part of the new Type 'A' Water Licence issued in 2016. The City is currently developing a monitoring program to meet these conditions.

Water Supply

In 2017, the City estimates that it used 1,208,200 m^3 of water from the Lake Geraldine, which is slightly over the allowable quantity of water as specified under the Licence (1,100,000 m^3). This can be attributed to the following factors:

1. Increase water demand in all municipal sectors (public, recreation, etc.)
2. Construction of the Iqaluit Airport
3. Water main breaks and leaks

In November 2015, a Dam Safety Inspection (DSI) was completed for the Lake Geraldine Dam. The City is currently developing a Dam Safety Management Plan (in 2018).

City Council approved the Supplementary Water Supply Plan in 2015 to extract water from Niaqunguk (Apex) River. In 2016, the City retained Nunami-Stantec to complete a Fish and Fish Habitat Assessment of the Niaqunguk (Apex) River, Lake Geraldine, and the Lake Geraldine Drainage Channel Fish and Fish Habitat Study of the Apex River. At the time of the assessment in the late summer of 2016, Arctic Char was found in both the Apex River and the Lake Geraldine Drainage Channel.

Following a series of studies, it was determined that it would not be possible to withdraw enough water from the Apex River to meet the City's supplemental water requirements while also meeting the Department of Fisheries and Oceans guidelines. Further studies were conducted in 2017 to assess the potential of the Sylvia Grinnell River to meet supplementation needs. The supplementary water need could be met in three (3) different scenarios. Five (5) options for water intake locations and pipeline routes were developed and two (2) were selected for further analysis in 2018.

In 2017, the City of Iqaluit began developing a drinking water management plan to ensure the City is using the available drinking water as efficiently as possible while also potentially reducing the overall water demand.

Wastewater Treatment

Detailed design of the Wastewater Treatment Plant Upgrade/Expansion was completed in 2016; however, the cost estimate was significantly over budget. A Value Engineering session was completed in 2017 and a re-design of the Plant commenced. The Wastewater Treatment Plant Upgrade/Expansion is currently ongoing in 2018.

Solid Waste Management

The City continues to manage its solid waste at the West 40 Landfill, which is nearing its capacity. Landfill run-off continues to be managed though on-site detention ponds and an off-site retention pond.

In August 2018, the City of Iqaluit received approval funding for a new solid waste facility, landfill and waste transfer station. The project is currently in the design phase and is expected to be completed in October 2020.

ᓄᓇᓕᐸᐅᓴᐃᓪ ᐃᖃᓗᓃᓪ
2017-ᒥ ᐊᖏᔪᒍᒫᓂᐅᑎ ᐃᒥᓕᓚᐟᓐᓇᐅᑎ ᓕᐃᓴ ᐱᓪᓗᒍ ᐅᓂᵇᑲᓴᓪ
ᐊᓐᓕᐟᖅᑲᐅᑎᓄᓪ ᐱᓪᓗᐊᒋᓐᓕᓂ ᐅᓂᵇᑲᓴᓪ

ᐊᑐᖅᑐᑎᵇ ᐃᒥᓕᓚᐟᓐᓇᐅᑎᒥᓪ ᓕᐃᓴᒥᓪ 3AM-IQA1626 (ᓕᐃᓴᓴ), ᓄᓇᓕᐸᐅᓴᐃᓪ ᐃᖃᓗᐃᓪ (ᓱᑎᵇᑯᑦ):

- ᐃᒥᖅᑕᐸᓪᑐᓪ ᐃᒥᖅᑕᕐᓴᒥᓪ ᓄᓇᓕᓐᓂ ᐊᑐᖅᑕᐅᐟᓴᓴᒥᓪ,
- ᑯᕐᓴᓕᓪᑐᓪ ᐊᔪᓂᓴᒥᓪ ᑭᓭᐟᓂ ᑯᓕᐊᓚᐊᒋᓪᑐᑐᒥᓪ, ᐊᓴᒪ
- ᑯᕐᓴᓕᓪᑐᓪ ᐅᐊᑕᑯᓂ ᑯᓕᐊᓚᐊᒥ ᐅᐊᑕᑯᓂ ᓴᓗᓴᒪᓴᐃᕐᓴᒥᓪ ᐊᓴᒪ ᑭᓭᐟᓗᓐᓄᓪ ᑕᓱᔪᓗᒥᓪ.

ᐅᓇ ᓕᐃᓴ ᑐᓂᔨᐅᓕᐅᔪᓴᖅ ᓄᓇᕐᓕᒥ ᐃᒥᓕᓚᓂᕆᒥᓪ ᑲᑎᒪᔨᓂᓪ 2016-ᒥ ᐊᓴᒪ ᓄᖓᓯᓪᖅᑐᓂ ᔪᓂ 16, 2026. ᒪᓕᑐᑎᓪ ᒪᓕᑎᐊᓯᓪ ᐅᐃᑐᖏᓂᓪ ᐱᗅᒪᔨᓂᓪ ᐊᖏᔪᒍᒫᓂᐅᑎ ᓕᐃᓴᑎᑐᔪ ᐱᓪᓗᐊᒋᓐᓂᓪ ᐃᓗᐃᓇᐃᐃᓕᓴᖅ ᖃᑲᓇᐃᐅᐃᓕᐅᖅᑐᑐᓂᓪ ᓱᑎᵇᑯᓚᓂᓪ 2017-ᖓᑎᓪᓗᐃ.

ᖃᑲᐅᔪᖅᐸᓪᓕᐊᓂᕆᓪ ᐱᓕᓚᐊᒥᓪ ᐱᓕᓚᐊᕐᓴᖅ

ᓄᑦᓂᓪ ᖃᑲᐅᔪᖅᐸᓪᓕᐊᓂᕆᓪ ᒪᓕᑎᐊᓕᓚᓂᓪ ᐱᑕᖃᓕᐅᖅᑐᑦ ᐃᓕᑎᐅᐯᓂᓪ ᓄᑦᓂ ‘ᐃ’ ᐃᒥᓕᓚᓂᒫᓕᐅᑎᒍᓪ ᑐᓂᔨᐅᓕᐅᖅᑐᒍᓪ 2016-ᒥ. ᓱᑎᵇᑯᓂ ᖃᑲᐅᔪᖅᐸᓪᓕᐊᔨᑎᓂᓪ ᐱᓕᓚᐊᓴᓂᓕᐅᖅᐸᓪᓕᐊᓕᖅᑐᑦ ᒪᓕᓪᑕᐅᑎᐊᓕᓚᓂᓪ ᒪᓕᔨᑎᓂᓪ.

ᐃᒥᓴᖅᑎᕐᓯᓂᖅ

2017-ᒥ, ᓱᑎᵇᑯᓂ ᓇᓕᐅᑦᑭᓯᒪᓕᐅᖅᑐᑦ ᐊᑐᓕᐅᕆᒥᒃ 1,208,200 ᑦᑕᓂᓪ ᐱᖓᓗᓯᐊᖅᑎᓪᓗᑎᓪ ᐊᖏᔪᑕᕐᒪᓪᒥ ᐃᒥᖅᑕᕐᓴᒥᓪ, ᐅᖓᓗᑦᐅᓂᓴᓂᓪᓕᖏᓐᓄᖅ ᓇᓗᓇᐃᖅᑕᐅᑎᓯᒪᓕᐅᓂᓪ ᐃᒥᖅᑕᖅᑕᐅᑎᐊᓕᓂᓪ ᓕᐃᓴᑎᑐᔪ (1,100,000 ᑦᑕᓂᓪ ᐱᖓᓗᓯᐊᖅᑎᓪᓗᑎᓪ). ᐱᓪᓚᑎᐅᓗᐊᓕᐅᖅᑐᑦ ᐅᑯᐊ:

4. ᐃᒥᖅᑐᑐᓗᓚᐅᓕᐅᖅᓗᒡᑕ ᓄᓇᓕᓴᓂᒥᐅᑕᐃᓪ (ᑭᖅᑯᑐᐃᓂᓇᐃᓪ, ᐱᖓᖏᐊᖅᑐᑎᓚᓱᓪ, ᐊᔪᖓᓪᓗᐊ)
5. ᓴᓇᓴᐅᓕᐅᖅᑎᓪᓗᑎᔪ ᐃᓴᑦᓗᓂᓪ ᖃᖓᓴᑕᓯᖅᑯᐊᖅ
6. ᐃᒥᓕᓚᓪᓴᐊᓱᓪ ᓱᓪᓗᓂᓕᓪ ᓱᕆᐸᓕᐅᓴᓂᖏᓐᓄᓗᓂᓪ ᐊᓪᓚᒪ ᖃᑭᓪᓕᓕᓂᖅᐸᓪᑐᑐᓗᒡᑕ

ᓅᘆᐱᓚᒥ 2015, ᐃᒥᖅᑕᕐᓇᐅᓪᐸ ᓴᓵᑐᑐᓂᖏᓗ ᖃᑲᐅᔪᖅᑎᑕᐅᓕᐅᖅᑐᖅᓂ ᐱᓴᓱᖅᑕᐅᓗᑐᓂ. ᓱᑎᵇᑯᓂ ᐸᖅᓇᐅᑎᓕᐅᖅᑐᖅᐸᓪᓕᐊᓕᖅᑐᖅᓂ ᐃᒥᖅᑕᕐᓇᐅᓪᐸ ᓴᓵᑐᑐᓂᖏᓐᓄᓪ ᐊᑎᑕᕐᑕᐃᓕᒥᒪᓕᐅᑎᓴᓂᓪ ᐊᐅᓕᓯᓱᑎᓴᓂᓪ (2018-ᒥ).

ᓱᑎᵇᑯᓂ ᑲᑎᒪᔨᖖᑎᓂ ᑲᔪᓱᑎᓯᓕᐅᑎᓯᒪᔪᓂ ᓴᓰᒪᓴᖅᑐᑎᵇ ᐊᓱᐊᓂᓪ ᐃᒥᖅᑕᕐᓇᐅᔪᒫᓴᖅᑐᒥᓪ ᐸᖅᓇᐅᑎᒥᓪ 2015-ᖓᑎᓪᓗᐃ ᐃᒥᖅᑕᕕᒪᓪᓗᑎᵇ ᓂᐊᖅᑯᓄᓪᒍᓐᓇᒪᓪᒥ ᑯᑦᑐᒥᓪ. 2016-ᒥ, ᓱᑎᵇᑯᓂ ᐃᖅᑲᓇᐃᐅᓴᖅᑎᑦᓯᓯᓕᐅᖅᑐᑦ ᓄᓇᒥ-ᓱᓪᓴᓪᒃ ᐱᓕᓚᐃᖖᑎᓪᓗᓂᓪ ᐱᓴᓵᖅᑯᐟᓗᐅᓪᓗᑎᵇ ᐃᓴᑦᓗᓂᓪ ᐊᓪᓚᒪ ᐃᓴᑦᓗᐃᓪ ᐃᓂᓪᓗᓂᓪᑕᐅᑎᓂᓪ ᖃᖓᓴᑕᓯᖅᑯᐊᖅᓴᐅᕐᓴᒥᓪ ᓂᐊᖅᑯᓄᓪᒍᓐᓇᒪᓪᒥ ᑯᑦᑐᒥᓪ, ᐃᒥᖅᑕᕐᓇᐅᒥᓪ, ᐊᓪᓚᒪ ᐃᒥᖅᑕᕐᓇᐅᓪᒥ ᑯᐟᐸᓕᑐᑐᒥᓪ ᐃᓴᑦᓗᖅᑎᓂᖅᓴᖅ ᐊᓪᓚᒪ ᐃᓴᑦᓗᓂᓕᓂᓪ ᐃᓂᓪᓗᓂᓪᑕᐅᑎᓂᓪ ᖃᖓᓴᑕᓯᖅᑯᐊᖅᓴᐅᕐᓴᒥᓪ ᑯᑦᑐᒥᓪ. ᑕᐃᓴᓱᒪᓂ ᖃᑲᐅᔪᖅᑎᓪᓗᑎᓪᓗᒍ ᐊᐅᑲᑐᖅᑎᓪᓗᑎᓪᓗᒍ 2016-ᒥ, ᐃᓴᑦᓗᐸᐱᑕᖅᑲᓂᕐᓴᒥᓪᓗ ᖃᖓᓴᑕᓯᖅᑯᐊᖅᓴᐅᕐᓴᒥᓪ ᑯᑦᑐᒥᓪ. ᑕᐃᓴᓱᒪᓂ ᖃᑲᐅᔪᖅᑎᓪᓗᑎᓪᓗᒍ 2016-ᒥ, ᐃᓴᑦᓗᐸᐱᑕᖅᑲᓂᕐᓴᒥᓪ ᖃᖓᓴᑕᓯᖅᑯᐊᖅᓴᐅᕐᓴᒥᓪ ᑯᑦᑐᒥᓪ.

ᖃᑲᐅᔪᖅᑎᓪᓗᑎᓪᓗᒍ ᐊᑕᐅᓱᐊᕆᑎᒃ, ᓇᓗᓇᐃᖅᑕᐅᓕᐅᖅᑐᖅᓂ ᖃᖓᓴᑕᓯᖅᑯᐊᖅᓴᐅᕐᓴᒥᓪ ᑯᑦᑐᒥᓪ ᐃᒥᖅᑕᕐᓂᓪᓚᕆᐊᖅᓯᒪᓕᒪᓪᒥ ᐃᓴᑦᓗᓂᓪᒫᓂᓪ ᐃᒥᖅᑕᐅᑎᑦᓯᓂᖅᑐᑎᓪᓗᒍ ᐃᒪᓕᓚᓱᓪᓗᑎᓪᓗᒍ ᐊᑐᐊᒪᓴᑦᓗᓂᖅᑎᓪᓗᒍ. ᖃᖓᓴᑕᓯᖅᑯᐊᖅᓴᐅᕐᓴᒥᓪ 2017-ᒥ ᖃᖓᓴᑕᓯᖅᑕᐅᓗᓂᓪ ᑯᑉ ᐃᓴᑦᓂᓚᖓᔪᓴᖅᑐᑎᓪᓗᒍ ᐃᒥᖅᑕᕕᒪᓪᓗᑎᵇ ᐊᓪᓚᒪ ᐃᓴᑦᓗᓂᓪᓕᖏᓐᓄᖅ. ᑕᑯᓐᓇᐅᓪᒥ (5) ᓇᓂᕐᑭᐅᑎᓴᓂᓪ ᓴᓵᖅᑭᓚᐅᖅᑐᑦ ᐃᒥᖅᑕᕕᒪᓪᓗᑎᓪᓗᒍ ᐊᓪᓚᒪ ᓯᓚᐃᓚᐅᖅᑐᑦ ᐊᑐᐊᒪᓴᑦᓗᓂᖅᑎᓪᓗᒍ ᖃᖓᓴᑕᓯᖅᑯᐊᖅᓴᐅᕐᓴᒥᓪ ᐱᓴᓵᖅᑕᐅᓗᑐᓂ 2018-ᒥ.

2017-ᒥ, ᓄᓇᓕᐸᐅᓴᐃᓪ ᐃᒥᖅᑕᐃᓪ ᐃᒥᓕᓚᓂᕆᒥᓪ ᐊᐅᓕᓯᓱᑎᓴᓂᓪ ᐸᖅᓇᐅᑎᓕᐅᖅᑐᖅᓂ ᓇᓗᓇᐃᖅᓯᒪᓕᒪᓪᒥ ᐃᓴᑦᓗᐃᓪᓕᐅᑕᐃᓪ ᐊᑐᐃᓇᖅᑕᐅᓗᑐᓂ ᐃᒥᖅᑎᓪ ᐊᔪᖅᓇᓚᕐᑐᓂᓪ ᐊᑐᐅᓕᐅᖅᑐᖅᓂ ᐃᒥᖅᑕᕕᒪᓪᓗᑎᵇ ᐊᐅᓕᓯᓱᑎᓴᓂᓪ ᒪᖅᑭᓪᓚᐅᖅᑐᑦ ᐊᐅᓕᓯᓱᑎᓴᓂᓪ ᖃᑲᐅᔪᖅᑎᓪᓗᑎᓪᓗᒍ 2018-ᒥ.

ᐅᐊᑕᑯᓂᓪ ᓴᓗᓴᒪᓴᖅᑐᑎᵇ

ᓇᓗᓇᐃᖅᑲᓱᒪᓕᓴᐅᖅᑐᑦ ᖃᓄᖅ ᓴᓇᔨᐅᑦᓯᓴᓂᖏᓐᓄᓪᓕᓂᓪ ᐅᐊᑕᑯᓂᓪ ᓴᓗᓴᒪᓴᖅᑐᑎᵇ / ᐊᖏᔪᓕᓚᓱᐊᓚᓂᓴᖅ ᐱᓴᓵᖅᑕᐅᓕᐅᖅᑐᖅᓂ 2016-ᒥ; ᑭᓱᐊᓂᓚ, ᐊᑭᑦᓴᖏᓂ ᐅᖓᓗᑦᐅᓂᓚᐅᖅᑐᑦ ᓇᓕᐅᑦᑭᓂᕐᑕᐅᔪᓇᖅᑐᑦ. 2017-ᒥ ᐱᓕᓚᐊᖏᐅᖅᓄᓕᐅᖅᑐᖅᓂ ᖃᓄᖅᑲᓇᐃᐅᓴᖅᑐᑎᓪᓗᒍ ᐸᖅᓇᐅᑎᓕᐅᖅᑐᖅᓂ ᓴᓗᓴᒪᓴᖅᑐᑎᵇ ᐃᒥᖅᑕᕕᒪᓪᓗᑎᵇ ᓇᓕᐅᑦᑭᓂᕐᑕᐅᔪᓇᖅᑐᑦ. ᐅᐊᑕᑯᓂᓪ ᓴᓗᓴᒪᓴᖅᑐᑎᵇ ᖃᓄᖅᑲᓇᐃᐅᓴᖅᑐᑎᓪᓗᒍ 2018-ᒥ.

ᑕᖅᑭᓕᖅᓂᑦ ᓴᓂᖅᓂᒃ ᐊᐅᓚᕆᔪᓂᖅ

ᔪᑎᒃᑯᑦ ᔪᓕ ᐊᐅᓚᕆᔪᓕᑦ ᑕᖅᑭᓕᖅᓂᑦ ᓴᓂᒃᑯᐃᕕᒥᓂᒃ ᑯᓕᐊᓗᐊᒥ ᐊᕆᔪᕕᒥ, ᑕᖅᓭᓕᓕ ᐊᑐᑭᖅᓂᕆᕕᖓᓕᖅᖏᓐᓄᑦ ᖃᐅᔨᓕᕆᓕᐊᑐᐃᓭᖅᑐᖅ. ᐊᕆᔪᕕᒥᑦ ᑭᐅᖅᑕᑐᖅ ᔪᓕ ᐊᐅᓚᑕᐅᔪᖅ ᐊᕆᔪᕕᒥ ᑕᔪᕐᓗᓕᐊᖓᔪᓕᔪᓄᑦ ᐊᒻᒪ ᔪᓚᑦᓂ ᐊᕆᔪᕕᐅᑦ ᑕᔪᕐᓗᓕᐊᖓᔪᓕᔪᒍᑦ.

ᐊᑐᔪᒥ 2018, ᓄᓇᓕᐸᐅᔨᐃᑦ ᐃᖃᓗᓗᐃᑦ ᐱᑎᑕᐅᓚᐅᖅᑐᑦ ᑭᓇᐅᔨᓂᑦ ᐱᓕᕆᔨᑎᑦᓴᓂᑦ ᓄᓕᒃᑕᑦ ᑕᖅᑭᓕᖅᓂᑦ ᓴᓂᒃᑯᐃᓕᓕᓇᖅᓴᕐᕕᖏᓐᓄᑦ, ᐊᕆᔪᕕᖏᓐᓄᑦ ᐊᒻᒪ ᓴᓂᓕᓇᖅᓴᕐᕕᖏᓐᓄᑦ. ᐱᓕᕆᐊᖏᓐᓄᐅᑉᐳᖅᑐᒥ ᔪᓕ ᖃᓄᖅᓇᓕᖅᖢᓂᒃᑯᑦᑎᐊᖅ ᐊᖅᑭᒃᑯᕐᓂᕐᒧᑦ ᐊᒻᒪ ᐱᔨᑦᖃᑎᒌᖅᑐᐃᓐᓇᖅᑐᒥ ᐊᑦᑐᐸᒥ 2020.

Water Licence No. 3AM-IQA0611
2017 Annual Report
City of Iqaluit

In June 2016, the City of Iqaluit (City) was issued Water Licence number 3AM-IQA1626 (the Licence) by the Nunavut Water Board. This licence was issued for a ten-year period concluding in June 2026. A requirement of the Licence is an annual report due March 31 of each year summarizing activities governed by the Licence for the previous calendar year. In accordance with Schedule B of the Water Licence, this Annual Water Licence Report summarizes the activities conducted by the City of Iqaluit in 2017.

A. The monthly and annual quantities in cubic metres of fresh water withdrawn from the Lake Geraldine Reservoir (Monitoring Station No. IQA-01).

Table 1 summarizes the estimated monthly and annual quantities of water drawn from Lake Geraldine, the City of Iqaluit's raw water source. The total water usage for 2017 was 1,208,200 m^3, which slightly exceeds the maximum allowable usage of 1,100,000 m^3.

Records for water taking from Lake Geraldine during January and February in 2017 were not available and are therefore estimations based on the average usage of identical months in 2016 and 2018.

Table 1. Raw Water Drawn from Lake Geraldine Reservoir (2017)

Month	Volume (m^3)
January	109,500
February	107,500
March	105,800
April	103,600
May	103,100
June	96,600
July	93,500
August	97,500
September	98,600
October	95,300
November	97,800
December	99,400
Total 2017	**1,208,200**

B. The monthly and annual quantities in cubic metres of any discharges from the Wastewater Treatment Facilities (Monitoring Stations No. IQA-02, IQA-04, IQA-08).

Table 2 summarizes the monthly and annual quantities of discharge from the City of Iqaluit's Wastewater Treatment Plant (WWTP) in 2017.

Table 2. Discharge from the Wastewater Treatment Plant (2017)

Month	Volume (m^3)
January	86,173
February	85,078
March	89,877
April	86,210
May	87,123
June	86,543
July	93,040
August	98,788
September	102,664
October	96,746
November	92,367
December	97,266
Total 2017	**1,101,875**

During periods when the WWTP was shut down for maintenance, raw sewage was diverted to the backup sewage lagoon. The knife gate valve that diverts the sewage to the sewage lagoon is not equipped with a monitoring device; therefore, there were no measurements taken to determine the amount of discharge for the days that the WWTP was not operational. As a result, the amount of discharge for the duration of each shutdown was calculated using average daily discharge rates. The average daily total was determined by averaging the totals from two days before and two days after the shutdown. The dates of each shutdown can be found in Section G.

In January, August, October and November of 2017, repairs and maintenance were required on the Salsnes Filter or other areas. This resulted in the City diverting sewage to the sewage lagoon for 29 days while the City made the necessary repairs.

Between October 14 – 28, an emergency lagoon decanting to the Koojesse Inlet took place. The Salsnes filter, which filters the treated wastewater in the Wastewater Treatment Plant had mechanical issues, as well as a PLC mechanical failure occurred. As required by the license, samples were taken to monitor the liquid being decanted from the lagoon, however a pre-decant test was not conducted due to weather. The approximate quantity of discharge was 42,000 m^3.

C. Reports generated from Dam Safety Inspections and Dam Safety Reviews and proposed actions to address issues identified and/or updates on continuing actions to address issues.

To address outstanding recommendations related to the Lake Geraldine Dam, the City is currently undertaking the following:

Lake Geraldine Dam Safety

The City is currently developing a Dam Safety Management Plan, which includes:

- Development of an Operation, Management and Surveillance (OMS) Manual;
- Completion of a 2018 Dam Safety Review;
- Completion of a Risk Assessment; and,
- Finalization of an Emergency Preparedness Plan that was initiated in 2012.
- Installation of automated monitoring equipment
- Implementing a pore-water pressure monitoring program
- Exercising and testing of the valves within the valve chamber are recommended as part of preventative measures
- Perform underwater repairs to localized areas of concrete and all sealant joints

This work is expected to be completed by the end of March 2019.

Lake Geraldine Dam Repairs

A Lake Geraldine Dam Repair Project was tendered in late summer 2016. The work was not able to be completed as the tendering process was delayed. The above-water line work was completed during the 2017 construction season. This included:

1. Installation of additional (new) rip-rap material within the spillway channel.
2. Installation of additional (new) rip-rap material on the east elevation of the center berm.
3. Installation of new granular fill and re-grading of the north and south access.
4. Installation of new granular fill and re-grading of the top of the berms.
5. Crack injection repair, concrete dam.
6. Concrete repair, above and below the water line.

A separate project to repair the below-water line facilities was tendered and to be completed for the summer construction season of 2018, however, due to funding constraints as well as the Lake Geraldine Reservoir Emergency situation the work is to be completed in the summer of 2019. Concentric Associates International Incorporated has reviewed pictures of the dam and informed the City of Iqaluit that underwater dam repairs can be postponed until 2019.

D. The monthly and annual quantities in cubic metres of sludge removed from the Wastewater Treatment Facility.

Table 3 summarizes the estimated monthly and annual quantities of sewage sludge removed from the City of Iqaluit's WWTP and deposited at a designated area in the West 40 Landfill.

Table 3. Sewage Sludge Removed from the Wastewater Treatment Facility and Deposited at the West 40 Landfill (2017)

Month	Total (m^3)
January	44.2
February	47.6
March	51.0
April	51.0
May	51.0
June	51.0
July	51.0
August	44.2
September	51.0
October	34.0
November	44.2
December	51.0
Total 2017	**571.2**

The sludge that is removed by the Salsnes Filter in the WWTP falls into a trailer in a room below the primary treatment room. The trailer that is used to catch the sludge from the Salsnes Filter has 3.4 cubic meters of storage and is approximately 100% full each time it is unloaded. The trailer is unloaded at the West 40 Landfill every second day including weekends and holidays. The difference in volume from month to month is due to two different factors: 1) every month doesn't have the same number of days, and 2) during the shutdowns there is no sludge produced because the raw sewage was diverted to the lagoon.

E. The monthly and annual quantities of wastes disposed of at the West 40 Landfill.

Table 4 summarizes the estimated monthly and annual quantities of waste disposed of at the West 40 Landfill.

Table 4. Waste disposed of at the West 40 Landfill (2017)

Month	Total (m^3)
January	415
February	450
March	639
April	447
May	661
June	1,011
July	769
August	1,552
September	745
October	1,028

November	829
December	545
Total 2017	**9,091**

F. A summary report which includes all data and information generated under the Monitoring Program, including the QA/QC program, in electronic and printed formats acceptable to the Board.

In 2017, the City was able to complete limited testing due to a staffing shortage (outlined below in Table 5). The monitoring results are provided in Appendix A.

Table 5. Summary of 2017 Sampling Conducted

Date	Station	Test	Sample Name	Lab Sample ID
September 11, 2017	IQA-06	D	Test D – WWTP SS	B17-36741
October 17, 2017	IQA-02	F	Sewage Lagoon Decant	B17-31262
October 27, 2017	IQA-02	F	Sewage Lagoon Decant	B17-32642
November 16, 2017	IQA-01	A	Test A – WTP	B17-34857
December 5, 2017	IQA-04	C	Test C – WWTP EFF	B17-36739
December 5, 2017	IQA-05	B	Test B - WWTP	B17-36737
December 5, 2017	IQA-06	D	Test D – WWTP LS	B17-26529
December 5, 2017	IQA-01	A	Test A – WTP	B17-36746

In September of 2017, the City implemented a more rigorous testing procedure as required by their water licence and continued this into 2018. Prior to September 2017 testing was limited to due staffing resources available.

G. A summary of all construction activities carried out for the facilities.

There were no construction activities conducted with respect to the water licence in 2017.

H. A summary of any modifications and/or major maintenance work carried out at the facilities and any associated structures.

<u>Wastewater Treatment Plant</u>

The following maintenance work was carried out at the WWTP in 2017:

January 26-30:	Filter in the Salsnes Filter was replaced.
August 27-31:	General maintenance was noted at the facility. Details are not available.
October 14-28:	Mechanical issue in Salsness filter repaired as well as PLC maintenance repairs.
November 13-16:	Salsness filter repairs.

During the above listed maintenance work, the WWTP was shut down and the sewage was diverted to the sewage lagoon.

Water Treatment Plant

The following maintenance work was carried out at the WTP in 2017 with approved funding from the Canada 150 Community Infrastructure Program. All repairs, upgrades and maintenance work was completed in late 2017.

Summer 2017 – Fall 2017:

- Repair and inspect Vertical Turbine Pump.
- Replacement of Vertical Inline Pump.
- Replacement of Diaphragm Chemical Metering Pump.
- Repair and maintenance of Rotary Lobe Blower.
- Replacement of Chemical Piping Systems.
- Replacement of process valves.
- Replacement of Air Scour Blower.
- Replacement of Service Water Pump.
- Miscellaneous piping modifications.

I. A progress report and revisions (if applicable) to any studies requested by the Board that relate to waste management, water use, or reclamation and a brief description of any future studies planned by the Licensee including, a non-technical executive summary for the general public, translated into Inuktitut.

Fish and Fish Habitat Assessment – Apex River

Nunami Stantec was retained to complete a Fish and Fish Habitat Assessment of the Niaqunguk (Apex) River, Lake Geraldine, and the Lake Geraldine Drainage Channel. At the time of the assessment in the late summer of 2016, Arctic Char was found in both the Apex River and the Lake Geraldine Drainage Channel. Further discussions with the Department of Fisheries and Oceans (DFO) identified that it was not possible to withdraw sufficient water from the Niaqunguk (Apex) River to meet the City's supplemental water supply while also meeting DFO's guidelines for water withdrawals in waters supporting fish and fish habitat.

Water Withdrawal and Flow Analysis – Sylvia Grinnell River

In 2017, the City retained Nunami Stantec to assess the potential of the Sylvia Grinnell River to meet the City's water supplementation needs. The results of a preliminary flow assessment of the Sylvia Grinnell River concluded that all three supplementation scenarios (identified by Golder Associates in 2013) could be met during every year of the historic flow record in compliance with DFO guidance. Estimated withdrawal rates range from 0.60 to 8.81% of available flow, depending on the supplementation scenarios.

Options Evaluation for Raw Water Supplementation – Sylvia Grinnell River

In August 2017, Nunami conducted a field investigation to identify sites along the Sylvia Grinnell River that could be suitable for water intakes, and to evaluate site-

specific fish habitat conditions. Five potentially suitable water intake locations and their routing options to the reservoir were identified within the selected study area. Two options have been selected as the most feasible options based on hydraulic and fish habitat conditions, ease of access, and estimated construction and operating costs. Further investigations are still on going in 2018 to identify the preferred site and intake type. Nunami has also further investigated another potential raw water source by evaluating the feasibility of "Unnamed Lake".

Drinking Water Management Plan

In 2017, the City of Iqaluit initiated a drinking water management plan to ensure the City is using the available drinking water as efficiently as possible. It will not impact the supplementary water supply requirement but may provide overall reductions in the water demand. This drinking water management plan is still ongoing into 2018.

J. Any revisions required, in the form of addenda, to Plans, Manuals and Reports approved under the Licence.

There are no revisions to the approved Contingency Plans and Operation and Maintenance Manuals.

K. A list and description, including volumes and Spill Report Line Identification Numbers, of all un-authorized discharges, spills and summaries of follow-up action taken.

Table 6 provides a summary of all spills and un-authorized discharges that occurred in 2017, including volumes, Spill Report Line Identification Number (if available) and summaries of the follow-up actions taken. Copies of the spill reports can be found in Appendix B.

L. A summary of any closure and reclamation work undertaken and an outline of any work anticipated for the next year, including any changes to implementation and scheduling.

In 2017, no closure and reclamation work was undertaken. No closure or reclamation work was anticipated for 2018.

M. A summary of actions taken to address concerns or deficiencies listed in the inspection reports and/or compliance reports filed by an Inspector.

No actions were taken to address the concerns and deficiencies listed in the previous inspection reports.

N. A brief update on the implementation plan of all facilities within the scope of this Licence including projected implementation and status of the Upgraded Wastewater Treatment Plant.

Wastewater Treatment Plant Upgrade

The City issued an RFP for detailed design in 2016 and Nunami-Stantec proceeded with the design effort. Following completion of the design in 2017, the cost estimate was significantly over budget. A Value Engineering session was undertaken in July 2017 to bring the scope of the project within budget. Re-design was commenced in late 2017 and completed in early 2018. The project went to tender in April 2018 and was awarded in May 2018. Construction began in June 2018 and is expected to be completed in January 2020.

O. A summary of any studies, reports and plans requested by the Board that related to waste disposal, water use, or reclamation and a brief description of any future studies planned.

See Section I above.

P. Any other details on the use of water or waste disposal requested by the Board by November 1st of the year being reported.

There were no requests made by the Board after November 1, 2017.

Table 6: Spill Report

Spill Report ID Number	Date (m/d/y)	Location	Description	Volume (m^3)	Cause	Follow-up Actions
N/A	03/05/2017	House 525	Sewage	Unknown	Sewer line plugged	Sewer flow was diverted from plugged pipeline to an alternate route to avoid further back up after flushing of line was attempted. House was cleaned up by contractor under home owner orders and spilled waste was scraped up and disposed of in City lagoon.
N/A	09/06/2017	Sewage Lagoon Dump Station	Sewage	Unknown	Overflow at dump station	Sewer flow was diverted from the station to an alternative route (Diversion to the Lagoon) to prevent further spillage.
N/A	11/24/2017	AV 214	Sewage	Unknown	Blocked sewer line	Contractor was called for clean up and sewer truck services alleviated the waste and disposed waste at discharge station. The City's Utilidor staff monitored the pumping and contained the spill.

Appendix A – Monitoring Results

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G67485

REPORT No. B17-36741

Report To:
City of Iqaluit
PO Box 460,
Iqaluit NU X0A 0H0
Attention: Maria Karveli

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

DATE RECEIVED: 05-Dec-17
DATE REPORTED: 18-Dec-17
SAMPLE MATRIX: Solid Sludge

JOB/PROJECT NO.: Test D (Solid Sludge)
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		Test D			
			Sample I.D.		B17-36741-1			
			Date Collected		30-Nov-17			
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Total Solids	% by wt	0.1	SM 2540	07-Dec-17/O	29.9			
Conductivity @25°C	µmho/cm	1	SM 2510B	07-Dec-17/O	697			
pH @25°C	pH Units		SM 4500H	08-Dec-17/O	5.16			
Nitrite (N)	µg/g	1	SM4110C	15-Dec-17/O	6			
Nitrate (N)	µg/g	1	SM4110C	15-Dec-17/O	< 5 [1]			
Ammonia (N)-Total	µg/g	0.01	MOEE 3364	11-Dec-17/O	522			
o-Phosphate (P)	µg/g	0.01	MOEE 3366	11-Dec-17/O	489			
Phosphorus-Total	µg/g	0.01	MOEE 3367	12-Dec-17/O	1800			
Aluminum	µg/g	10	EPA 6010	07-Dec-17/O	1200			
Antimony	µg/g	2	EPA 6020	07-Dec-17/O	< 2			
Arsenic	µg/g	2	EPA 6020	07-Dec-17/O	< 2			
Barium	µg/g	1	EPA 6010	07-Dec-17/O	23			
Beryllium	µg/g	0.2	EPA 6010	07-Dec-17/O	< 0.2			
Cadmium	µg/g	0.5	EPA 6010	07-Dec-17/O	< 0.5			
Chromium	µg/g	1	EPA 6010	07-Dec-17/O	819			
Cobalt	µg/g	1	EPA 6010	07-Dec-17/O	5			
Copper	µg/g	1	EPA 6010	07-Dec-17/O	281			
Iron	µg/g	10	EPA 6010	07-Dec-17/O	7820			
Lead	µg/g	5	EPA 6010	07-Dec-17/O	35			
Lithium	µg/g	0.1	EPA 6010	07-Dec-17/O	< 0.1			
Manganese	µg/g	1	EPA 6010	07-Dec-17/O	119			
Mercury	µg/g	0.01	EPA 7471A	07-Dec-17/O	0.19			
Molybdenum	µg/g	1	EPA 6010	07-Dec-17/O	105			
Nickel	µg/g	1	EPA 6010	07-Dec-17/O	610			
Selenium	µg/g	2	EPA 6020	07-Dec-17/O	< 2			
Silver	µg/g	0.2	EPA 6010	07-Dec-17/O	0.8			
Strontium	µg/g	1	EPA 6010	07-Dec-17/O	21			

Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: ---

REPORT No. B17-26529

Report To:

City of Iqaluit
PO Box 460,
Iqaluit NU X0A 0H0
Attention: Mike Hatfield

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

DATE RECEIVED: 11-Sep-17
DATE REPORTED: 20-Sep-17
SAMPLE MATRIX: Liquid Sludge

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

			Client I.D.		Test D			
			Sample I.D.		B17-26529-1			
			Date Collected		05-Sep-17			
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
pH @25°C	pH Units		SM 4500H	12-Sep-17/O	6.87			
Conductivity @25°C	µmho/cm	1	SM 2510B	12-Sep-17/O	437			
Total Suspended Solids	mg/L	3	SM 2540D	18-Sep-17/O	88			
Nitrite (N)	mg/L	0.1	SM4110C	11-Sep-17/O	< 0.1			
Nitrate (N)	mg/L	0.1	SM4110C	11-Sep-17/O	0.2			
Ammonia (N)-Total	mg/L	0.01	MOEE 3364	12-Sep-17/O	29.3			
o-Phosphate (P)	mg/L	0.01	MOEE 3366	14-Sep-17/O	1.88			
Phosphorus-Total	mg/L	0.01	MOEE 3367	14-Sep-17/O	3.85			
Aluminum	mg/L	0.03	SM 3120	15-Sep-17/O	0.33			
Antimony	mg/L	0.01	EPA 200.8	18-Sep-17/O	< 0.01			
Arsenic	mg/L	0.1	EPA 200.8	18-Sep-17/O	< 0.1			
Barium	mg/L	0.005	SM 3120	15-Sep-17/O	0.095			
Beryllium	mg/L	0.01	SM 3120	15-Sep-17/O	< 0.01			
Cadmium	mg/L	0.03	SM 3120	15-Sep-17/O	< 0.03			
Chromium	mg/L	0.01	SM 3120	15-Sep-17/O	< 0.01			
Cobalt	mg/L	0.03	SM 3120	15-Sep-17/O	< 0.03			
Copper	mg/L	0.01	SM 3120	15-Sep-17/O	0.19			
Iron	mg/L	0.03	SM 3120	15-Sep-17/O	0.63			
Lithium	mg/L	0.03	SM 3120	15-Sep-17/O	< 0.03			
Lead	mg/L	0.1	SM 3120	15-Sep-17/O	< 0.1			
Molybdenum	mg/L	0.05	SM 3120	15-Sep-17/O	< 0.05			
Nickel	mg/L	0.05	SM 3120	15-Sep-17/O	< 0.05			
Manganese	mg/L	0.005	SM 3120	15-Sep-17/O	0.130			
Mercury	mg/L	0.002	EPA 7471A	15-Sep-17/O	< 0.002			
Selenium	mg/L	0.1	EPA 200.8	18-Sep-17/O	< 0.1			
Silver	mg/L	0.002	EPA 200.8	18-Sep-17/O	< 0.002			
Strontium	mg/L	0.005	SM 3120	15-Sep-17/O	0.235			

NOTE: Total & Fecal Coliform passed acceptable holding times (i.e. 48 hrs) upon arrival at the lab.

Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: ---

REPORT No. B17-32642

Report To:
City of Iqaluit
PO Box 460,
Iqaluit NU X0A 0H0
Attention: Pat Wolfe

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

DATE RECEIVED: 27-Oct-17
DATE REPORTED: 06-Nov-17
SAMPLE MATRIX: Waste Water

JOB/PROJECT NO.: Test F (Second Test)
P.O. NUMBER: 460
WATERWORKS NO.

			Client I.D.		Sewage Lagoon Decant			
			Sample I.D.		B17-32642-1			
			Date Collected		26-Oct-17			
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
BOD	mg/L	3	SM 5210B	01-Nov-17/O	42			
pH @25°C	pH Units		SM 4500H	31-Oct-17/O	7.63			
Conductivity @25°C	µmho/cm	1	SM 2510B	01-Nov-17/O	362			
Total Suspended Solids	mg/L	3	SM 2540D	31-Oct-17/O	68			
Nitrite (N)	mg/L	0.1	SM4110C	03-Nov-17/O	< 0.1			
Nitrate (N)	mg/L	0.1	SM4110C	03-Nov-17/O	0.1			
Ammonia (N)-Total	mg/L	0.01	MOEE 3364	31-Oct-17/O	17.9			
o-Phosphate (P)	mg/L	0.01	MOEE 3366	31-Oct-17/O	1.34			
Phosphorus-Total	mg/L	0.01	MOEE 3367	02-Nov-17/O	3.14			
Aluminum	mg/L	0.01	SM 3120	01-Nov-17/O	0.11			
Antimony	mg/L	0.0005	EPA 200.8	30-Oct-17/O	< 0.0005			
Arsenic	mg/L	0.0005	EPA 200.8	30-Oct-17/O	< 0.0005			
Barium	mg/L	0.001	SM 3120	01-Nov-17/O	0.018			
Beryllium	mg/L	0.002	SM 3120	01-Nov-17/O	< 0.002			
Cadmium	mg/L	).000070	EPA 200.8	30-Oct-17/O	< 0.000070			
Chromium	mg/L	0.002	SM 3120	01-Nov-17/O	0.002			
Cobalt	mg/L	0.005	SM 3120	01-Nov-17/O	< 0.005			
Copper	mg/L	0.002	SM 3120	01-Nov-17/O	0.125			
Iron	mg/L	0.005	SM 3120	01-Nov-17/O	0.764			
Lead	mg/L	0.0001	EPA 200.8	30-Oct-17/O	0.0010			
Lithium	mg/L	0.01	SM 3120	01-Nov-17/O	< 0.01			
Manganese	mg/L	0.001	SM 3120	01-Nov-17/O	0.124			
Mercury	mg/L	0.00002	SM 3112 B	31-Oct-17/O	< 0.00002			
Molybdenum	mg/L	0.01	SM 3120	01-Nov-17/O	< 0.01			
Nickel	mg/L	0.01	SM 3120	01-Nov-17/O	< 0.01			
Selenium	mg/L	0.005	EPA 200.8	30-Oct-17/O	< 0.005			

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G67432

REPORT No. B17-31262

Report To:
City of Iqaluit
PO Box 460,
Iqaluit NU X0A 0H0
Attention: Pat Wolfe

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

DATE RECEIVED: 17-Oct-17
DATE REPORTED: 25-Oct-17
SAMPLE MATRIX: Waste Water

JOB/PROJECT NO.: Test F
P.O. NUMBER: 460
WATERWORKS NO.

			Client I.D.		Sewage Lagoon Decant			
			Sample I.D.		B17-31262-1			
			Date Collected		16-Oct-17			
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
BOD	mg/L	3	SM 5210B	19-Oct-17/O	103			
pH @25°C	pH Units		SM 4500H	18-Oct-17/O	7.49			
Conductivity @25°C	µmho/cm	1	SM 2510B	18-Oct-17/O	373			
Total Suspended Solids	mg/L	3	SM 2540D	20-Oct-17/O	104			
Nitrite (N)	mg/L	0.1	SM4110C	24-Oct-17/O	< 0.1			
Nitrate (N)	mg/L	0.1	SM4110C	24-Oct-17/O	0.1			
Ammonia (N)-Total	mg/L	0.01	MOEE 3364	18-Oct-17/O	13.0			
o-Phosphate (P)	mg/L	0.01	MOEE 3366	18-Oct-17/O	0.70			
Phosphorus-Total	mg/L	0.01	MOEE 3367	19-Oct-17/O	2.46			
Aluminum	mg/L	0.01	SM 3120	18-Oct-17/O	0.16			
Antimony	mg/L	0.0005	EPA 200.8	18-Oct-17/O	< 0.0005			
Arsenic	mg/L	0.0005	EPA 200.8	18-Oct-17/O	0.0005			
Barium	mg/L	0.001	SM 3120	18-Oct-17/O	0.019			
Beryllium	mg/L	0.002	SM 3120	18-Oct-17/O	< 0.002			
Cadmium	mg/L	).000070	EPA 200.8	18-Oct-17/O	0.000135			
Chromium	mg/L	0.002	SM 3120	18-Oct-17/O	< 0.002			
Cobalt	mg/L	0.005	SM 3120	18-Oct-17/O	< 0.005			
Copper	mg/L	0.002	SM 3120	18-Oct-17/O	0.092			
Iron	mg/L	0.005	SM 3120	18-Oct-17/O	1.29			
Lead	mg/L	0.0001	EPA 200.8	18-Oct-17/O	0.0013			
Lithium	mg/L	0.01	SM 3120	18-Oct-17/O	< 0.01			
Manganese	mg/L	0.001	SM 3120	18-Oct-17/O	0.141			
Mercury	mg/L	0.00002	SM 3112 B	20-Oct-17/O	< 0.00002			
Molybdenum	mg/L	0.01	SM 3120	18-Oct-17/O	< 0.01			
Nickel	mg/L	0.01	SM 3120	18-Oct-17/O	< 0.01			
Selenium	mg/L	0.005	EPA 200.8	18-Oct-17/O	< 0.005			

Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G63453

REPORT No. B17-34857

Report To:

City of Iqaluit
PO Box 460,
Iqaluit NU X0A 0H0
Attention: Maria Karveli

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

DATE RECEIVED: 16-Nov-17
DATE REPORTED: 29-Nov-17
SAMPLE MATRIX: Drinking Water

JOB/PROJECT NO.: Test A (WTP)
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		WTP Test A	WTP Test A (Total)		
			Sample I.D.		B17-34857-1	B17-34857-2		
			Date Collected		16-Nov-17	16-Nov-17		
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Hardness (as CaCO3)	mg/L	1	SM 3120	20-Nov-17/O	15			
Hardness (as CaCO3)	mg/L	1	SM 3120	21-Nov-17/O		14		
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	22-Nov-17/O	9			
Carbonate (as CaCO3)	mg/L	5	SM 2320B	22-Nov-17/O	< 5			
Bicarbonate(as CaCO3)	mg/L	5	SM 2320B	22-Nov-17/O	9			
Hydroxide	mg/L	5	EPA 310.2	22-Nov-17/O	< 5			
Acidity (as CaCO3)	mg/L	5.0	Subcontract	23-Nov-17	5.8 [1]			
Conductivity @25°C	µmho/cm	1	SM 2510B	22-Nov-17/O	41			
REDOX potential	mV		In-House	23-Nov-17/R	188			
pH @25°C	pH Units		SM 4500H	22-Nov-17/O	7.11			
TDS (Calc. from Cond.)	mg/L	1	Calc.	23-Nov-17	21			
Total Suspended Solids	mg/L	3	SM 2540D	17-Nov-17/O	< 3			
Turbidity	NTU	0.1	SM 2130	16-Nov-17/O	0.6			
Chloride	mg/L	0.5	SM4110C	15-Nov-17/O	5.0			
Sulphate	mg/L	1	SM4110C	15-Nov-17/O	2			
Aluminum	mg/L	0.01	SM 3120	20-Nov-17/O	0.01			
Aluminum	mg/L	0.01	SM 3120	21-Nov-17/O		0.01		
Antimony	mg/L	0.0001	EPA 200.8	20-Nov-17/O	< 0.0001			
Antimony	mg/L	0.0001	EPA 200.8	21-Nov-17/O		< 0.0001		
Arsenic	mg/L	0.0001	EPA 200.8	20-Nov-17/O	0.0001			
Arsenic	mg/L	0.0001	EPA 200.8	21-Nov-17/O		< 0.0001		
Barium	mg/L	0.001	SM 3120	20-Nov-17/O	0.001			
Barium	mg/L	0.001	SM 3120	21-Nov-17/O		0.002		
Beryllium	mg/L	0.002	SM 3120	20-Nov-17/O	< 0.002			
Beryllium	mg/L	0.002	SM 3120	21-Nov-17/O		< 0.002		
Cadmium	mg/L	).000014	EPA 200.8	20-Nov-17/O	< 0.000014			
Cadmium	mg/L	).000014	EPA 200.8	21-Nov-17/O		< 0.000014		

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G63453 **REPORT No. B17-34857**

Report To:
City of Iqaluit
PO Box 460,
Iqaluit NU X0A 0H0
Attention: Maria Karveli

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

DATE RECEIVED: 16-Nov-17
DATE REPORTED: 29-Nov-17
SAMPLE MATRIX: Drinking Water

JOB/PROJECT NO.: Test A (WTP)
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		WTP Test A	WTP Test A (Total)		
			Sample I.D.		B17-34857-1	B17-34857-2		
			Date Collected		16-Nov-17	16-Nov-17		
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Tin	mg/L	0.05	SM 3120	20-Nov-17/O	< 0.05			
Tin	mg/L	0.05	SM 3120	21-Nov-17/O		< 0.05		
Titanium	mg/L	0.005	SM 3120	20-Nov-17/O	< 0.005			
Titanium	mg/L	0.005	SM 3120	21-Nov-17/O		< 0.005		
Uranium	mg/L	0.00005	EPA 200.8	20-Nov-17/O	< 0.00005			
Uranium	mg/L	0.00005	EPA 200.8	21-Nov-17/O		< 0.00005		
Vanadium	mg/L	0.005	SM 3120	20-Nov-17/O	< 0.005			
Vanadium	mg/L	0.005	SM 3120	21-Nov-17/O		< 0.005		
Zinc	mg/L	0.005	SM 3120	20-Nov-17/O	0.006			
Zinc	mg/L	0.005	SM 3120	21-Nov-17/O		0.007		
Total Organic Carbon	mg/L	0.2	EPA 415.1	22-Nov-17/O	2.0			
TIC	mg/L	0.5	EPA 415.1	22-Nov-17/O	2.5			
Fecal Coliform	cfu/100mL	1	MOE E3371	16-Nov-17/O	0			

1 subcontracted to Testmark Labs.

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G67485 **REPORT No. B17-36746**

Report To:
City of Iqaluit
PO Box 460,
Iqaluit NU X0A 0H0
Attention: Maria Karveli

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

DATE RECEIVED: 05-Dec-17
DATE REPORTED: 15-Dec-17
SAMPLE MATRIX: Drinking Water

JOB/PROJECT NO.: Test A (WTP)
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		WTP Test A	WTP Test A (Total)		
			Sample I.D.		B17-36746-1	B17-36746-2		
			Date Collected		30-Nov-17	05-Dec-17		
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Hardness (as CaCO3)	mg/L	1	SM 3120	06-Dec-17/O	15			
Hardness (as CaCO3)	mg/L	1	SM 3120	06-Dec-17/O		15		
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	05-Dec-17/O	10			
Bicarbonate(as CaCO3)	mg/L	5	SM 2320B	05-Dec-17/O	10			
Carbonate (as CaCO3)	mg/L	5	SM 2320B	05-Dec-17/O	< 5			
Hydroxide	mg/L	5	EPA 310.2	05-Dec-17/O	< 5			
Acidity (as CaCO3)	mg/L	5	Subcontract	14-Dec-17	< 5 [1]			
pH @25°C	pH Units		SM 4500H	05-Dec-17/O	7.12			
Conductivity @25°C	µmho/cm	1	SM 2510B	05-Dec-17/O	39			
TDS (Calc. from Cond.)	mg/L	1	Calc.	06-Dec-17	20			
Total Suspended Solids	mg/L	3	SM 2540D	06-Dec-17/O	< 3			
Turbidity	NTU	0.1	SM 2130	05-Dec-17/O	0.7			
REDOX potential	mV		Subcontract	14-Dec-17	472 [1]			
Chloride	mg/L	0.5	SM4110C	06-Dec-17/O	3.9			
Sulphate	mg/L	1	SM4110C	06-Dec-17/O	3			
Aluminum	mg/L	0.01	SM 3120	06-Dec-17/O	0.01			
Aluminum	mg/L	0.01	SM 3120	06-Dec-17/O		0.01		
Antimony	mg/L	0.0001	EPA 200.8	11-Dec-17/O	< 0.0001			
Antimony	mg/L	0.0001	EPA 200.8	06-Dec-17/O		< 0.0001		
Arsenic	mg/L	0.0001	EPA 200.8	11-Dec-17/O	< 0.0001			
Arsenic	mg/L	0.0001	EPA 200.8	06-Dec-17/O		< 0.0001		
Barium	mg/L	0.001	SM 3120	06-Dec-17/O	0.001			
Barium	mg/L	0.001	SM 3120	06-Dec-17/O		0.001		
Beryllium	mg/L	0.002	SM 3120	06-Dec-17/O	< 0.002			
Beryllium	mg/L	0.002	SM 3120	06-Dec-17/O		< 0.002		
Cadmium	mg/L	).000014	EPA 200.8	11-Dec-17/O	< 0.000014			
Cadmium	mg/L	).000014	EPA 200.8	06-Dec-17/O		0.000020		

Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G67485

REPORT No. B17-36746

Report To:

City of Iqaluit
PO Box 460,
Iqaluit NU X0A 0H0
Attention: Maria Karveli

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

DATE RECEIVED: 05-Dec-17
DATE REPORTED: 15-Dec-17
SAMPLE MATRIX: Drinking Water

JOB/PROJECT NO.: Test A (WTP)
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		WTP Test A	WTP Test A (Total)		
			Sample I.D.		B17-36746-1	B17-36746-2		
			Date Collected		30-Nov-17	05-Dec-17		
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Tin	mg/L	0.05	SM 3120	06-Dec-17/O	< 0.05			
Tin	mg/L	0.05	SM 3120	06-Dec-17/O		< 0.05		
Titanium	mg/L	0.005	SM 3120	06-Dec-17/O	< 0.005			
Titanium	mg/L	0.005	SM 3120	06-Dec-17/O		< 0.005		
Uranium	mg/L	0.00005	EPA 200.8	11-Dec-17/O	< 0.00005			
Uranium	mg/L	0.00005	EPA 200.8	06-Dec-17/O		0.00020		
Vanadium	mg/L	0.005	SM 3120	06-Dec-17/O	< 0.005			
Vanadium	mg/L	0.005	SM 3120	06-Dec-17/O		< 0.005		
Zinc	mg/L	0.005	SM 3120	06-Dec-17/O	0.007			
Zinc	mg/L	0.005	SM 3120	06-Dec-17/O		0.007		
Total Organic Carbon	mg/L	0.2	EPA 415.1	06-Dec-17/O	1.7			
TIC	mg/L	0.5	EPA 415.1	06-Dec-17/O	2.8			
Fecal Coliform	cfu/100mL	1	MOE E3371	05-Dec-17/O	0			
Anion Sum	meq/L		Calc.	07-Dec-17/O	0.370			
Cation Sum	meq/L		Calc.	07-Dec-17/O	0.371			
% Difference	%		Calc.	07-Dec-17/O	0.0687			
Ion Ratio	AS/CS		Calc.	07-Dec-17/O	0.999			
Sodium Adsorption Ratio	-		Calc.	07-Dec-17/O	0.172			
TDS(ion sum calc.)	mg/L	1	Calc.	07-Dec-17/O	20			
Conductivity (calc.)	µmho/cm		Calc.	07-Dec-17/O	41.6			
EC(calc.)/EC(actual)	-		Calc.	07-Dec-17/O	1.07			
TDS(calc.)/EC(actual)	-		Calc.	07-Dec-17/O	0.516			
Langelier Index(25°C)	S.I.		Calc.	07-Dec-17/O	-2.53			

1 subcontracted to Testmark Labs.

Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G67485 **REPORT No. B17-36741**

Report To:
City of Iqaluit
PO Box 460,
Iqaluit NU X0A 0H0
Attention: Maria Karveli

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

DATE RECEIVED: 05-Dec-17
DATE REPORTED: 18-Dec-17
SAMPLE MATRIX: Solid Sludge

JOB/PROJECT NO.: Test D (Solid Sludge)
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		Test D			
			Sample I.D.		B17-36741-1			
			Date Collected		30-Nov-17			
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
Total Solids	% by wt	0.1	SM 2540	07-Dec-17/O	29.9			
Conductivity @25°C	µmho/cm	1	SM 2510B	07-Dec-17/O	697			
pH @25°C	pH Units		SM 4500H	08-Dec-17/O	5.16			
Nitrite (N)	µg/g	1	SM4110C	15-Dec-17/O	6			
Nitrate (N)	µg/g	1	SM4110C	15-Dec-17/O	< 5 [1]			
Ammonia (N)-Total	µg/g	0.01	MOEE 3364	11-Dec-17/O	522			
o-Phosphate (P)	µg/g	0.01	MOEE 3366	11-Dec-17/O	489			
Phosphorus-Total	µg/g	0.01	MOEE 3367	12-Dec-17/O	1800			
Aluminum	µg/g	10	EPA 6010	07-Dec-17/O	1200			
Antimony	µg/g	2	EPA 6020	07-Dec-17/O	< 2			
Arsenic	µg/g	2	EPA 6020	07-Dec-17/O	< 2			
Barium	µg/g	1	EPA 6010	07-Dec-17/O	23			
Beryllium	µg/g	0.2	EPA 6010	07-Dec-17/O	< 0.2			
Cadmium	µg/g	0.5	EPA 6010	07-Dec-17/O	< 0.5			
Chromium	µg/g	1	EPA 6010	07-Dec-17/O	819			
Cobalt	µg/g	1	EPA 6010	07-Dec-17/O	5			
Copper	µg/g	1	EPA 6010	07-Dec-17/O	281			
Iron	µg/g	10	EPA 6010	07-Dec-17/O	7820			
Lead	µg/g	5	EPA 6010	07-Dec-17/O	35			
Lithium	µg/g	0.1	EPA 6010	07-Dec-17/O	< 0.1			
Manganese	µg/g	1	EPA 6010	07-Dec-17/O	119			
Mercury	µg/g	0.01	EPA 7471A	07-Dec-17/O	0.19			
Molybdenum	µg/g	1	EPA 6010	07-Dec-17/O	105			
Nickel	µg/g	1	EPA 6010	07-Dec-17/O	610			
Selenium	µg/g	2	EPA 6020	07-Dec-17/O	< 2			
Silver	µg/g	0.2	EPA 6010	07-Dec-17/O	0.8			
Strontium	µg/g	1	EPA 6010	07-Dec-17/O	21			

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Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G67485

REPORT No. B17-36739

Report To:
City of Iqaluit
PO Box 460,
Iqaluit NU X0A 0H0
Attention: Maria Karveli

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

DATE RECEIVED: 05-Dec-17
DATE REPORTED: 15-Dec-17
SAMPLE MATRIX: Waste Water

JOB/PROJECT NO.: Test C (WWTP Eff)
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		Test C			
			Sample I.D.		B17-36739-1			
			Date Collected		30-Nov-17			
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
pH @25°C	pH Units		SM 4500H	07-Dec-17/O	7.54			
Conductivity @25°C	µmho/cm	1	SM 2510B	07-Dec-17/O	482			
Total Suspended Solids	mg/L	3	SM 2540D	06-Dec-17/O	164			
Nitrite (N)	mg/L	0.1	SM4110C	14-Dec-17/O	< 0.1			
Nitrate (N)	mg/L	0.1	SM4110C	14-Dec-17/O	< 0.1			
Ammonia (N)-Total	mg/L	0.01	MOEE 3364	07-Dec-17/O	40.4			
o-Phosphate (P)	mg/L	0.01	MOEE 3366	07-Dec-17/O	4.33			
Phosphorus-Total	mg/L	0.01	MOEE 3367	07-Dec-17/O	5.08			
Aluminum	mg/L	0.01	SM 3120	06-Dec-17/O	0.21			
Antimony	mg/L	0.0005	EPA 200.8	07-Dec-17/O	< 0.0005			
Arsenic	mg/L	0.0005	EPA 200.8	07-Dec-17/O	< 0.0005			
Barium	mg/L	0.001	SM 3120	06-Dec-17/O	0.020			
Beryllium	mg/L	0.002	SM 3120	06-Dec-17/O	< 0.002			
Cadmium	mg/L	0.005	SM 3120	06-Dec-17/O	< 0.005			
Chromium	mg/L	0.002	SM 3120	06-Dec-17/O	< 0.002			
Cobalt	mg/L	0.005	SM 3120	06-Dec-17/O	< 0.005			
Copper	mg/L	0.002	SM 3120	06-Dec-17/O	0.301			
Iron	mg/L	0.005	SM 3120	06-Dec-17/O	0.445			
Lead	mg/L	0.02	SM 3120	06-Dec-17/O	< 0.02			
Lithium	mg/L	0.01	SM 3120	06-Dec-17/O	< 0.01			
Manganese	mg/L	0.001	SM 3120	06-Dec-17/O	0.085			
Mercury	mg/L	0.00002	SM 3112 B	07-Dec-17/O	0.00004			
Molybdenum	mg/L	0.01	SM 3120	06-Dec-17/O	< 0.01			
Nickel	mg/L	0.01	SM 3120	06-Dec-17/O	< 0.01			
Selenium	mg/L	0.005	EPA 200.8	07-Dec-17/O	< 0.005			
Silver	mg/L	0.005	SM 3120	06-Dec-17/O	< 0.005			
Strontium	mg/L	0.001	SM 3120	06-Dec-17/O	0.062			

Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

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Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G67485 **REPORT No. B17-36737**

Report To:
City of Iqaluit
PO Box 460,
Iqaluit NU X0A 0H0
Attention: Maria Karveli

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

DATE RECEIVED: 05-Dec-17
DATE REPORTED: 15-Dec-17
SAMPLE MATRIX: Waste Water

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

			Client I.D.		Test B - WWTP			
			Sample I.D.		B17-36737-1			
			Date Collected		30-Nov-17			
Parameter	**Units**	**R.L.**	**Reference Method**	**Date/Site Analyzed**				
pH @25°C	pH Units		SM 4500H	05-Dec-17/O	7.65			
Conductivity @25°C	µmho/cm	1	SM 2510B	05-Dec-17/O	478			
Total Suspended Solids	mg/L	3	SM 2540D	06-Dec-17/O	300			
Nitrite (N)	mg/L	0.1	SM4110C	14-Dec-17/O	< 0.1			
Nitrate (N)	mg/L	0.1	SM4110C	14-Dec-17/O	< 0.1			
Ammonia (N)-Total	mg/L	0.01	MOEE 3364	07-Dec-17/O	39.3			
o-Phosphate (P)	mg/L	0.01	MOEE 3366	07-Dec-17/O	4.03			
Phosphorus-Total	mg/L	0.01	MOEE 3367	07-Dec-17/O	5.55			
Aluminum	mg/L	0.01	SM 3120	06-Dec-17/O	0.22			
Antimony	mg/L	0.0005	EPA 200.8	07-Dec-17/O	< 0.0005			
Arsenic	mg/L	0.0005	EPA 200.8	07-Dec-17/O	< 0.0005			
Barium	mg/L	0.001	SM 3120	06-Dec-17/O	0.021			
Beryllium	mg/L	0.002	SM 3120	06-Dec-17/O	< 0.002			
Cadmium	mg/L	0.005	SM 3120	06-Dec-17/O	< 0.005			
Chromium	mg/L	0.002	SM 3120	06-Dec-17/O	0.003			
Cobalt	mg/L	0.005	SM 3120	06-Dec-17/O	< 0.005			
Copper	mg/L	0.002	SM 3120	06-Dec-17/O	0.319			
Iron	mg/L	0.005	SM 3120	06-Dec-17/O	0.523			
Lead	mg/L	0.02	SM 3120	06-Dec-17/O	< 0.02			
Lithium	mg/L	0.01	SM 3120	06-Dec-17/O	< 0.01			
Manganese	mg/L	0.001	SM 3120	06-Dec-17/O	0.088			
Mercury	mg/L	0.00002	SM 3112 B	07-Dec-17/O	0.00017			
Molybdenum	mg/L	0.01	SM 3120	06-Dec-17/O	< 0.01			
Nickel	mg/L	0.01	SM 3120	06-Dec-17/O	0.02			
Selenium	mg/L	0.005	EPA 200.8	07-Dec-17/O	< 0.005			
Silver	mg/L	0.005	SM 3120	06-Dec-17/O	0.005			
Strontium	mg/L	0.001	SM 3120	06-Dec-17/O	0.063			

Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

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CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G67485

REPORT No. B17-36739

Report To:
City of Iqaluit
PO Box 460,
Iqaluit NU X0A 0H0
Attention: Maria Karveli

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

DATE RECEIVED: 05-Dec-17
DATE REPORTED: 15-Dec-17
SAMPLE MATRIX: Waste Water

JOB/PROJECT NO.: Test C (WWTP Eff)
P.O. NUMBER:
WATERWORKS NO.

			Client I.D.		Test C			
			Sample I.D.		B17-36739-1			
			Date Collected		30-Nov-17			
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
pH @25°C	pH Units		SM 4500H	07-Dec-17/O	7.54			
Conductivity @25°C	µmho/cm	1	SM 2510B	07-Dec-17/O	482			
Total Suspended Solids	mg/L	3	SM 2540D	06-Dec-17/O	164			
Nitrite (N)	mg/L	0.1	SM4110C	14-Dec-17/O	< 0.1			
Nitrate (N)	mg/L	0.1	SM4110C	14-Dec-17/O	< 0.1			
Ammonia (N)-Total	mg/L	0.01	MOEE 3364	07-Dec-17/O	40.4			
o-Phosphate (P)	mg/L	0.01	MOEE 3366	07-Dec-17/O	4.33			
Phosphorus-Total	mg/L	0.01	MOEE 3367	07-Dec-17/O	5.08			
Aluminum	mg/L	0.01	SM 3120	06-Dec-17/O	0.21			
Antimony	mg/L	0.0005	EPA 200.8	07-Dec-17/O	< 0.0005			
Arsenic	mg/L	0.0005	EPA 200.8	07-Dec-17/O	< 0.0005			
Barium	mg/L	0.001	SM 3120	06-Dec-17/O	0.020			
Beryllium	mg/L	0.002	SM 3120	06-Dec-17/O	< 0.002			
Cadmium	mg/L	0.005	SM 3120	06-Dec-17/O	< 0.005			
Chromium	mg/L	0.002	SM 3120	06-Dec-17/O	< 0.002			
Cobalt	mg/L	0.005	SM 3120	06-Dec-17/O	< 0.005			
Copper	mg/L	0.002	SM 3120	06-Dec-17/O	0.301			
Iron	mg/L	0.005	SM 3120	06-Dec-17/O	0.445			
Lead	mg/L	0.02	SM 3120	06-Dec-17/O	< 0.02			
Lithium	mg/L	0.01	SM 3120	06-Dec-17/O	< 0.01			
Manganese	mg/L	0.001	SM 3120	06-Dec-17/O	0.085			
Mercury	mg/L	0.00002	SM 3112 B	07-Dec-17/O	0.00004			
Molybdenum	mg/L	0.01	SM 3120	06-Dec-17/O	< 0.01			
Nickel	mg/L	0.01	SM 3120	06-Dec-17/O	< 0.01			
Selenium	mg/L	0.005	EPA 200.8	07-Dec-17/O	< 0.005			
Silver	mg/L	0.005	SM 3120	06-Dec-17/O	< 0.005			
Strontium	mg/L	0.001	SM 3120	06-Dec-17/O	0.062			

Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

CADUCEON ENVIRONMENTAL LABORATORIES
Client committed. Quality assured.

CERTIFICATE OF ANALYSIS

Final Report

C.O.C.: G67485

REPORT No. B17-36737

Report To:
City of Iqaluit
PO Box 460,
Iqaluit NU X0A 0H0
Attention: Maria Karveli

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

DATE RECEIVED: 05-Dec-17
DATE REPORTED: 15-Dec-17
SAMPLE MATRIX: Waste Water

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

	Client I.D.	Test B - WWTP			
	Sample I.D.	B17-36737-1			
	Date Collected	30-Nov-17			

Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
pH @25°C	pH Units		SM 4500H	05-Dec-17/O	7.65			
Conductivity @25°C	µmho/cm	1	SM 2510B	05-Dec-17/O	478			
Total Suspended Solids	mg/L	3	SM 2540D	06-Dec-17/O	300			
Nitrite (N)	mg/L	0.1	SM4110C	14-Dec-17/O	< 0.1			
Nitrate (N)	mg/L	0.1	SM4110C	14-Dec-17/O	< 0.1			
Ammonia (N)-Total	mg/L	0.01	MOEE 3364	07-Dec-17/O	39.3			
o-Phosphate (P)	mg/L	0.01	MOEE 3366	07-Dec-17/O	4.03			
Phosphorus-Total	mg/L	0.01	MOEE 3367	07-Dec-17/O	5.55			
Aluminum	mg/L	0.01	SM 3120	06-Dec-17/O	0.22			
Antimony	mg/L	0.0005	EPA 200.8	07-Dec-17/O	< 0.0005			
Arsenic	mg/L	0.0005	EPA 200.8	07-Dec-17/O	< 0.0005			
Barium	mg/L	0.001	SM 3120	06-Dec-17/O	0.021			
Beryllium	mg/L	0.002	SM 3120	06-Dec-17/O	< 0.002			
Cadmium	mg/L	0.005	SM 3120	06-Dec-17/O	< 0.005			
Chromium	mg/L	0.002	SM 3120	06-Dec-17/O	0.003			
Cobalt	mg/L	0.005	SM 3120	06-Dec-17/O	< 0.005			
Copper	mg/L	0.002	SM 3120	06-Dec-17/O	0.319			
Iron	mg/L	0.005	SM 3120	06-Dec-17/O	0.523			
Lead	mg/L	0.02	SM 3120	06-Dec-17/O	< 0.02			
Lithium	mg/L	0.01	SM 3120	06-Dec-17/O	< 0.01			
Manganese	mg/L	0.001	SM 3120	06-Dec-17/O	0.088			
Mercury	mg/L	0.00002	SM 3112 B	07-Dec-17/O	0.00017			
Molybdenum	mg/L	0.01	SM 3120	06-Dec-17/O	< 0.01			
Nickel	mg/L	0.01	SM 3120	06-Dec-17/O	0.02			
Selenium	mg/L	0.005	EPA 200.8	07-Dec-17/O	< 0.005			
Silver	mg/L	0.005	SM 3120	06-Dec-17/O	0.005			
Strontium	mg/L	0.001	SM 3120	06-Dec-17/O	0.063			

Greg Clarkin , BSc., C. Chem
Lab Manager - Ottawa District

R.L. = Reporting Limit
Test methods may be modified from specified reference method unless indicated by an *
Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie

Appendix B – Spill Reports

Northwest Territories | Nunavut | Canada

NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND OTHER HAZARDOUS MATERIALS

NT-NU 24-HOUR SPILL REPORT LINE
TEL: (867) 920-8130
FAX: (867) 873-6924
EMAIL: spills@gov.nt.ca

REPORT LINE USE ONLY

A	REPORT DATE: MONTH – DAY – YEAR: MARCH 20 2017	REPORT TIME: 14:30	[X] ORIGINAL SPILL REPORT, OR [ ] UPDATE # _____ TO THE ORIGINAL SPILL REPORT	REPORT NUMBER: ____-____
B	OCCURRENCE DATE: MONTH – DAY – YEAR: MARCH 05 2017	OCCURRENCE TIME: 9 AM		
C	LAND USE PERMIT NUMBER (IF APPLICABLE)	WATER LICENCE NUMBER (IF APPLICABLE)		
D	GEOGRAPHIC PLACE NAME OR DISTANCE AND DIRECTION FROM NAMED LOCATION: HOUSE 525	REGION: [ ] NWT [X] NUNAVUT [ ] ADJACENT JURISDICTION OR OCEAN		
E	LATITUDE: DEGREES / MINUTES / SECONDS	LONGITUDE: DEGREES / MINUTES / SECONDS		
F	RESPONSIBLE PARTY OR VESSEL NAME: CITY OF IQALUIT	RESPONSIBLE PARTY ADDRESS OR OFFICE LOCATION: PO BOX 460 IQALUIT NU XOA 0H0		
G	ANY CONTRACTOR INVOLVED	CONTRACTOR ADDRESS OR OFFICE LOCATION		
H	PRODUCT SPILLED: SEWAGE	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES: UNKNOWN	U.N. NUMBER	
	SECOND PRODUCT SPILLED (IF APPLICABLE)	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES	U.N. NUMBER	
I	SPILL SOURCE: HOUSE 525 CONNECTION PIPE	SPILL CAUSE: PLUGGED SEWER LINE	AREA OF CONTAMINATION IN SQUARE METRES: SMALL UNKNOWN	
J	FACTORS AFFECTING SPILL OR RECOVERY: POSSIBLE COLLAPSED LINE	DESCRIBE ANY ASSISTANCE REQUIRED	HAZARDS TO PERSONS, PROPERTY OR ENVIRONMENT	

K — ADDITIONAL INFORMATION, COMMENTS, ACTIONS PROPOSED OR TAKEN TO CONTAIN, RECOVER OR DISPOSE OF SPILLED PRODUCT AND CONTAMINATED MATERIALS

MORNING OF MARCH 5TH 2017 A BACK UP OF SEWER INTO HSE 525 WAS REPORTED AND PROMPLY INVESTIGATED. SEWER FLOW WAS DIVERTED FROM PLUGGED PIPELINE TO AN ALTERNATE ROUTE TO AVOID FURTHER BACK UP AFTER FLUSHING THE LINE WAS ATTEMPTED.HOUSE HAS BEEN CLEANED UP BY CONTRACTORS UNDER HOME OWNER ORDERS.SPILLED PRODUCTS WILL BE SCRAPED UP FROM GROUND AS THEY ARE FROZEN ONCE SNOW REMOVAL AND WEATHER ALLOWS AND DISPOSED OF IN CITY LAGOON.SCOPE OF WORK IS BEING DONE TODAY TO DETERMINE BEST PLAN OF ACTION TO CORRECT THE COLLAPSED PIELINE. REASON FOR DELAY IN REPORT I COULD NOT DETERMINE AMOUNT OR CAUSE OF SPILL AND AFFECTED AREA UNTIL NOW DUE TO WEATHER CONDITIONS AND STAFF SHORTAGES

L	REPORTED TO SPILL LINE BY: MIKE HATFIELD	POSITION: MANAGER	EMPLOYER: CITY OF IQALUIT	LOCATION CALLING FROM: BLDG 2425	TELEPHONE: 8679795632
M	ANY ALTERNATE CONTACT: JOE BROWN	POSITION: SUPERINTENDANT	EMPLOYER: CITY OF IQALUIT	ALTERNATE CONTACT LOCATION: BLDG 2425	ALTERNATE TELEPHONE: 8679795631

REPORT LINE USE ONLY

N	RECEIVED AT SPILL LINE BY	POSITION: STATION OPERATOR	EMPLOYER	LOCATION CALLED: YELLOWKNIFE, NT	REPORT LINE NUMBER: (867) 920-8130

LEAD AGENCY [ ] EC [ ] CCG [ ] GNWT [ ] GN [ ] ILA [ ] INAC [ ] NEB [ ] TC | SIGNIFICANCE [ ] MINOR [ ] MAJOR [ ] UNKNOWN | FILE STATUS [ ] OPEN [ ] CLOSED

AGENCY	CONTACT NAME	CONTACT TIME	REMARKS
LEAD AGENCY			
FIRST SUPPORT AGENCY			
SECOND SUPPORT AGENCY			
THIRD SUPPORT AGENCY			

Northwest Territories | Nunavut | Canada

NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND OTHER HAZARDOUS MATERIALS

NT-NU 24-HOUR SPILL REPORT LINE
TEL: (867) 920-8130
FAX: (867) 873-6924
EMAIL: spills@gov.nt.ca

REPORT LINE USE ONLY

A	REPORT DATE: MONTH – DAY – YEAR 09-06-2017	REPORT TIME 10:25 AM	☒ ORIGINAL SPILL REPORT, OR ☐ UPDATE # _____ TO THE ORIGINAL SPILL REPORT	REPORT NUMBER _____-_____
B	OCCURRENCE DATE: MONTH – DAY – YEAR 09-06-2017	OCCURRENCE TIME 8:30 AM		
C	LAND USE PERMIT NUMBER (IF APPLICABLE)	WATER LICENCE NUMBER (IF APPLICABLE)		
D	GEOGRAPHIC PLACE NAME OR DISTANCE AND DIRECTION FROM NAMED LOCATION SEWER DUMP STN BY LAGOON	REGION ☐ NWT ☒ NUNAVUT ☐ ADJACENT JURISDICTION OR OCEAN		
E	LATITUDE DEGREES MINUTES SECONDS	LONGITUDE DEGREES MINUTES SECONDS		
F	RESPONSIBLE PARTY OR VESSEL NAME CITY OF IQALUIT	RESPONSIBLE PARTY ADDRESS OR OFFICE LOCATION PO BOX 460, IQALUIT, NU, X0A OHO		
G	ANY CONTRACTOR INVOLVED N/A	CONTRACTOR ADDRESS OR OFFICE LOCATION N/A		
H	PRODUCT SPILLED SEWAGE	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES UNKOWN	U.N. NUMBER	
	SECOND PRODUCT SPILLED (IF APPLICABLE)	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES	U.N. NUMBER	
I	SPILL SOURCE OVER FLOW DUMP STN	SPILL CAUSE PCL PRGRM DOWN & RAG CLG	AREA OF CONTAMINATION IN SQUARE METRES UNKOWN (RATHER SMALL)	
J	FACTORS AFFECTING SPILL OR RECOVERY OPERATING LIMITATIONS	DESCRIBE ANY ASSISTANCE REQUIRED	HAZARDS TO PERSONS, PROPERTY OR ENVIRONMENT	

K — ADDITIONAL INFORMATION, COMMENTS, ACTIONS PROPOSED OR TAKEN TO CONTAIN, RECOVER OR DISPOSE OF SPILLED PRODUCT AND CONTAMINATED MATERIALS

IN THE MORNING OF WED, SEPTEMBER 06, 2017 THERE WAS AN OVERFLOW AT THE DUMP STATION AND HAS BEEN PROMPTLY ATTENDED. IN THE MEAN TIME, SEWER FLOW WAS DIVERTED FROM THE STATION TO AN ALTERNATE ROUTE (DIVERSION TO LAGOON) TO AVOID FURTHER SPILL. TODAY THERE IS A FUTHER INVESTIGATION TO DETERMINE THE BEST PLAN OF ACTION IN ORDER TO CORECT THE PIPELINE FLOW ISSUE, AND A NEW COMPUTER IS BEING INSTALLED. THE QUANTITY SPILLED WAS LESS THAN 100 LITRES.

L	REPORTED TO SPILL LINE BY MARIA KARVELI	POSITION W.T. OPERATOR	EMPLOYER CITY OF IQALUIT	LOCATION CALLING FROM BLDG 2425	TELEPHONE 867-222-4612
M	ANY ALTERNATE CONTACT MIKE HATFIELD	POSITION W/WW MANAGER	EMPLOYER CITY OF IQALUIT	ALTERNATE CONTACT LOCATION BLDG 2425	ALTERNATE TELEPHONE 867-979-5632

REPORT LINE USE ONLY

N	RECEIVED AT SPILL LINE BY	POSITION STATION OPERATOR	EMPLOYER	LOCATION CALLED YELLOWKNIFE, NT	REPORT LINE NUMBER (867) 920-8130

LEAD AGENCY ☐ EC ☐ CCG ☐ GNWT ☐ GN ☐ ILA ☐ INAC ☐ NEB ☐ TC | SIGNIFICANCE ☐ MINOR ☐ MAJOR ☐ UNKNOWN | FILE STATUS ☐ OPEN ☐ CLOSED

AGENCY	CONTACT NAME	CONTACT TIME	REMARKS
LEAD AGENCY			
FIRST SUPPORT AGENCY			
SECOND SUPPORT AGENCY			
THIRD SUPPORT AGENCY			

Northwest Territories | Nunavut | Canada

NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND OTHER HAZARDOUS MATERIALS

NT-NU 24-HOUR SPILL REPORT LINE
TEL: (867) 920-8130
FAX: (867) 873-6924
EMAIL: spills@gov.nt.ca

REPORT LINE USE ONLY

A	REPORT DATE: MONTH – DAY – YEAR 12/04/2017	REPORT TIME 15:00	☒ ORIGINAL SPILL REPORT, OR ☐ UPDATE # _____ TO THE ORIGINAL SPILL REPORT	REPORT NUMBER ____-____
B	OCCURRENCE DATE: MONTH – DAY – YEAR 11/24/2017	OCCURRENCE TIME 08:30		

C	LAND USE PERMIT NUMBER (IF APPLICABLE)	WATER LICENCE NUMBER (IF APPLICABLE)
D	GEOGRAPHIC PLACE NAME OR DISTANCE AND DIRECTION FROM NAMED LOCATION Sewage Line at AV 215 (Northwestel, Elizabeth Str)	REGION ☐ NWT ☒ NUNAVUT ☐ ADJACENT JURISDICTION OR OCEAN
E	LATITUDE DEGREES MINUTES SECONDS	LONGITUDE DEGREES MINUTES SECONDS
F	RESPONSIBLE PARTY OR VESSEL NAME CITY OF IQALUIT	RESPONSIBLE PARTY ADDRESS OR OFFICE LOCATION PO BOX 460 IQALUIT NU X0A 0H0
G	ANY CONTRACTOR INVOLVED BBS	CONTRACTOR ADDRESS OR OFFICE LOCATION

H	PRODUCT SPILLED SEWAGE	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES UNKNOWN	U.N. NUMBER
	SECOND PRODUCT SPILLED (IF APPLICABLE)	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES	U.N. NUMBER
I	SPILL SOURCE Collapsed Pipe	SPILL CAUSE FROZEN PIPE	AREA OF CONTAMINATION IN SQUARE METRES
J	FACTORS AFFECTING SPILL OR RECOVERY	DESCRIBE ANY ASSISTANCE REQUIRED	HAZARDS TO PERSONS, PROPERTY OR ENVIRONMENT

K — ADDITIONAL INFORMATION, COMMENTS, ACTIONS PROPOSED OR TAKEN TO CONTAIN. RECOVER OR DISPOSE OF SPILLED PRODUCT AND CONTAMINATED MATERIALS

FROZEN PIPE CAUSED SEWAGE TO EXIT FROM TOP OF AV IT WAS IMMEDIATELY REMOVED WITH FRONT END LOADER AND DUMPED TO LAGOON.LESS THAN 1 BUCKET IN QUANTITY

L	REPORTED TO SPILL LINE BY Maria Karveli	POSITION UTILIDOR	EMPLOYER CITY OF IQALUIT	LOCATION CALLING FROM 1554D	TELEPHONE 8679795636
M	ANY ALTERNATE CONTACT Mike Hatfield	POSITION MNG UTILIDOR	EMPLOYER CITY OF IQALUIT	ALTERNATE CONTACT LOCATION 1554D	ALTERNATE TELEPHONE 8679795632

REPORT LINE USE ONLY

N	RECEIVED AT SPILL LINE BY	POSITION STATION OPERATOR	EMPLOYER	LOCATION CALLED YELLOWKNIFE, NT	REPORT LINE NUMBER (867) 920-8130

LEAD AGENCY ☐ EC ☐ CCG ☐ GNWT ☐ GN ☐ ILA ☐ INAC ☐ NEB ☐ TC | SIGNIFICANCE ☐ MINOR ☐ MAJOR ☐ UNKNOWN | FILE STATUS ☐ OPEN ☐ CLOSED

AGENCY	CONTACT NAME	CONTACT TIME	REMARKS
LEAD AGENCY			
FIRST SUPPORT AGENCY			
SECOND SUPPORT AGENCY			
THIRD SUPPORT AGENCY			