



City of Iqaluit

Environmental Monitoring Program and Quality Assurance / Quality Control Plan - Water Licence

3AM-IQA1626

April 24, 2026

Rev 4



Revision History			
Rev	Date	Comments	Author
0	March 2013	Original version	EXP
1	March 2017	Updated per NWB comments	Richard Sparham
2	March 2019	Updated per NWB/ECCC comments	Josip Deronja
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4	April 24, 2026	Updated to reflect latest SNP stations, updated the lab accreditation	Knight Piésold Ltd.



Table of Contents

1.0	Introduction.....	1
2.0	Background	2
3.0	Environmental Monitoring and Quality Assurance/Quality Control Plan.....	3
3.1	Definitions	3
3.2	Monitoring and Regulatory Requirement Program.....	3
3.3	Scope and Objective of Environmental Monitoring Program and QA/QC Plan	3
4.0	Field Sampling	5
4.1	Field Measurements.....	5
4.2	Sampling Procedures	5
4.3	Pre-Sampling Activities	5
4.4	Sampling Locations and Schedule	6
4.5	Sampling Equipment	6
4.6	Sampling Methods	7
4.6.1	Water Treatment Plant (IQA-01)	7
4.6.2	Wastewater Treatment Plant (IQA-04 and IQA-05)	7
4.6.3	Sewage lagoon (IQA-02).....	7
4.6.4	Sewage Sludge (IQA-06).....	7
4.6.5	Landfill Leachate (IQA-08, IQA-15, and IQA-16).....	7
4.6.6	Groundwater (19MW-01 to 19MW-05, W-107 to W-111).....	8
4.6.7	Surface Water (SW1, SW2, SW3, WS-100, WS-101, WS-102)	9
4.7	Sample Handling, Labelling and Chain of Custody Form	9
4.8	Sample Shipment.....	9
4.9	Quality Assurance and Quality Control Program	10
4.10	Sampling Personnel	10
5.0	Lab Analysis.....	11
5.1	Lab Information	11
5.2	Detection Limits	11
5.3	Methodology.....	11
6.0	Reporting Requirements.....	12
6.1	General Submissions	12
7.0	References	13



Appendices

Appendix A	Site Plans
Appendix B	Sample Bottle Requirements
Appendix C	Monitoring Program Sampling Schedule
Appendix D	Laboratory Accreditation & Supporting Documentation
Appendix E	City of Iqaluit Water Licence



1.0 INTRODUCTION

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-IQA1626, issued on June 17, 2016, which expires on June 16, 2026. This Plan applies specifically to the following facilities:

- Permanent water supply infrastructure including the Lake Geraldine Reservoir and water treatment plant
- West 40 Landfill
- North 40 Landfill and Waste Transfer Station, added to the current licence under an amendment in 2021
- Sewage treatment plant, sewage lagoon and sludge management facility
- Temporary water supply facilities to supplement the permanent water supply



2.0 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 A.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 7,429 in 2021 (Government of Canada, 2025). Having been ranked as the fastest growing community in Nunavut, the forecasted growth rate is 3% - 4% annually (Arcadis Canada Inc., 2025).

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 and chlorination. 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.

At the operating West 40 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.

A new North 40 Landfill, Waste Transfer Station, and associated infrastructure were added into the scope of the current Licence in Amendment No. 5 of the current Licence in 2021. Issued for Construction drawings of these facilities were submitted in 2022 in accordance with Part F, Item 1 of the current Licence, and the facilities have been constructed but are not currently in operation. The various site locations can be found in Appendix A: Site Plans.



3.0 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 effluent quality, 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.



4.0 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. In most instances, a clean beaker grab sample is collected from influent and effluent tap for the collection of field measurements using the multi-meter instrument. Site specific instructions are described in Section 4.3.3.

4.2 SAMPLING PROCEDURES

Effluent, surface water and groundwater 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.

All sampling, sample preservation and analyses will be 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)

Sampling procedures are described below. Sample bottle requirements are presented in Appendix B: Environmental Monitoring Program Checklist.

4.3 PRE-SAMPLING ACTIVITIES

It is important to conduct pre-sampling activities to ensure a safe and successful sampling event. Table 1 shows the general steps to be taken prior to sample collection.



Table 1 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.
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 unsafe conditions that may prevent the collection of the environmental monitoring program samples.

4.4 SAMPLING LOCATIONS AND SCHEDULE

The Water Licence issued to the City (3AM-IQA1626) by the NWB specifies 28 monitoring stations across the following City facilities:

- Water Treatment Plant
- Waste Water Treatment Plant
- West 40 Landfill
- Waste Transfer Station (sampling to start one year before commission)
- Sewage Lagoon
- Niaqunguk river (Apex River)
- North 40 Landfill (sampling to start one year before commission)

The sample locations at the above facilities are shown on site plans in Appendix A.

The Monitoring Program created by Water Licence 3AM-IQA1626 includes specific requirements regarding sampling locations, sampling frequency, parameters to be analyzed. These requirements are summarized in Appendix C.

4.5 SAMPLING EQUIPMENT

The following equipment is required when collecting samples:

- Dedicated latex or nitrile gloves (one pair per sample)
- Sampling pole (pond sampling)
- Foot valve, Wattera tubing, and graduated bucket (groundwater)
- Multimeter and bucket (when in-situ readings are required)

Dedicated latex or nitrile gloves are used when handling samples. Equipment such as sampling poles and holding buckets are cleaned with soap and water after each sample is collected to prevent cross-contamination. The water used must be Distilled Deionized Water (DDW).



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 contract laboratory. The samples are transported/submitted under Chain of Custody documentation.

4.6 SAMPLING METHODS

4.6.1 WATER TREATMENT PLANT (IQA-01)

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. To take the sample, hold the sample bottle below the valve until the bottle is filled to the indicated level.

4.6.2 WASTEWATER TREATMENT PLANT (IQA-04 AND IQA-05)

Samples of influent wastewater to the WWTP (IQA-05) are collected from a valve located after the wastewater enters the screw screen tanks. Effluent wastewater samples (IQA-04) are collected from a valve located at the last effluent pipe leading to discharge. To take samples, hold the sample bottle below the valve until the bottle is filled to the indicated level.

To collect in-situ data, fill a large clean container from the valve, big enough to ensure the multimeter can be fully submerged. Follow the procedure outlined in the multimeter manual for measurements.

4.6.3 SEWAGE LAGOON (IQA-02)

Sewage lagoon samples are collected from the effluent outlet structure located on the west dyke, which is connected to the control valve. To take samples, place a large clean sample container in front of the effluent outlet while water is discharging. Once it is full, use the larger container to fill the smaller sample bottles. To take in-situ measurements, place the multimeter in the large container and ensure it is fully submerged. Follow the procedure outlined in the multimeter manual.

4.6.4 SEWAGE SLUDGE (IQA-06)

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.

4.6.5 LANDFILL LEACHATE (IQA-08, IQA-15, AND IQA-16)

This section is relevant to Stations IQA-08 (West 40 Landfill), IQA-15 (WTS), and IQA-16 (North Landfill).

Run-off from the West 40 Landfill is collected in an on-site run-off retention pond. The run-off is then pumped to the retention Pond 1 located across the road from the landfill, and when full, the contents of Retention Pond 1 is pumped to Retention Pond 2.



The landfill leachate sample is to be collected from Retention Pond 2. 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.

Samples from IQA-08A are collected from the ditch upstream of the landfill, and IQ-08B is collected from the ditch downstream of the landfill. To take these samples, lower an empty sample bottle (no preservatives) into the ditch at mid-depth, facing upstream. When the bottle is full, use it to decant into the other sample bottles.

Leachate at the Waste Transfer Station will be collected in a holding tank (IQA-15). The WTS leachate sample will be filled by opening the tank valve, before and during transfer.

At the North 40 Landfill, leachate will collect in two leachate ponds. Leachate samples should be collected from the valved discharge manhole on the second pond. Alternatively, samples may be collected using a sampling pole. Samples collected using this latter method should be collected as close to the middle of the pond (and at mid-depth), prioritizing the safety of the sampler. The intent is to avoid dead zones, corners, or surface scum as these parts of the pond are less likely to represent conditions within most of the pond.

4.6.6 GROUNDWATER (19MW-01 TO 19MW-05, W-107 TO W-111)

Groundwater is monitored at the Waste Transfer Station and the North Landfill, which include the following stations:

- Waste Transfer Station: 19MW-01, 19MW-02, 19MW-03, 19MW-04, and 19MW-05
- North Landfill: W-107, W-108, W-109, W-110, and W-111 (sampling to start one year before commission)

The wells are sampled using Watterra tubing equipped with a foot valve. Three well volumes (measured from the current water level to the bottom of the well, typically 3 litres to 6 litres in total) are purged prior to sampling; to do this, lower the foot valve into the well while connected to Watterra tubing, and shake up and down in a pulsing movement, which should cause water to flow out of the Watterra tubing. Ensure the Watterra tubing outlets into a graduated bucket to keep track of how much water has been purged. Once the required volume is purged, sample bottles can be filled using the same technique. If water stops coming out before the required volume is purged, you will be required to wait for the well to recharge so you can continue purging. If the well is dry, contains insufficient water to purge/sample, or the well is frozen, write down the observation and continue to the next location as necessary.

To collect in-situ measurements, fill a large clean container, big enough to ensure the multimeter can be fully submerged. Follow the procedure outlined in the multimeter manual for measurements.

It is possible for wells to take time (minutes to hours) to recover after purging. Thus, it may be necessary to move on from a well and purge the other wells, before returning to collect samples.



4.6.7 SURFACE WATER (SW1, SW2, SW3, WS-100, WS-101, WS-102)

Surface water surrounding the WTS is sampled at Stations SW1, SW2, and SW3. When sampling these locations, a clean empty bottle (no preservatives) is lowered into the water body and fully submerged. This bottle is used to fill the other bottles as required.

4.7 SAMPLE HANDLING, LABELLING AND CHAIN OF CUSTODY FORM

It is important to follow the laboratory-provided procedures to ensure a representative sample is taken, with no contamination. Even small amounts of foreign material (dirt on hands, sweat, other liquids/samples, etc.) can change the sample results.

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.

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 should be cleaned with soap and water after sampling and prior to placing the samples in the cooler. Use ice or freezer packs to ensure that the samples are maintained below 10°C in the cooler during shipment to the laboratory. The samples are stored on ice in a cooler to maintain sample temperatures below 10°C until delivery to the laboratory. The samples cannot be allowed to freeze.

A chain of custody form is filled out completely and is used to track the samples. 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.

4.8 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.



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 correspond to sample identification numbers on the sample containers.
- Verifications that holding times were met and samples were kept cool during transit.

Upon arrival at the laboratory, samples shall be refrigerated as soon as possible.

4.9 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.

4.10 SAMPLING PERSONNEL

The following positions are responsible for conducting sampling at the various municipal facilities:

- Water treatment plant: Level 1 to Level 3 water treatment operator training
- WWTP and sewage lagoon: Level 1 to Level 2 wastewater treatment and collection training
- Landfills and other locations: In-house training on environmental sampling



5.0 LAB ANALYSIS

5.1 LAB INFORMATION

The City uses the following laboratory for water quality testing:

Caduceon Environmental Laboratories (Ottawa)

2378 Holly Lane Ottawa, ON K1V 7P1

Tel: 613-526-0123

Caduceon accreditation with the Canadian Association for Laboratory Accreditation (CALA) is presented in Appendix D: Laboratory Accreditation & Supporting Documentation. This includes the list of the parameters for which they are certified, as well as a letter of support confirming the laboratories testing capabilities. Caduceon send samples to other accredited labs for any parameters that it does not have accreditation.

5.2 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.

5.3 METHODOLOGY

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



6.0 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.



7.0 REFERENCES

Arcadis Canada Inc. (Arcadis), 2025. *Physical, Biological and Socioeconomic Screening Report - Long Term Water Project - Supply and Storage*. September. Ref. No. 30192375. Prepared for the City of Iqaluit.



APPENDIX A

Site Plans



Figure A.1

Site Location



Figure A.2

Site Location - Water Treatment Plant



Figure A.3

Site Location - Waste Water Treatment Plant



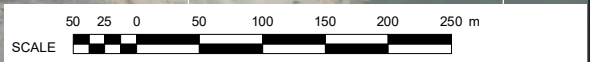
SAVED: \\1102\005370\1\GIS\FIG\A01\A01.RD.mxd; Apr 29, 2026 2:27 PM; as\m\pason

LEGEND:

■	ACTIVE
▶▶	FLOW PATH
 	WEST 40 LANDFILL

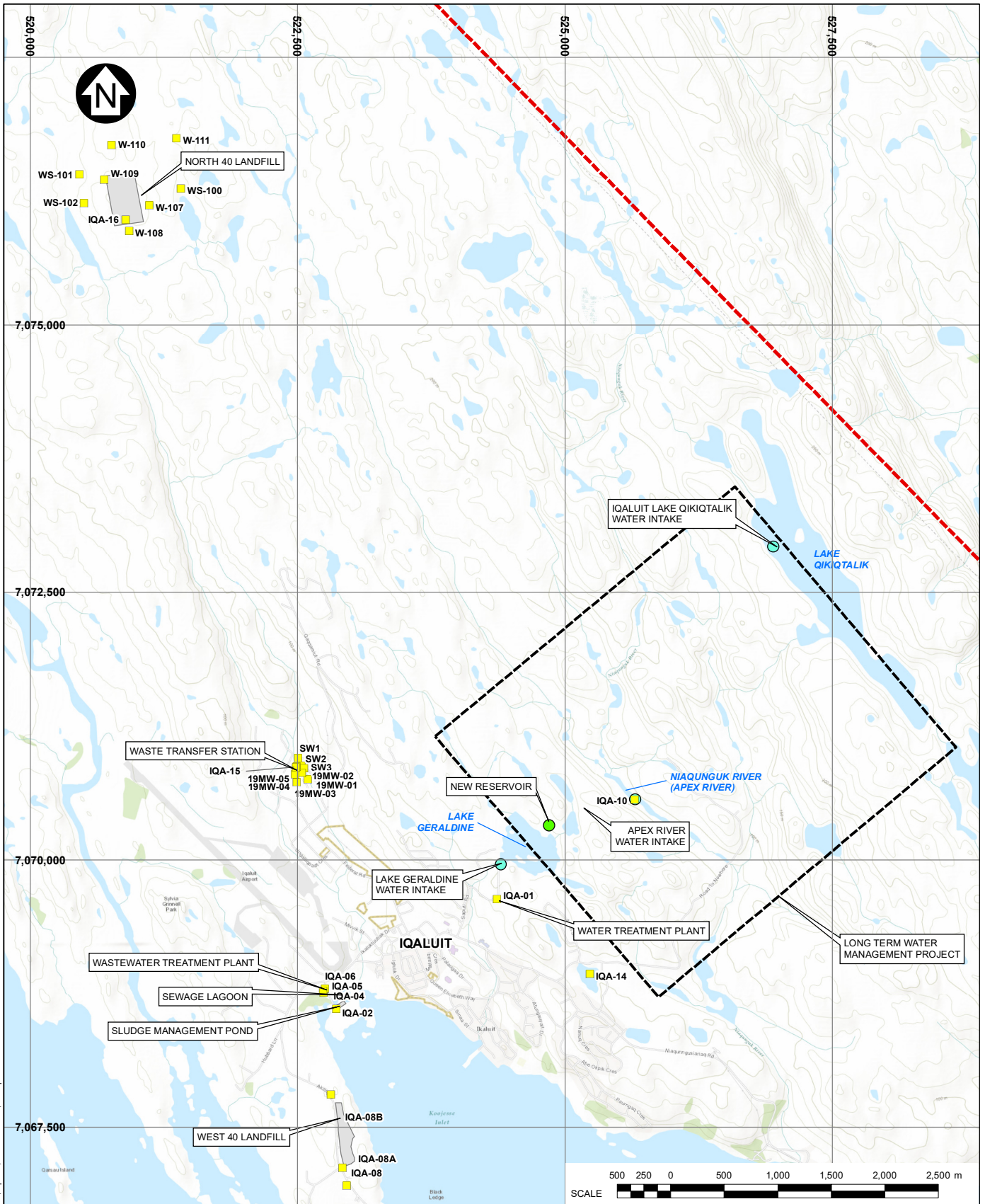
NOTES:

- COORDINATE GRID IS IN METRES. COORDINATE SYSTEM: NAD 1983 UTM ZONE 19N.
- BASE MAP/IMAGERY: © ESRI AND DATA (ONLINE) SERVICE LAYERS (2026). REDLANDS, CA: ENVIRONMENTAL SYSTEM RESEARCH INSTITUTE. ALL RIGHTS RESERVED.



CITY OF IQALUIT	
TYPE A WATER LICENCE	
IQALUIT WEST 40 LANDFILL MONITORING LOCATIONS PLAN	
Knight Piésold CONSULTING	P/A NO. NB102-537/1 REF NO. NB26-00359 FIGURE A.4 REV 0

REV	DATE	DESCRIPTION	RAC DESIGNED	AS DRAWN	RAC REVIEWED
0	24APR'26	ISSUED WITH TRANSMITTAL			



SAV:ED: I:\1102\006370\1\GIS\IFigs\B04\B04_R1.mxd; Apr 24, 2026 1:52 PM; as\m\pason

LEGEND:

- NEW RESERVOIR
- SNP LOCATION (ACTIVE)
- WATER INTAKE
- MUNICIPAL LIMITS
- FACILITY
- LONG TERM WATER MANAGEMENT PROJECT

NOTES:

1. COORDINATE GRID IS IN METRES.
COORDINATE SYSTEM: NAD 1983 UTM ZONE 19N.
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CITY OF IQALUIT

TYPE A WATER LICENCE

**SURVEILLANCE NETWORK PROGRAM
MONITORING STATIONS**



PIA NO. NB102-537/1	REF NO. 1
FIGURE 6.1	
REV	1

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED
1	24APR/26	ISSUED WITH REPORT	JWG	AS	RAC



APPENDIX B

Sample Bottle Requirements



APPENDIX B

SAMPLE BOTTLE REQUIREMENTS

Table B.1 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	H ₂ SO ₄ 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	Na ₂ S ₂ O ₃	C	14d
Mercury	P, G	125	HCl to pH < 2, field filter for GW or SW		14d
Metals, general	P	125	HNO ₃ to pH < 2, field filter for GW		28d
Microbiology	P, S	300	Na ₂ S ₂ O ₃ , 100mL min. vol./parameter	C	48h
Minerals - Ca, Mg, Na, K	P, G	250-1000			28d
Nitrogen, Total Ammonia or TKN	P	125	H ₂ SO ₄ 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	H ₂ SO ₄ to pH < 2	C	28d
Phosphorus, dissolved reactive	P, G	250-1000	Field filter for GW or SW	C	28d
Phosphorus, total	P	125	H ₂ SO ₄ 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



Water					
Parameter	Bottle	Bottle Size (mL)	Preservative/Instructions	Store	Hold Time
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

Note(s):

1. 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



APPENDIX C

MONITORING PROGRAM SAMPLING SCHEDULE

Appendix C contains information on sampling locations, sampling frequency, and parameters to be analyzed as required by Water Licence 3AM-IQA1626, including additional sampling sites and parameters introduced through the associated amendments. This information is presented in the following tables (Table C.1 and C.2).



Table C.1 Water Quality Monitoring Station Summary

Station ID	Description	Status	Parameter	Testing / Measurement Frequency	Reporting Frequency	UTM Coordinates (Zone 19V)	
						Easting	Northing
IQA-01	Lake Geraldine Reservoir - Raw Water	Active	R, PW	Monthly	Biannually	524367.61	7069633.85
			F	Monthly			
IQA-01(#)	Based on Part I, Item 4 of Expired Licence	Inactive	N/A	N/A	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	522861.57	7068606.42
			F	During decant			
IQA-03	Sewage Lagoon - Inflow	Inactive	N/A	N/A	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	522745.4	7068760.91
			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 - Inflow	Active	B, E, N, ICP	Biannually - Prior to commissioning of the WWTP	Annually	522754.98	7068795.08
				No testing requirements following commissioning of the WWTP			
IQA-06	Sludge - From WWTP	Active	B, E, N, ICP	Quarterly	Annually	522740.03	7068772.46
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	N/A	N/A
IQA-08	West 40 Landfill - Effluent Discharge Point (Discharge from Retention Pond 2 to Koojesse Inlet)	Active	B, E, N, ICP, F, LS	Once prior to discharge; once during discharge; and once prior to the completion of discharge		522944.29	7067134.88
			F	During Discharge			



Station ID	Description	Status	Parameter	Testing / Measurement Frequency	Reporting Frequency	UTM Coordinates (Zone 19V)	
						Easting	Northing
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	N/A	N/A
IQA-08A	Station situated up-gradient of West 40 Landfill	Active	B, E, N, ICP, F, LS	Annually	Annually	523009.56	7067197.87
IQA-08B	Station situated down-gradient of West 40 Landfill	Active				522888.14	7067611.07
IQA-09	Contaminated soil accepted at the West 40 Landfill	Inactive	NA	NA	NA	N/A	N/A
IQA-10	Withdrawal from Upper Niaqunngut River for transfer directly into the Reservoir.	Active	F	Daily when withdrawals occurring at this station.	Annual Report	525652.96	7070564.94
IQA-11	Withdrawal from Middle Niaqunngut River watershed for transfer directly into the Reservoir. Withdrawal point to be located on an ephemeral tributary near where it enters the Niaqunngut River or on the river itself just downstream of the confluence with the tributary.	Inactive	F	Daily when withdrawals occurring at this station.	N/A	N/A	N/A
IQA-12	Withdrawal from small unnamed source water lakes adjacent to Lake Geraldine Reservoir for transfer directly to the reservoir.	Inactive	F	Daily when withdrawals occurring at this station.	N/A	N/A	N/A
IQA-13	Withdrawal from large unnamed source water lake for transfer into ephemeral tributary to Niaqunngut River. Intent of withdrawal is to provide water to withdrawal point at Monitoring Station IQA-10.	Inactive	F	Daily when withdrawals occurring at this station.	N/A	N/A	N/A
IQA-14	Withdrawal from Imiqtariviviniq (Dead Dog Lake) for dust suppression.	Active	F	Daily when withdrawals occurring at this station	Annually	525233.6	7068931.84



Station ID	Description	Status	Parameter	Testing / Measurement Frequency	Reporting Frequency	UTM Coordinates (Zone 19V)	
						Easting	Northing
IQA-15	Waste Transfer Station Runoff/Leachate Discharge Point	Active	B, N, E, ICP, F, LS	Daily flow measurements; Once prior to discharge; once during discharge; and once prior to completion of discharge.	Annually	522486.33	7070862.23
IQA-16 (WS-103)	Landfill Runoff/Leachate Discharge Point	Active	B, N, E, ICP, F, LS	Daily flow measurements; Once prior to discharge; once during discharge; and once prior to completion of discharge	Annually	520895.03	7075982.07
IQA-17	Withdrawal from Sylvia Grinnell River	Inactive	F	Daily when withdrawal occurring at this Station	2021 Annual Report	N/A	N/A
SW1	Waste Transfer Station surface water monitoring	Active	Field	Monthly	Annually	522508.82	7070951.76
			Laboratory	Twice per Year			
SW2	Waste Transfer Station surface water monitoring	Active	Field	Monthly	Annually	522535.75	7070882.75
			Laboratory	Twice per Year			
SW3	Waste Transfer Station surface water monitoring	Active	Field	Monthly	Annually	522560.7	7070856.75
			Laboratory	Twice per Year			
WS-100	New North Landfill surface water monitoring	Active	Field	Monthly	Annually	521411.38	7076275.05
			Laboratory	Twice per Year			
WS-101	New North Landfill surface water monitoring	Active	Field	Monthly	Annually	520461.29	7076406.01
			Laboratory	Twice per Year			
WS-102	New North Landfill surface water monitoring	Active	Field	Monthly	Annually	520503.61	7076138.07
			Laboratory	Twice per Year			
19MW-01	Waste Transfer Station ground water monitoring	Active	Field	Monthly	Annually	522597.93	7070755.78
			Laboratory	Twice per Year			
19MW-02	Waste Transfer Station ground water monitoring	Active	Field	Monthly	Annually	522541.68	7070812.28
			Laboratory	Twice per Year			
19MW-03	Waste Transfer Station ground water monitoring	Active	Field	Monthly	Annually	522495.78	7070726.69
			Laboratory	Twice per Year			
19MW-04	Waste Transfer Station ground water monitoring	Active	Field	Monthly	Annually	522477.55	7070799.77
			Laboratory	Twice per Year			



Station ID	Description	Status	Parameter	Testing / Measurement Frequency	Reporting Frequency	UTM Coordinates (Zone 19V)	
						Easting	Northing
19MW-05	Waste Transfer Station ground water monitoring	Active	Field	Monthly	Annually	522493.75	7070873.09
			Laboratory	Twice per Year			
W-107	New North Landfill ground water monitoring	Active	Field	Monthly	Annually	521116.06	7076117.94
			Laboratory	Twice per Year			
W-108	New North Landfill ground water monitoring	Active	Field	Monthly	Annually	520926.65	7075878.21
			Laboratory	Twice per Year			
W-109	New North Landfill ground water monitoring	Active	Field	Monthly	Annually	520695.06	7076355.5
			Laboratory	Twice per Year			
W-110	New North Landfill ground water monitoring	Active	Field	Monthly	Annually	520764.5	7076679
			Laboratory	Twice per Year			
W-111	New North Landfill ground water monitoring	Active	Field	Monthly	Annually	521370.41	7076746.25
			Laboratory	Twice per Year			

Table C.2 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 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



Test Group	Analytical Parameters	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, March 2008), if single concentration test fails and unionized 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, Xylene (BTEX)	mg/L
Field	pH, temperature, conductivity, Dissolved Oxygen (DO), and turbidity.	pH units, °C, uS/cm, mg/L, NTU
Laboratory	PHCs Fractions F1 to F4, including BTEX, Total metals, Dissolved metals, PFAS (WTS only) PAHs, and Dissolved major ions (including alkalinity), hardness, total dissolved solids and total suspended solids.	mg/L



APPENDIX D

Laboratory Accreditation & Supporting Documentation



APPENDIX D

LABORATORY ACCREDITATION & SUPPORTING DOCUMENTS

1.0 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.

2.0 METHOD REPORTING LIMIT (MRL)

The Method Reporting Limit (MRL) is 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.



CALA Scope of Accreditation

Laboratory Name: Caduceon Environmental Laboratories (Ottawa)

Client ID: 1002644

Parent Institution: Caduceon Enterprises Inc.

Address: 2378 Holly Lane, Ottawa, Ontario, K1V 7P1

Contact: Mr. Steve Garrett

Email: sgarrett@caduceonlabs.com; sburrows@caduceonlabs.com

Phone: (613) 526-0123

Fax: (613) 526-1244

Standard: Conforms with requirements of ISO/IEC 17025:2017

Clients Served:

Revised On: 05/24/2024

Valid To: 05/22/2027

CALA is committed to [Canada's anti-spam legislation \(CASL\)](https://ised-isde.canada.ca/site/canada-anti-spam-legislation/en). Please note that the email addresses published on this website are provided solely for professional or informational purposes. Any use of these addresses for unsolicited commercial electronic messages or the harvesting of email addresses is strictly prohibited and may be subject to legal action under CASL.

002 - Anions

Field of Accreditation: Environmental

Matrix: Water [Liquid Biosolid, Wastewater]

OSDWA[†]

Analytical Method: ION CHROMATOGRAPHY (IC)

Preparation Method:

Lab Method ID(s): A-IC-01

Method Reference	Modified From	Analytical Method	Preparation Method
SM 4110 B	Yes	Yes	No

Parameter

Bromide
Chloride
Fluoride
Nitrate
Nitrite
Sulfate

003 - Conductivity

Field of Accreditation: Environmental

Matrix: Water

OSDWA[†]

Analytical Method: CONDUCTIVITY METER

Preparation Method:

Lab Method ID(s): A-COND-01

Method Reference	Modified From	Analytical Method	Preparation Method
SM 2510 B	Yes	Yes	No

Parameter

Conductivity (25°C)

004 - Dissolved and Extractable Metals

Field of Accreditation: Environmental

Matrix: Water

OSDWA[†]

Analytical Method: ICP

Preparation Method:

Lab Method ID(s): D-ICP-01

Method Reference	Modified From	Analytical Method	Preparation Method
SM 3120 B	Yes	Yes	No

Parameter

Aluminum
Barium
Beryllium
Bismuth
Boron
Cadmium
Calcium
Chromium
Cobalt
Copper
Iron
Lead
Lithium
Magnesium
Manganese
Molybdenum
Nickel
Potassium

Parameter

Silicon
 Silver
 Sodium
 Strontium
 Tin
 Titanium
 Tungsten
 Vanadium
 Yttrium
 Zinc
 Zirconium

005 - pH**Field of Accreditation:** Environmental**Matrix:** Water [Liquid Biosolid, Wastewater]

OSDWA†

Analytical Method: PH METER**Preparation Method:****Lab Method ID(s):** A-PH-01

Method Reference	Modified From	Analytical Method	Preparation Method
SM 4500-H+	Yes	Yes	No

Parameter

pH

010 - Escherichia coli (E. coli)**Field of Accreditation:** Environmental**Matrix:** Water

OSDWA†

Analytical Method: MEMBRANE FILTRATION (EC)**Preparation Method:****Lab Method ID(s):** B-MFEC-01

Method Reference	Modified From	Analytical Method	Preparation Method
ON MECP E3371	Yes	Yes	No

Parameter

Escherichia coli

012 - Metals**Field of Accreditation:** Environmental**Matrix:** Air [Filter]**Analytical Method:** ICP**Preparation Method:** DIGESTION**Lab Method ID(s):** D-ICP-02

Method Reference	Modified From	Analytical Method	Preparation Method
NIOSH 7303	No	Yes	No
SM 3120 B	Yes	Yes	No

Parameter

Cadmium
 Copper
 Lead
 Zinc

015 - Metals**Field of Accreditation:** Environmental**Matrix:** Solids [Biosolid, Soil]**Analytical Method:** ICP/OES**Preparation Method:** DIGESTION**Lab Method ID(s):** D-ICP-02

Method Reference	Modified From	Analytical Method	Preparation Method
EPA 6010	Yes	Yes	No

Parameter

Aluminum
 Antimony
 Arsenic
 Barium
 Beryllium
 Boron
 Cadmium
 Calcium
 Chromium
 Cobalt
 Copper
 Iron
 Lead
 Magnesium

Parameter
Manganese
Molybdenum
Nickel
Potassium
Silver
Sodium
Strontium
Tin
Titanium
Tungsten
Vanadium
Zinc

017 - Mercury

Field of Accreditation: Environmental

Matrix: Solids [Biosolid, Soil]

Analytical Method: COLD VAPOUR ATOMIC ABSORPTION (CVAA)

Preparation Method: DIGESTION

Lab Method ID(s): D-HG-01

Method Reference	Modified From	Analytical Method	Preparation Method
EPA 7471A	Yes	Yes	No

Parameter
Mercury

018 - Total Suspended Particulates

Field of Accreditation: Environmental

Matrix: Air [Filter, Particulate]

Analytical Method: GRAVIMETRIC

Preparation Method:

Lab Method ID(s): A-TSP-01

Method Reference	Modified From	Analytical Method	Preparation Method
ON MECP E3288A	Yes	Yes	No

Parameter
Total Suspended Particulates

019 - Fluoride

Field of Accreditation: Environmental

Matrix: Fluoride Candles

Analytical Method: ION SELECTIVE ELECTRODE (ISE)

Preparation Method: DIGESTION

Lab Method ID(s): A-FISE-01

Method Reference	Modified From	Analytical Method	Preparation Method
ON MECP FSIE-1983D	Yes	Yes	No

Parameter
Fluoride

020 - Dustfall

Field of Accreditation: Environmental

Matrix: Dustfall

Analytical Method: GRAVIMETRIC

Preparation Method: FILTRATION

Lab Method ID(s): A-DF-01

Method Reference	Modified From	Analytical Method	Preparation Method
ON MECP E3043	Yes	Yes	No

Parameter
Insoluble Dustfall
Total Dustfall

021 - Heterotrophic Plate Count (HPC)

Field of Accreditation: Environmental

Matrix: Water

OSDWA†

Analytical Method: SPREAD PLATE

Preparation Method:

Lab Method ID(s): B-HPC-01

Method Reference	Modified From	Analytical Method	Preparation Method
SM 9215 C	Yes	Yes	No

Parameter
Heterotrophic Plate Count (HPC)

025 - Mercury

Field of Accreditation: Environmental

Matrix: Water [Wastewater]

OSDWA†

Analytical Method: COLD VAPOUR ATOMIC ABSORPTION (CVAA)

Preparation Method: DIGESTION

Lab Method ID(s): D-HG-02

Method Reference	Modified From	Analytical Method	Preparation Method
SM 3112 B	Yes	Yes	No

Parameter
Mercury

026 - Turbidity

Field of Accreditation: Environmental

Matrix: Water

OSDWA†

Analytical Method: NEPHELOMETRIC

Preparation Method:

Lab Method ID(s): A-TURB-01

Method Reference	Modified From	Analytical Method	Preparation Method
SM 2130 B	Yes	Yes	No

Parameter
Turbidity

027 - Colour

Field of Accreditation: Environmental

Matrix: Water

OSDWA†

Analytical Method: SPECTROPHOTOMETRIC

Preparation Method:

Lab Method ID(s): A-COL-01

Method Reference	Modified From	Analytical Method	Preparation Method
SM 2120 C	Yes	Yes	No

Parameter
True Colour

049 - Dissolved Metals

Field of Accreditation: Environmental

Matrix: Water

OSDWA†

Analytical Method: ICP/MS

Preparation Method:

Lab Method ID(s): D-ICPMS-01

Method Reference	Modified From	Analytical Method	Preparation Method
EPA 200.8	Yes	Yes	No

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

050 - Coliforms

Field of Accreditation: Environmental

Matrix: Water

OSDWA†

Analytical Method: MEMBRANE FILTRATION (DC)

Preparation Method:

Lab Method ID(s): B-ECTC-01

Method Reference	Modified From	Analytical Method	Preparation Method
ON MECP E3407	Yes	Yes	No

Parameter
Background Counts
Escherichia coli
Total Coliforms

054 - Carbon

Field of Accreditation: Environmental

Matrix: Water

OSDWA†

Analytical Method: INFRARED SPECTROSCOPY (IR)

Preparation Method: UV-PERSULPHATE OXIDATION

Lab Method ID(s): C-OC-01

Method Reference	Modified From	Analytical Method	Preparation Method
EPA 415.2	Yes	Yes	No
SM 5310 C	Yes	Yes	No

Parameter

Organic Carbon

065 - Fecal (Thermotolerant) Coliforms

Field of Accreditation: Environmental

Matrix: Water

OSDWA†

Analytical Method: MEMBRANE FILTRATION (M-FC)

Preparation Method:

Lab Method ID(s): B-MFFC-01

Method Reference	Modified From	Analytical Method	Preparation Method
SM 9222 D	Yes	Yes	No

Parameter

Fecal (Thermotolerant) Coliforms

066 - Total Coliforms

Field of Accreditation: Environmental

Matrix: Water

OSDWA†

Analytical Method: MEMBRANE FILTRATION (M-ENDO)

Preparation Method:

Lab Method ID(s): B-MFTC-01

Method Reference	Modified From	Analytical Method	Preparation Method
ON MECP E3371	Yes	Yes	No

Parameter

Background Counts

Total Coliforms

067 - Total Metals

Field of Accreditation: Environmental

Matrix: Water [Liquid Biosolid, Wastewater]

Analytical Method: ICP/OES

Preparation Method: DIGESTION

Lab Method ID(s): D-ICP-01

Method Reference	Modified From	Analytical Method	Preparation Method
SM 3120 B	Yes	Yes	No

Parameter

Aluminum

Antimony

Arsenic

Barium

Beryllium

Bismuth

Boron

Cadmium

Calcium

Chromium

Cobalt

Copper

Iron

Lead

Lithium

Magnesium

Manganese

Molybdenum

Nickel

Potassium

Silver

Sodium

Strontium

Tin

Titanium

Tungsten

Vanadium

Yttrium

Zinc

Zirconium

069 - Anions

Field of Accreditation: Environmental

Matrix: Solids [Biosolid, Soil]

Analytical Method: ION CHROMATOGRAPHY (IC)

Preparation Method: EXTRACTION

Lab Method ID(s): A-IC-01

Method Reference	Modified From	Analytical Method	Preparation Method
SM 4110 B	Yes	Yes	No

Parameter

- Chloride
- Nitrate (NO3)
- Nitrite (NO2)
- Sulphate (Sulfate)

070 - Total Metals

Field of Accreditation: Environmental

Matrix: Solids [Biosolid, Soil]

Analytical Method: ICP/MS

Preparation Method: DIGESTION

Lab Method ID(s): D-ICPMS-01

Method Reference	Modified From	Analytical Method	Preparation Method
EPA 6020B	Yes	Yes	No

Parameter

- Antimony
- Arsenic
- Selenium
- Silver
- Thallium
- Uranium

071 - Total Metals

Field of Accreditation: Environmental

Matrix: Water [Liquid Biosolid, Wastewater]

Analytical Method: ICP/MS

Preparation Method: DIGESTION

Lab Method ID(s): D-ICPMS-01

Method Reference	Modified From	Analytical Method	Preparation Method
EPA 6020	Yes	Yes	No

Parameter

- Antimony
- Arsenic
- Barium
- Beryllium
- Cadmium
- Chromium
- Cobalt
- Copper
- Lead
- Molybdenum
- Selenium
- Silver
- Vanadium

086 - pH

Field of Accreditation: Environmental

Matrix: Water

OSDWA†

Analytical Method: AUTOMATED PH METER

Preparation Method:

Lab Method ID(s): A-PH-02

Method Reference	Modified From	Analytical Method	Preparation Method
SM 4500-H+ B	Yes	Yes	No

Parameter

- pH

087 - Conductivity

Field of Accreditation: Environmental

Matrix: Water

OSDWA†

Analytical Method: AUTOMATED CONDUCTIVITY METER

Preparation Method:

Lab Method ID(s): A-COND-02

Method Reference	Modified From	Analytical Method	Preparation Method
SM 2510 B	Yes	Yes	No

Parameter

- Conductivity (25°C)

088 - Alkalinity

OSDWA†

Field of Accreditation: Environmental**Matrix:** Water**Analytical Method:** AUTOMATED TITRIMETRIC**Preparation Method:****Lab Method ID(s):** A-ALK-03

Method Reference	Modified From	Analytical Method	Preparation Method
SM 2320 B	Yes	Yes	No

Parameter

Alkalinity (pH 4.5)

090 - Extractable Anions

Field of Accreditation: Environmental**Matrix:** Solids**Analytical Method:** ION CHROMATOGRAPHY (IC)**Preparation Method:** TCLP**Lab Method ID(s):** A-IC-01

Method Reference	Modified From	Analytical Method	Preparation Method
EPA 1311	Yes	No	Yes
SM 4110 B	Yes	Yes	No

Parameter

Nitrate

Nitrite (NO₂)

091 - Extractable Metals

Field of Accreditation: Environmental**Matrix:** Solids**Analytical Method:** ICP/OES**Preparation Method:** TCLP**Lab Method ID(s):** D-ICP-01, TCLP_SPLP-001

Method Reference	Modified From	Analytical Method	Preparation Method
EPA 1311	Yes	No	Yes
SM 3120 B	Yes	Yes	No

Parameter

Arsenic

Barium

Beryllium

Boron

Cadmium

Chromium

Lead

Nickel

Silver

Zinc

092 - Extractable Metals

Field of Accreditation: Environmental**Matrix:** Solids**Analytical Method:** ICP/MS**Preparation Method:** TCLP**Lab Method ID(s):** D-ICPMS-01, TCLP_SPLP-001

Method Reference	Modified From	Analytical Method	Preparation Method
EPA 1311	Yes	No	Yes
EPA 200.8	Yes	Yes	No

Parameter

Antimony

Arsenic

Selenium

Uranium

093 - Extractable Metals

Field of Accreditation: Environmental**Matrix:** Solids**Analytical Method:** COLD VAPOUR ATOMIC ABSORPTION (CVAA)**Preparation Method:** TCLP**Lab Method ID(s):** D-HG-02

Method Reference	Modified From	Analytical Method	Preparation Method
EPA 1311	Yes	No	Yes
SM 3112 B	Yes	Yes	No

Parameter

Mercury

094 - Hexavalent Chromium

Field of Accreditation: Environmental

Matrix: Solids [Soil]

Analytical Method: COLORIMETRIC

Preparation Method:

Lab Method ID(s): D-CRVI-02

Method Reference	Modified From	Analytical Method	Preparation Method
EPA 3060A	Yes	Yes	No
EPA 7196A	Yes	Yes	No

Parameter

Hexavalent Chromium

095 - Hexavalent Chromium

Field of Accreditation: Environmental

Matrix: Water

Analytical Method: COLORIMETRIC

Preparation Method:

Lab Method ID(s): D-CRVI-01

Method Reference	Modified From	Analytical Method	Preparation Method
ON MECP E3056	Yes	Yes	No

Parameter

Hexavalent Chromium

096 - Flashpoint

Field of Accreditation: Environmental

Matrix: Solids [Ash, Soil]

Analytical Method: CLOSED CUP FLASH POINT TESTER

Preparation Method:

Lab Method ID(s): C-FPCC-01

Method Reference	Modified From	Analytical Method	Preparation Method
ASTM D93	Yes	Yes	No

Parameter

Flashpoint

098 - Boron (Hot Water Soluble)

Field of Accreditation: Environmental

Matrix: Solids [Soil]

Analytical Method: ICP/OES

Preparation Method: EXTRACTION

Lab Method ID(s): D-ICP-02

Method Reference	Modified From	Analytical Method	Preparation Method
ON MECP E3470	No	Yes	No

Parameter

Boron

099 - Conductivity

Field of Accreditation: Environmental

Matrix: Solids [Sediment, Soil]

Analytical Method: CONDUCTIVITY METER

Preparation Method: EXTRACTION

Lab Method ID(s): A-COND-03

Method Reference	Modified From	Analytical Method	Preparation Method
ON MECP E3530	Yes	Yes	No
SM 2510 B	Yes	Yes	No

Parameter

Conductivity

100 - pH

Field of Accreditation: Environmental

Matrix: Solids [Sediment, Sludge, Soil]

Analytical Method: PH METER

Preparation Method: EXTRACTION

Lab Method ID(s): A-PH-03

Method Reference	Modified From	Analytical Method	Preparation Method
ON MECP E3530	Yes	Yes	No
SM 4500-H+	Yes	Yes	No

Parameter

pH

109 - Extractable Metals

Field of Accreditation: Environmental

Matrix: Solids

Analytical Method: ICP/MS

Preparation Method: MSPLP

Lab Method ID(s): D-ICPMS-01, TCLP_SPLP-001

Method Reference	Modified From	Analytical Method	Preparation Method
EPA 200.8	No	Yes	No
ON MECP E9003	No	No	Yes

Parameter

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

110 - Extractable Metals

Field of Accreditation: Environmental

Matrix: Solids

Analytical Method: ICP/OES

Preparation Method: SPLP

Lab Method ID(s): D-ICP-01, TCLP_SPLP-001

Method Reference	Modified From	Analytical Method	Preparation Method
ON MECP E9003	No	No	Yes
SM 3120 B	No	Yes	No

Parameter

Barium
Beryllium
Boron
Cadmium
Chromium
Cobalt
Copper
Molybdenum
Nickel
Vanadium
Zinc

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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,

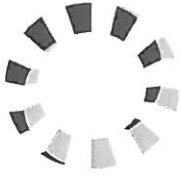


Greg Clarkin, Lab Manager - Ottawa District
Caduceon Environmental Laboratories
Tel: (613) 526-0123
Fax: (613) 526-1244
E-mail: gclarkin@caduceonlabs.com

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

Laboratory Locations

Barrie – 112 Commerce Park Drive, Barrie, ON L4N 8W8 Tel: (705) 252-5743 Fax: (705) 252-5746
Kingston - 285 Dalton Ave. Kingston, ON K7K 6Z1 Tel: (613) 544-2001 Fax: (613) 544-2770
Ottawa - 2378 Holly Lane Ottawa, ON K1V 7P1 Tel: (613) 526-0123 Fax: (613) 526-1244
Richmond Hill - #14-110 West Beaver Creek, Richmond Hill, ON L4B 1J9 Tel: (289) 475-5442 Fax: (866) 562-1963
Windsor - #5-3201 Marentette Ave. Windsor, ON N8X 4G3 Tel: (519) 966-9541 Fax: (519) 966-9567



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)

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

Water (Inorganic)

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

Water (Inorganic)

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

Water (Inorganic)

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

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Water (Inorganic) Colour - Water (027) A-COL-01; modified from SM 2120 C SPECTROPHOTOMETRIC True Colour	OSDWA †
Water (Inorganic) Conductivity - Water (003) A-COND-01; modified from SM 2510 B CONDUCTIVITY METER Conductivity (25°C)	OSDWA †
Water (Inorganic) Conductivity - Water (087) A-COND-02; modified from SM 2510 B AUTO CONDUCTIVITY METER Conductivity (25°C)	OSDWA †
Water (Inorganic) 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	OSDWA †
Water (Inorganic) Dissolved Metals - Water (049) D-ICPMS-01; modified from EPA 200.8 ICP/MS Antimony	OSDWA †

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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)

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

OSDWA †

Water (Inorganic)

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

OSDWA †

Water (Inorganic)

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

OSDWA †

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)

Turbidity - Water (026)

A-TURB-01; modified from SM 2130 B

NEPHELOMETRY

Turbidity

OSDWA †

Water (Microbiology)

Coliforms - Water (050)

B-ECTC-01; modified from ON MOECC E3407

MEMBRANE FILTRATION (DC)

Background Bacteria
Escherichia coli (E. coli)
Total Coliforms

OSDWA †

Water (Microbiology)

Escherichia coli (E. coli) - Water (010)

B-MFEC-01; modified from ON MOECC E3371

MEMBRANE FILTRATION (EC)

Escherichia coli (E. coli)

OSDWA †

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Water (Microbiology) Fecal (Thermotolerant) Coliforms - Water (065) B-MFFC-01; modified from ON MOECC E3371 MEMBRANE FILTRATION (mFC) Fecal (Thermotolerant) Coliforms	OSDWA †
Water (Microbiology) Heterotrophic Plate Count (HPC) - Water (021) B-HPC-01; modified from SM 9215 C SPREAD PLATE Heterotrophic Plate Count (HPC)	OSDWA †
Water (Microbiology) Total Coliforms - Water (066) B-MFTC-01; modified from ON MOECC E3371 MEMBRANE FILTRATION (mENDO) Background Counts Total Coliforms	OSDWA †
Water (Organic) 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	OSDWA †

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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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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

Located at: 2378 Holly Lane

Licensee: Caduceon Enterprises Inc.

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



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



Compliance, Promotion and
Support Branch
Laboratory Licensing and
Compliance Program

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

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

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

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



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



Class: Inorganic	Technique - Sub-Technique:
Uranium Lab Method Code: D-ICPMS-01	ICP-MS, (Total-non-digested) Appendix #: C049
Vanadium Lab Method Code: D-ICPMS-01	ICP-MS, (Total-non-digested) Appendix #: C049
Vanadium Lab Method Code: D-ICP-01	ICP-AES, (Total-non-digested) Appendix #: C004
Yttrium Lab Method Code: D-ICP-01	ICP-AES, (Total-non-digested) Appendix #: C004
Zinc Lab Method Code: D-ICP-01	ICP-AES, (Total-non-digested) Appendix #: C004
Zirconium Lab Method Code: D-ICP-01	ICP-AES, (Total-non-digested) Appendix #: C004
Class: Microbiological	Technique - Sub-Technique:
E. coli Lab Method Code: B-MFEC-01	MF-ec broth Appendix #: C010
E. coli Lab Method Code: B-ECTC-01	MF-DC Appendix #: C050
Fecal coliforms Lab Method Code: B-MFFC-01	MF-mFC Appendix #: C065
HPC Lab Method Code: B-HPC-01	Spread Plate Appendix #: C021
Total coliform Lab Method Code: B-ECTC-01	MF-DC Appendix #: C050
Total coliform Lab Method Code: B-MFTC-01	MF-mEndo Appendix #: C066
Total coliform background Lab Method Code: B-ECTC-01	MF-DC Appendix #: C050
Total coliform background Lab Method Code: B-MFTC-01	MF-mEndo Appendix #: C066



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

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



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

Ministry of the Environment,
Conservation and Parks

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



Compliance, Promotion and
Support Branch
Laboratory Licensing and
Compliance Program

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

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

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

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

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.



Canadian Association for Laboratory Accreditation Inc.



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).



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

Andrew M. Adams

President & CEO



This certificate is the property of the Canadian Association for Laboratory Accreditation Inc. and must be returned on request; reproduction must follow policy in place at date of issue. For the specific tests to which this accreditation applies, please refer to the laboratory's scope of accreditation at www.cala.ca.



APPENDIX E

City of Iqaluit Water Licence



NUNAVUT WATER BOARD

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



TABLE OF CONTENTS

PART A:	SCOPE, DEFINITIONS, AND ENFORCEMENT.....	4
	1. SCOPE.....	4
	2. DEFINITIONS.....	5
	3. ENFORCEMENT.....	5
PART B:	GENERAL CONDITIONS.....	5
PART C:	CONDITIONS APPLYING TO SECURITY	7
PART D:	CONDITIONS APPLYING TO THE USE OF WATERS AND WATER MANAGEMENT PLANS	7
PART E:	CONDITIONS APPLYING TO THE DEPOSIT OF WASTE AND WASTE MANAGEMENT PLANS	8
PART F:	CONDITIONS APPLYING TO CONSTRUCTION	11
PART G:	CONDITIONS APPLYING TO MODIFICATIONS	12
PART H:	CONDITIONS APPLYING TO SPILL CONTINGENCY PLANNING.....	12
PART I:	CONDITIONS APPLYING TO MONITORING	13
PART J:	CONDITIONS APPLYING TO CLOSURE AND RECLAMATION	14
SCHEDULES	15
	Schedule A: Definitions	16
	Schedule B: Annual Reporting Requirements	20
	Schedule I: Condition Applying to Monitoring.....	21



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.

A handwritten signature in black ink, appearing to read "Norman Mike".

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.



Nunavut Water Board | Type "A" Water Licence No: 3AM-IQA1626

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:



Nunavut Water Board | Type “A” Water Licence No: 3AM-IQA1626

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:](#) Scope, Definitions, and Enforcement

[Schedule B:](#) General Conditions

Schedule C: No Schedule for Security

Schedule D: No Schedule for Use of Water and Water Management Plans

Schedule E: No Schedule Waste Disposal and Waste Management Plans

Schedule F: No Schedule for Construction

Schedule G: No Schedule for Modifications

Schedule H: No Schedule for Spill Contingency Planning

[Schedule I:](#) Monitoring

Schedule J: No Schedule for Closure and Reclamation



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 <i>Procedure for pH Stabilization During the Testing of Acute Lethality of Wastewater Effluent to Rainbow Trout</i> (EPS 1/RM/50, March 2008), if single concentration test fails and unionized 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 2¹ - 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