

# CITY OF IQALUIT WATER LICENCE 3AM-IQA1626 2019 ANNUAL WATER LICENCE REPORT

MAY 1, 2020

### **EXECUTIVE SUMMARY**

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

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

This Licence was issued by the Nunavut Water Board (NWB) in 2016, and expires on June 16, 2026. The City was granted an amendment to the Licence (Amendment No. 4) on December 2, 2020 by the NWB. Amendment No. 4 will be effective come April 1, 2020. This Annual Water Licence Report summarizes the activities conducted by the City in 2019, pursuant to the requirements stipulated in Schedule B of the Licence.

### Monitoring Program

As part of the Licence conditions, the City is required to develop and implement an Environmental Monitoring Program and Quality Assurance/ Quality Control Plan (the Monitoring Plan). A third revision of the City's Monitoring Plan was approved by the NWB on May 6, 2019, following comments received by the NWB in response to the 2018 Annual Water Licence Report.

### Water Supply

In 2019, the City estimates that it used approximately 1,202,000  $\text{m}^3$  of water from the Lake Geraldine reservoir, which is slightly over the allowable quantity of water as specified under the Licence (1,100,000  $\text{m}^3$ ). This can be attributed to the following factors:

- 1. Increase water demand in all municipal sectors (public, recreation, etc.);
- 2. Water main breaks and leaks:
- 3. Increase in system bleeding during winter period to reduce risk of freezing;

In 2019, the City received emergency approval from the NWB to amend its water licence 3AM-IQA1626 (Amendment No. 3) to allow supplementation of its drinking water supply by withdrawing water from the Apex River and Unnamed Lake. The project was undertaken in response to an emergency, as declared by the Minister if Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) in letters to the Nunavut Impact Review Board (NIRB) and Nunavut Planning Commission (NPC), and the NWB on August 9, 2019, thus invoking the provisions of section 152 of the Nunavut Planning and Project Assessment Act (NUPPAA). The emergency supplementation project was completed on October 1, 2019. A cumulative total of 453,823 cubic metres of water was withdrawn from Unnamed Lake and transferred into the Apex River, while a cumulative total of 556,107 cubic metres of water was withdrawn from Apex River and transferred to the Lake Geraldine water reservoir. A final report titled "Final Report: Iqaluit 2019 Emergency Water Supply Project: Report of Activities" (Nunami-Stantec 2019) was issued to NIRB, NPC, DFO, NWB, and CIRNAC on December 1, 2019.

As part of the long-term strategy for supplementing water for the Lake Geraldine water reservoir, the City completed a concept design study in March 2019 on the potential of the Sylvia Grinnell River to meet the supplemental needs of the City. The report investigated two (2) intake options, which were shortlisted from a previous assessment report. Similarly, as per recommendations following a public engagement session in 2018 with

the Hunters and Trappers Association (HTA), the City continued monitoring and collecting data from temporary pressure transducers and staff gauges – monitoring flow and water level in the Lake – in order to facilitate a water balance assessment of Unnamed Lake to verify its long terms viability as an another option of supplementing water for the Lake Geraldine water reservoir. A final report summarizing findings was completed in February 2020. The City plans to start developing the water balance model in 2020. Similarly, the city began a pre-feasibility level study in November 2019 invesitgating viable storage options, to supplement storage capacity of Lake Geraldine. A final submission of the report is anticipated late 2020.

In 2017, the City of Iqaluit began developing a drinking water management plan to ensure the City is using the available drinking water as efficiently as possible while also potentially reducing the overall water demand. The management plan is currently scheduled for completion by June 2020.

### Wastewater Treatment

Construction activities for the Wastewater Treatment Plant (WWTP) Upgrade/ Expansion project continued in 2019. The primary treatment process was commissioned in March 2019. Upgrades to the secondary treatment process was completed in March 2020; however, commissioning activities were put on hold given developments of the COVID-19 pandemic. As a result, commissioning activities are being postponed until July 2020, with final completion anticipated for August 2020. The primary treatment process continues to function, with partial secondary treatment through the Moving Bed Biofilm Reactor (MBBR) tanks and flow-through the new Dissolved Air Flotation (DAF) tanks. However, no collection, processing and return of secondary sludge is able to occur.

### Solid Waste Management

The City continues to manage its solid waste at the West 40 Landfill, which is nearing its capacity. Landfill run-off continues to be managed though on-site detention ponds and an off-site retention pond. The City completed a Waste Collection Optimization study in April 2019. The study assessed current waste collection practices, while providing recommendations on how to optimizate the collection process for a more efficient and cost-effective operation.

In August 2018, the City of Iqaluit received approval funding for a new solid waste facility, landfill and waste transfer station. The project is currently in the design phase, and has engaged the Nunavut Water Board for review of the 90% design package, and to initiate the amendment of the City's Type A water licence. The City anticipates to start construction activities, as well as the procurement of major equipment, in the Summer 2020. Construction activities will continue until December 2022.

### Lake Geraldine Dam

In November 2015, a Dam Safety Inspection (DSI) was completed for the Lake Geraldine Dam. A Dam Safety Management Plan (DSM) is required every five (5) years. The City is currently in their fifth year and as part of their Capital Projects, the DSM is scheduled to be completed by May 2020.

The Lake Geraldine Underwater Repair project was tendered and executed during the Summer 2019. Repairs were undertaken to the dam concrete structure. Plans to install a fish screen at the intake were cancelled, following submission of an Environmental DNA Sampling Program for Arctic Char in the Lake Geraldein Reservoir (Stantec, November



May 1, 2020

2018), which indicated no population of resident arctic char in the reservoir. The report and recommendation to cancel the installation of the fish screen was shared with Department of Fisheries and Oceans Canada (DFO). Construction was completed in the Fall 2019.

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### INTRODUCTION

In June 2016, the City of Iqaluit (the City) was issued Water Licence number 3AM-IQA1626 (the Licence) by the Nunavut Water Board (NWB). This licence was issued for a ten-year period concluding in June 2026. The City was granted an amendment to the Licence (Amendment No. 4) on December 2, 2020 in order to allow for the supplementation of water from the Apex River to the Lake Geraldine reservoir.

A requirement of the Licence is an annual report due March 31 of each year, summarizing activities governed by the Licence for the previous calendar year. In accordance with Schedule B of the Water Licence, this Annual Water Licence Report summarizes the activities conducted by the City of Iqaluit in 2019. A request to extend the submission deadline to May 1, 2020 was granted by the NWB on March 30, 2020.

#### **ANALYSIS**

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

Table 1 summarizes the estimated monthly and annual quantities of water drawn from Lake Geraldine, the City of Iqaluit's raw water source. The total water usage for 2019 was 1,202,168 cubic metres, which slightly exceeds the maximum allowable usage of 1,100,000 cubic metres. As per Amendment No. 4, the City will be authorized to withdraw 2,000,000 cubic metres of water annually from Lake Geraldine. Amendment No. 4 will be effective April 1, 2020.

<b>Table 1</b> Raw Water Drawn from Lake Geraldine Reservoir (20)	19)
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Month	Volume (m³)
January	83,200
February	90,100
March	141,900
April	91,498
May	126,400
June	117,800
July	130,300
August	85,640
September	80,150
October	83,900
November	85,360
December	85,920
Total 2019	1,202,168

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

Table 2 summarizes the monthly and annual quantities of discharge from the City of Iqaluit's Wastewater Treatment Plant (WWTP) in 2019.

December

**Total 2019** 

**Table 2** Discharge from the WWTP Treatment Plant (2019)

From January 2019 to March 2019, the WWTP was shut down as construction was underway for upgrades to the Plant's primary treatment process. During this period, raw sewage was diverted to the backup sewage lagoon. The knife gate valve that diverts the sewage to the sewage lagoon is not equipped with a monitoring device; therefore, there were no measurements taken to determine the amount of discharge for the days that the WWTP was not operational.

86,524

1,131,582

The primary treatment process remains in operation, as construction continued on the secondary treatment process. Secondary construction was complete, less deficiencies, March 7, 2020 and commissioning commenced at that time. As directed by the Government of Nunavut, Contractors were requested to depart from NU due to the COVID-19 crises, interrupting the commissioning of the solids handling portion of the Secondary Treatment. Current status is Primary Treatment continues to function, with partial secondary treatment through Moving Bed Biofilm Reactor (MBBR) tanks and flow-through the new Dissolved Air Flotation (DAF) tanks. No collection, processing and return of secondary sludge is able to occur. The City anticipates to restart commissioning activities in Summer 2020, pending the lifting of restrictions as a result of COVID-19.

A survey of the sewage lagoon was completed in September 2018 by Lambourine Environmental. The survey was intended to identify quantity of sludge accumulated within the lagoon. A total of 5,220 cubic metres wet sludge and 1,600 cubic metres of dry sludge was noted. Between September 2019 and October 2019, the City initiated desludging of the sewage lagoon. Sludge was removed and placed within geotube containment cells. A total of 4,700 cubic metres (475 Bone Dry Tons, based on 20% solids) was removed from the sewage lagoon.

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

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

### Lake Geraldine Dam Safety Inspection

The City undertook an inspection of the Lake Geraldine Dam structure in order to identify any visual changes in the condition of the dam, any concerns with the structure, while providing recommendations on maintenance repairs or further investigations. A final report was submitted to the City on May 31, 2019 and is appended to this report in Appendix C.

### Lake Geraldine Dam Safety Management Plan

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

- Development of an Operation, Management and Surveillance (OMS)
   Manual;
- Completion of a 2019 Dam Safety Review;
- Completion of a Risk Assessment; and,
- Finalization of an Emergency Preparedness Plan that was initiated in 2012.
- Installation of automated monitoring equipment
- Implementing a pore-water pressure monitoring program
- Exercising and testing of the valves within the valve chamber are recommended as part of preventative measures
- Perform underwater repairs to localized areas of concrete and all sealant joints

This Dam Safety Management Plan is expected to be completed by May 2020.

### Lake Geraldine Dam Repairs

A Lake Geraldine Dam Repair Project was tendered in spring 2019. The work consisted of both above and below water line works to the dam concrete structure. This included:

- 1. Placement of sealant at vertical and horizontal expansion joints.
- 2. Repair to deteriorated/ spalled concrete surfaces.

The project had originally intended to supply and install a new fish screen for the dam intake, following recommendations provided by DFO. The City undertook an Environmental DNA Sampling Program for Arctic Char in the Lake Geraldine Reservoir in 2018 (Stantec). The report revealed no indication of resident fish population in the reservoir. The report was later shared with DFO, and a request was made to eliminate the need to install a fish screen at the dam intake, given the findings of the report. DFO confirmed that no fish screen was required – this item was descoped from the project.

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

The sludge that is removed by the Salsnes Filter in the Wastewater Treatment Plant (WWTP) falls into a trailer in a room below the primary treatment room. The trailer that is used to catch the sludge from the Salsnes Filter has 3.4 cubic meters

of storage and is approximately 100% full each time it is unloaded. The trailer is unloaded at the West 40 Landfill every second day including weekends and holidays.

On average, approximately 135.92 cubic metres of sludge was removed from the WWTP on a monthly basisi, and deposited at a designated area in the West 40 Landfill. This equated to an annual total of approximately 1631.04 cubic metres of sludge deposited at the West 40 Landfill.

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

Quantities of waste disposed at the West 40 Landfill was tracked by conducting surveys of consumed airspace at the landfill. The latest survey of the West 40 Landfill was completed October 7, 2019. The airspace consumption compares the waste surface from October 22, 2018 to October 7, 2019. Quantities were monitored over the following timespan:

50 weeks 11.5 months 250 weekdays

During this period the estimated airspace consumed (quantity of waste disposed at the landfill) was 17,679 m³. This is based on the following surveyed quantities observed on a weekday, weekly, and monthly basis:

71 m³ per weekday 353 m³ per week 1,537 m³ per month

Based on these numbers, it is estimated that approximately 18,356 m³ per year of airspace (waste disposed at the landfill) will be consumed by normal waste delivery and cover soil in 2019. Further details can be found in Appendix C.

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

In 2019, the City implemented a more rigorous testing procedure as required by the water license and continues this into 2020. The monitoring results are provided in Appendix A.

Date	Station	Test	Sample Name	No. Samples	Lab Sample ID
10-Jan-2019	IQA-01	Α	WTP	2	B19-01024
10-Jan-2019	IQA-02	F	Sewage Lagoon, Effluent	1	B19-01028
24-Jan-2019		F	WWTP	1	B19-02364
07-Feb-2019		F	WWTP	1	B19-03486
03-Apr-2019	IQA-01	Α	WTP	2	B19-08580

Table 3 Summary of 2019 Sampling Conducted



01-May-2019	IQA-01	Α	WTP	2	B19-11566
01-May-2019	IQA-04	F	WWTP Effluent	1	B19-11569
01-May-2019	IQA-05	F	WWTP Influent	1	B19-11569
21-May-2019	IQA-02	F	Sewage Lagoon, Effluent	1	B19-14176
21-May-2019	IQA-04	F	WWTP, Effluent	1	B19-14176
30-May-2019	IQA-08	E	Landfill, Effluent Discharge	1	B19-15462
30-May-2019	IQA-08A	E	Landfill, Up-Gradient	1	B19-15462
30-May-2019	IQA-08B	E	Landfill, Down-Gradient	1	B19-15462
03-Jun-2019	IQA-01	Α	WTP	2	B19-15905
04-Jun-2019	IQA-04	F	WWTP, Effluent	1	B19-15915
04-Jun-2019	IQA-05	F	WWTP, Influent	1	B19-15915
25-Jul-2019	IQA-01	Α	WTP	4	B19-22803
25-Jul-2019	IQA-04	F	WWTP, Effluent	1	B19-22809
25-Jul-2019	IQA-05	F	WWTP, Influent	1	B19-22809
21-Aug-2019	IQA-01	Α	WTP	4	B19-26341
21-Aug-2019	IQA-04	F	WWTP, Effluent	1	B19-26346
21-Aug-2019	IQA-05	F	WWTP, Influent	1	B19-26346
25-Sep-2019	IQA-01	Α	WTP	4	B19-30685
25-Sep-2019	IQA-04	F	WWTP, Effluent	1	B19-30688
25-Sep-2019	IQA-05	F	WWTP, Influent	1	B19-30688
25-Sep-2019	IQA-08	Е	Landfill, Effluent Discharge	1	B19-30689
25-Sep-2019	IQA-05	В	WWTP, Influent	1	B19-30694
23-Oct-2019	IQA-01	Α	WTP	4	B19-34273
23-Oct-2019	IQA-04	F	WWTP, Effluent	1	B19-34282
23-Oct-2019	IQA-05	F	WWTP, Influent	1	B19-34282
27-Nov-2019	IQA-01	Α	WTP	4	B19-38495
24-Nov-2019	IQA-04	F	WWTP, Effluent	1	B19-38496
24-Nov-2019	IQA-05	F	WWTP, Influent	1	B19-38496

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

There were no construction activities conducted with respect to the water licence in 2019.

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

### Wastewater Treatment Plant

The following maintenance work was carried out at the WWTP in 2019:

- Wastewater Treatment Plant Upgrades/ Expansion
  - Construction and commissioning of Primary Treatment process completed April 2019

Following the successful commissioning of the WWTP Primary Treatment process in April 2019, sewage was diverted from the Sewage Lagoon to the WWTP. Prior to that, all sewage was diverted to the Sewage Lagoon for treatment.

#### Water Treatment Plant

The following upgrades/ major maintenance work was carried out at the Water Treatment Plant (WTP) in 2019.

- o PLC Issue analysis
- SCADA Upgrades
- Filter Media Replacement
- Chlorine Delivery System Upgrades
- Replacement of Chlorine Analyzer System
- 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.

### Water Withdrawal and Flow Analysis - Unnamed Lake

The City retained Nunami Stantec to assess the potential of Unnamed Lake to meet the City's water supplementation needs. No information is presently available on Unnamed Lake in order to verify its long-term viability for water supply. The work entails the installation of a temporary hydrometric station to verify water level data and will consider a LiDar survey and bathymetric assessment. The LiDar survey and bathymetric assessment was completed in November 2019. A final report, which compiles all the data compiled from the temporary hydrometric station was submitted in December 2019.

The City intends on initiating a water balance model assessment of Unnamed Lake, in order to assess the viability of long-term water withdrawl from the reservoir to support the City's long-term water supply and storage requirements. The City anticipates completion of the assessment in Q1-2021.

# <u>Options Evaluation / Concept Design for Raw Water Supplementation – Sylvia Grinnell River</u>

In August 2018, the City retained Nunami Stantec to investigate two (2) options shortlisted from a 2017 Nunami Stantec report identifying intake site options for water withdrawal from Sylvia Grinnell to the Lake Geraldine water reservoir. The report will provide concept level analysis and design in order to confirm technical, constructability and financial feasibility. The work falls under the long-term water supply program for the Lake Geraldine Water Reservoir. The final report was submitted to the City in April 2019. The City will re-evaluate the recommendations of the report, following the completion of the Unnamed Lake water balance assessment, at which point, the City will have several options for consideration.

Should Unnamed Lake present a viable option, following the completion of the water balance model, the City will consider the completion of a pre-feasibility study to evaluate possible intake options and pipeline routes, to supplement Lake Geraldine from Unnamed Lake. This assignment will be considered in 2021.

### <u>Lake Geraldine Reservoir Storage – Desktop Review and Assessment</u>

The City retained Nunami Stantec to assess the storage capacity of Lake Geraldine, while considering the current and future water demand requirements based on expected population growth in the City of Igaluit. The desktop study highlights the current situation regarding water supply to Lake Geraldine, water storage and withdrawal capabilities of the reservoir, and water demand from the City, and provides a problem definition leading to the water deficit in summer/fall 2018. Nunami's analysis shows that, aside from a supplementary water source required to provide additional flows during the summer and fall to fill the reservoir to capacity, supplementary water storage is necessary to provide a stable supply of drinking water to meet the City's needs throughout the winter months. Assuming the 2017 water demand rates and 2017 population numbers, and minimal to no inflows to the reservoir during the winter months, the City currently has a margin of approximately 25% to 30% on the volume of storage contained in the Lake Geraldine reservoir, and will likely need to identify additional storage for the upcoming winter season, and for a sustainable long-term water supply. The final report was submitted to the City in February 2019. The report findings have prompted the initiation of a Long-Term Water Storage Pre-Feasibility Study to investigate viable alternatives to secondary water storage, in addition to the Lake Geraldine Water Reservoir.

#### Drinking Water Management Plan

The City of Iqaluit continued to initiate a Drinking Water Management Plan, as part of the original mandate to identify means of improve water usage, conversation awareness, and efficiencies. The work will not impact the supplementary water supply requirement but will provide recommendations on reducing water demand, and controlling losses. The final report is anticipated in April 2020.

### <u>Long-Term Water Storage – Pre-Feasibility Study</u>

In November 2019, the City retained Exp to investigate viable alternatives for secondary water storage, in addition to the Lake Geraldine Reservoir. The intent is to investigate three (3) alternatives, which will meet future City demand requirements, given the projected growth of the municipality. Completion of the pre-feasbility study is expected in Q4-2020.

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

The following revisions/ updates were performed to Plans, Manuals, and Reports approved under the Licence in 2019:

- Environmental Monitoring Program and Quality Assurance/ Quality Control Plan (approved April 2019)
- Landfill Operations and Maintenance Manual

The City anticipates the completion of the following Plans, Manuals, and Reports approved under the Licence in 2020:

- Sewage Lagoon Operations and Maintenance Manual
- o Wastewater Treatment Plant Operations and Maintenance Manual
- K. A list and description, including volumes and Spill Report Line Identification Numbers, of all un-authorized discharges, spills and summaries of follow-up action taken.

Table 4 below provides a summary of all reported spills/ un-authorized discharges that occurred in 2019. Details of the spill have been provided in Appendix B.

Table 4 Summary of spills/ un-authorized discharges in 2019

Spill ID	Date	Location	Spilled	Volume	Cause	Follow-Up Action
2019135	05-Jan-19	House 140	Sewage	Unknown	Collapsed Line	Scheduled weekly blasting
2019051	08-Feb-19	AV337	Sewage	Unknown	Collapsed Line	Scheduled weekly blasting
2019059	18-Feb-19	AV415	Sewage	Unknown	Collapsed Line	Scheduled weekly blasting
2019061	18-Feb-19	AV356	Sewage	Unknown	Collapsed Line	Scheduled weekly blasting
2019062	18-Feb-19	MH01	Sewage	Unknown	Collapsed Line	Scheduled weekly blasting
2019072	22-Feb-19	House 2643	N/A	Unknown	Fire at House	Site Clean-up
2019082	01-Mar-19	MH01	Sewage	Unknown	Collapsed Line	Scheduled weekly blasting
2019085	04-Mar-19	MH01	Sewage	Unknown	Collapsed Line	Repairs to structure
2019086	04-Mar-19	MH82	Sewage	Unknown	Collapsed Line	Scheduled weekly blasting
2019108	14-Mar-19	House 639	Fuel	Unknown	Fitting Leak	Site Remediation
2019139	17-Mar-19	MH81	Sewage	Unknown	Overflow Event	Scheduled weekly blasting
2019134	18-Mar-19	Inukshuk School	Sewage	6000 L	Damage due to Weather	Repairs to service line
2019118	19-Mar-19	House 2713	Sewage	Unknown	Damage due to Weather	Repairs to service line
2019124	21-Mar-19	House 1538	Fuel	Unknown	Overflow Event	Site Remediation
2019141	29-Mar-19	AV340	Sewage	Unknown	Overflow Event	Scheduled weekly blasting
2019140	29-Mar-19	AV340	Sewage	Unknown	Overflow Event	Scheduled weekly blasting
2019137	23-Mar-19	AV340	Sewage	Unknown	Overflow Event	Scheduled weekly blasting
2019138	28-Mar-19	Lift Station 1	Sewage	Unknown	Overflow Event	Blasting/ Site Remediation
2019148	29-Mar-19	AV05	Sewage	Unknown	Collapsed Line	Scheduled weekly blasting
2019149	01-Apr-19	AV05	Sewage	Unknown	Collapsed Line	Scheduled weekly blasting
2019159	10-Apr-19	House 140/144	Sewage	50 L	Damage due to Weather	Repairs to service line
2019178	28-Apr-19	House 430	Fuel	Unknown	Damage due to Weather	Repairs/ Site Remediation
2019203	13-May-19	CGS Building	Grey Water	Unknown	Breakage	Repairs to service line



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2019220	27-May-19	N/A	Sewage	30 L	N/A	N/A
2019266	01-Jun-19	Akilliq Road	Oil	5 L	Spill	Site Remediation
2019294	19-Jul-19	Akilliq Road	Antifreeze	5 L	Breakage	Site Remediation
2019315	09-Aug-19	Crystal Road	Oil	10 L	Breakage	Site Remediation
2019376	13-Sep-19	Fire Hall	Unknown	Unknown	Unknown	N/A
2019393	21-Sep-19	House 1000	Sewage	Unknown	Collapsed Line	Repairs to service line
2019406	29-Sep-19	Crystal Road	Fuel	0.05 L	Damage due to Weather	Repairs/ Site Remediation
2019408	01-Oct-19	Akilliq Road	Oil	10 L	Breakage	Site Remediation
2019411	03-Oct-19	Akilliq Road	Oil	5 L	Fitting Leak	Site Remediation
2019432	20-Oct-19	SCH	Oil	0.5 L	Breakage	Site Remediation
2019433	21-Oct-19	1552 Federal Road	Fuel	129 L	Breakage	Site Remediation
2019464	17-Nov-19	MH82/ MH81	Sewage	Unknown	Collapsed Line	Scheduled weekly blasting

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

In 2019, no closure and reclamation work were undertaken. No closure or reclamation work is anticipated for 2019.

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

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

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

### Wastewater Treatment Plant Upgrade

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

The primary treatment process was commissioned in April 2019, and remains in operation, as construction continued on the secondary treatment process in 2019. Construction on the secondary treatment process was complete, less deficiencies, in March 2020; commissioning commenced thereafter. Commissioning activities were put on hold following directives issued by the Government of Nunavut in response to COVID-19. Contractors were requested to depart from NU due to the

COVID-19 crises, interrupting the commissioning of the solids handling portion of the Secondary Treatment. Current status is Primary Treatment continues to function, with partial secondary treatment through Moving Bed Biofilm Reactor (MBBR) tanks and flow-through the new Dissolved Air Flotation (DAF) tanks. No collection, processing and return of secondary sludge is able to occur. The City anticipates to restart commissioning activities in Summer 2020, pending the lifting of restrictions as a result of COVID-19.

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

See Section I above.

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

The City was granted an emergency amendment to its Type A 3AM-IQA626 water licence (Amendment No. 3) on August 9, 2019 by the Ministry of Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC), the Hon. Carolyn Bennett. Amendment No. 3 was in response to an emergency declaration issued by the Government of Nunavut's Minister of Community and Government Services on July 31, 2019. The amendment acknowledged the supplementation of drinking water from Unnamed Lake, via the Apex River, to the Lake Geraldine Reservoir. As a requirement of the emergency amendment, the City was required to prepare and submit a final report, which summarized supplemental pumping activites that were initiated. The final report was issued to CIRNAC, Department of Fisheries and Ocean's Canada (DFO), and the Nunavut Impact Review Board (NIRB) on November 29, 2019.

# APPENDIX A MONITORING REPORTS

	DRINKING WA	TER SUBMISSI	ON FOR	RM			DRINKIN	IG WAT	ER FAC	CILITY CLASSI	FICATION		()	240	R N M BE	m (1845)	rs(
		TAL LABORATO	RIES Quality assu				Municipal Large Residentia Seasonal	·	Smal Non-	Municipal I Residential Round	Reg. 318	/08 & 319/08 /07	2	la.	n	10	24
	Indicate Laboratory €  Kingston Ottawa □ Rich				don	×	Other:					K.; Bur			-0	10	21
Organiz	ration of Igo	Coff Waterworks	Address:		P. Box			Microbi	ological	ANAI	YSES REC		10	Other	TL		UND TIME ESTED
Contac	Manta Ko	li:			Igalin								8	THE PERSON NAMED IN		nmary of S	furcharges *** 00% - same day**
Tel:	757-222-47512				XOA OH			/ E.coli	Plate C		es	as N	inics lics		☐ Go	old 10	00% - 24 Hour 0% - 48 Hours
	ours Tel: Public Health Unit:	Waterworks	No. 16-1	galit.	Project Name/No.	:		Coliform / E.coli	Background Heterotrophic Plate Count		Trihalomethanes	Nitrite, Nitrate as N	Sch. 24 Organics	2		onze 25	5% - 72 Hours 7 days
Email:	1. Karveli@ City. Te	palvit NV.	CA	0			, d	Total				Nitrite,	Sch. 24	2	☐ Sp	ecific Da	te:
	GUDI = Groundwater under the in		eated Water, PR = Plumbi	DW = Distribu ng Residential,	tion Water, GW = R PNR = Plumbing N	law Groundwa Ion-Residentia	iter, SW = Ra al ** Fastes	w Surface t possibl	e Water, I e TAT ach	nievable (same da	y if applicabl	e) *** See			naround Time	Terms	
Lab No.	Sample Source and/or Sample Identification		S.P.L.	Sample Matrix *	Date Collected (yy-mm-dd)	Time Collected	Adverse Resample			Indica By Using A C	te Test For E heck Mark In		vided	,	Chlo Free	Total	# Bottles/ Sample
	test A CT	otal)		DW	Jan 9.10	1			177					1			259
	TEST-A COUNTY	(ela)	5533	DW	- 11						3 12		\			9	1 1 1
														Ĺ			
									3			•					
			XIII II						9	1 6 1							
	E-Wall																
			11/16														
						1											
			18.51	1997			-1-11					13			17		
	5 TOTAL 1910	Same to the		- 1													- 14 - 5
			100	- 87566			3.11					212					
	Has Lab Serv Laboratory	ice Notification (L Analysis will not	.SN) Forr	n been co	mpleted & sull Notification	informat	to the MC	E/PHI	J? [	Yes		No [	No	t Appli	cable ted		
	SAMPLE SUBMISSION INFORM				INFORMATION		REPORTI								ORATORY L	ISE ONL'	()
	Sampled by:	Submitted by:	Courier (C	lient accoun	t)	Invoice	Report by	Fax		Received By (	print):	200	-	Signa	ture: > 7	7	
Print:	Geromy		Courier (C	Caduceon acc	count)		Report by	Email	X	Date Received		1: 10/0	01/19	3.5	Received: /		10
Sign:	John Mill		Drop Off			# of Pieces	Invoice by	Email		Laboratory Pro			Yes [	No			
	Date (vy-mm-dd)/fime:	ate (yy-mm-dd)/Time:	Caduceor	(Pick-up)			Invoice by	Mail		Sample Tempe	erature °C:	10,2	La	beled by:			
Comm									17	42 PET	+IN IP	42 M	+2Hg	2+100	AC(Page	00	of Q F F
dini.	White: Lab Copy / Yellow: Invoicing Copy / Pink: C	Slient Conv													CofC DW. Jan	2017 Payin	C J J O



### **QUOTATION FOR ANALYTICAL SERVICES**

Quote # :

YD18 Igaluit A

Organization:

City of Iqaluit

Contact:

Mike Hatfield

Telephone:

867-979-6363

Facsimile:

Email:

M.Hatfield@city.lgaluit.nu.ca

Project #:

TEST A - Drinking Water

Address:

Box 460, Iqaluit NU, X0A 0H0

Additional Info: Additional Info: QUOTE # ('S) MUST BE ON C OF C TO APPLY if not listed, General pricing will be applied. Replacing Quote YD17\_Iqaluit\_A\_Rev1

Date:

26-Feb-18

Valid Until:

31-Dec-19

Item #	Quantity	Analysis Request	Matrix	Unit Cost, \$	Amount, \$
1	1	Acidity (Subcontracted)	DW	33.50	33.50
2	1	Alkalinity	DW	14.50	14.50
3	1	Bicarbonate/ Carbonate	DW.	17.50	17.50
4	1	Chloride/Sulphate	DW	23.75	23.75
5	1	Conductivity	DW	9.45	9.45
6	1	Hydroxide	DW	14.50	14.50
7	1	Redox Potential	DW	15.75	15.75
8	1	TDS	DW	17.50	17.50
9	1	TSS	DW	17.50	17.50
10	1	TOC	DW	23.75	23.75
11	1	TIC	DW	23.75	23.75
12	TOTAL METALS ICPOES AI, Ba, Be, Cr, Co, Cu, Fe, Li, Mn, Mo, Ni, Sn, Sr, Ti, V, Zn + Hardness ICPMS Sb, As, Cd, Pb, Se, Ag, Tl, U CVAAS Hg			92.00	92.00
13	1	DISSOLVED METALS ICPOES AI, Ba, Be, Cr, Co, Cu, Fe, Li, Mn, Mo, Ni, Sn, Sr, Ti, V, Zn + Hardness ICPMS Sb, As, Cd, Pb, Se, Ag, Tl, U CVAAS Hg	DW	92.00	92.00
14	1	Fecal Coliforms	DW	16.25	16.25
15	1	pH	DW,	9.00	9.00
16	1	Turbidity	ĎW	14.50	14.50
17	1	Ottawa Airport Pick Up		25.00	25.00
es do not include shinnir	a unless otherwise state		11	Subtotal	460.20

Prices do not include shipping unless otherwise stated.

Environmental Surcharge of \$1.50 per sample set

Rebecca Marshall

**Customer Service Representative** 

**Caduceon Environmental Laboratories** 

rmarshall@caduceonlabs.com

613-526-0123



#### DRINKING WATER CHAIN OF CUSTODY FORM

Page	of	

Please use our General Chain of Custody Form for non-drinking water sample submissions REPORT TO: PROJECT INFORMATION: INVOICE TO: (if different from Report) Client Caduceon Environmental Laboratories TM Quote #: Caduceon Environmental Laboratories Address: Client P.O. #: P190110\_TM 2378 Holly Lane, Ottawa ON, K1V 7P1 Address: 285 Dalton Ave. Kingston K7K 6Z1 Client Project #: Contact: Grea Clarkin Contact: Maggie McCormick Email: gclarkin@caduceonlabs.com, tyapici@caduceonlabs.com Email: mmccormick@caduceonlabs.com 613-526-0123 Phone: 613-526-1244 Phone: 613-544-2001 613-544-2770 Fax: REPORTING/INVOICING FORMAT TURN AROUND TIME (TAT)\* LABORATORY USE ONLY ANALYSIS REQUESTED ☑2 Business Days ☐1 Business Day Mail WORK ORDER NUMBER: esidual Chlorine or No?) OC DATA REPORTED ☐3 Business Davs ☐Standard Count 8 RECEIVED □Yes □No шi SAMPLE DISPOSAL SPECIFIC DATE: Total Coliform / ŏ \* Prior arrangements must be made for Trihalomethan Nitrite, Nitrate ☐Hold ☑Dispose Return Heterotrophic 23 Red Schedule 24 rush/weekend/holiday work Background Resample Schedule 2 SAMPLING read \*\*\* Sodium Fluoride SAMPLE DESCRIPTION **Water Trax** Type\*\* DATE Total TIME (This Will Appear On The Report) # (if appl) (mm-dd-yy) TDP Btl. Type R Lab ID TEMP 01-09-19 B19-01024-2 22.5 a: .......... \*\*Type: R=Raw, T=Entry/Treated, D=Distribution, P=Plumbing (O.REG. 170 / O.REG. □O. REG. 170 □O. REG. 319 □None Waterworks # 319 / O.REG. 243) □O. REG. 243 □ODWS Adverse and Exceedance Notification Information: □No Not Applicable □Yes LSN Form Submitted to MOE/PHU? √Yes □No Name: Penny Wilson Are these water samples for human consumption? Cell: ☑No Yes Phone: 613-580-2424 x 22839 Are the results reportable as per O. REG. 170/319? Fax: 613-721-4220 COMMENTS/FIELD NOTES: O. REG. 170/319 Only: Phone: Fax: Public Health Unit: Relinquished to Testmark By (Signature) Time Date Sabina Islam Mar.06,2018 Sampled By Date Time Shipped By Shipping Reference CLIENT Received By Date Time Received at Testmark By Date Time

7 Margaret Street, Garson, ON, P3L 1E1 • 705-693-1121 (P) • 705-693-1124 (F) • customer.service@testmark.ca

100 Wilson Ave., Timmins, ON, P4N 2S9 • 705-531-1121 (P) • 705-531-1125 (F) • timmins@testmark.ca

6820 Kitimat Road Unit #1, Mississauga, ON, L5N 5M3 • 905-821-1112 (P) • 905-821-2095 (F) • csr-mississauga@testmark.ca



**Final Report** 

C.O.C.: G76741 **REPORT No. B19-01028** 

Report To:

City of Iqaluit PO Box 460,

Iqaluit NU X0A 0H0 Attention: Maria Karveli

DATE RECEIVED: 10-Jan-19

DATE REPORTED: 16-Jan-19

SAMPLE MATRIX: Waste Water

**Caduceon Environmental Laboratories** 

2378 Holly Lane

Ottawa Ontario K1V 7P1 Tel: 613-526-0123

Fax: 613-526-1244

JOB/PROJECT NO.: Test F

P.O. NUMBER:

WATERWORKS NO.

			Client I.D.		Lagoon Effluent		
			Sample I.D.		B19-01028-1		
			Date Collecte	ed	10-Jan-19		
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed			
Total Suspended Solids	mg/L	3	SM2540D	14-Jan-19/K	45		
BOD(5 day)	mg/L	3	SM 5210B	11-Jan-19/K	138		
Nitrite (N)	mg/L	0.1	SM4110C	11-Jan-19/O	< 0.1		
Nitrate (N)	mg/L	0.1	SM4110C	11-Jan-19/O	< 0.1		
Ammonia (N)-Total	mg/L	0.01	SM4500- NH3-H	15-Jan-19/K	31.8		
Phosphorus-Total	mg/L	0.01	E3199A.1	15-Jan-19/K	4.39		
o-Phosphate (P)	mg/L	0.01	PE4500-S	15-Jan-19/K	3.75		
Aluminum	mg/L	0.01	SM 3120	11-Jan-19/O	0.15		
Antimony	mg/L	0.0005	EPA 200.8	14-Jan-19/O	< 0.0005		
Arsenic	mg/L	0.0005	EPA 200.8	14-Jan-19/O	< 0.0005		
Barium	mg/L	0.001	SM 3120	11-Jan-19/O	0.004		
Beryllium	mg/L	0.002	SM 3120	11-Jan-19/O	< 0.002		
Cadmium	mg/L	).000070	EPA 200.8	14-Jan-19/O	0.000087		
Chromium	mg/L	0.002	SM 3120	11-Jan-19/O	< 0.002		
Cobalt	mg/L	0.005	SM 3120	11-Jan-19/O	< 0.005		
Copper	mg/L	0.002	SM 3120	11-Jan-19/O	0.339		
Iron	mg/L	0.005	SM 3120	11-Jan-19/O	0.397		
Lead	mg/L	0.0001	EPA 200.8	14-Jan-19/O	0.0017		
Lithium	mg/L	0.01	SM 3120	11-Jan-19/O	< 0.01		
Manganese	mg/L	0.001	SM 3120	11-Jan-19/O	0.030		
Mercury	mg/L	0.00002	SM 3112 B	11-Jan-19/O	0.00002		
Molybdenum	mg/L	0.01	SM 3120	11-Jan-19/O	< 0.01		
Nickel	mg/L	0.01	SM 3120	11-Jan-19/O	< 0.01		
Selenium	mg/L	0.005	EPA 200.8	14-Jan-19/O	< 0.005		
Silver	mg/L	0.0001	EPA 200.8	14-Jan-19/O	< 0.0001		
Strontium	mg/L	0.001	SM 3120	11-Jan-19/O	0.019		

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

R.L. = Reporting Limit

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

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

Tahir Yapici Ph.D Lab Supervisor



**Final Report** 

C.O.C.: G76741 REPORT No. B19-01028

Report To:

City of Iqaluit PO Box 460,

Iqaluit NU X0A 0H0

Attention: Maria Karveli

DATE RECEIVED: 10-Jan-19

DATE REPORTED: 16-Jan-19

SAMPLE MATRIX: Waste Water

**Caduceon Environmental Laboratories** 

2378 Holly Lane

Ottawa Ontario K1V 7P1

Tel: 613-526-0123

Fax: 613-526-1244

JOB/PROJECT NO.: Test F

P.O. NUMBER:

WATERWORKS NO.

	Client I.D.		Lagoon Effluent				
			Sample I.D.		B19-01028-1		İ
			Date Collecte	ed	10-Jan-19		
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed			
Thallium	mg/L	0.0003	EPA 200.8	14-Jan-19/O	< 0.0003		
Tin	mg/L	0.05	SM 3120	11-Jan-19/O	< 0.05		
Titanium	mg/L	0.005	SM 3120	11-Jan-19/O	< 0.005		
Uranium	mg/L	0.0003	EPA 200.8	14-Jan-19/O	< 0.0003		
Vanadium	mg/L	0.005	SM 3120	11-Jan-19/O	< 0.005		
Zinc	mg/L	0.005	SM 3120	11-Jan-19/O	0.095		
Conductivity @25°C	µmho/cm	1	SM 2510B	10-Jan-19/O	465		
pH @25°C	pH Units		SM 4500H	10-Jan-19/O	7.10		
Total Coliform	cfu/100mL	1	MOE E3371	10-Jan-19/O	56000000	_	
Fecal Coliform	cfu/100mL	1	MOE E3371	10-Jan-19/O	2100000		

R.L. = Reporting Limit

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

Tahir Yapici Ph.D Lab Supervisor



Final Report

C.O.C.: G76743 REPORT No. B19-02364

Report To:

City of Iqaluit PO Box 460,

Iqaluit NU X0A 0H0
Attention: Maria Karveli

DATE RECEIVED: 24-Jan-19

DATE REPORTED: 05-Feb-19

SAMPLE MATRIX: Waste Water

**Caduceon Environmental Laboratories** 

2378 Holly Lane

Ottawa Ontario K1V 7P1 Tel: 613-526-0123

Fax: 613-526-1244

JOB/PROJECT NO.: Test F

P.O. NUMBER:

WATERWORKS NO.

			Client I.D.		Test F		
			Sample I.D.		B19-02364-1		
			Date Collect	ed	23-Jan-19		
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed			
BOD(5 day)	mg/L	3	SM 5210B	25-Jan-19/K	131		
Total Suspended Solids	mg/L	3	SM2540D	28-Jan-19/K	95		
Conductivity @25°C	µmho/cm	1	SM 2510B	28-Jan-19/O	686		
pH @25°C	pH Units		SM 4500H	28-Jan-19/O	7.28		
Nitrite (N)	mg/L	0.1	SM4110C	25-Jan-19/O	< 0.1		
Nitrate (N)	mg/L	0.1	SM4110C	25-Jan-19/O	< 0.1		
Ammonia (N)-Total	mg/L	0.01	SM4500- NH3-H	30-Jan-19/K	32.7		
o-Phosphate (P)	mg/L	0.01	PE4500-S	30-Jan-19/K	3.70		
Phosphorus-Total	mg/L	0.01	E3199A.1	30-Jan-19/K	4.64		
Aluminum	mg/L	0.01	SM 3120	25-Jan-19/O	0.17		
Antimony	mg/L	0.0005	EPA 200.8	25-Jan-19/O	< 0.0005		
Arsenic	mg/L	0.0005	EPA 200.8	25-Jan-19/O	< 0.0005		
Barium	mg/L	0.001	SM 3120	25-Jan-19/O	0.005		
Beryllium	mg/L	0.002	SM 3120	25-Jan-19/O	< 0.002		
Cadmium	mg/L	).000070	EPA 200.8	25-Jan-19/O	< 0.000070		
Chromium	mg/L	0.002	SM 3120	25-Jan-19/O	0.002		
Cobalt	mg/L	0.005	SM 3120	25-Jan-19/O	< 0.005		
Copper	mg/L	0.002	SM 3120	25-Jan-19/O	0.348		
Iron	mg/L	0.005	SM 3120	25-Jan-19/O	0.395		
Lead	mg/L	0.0001	EPA 200.8	25-Jan-19/O	0.0016		
Lithium	mg/L	0.01	SM 3120	25-Jan-19/O	< 0.01		
Manganese	mg/L	0.001	SM 3120	25-Jan-19/O	0.027		
Mercury	mg/L	0.00002	SM 3112 B	25-Jan-19/O	0.00003		
Molybdenum	mg/L	0.01	SM 3120	25-Jan-19/O	< 0.01		
Nickel	mg/L	0.01	SM 3120	25-Jan-19/O	< 0.01		
Selenium	mg/L	0.005	EPA 200.8	25-Jan-19/O	< 0.005		
Silver	mg/L	0.0001	EPA 200.8	25-Jan-19/O	0.0001		

R.L. = Reporting Limit

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

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



Final Report

C.O.C.: G76743 REPORT No. B19-02364

Report To:

City of Iqaluit PO Box 460,

Iqaluit NU X0A 0H0

**Attention:** Maria Karveli

DATE RECEIVED: 24-Jan-19

DATE REPORTED: 05-Feb-19

SAMPLE MATRIX: Waste Water

**Caduceon Environmental Laboratories** 

2378 Holly Lane

Ottawa Ontario K1V 7P1

Tel: 613-526-0123

Fax: 613-526-1244

JOB/PROJECT NO.: Test F

P.O. NUMBER:

WATERWORKS NO.

			Client I.D.		Test F		
			Sample I.D.		B19-02364-1		
			Date Collecte	ed	23-Jan-19		
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed			
Strontium	mg/L	0.001	SM 3120	25-Jan-19/O	0.237		
Thallium	mg/L	0.0003	EPA 200.8	25-Jan-19/O	< 0.0003		
Tin	mg/L	0.05	SM 3120	25-Jan-19/O	< 0.05		
Titanium	mg/L	0.005	SM 3120	25-Jan-19/O	< 0.005		
Uranium	mg/L	0.0003	EPA 200.8	25-Jan-19/O	< 0.0003		
Vanadium	mg/L	0.005	SM 3120	25-Jan-19/O	< 0.005		
Zinc	mg/L	0.005	SM 3120	25-Jan-19/O	0.092		
Total Coliform	cfu/100mL	1	MOE E3371	24-Jan-19/O	64000000		
Fecal Coliform	cfu/100mL	1	MOE E3371	24-Jan-19/O	5200000		

R.L. = Reporting Limit

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

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



Final Report

C.O.C.: G76744 REPORT No. B19-03486

Report To:

City of Iqaluit PO Box 460,

Iqaluit NU X0A 0H0

Attention: Maria Karveli

DATE RECEIVED: 07-Feb-19

DATE REPORTED: 13-Feb-19

SAMPLE MATRIX: Waste Water

**Caduceon Environmental Laboratories** 

2378 Holly Lane

Ottawa Ontario K1V 7P1

Tel: 613-526-0123 Fax: 613-526-1244

JOB/PROJECT NO.: Test F

P.O. NUMBER:

WATERWORKS NO.

			Client I.D.		Test F		
			Sample I.D.		B19-03486-1		
			Date Collect	ed	05-Feb-19		
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed			
BOD(5 day)	mg/L	3	SM 5210B	08-Feb-19/K	115		
Total Suspended Solids	mg/L	3	SM2540D	08-Feb-19/K	11		
Conductivity @25°C	µmho/cm	1	SM 2510B	07-Feb-19/O	431		
pH @25°C	pH Units		SM 4500H	07-Feb-19/O	7.19		
Nitrite (N)	mg/L	0.1	SM4110C	08-Feb-19/O	< 0.1		
Nitrate (N)	mg/L	0.1	SM4110C	08-Feb-19/O	< 0.1		
Ammonia (N)-Total	mg/L	0.01	SM4500- NH3-H	08-Feb-19/K	32.4		
o-Phosphate (P)	mg/L	0.01	PE4500-S	08-Feb-19/K	3.49		
Phosphorus-Total	mg/L	0.01	E3199A.1	11-Feb-19/K	4.34		
Aluminum	mg/L	0.01	SM 3120	08-Feb-19/O	0.16		
Antimony	mg/L	0.0005	EPA 200.8	11-Feb-19/O	< 0.0005		
Arsenic	mg/L	0.0005	EPA 200.8	11-Feb-19/O	< 0.0005		
Barium	mg/L	0.001	SM 3120	08-Feb-19/O	0.005		
Beryllium	mg/L	0.002	SM 3120	08-Feb-19/O	< 0.002		
Cadmium	mg/L	).000070	EPA 200.8	11-Feb-19/O	0.000128		
Chromium	mg/L	0.002	SM 3120	08-Feb-19/O	< 0.002		
Cobalt	mg/L	0.005	SM 3120	08-Feb-19/O	< 0.005		
Copper	mg/L	0.002	SM 3120	08-Feb-19/O	0.315		
Iron	mg/L	0.005	SM 3120	08-Feb-19/O	0.399		
Lead	mg/L	0.0001	EPA 200.8	11-Feb-19/O	0.0016		
Lithium	mg/L	0.01	SM 3120	08-Feb-19/O	< 0.01		
Manganese	mg/L	0.001	SM 3120	08-Feb-19/O	0.027		
Mercury	mg/L	0.00002	SM 3112 B	08-Feb-19/O	< 0.00002		
Molybdenum	mg/L	0.01	SM 3120	08-Feb-19/O	< 0.01		
Nickel	mg/L	0.01	SM 3120	08-Feb-19/O	< 0.01		
Selenium	mg/L	0.005	EPA 200.8	11-Feb-19/O	< 0.005		
Silver	mg/L	0.0001	EPA 200.8	11-Feb-19/O	0.0001		

NOTE: Total & Fecal Coliform passed acceptable holding time of 48 hrs upon arrival at lab.

R.L. = Reporting Limit

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

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



Final Report

C.O.C.: G76744 **REPORT No. B19-03486** 

**Report To:** 

City of Iqaluit PO Box 460,

Iqaluit NU X0A 0H0

Attention: Maria Karveli

DATE RECEIVED: 07-Feb-19

DATE REPORTED: 13-Feb-19

SAMPLE MATRIX: Waste Water

**Caduceon Environmental Laboratories** 

2378 Holly Lane

Ottawa Ontario K1V 7P1 Tel: 613-526-0123

Fax: 613-526-1244

JOB/PROJECT NO.: Test F

P.O. NUMBER:

WATERWORKS NO.

			Client I.D.		Test F		
			Sample I.D.		B19-03486-1		
			Date Collect	ed	05-Feb-19		
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed			
Strontium	mg/L	0.001	SM 3120	08-Feb-19/O	0.019		
Thallium	mg/L	0.0003	EPA 200.8	11-Feb-19/O	< 0.0003		
Tin	mg/L	0.05	SM 3120	08-Feb-19/O	< 0.05		
Titanium	mg/L	0.005	SM 3120	08-Feb-19/O	< 0.005		
Uranium	mg/L	0.0003	EPA 200.8	11-Feb-19/O	< 0.0003		
Vanadium	mg/L	0.005	SM 3120	08-Feb-19/O	< 0.005		
Zinc	mg/L	0.005	SM 3120	08-Feb-19/O	0.089		
Total Coliform	cfu/100mL	1	MOE E3371	07-Feb-19/O	65000000		
Fecal Coliform	cfu/100mL	1	MOE E3371	07-Feb-19/O	19200000		

NOTE: Total & Fecal Coliform passed acceptable holding time of 48 hrs upon arrival at lab.

R.L. = Reporting Limit

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

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

	DRI	NKING WATER S	UBMISSI	ON FOR	M			DRINKII	NG W	ATER	FACII	LITY CI	ASSII	FICATI	ON			M	REP	ORT	IMME	R (Lab	Use)
-	13		ABORATO!	RIES Quality assur	5550			Municipal Large Residentia Seasonal	al		Small Von-Re	unicipal esidenti ound	al 🔲	Reg. Reg. Reg.	318/08 243/07	& 319	/08	B	19	_(	36	5	30
		ate Laboratory or Depot Ottawa  Richmond Hill				don	De	Other:				<u> </u>		-			-	-					
Organ	City of I	ralvit	Waterworks A			P. O B		5	Micro	obiologi			ANAL	YSES I		ESTE	D		Other			REQU	OUND TIME
Contac	Patrick 1 7-222-242 Fax	Jolfe				Iquali	it 1	U	E.coli		Heterotrophic Plate Count			S		Z	ics	SS.			Pla Go	atinum 2 old 1	Surcharges *** 00% - same day** 00% - 24 Hour
		blic Health Unit:	Waterworks I	No.:		Project Name/No		A	Total Coliform / E.coli	Background	otrophic P	E	de	rihalomethanes		Nitrite, Nitrate as N	Sch. 23 Inorganics	. 24 Organics			☐ Bro	onze 2 andard 5	
majl:	Wolfe @ City.	Igalist No. CA	Quote No.:	atad Water	DW = Dietribu	P.O. No.:	60	tor SW = D				0) -	Fluoride		HAA's			Sch	tion		Sp	ecific Da	ate:
Lab	GUDI = Grou	ndwater under the influence of	surface water, I	R = Plumbin	g Residential, Sample	PNR = Plumbing N	Ion-Residentia	** Faste	st poss	sible TA	T achie	vable (sa	ame day	if applic	able)	*** Se	e Cad	luceon G	eneral Tu	rnaroun	d Time T	ROLLEGO CONTRACTOR STATE	# Bottles/
		ple Identification		S.P.L.	Matrix *	(yy-mm-dd) F/03/V4		Resample				By Usi	ng A Ch	eck Mar	k in Th	e Box P	rovide	ed				Total	Sample
	Test A -	Total metal	lc		DAA	1/02/14	9Am		5.6	2 1					2/4				+		1.0	156	2
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	SAMPLE SUE	BMISSION INFORMATION	no will mot			G INFORMATION		REPORT	ING/I	Name and Address of the Owner, where	-	7 0 0 10 1					-		ION (LAE		ORY US	SE ONLY	)
	Sampled by:	Submit	ted by:		lient accour		Invoice	Report by			-	Receive	d By (p	rint):		,	20	h	Signa	iture:	2	B	
Print	: Pat W	olle lat	Woll	-	aduceon ac	count)		Report by				ate Red	ceived	(yy-mm	-dd):	3/0	2/1	119	Time	Receive	ed:	131	10
Sign	: 12# Wes	1 214	10	Drop Off			# of Pieces			II L	_	aborato	ory Pre	pared B	ottles	[	V	Yes [	No				
	Date (yy-mm-dd)//	me: Date (yy-mr		Caduceon	(Pick-up)			Invoice by				Sample '				200	_		beled by	: ,	4	>	
Com	iments:						IPST	410,				2449	+1	bac	L,	26	ab	y. 11	et .	[	DW DW	09	2953
	White: Lab Copy / Yellow: I	nvoicing Copy / Pink: Client Copy							11	N.1	Hay	)								CofC DV	N, Jan 2	J17 Revis	ion No: 12





### **QUOTATION FOR ANALYTICAL SERVICES**

Quote #:

YD18\_lqaluit\_A

Organization:

City of Iqaluit

Contact:

Mike Hatfield

Telephone:

867-979-6363

Facsimile:

Email:

M.Hatfield@city.lqaluit.nu.ca

Project #: Address:

**TEST A - Drinking Water** Box 460, Iqaluit NU, X0A 0H0

Additional Info:

QUOTE # ('S) MUST BE ON C OF C TO APPLY if not listed, General pricing will be applied.

Additional Info:

Replacing Quote YD17\_lqaluit\_A\_Rev1

Date:

26-Feb-18

Valid Until:

31-Dec-19

Item #	Quantity	Analysis Request	Matrix	Unit Cost, \$	Amount, \$
1	1	Acidity (Subcontracted)	DW	33.50	33.50
2	1	Alkalinity	DW	14.50	14.50
3	1	Bicarbonate/ Carbonate	DW	17.50	17.50
4	1	Chloride/Sulphate	DW	23.75	23.75
5	1	Conductivity	DW	9.45	9,45
6	1	Hydroxide	DW	14.50	14.50
7	1	Redox Potential	DW	15.75	15.75
8	1	TDS	DW	17.50	17.50
9	1	TSS	DW	17.50	17.50
10	1	TOC	DW	23.75	23.75
11	1	TIC	DW	23.75	23.75
12	1	TOTAL METALS ICPOES AI, Ba, Be, Cr, Co, Cu, Fe, Li, Mn, Mo, Ni, Sn, Sr, Ti, V, Zn + Hardness ICPMS Sb, As, Cd, Pb, Se, Ag, Tl, U CVAAS Hg	DW	92.00	92.00
13	1	DISSOLVED METALS ICPOES AI, Ba, Be, Cr, Co, Cu, Fe, Li, Mn, Mo, Ni, Sn, Sr, Ti, V, Zn + Hardness ICPMS Sb, As, Cd, Pb, Se, Ag, TI, U CVAAS Hg	DW	92.00	92.00
14	1	Fecal Coliforms	DW	16.25	16.25
15	1	pH	DW	9.00	9.00
16	1	Turbidity	DW	14.50	14.50
17	1	Ottawa Airport Pick Up		25.00	25.00
rices do not include shippir	ng unless otherwise state			Subtotal	460.20

Environmental Surcharge of \$1.50 per sample set

**|Subtota**| 460.20 HST · 59.83 **Total Cost** 520.03

Rebecca Marshall **Customer Service Representative Caduceon Environmental Laboratories** rmarshall@caduceonlabs.com

613-526-0123

Corporate Office - Kingston - 285 Dalton Ave. Kingston, ON K7K 6Z1 Tel: (613) 544-2001 Fax: (613) 544-2770 Ottawa Kingston **Richmond Hili** London Windsor



#### DRINKING WATER CHAIN OF CUSTODY FORM

	2000
Page	of
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Please use our General Chain of Custody Form for non-drinking water sample submissions

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										King	ston	K7K	6Z1											ı	t Project #:		
Contact:					Greg Clarkin		12	Cont	act:	Mag	gie M	1cCor	mick												•		
Email:	gclar	kin(	@cad	luce	onlabs.com, tyap	ici@caduceor	nlabs.com	Emai	il:	mmo	ccorn	nick@	@cadu	ıceor	ılabs.	com											
Phone:	613-526-012	3			Fax: 613-52	6-1244		Phon	ne:	613-	-544-	-200	1			Fax:		613-	544-	2770							
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7 Margaret Street, Garson, ON, P3L 1E1 • 705-693-1121 (P) • 705-693-1124 (F) • customer.service@testmark.ca

100 Wilson Ave., Timmins, ON, P4N 2S9 • 705-531-1121 (P) • 705-531-1125 (F) • timmins@testmark.ca

6820 Kitimat Road Unit #1, Mississauga, ON, L5N 5M3 • 905-821-1112 (P) • 905-821-2095 (F) • csr-mississauga@testmark.ca



**Final Report** 

C.O.C.: DW 092953 REPORT No. B19-08580

Report To:

City of Iqaluit PO Box 460,

Iqaluit NU X0A 0H0
Attention:
Pat Wolfe

DATE RECEIVED: 03-Apr-19

DATE REPORTED: 09-Apr-19
SAMPLE MATRIX: Drinking Water

**Caduceon Environmental Laboratories** 

2378 Holly Lane

Ottawa Ontario K1V 7P1 Tel: 613-526-0123 Fax: 613-526-1244

JOB/PROJECT NO.: Test A (WTP)

P.O. NUMBER: WATERWORKS NO.

			Client I.D.		WTP Test A	WTP Test A (Total)	
			Sample I.D.		B19-08580-1	B19-08580-2	
			Date Collecte	ed	14-Mar-19	14-Mar-19	
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed			
Hardness (as CaCO3)	mg/L	1	SM 3120	04-Apr-19/O		42	
Hardness (as CaCO3)	mg/L	1	SM 3120	04-Apr-19/O	19		
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	03-Apr-19/O	11		
Bicarbonate(as CaCO3)	mg/L	5	SM 2320B	03-Apr-19/O	11		
Carbonate (as CaCO3)	mg/L	5	SM 2320B	03-Apr-19/O	< 5		
Hydroxide	mg/L	5	EPA 310.2	03-Apr-19/O	< 5		
Acidity (as CaCO3)	mg/L	1	Subcontract	09-Apr-19	< 1 1	1	
pH @25°C	pH Units		SM 4500H	03-Apr-19/O	6.99		
Conductivity @25°C	µmho/cm	1	SM 2510B	03-Apr-19/O	45		
TDS(ion sum calc.)	mg/L	1	Calc.	04-Apr-19/O	21		
Total Suspended Solids	mg/L	3	SM2540D	05-Apr-19/K	< 3		
Turbidity	NTU	0.1	SM 2130	04-Apr-19/O	0.2		
REDOX potential	mV		In-House	05-Apr-19/R	228		
Chloride	mg/L	0.5	SM4110C	03-Apr-19/O	3.3		
Sulphate	mg/L	1	SM4110C	03-Apr-19/O	3		
Aluminum	mg/L	0.01	SM 3120	04-Apr-19/O	0.01		
Aluminum	mg/L	0.01	SM 3120	04-Apr-19/O		0.05	
Antimony	mg/L	0.0001	EPA 200.8	04-Apr-19/O	< 0.0001		
Antimony	mg/L	0.0001	EPA 200.8	04-Apr-19/O		< 0.0001	
Arsenic	mg/L	0.0001	EPA 200.8	04-Apr-19/O	< 0.0001		
Arsenic	mg/L	0.0001	EPA 200.8	04-Apr-19/O		< 0.0001	
Barium	mg/L	0.001	SM 3120	04-Apr-19/O	0.002		
Barium	mg/L	0.001	SM 3120	04-Apr-19/O		0.021	
Beryllium	mg/L	0.002	SM 3120	04-Apr-19/O	< 0.002		
Beryllium	mg/L	0.002	SM 3120	04-Apr-19/O		< 0.002	
Cadmium	mg/L	).000015	EPA 200.8	04-Apr-19/O	< 0.000015		
Cadmium	mg/L	).000015	EPA 200.8	04-Apr-19/O		< 0.000015	

NOTE: Acceptable Holding times exceeded for several parameters (i.e. Date Collected 14-Mar-19, Date Received 03-Apr-19).

R.L. = Reporting Limit

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

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



**Final Report** 

C.O.C.: DW 092953 REPORT No. B19-08580

Client I.D.

Report To:

City of Iqaluit PO Box 460,

Iqaluit NU X0A 0H0
Attention:
Pat Wolfe

DATE RECEIVED: 03-Apr-19

DATE REPORTED: 09-Apr-19
SAMPLE MATRIX: Drinking Water

**Caduceon Environmental Laboratories** 

2378 Holly Lane

Ottawa Ontario K1V 7P1 Tel: 613-526-0123 Fax: 613-526-1244

JOB/PROJECT NO.: Test A (WTP)

WTP Test A

P.O. NUMBER: WATERWORKS NO.

WTP Test A

						(Total)	
			Sample I.D.		B19-08580-1	B19-08580-2	
			Date Collect	ed	14-Mar-19	14-Mar-19	
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed			
Chromium	mg/L	0.002	SM 3120	04-Apr-19/O	< 0.002		
Chromium	mg/L	0.002	SM 3120	04-Apr-19/O		< 0.002	
Cobalt	mg/L	0.005	SM 3120	04-Apr-19/O	< 0.005		
Cobalt	mg/L	0.005	SM 3120	04-Apr-19/O		< 0.005	
Copper	mg/L	0.002	SM 3120	04-Apr-19/O	0.070		
Copper	mg/L	0.002	SM 3120	04-Apr-19/O		0.092	
Iron	mg/L	0.005	SM 3120	04-Apr-19/O	0.010		
Iron	mg/L	0.005	SM 3120	04-Apr-19/O		0.075	
Lead	mg/L	0.00002	EPA 200.8	04-Apr-19/O	0.00023		
Lead	mg/L	0.00002	EPA 200.8	04-Apr-19/O		0.00026	
Lithium	mg/L	0.01	SM 3120	04-Apr-19/O	< 0.01		
Lithium	mg/L	0.01	SM 3120	04-Apr-19/O		< 0.01	
Manganese	mg/L	0.001	SM 3120	04-Apr-19/O	0.002		
Manganese	mg/L	0.001	SM 3120	04-Apr-19/O		0.004	
Mercury	mg/L	0.00002	SM 3112 B	04-Apr-19/O	< 0.00002	< 0.00002	
Molybdenum	mg/L	0.01	SM 3120	04-Apr-19/O	< 0.01		
Molybdenum	mg/L	0.01	SM 3120	04-Apr-19/O		< 0.01	
Nickel	mg/L	0.01	SM 3120	04-Apr-19/O	< 0.01		
Nickel	mg/L	0.01	SM 3120	04-Apr-19/O		< 0.01	
Selenium	mg/L	0.001	EPA 200.8	04-Apr-19/O	< 0.001		
Selenium	mg/L	0.001	EPA 200.8	04-Apr-19/O		< 0.001	
Silver	mg/L	0.0001	EPA 200.8	04-Apr-19/O	< 0.0001		
Silver	mg/L	0.0001	EPA 200.8	04-Apr-19/O		< 0.0001	
Strontium	mg/L	0.001	SM 3120	04-Apr-19/O	0.013		
Strontium	mg/L	0.001	SM 3120	04-Apr-19/O		0.062	
Thallium	mg/L	0.00005	EPA 200.8	04-Apr-19/O	< 0.00005		
Thallium	mg/L	0.00005	EPA 200.8	04-Apr-19/O		< 0.00005	

NOTE: Acceptable Holding times exceeded for several parameters (i.e. Date Collected 14-Mar-19, Date Received 03-Apr-19).

R.L. = Reporting Limit

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

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



Final Report

C.O.C.: DW 092953 REPORT No. B19-08580

Report To:

City of Iqaluit PO Box 460,

Iqaluit NU X0A 0H0
Attention:
Pat Wolfe

DATE DECENTED: 02

DATE RECEIVED: 03-Apr-19

DATE REPORTED: 09-Apr-19
SAMPLE MATRIX: Drinking Water

**Caduceon Environmental Laboratories** 

2378 Holly Lane

Ottawa Ontario K1V 7P1 Tel: 613-526-0123

Fax: 613-526-1244

JOB/PROJECT NO.: Test A (WTP)

P.O. NUMBER:

WATERWORKS NO.

			Client I.D.		WTP Test A	WTP Test A (Total)	
			Sample I.D.		B19-08580-1	B19-08580-2	
			Date Collecte	ed	14-Mar-19	14-Mar-19	
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed			
Tin	mg/L	0.05	SM 3120	04-Apr-19/O	< 0.05		
Tin	mg/L	0.05	SM 3120	04-Apr-19/O		< 0.05	
Titanium	mg/L	0.005	SM 3120	04-Apr-19/O	< 0.005		
Titanium	mg/L	0.005	SM 3120	04-Apr-19/O		< 0.005	
Uranium	mg/L	0.00005	EPA 200.8	04-Apr-19/O	< 0.00005		
Uranium	mg/L	0.00005	EPA 200.8	04-Apr-19/O		< 0.00005	
Vanadium	mg/L	0.005	SM 3120	04-Apr-19/O	< 0.005		
Vanadium	mg/L	0.005	SM 3120	04-Apr-19/O		< 0.005	
Zinc	mg/L	0.005	SM 3120	04-Apr-19/O	0.018		
Zinc	mg/L	0.005	SM 3120	04-Apr-19/O		0.024	
Total Organic Carbon	mg/L	0.2	EPA 415.1	03-Apr-19/O	1.9		
TIC	mg/L	0.5	EPA 415.1	03-Apr-19/O	3.4		
Fecal Coliform	cfu/100mL	1	MOE E3371	03-Apr-19/O	0		
Anion Sum	meq/L		Calc.	04-Apr-19/O	0.413		
Cation Sum	meq/L		Calc.	04-Apr-19/O	0.429		
% Difference	%		Calc.	04-Apr-19/O	1.85		
Ion Ratio	AS/CS		Calc.	04-Apr-19/O	0.964		
Sodium Adsorption Ratio	-		Calc.	04-Apr-19/O	0.0930		
Conductivity (calc.)	µmho/cm		Calc.	04-Apr-19/O	44		
EC(calc.)/EC(actual)	-		Calc.	04-Apr-19/O	0.966		
TDS(calc.)/EC(actual)	-		Calc.	04-Apr-19/O	0.472		
Langelier Index(25°C)	S.I.		Calc.	04-Apr-19/O	-2.53		

<sup>1</sup> Subcontracted to Testmark Labs

NOTE: Acceptable Holding times exceeded for several parameters (i.e. Date Collected 14-Mar-19, Date Received 03-Apr-19).

R.L. = Reporting Limit

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

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

	9	DF	RINKING	WATE	R SUBMIS	SSION FO	RM			DRINKI	NG W	/ATER	RFAC	ILITY	CLAS	SIFIC	CATIC	N			M		PORT	NUMB	FR (La	Use)	
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86 ( After Ho	urs Tel:	2429	Public Health Ur	nit:	Waterw	orks No.:		Project Name/N			orm/	р	hic Pl		-		hanes		ate as	23 Inorganics	ganics	2 6	3			50% - 48 Hours 25% - 72 Hours	
Fmail:					Quote l	Vo.:	<i>'</i>	P.O. No.: ( )	10		Total Coliform / E.coli	kgrour	Heterotrophic Plate Count	m,	_	ride	Trihalomethanes	S	Nitrite, Nitrate as N	23 ln	Sch. 24 Organics	5,0	5		andard pecific D		
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		GUDI = Gr	oundwater und	er the influe	nce of surface w	ater, PR = Plumb		tion Water, GW =			st pos	sible TA	AT achi	ievable						Cadu	ceon Ge	neral T	urnaro	und Time			
Lab No.	Sample Source	ce and/or Sa	ample Identifica	ition		S.P.L.	Sample Matrix *	(yy-mm-dd)	Time Collected	Adverse Resample				By I					Sample Box Pro	vided				-	orine Total	# Bottles/ Sample	
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Print:	17.40	Vall	1990(10)	Pat	Wolfe	Courier (	Caduceon ac	count)		Report by	Emai	il	M	Date R	6118			dd): /	100	10	2			eived:	The state of	000	
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### QUOTATION FOR ANALYTICA:... SERVICES

Quote #:

YD18\_lqaluit\_A

Organization:

City of Iqaluit Mike Hatfield

Contact: Telephone:

867-979-6363

Facsimile:

Email:

M.Hatfield@city.lgaluit.nu.ca

Project #:

**TEST A - Drinking Water** 

Address:

Box 460, Igaluit NU, X0A 0H0

Additional Info:

QUOTE # ('S) MUST BE ON C OF C TO APPLY if no listed, General pricing will be applied.

Replacing Quote YD17\_lqaluit\_A\_Rev1 Additional Info:

Date: 26-Feb-18 Valid Until:

31-Dec-19

Item #	Quantity	Analysis Request	i/latrix	Unit Cost, \$	Amo int, \$
1	1	Acidity (Subcontracted)	ÖW	33.50	33.50
2	1	Alkalinity	DW	14.50	14.50
3	1	Bicarbonate/ Carbonate	DW	17.50	17:50
4	1	Chloride/Sulphate	DW	23.75	23.75
5	1	Conductivity	DW	9.45	9.45
6	1	Hydroxide	DW	14.50	14.50
7	1	Redox Potential	DW	15.75	15.75
8	1	TDS	DW	17.50	17.50
9	1	TSS	DW	17.50	17.50
10	1	TOC	DW	23.75	23.75
11	1	TIC	DW	23.75	23.75
12	1	TOTAL METALS ICPOES AI, Ba, Be, Cr, Co, Cu, Fe, Li, nin, Mo, Ni, Sn, Sr, Ti, V, Zn + Hardness ICPMS Sb, As, Cd, Pb, Se, Ag, TI, U CVAAS Hg	DW	92.00	92.00
13	1	DISSOLVED METALS ICPOES AI, Ba, Be, Cr, Co, Cu, Fe, Li, 1, Mo, Ni, Sn, Sr, Ti, V, Zn + Hardness ICPMS Sb, As, Cd, Pb, Se, Ag, Tl, U CVAAS Hg	DW	92.00	92.00
14	1	Fecal Coliforms	DW	16.25	16.25
15	1	pH	DW	9.00	9.00
16	1	Turbidity	DW	14.50	14.50
17	1	Ottawa Airport Pick Up		25.00	25.00
es do not include shippir	g unless otherwise state			Subtotal	460.20

Environmental Surcharge of \$1.50 per sample set

1	20.00									
Subtotal	460.20									
HST	59.83									
Total Cost	520.03									

3: Q

Rebecca Marshall **Customer Service Representative Caduceon Environmental Laboratories** rmarshall@caduceonlabs.com 613-526-0123

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#### DRINKING WATER CHAIN OF CUSTODY FORM

Page	of
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Please use our General Chain of Custody Form for non-drinking water sample submissions

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	00-00000								Country of the National State of the State o												OJECT INFORMATION:						
Client:	Caduceon Environmental Laboratories								Client: Caduceon Environmental Laboratories														TM Quote #:				
Address:	2378 Holly Lane, Ottawa ON, K1V 7P1							Address: 285 Dalton Ave. Client P.O. #: P190502_TM													.90502_TM						
									Kingston K7K 6Z1 Client Project #:																		
Contact:	Greg Clarkin							act:	Mag	gie M	1cCo	rmick													<del></del>		
Email:	gclarkin@caduceonlabs.com, tyapici@caduceonlabs.com							il:	mm	ccorn	nick(	@cadu	ıceor	ılabs.	com								]				
Phone:	613-526-0123 Fax: 613-526-1244 P							ne: 613-544-2001 Fax: 613-544-2770																			
REPORT	REPORTING/INVOICING FORMAT TURN AROUND TIME (TAT)*										ANALYSIS REQUESTED											LABORA	TORY US	SE ONLY			
□Fax	☑Email ☐Mail ☐1 Business Day ☑2 Business Days						_									Ť						e e		T	rk Order		
Q	QC DATA REPORTED ☐3 Business Days ☑Standard						5	":		ınt											Residual Chlorine		Received				
☐Yes	□No									Count																	
S	AMPLE DIS	POSA	AL.		SPECIFIC DATE:	a mada far	es \	_		late				nes	e e						nal		REC				
□Hold					Resample ()	orn	Background	hic F				tha	Nitrate	ule 23				- 1		pisa							
	SAMPLE DESCRIPTION Water Trax							Coliform	Heterotrophic Plate	۶ ا	* *	g	Trihalomethanes			ž			L		Υ	CONTAINERS	\$ \$18.50				
DATE	TIME	Type**			(This Will Appear On The Report)	# (if appl)	Sar	Total (	ckg	tero	Sodium	Lead *	Fluoride	halo	Nitrite,	Schedule	Schedule	Acidity	⋖		Free	Total	TNC				
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**Tvne	R=Raw T	=Fn	trv/	Treat	ed D=Distribution P=Plumb	l ina (O.RFG. 170	) / (	LI	G	_	10/-1								) DE	$\frac{1}{1}$	70			240 DN	000		
**Type: R=Raw, T=Entry/Treated, D=Distribution, P=Plumbing (O.REG. 170 319 / O.REG. 243)									О.	REGULATION	Waterworks #													1			
Adverse	Adverse and Exceedance Notification Information:									LAT	LSN Form Submitted to MOE/PHU?														□No		
	me: Penny Wilson Cell:									EGU	Are these water sample:							es for human consumptio							√ Yes	□No	
	none: 613-580-2424 x 22839 Fax: 613-721-4220								=1	Are the results reportable as per O. REG. 170/319?										☑No							
COMME	COMMENTS/FIELD NOTES:										O. REG. 170/319 Only:												Phone:				
											Public Health Unit:												Fax:				
											elinquished to Testmark By (Signature)												- 1	Date Mar.06,201		Time	
Sample	Sampled By Date							ne			Shipped By													Shipping Reference			
CLIENT	and the second s								Simpled by													Shipping Reference					
and the same of th							Tim	ne .		Received at Testmark By Date								Time									
								1121 (D) - 705 (O2 1124 (E)										167			10 K						

100 Wilson Ave., Timmins, ON, P4N 2S9 • 705-531-1121 (P) • 705-531-1125 (F) • timmins@testmark.ca

6820 Kitimat Road Unit #1, Mississauga, ON, L5N 5M3 • 905-821-1112 (P) • 905-821-2095 (F) • csr-mississauga@testmark.ca



**Final Report** 

C.O.C.: DW 096834 REPORT No. B19-11566

Report To:

City of Iqaluit PO Box 460,

Iqaluit NU X0A 0H0
Attention:
Pat Wolfe

DATE RECEIVED: 01-May-19

DATE REPORTED: 28-May-19

SAMPLE MATRIX: Drinking Water

**Caduceon Environmental Laboratories** 

2378 Holly Lane

Ottawa Ontario K1V 7P1 Tel: 613-526-0123

Fax: 613-526-1244

WATERWORKS NO.

JOB/PROJECT NO.: Test A (WTP)

P.O. NUMBER: 460

			Client I.D.		WTP - Potable - Test A	WTP - Potable - Test A (Total Metal)	
			Sample I.D.		B19-11566-1	B19-11566-2	
			Date Collecte	ed	30-Apr-19	30-Apr-19	
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed			
Hardness (as CaCO3)	mg/L	1	SM 3120	06-May-19/O	19		
Hardness (as CaCO3)	mg/L	1	SM 3120	06-May-19/O		22	
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	02-May-19/O	13		
Bicarbonate(as CaCO3)	mg/L	5	SM 2320B	02-May-19/O	13		
Carbonate (as CaCO3)	mg/L	5	SM 2320B	02-May-19/O	< 5		
Hydroxide	mg/L	5	EPA 310.2	02-May-19/O	< 5		
Acidity (as CaCO3)	mg/L	1	Subcontract	07-May-19	4 1		
pH @25°C	pH Units		SM 4500H	02-May-19/O	6.90		
Conductivity @25°C	µmho/cm	1	SM 2510B	02-May-19/O	49		
TDS(ion sum calc.)	mg/L	1	Calc.	06-May-19/O	22		
Total Suspended Solids	mg/L	3	SM2540D	03-May-19/K	< 3		
Turbidity	NTU	0.1	SM 2130	03-May-19/O	0.3		
REDOX potential	mV		In-House	06-May-19/R	583		
Chloride	mg/L	0.5	SM4110C	01-May-19/O	3.2		
Sulphate	mg/L	1	SM4110C	01-May-19/O	3		
Aluminum	mg/L	0.01	SM 3120	06-May-19/O	< 0.01		
Aluminum	mg/L	0.01	SM 3120	06-May-19/O		0.01	
Antimony	mg/L	0.0001	EPA 200.8	02-May-19/O	< 0.0001		
Antimony	mg/L	0.0001	EPA 200.8	03-May-19/O		0.0002	
Arsenic	mg/L	0.0001	EPA 200.8	02-May-19/O	< 0.0001		
Arsenic	mg/L	0.0001	EPA 200.8	03-May-19/O		< 0.0001	
Barium	mg/L	0.001	SM 3120	06-May-19/O	0.002		
Barium	mg/L	0.001	SM 3120	06-May-19/O		0.003	
Beryllium	mg/L	0.002	SM 3120	06-May-19/O	< 0.002		
Beryllium	mg/L	0.002	SM 3120	06-May-19/O		< 0.002	

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

R.L. = Reporting Limit

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

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



Final Report

C.O.C.: DW 096834 REPORT No. B19-11566

Report To:
City of Iqaluit

PO Box 460,

Iqaluit NU X0A 0H0

Attention: Pat Wolfe

DATE RECEIVED: 01-May-19

DATE REPORTED: 28-May-19
SAMPLE MATRIX: Drinking Water

**Caduceon Environmental Laboratories** 

2378 Holly Lane

Ottawa Ontario K1V 7P1 Tel: 613-526-0123

Fax: 613-526-1244

WATERWORKS NO.

JOB/PROJECT NO.: Test A (WTP)

P.O. NUMBER: 460

	Client I.D.		WTP - Potable - Test A	WTP - Potable - Test A (Total Metal)	
l	Sample I.D.		B19-11566-1	B19-11566-2	
l	Date Collect	ed	30-Apr-19	30-Apr-19	
	Reference Method	Date/Site Analyzed			
5	EPA 200.8	02-May-19/O	< 0.000015		

		Date Collect	ed	30-Apr-19	30-Apr-19		
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed			
Cadmium	mg/L	).000015	EPA 200.8	02-May-19/O	< 0.000015		
Cadmium	mg/L	).000015	EPA 200.8	03-May-19/O		< 0.000015	
Chromium	mg/L	0.002	SM 3120	06-May-19/O	< 0.002		
Chromium	mg/L	0.002	SM 3120	06-May-19/O		< 0.002	
Cobalt	mg/L	0.005	SM 3120	06-May-19/O	< 0.005		
Cobalt	mg/L	0.005	SM 3120	06-May-19/O		< 0.005	
Copper	mg/L	0.002	SM 3120	06-May-19/O	0.026		
Copper	mg/L	0.002	SM 3120	06-May-19/O		0.038	
Iron	mg/L	0.005	SM 3120	06-May-19/O	< 0.005		
Iron	mg/L	0.005	SM 3120	06-May-19/O		0.066	
Lead	mg/L	0.00002	EPA 200.8	02-May-19/O	0.00013		
Lead	mg/L	0.00002	EPA 200.8	03-May-19/O		0.00013	
Lithium	mg/L	0.01	SM 3120	06-May-19/O	< 0.01		
Lithium	mg/L	0.01	SM 3120	06-May-19/O		< 0.01	
Manganese	mg/L	0.001	SM 3120	06-May-19/O	0.002		
Manganese	mg/L	0.001	SM 3120	06-May-19/O		0.003	
Mercury	mg/L	0.00002	SM 3112 B	06-May-19/O	< 0.00002	< 0.00002	
Molybdenum	mg/L	0.01	SM 3120	06-May-19/O	< 0.01		
Molybdenum	mg/L	0.01	SM 3120	06-May-19/O		< 0.01	
Nickel	mg/L	0.01	SM 3120	06-May-19/O	< 0.01		
Nickel	mg/L	0.01	SM 3120	06-May-19/O		< 0.01	
Selenium	mg/L	0.001	EPA 200.8	02-May-19/O	< 0.001		
Selenium	mg/L	0.001	EPA 200.8	03-May-19/O		< 0.001	
Silver	mg/L	0.0001	EPA 200.8	02-May-19/O	< 0.0001		
Silver	mg/L	0.0001	EPA 200.8	03-May-19/O		< 0.0001	

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Final Report

C.O.C.: DW 096834 REPORT No. B19-11566

Client LD

Report To:

City of Iqaluit PO Box 460,

Iqaluit NU X0A 0H0
Attention:
Pat Wolfe

DATE RECEIVED: 01-May-19

DATE REPORTED: 28-May-19
SAMPLE MATRIX: Drinking Water

**Caduceon Environmental Laboratories** 

2378 Holly Lane

WTP -

Ottawa Ontario K1V 7P1 Tel: 613-526-0123 Fax: 613-526-1244

JOB/PROJECT NO.: Test A (WTP)

WTP -

P.O. NUMBER: 460 WATERWORKS NO.

			Client I.D.		VV I P - Potable -	Potable -		
					Test A	Test A (Total Metal)		
			Sample I.D.		B19-11566-1	B19-11566-2		
			Date Collecte	ed	30-Apr-19	30-Apr-19		
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed		•	•	
Strontium	mg/L	0.001	SM 3120	06-May-19/O	0.014			
Strontium	mg/L	0.001	SM 3120	06-May-19/O		0.015		
Thallium	mg/L	0.00005	EPA 200.8	02-May-19/O	< 0.00005			
Thallium	mg/L	0.00005	EPA 200.8	03-May-19/O		< 0.00005		
Tin	mg/L	0.05	SM 3120	06-May-19/O	< 0.05			
Tin	mg/L	0.05	SM 3120	06-May-19/O		< 0.05		
Titanium	mg/L	0.005	SM 3120	06-May-19/O	< 0.005			
Titanium	mg/L	0.005	SM 3120	06-May-19/O		< 0.005		
Uranium	mg/L	0.00005	EPA 200.8	02-May-19/O	< 0.00005			
Uranium	mg/L	0.00005	EPA 200.8	03-May-19/O		< 0.00005		
Vanadium	mg/L	0.005	SM 3120	06-May-19/O	< 0.005			
Vanadium	mg/L	0.005	SM 3120	06-May-19/O		< 0.005		
Zinc	mg/L	0.005	SM 3120	06-May-19/O	< 0.005			
Zinc	mg/L	0.005	SM 3120	06-May-19/O		0.014		
Total Organic Carbon	mg/L	0.2	EPA 415.1	10-May-19/O	2.0			
TIC	mg/L	0.5	EPA 415.1	10-May-19/O	4.03			
Fecal Coliform	cfu/100mL	1	MOE E3371	01-May-19/O	< 2			
Anion Sum	meq/L		Calc.	06-May-19/O	0.404			
Cation Sum	meq/L		Calc.	06-May-19/O	0.431			
% Difference	%		Calc.	06-May-19/O	3.19			
Ion Ratio	AS/CS		Calc.	06-May-19/O	0.938			
Sodium Adsorption Ratio	-		Calc.	06-May-19/O	0.103			
Conductivity (calc.)	µmho/cm		Calc.	06-May-19/O	46			
EC(calc.)/EC(actual)	-		Calc.	06-May-19/O	0.943			
TDS(calc.)/EC(actual)	-		Calc.	06-May-19/O	0.448			

R.L. = Reporting Limit

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



Final Report

C.O.C.: DW 096834 REPORT No. B19-11566

Report To:

City of Iqaluit PO Box 460,

Iqaluit NU X0A 0H0

Attention: Pat Wolfe

DATE RECEIVED: 01-May-19

DATE REPORTED: 28-May-19 SAMPLE MATRIX: Drinking Water **Caduceon Environmental Laboratories** 

2378 Holly Lane

Ottawa Ontario K1V 7P1

Tel: 613-526-0123 Fax: 613-526-1244

JOB/PROJECT NO.: Test A (WTP)

P.O. NUMBER: 460

WATERWORKS NO.

			Client I.D.  Sample I.D.		WTP - Potable - Test A	WTP - Potable - Test A (Total Metal)	
					B19-11566-1	B19-11566-2	
			Date Collect	ed	30-Apr-19	30-Apr-19	
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed			
Langelier Index(25°C)	S.I.		Calc.	06-May-19/O	-2.54		

<sup>1</sup> Subcontracted to Testmark Labs

R.L. = Reporting Limit

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

		TESTING REQUIRE		REPORT NUMBER (Lab Use)
CADUCEZN	O.Reg 153 Table	Medium/Fine (		14400
		Surface Soil (O.Reg 153 Site Condition (O.Reg 153		- 11-10
ENVIRONMENTAL LABORATOR ES  Client committed. Quality assured.	Provincial Water Quality Objectives	nte condition (c.reg 150	Landfill Monitoring	DIA 11569
	Sewer Use By-Law:		Other:	DI-11701
Are any samples to be submitted intended for Human Consumption	under any Drinking Water Regulations?	? · Yes No	(If yes, submit all Drinking Water San	nples on a Drinking Water Chain of Custody)
Indicate Laboratory Samples are submitt				Barrie London
Organization: Address and Invoicing Address	(if different)		SES REQUESTED (Print Test in Boxes)	
alyot Igaluch BOX 460		30		REQUESTED (see back page)
Dit Wolfe Igaluit	NU, XOA OHO	Quok		REQUESTED (see back page)  Platinum 200% Surcharge**  Gold 100% Surcharge  Silver 50% Surcharge  Bronze 25% Surcharge  Standard 5-7 days  Specific Date:
Tel:				Gold 100% Surcharge
867 222				Silver 50% Surcharge
Fax: Quote No.; YDi8-Igaluit!	Project Name:	à		Bronze 25% Surcharge Standard 5-7 days
Email: P.O. No.: /// 5	Additional Info:			Standard 5-7 days
Photocity Underlandet TOO				
	er, SW=Surface Water, GW=Groundwater, L			
No: Sample Identification S.P.L.	Sample Date Collected Time  Matrix * (yy-mm-dd) Collected		Indicate Test For Each Sample ng A Check Mark In The Box Provided	Field # Bottles/ Field Sample Filtered(Y/N)
				7/7 107°4
WWTP InFFloer	444		PS ( )	1059
WWTP EFFLUENT	W III II	10	95 (	732/1700
DAMES OF STREET	CUIDDING INFORMATION	DEPORTING / NIVO	MONIO CAMPI E DESERVINA	NUESCHA TION (I ADOLI TORNI NEL ANIXI
SAMPLE SUBMISSION INFORMATION	SHIPPING INFORMATION	REPORTING / INVOI		SINFORMATION (LABORATORY USE ONLY)
Sampled by: Submitted by:	Client's Courier Invoice	e Report by Fax		OL Signature: 5 B
Print: Pat Wolfe Pat Wolfe	Caduceon's Courier	Report by Email	Date Received (yy-mm-dd): //	25769 Time Received: 1110
Sign: Pat Wolfe Pat Wolfe	Drop Off # of Piec	ces Invoice by Email	Laboratory Prepared Bottles:	Yes No
79/04/30/9M10/04/30 9H	Caduceon (Pick-up)	Invoice by Mail		Da
Date (yy-mm-dd)/Time: Date (yy-mm-dd)/Time:		10 12	Sample Temperature °C: 10, 1PET+ IN IP+ IM+ IH9	2 Labeled by:
Comments:		1241	THET + IN IT + IM+ ING.	
			×2	G 76547

YD18\_lqaluit\_F Quote #:

Organization: Contact:

City of Iqaluit Mike Hatfield 867-979-6363

Telephone:

Facsimile: Email:

M.Hatfield@city.lgaluit.nu.ca **TEST F - Sewage Lagoon** 

Project #: Address:

Box 460, Igaluit NU, X0A 0H0

Additional Info: Additional Info: QUOTE # ('S) MUST BE ON C OF C TO APPLY if no listed, General pricing will be applied.

Replacing Quote YD17\_Iqaluit\_F\_REV1

1-Mar-18 Date:

Valid Until: 31-Dec-19

item #	Quantity	Analysis Request	Matrix	Unit Cost, \$	Amount, \$
1	1	BOD	WW.	30.00	30.00
2	1	Total Coliform / Fecal Coliform	· ww	31.00	31.00
3	1	Ammonia, NO2/NO3	· ww	30.00	30.00
4	1	Total Phosphorus	WW.	17.50	17.50
5	1	Orthophosphate	WW	17.50	17.50
6	1	Conductivity	WW.	9.45	9.45
7	1	TSS	:WW	17.50	17.50
8	1	pH	WW	9.00	9.00
9	1	TOTAL METALS ICPOES AI, Ba, Be, Cr, Co, Cu, Fe, Li, Mn, Mo, Ni, Sn, Sr, Ti, V, Zn ICPMS Sb, As, Cd, Pb, Se, Ag, Tl, U CVAAS Hg	ww	92.00	92.00
10	1	Ottawa Airport Pick Up		25.00	25.00
ces do not include shippir	ng unless otherwise state	d.		Subtotal	278.95
vironmental Surch	arge of \$1.50 per :	sample set		HST	36.26

25.00	25.00
Subtotal	278.95
HST	36.26
Total Cost	315.21

3(

vet 43

Rebecca Marshall **Customer Service Representative Caduceon Environmental Laboratories** rmarshall@caduceonlabs.com 613-526-0123

:ir



**Final Report** 

**REPORT No. B19-11569** C.O.C.: G76547

Report To: City of Iqaluit

PO Box 460, Iqaluit NU X0A 0H0

Attention: Pat Wolfe

DATE RECEIVED: 01-May-19

DATE REPORTED: 09-May-19 SAMPLE MATRIX: Waste Water

**Caduceon Environmental Laboratories** 

2378 Holly Lane

Ottawa Ontario K1V 7P1 Tel: 613-526-0123 Fax: 613-526-1244

JOB/PROJECT NO.: Test F

P.O. NUMBER:

WATERWORKS NO.

	Client I.D.				WWTP Influent	WWTP Effluent	
			Sample I.D.		B19-11569-1	B19-11569-2	
			Date Collect	ed	30-Apr-19	30-Apr-19	
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed			
Total Suspended Solids	mg/L	3	SM2540D	03-May-19/K	4850	70	
BOD(5 day)	mg/L	3	SM 5210B	02-May-19/K	562	78	
Conductivity @25°C	µmho/cm	1	SM 2510B	02-May-19/O	386	310	
pH @25°C	pH Units		SM 4500H	02-May-19/O	6.90	7.21	
Nitrite (N)	mg/L	0.1	SM4110C	08-May-19/O	< 0.1	< 0.1	
Nitrate (N)	mg/L	0.1	SM4110C	08-May-19/O	< 0.1	< 0.1	
Ammonia (N)-Total	mg/L	0.01	SM4500- NH3-H	06-May-19/K	19.8	13.5	
o-Phosphate (P)	mg/L	0.002	PE4500-S	08-May-19/K	4.78	2.74	
Phosphorus-Total	mg/L	0.01	E3199A.1	06-May-19/K	13.0	3.63	
Aluminum	mg/L	0.01	SM 3120	07-May-19/O	2.07	0.15	
Antimony	mg/L	0.0005	EPA 200.8	03-May-19/O	0.0009	< 0.0005	
Arsenic	mg/L	0.0005	EPA 200.8	03-May-19/O	0.0009	< 0.0005	
Barium	mg/L	0.001	SM 3120	07-May-19/O	0.041	0.005	
Beryllium	mg/L	0.002	SM 3120	07-May-19/O	< 0.002	< 0.002	
Cadmium	mg/L	).000070	EPA 200.8	03-May-19/O	0.000392	< 0.000070	
Chromium	mg/L	0.002	SM 3120	07-May-19/O	0.009	< 0.002	
Cobalt	mg/L	0.005	SM 3120	07-May-19/O	< 0.005	< 0.005	
Copper	mg/L	0.002	SM 3120	07-May-19/O	0.614	0.202	
Iron	mg/L	0.005	SM 3120	07-May-19/O	4.86	0.281	
Lead	mg/L	0.0001	EPA 200.8	03-May-19/O	0.0142	0.0013	
Lithium	mg/L	0.01	SM 3120	07-May-19/O	< 0.01	< 0.01	
Manganese	mg/L	0.001	SM 3120	07-May-19/O	0.068	0.018	
Mercury	mg/L	0.00002	SM 3112 B	06-May-19/O	0.00048	< 0.00002	
Molybdenum	mg/L	0.01	SM 3120	07-May-19/O	< 0.01	< 0.01	
Nickel	mg/L	0.01	SM 3120	07-May-19/O	< 0.01	< 0.01	
Selenium	mg/L	0.005	EPA 200.8	03-May-19/O	< 0.005	< 0.005	

R.L. = Reporting Limit

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

Tahir Yapici Ph.D Lab Supervisor



**Final Report** 

**REPORT No. B19-11569** C.O.C.: G76547

Report To:

City of Iqaluit PO Box 460,

Attention: Pat Wolfe

Iqaluit NU X0A 0H0

DATE RECEIVED: 01-May-19

DATE REPORTED: 09-May-19 SAMPLE MATRIX: Waste Water **Caduceon Environmental Laboratories** 

2378 Holly Lane

Ottawa Ontario K1V 7P1 Tel: 613-526-0123

Fax: 613-526-1244

JOB/PROJECT NO.: Test F

P.O. NUMBER:

WATERWORKS NO.

			Client I.D.		WWTP Influent	WWTP Effluent			
			Sample I.D.		B19-11569-1	B19-11569-2	319-11569-2		
			Date Collecte	ed	30-Apr-19	30-Apr-19			
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed					
Silver	mg/L	0.0001	EPA 200.8	03-May-19/O	0.0007	< 0.0001			
Strontium	mg/L	0.001	SM 3120	07-May-19/O	0.031	0.020			
Thallium	mg/L	0.0003	EPA 200.8	03-May-19/O	< 0.0003	< 0.0003			
Tin	mg/L	0.05	SM 3120	07-May-19/O	< 0.05	< 0.05			
Titanium	mg/L	0.005	SM 3120	07-May-19/O	0.061	< 0.005			
Uranium	mg/L	0.0003	EPA 200.8	03-May-19/O	< 0.0003	< 0.0003			
Vanadium	mg/L	0.005	SM 3120	07-May-19/O	< 0.005	< 0.005			
Zinc	mg/L	0.005	SM 3120	07-May-19/O	0.464	0.085			
Total Coliform	cfu/100mL	1	MOE E3371	01-May-19/O	57000000	10100000			
Fecal Coliform	cfu/100mL	1	MOE E3371	01-May-19/O	4600000	128000			

R.L. = Reporting Limit

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

Tahir Yapici Ph.D Lab Supervisor

	TESTING REQUIREMENTS	19-14176
CADILCE	O.Reg 153 Table Medium/Fine Coarse MISA Guidelines	100012.
CADUCEZN	Surface Soil O.Reg 558 Leachate Analysis	
ENWRONMENTAL LABORATOR ES	Yes No Record of Site Condition (O.Reg 153) Disposal Site:	10 111171
the committee, guerry assured.	Provincial Water Quality Objectives	19-19116
A		
Are any samples to be submitted intended for Human Consumption		
Indicate Laboratory Samples are submit		London
Organization: Address and Invoicing Address		TURNAROUND SERVICE
City of Lyacul So	me 460	REQUESTED (see back page)
Wat waste		☐ Platinum 200% Surcharge**
Tel: P. 0 1504	760	Gold 100% Surcharge
867227 2424 Igaluit		Silver 50% Surcharge
Fax: Quote No.:	Project Name: 발	Bronze 25% Surcharge
4.77		Standard 5-7 days
P.Wolfe Edy Tunkin no CA 460	Project Name:  Additional Info:	
P.O. No.: 460 P.Wolfe City Jyalii no Cit 460 *Sample Matrix Lenend: WW=Waste Wa	r, SW=Surface Water, GW=Groundwater, LS=Liquid Sludge, SS=Solid Sludge, S=Soil, Sed=Sediment, PC=Paint Chips, F=Filter, O	Specific Date:
Lab	Sample Date Collected Time Indicate Test For Each Sample	Field #Bottles/ Field
No: Sample Identification S.P.L.	Matrix * (yy-mm-dd) Collected By Using A Check Mark In The Box Provided	pH Temp. Sample Filtered(Y/N)
EFFLUENT Lagoon	WW Mayly 9:15 Test F	6.84 4.2 6
EFFLOERT WUTP	WN 1 9:00 Test A	73/01/
131-1 CBEN ( WW ( P	7.00	1.13/0.7 6
1/0	T Gollas are opposite EFFLUE	160000 l
I	out DF Filsent	3
	JW 17 21 1 30 81 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
	> Bottles switched.	
Vamples paned t	olding time	1
Suring Publication		
	· U	
SAMPLE SUBMISSION INFORMATION	SHIPPING INFORMATION REPORTING / INVOICING SAMPLE RECEIVING INFORMATION	N (LABORATORY USE ONLY)
Sampled by: Submitted by:		Signature:
Print: Pat Wolfe Pat Wolfe	Caduceon's Courier Report by Email Date Received (yy-mm-dd): 19-05-21	
Sign: Put Wolf Pat Wolf	Drop Off # of Pieces Invoice by Email Laboratory Prepared Bottles: Yes	□ No
IN NOTE IN NOTE		
Date (yy-mm-dd)/Time: Date (yy-mm-dd)/Time:	Caduceon (Pick-up) Invoice by Mail Sample Temperature °C:	Labeled by:
Comments: 1-2) PET 12a	+ PMNP Ha	Page of
12)1111		g 76555

Quote #:

YD18\_lqaluit\_F

Organization:

City of Igaluit

Contact:

Mike Hatfield 867-979-6363

Telephone:

Facsimile: Email:

M.Hatfield@city.lqaluit.nu.ca

Project #: Address:

**TEST F - Sewage Lagoon** Box 460, Iqaluit NU, X0A 0H0

Additional Info:

QUOTE # ('S) MUST BE ON C OF C TO APPLY if not listed, General pricing will be applied.

Additional Info:

Replacing Quote YD17\_lqaluit\_F\_REV1

Date:

1-Mar-18

Valid Until:

31-Dec-19

Item #	Quantity	Analysis Request	Matrix	Unit Cost, \$	Amount, \$
1	1	BOD	ww	30.00	30.00
2	1	Total Coliform / Fecal Coliform	WW	31.00	31.00
3	1	Ammonia, NO2/NO3	ww	30.00	30.00
4	1	Total Phosphorus	WW	17.50	17.50
5	1	Orthophosphate	ŴW	17.50	17.50
6	1	Conductivity	WW	9.45	9.45
7	1	TSS	ww	17.50	17.50
8	1	pH	ww	9.00	9.00
9	1	TOTAL METALS ICPOES AI, Ba, Be, Cr, Co, Cu, Fe, Li, Mn, Mo, Ni, Sn, Sr, Ti, V, Zn ICPMS Sb, As, Cd, Pb, Se, Ag, Tl, U CVAAS Hg	ww	92.00	92.00
10	1	Ottawa Airport Pick Up		25.00	25.00
do not include shippir	ng unless otherwise state	d.		Subtotal	278.95
	area of \$1.50 per	nomnia aat		HET	26.26

Environmental Surcharge of \$1.50 per sample set

**HST** 36.26 **Total Cost** 315.21

Rebecca Marshall **Customer Service Representative Caduceon Environmental Laboratories** rmarshall@caduceonlabs.com 613-526-0123



**Final Report** 

C.O.C.: G76555 REPORT No. B19-14176

Report To:

City of Iqaluit PO Box 460,

Iqaluit NU X0A 0H0
Attention:
Pat Wolfe

DATE RECEIVED: 21-May-19

DATE REPORTED: 31-May-19
SAMPLE MATRIX: Waste Water

**Caduceon Environmental Laboratories** 

2378 Holly Lane

Ottawa Ontario K1V 7P1 Tel: 613-526-0123

JOB/PROJECT NO.: Test F

P.O. NUMBER:

Fax: 613-526-1244

WATERWORKS NO.

			Client I.D.		Effluent Lagoon	Effluent WWTP	
			Sample I.D.		B19-14176-1	B19-14176-2	
			Date Collect	nd	14-May-19	14-May-19	
					14-May-19	14-Way-19	
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed			
BOD(5 day)	mg/L	3	SM 5210B	23-May-19/K	68	61	
Total Suspended Solids	mg/L	3	SM2540D	27-May-19/K	20	30	
Conductivity @25°C	µmho/cm	1	SM 2510B	23-May-19/O	365	413	
pH @25°C	pH Units		SM 4500H	23-May-19/O	6.84	6.94	
Nitrite (N)	mg/L	0.1	SM4110C	30-May-19/O	< 0.1	< 0.1	
Nitrate (N)	mg/L	0.1	SM4110C	30-May-19/O	< 0.1	< 0.1	
Ammonia (N)-Total	mg/L	0.01	SM4500- NH3-H	27-May-19/K	24.6	24.0	
o-Phosphate (P)	mg/L	0.002	PE4500-S	27-May-19/K	3.00	3.37	
Phosphorus-Total	mg/L	0.01	E3199A.1	27-May-19/K	3.41	4.43	
Aluminum	mg/L	0.01	SM 3120	31-May-19/O	0.14	0.12	
Antimony	mg/L	0.0005	EPA 200.8	29-May-19/O	< 0.0005	< 0.0005	
Arsenic	mg/L	0.0005	EPA 200.8	29-May-19/O	< 0.0005	< 0.0005	
Barium	mg/L	0.001	SM 3120	31-May-19/O	0.004	0.005	
Beryllium	mg/L	0.002	SM 3120	31-May-19/O	< 0.002	< 0.002	
Cadmium	mg/L	).000070	EPA 200.8	29-May-19/O	0.000081	0.000183	
Chromium	mg/L	0.002	SM 3120	31-May-19/O	< 0.002	< 0.002	
Cobalt	mg/L	0.005	SM 3120	31-May-19/O	< 0.005	< 0.005	
Copper	mg/L	0.002	SM 3120	31-May-19/O	0.140	0.252	
Iron	mg/L	0.005	SM 3120	31-May-19/O	0.651	0.342	
Lead	mg/L	0.0001	EPA 200.8	29-May-19/O	0.0011	0.0012	
Lithium	mg/L	0.01	SM 3120	31-May-19/O	0.02	< 0.01	
Manganese	mg/L	0.001	SM 3120	31-May-19/O	0.042	0.029	
Mercury	mg/L	0.00002	SM 3112 B	28-May-19/O	< 0.00002	< 0.00002	
Molybdenum	mg/L	0.01	SM 3120	31-May-19/O	< 0.01	< 0.01	
Nickel	mg/L	0.01	SM 3120	31-May-19/O	< 0.01	< 0.01	
Selenium	mg/L	0.005	EPA 200.8	29-May-19/O	< 0.005	< 0.005	

NOTE: Total & Fecal Coliform passed acceptable holding time of 48 hrs upon arrival at lab.

R.L. = Reporting Limit

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

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



Final Report

C.O.C.: G76555 **REPORT No. B19-14176** 

**Report To:** 

City of Iqaluit PO Box 460,

Iqaluit NU X0A 0H0

Attention: Pat Wolfe

DATE RECEIVED: 21-May-19

DATE REPORTED: 31-May-19

SAMPLE MATRIX: Waste Water

**Caduceon Environmental Laboratories** 

2378 Holly Lane

Ottawa Ontario K1V 7P1

Tel: 613-526-0123 Fax: 613-526-1244

JOB/PROJECT NO.: Test F

P.O. NUMBER:

WATERWORKS NO.

			Client I.D.		Effluent Lagoon	Effluent WWTP	
			Sample I.D.		B19-14176-1	B19-14176-2	
			Date Collect	ed	14-May-19	14-May-19	
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed			
Silver	mg/L	0.0001	EPA 200.8	29-May-19/O	0.0001	< 0.0001	
Strontium	mg/L	0.001	SM 3120	31-May-19/O	0.022	0.022	
Thallium	mg/L	0.0003	EPA 200.8	29-May-19/O	< 0.0003	< 0.0003	
Tin	mg/L	0.05	SM 3120	31-May-19/O	< 0.05	< 0.05	
Titanium	mg/L	0.005	SM 3120	31-May-19/O	0.006	< 0.005	
Uranium	mg/L	0.0003	EPA 200.8	29-May-19/O	< 0.0003	< 0.0003	
Vanadium	mg/L	0.005	SM 3120	31-May-19/O	< 0.005	< 0.005	
Zinc	mg/L	0.005	SM 3120	31-May-19/O	0.066	0.124	
Total Coliform	cfu/100mL	1	MOE E3371	22-May-19/O	148000	5300000	
Fecal Coliform	cfu/100mL	1	MOE E3371	22-May-19/O	92000	3600000	

NOTE: Total & Fecal Coliform passed acceptable holding time of 48 hrs upon arrival at lab.

R.L. = Reporting Limit

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

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

200		TESTING REQUIREMENT	S	REPORT NUMBER (Lab Use)
CADUCEZIN	O.Reg 153 Table	Medium/Fine Coarse		Mind 20.1)
CADUCEZAN	Surface Soil Sub Surfa		O.Reg 558 Leachate Analysis	
ENVIRONMENTAL LABORATORIES  Client committed, Quality assured.	Yes No Record of Site C	Condition (O.Reg 153)	Disposal Site:	000 1511/2
Stell Collinger Stell Collinger Stell	Provincial Water Quality Objectives		Landfill Monitoring	1519-15462
Are any samples to be submitted intended for Human Consumption	Sewer Use By-Law:	Yes No (If ye	Other:	oles on a Drinking Water Chain of Custody)
Indicate Laboratory Samples are submit		Ottawa Richmon		Barrie London
			REQUESTED (Print Test in Boxes)	TURNAROUND SERVICE
			EQUESTED (FIIII Test III Boxes)	DEALEGEES ( )
Contact: San E	1 1 1 1 1	30		te ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) (
1 P. OBO 460	Jamit NU.	Buck		Platinum 200% Surcharge**
				Platinum 200% Surcharge**  Gold 100% Surcharge
5672222424				
Fax: Quote No.: YD18 - Iq aluit	Project Name: Test E	) Aad		Bronze 25% Surcharge
7018 - 19 and	Additional lufer	8		Standard 5-7 days
Email: P.O. No.: 460	Additional Info:			Silver 50% Surcharge Bronze 25% Surcharge Standard 5-7 days  Specific Date:
* Sample Matrix Legend: WW=Waste Wa	Later, SW=Surface Water, GW=Groundwater, LS=	Liquid Sludge, SS=Solid Sludge.	S=Soil, Sed=Sediment, PC=Paint Chi	
Lab	Sample Date Collected Time	Indicate	Test For Each Sample	Field # Bottles/ Field
No: Sample Identification S.P.L.	Matrix * (yy-mm-dd) Collected	By Using A Ch	eck Mark In The Box Provided	pH Temp. Sample Filtered(Y/N)
00-1071121	May 29.19	Te	STE	10
Landrill Late 08	Way 2 mg	1116	8 L E	10
Land Fill IQA-08A Land Fill IQA-08B		10	51 6	10
1001 ENTAH-08B		1 1 00	TIFIII	
Cara Fill Lat. Oop				
				<del>                                     </del>
SAMPLE SUBMISSION INFORMATION	SHIPPING INFORMATION	REPORTING / INVOICING	SAMPLE RECEIVING	INFORMATION (LABORATORY USE ONLY)
Sampled by: Submitted by:	Client's Courier Invoice	Report by Fax	Received By (print):	Signature:
	Caduceon's Courier	Report by Email	Date Received (yy-mm-dd):	
21.3		_		
Sign: The fath wife	Drop Off Hof Pieces	Invoice by Email	Laboratory Prepared Bottles:	Yes No
1905 2010M 1005 2010Ar	Caduceon (Pick-up)	Invoice by Mail	Sample Temperature °C: 18c	2 I sholed but
Date (yy-mm-dd)/Time: Date (yy-mm-dd)/Time: Comments:	1 11 06	DOCKEMD LINGTON	Al lest / Mars / East 11	Labeled by:
	(-1294	est retire it	Nbot 1M+ 1 bact +14	9 +2VO Page of
			X3	G (6554



YD18 Igaluit E Quote #:

City of Igaluit Organization:

Contact: **Paul Clow** 

Telephone: 867-979-6363 Ex233

Facsimile:

Email: p.clow@city.iqaluit.nu.ca Project #: TEST E (Landfill Runoff)

City Of Igaluit Box 460 Igaluit, NU Address: Additional Info:

QUOTE # ('S) MUST BE ON C OF C TO APPLY if not listed, General pricing will be applied. Replacing Quote YD17\_lqaluit\_E Additional Info:

26-Feb-18 Valid Until: 31-Dec-19 Date:

ltem #	Quantity	Analysis Request	Matrix	Unit Cost, \$	Amount, \$
		Detention Pond			
1	1	PΗ	ww	9.00	9.00
2	1	Turbidity	ww	14.50	14.50
3	1	TSS	ww	17.50	17.50
4	1	BOD5	WW	30.00	30.00
5	1	COD	ww	17.50	17.50
6	1	TOC	ww	23.75	23.75
***************************************		Retention Pond			
7	1	pH	WW	9.00	9.00
8	1	Turbidity	WW	14.50	14.50
9	1	TSS	ww	17.50	17.50
10	1	BOD5	WW	30.00	30.00
11	1	COD	ww	17.50	17.50
12	1	TOC	WW	23.75	23.75
13	1	Ammonia Nitrogen	WW	9.50	9.50
14	1	TKN	WW	17.50	17.50
15	1	Total Phosphorus	WW	17.50	17.50
16	1	Full Metals Scan +Hg	WW	70.00	70.00
17	1	Total Coliform/Fecal Coliform	WW	31.00	31.00
18	1	BTEX	WW	72.75	72.75
19	1	PCB's	WW	78.75	78.75
19	1	Ottawa Airport Pick Up		25.00	25.00
not include shippi	ng unless otherwise state	ed.		Subtotal	546.50
nmental Surci	narge of \$1.50 per	sample set		нѕт	71.05
				Tatal Cast	047.55

Total Cost 617.55

**Customer Service Representative Caduceon Environmental Laboratories** 

kbyers@caduceonlabs.com

Cell: 613-453-0964 Office 544-2001 Ex 222



Final Report

C.O.C.: --- REPORT No. B19-15462

Report To:
City of Iqaluit

PO Box 460,

Iqaluit NU X0A 0H0

<u>Attention:</u> Paul Clow

DATE RECEIVED: 30-May-19

DATE REPORTED: 21-Jun-19
SAMPLE MATRIX: Waste Water

**Caduceon Environmental Laboratories** 

2378 Holly Lane

Ottawa Ontario K1V 7P1 Tel: 613-526-0123 Fax: 613-526-1244

JOB/PROJECT NO.: Test E

P.O. NUMBER:

WATERWORKS NO.

			Client I.D.		Landfill IQA- 08	Landfill IQA- 08A	Landfill IQA- 08B	
			Sample I.D.		B19-15462-1	B19-15462-2	B19-15462-3	
			Date Collect	ed	29-May-19	29-May-19	29-May-19	
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
pH @25°C	pH Units		SM 4500H	31-May-19/O	7.68	7.70	7.38	
Turbidity	NTU	0.1	SM 2130	04-Jun-19/O	5.1	4.6	3.5	
Total Suspended Solids	mg/L	3	SM2540D	10-Jun-19/K	14	116	42	
BOD(5 day)	mg/L	3	SM 5210B	31-May-19/K	< 3	< 3	9	
COD	mg/L	5	SM 5220D	05-Jun-19/O	21	20	6	
Total Organic Carbon	mg/L	0.2	EPA 415.1	04-Jun-19/O	9.2	7.9	3.7	
Ammonia (N)-Total	mg/L	0.01	SM4500- NH3-H	06-Jun-19/K	0.73	0.19	0.06	
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	04-Jun-19/K	1.2	0.8	0.3	
Phosphorus-Total	mg/L	0.01	E3199A.1	04-Jun-19/K	0.14	0.05	0.03	
Aluminum	mg/L	0.01	SM 3120	06-Jun-19/O	0.50	0.07	0.14	
Antimony	mg/L	0.0005	EPA 200.8	31-May-19/O	< 0.0005	< 0.0005	< 0.0005	
Arsenic	mg/L	0.0005	EPA 200.8	31-May-19/O	< 0.0005	< 0.0005	< 0.0005	
Barium	mg/L	0.001	SM 3120	06-Jun-19/O	0.013	0.009	0.003	
Beryllium	mg/L	0.0005	EPA 200.8	31-May-19/O	< 0.0005	< 0.0005	< 0.0005	
Chromium	mg/L	0.001	EPA 200.8	31-May-19/O	< 0.001	< 0.001	< 0.001	
Cobalt	mg/L	0.0005	EPA 200.8	31-May-19/O	0.0009	< 0.0005	< 0.0005	
Copper	mg/L	0.0005	EPA 200.8	31-May-19/O	0.0030	0.0018	0.0013	
Iron	mg/L	0.005	SM 3120	06-Jun-19/O	1.87	1.81	0.520	
Lithium	mg/L	0.01	SM 3120	06-Jun-19/O	0.01	0.01	0.01	
Manganese	mg/L	0.001	SM 3120	06-Jun-19/O	0.403	0.113	0.012	
Mercury	mg/L	0.00002	SM 3112 B	06-Jun-19/O	< 0.00002	< 0.00002	< 0.00002	
Molybdenum	mg/L	0.0005	EPA 200.8	31-May-19/O	< 0.0005	< 0.0005	< 0.0005	
Nickel	mg/L	0.001	EPA 200.8	31-May-19/O	0.001	< 0.001	< 0.001	
Selenium	mg/L	0.005	EPA 200.8	31-May-19/O	< 0.005	< 0.005	< 0.005	
Silver	mg/L	0.0001	EPA 200.8	31-May-19/O	< 0.0001	< 0.0001	< 0.0001	
Strontium	mg/L	0.001	SM 3120	06-Jun-19/O	0.056	0.058	0.014	

R.L. = Reporting Limit

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



**Caduceon Environmental Laboratories** 

Final Report

C.O.C.: --- REPORT No. B19-15462

Report To:
City of Iqaluit

PO Box 460,

Iqaluit NU X0A 0H0

Attention: Paul Clow

DATE RECEIVED: 30-May-19

DATE REPORTED: 21-Jun-19
SAMPLE MATRIX: Waste Water

10 Clow

JOB/PROJECT NO.: Test E

Ottawa Ontario K1V 7P1

P.O. NUMBER:

2378 Holly Lane

Tel: 613-526-0123

Fax: 613-526-1244

WATERWORKS NO.

			Client I.D.		Landfill IQA- 08	Landfill IQA- 08A	Landfill IQA- 08B	
			Sample I.D.		B19-15462-1	B19-15462-2	B19-15462-3	
			Date Collect	ed	29-May-19	29-May-19	29-May-19	
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Tin	mg/L	0.05	SM 3120	06-Jun-19/O	< 0.05	< 0.05	< 0.05	
Titanium	mg/L	0.005	SM 3120	06-Jun-19/O	0.040	< 0.005	0.011	
Uranium	mg/L	0.0003	EPA 200.8	31-May-19/O	< 0.0003	< 0.0003	< 0.0003	
Vanadium	mg/L	0.0005	EPA 200.8	31-May-19/O	0.0009	< 0.0005	0.0007	
Zinc	mg/L	0.005	SM 3120	06-Jun-19/O	0.026	0.055	0.011	
Benzene	μg/L	0.5	EPA 8260	04-Jun-19/R	< 0.5	< 0.5	< 0.5	
Toluene	μg/L	0.5	EPA 8260	04-Jun-19/R	< 0.5	< 0.5	< 0.5	
Ethylbenzene	μg/L	0.5	EPA 8260	04-Jun-19/R	< 0.5	< 0.5	< 0.5	
Xylene, m,p-	μg/L	1.0	EPA 8260	04-Jun-19/R	< 1.0	< 1.0	< 1.0	
Xylene, o-	μg/L	0.5	EPA 8260	04-Jun-19/R	< 0.5	< 0.5	< 0.5	
Xylene, m,p,o-	μg/L	1.1	EPA 8260	04-Jun-19/R	< 1.1	< 1.1	< 1.1	
Toluene-d8 (SS)	% rec.		EPA 8260	04-Jun-19/R	110	101	101	
Poly-Chlorinated Biphenyls (PCB's)	μg/L	0.05	EPA 8082	04-Jun-19/K	< 0.05	< 0.05	< 0.05	
Total Coliform	cfu/100mL	1	MOE E3371	30-May-19/O	68	10	32	
Fecal Coliform	cfu/100mL	1	MOE E3371	30-May-19/O	< 2	< 2	8	

R.L. = Reporting Limit

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

DRINKING WATER SUBMISSION OF THE PROPERTY OF T	N"			DRINKIN Municipal Large Residential Seasonal		Non-l	Municipa	al	Reg. 170/ Reg. 318/ Reg. 243/ Private W	08 & 319/ 07	08	ur 2	REPOR		36	705
Indicate Laboratory or Depot Samples are ☐ Kingston ☐ Ottawa ☐ Richmond Hill ☐ Windson	Barrie Lond			Other:					1.0			0	19	-1.		103
rganization:  City of Igaluit  Waterworks A	Address:	Invoicing Address	460		Microbi	iological		ANALY	Chemical	UESTED	)		Other		REQUE	UND TIME ESTED urcharges ***
el: Fax: 96 7 2 2 3 2 4 2 4  fter Hours Tel: Public Health Unit: Waterworks N	do.:	T9 aU NU X Project Name/No.		A	Total Coliform / E.coli	Background Heterotrophic Plate Count	ш	de	Trihalomethanes HAA's	Nitrite, Nitrate as N	Sch. 23 Inorganics			Plati	inum 20 d 10 er 50 nze 25 ndard 5-7	10% - same day** 10% - 24 Hour 1% - 48 Hours 1% - 72 Hours 17 days
mail: Quote No.: Wolf Eaty I galuit no A sample Matrix Legend: TW = Tre	ated Water, DW = Distributi	P.O. No.:	e O aw Groundwat	ter, SW = Rav	v Surfac	e Water. L	IGW = Unt	reated Gi	oundwater	(Drinking \	Water/Dis	tribution			cific Dat	e:
GUDI = Groundwater under the influence of surface water, F Lab No. Sample Source and/or Sample Identification	S.P.L. Sample Matrix *	Date Collected (yy-mm-dd)	Time Collected	Adverse Resample	possibl	le TAT ach		Indicate	f applicable Test For Ea eck Mark In	ch Sample	)	on Gene	ral Turnar	Chlori Free		# Bottles/ Sample
1. WaterTreatment Plant Potable 2. 39 - (Total Metal)	DW	190530	9 AM				Te	57	A				10	1061	23	2
Back passed holdi	ng tim	e,														
	(2	-			9,											
						37				So.		533				
Has Lab Service Notification (L Laboratory Analysis will not o	commence until all	Notification	ibmitted t	on is rec	eived	and th	Ye e Subr	nissio	n form i			ly cor		d		
SAMPLE SUBMISSION INFORMATION  Sampled by: Submitted by:	Courier (Client account	t)	Invoice	REPORTIN			Received		nt): Be		INFOR	Kushadi ada	131 50 100	ATORY USI e:Benden		chan-Ada
Print: Pat Wolfe Pat Wolfe	Courier (Caduceon acc		# of Pieces	Report by I					y-mm-dd)		/	3		ceived: 18		
1 10 10 11 1 10 10 1	Caduceon (Pick-up)		# Of Pieces	Invoice by			Laborato		ared Bottle	9.0	Yes	Label	No .	17		
Date (yy-mm-dd)/Time: Date (yy-mm-dd)/Time:  Comments:  White: Lab Copy / Yellow: Invoicing Copy / Pink: Client Copy	(	D PET,		P, 4~	1, 12				nute G.			Label		Page	196	of 0833 on No: 12

	1
	TESTMARK Laboratories
T)	Committed to Quality and Service

#### **GENERAL CHAIN OF CUSTODY FORM**

Page	of	
3 -		

Please use our Drinking Water Chain of Custody Form for regulated drinking water samples REPORT TO: INVOICE TO: (if different from Report) PROJECT INFORMATION: Client: Ctient: Caduceon Environmental Laboratories TM Quote #: Caduceon Environmental Laboratories Client P.O. #: P190606-TM Address: Address: 285 Dalton Avenue 2378 Holly Lane Ottawa ON, K1V 7P1 Kingston ON Client Project #: Greg Clarkin Contact: K7K 6Z1 Email: qclarkin@caduceonlabs.com Fmail: mmccormick@caduceonlabs.com Phone: 613-526-0123 Fax: 613-526-1244 Phone: 6135442001 Fax: 6135442770 REPORTING/INVOICING FORMAT TURN AROUND TIME (TAT)\* **ANALYSIS REQUESTED** LABORATORY USE ONLY CONTAINERS ☐2 Business Days ☐1 Business Day METALS FIELD FILTERED ☐Fax ☐Email ∏Mail WORK ORDER NUMBER: FIELD TEMP (if applicable) RECEIVED pH (if applicable) **OC DATA REPORTED** ☐3 Business Days □No □Yes SAMPLE DISPOSAL SPECIFIC DATE: NUMBER OF CONTAINERS \* Prior arrangements must be made for ☐Hold ☐Dispose ☐Return rush/weekend/holiday work Acidity **SAMPLING** (Y/N?) **SAMPLE DESCRIPTION** FIELD DATE MATRIX\*\* (This Will Appear On The Report) TIME TEMP Btl. Type Lab ID mm-dd-yy WW |30/05/2019 9:00 B19-15905-1 1210 \*\*Matrix: B=Biota, GW=Ground Water, O=Oil, P=Paint, S=Soil, SL=Sludge, □O.Reg. 153: (1 □2 □3 □4 □5 □6 □7 □8 □9 □) SW=Surface Water, W=Water, WW=Wastewater, SD=Sediment REGULATION □Industrial / Commercial Residential / Parkland □ Agricultural ☐Coarse Soil ☐Fine Soil ☐ Surface ☐Subsurface ☐ High Concentrations Expected □O.Reg. 558 □PWQO □MISA □CofA □MMER □EEM □None Sewer Use: Sanitary Storm Municipality: COMMENTS/FIELD NOTES: ☐Other: Relinquished to Testmark By (Signature) Date Time Sampled By Date Time Shipped By Shipping Reference Client Received By Date Time Received at Testmark By Date Time

Quote #:

YD18\_|qaluit\_A

Organization:

City of Iqaluit

Contact:

Mike Hatfield

Telephone:

867-979-6363

Facsimile:

Email:

M.Hatfield@city.lqaluit.nu.ca

Project #: Address:

TEST A - Drinking Water Box 460, Igaluit NU, X0A 0H0

Additional Info:

QUOTE # ('S) MUST BE ON C OF C TO APPLY if not listed, General pricing will be applied.

Additional Info:

Replacing Quote YD17\_Iqaluit\_A\_Rev1

Date:

Valid Until: 31-Dec-19 26-Feb 18

Item #	Quantity	Analysis Request	Matrix	Unit Cost, \$	Amount, \$
1	1	Acidity (Subcontracted)	DW	33.50	33.50
2	1	Alkalinity	DW	14.50	14.50
3	1	Bicarbonate/ Carbonate	DW	17.50	17.50
4	1	Chloride/Sulphate	DW	23.75	23.75
5	1	Conductivity	DW	9.45	9.45
6	1	Hydroxide	DW	14.50	14.50
7	1	Redox Potential	DW	15.75	15.75
8	1	TDS	DW	17.50	17.50
9	1	TSS	DW	17.50	17.50
10	1	TOC	DW	23.75	23.75
11	1	TIC	DW	23.75	23.75
12	1	TOTAL METALS ICPOES AI, Ba, Be, Cr, Co, Cu, Fe, Li, Mn, Mo, Ni, Sn, Sr, Ti, V, Zn + Hardness ICPMS Sb, As, Cd, Pb, Se, Ag, Tl, U CVAAS Hg	DW	92.00	92.00
13	1	DISSOLVED METALS ICPOES AI, Ba, Be, Cr, Co, Cu, Fe, Li, Mn, Mo, Ni, Sn, Sr, Ti, V, Zn + Hardness ICPMS Sb, As, Cd, Pb, Se, Ag, TI, U CVAAS Hg	DW	92.00	92.00
14	1	Fecal Coliforms	DW	16.25	16.25
15	1	pH	DW	9.00	9.00
16	1	Turbidity	DW	14.50	14.50
17	1	Ottawa Airport Pick Up		25.00	25.00
Prices do not include shippin	g unless otherwise state		·	Subtotal	460.20

Environmental Surcharge of \$1.50 per sample set

HST 59.83 **Total Cost** 520.03

Rebecca Marshall

Customer Service Representative

Caduceon Environmental Laboratories

rmarshall@caduceonlabs.com

613-526-0123

Corporate Office - Kingston - 285 Dalton Ave. Kingston, ON K7K 6Z1 Tel: (613) 544-2001 Fax: (613) 544-2770 Kingston Ottawa **Richmond Hill** London Windsor



Final Report

C.O.C.: DW 096833 REPORT No. B19-15905

Client I.D.

Report To:

City of Iqaluit PO Box 460,

Iqaluit NU X0A 0H0
Attention:
Pat Wolfe

DATE RECEIVED: 03-Jun-19

DATE REPORTED: 21-Jun-19 SAMPLE MATRIX: Drinking Water **Caduceon Environmental Laboratories** 

2378 Holly Lane

WTP Potable

Ottawa Ontario K1V 7P1 Tel: 613-526-0123 Fax: 613-526-1244

JOB/PROJECT NO.: Test A (WTP)

WTP

P.O. NUMBER: 460 WATERWORKS NO.

						Potable (Total)		
			Sample I.D.		B19-15905-1	B19-15905-2		
			Date Collecte	ed	30-May-19	30-May-19		
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed			•	
Hardness (as CaCO3)	mg/L	1	SM 3120	06-Jun-19/O	19			
Hardness (as CaCO3)	mg/L	1	SM 3120	11-Jun-19/O		20		
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	04-Jun-19/O	10			
Bicarbonate(as CaCO3)	mg/L	5	SM 2320B	04-Jun-19/O	10			
Carbonate (as CaCO3)	mg/L	5	SM 2320B	04-Jun-19/O	< 5			
Hydroxide	mg/L	5	EPA 310.2	04-Jun-19/O	< 5			
Acidity (as CaCO3)	mg/L	5	Subcontract	13-Jun-19	< 5	1		
pH @25°C	pH Units		SM 4500H	04-Jun-19/O	6.97			
Conductivity @25°C	µmho/cm	1	SM 2510B	04-Jun-19/O	47			
TDS(ion sum calc.)	mg/L	1	Calc.	07-Jun-19/O	23			
Total Suspended Solids	mg/L	3	SM2540D	11-Jun-19/K	< 3			
Turbidity	NTU	0.1	SM 2130	04-Jun-19/O	0.3			
REDOX potential	mV		In-House	10-Jun-19/R	243			
Chloride	mg/L	0.5	SM4110C	06-Jun-19/O	3.8			
Sulphate	mg/L	1	SM4110C	06-Jun-19/O	4			
Aluminum	mg/L	0.01	SM 3120	06-Jun-19/O	< 0.01			
Aluminum	mg/L	0.01	SM 3120	11-Jun-19/O		0.02		
Antimony	mg/L	0.0001	EPA 200.8	12-Jun-19/O	< 0.0001			
Antimony	mg/L	0.0001	EPA 200.8	10-Jun-19/O		0.0002		
Arsenic	mg/L	0.0001	EPA 200.8	12-Jun-19/O	0.0001			
Arsenic	mg/L	0.0001	EPA 200.8	10-Jun-19/O		0.0001		
Barium	mg/L	0.001	SM 3120	06-Jun-19/O	0.001			
Barium	mg/L	0.001	SM 3120	11-Jun-19/O		0.003		
Beryllium	mg/L	0.002	SM 3120	06-Jun-19/O	< 0.002			
Beryllium	mg/L	0.002	SM 3120	11-Jun-19/O		< 0.002		
Cadmium	mg/L	).000015	EPA 200.8	12-Jun-19/O	< 0.000015			

NOTE: Acceptable Holding times exceeded for several parameters (i.e. Date Collected30-May-19, Date Received 03-Jun-19).

R.L. = Reporting Limit

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

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



Final Report

C.O.C.: DW 096833 REPORT No. B19-15905

Client I.D.

Report To:
City of Iqaluit

PO Box 460,

Iqaluit NU X0A 0H0

Attention: Pat Wolfe

DATE RECEIVED: 03-Jun-19

DATE REPORTED: 21-Jun-19 SAMPLE MATRIX: Drinking Water **Caduceon Environmental Laboratories** 

2378 Holly Lane

WTP Potable

Ottawa Ontario K1V 7P1 Tel: 613-526-0123 Fax: 613-526-1244

JOB/PROJECT NO.: Test A (WTP)

WTP Potable

P.O. NUMBER: 460 WATERWORKS NO.

						(Total)	
			Sample I.D.		B19-15905-1	B19-15905-2	
			Date Collecte	ed	30-May-19	30-May-19	
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed			
Cadmium	mg/L	0.000015	EPA 200.8	10-Jun-19/O		< 0.000015	
Chromium	mg/L	0.002	SM 3120	06-Jun-19/O	< 0.002		
Chromium	mg/L	0.002	SM 3120	11-Jun-19/O		< 0.002	
Cobalt	mg/L	0.005	SM 3120	06-Jun-19/O	< 0.005		
Cobalt	mg/L	0.005	SM 3120	11-Jun-19/O		< 0.005	
Copper	mg/L	0.002	SM 3120	06-Jun-19/O	0.033		
Copper	mg/L	0.002	SM 3120	11-Jun-19/O		0.048	
Iron	mg/L	0.005	SM 3120	06-Jun-19/O	0.008		
Iron	mg/L	0.005	SM 3120	11-Jun-19/O		0.050	
Lead	mg/L	0.00002	EPA 200.8	12-Jun-19/O	0.00011		
Lead	mg/L	0.00002	EPA 200.8	10-Jun-19/O		0.00012	
Lithium	mg/L	0.01	SM 3120	06-Jun-19/O	< 0.01		
Lithium	mg/L	0.01	SM 3120	11-Jun-19/O		< 0.01	
Manganese	mg/L	0.001	SM 3120	06-Jun-19/O	0.001		
Manganese	mg/L	0.001	SM 3120	11-Jun-19/O		0.002	
Mercury	mg/L	0.00002	SM 3112 B	11-Jun-19/O	< 0.00002	< 0.00002	
Molybdenum	mg/L	0.01	SM 3120	06-Jun-19/O	< 0.01		
Molybdenum	mg/L	0.01	SM 3120	11-Jun-19/O		< 0.01	
Nickel	mg/L	0.01	SM 3120	06-Jun-19/O	< 0.01		
Nickel	mg/L	0.01	SM 3120	11-Jun-19/O		< 0.01	
Selenium	mg/L	0.001	EPA 200.8	12-Jun-19/O	< 0.001		
Selenium	mg/L	0.001	EPA 200.8	10-Jun-19/O		< 0.001	
Silver	mg/L	0.0001	EPA 200.8	12-Jun-19/O	< 0.0001		
Silver	mg/L	0.0001	EPA 200.8	10-Jun-19/O		< 0.0001	
Strontium	mg/L	0.001	SM 3120	06-Jun-19/O	0.013		
Strontium	mg/L	0.001	SM 3120	11-Jun-19/O		0.014	

NOTE: Acceptable Holding times exceeded for several parameters (i.e. Date Collected30-May-19, Date Received 03-Jun-19).

R.L. = Reporting Limit

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

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

Site Analyzed=K-Kingston,W-Windsor,O-Ottawa,R-Richmond Hill,B-Barrie
The analytical results reported begin refer to the samples as received. Reproduction of this analytic



**Final Report** 

C.O.C.: DW 096833 REPORT No. B19-15905

Client I.D.

Report To:

City of Iqaluit PO Box 460,

Iqaluit NU X0A 0H0
Attention:
Pat Wolfe

DATE RECEIVED: 03-Jun-19

DATE REPORTED: 21-Jun-19
SAMPLE MATRIX: Drinking Water

**Caduceon Environmental Laboratories** 

2378 Holly Lane

WTP Potable

Ottawa Ontario K1V 7P1 Tel: 613-526-0123 Fax: 613-526-1244

JOB/PROJECT NO.: Test A (WTP)

WTP

P.O. NUMBER: 460 WATERWORKS NO.

						Potable (Total)	
			Sample I.D.		B19-15905-1	B19-15905-2	
			Date Collecte	ed	30-May-19	30-May-19	
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed			
Thallium	mg/L	0.00005	EPA 200.8	12-Jun-19/O	< 0.00005		
Thallium	mg/L	0.00005	EPA 200.8	10-Jun-19/O		< 0.00005	
Tin	mg/L	0.05	SM 3120	06-Jun-19/O	< 0.05		
Tin	mg/L	0.05	SM 3120	11-Jun-19/O		< 0.05	
Titanium	mg/L	0.005	SM 3120	06-Jun-19/O	< 0.005		
Titanium	mg/L	0.005	SM 3120	11-Jun-19/O		< 0.005	
Uranium	mg/L	0.00005	EPA 200.8	12-Jun-19/O	< 0.00005		
Uranium	mg/L	0.00005	EPA 200.8	10-Jun-19/O		< 0.00005	
Vanadium	mg/L	0.005	SM 3120	06-Jun-19/O	< 0.005		
Vanadium	mg/L	0.005	SM 3120	11-Jun-19/O		< 0.005	
Zinc	mg/L	0.005	SM 3120	06-Jun-19/O	0.005		
Zinc	mg/L	0.005	SM 3120	11-Jun-19/O		0.012	
Total Organic Carbon	mg/L	0.2	EPA 415.1	10-Jun-19/O	4.4		
TIC	mg/L	0.5	EPA 415.1	10-Jun-19/O	2.9		
Fecal Coliform	cfu/100mL	1	MOE E3371	04-Jun-19/O	0		
Anion Sum	meq/L		Calc.	07-Jun-19/O	0.451		
Cation Sum	meq/L		Calc.	07-Jun-19/O	0.430		
% Difference	%		Calc.	07-Jun-19/O	2.40		
Ion Ratio	AS/CS		Calc.	07-Jun-19/O	1.05		
Sodium Adsorption Ratio	-		Calc.	07-Jun-19/O	0.106		
Conductivity (calc.)	µmho/cm		Calc.	07-Jun-19/O	46		
EC(calc.)/EC(actual)	-		Calc.	07-Jun-19/O	0.997		
TDS(calc.)/EC(actual)	-		Calc.	07-Jun-19/O	0.495		
Langelier Index(25°C)	S.I.		Calc.	07-Jun-19/O	-2.57		

1 Subcontracted to Testmark Labs

NOTE: Acceptable Holding times exceeded for several parameters (i.e. Date Collected30-May-19, Date Received 03-Jun-19).

R.L. = Reporting Limit

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

							TES	TING F	REQUIREM	/ENTS	3			BOR	-0'	2 库	PORTNUN	IBER (Lat	Use)
	15110		N 1"	O.Reg	153	Table					MISA Gu	idelines				1.6			
	ADUC	E		Surface	e Soil	Sub Surfac	e Soil	(0	D.Reg 153)		O.Reg 5	58 Leachate Anal	ysis			15			
	· ENVIRONMENTAL LA			Yes	☐ No	Record of Site C	ondition	(0	D.Reg 153)	122	Disposa	Site:					-0	1	
	Clien	it committed. Quality a	issured.		cial Water Quality (	Objectives					Landfill	Monitoring		41		15	4	5	
					Use By-Law:	1,77	Mar in			L	Other:	1.70/1.1							
Are	e any samples to be submitted int					1		Yes				II Drinking Wat				king Water	Chain of (	Custody)	
		oratory Samples			King	ston	Ottaw	a		mon				Barr	ie	Lon			
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Fax:	. 2202921	Quote No.:		Project Nam	ne:		6								ighl	Bron		25% Surc	
I da.		Quote No.: YD18_ FgaU	ut_F_	Project Nam	FF		9	2 - 1							Suspected Highly Contaminated	Stan		5-7 days	3-
Email:	TA 1 - 1	P.O. No.:	Yerl	Additional I		1	A								pect	1			
WEI	tecty lealey nout	460				W.	-										ific Date:		
	* Sar	nple Matrix Legend: V	VW=Waste Wa				iquid SI	udge, S					Paint Chi	ps, F=F	ilter, O			I# D=#I==	
Lab No:	Sample Identificati	ion	S.P.L.	Sample Matrix *	Date Collected (yy-mm-dd)	Time Collected					Test For Ea	ch Sample The Box Provided	,		V	pH	ield Temp.	# Bottles/	
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Comme				P	ET, Z, N	R, M, HG	, ba	ct	XZ							Page	1	of	1
						0		1								G 7	204		
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Quote #: YD18\_lqaluit\_F

Organization:

City of Iqaluit

Contact: Telephone: Mike Hatfield 867-979-6363

Facsimile:

Email:

M.Hatfield@city.lgaluit.nu.ca

Project #: Address:

TEST F - Sewage Lagoon Box 460, Iqaluit NU, X0A 0H0

Additional Info:

QUOTE # ('S) MUST BE ON C OF C TO APPLY if not listed, General pricing will be applied.

Additional Info:

Replacing Quote YD17\_Iqaluit\_F\_REV1

1-Mar-18 Date:

Valid Until:

31-Dec-19

Item #	Quantity	Analysis Request	Matrix	Unit Cost, \$	Amount, \$
1	1	BOD	WW	30.00	30.00
2	1	Total Coliform / Fecal Coliform	ww	31.00	31.00
3	1	Ammonia, NO2/NO3	ww	30.00	30.00
4	1	Total Phosphorus	ww	17.50	17.50
5	1	Orthophosphate	ww	17.50	17.50
6	1	Conductivity	ww	9.45	9.45
7	1	TSS	ww	17.50	17.50
8	1	pH	ww	9.00	9.00
9	1	TOTAL METALS ICPOES AI, Ba, Be, Cr, Co, Cu, Fe, Li, Mn, Mo, Ni, Sn, Sr, Ti, V, Zn ICPMS Sb, As, Cd, Pb, Se, Ag, Tl, U CVAAS Ha	ww	92.00	92.00
10	1	Ottawa Airport Pick Up		25.00	25.00
not include shippin	g unless otherwise state	d.		Subtotal	278.95
	arge of \$1.50 per			LICT	36.26

Environmental Surcharge of \$1.50 per sample set

IHST 36.26 **Total Cost** 315.21

Rebecca Marshall

Customer Service Representative

Caduceon Environmental Laboratories

rmarshall@caduceonlabs.com

613-526-0123



Final Report

C.O.C.: G72048 REPORT No. B19-15915

Report To:

City of Iqaluit PO Box 460,

Iqaluit NU X0A 0H0
Attention:
Pat Wolfe

DATE RECEIVED: 04-Jun-19

DATE REPORTED: 18-Jun-19
SAMPLE MATRIX: Waste Water

**Caduceon Environmental Laboratories** 

2378 Holly Lane

Ottawa Ontario K1V 7P1 Tel: 613-526-0123

Fax: 613-526-1244

JOB/PROJECT NO.: Test F

P.O. NUMBER: 460

WATERWORKS NO.

			Client I.D.		WWTP Influent	WWTP Effluent	
			Sample I.D.		B19-15915-1	B19-15915-2	
			Date Collecte	ed	30-May-19	30-May-19	
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed			
BOD(5 day)	mg/L	3	SM 5210B	05-Jun-19/K	102	75	
Total Suspended Solids	mg/L	3	SM2540D	11-Jun-19/K	130	50	
Conductivity @25°C	µmho/cm	1	SM 2510B	04-Jun-19/O	369	260	
pH @25°C	pH Units		SM 4500H	04-Jun-19/O	7.48	7.48	
Nitrite (N)	mg/L	0.1	SM4110C	17-Jun-19/O	< 0.1	< 0.1	
Nitrate (N)	mg/L	0.1	SM4110C	17-Jun-19/O	< 0.1	< 0.1	
Ammonia (N)-Total	mg/L	0.01	SM4500- NH3-H	10-Jun-19/K	13.0	13.0	
o-Phosphate (P)	mg/L	0.002	PE4500-S	10-Jun-19/K	2.69	2.57	
Phosphorus-Total	mg/L	0.01	E3199A.1	05-Jun-19/K	3.89	3.18	
Aluminum	mg/L	0.01	SM 3120	11-Jun-19/O	0.22	0.20	
Antimony	mg/L	0.0005	EPA 200.8	12-Jun-19/O	< 0.0005	< 0.0005	
Arsenic	mg/L	0.0005	EPA 200.8	12-Jun-19/O	< 0.0005	< 0.0005	
Barium	mg/L	0.001	SM 3120	11-Jun-19/O	0.005	0.005	
Beryllium	mg/L	0.002	SM 3120	11-Jun-19/O	< 0.002	< 0.002	
Cadmium	mg/L	).000070	EPA 200.8	12-Jun-19/O	0.000132	0.000138	
Chromium	mg/L	0.002	SM 3120	11-Jun-19/O	< 0.002	< 0.002	
Cobalt	mg/L	0.005	SM 3120	11-Jun-19/O	< 0.005	< 0.005	
Copper	mg/L	0.002	SM 3120	11-Jun-19/O	0.291	0.235	
Iron	mg/L	0.005	SM 3120	11-Jun-19/O	0.301	0.236	
Lead	mg/L	0.0001	EPA 200.8	12-Jun-19/O	0.0013	0.0011	
Lithium	mg/L	0.01	SM 3120	11-Jun-19/O	< 0.01	< 0.01	
Manganese	mg/L	0.001	SM 3120	11-Jun-19/O	0.021	0.022	
Mercury	mg/L	0.00002	SM 3112 B	11-Jun-19/O	< 0.00002	< 0.00002	
Molybdenum	mg/L	0.01	SM 3120	11-Jun-19/O	< 0.01	< 0.01	
Nickel	mg/L	0.01	SM 3120	11-Jun-19/O	< 0.01	< 0.01	
Selenium	mg/L	0.005	EPA 200.8	12-Jun-19/O	< 0.005	< 0.005	

R.L. = Reporting Limit

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

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



Final Report

C.O.C.: G72048 REPORT No. B19-15915

Report To:

City of Iqaluit PO Box 460,

Iqaluit NU X0A 0H0
Attention:
Pat Wolfe

DATE RECEIVED: 04-Jun-19

DATE REPORTED: 18-Jun-19
SAMPLE MATRIX: Waste Water

**Caduceon Environmental Laboratories** 

2378 Holly Lane

Ottawa Ontario K1V 7P1 Tel: 613-526-0123

Fax: 613-526-1244

JOB/PROJECT NO.: Test F

P.O. NUMBER: 460

WATERWORKS NO.

			Client I.D.		WWTP Influent	WWTP Effluent	
			Sample I.D.		B19-15915-1	B19-15915-2	
			Date Collect	ed	30-May-19	30-May-19	
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed			
Silver	mg/L	0.0001	EPA 200.8	12-Jun-19/O	< 0.0001	< 0.0001	
Strontium	mg/L	0.001	SM 3120	11-Jun-19/O	0.023	0.021	
Thallium	mg/L	0.0003	EPA 200.8	12-Jun-19/O	< 0.0003	< 0.0003	
Tin	mg/L	0.05	SM 3120	11-Jun-19/O	< 0.05	< 0.05	
Titanium	mg/L	0.005	SM 3120	11-Jun-19/O	< 0.005	< 0.005	
Uranium	mg/L	0.0003	EPA 200.8	12-Jun-19/O	< 0.0003	< 0.0003	
Vanadium	mg/L	0.005	SM 3120	11-Jun-19/O	< 0.005	< 0.005	
Zinc	mg/L	0.005	SM 3120	11-Jun-19/O	0.096	0.084	
Total Coliform	cfu/100mL	1	MOE E3371	04-Jun-19/O	134000000	10800000	
Fecal Coliform	cfu/100mL	1	MOE E3371	04-Jun-19/O	3700000	1400000	

R.L. = Reporting Limit

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

CADUCE Surface Soil O.Reg 153 Table MISA Guidelines  Surface Soil O.Reg 153 O.Reg 558 Leachate Analysis	
N	
ENVIRONMENTAL LABORATORYES Yes No Record of Site Condition (O.Reg 153) Disposal Site:	0
Provincial water quality Objectives	
Sewer Use By-Law: Other: Other:	
Are any samples to be submitted intended for Human Consumption under any Drinking Water Regulations? Yes No (If yes, submit all Drinking Water Samples on a Drinking Water Chain of Custod	/)
Indicate Laboratory Samples are submitted to: ☐ Kingston ❤️Ottawa ☐ Richmond Hill ☐ Windsor ☐ Barrie ☐ London	
Organization:  ANALYSES REQUESTED (Print Test in Boxes)  TURNAROUND SE	
City of Igalat Box 460	ck page)
C: Fy of Igalut Box 460  Contact: Wolfe Igalut NU XOA OHO  Tel: 67-272-2424  Fax: Quote No.: Project Name:  Email: P.O. No.: Additional Info:  Post Wolfe City. Igalust MV (A)  REQUESTED (see bity of the bity of	Surcharge**
Tel: // 0 - 00 0 - 0 / 1 Gold 100%	Surcharge
867-272-2424 Silver 50%s	urcharge
Fax: Quote No.: Project Name: 25% Standard 5.7 de	urcharge
Standard 5-7 da	ys
Email: P.O. No.: Additional Info:	
Specific Date:	
Lab   Sample Matrix Legenti. WW-Waste Water, SW-Stoundwater, ES-Enquite Studge, SS-Solid St	es/ Field
No: Sample Identification S.P.L. Matrix * (yy-mm-dd) Collected By Using A Check Mark In The Box Provided pH Temp. Sam	
(1) INTP Raw @ Total M DW 19/07/24 9Am / TEST A 7.12/28/0	
3) WTP treated & Total M. DW 19/01/24 9Am Test A 8.41 142 LO	
	37
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SAMPLE SUBMISSION INFORMATION SHIPPING INFORMATION REPORTING / INVOICING SAMPLE RECEIVING INFORMATION (LABORATORY USE ON	.Y)
Sampled by: Submitted by: Client's Courier Invoice Report by Fax Received By (print):	
Print: Geroung Kanay & Caduceon's Courier   Report by Email   Date Received (yy-mm-dd): 25/07/8 Time Received: 10:0	10
Sign: Drop Off # of Pieces Invoice by Email Laboratory Prepared Bottles: Yes No	
Date (vy-mm-dd)/Time:	
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Date (yy-mm-dd)/Time:  Date (yy-mm-dd)/Time:  Sample Temperature °C: Q: B  Labeled by:  Sample Temperature °C: Q: B  Apple Temperature °C: Q:	

Quote #:

YD18 | Iqaluit\_A

Organization:

City of Iqaluit

Contact:

Mike Hatfield

Telephone:

867-979-6363

Facsimile:

Email:

M.Hatfield@city.lgaluit.nu.ca

Project #:

TEST A - Drinking Water

Address:

Box 460, Igaluit NU, X0A 0H0

Additional Info:

QUOTE # ('S) MUST BE ON C OF C TO APPLY if not listed, General pricing will be applied.

Additional Info:

Replacing Quote YD17\_lqaluit\_A\_Rev1

Date:

26-Feb-18

Valid Until:

31-Dec-19

Item #	Quantity	Analysis Request	Matrix	Unit Cost, \$	Amount, \$
1	1	Acidity (Subcontracted)	DW	33.50	33.50
2	1	Alkalinity	DW	14.50	14.50
3	1	Bicarbonate/ Carbonate	DW	17.50	17.50
4	1	Chloride/Sulphate	DW	23.75	23.75
5	1	Conductivity	DW	9.45	9.45
6	1	Hydroxide	DW	14.50	14.50
7	1	Redox Potential	DW	15.75	15.75
8	1	TDS	DW	17.50	17.50
9	1	TSS	DW	17.50	17.50
10	1	TOC	DW	23.75	23.75
11	1	TIC	DW	23.75	23.75
12	1	TOTAL METALS ICPOES AI, Ba, Be, Cr, Co, Cu, Fe, Li, Mn, Mo, Ni, Sn, Sr, Ti, V, Zn + Hardness ICPMS Sb, As, Cd, Pb, Se, Ag, Tl, U CVAAS Hg	DW	92.00	92.00
13	1	DISSOLVED METALS ICPOES AI, Ba, Be, Cr, Co, Cu, Fe, Li, Mn, Mo, Ni, Sn, Sr, Ti, V, Zn + Hardness ICPMS Sb, As, Cd, Pb, Se, Ag, TI, U CVAAS Hg	DW	92.00	92.00
14	1	Fecal Coliforms	DW	16.25	16.25
15	1	pH	DW	9.00	9.00
16	1	Turbidity	DW	14.50	14.50
17	1	Ottawa Airport Pick Up		25.00	25.00
do not include shippin	g unless otherwise state	d.		Subtotal	460.20
ronmental Surch	argo of \$1.50 per	eample eet		нет	50.83

Environmental Surcharge of \$1.50 per sample set

 Subtotal
 460.20

 HST
 59.83

 Total Cost
 520.03

Rebecca Marshall

Customer Service Representative

**Caduceon Environmental Laboratories** 

rmarshall@caduceonlabs.com

613-526-0123



#### **GENERAL CHAIN OF CUSTODY FORM**

of
of

Please use our Drinking Water Chain of Custody Form for regulated drinking water samples

REPORT	г то:	Cadu	ceon Environmental La	aboratories	INV							<b>fron</b> Labor			:)					TM C	Quote #:	NFORMA				
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			Ottawa ON, K1V 7	P1			King	ston	ON											Clien	Client Project #:					
Contact:	5		Greg Clarkin	w <sup>15</sup>		K7K 6Z1							3													
Email:		gcl	arkin@caduceonla	ibs.com	Email	mail: mmccormick@caduceonlabs.com																				
Phone:	613-526-012	.3	Fax: 613-526-	1244	Phone	e:	6135442001 Fax: 6135442770																			
REPORTI	NG/INVOIC	ING FORMAT		*(TAT) MIT DNUC							An	ALYS	ıs Rı	EQUE	STED				<i>-</i>		LABOR	ATORY U	SE ONLY			
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QC □Yes	DATA REP	TA REPORTED ☐3 Business Days ☑Standard				**************************************		CONTAINERS												pH (if applicable)	applicable)	Filtered	RECEIVED			
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			ind Water, O=Oil, r, WW=Wastewate	P=Paint, S=Soil, SL=Slud er, SD=Sediment	ge,			REGULATION		).Reg		ndusti	rial /	Comr	nercia	al		□Re	8 🗍 9 esiden urface	tial / I	Parkland		gricultural			
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COMMENTS/FIELD NOTES:								REG	Sew	er U: Other:	se: [	_]Sar	itary		Storm	1	Muni	cipa	lity:				,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			
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Sample <sup>Client</sup>	Sampled By Date				Tim	е		Ship	pped	Ву											Shipping	Reference	æ			
Receive						е	Received at Testmark By Date						Time													



Final Report

C.O.C.: G72042 REPORT No. B19-22803

Report To:

City of Iqaluit PO Box 460,

Iqaluit NU X0A 0H0
Attention:
Pat Wolfe

DATE RECEIVED: 25-Jul-19

DATE REPORTED: 07-Aug-19
SAMPLE MATRIX: Drinking Water

**Caduceon Environmental Laboratories** 

2378 Holly Lane

Ottawa Ontario K1V 7P1 Tel: 613-526-0123 Fax: 613-526-1244

JOB/PROJECT NO.: Test A (WTP)

P.O. NUMBER:

WATERWORKS NO.

					WITE	I WITE E	I WED	I WITD
			Client I.D.		WTP Raw - Test A	WTP Raw Test A (Total	WTP Treated -	WTP Treated -
					165t A	Metal)	Test A	Test A (Total
						,		Metal
			Sample I.D.		B19-22803-1	B19-22803-2	B19-22803-3	B19-22803-4
			Date Collect	ed	24-Jul-19	24-Jul-19	24-Jul-19	24-Jul-19
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Hardness (as CaCO3)	mg/L	1	SM 3120	30-Jul-19/O	11		11	
Hardness (as CaCO3)	mg/L	1	SM 3120	26-Jul-19/O		12		11
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	25-Jul-19/O	9		5	
Bicarbonate(as CaCO3)	mg/L	5	SM 2320B	25-Jul-19/O	9		5	
Carbonate (as CaCO3)	mg/L	5	SM 2320B	25-Jul-19/O	< 5		< 5	
Hydroxide	mg/L	5	EPA 310.2	25-Jul-19/O	< 5		< 5	
Acidity (as CaCO3)	mg/L	5	Subcontract	30-Jul-19	6	1	< 5	1
pH @25°C	pH Units		SM 4500H	26-Jul-19/O	7.11		6.68	
Conductivity @25°C	µmho/cm	1	SM 2510B	25-Jul-19/O	25		28	
TDS(ion sum calc.)	mg/L	1	Calc.	30-Jul-19/O	12		12	
Total Suspended Solids	mg/L	3	SM2540D	29-Jul-19/K	< 3		< 3	
Turbidity	NTU	0.1	SM 2130	25-Jul-19/O	0.5		0.5	
REDOX potential	mV		In-House	30-Jul-19/R	380		592	
Chloride	mg/L	0.5	SM4110C	25-Jul-19/O	1.1		2.4	
Sulphate	mg/L	1	SM4110C	25-Jul-19/O	< 1		1	
Aluminum	mg/L	0.01	SM 3120	30-Jul-19/O	0.01		0.01	
Aluminum	mg/L	0.01	SM 3120	26-Jul-19/O		0.02		0.02
Antimony	mg/L	0.0001	EPA 200.8	02-Aug-19/O	< 0.0001		< 0.0001	
Antimony	mg/L	0.0001	EPA 200.8	29-Jul-19/O		0.0003		0.0003
Arsenic	mg/L	0.0001	EPA 200.8	02-Aug-19/O	< 0.0001		< 0.0001	
Arsenic	mg/L	0.0001	EPA 200.8	29-Jul-19/O		< 0.0001		< 0.0001
Barium	mg/L	0.001	SM 3120	30-Jul-19/O	0.001		0.001	
Barium	mg/L	0.001	SM 3120	26-Jul-19/O		0.002		0.002
Beryllium	mg/L	0.002	SM 3120	30-Jul-19/O	< 0.002		< 0.002	
Beryllium	mg/L	0.002	SM 3120	26-Jul-19/O		< 0.002		< 0.002

R.L. = Reporting Limit

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



Final Report

C.O.C.: G72042 **REPORT No. B19-22803** 

**Report To:** City of Iqaluit

PO Box 460,

Iqaluit NU X0A 0H0 Attention: Pat Wolfe

DATE RECEIVED: 25-Jul-19

DATE REPORTED: 07-Aug-19 SAMPLE MATRIX: Drinking Water **Caduceon Environmental Laboratories** 

2378 Holly Lane

Ottawa Ontario K1V 7P1 Tel: 613-526-0123 Fax: 613-526-1244

JOB/PROJECT NO.: Test A (WTP)

P.O. NUMBER: WATERWORKS NO.

			Client I.D.		WTP Raw - Test A	WTP Raw Test A (Total Metal)	WTP Treated - Test A	WTP Treated - Test A (Total Metal
			Sample I.D.		B19-22803-1	B19-22803-2	B19-22803-3	B19-22803-4
			Date Collecte	ed	24-Jul-19	24-Jul-19	24-Jul-19	24-Jul-19
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Cadmium	mg/L	0.000015	EPA 200.8	02-Aug-19/O	< 0.000015		< 0.000015	
Cadmium	mg/L	).000015	EPA 200.8	29-Jul-19/O		< 0.000015		< 0.000015
Chromium	mg/L	0.001	EPA 200.8	02-Aug-19/O	< 0.001		< 0.001	
Chromium	mg/L	0.001	EPA 200.8	29-Jul-19/O		< 0.001		< 0.001
Cobalt	mg/L	0.0001	EPA 200.8	02-Aug-19/O	< 0.0001		< 0.0001	
Cobalt	mg/L	0.0001	EPA 200.8	29-Jul-19/O		< 0.0001		< 0.0001
Copper	mg/L	0.0001	EPA 200.8	02-Aug-19/O	0.0011		0.0660	
Copper	mg/L	0.0001	EPA 200.8	29-Jul-19/O		0.0011		0.0660
Iron	mg/L	0.005	SM 3120	30-Jul-19/O	0.031		0.028	
Iron	mg/L	0.005	SM 3120	26-Jul-19/O		0.058		0.051
Lead	mg/L	0.00002	EPA 200.8	02-Aug-19/O	0.00005		0.00018	
Lead	mg/L	0.00002	EPA 200.8	29-Jul-19/O		0.00005		0.00018
Lithium	mg/L	0.01	SM 3120	30-Jul-19/O	< 0.01		< 0.01	
Lithium	mg/L	0.01	SM 3120	26-Jul-19/O		< 0.01		< 0.01
Manganese	mg/L	0.001	SM 3120	30-Jul-19/O	0.014		0.002	
Manganese	mg/L	0.001	SM 3120	26-Jul-19/O		0.016		0.002
Mercury	mg/L	0.00002	SM 3112 B	30-Jul-19/O	0.00003		< 0.00002	
Molybdenum	mg/L	0.0001	EPA 200.8	02-Aug-19/O	< 0.0001		< 0.0001	
Molybdenum	mg/L	0.0001	EPA 200.8	29-Jul-19/O		< 0.0001		< 0.0001
Nickel	mg/L	0.0002	EPA 200.8	02-Aug-19/O	< 0.0002		< 0.0002	
Nickel	mg/L	0.0002	EPA 200.8	29-Jul-19/O		< 0.0002		< 0.0002
Selenium	mg/L	0.001	EPA 200.8	02-Aug-19/O	< 0.001		< 0.001	
Selenium	mg/L	0.001	EPA 200.8	29-Jul-19/O		< 0.001		< 0.001
Silver	mg/L	0.0001	EPA 200.8	02-Aug-19/O	< 0.0001		< 0.0001	
Silver	mg/L	0.0001	EPA 200.8	29-Jul-19/O		< 0.0001		< 0.0001

R.L. = Reporting Limit

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



Final Report

C.O.C.: G72042 REPORT No. B19-22803

Report To:

City of Iqaluit PO Box 460,

Iqaluit NU X0A 0H0
Attention:
Pat Wolfe

DATE RECEIVED: 25-Jul-19

DATE REPORTED: 07-Aug-19
SAMPLE MATRIX: Drinking Water

**Caduceon Environmental Laboratories** 

2378 Holly Lane

Ottawa Ontario K1V 7P1 Tel: 613-526-0123 Fax: 613-526-1244

JOB/PROJECT NO.: Test A (WTP)

P.O. NUMBER: WATERWORKS NO.

			Client I.D.		WTP Raw - Test A	WTP Raw Test A (Total Metal)	WTP Treated - Test A	WTP Treated - Test A (Total Metal
			Sample I.D.		B19-22803-1	B19-22803-2	B19-22803-3	B19-22803-4
			Date Collecte	ed	24-Jul-19	24-Jul-19	24-Jul-19	24-Jul-19
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Strontium	mg/L	0.001	SM 3120	30-Jul-19/O	0.008		0.008	
Strontium	mg/L	0.001	SM 3120	26-Jul-19/O		0.009		0.009
Thallium	mg/L	0.00005	EPA 200.8	02-Aug-19/O	< 0.00005		< 0.00005	
Thallium	mg/L	0.00005	EPA 200.8	29-Jul-19/O		< 0.00005		< 0.00005
Tin	mg/L	0.05	SM 3120	30-Jul-19/O	< 0.05		< 0.05	
Tin	mg/L	0.05	SM 3120	26-Jul-19/O		< 0.05		< 0.05
Titanium	mg/L	0.005	SM 3120	30-Jul-19/O	< 0.005		< 0.005	
Titanium	mg/L	0.005	SM 3120	26-Jul-19/O		< 0.005		< 0.005
Uranium	mg/L	0.00005	EPA 200.8	02-Aug-19/O	< 0.00005		< 0.00005	
Uranium	mg/L	0.00005	EPA 200.8	29-Jul-19/O		< 0.00005		< 0.00005
Vanadium	mg/L	0.0001	EPA 200.8	02-Aug-19/O	< 0.0001		< 0.0001	
Vanadium	mg/L	0.0001	EPA 200.8	29-Jul-19/O		< 0.0001		< 0.0001
Zinc	mg/L	0.005	SM 3120	30-Jul-19/O	< 0.005		0.005	
Zinc	mg/L	0.005	SM 3120	26-Jul-19/O		< 0.005		0.007
Total Organic Carbon	mg/L	0.2	EPA 415.1	29-Jul-19/O	2.0		1.9	
TIC	mg/L	0.5	EPA 415.1	29-Jul-19/O	2.5		1.8	
Fecal Coliform	cfu/100mL	1	MOE E3371	25-Jul-19/O	< 2		< 2	
Anion Sum	meq/L		Calc.	30-Jul-19/O	0.239		0.219	
Cation Sum	meq/L		Calc.	30-Jul-19/O	0.243		0.253	
% Difference	%		Calc.	30-Jul-19/O	0.773		7.19	
Ion Ratio	AS/CS		Calc.	30-Jul-19/O	0.985		0.866	
Sodium Adsorption Ratio	-		Calc.	30-Jul-19/O	0.0792		0.0841	
Conductivity (calc.)	µmho/cm		Calc.	30-Jul-19/O	25		25	
EC(calc.)/EC(actual)	-		Calc.	30-Jul-19/O	1.02		0.902	
TDS(calc.)/EC(actual)	-		Calc.	30-Jul-19/O	0.497		0.425	

R.L. = Reporting Limit

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



**Final Report** 

C.O.C.: G72042 REPORT No. B19-22803

Report To: Caduceon Environmental Laboratories

City of Iqaluit 2378 Holly Lane

PO Box 460, Ottawa Ontario K1V 7P1 Iqaluit NU X0A 0H0 Tel: 613-526-0123

Attention: Pat Wolfe Fax: 613-526-1244

DATE RECEIVED: 25-Jul-19 JOB/PROJECT NO.: Test A (WTP)

DATE REPORTED: 07-Aug-19 P.O. NUMBER: SAMPLE MATRIX: Drinking Water WATERWORKS NO.

			Client I.D.		WTP Raw - Test A	WTP Raw Test A (Total Metal)	WTP Treated - Test A	WTP Treated - Test A (Total Metal
			Sample I.D.		B19-22803-1	B19-22803-2	B19-22803-3	B19-22803-4
			Date Collected		24-Jul-19	24-Jul-19	24-Jul-19	24-Jul-19
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Langelier Index(25°C)	S.I.		Calc.	30-Jul-19/O	-2.72		-3.39	

<sup>1</sup> Subcontracted to Testmark Labs

R.L. = Reporting Limit

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

							TES	TING F	REQUIRE	MENTS	3				MA		REF	ORT NUM	BER (Lab	Use)
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	ENVIRONMENTAL LA	BORATORIES	27	Yes		Record of Site Co	ondition	(0	D.Reg 153)	-	Disposa			4	2	1		101	1	<b>A</b>
	Clier	it committed. Quality assu	ired.		cial Water Quality C	Objectives				Ļ	Landfill	Monitori	ng			4	-9	177	(OL	1
					Jse By-Law:				<b></b>		Other: _			-		_ (				
Are a	any samples to be submitted int						\(\rac{1}{2}\)										king Water		ustody)	
		oratory Samples are			☐ King	ston	Ottawa	a		hmon			lindsor		Barrie	)	Lon			, 11,
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		mple Matrix Legend: WW	=Waste Wa	ater, SW=Surfa	ice Water, GW=Gr	oundwater, LS=L	iquid Slu	udge, S	S=Solid S	ludge,	S=Soil, Sec	=Sedime	ent, PC=Pa	int Chips	, F=Filte			io bate.		ECV. TURNAM
Lab				Sample	Date Collected	Time			- 1	ndicate	Test For Ea	ch Samp	ole			.,	Fie	eld	# Bottles/	Field
No:	Sample Identificat	ion	S.P.L.	Matrix *	(yy-mm-dd)	Collected			By Usin	g A Che	eck Mark In	The Box	Provided			V	pH	Temp.	Control Property	Filtered(Y/N)
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Quote #:

YD18\_lqaluit\_F

Organization:

City of Igaluit

Contact:

Mike Hatfield 867-979-6363

Telephone:

Facsimile:

M.Hatfield@city.lqaluit.nu.ca

Project #:

TEST F - Sewage Lagoon

Address:

Box 460, Iqaluit NU, X0A 0H0

Additional Info:

QUOTE # ('S) MUST BE ON C OF C TO APPLY if not listed, General pricing will be applied.

Additional Info:

Replacing Quote YD17\_lqaluit\_F\_REV1

Date:

Email:

1-Mar-18

Valid Until:

31-Dec-19

item #	Quantity	Analysis Request	Matrix	Unit Cost, \$	Amount, \$
1	1	BOD	WW	30.00	30.00
2	1	Total Coliform / Fecal Coliform	WW	31.00	31.00
3	1	Ammonia, NO2/NO3	ww	30.00	30.00
4	1	Total Phosphorus	ww	17.50	17.50
5	1	Orthophosphate	ww	17.50	17.50
6	1	Conductivity	ww	9.45	9.45
7	1	TSS	WW	17.50	17.50
8	1	pH	ww	9.00	9.00
9	1	TOTAL METALS ICPOES AI, Ba, Be, Cr, Co, Cu, Fe, Li, Mn, Mo, Ni, Sn, Sr, Ti, V, Zn ICPMS Sb, As, Cd, Pb, Se, Ag, Tl, U CVAAS Hg	ww	92.00	92.00
10	1	Ottawa Airport Pick Up		25.00	25.00
not include shippir	ng unless otherwise state	d.		Subtotal	278 95

Environmental Surcharge of \$1.50 per sample set

25.00	25.00
Subtotal	278.95
HST	36.26
Total Cost	315.21

Rebecca Marshall

Customer Service Representative

Caduceon Environmental Laboratories

rmarshall@caduceonlabs.com

613-526-0123



Final Report

C.O.C.: G72043 **REPORT No. B19-22809** 

**Report To:** 

City of Iqaluit PO Box 460,

Iqaluit NU X0A 0H0

**Attention:** Emmanuel Kayode

DATE RECEIVED: 25-Jul-19

DATE REPORTED: 01-Aug-19

SAMPLE MATRIX: Waste Water

**Caduceon Environmental Laboratories** 

2378 Holly Lane

Ottawa Ontario K1V 7P1

Tel: 613-526-0123

Fax: 613-526-1244

JOB/PROJECT NO.: Test F

P.O. NUMBER: 460

WATERWORKS NO.

			Client I.D.		WWTP Influent	WWTP Effluent	
			Sample I.D.		B19-22809-1	B19-22809-2	
			Date Collected		24-Jul-19	24-Jul-19	
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed		1	
BOD(5 day)	mg/L	3	SM 5210B	26-Jul-19/K	171	73	
Total Suspended Solids	mg/L	3	SM2540D	29-Jul-19/K	480	80	
Conductivity @25°C	µmho/cm	1	SM 2510B	25-Jul-19/O	358	349	
pH @25°C	pH Units		SM 4500H	26-Jul-19/O	7.58	7.55	
Nitrite (N)	mg/L	0.1	SM4110C	25-Jul-19/O	< 0.1	< 0.1	
Nitrate (N)	mg/L	0.1	SM4110C	25-Jul-19/O	< 0.1	< 0.1	
Ammonia (N)-Total	mg/L	0.01	SM4500- NH3-H	30-Jul-19/K	17.6	17.7	
o-Phosphate (P)	mg/L	0.002	PE4500-S	30-Jul-19/K	2.93	3.24	
Phosphorus-Total	mg/L	0.01	E3199A.1	29-Jul-19/K	4.16	4.00	
Aluminum	mg/L	0.01	SM 3120	26-Jul-19/O	0.39	0.27	
Antimony	mg/L	0.0005	EPA 200.8	29-Jul-19/O	< 0.0005	< 0.0005	
Arsenic	mg/L	0.0005	EPA 200.8	29-Jul-19/O	< 0.0005	< 0.0005	
Barium	mg/L	0.001	SM 3120	26-Jul-19/O	0.011	0.008	
Beryllium	mg/L	0.002	SM 3120	26-Jul-19/O	< 0.002	< 0.002	
Cadmium	mg/L	).000070	EPA 200.8	29-Jul-19/O	0.000222	0.000147	
Chromium	mg/L	0.002	SM 3120	26-Jul-19/O	< 0.002	< 0.002	
Cobalt	mg/L	0.005	SM 3120	26-Jul-19/O	< 0.005	< 0.005	
Copper	mg/L	0.002	SM 3120	26-Jul-19/O	0.355	0.266	
Iron	mg/L	0.005	SM 3120	26-Jul-19/O	0.679	0.411	
Lead	mg/L	0.0001	EPA 200.8	29-Jul-19/O	0.0024	0.0018	
Lithium	mg/L	0.01	SM 3120	26-Jul-19/O	< 0.01	< 0.01	
Manganese	mg/L	0.001	SM 3120	26-Jul-19/O	0.066	0.060	
Mercury	mg/L	0.00002	SM 3112 B	30-Jul-19/O	0.00004	0.00004	
Molybdenum	mg/L	0.01	SM 3120	26-Jul-19/O	< 0.01	< 0.01	
Nickel	mg/L	0.01	SM 3120	26-Jul-19/O	< 0.01	< 0.01	
Selenium	mg/L	0.005	EPA 200.8	29-Jul-19/O	< 0.005	< 0.005	

R.L. = Reporting Limit

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

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

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



**Caduceon Environmental Laboratories** 

460

Final Report

C.O.C.: G72043 **REPORT No. B19-22809** 

**Report To:** 

City of Iqaluit PO Box 460,

Iqaluit NU X0A 0H0

**Attention:** Emmanuel Kayode

DATE RECEIVED: 25-Jul-19

DATE REPORTED: 01-Aug-19 SAMPLE MATRIX: Waste Water

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

2378 Holly Lane

Tel: 613-526-0123

Fax: 613-526-1244

Ottawa Ontario K1V 7P1

WATERWORKS NO.

			Client I.D.		WWTP Influent	WWTP Effluent	
			Sample I.D.		B19-22809-1	B19-22809-2	
			Date Collecte	ed	24-Jul-19	24-Jul-19	
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed			
Silver	mg/L	0.0001	EPA 200.8	29-Jul-19/O	0.0001	< 0.0001	
Strontium	mg/L	0.001	SM 3120	26-Jul-19/O	0.028	0.028	
Thallium	mg/L	0.0003	EPA 200.8	29-Jul-19/O	< 0.0003	< 0.0003	
Tin	mg/L	0.05	SM 3120	26-Jul-19/O	< 0.05	< 0.05	
Titanium	mg/L	0.005	SM 3120	26-Jul-19/O	0.006	< 0.005	
Uranium	mg/L	0.0003	EPA 200.8	29-Jul-19/O	< 0.0003	< 0.0003	
Vanadium	mg/L	0.005	SM 3120	26-Jul-19/O	< 0.005	< 0.005	
Zinc	mg/L	0.005	SM 3120	26-Jul-19/O	0.151	0.103	
Total Coliform	cfu/100mL	1	MOE E3371	25-Jul-19/O	20000000	200000	
Fecal Coliform	cfu/100mL	1	MOE E3371	25-Jul-19/O	3100000	42000	

R.L. = Reporting Limit

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

	y							TES	TING R	QUIRE	MENTS	3					A	10	I	PRTITUI	(Lab	Use)
	A 195 1 1	port, post		A A TH	O.Reg	153	Table					MIS	A Guid	elines			41	V	70	1.1	1	
(	A-D U	CE		N	Surface	Soil	Sub Surfac	e Soil	(0.	Reg 153)		O.R	eg 558	Leacha	te Analysi	s	4.5	٠ _				
	ENVIRONMENT		U.		Yes	☐ No	Record of Site C	ondition	(0.	Reg 153)		Dis	posal S	ite:	5			- 1		01	9	1 4
		Client comm	nitted. Quality a	ssured.	Province	cial Water Quality C	Objectives					Lan	dfill Mo	nitorin	g		14	M	7-	16		
	μ.	F. —			Sewer I	Use By-Law:					[	Oth	er:				L					
Are ar	ny samples to be subr	mitted intended	for Human C	onsumption	under any D	rinking Water Re	gulations?		Yes [	No	(If ye	s, subr	nit all	Drinkiı	ng Water	Sample	s on a	Drink	ing Water	Chain of C	ustody)	
	Indic	cate Laborator	ry Samples	are submit	ted to:	☐ King	ston	Ottaw	a	Ric	hmon	d Hill		☐ Wi	ndsor		Barrie	9	Lone	don		455
Organizati	on:	Addres	ss and Invoici	ng Address	(if different)		,			ANALY	SES R	EQUES	STED (	Print T	est in Bo	xes)				IRNAROU		
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Lab		* Sample Ma	atrix Legend: V	vvv=vvaste vva	Sample	Date Collected	Time	Iquia Sii	uage, Sa		ndicate					nt Chips,	, F=Filt	er, Oi	I = OII Fie	ald	# Bottles/	Field
No:	Sample I	Identification		S.P.L.	Matrix *	(yy-mm-dd)	Collected								rovided			~	рН	Temp.	Sample	Filtered(Y/N)
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(3)										+	1	-		λ					6.19	15.7	10	
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	Sampled by:		Submitted	by:	Client's Cou	ırier 💢	Invoice	Report	by Fax			Recei	ved By	(print	):	X	h		Signature:	003		
Print:		219		<b>F</b>	Caduceon's	Courier		Report	t by Ema	nil	X	Date F	Receiv	ed (yy-	mm-dd):	2/16	08/		Time Rece		14:1	0
Sign:					Drop Off		# of Pieces	Invoice	e by Em	ail		TV - TO V	TOTAL	, INCH	ed Bottles		X			No		
	WE TO THE		The bas	. 17 190	Caduceon (	Pick-up)		Invoice	e by Mai	ı										0	0.0	
	Date (yy-mm-dd)/Tin	me:	Date (yy-mm-do	l)/Time:				White.	41/1			Samp	le Tem	peratu	re °C: /	2,1			Labeled by	: 2		
Comments	<u>:</u>											37	4-1	Per	# /N/	12/	nt/	boc	tage	49	of	
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	Mary College of the C													-	,				1 6	-04		

Quote #: YD18 Igaluit A

Organization: City of Iqaluit Contact: Mike Hatfield

Telephone: 867-979-6363

Facsimile:

Email: M.Hatfield@city.lgaluit.nu.ca Project #: **TEST A - Drinking Water** Address: Box 460, Iqaluit NU, X0A 0H0

Additional Info: QUOTE # ('S) MUST BE ON C OF C TO APPLY if not listed, General pricing will be applied.

Additional Info: Replacing Quote YD17\_Iqaluit\_A\_Rev1

Date: 26-Feb-18 Valid Until: 31-Dec-19

ltem #	Quantity	Analysis Request	Matrix	Unit Cost, \$	Amount, \$
1	1	Acidity (Subcontracted)	DW	33.50	33.50
2	1	Alkalinity	DW	14.50	14.50
3	1	Bicarbonate/ Carbonate	DW	17.50	17.50
4	1	Chloride/Sulphate	DW	23.75	23.75
5	1	Conductivity	DW	9.45	9.45
6	1	Hydroxide	DW	14.50	14.50
7	1	Redox Potential	DW	15.75	15.75
8	1	TDS	DW	17.50	17.50
9	1	TSS	DW	17.50	17.50
10	1	TOC	DW	23.75	23.75
11	1	TIC	DW	23.75	23.75
12	1	TOTAL METALS ICPOES AI, Ba, Be, Cr, Co, Cu, Fe, Li, Mn, Mo, Ni, Sn, Sr, Ti, V, Zn + Hardness ICPMS Sb, As, Cd, Pb, Se, Ag, Tl, U CVAAS Hg	DW	92.00	92.00
13	1	DISSOLVED METALS ICPOES AI, Ba, Be, Cr, Co, Cu, Fe, Li, Mn, Mo, Ni, Sn, Sr, Ti, V, Zn + Hardness ICPMS Sb, As, Cd, Pb, Se, Ag, Tl, U CVAAS Hg	DW	92.00	92.00
14	1	Fecal Coliforms	DW	16.25	16.25
15	1	pH	DW	9.00	9.00
16	1	Turbidity	DW	14.50	14.50
17	1	Ottawa Airport Pick Up		25.00	25.00
es do not include shippir	a unless otherwise state			Subtotal	460.20

**Environmental Surcharge of \$1.50 per sample set** 

HST 59.83 **Total Cost** 520.03

Rebecca Marshall

**Customer Service Representative** 

**Caduceon Environmental Laboratories** 

rmarshall@caduceonlabs.com

613-526-0123



#### **GENERAL CHAIN OF CUSTODY FORM**

Page	of
rage	UI

Please use our Drinking Water Chain of Custody Form for regulated drinking water samples

REPORT	TO:			1000000 10		E T	0: (	if d	iffere	ent f	rom	Rep	ort	)					PRO	DJECT IN	IFORMA <sup>*</sup>	TION:	
Client:		Cadu	ceon Environmental L	aboratories	Client		Cadu	iceon	Envi	ronme	ental L	.abora	torie	S							uote #:		
Address:			2378 Holly Lane		Addre	ss:	285	Dalto	n Av	enue										Client	t P.O. #: <b>P</b>	190822_	TM
			Ottawa ON, K1V 7	P1		1	Kings	ston (	ON											Client	t Project #:		
Contact:			Greg Clarkin			1	K7K	6Z1							25								
mail:		gcl	arkin@caduceonla	bs.com	Email:		<u>mm</u>	ccor	rmic	k@ca	duce	eonla	bs.c	<u>:om</u>									
Phone:	613-526-012	3	Fax: 613-526-	1244	Phone	):	6135	4420	001			Fax:		6135	44277	0							
REPORTI	NG/INVOIC	NG FORMAT	TURN ARG	OUND TIME (TAT)*							Ana	LYSI	s Re	QUES	TED						LABORA	TORY US	SE ONLY
□Fax	☑Email	□Mail	□1 Business Day	☐2 Business Days	CONTAINERS												(e)			Q	Wo	RK ORDER	Number:
QC	DATA REP	ORTED	☐3 Business Day	s	TAIN											Colhecilone	(if applicable)			RECEIVED			
□Yes		□No			NO											ا ا	арр	IE.		SEC.			
S	MPLE DISP	OSAL	SPECIFIC DATE:		OF C											2	=	FIELD					
□Hold	□Dispose	□Return		ements must be made for ekend/holiday work		7										. Ho	TEMP	IE.		CONTAINERS			
	SAMPLIN	IG		DESCRIPTION	NUMBER	ipi										2		METALS	(Y/N?)	YTA			
DATE mm-dd-yy	TIME	MATRIX**	(This Will A	ppear On The Report)	ž	Acidity										II.	FIELD	Σ	3	CO	ТЕМР	Btl. Type	Lab ID
7/24/19		WW	19-26341-1		X																		
7/24/19	am	WW	E	19-26341-3		X																	
8/20/19	pm	WW		19-26402-1		Х																	
8/20/19	pm	WW	E	19-26402-2		X																	
8/20/19	pm	WW	E	19-26402-3		Х																	
8/20/19	pm	WW		19-26402-4		Х																	
8/20/19	pm	WW		19-26402-5		Χ																	
8/20/19	pm	WW		19-26402-6		X																	
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Client	ppled By t Date								ped												Shipping	Referenc	e
Receive	d By	Date	Time	9		Rece	eive	d at T	Testn	nark	Ву								Date		Time		



Final Report

C.O.C.: DW 72041 REPORT No. B19-26341

Report To:

City of Iqaluit PO Box 460,

Iqaluit NU X0A 0H0

**Attention:** Emmanuel Kayode

DATE RECEIVED: 21-Aug-19

DATE REPORTED: 06-Sep-19

SAMPLE MATRIX: Drinking Water

**Caduceon Environmental Laboratories** 

2378 Holly Lane

Ottawa Ontario K1V 7P1

Tel: 613-526-0123 Fax: 613-526-1244

JOB/PROJECT NO.: Test A (WTP)

P.O. NUMBER:

WATERWORKS NO.

			Client I.D.		WTP Raw - Test A	WTP Raw - Test A (Total)	WTP Potable - Test A	WTP Potable - Test A (Total)
			Sample I.D.		B19-26341-1	B19-26341-2	B19-26341-3	B19-26341-4
			Date Collecte	ed	20-Aug-19	20-Aug-19	20-Aug-19	20-Aug-19
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Hardness (as CaCO3)	mg/L	1	SM 3120	27-Aug-19/O	13		13	
Hardness (as CaCO3)	mg/L	1	SM 3120	23-Aug-19/O		15		14
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	22-Aug-19/O	11		7	
Bicarbonate(as CaCO3)	mg/L	5	SM 2320B	22-Aug-19/O	11		7	
Carbonate (as CaCO3)	mg/L	5	SM 2320B	22-Aug-19/O	< 5		< 5	
Hydroxide	mg/L	5	EPA 310.2	22-Aug-19/O	< 5		< 5	
Acidity (as CaCO3)	mg/L	5	Subcontract	27-Aug-19	< 5		8 1	
pH @25°C	pH Units		SM 4500H	22-Aug-19/O	6.89		6.55	
Conductivity @25°C	µmho/cm	1	SM 2510B	22-Aug-19/O	30		33	
TDS(ion sum calc.)	mg/L	1	Calc.	27-Aug-19/O	15		16	
Total Suspended Solids	mg/L	3	SM2540D	22-Aug-19/K	< 3		< 3	
Turbidity	NTU	0.1	SM 2130	29-Aug-19/O	1.1		0.4	
REDOX potential	mV		In-House	23-Aug-19/R	404		754	
Chloride	mg/L	0.5	SM4110C	26-Aug-19/O	< 0.5		2.9	
Sulphate	mg/L	1	SM4110C	26-Aug-19/O	3		3	
Aluminum	mg/L	0.01	SM 3120	27-Aug-19/O	0.03		< 0.01	
Aluminum	mg/L	0.01	SM 3120	23-Aug-19/O		0.05		0.01
Antimony	mg/L	0.0001	EPA 200.8	26-Aug-19/O	< 0.0001		< 0.0001	
Antimony	mg/L	0.0001	EPA 200.8	22-Aug-19/O		0.0002		0.0002
Arsenic	mg/L	0.0001	EPA 200.8	26-Aug-19/O	< 0.0001		0.0001	
Arsenic	mg/L	0.0001	EPA 200.8	22-Aug-19/O		< 0.0001		0.0001
Barium	mg/L	0.001	SM 3120	27-Aug-19/O	0.001		0.001	
Barium	mg/L	0.001	SM 3120	23-Aug-19/O		0.002		0.001
Beryllium	mg/L	0.002	SM 3120	27-Aug-19/O	< 0.002		< 0.002	
Beryllium	mg/L	0.002	SM 3120	23-Aug-19/O		< 0.002		< 0.002
Cadmium	mg/L	).000015	EPA 200.8	26-Aug-19/O	< 0.000015		< 0.000015	

R.L. = Reporting Limit

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

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



Final Report

C.O.C.: DW 72041 REPORT No. B19-26341

Report To:

City of Iqaluit PO Box 460,

Iqaluit NU X0A 0H0

**Attention:** Emmanuel Kayode

DATE RECEIVED: 21-Aug-19

DATE REPORTED: 06-Sep-19

SAMPLE MATRIX: Drinking Water

**Caduceon Environmental Laboratories** 

2378 Holly Lane

Ottawa Ontario K1V 7P1

Tel: 613-526-0123 Fax: 613-526-1244

JOB/PROJECT NO.: Test A (WTP)

P.O. NUMBER:

WATERWORKS NO.

			Client I.D.		WTP Raw - Test A	WTP Raw - Test A (Total)	WTP Potable - Test A	WTP Potable - Test A (Total)
			Sample I.D.		B19-26341-1	B19-26341-2	B19-26341-3	B19-26341-4
			Date Collect	ed	20-Aug-19	20-Aug-19	20-Aug-19	20-Aug-19
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed		•		
Cadmium	mg/L	0.000015	EPA 200.8	22-Aug-19/O		< 0.000015		< 0.000015
Chromium	mg/L	0.002	SM 3120	27-Aug-19/O	< 0.002		< 0.002	
Chromium	mg/L	0.002	SM 3120	23-Aug-19/O		< 0.002		< 0.002
Cobalt	mg/L	0.005	SM 3120	27-Aug-19/O	< 0.005		< 0.005	
Cobalt	mg/L	0.005	SM 3120	23-Aug-19/O		< 0.005		< 0.005
Copper	mg/L	0.002	SM 3120	27-Aug-19/O	< 0.002		0.055	
Copper	mg/L	0.002	SM 3120	23-Aug-19/O		< 0.002		0.063
Iron	mg/L	0.005	SM 3120	27-Aug-19/O	0.048		0.036	
Iron	mg/L	0.005	SM 3120	23-Aug-19/O		0.097		0.060
Lead	mg/L	0.00002	EPA 200.8	26-Aug-19/O	0.00004		0.00020	
Lead	mg/L	0.00002	EPA 200.8	22-Aug-19/O		0.00005		0.00020
Lithium	mg/L	0.01	SM 3120	27-Aug-19/O	< 0.01		< 0.01	
Lithium	mg/L	0.01	SM 3120	23-Aug-19/O		< 0.01		< 0.01
Manganese	mg/L	0.001	SM 3120	27-Aug-19/O	0.022		0.003	
Manganese	mg/L	0.001	SM 3120	23-Aug-19/O		0.023		0.003
Mercury	mg/L	0.00002	SM 3112 B	27-Aug-19/O	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	mg/L	0.01	SM 3120	27-Aug-19/O	< 0.01		< 0.01	
Molybdenum	mg/L	0.01	SM 3120	23-Aug-19/O		< 0.01		< 0.01
Nickel	mg/L	0.01	SM 3120	27-Aug-19/O	< 0.01		< 0.01	
Nickel	mg/L	0.01	SM 3120	23-Aug-19/O		< 0.01		< 0.01
Selenium	mg/L	0.001	EPA 200.8	26-Aug-19/O	< 0.001		< 0.001	
Selenium	mg/L	0.001	EPA 200.8	22-Aug-19/O		< 0.001		< 0.001
Silver	mg/L	0.0001	EPA 200.8	26-Aug-19/O	< 0.0001		< 0.0001	
Silver	mg/L	0.0001	EPA 200.8	22-Aug-19/O		< 0.0001		< 0.0001
Strontium	mg/L	0.001	SM 3120	27-Aug-19/O	0.010		0.009	
Strontium	mg/L	0.001	SM 3120	23-Aug-19/O		0.010		0.009

R.L. = Reporting Limit

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



Final Report

C.O.C.: DW 72041 REPORT No. B19-26341

Report To:

City of Iqaluit PO Box 460,

Iqaluit NU X0A 0H0

**Attention:** Emmanuel Kayode

DATE RECEIVED: 21-Aug-19

DATE REPORTED: 06-Sep-19

SAMPLE MATRIX: Drinking Water

**Caduceon Environmental Laboratories** 

2378 Holly Lane

Ottawa Ontario K1V 7P1 Tel: 613-526-0123

Fax: 613-526-1244

JOB/PROJECT NO.: Test A (WTP)

P.O. NUMBER:

WATERWORKS NO.

					WTP Raw - Test A	WTP Raw - Test A (Total)	WTP Potable -	WTP Potable -
						, ,	Test A	Test A (Total)
			Sample I.D.		B19-26341-1	B19-26341-2	B19-26341-3	B19-26341-4
			Date Collecte	ed	20-Aug-19	20-Aug-19	20-Aug-19	20-Aug-19
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Thallium	mg/L	0.00005	EPA 200.8	26-Aug-19/O	< 0.00005		< 0.00005	
Thallium	mg/L	0.00005	EPA 200.8	22-Aug-19/O		< 0.00005		< 0.00005
Tin	mg/L	0.05	SM 3120	27-Aug-19/O	< 0.05		< 0.05	
Tin	mg/L	0.05	SM 3120	23-Aug-19/O		< 0.05		< 0.05
Titanium	mg/L	0.005	SM 3120	27-Aug-19/O	< 0.005		< 0.005	
Titanium	mg/L	0.005	SM 3120	23-Aug-19/O		< 0.005		< 0.005
Uranium	mg/L	0.00005	EPA 200.8	26-Aug-19/O	< 0.00005		< 0.00005	
Uranium	mg/L	0.00005	EPA 200.8	22-Aug-19/O		< 0.00005		< 0.00005
Vanadium	mg/L	0.005	SM 3120	27-Aug-19/O	< 0.005		< 0.005	
Vanadium	mg/L	0.005	SM 3120	23-Aug-19/O		< 0.005		< 0.005
Zinc	mg/L	0.005	SM 3120	27-Aug-19/O	< 0.005		< 0.005	
Zinc	mg/L	0.005	SM 3120	23-Aug-19/O		< 0.005		0.006
Total Organic Carbon	mg/L	0.2	EPA 415.1	22-Aug-19/O	1.7		1.6	
TIC	mg/L	0.5	EPA 415.1	22-Aug-19/O	3.41		2.59	
Fecal Coliform	cfu/100mL	1	MOE E3371	21-Aug-19/O	0		0	
Anion Sum	meq/L		Calc.	27-Aug-19/O	0.283		0.288	
Cation Sum	meq/L		Calc.	27-Aug-19/O	0.297		0.317	
% Difference	%		Calc.	27-Aug-19/O	2.39		4.90	
Ion Ratio	AS/CS		Calc.	27-Aug-19/O	0.953		0.907	
Sodium Adsorption Ratio	-		Calc.	27-Aug-19/O	0.0782		0.155	
Conductivity (calc.)	µmho/cm		Calc.	27-Aug-19/O	31		34	
EC(calc.)/EC(actual)	-		Calc.	27-Aug-19/O	1.04		1.03	
TDS(calc.)/EC(actual)	-		Calc.	27-Aug-19/O	0.518		0.490	
Langelier Index(25°C)	S.I.		Calc.	27-Aug-19/O	-2.78		-3.35	

1 Subcontracted to Testmark Labs

R.L. = Reporting Limit

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

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

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Are any samples to b	e submitted i	ntended for Human (	Consumption	n under any D	rinking Water Re	egulations?		Yes	No (If	yes, s	ubmit a	II Drinkin	g Water	Samples of	n a Drin	king Water	Chain of C	ustody)	
and a second	Indicate L	aboratory Samples	s are submi	tted to:	☐ King	gston	1 Ot	tawa		Richr	nond H	lill		Vindsor		Londo	on		
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Email: e- Kayode @ City	· I gant nuce	ample Matrix Legend:	WW=Waste W			roundwater, LS=	Liquid SI	udge, SS=S	Solid Slude	1e, S=S	Soil, Sed	=Sedimen	t, PC=Pai	nt Chips, F:			ic Date: _		
Lab No:	Sample Identific		S.P.L.	Sample Matrix *	Date Collected (yy-mm-dd)	Time Collected			Indic	ate Tes	t For Ea	ch Sample The Box Pr			V	pH Fie	eld Temp.	# Bottles/ Sample	Field Filtered(Y/N)
ww	TP T	nfluent		winter	Aug 20		~			0	SŁ	F				7.32	17.9	6	- 4
ww	TP i	-ffluent		MM	Auggo		~			Te	5}	7				6.07	16.6	6	
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Sample		Submitted	d by:	Client's Cou	i-6	Invoice		t by Fax	Ĺ		ceived	By (print)		sel	ALC MARK	Signature:	7 7 7 7		
Print: Emma	in wel Kan	nde Emman	vel Kayel	Caduceon's	.,~		Repor	t by Email	Į	Da	te Rece	ived (yy-	mm-dd):	2110	6/19	Time Rece	eived: /C	1100	
Sign: 19/09	6 20	Kale	6/20	Drop Off Caduceon (	(Bick up)	# of Pieces		e by Email		La	borator	y Prepare	d Bottle	s:	Yes		No		
Date (yy-mn		Date (yy-mm-c		Caddceon (	Flor-up)		1	e by Mail	1.300			emperatu				Labeled by	y:		
Solilliono.							K+l	PETS /	NID	X		Lay + 1	640			Page	651	of	



Final Report

C.O.C.: G65198 REPORT No. B19-26346

Report To:

City of Iqaluit

PO Box 460,

Iqaluit NU X0A 0H0

**Attention:** Emmanuel Kayode

DATE RECEIVED: 21-Aug-19

DATE REPORTED: 28-Aug-19

SAMPLE MATRIX: Waste Water

**Caduceon Environmental Laboratories** 

2378 Holly Lane

Ottawa Ontario K1V 7P1

Tel: 613-526-0123

Fax: 613-526-1244

JOB/PROJECT NO.: Test F

P.O. NUMBER:

WATERWORKS NO.

			Client I.D.		WWTP Influent	WWTP Effluent	
			Sample I.D.		B19-26346-1	B19-26346-2	
			Date Collect	ed	20-Aug-19	20-Aug-19	
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed			
BOD(5 day)	mg/L	3	SM 5210B	23-Aug-19/K	211	893	
Total Suspended Solids	mg/L	3	SM2540D	22-Aug-19/K	330	3050	
Conductivity @25°C	µmho/cm	1	SM 2510B	22-Aug-19/O	509	612	
pH @25°C	pH Units		SM 4500H	22-Aug-19/O	7.20	7.32	
Nitrite (N)	mg/L	0.1	SM4110C	26-Aug-19/O	< 0.1	< 0.1	
Nitrate (N)	mg/L	0.1	SM4110C	26-Aug-19/O	< 0.1	< 0.1	
Ammonia (N)-Total	mg/L	0.01	SM4500- NH3-H	26-Aug-19/K	31.1	53.5	
o-Phosphate (P)	mg/L	0.002	PE4500-S	26-Aug-19/K	5.04	8.95	
Phosphorus-Total	mg/L	0.01	E3199A.1	23-Aug-19/K	7.58	9.80	
Aluminum	mg/L	0.01	SM 3120	23-Aug-19/O	1.07	3.65	
Antimony	mg/L	0.0005	EPA 200.8	27-Aug-19/O	0.0008	0.0018	
Arsenic	mg/L	0.0005	EPA 200.8	27-Aug-19/O	0.0008	0.0022	
Barium	mg/L	0.001	SM 3120	23-Aug-19/O	0.029	0.107	
Beryllium	mg/L	0.002	SM 3120	23-Aug-19/O	< 0.002	< 0.002	
Cadmium	mg/L	).000070	EPA 200.8	27-Aug-19/O	0.000599	0.00145	
Chromium	mg/L	0.002	SM 3120	23-Aug-19/O	0.005	0.019	
Cobalt	mg/L	0.005	SM 3120	23-Aug-19/O	< 0.005	< 0.005	
Copper	mg/L	0.002	SM 3120	23-Aug-19/O	0.565	1.86	
Iron	mg/L	0.005	SM 3120	23-Aug-19/O	2.60	20.4	
Lead	mg/L	0.0001	EPA 200.8	27-Aug-19/O	0.0110	0.0422	
Lithium	mg/L	0.01	SM 3120	23-Aug-19/O	< 0.01	< 0.01	
Manganese	mg/L	0.001	SM 3120	23-Aug-19/O	0.146	0.470	
Mercury	mg/L	0.00002	SM 3112 B	27-Aug-19/O	0.00004	0.00015	
Molybdenum	mg/L	0.01	SM 3120	23-Aug-19/O	< 0.01	< 0.01	
Nickel	mg/L	0.01	SM 3120	23-Aug-19/O	< 0.01	0.11	
Selenium	mg/L	0.005	EPA 200.8	27-Aug-19/O	< 0.005	< 0.005	

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

R.L. = Reporting Limit

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

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



Final Report

C.O.C.: G65198 REPORT No. B19-26346

Report To:

City of Iqaluit

PO Box 460,

Iqaluit NU X0A 0H0

**Attention:** Emmanuel Kayode

DATE RECEIVED: 21-Aug-19

DATE REPORTED: 28-Aug-19

SAMPLE MATRIX: Waste Water

**Caduceon Environmental Laboratories** 

2378 Holly Lane

Ottawa Ontario K1V 7P1

Tel: 613-526-0123

Fax: 613-526-1244

JOB/PROJECT NO.: Test F

P.O. NUMBER:

WATERWORKS NO.

			Client I.D.		WWTP Influent	WWTP Effluent	
			Sample I.D.		B19-26346-1	B19-26346-2	
			Date Collect	ed	20-Aug-19	20-Aug-19	
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed			
Silver	mg/L	0.0001	EPA 200.8	27-Aug-19/O	0.0005	0.0018	
Strontium	mg/L	0.001	SM 3120	23-Aug-19/O	0.038	0.141	
Thallium	mg/L	0.0003	EPA 200.8	27-Aug-19/O	< 0.0003	< 0.0003	
Tin	mg/L	0.05	SM 3120	23-Aug-19/O	< 0.05	< 0.05	
Titanium	mg/L	0.005	SM 3120	23-Aug-19/O	0.023	0.052	
Uranium	mg/L	0.0003	EPA 200.8	27-Aug-19/O	0.0003	0.0006	
Vanadium	mg/L	0.005	SM 3120	23-Aug-19/O	< 0.005	< 0.005	
Zinc	mg/L	0.005	SM 3120	23-Aug-19/O	0.368	1.45	
Total Coliform	cfu/100mL	1	MOE E3371	21-Aug-19/O	72000000	41000000	
Fecal Coliform	cfu/100mL	1	MOE E3371	21-Aug-19/O	9800000	3900000	

R.L. = Reporting Limit

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

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YD18 Igaluit A Quote #:

Organization: City of Iqaluit Contact: Mike Hatfield

Telephone: 867-979-6363

Facsimile:

Email: M.Hatfield@city.lgaluit.nu.ca Project #: **TEST A - Drinking Water** Address: Box 460, Iqaluit NU, X0A 0H0

Additional Info:

QUOTE # ('S) MUST BE ON C OF C TO APPLY if not listed, General pricing will be applied.

Additional Info: Replacing Quote YD17\_Iqaluit\_A\_Rev1

Date: 26-Feb-18 Valid Until: 31-Dec-19

Item #	Quantity	Analysis Request	Matrix	Unit Cost, \$	Amount, \$
1	1	Acidity (Subcontracted)	DW	33.50	33.50
2	1	Alkalinity	DW	14.50	14.50
3	1	Bicarbonate/ Carbonate	DW	17.50	17.50
4	1	Chloride/Sulphate	DW	23.75	23.75
5	1	Conductivity	DW	9.45	9.45
6	1	Hydroxide	DW	14.50	14.50
7	1	Redox Potential	DW	15.75	15.75
8	1	TDS	DW	17.50	17.50
9	1	TSS	DW	17.50	17.50
10	1	TOC	DW	23.75	23.75
11	1	TIC	DW	23.75	23.75
12	1	TOTAL METALS ICPOES AI, Ba, Be, Cr, Co, Cu, Fe, Li, Mn, Mo, Ni, Sn, Sr, Ti, V, Zn + Hardness ICPMS Sb, As, Cd, Pb, Se, Ag, Tl, U CVAAS Hg	DW	92.00	92.00
13	1	DISSOLVED METALS ICPOES AI, Ba, Be, Cr, Co, Cu, Fe, Li, Mn, Mo, Ni, Sn, Sr, Ti, V, Zn + Hardness ICPMS Sb, As, Cd, Pb, Se, Ag, TI, U CVAAS Hg	DW	92.00	92.00
14	111	Fecal Coliforms	DW	16.25	16.25
15	1	pH	DW	9.00	9.00
16	1	Turbidity	DW	14.50	14.50
17	11	Ottawa Airport Pick Up		25.00	25.00
do not include shippir	ng unless otherwise state	d.		Subtotal	460.20
onmental Surch	arge of \$1.50 per s	sample set		HST	59.83

59.83 **Total Cost** 520.03

Rebecca Marshall **Customer Service Representative Caduceon Environmental Laboratories** rmarshall@caduceonlabs.com

613-526-0123



#### **GENERAL CHAIN OF CUSTODY FORM**

Page	of	
3 -		

Please use our Drinking Water Chain of Custody Form for regulated drinking water samples INVOICE TO: (if different from Report) PROJECT INFORMATION: REPORT TO: Client: Client: Caduceon Environmental Laboratories TM Quote #: Caduceon Environmental Laboratories Client P.O. #: P190925\_TM Address: 285 Dalton Avenue Address: 2378 Holly Lane Ottawa ON, K1V 7P1 Kingston ON Client Project #: Greg Clarkin K7K 6Z1 Contact: aclarkin@caduceonlabs.com tvapici@caduceonlabs.com Email: mmccormick@caduceonlabs.com Email: Fax: 613-526-1244 Phone: Phone: 613-526-0123 6135442001 Fax: 6135442770 REPORTING/INVOICING FORMAT TURN AROUND TIME (TAT)\* **ANALYSIS REQUESTED** LABORATORY USE ONLY NUMBER OF CONTAINERS ☐2 Business Days ☐1 Business Day METALS FIELD FILTERED ∏Mail WORK ORDER NUMBER: □Fax ☑Email FIELD TEMP (if applicable) RECEIVED FIELD pH (if applicable) □3 Business Davs **✓** Standard **QC DATA REPORTED** ∏No □Yes SAMPLE DISPOSAL SPECIFIC DATE: CONTAINERS \* Prior arrangements must be made for □Hold □Dispose □Return rush/weekend/holiday work Acidity SAMPLING SAMPLE DESCRIPTION DATE MATRIX\*\* (This Will Appear On The Report) TIME Btl. Type Lab ID (mm-dd-yy) X 9/25/19 ww B19-30685-1 am 9/23/19 WW B19-30685-3 am 11 □O.Reg. 153: (1 □2 □3 □4 □5 □6 □7 □8 □9 □) \*\*Matrix: B=Biota, GW=Ground Water, O=Oil, P=Paint, S=Soil, SL=Sludge, SW=Surface Water, W=Water, WW=Wastewater, SD=Sediment □Industrial / Commercial ☐Residential / Parkland REGULATION □ Agricultural □Surface ☐Coarse Soil ☐Fine Soil □Subsurface ☐ High Concentrations Expected □O.Reg. 558 □PWQO □MISA □CofA □MMER □EEM □None Sewer Use: □Sanitary □Storm Municipality: COMMENTS/FIELD NOTES: □Other: Relinquished to Testmark By (Signature) Date Time Time Shipped By Sampled By Date Shipping Reference Client Date Time Received at Testmark By Date Received By Time



**Final Report** 

C.O.C.: G71726 REPORT No. B19-30685

Report To:

City of Iqaluit

PO Box 460,

Iqaluit NU X0A 0H0

**Attention:** Emmanuel Kayode

DATE RECEIVED: 25-Sep-19

DATE REPORTED: 08-Oct-19

SAMPLE MATRIX: Drinking Water

**Caduceon Environmental Laboratories** 

2378 Holly Lane

Ottawa Ontario K1V 7P1

Tel: 613-526-0123 Fax: 613-526-1244

JOB/PROJECT NO.: Test A (WTP)

P.O. NUMBER:

WATERWORKS NO.

			Client I.D.		WTP Raw Test A	WTP Raw Test A (Total)	WTP Potable Test A	WTP Potable Test A (Total)
			Sample I.D.		B19-30685-1	B19-30685-2	B19-30685-3	B19-30685-4
			Date Collect	ed	23-Sep-19	23-Sep-19	23-Sep-19	23-Sep-19
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Hardness (as CaCO3)	mg/L	1	SM 3120	02-Oct-19/O	19		18	
Hardness (as CaCO3)	mg/L	1	SM 3120	26-Sep-19/O		19		18
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	26-Sep-19/O	16		10	
Bicarbonate(as CaCO3)	mg/L	5	SM 2320B	26-Sep-19/O	16		10	
Carbonate (as CaCO3)	mg/L	5	SM 2320B	26-Sep-19/O	< 5		< 5	
Hydroxide	mg/L	5	EPA 310.2	26-Sep-19/O	< 5		< 5	
Acidity (as CaCO3)	mg/L	5	Subcontract	27-Sep-19	< 5	1	< 5 1	
pH @25°C	pH Units		SM 4500H	26-Sep-19/O	7.46		6.98	
Conductivity @25°C	µmho/cm	1	SM 2510B	26-Sep-19/O	40		41	
TDS(ion sum calc.)	mg/L	1	Calc.	02-Oct-19/O	21		19	
Total Suspended Solids	mg/L	3	SM2540D	26-Sep-19/K	3		< 3	
Turbidity	NTU	0.1	SM 2130	26-Sep-19/O	0.9		0.4	
REDOX potential	mV		In-House	30-Sep-19/R	357		536	
Chloride	mg/L	0.5	SM4110C	26-Sep-19/O	1.0		3.3	
Sulphate	mg/L	1	SM4110C	26-Sep-19/O	3		2	
Aluminum	mg/L	0.01	SM 3120	02-Oct-19/O	0.02		0.01	
Aluminum	mg/L	0.01	SM 3120	26-Sep-19/O		0.02		0.01
Antimony	mg/L	0.0001	EPA 200.8	26-Sep-19/O	< 0.0001		< 0.0001	
Antimony	mg/L	0.0001	EPA 200.8	27-Sep-19/O		0.0003		< 0.0001
Arsenic	mg/L	0.0001	EPA 200.8	26-Sep-19/O	< 0.0001		0.0001	
Arsenic	mg/L	0.0001	EPA 200.8	27-Sep-19/O		< 0.0001		0.0001
Barium	mg/L	0.001	SM 3120	02-Oct-19/O	0.002		0.002	
Barium	mg/L	0.001	SM 3120	26-Sep-19/O		0.002		0.002
Beryllium	mg/L	0.002	SM 3120	02-Oct-19/O	< 0.002		< 0.002	
Beryllium	mg/L	0.002	SM 3120	26-Sep-19/O		< 0.002		< 0.002
Cadmium	mg/L	).000015	EPA 200.8	26-Sep-19/O	< 0.000015		< 0.000015	

R.L. = Reporting Limit

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



Final Report

C.O.C.: G71726 REPORT No. B19-30685

Report To:

City of Iqaluit

PO Box 460,

Iqaluit NU X0A 0H0

**Attention:** Emmanuel Kayode

DATE RECEIVED: 25-Sep-19

DATE REPORTED: 08-Oct-19

SAMPLE MATRIX: Drinking Water

**Caduceon Environmental Laboratories** 

2378 Holly Lane

Ottawa Ontario K1V 7P1

Tel: 613-526-0123 Fax: 613-526-1244

JOB/PROJECT NO.: Test A (WTP)

P.O. NUMBER:

WATERWORKS NO.

			Client I.D.		WTP Raw Test A	WTP Raw Test A (Total)	WTP Potable Test A	WTP Potable Test A (Total)
			Sample I.D.		B19-30685-1	B19-30685-2	B19-30685-3	B19-30685-4
			Date Collecte	ed	23-Sep-19	23-Sep-19	23-Sep-19	23-Sep-19
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Cadmium	mg/L	0.000015	EPA 200.8	27-Sep-19/O		< 0.000015		< 0.000015
Chromium	mg/L	0.002	SM 3120	02-Oct-19/O	< 0.002		< 0.002	
Chromium	mg/L	0.002	SM 3120	26-Sep-19/O		< 0.002		< 0.002
Cobalt	mg/L	0.005	SM 3120	02-Oct-19/O	< 0.005		< 0.005	
Cobalt	mg/L	0.005	SM 3120	26-Sep-19/O		< 0.005		< 0.005
Copper	mg/L	0.002	SM 3120	02-Oct-19/O	< 0.002		0.044	
Copper	mg/L	0.002	SM 3120	26-Sep-19/O		0.002		0.044
Iron	mg/L	0.005	SM 3120	02-Oct-19/O	0.072		0.033	
Iron	mg/L	0.005	SM 3120	26-Sep-19/O		0.072		0.033
Lead	mg/L	0.00002	EPA 200.8	26-Sep-19/O	0.00006		0.00011	
Lead	mg/L	0.00002	EPA 200.8	27-Sep-19/O		0.00006		0.00011
Lithium	mg/L	0.01	SM 3120	02-Oct-19/O	< 0.01		< 0.01	
Lithium	mg/L	0.01	SM 3120	26-Sep-19/O		< 0.01		< 0.01
Manganese	mg/L	0.001	SM 3120	02-Oct-19/O	0.029		0.003	
Manganese	mg/L	0.001	SM 3120	26-Sep-19/O		0.029		0.003
Mercury	mg/L	0.00002	SM 3112 B	01-Oct-19/O	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	mg/L	0.01	SM 3120	02-Oct-19/O	< 0.01		< 0.01	
Molybdenum	mg/L	0.01	SM 3120	26-Sep-19/O		< 0.01		< 0.01
Nickel	mg/L	0.01	SM 3120	02-Oct-19/O	< 0.01		< 0.01	
Nickel	mg/L	0.01	SM 3120	26-Sep-19/O		< 0.01		< 0.01
Selenium	mg/L	0.001	EPA 200.8	26-Sep-19/O	< 0.001		< 0.001	
Selenium	mg/L	0.001	EPA 200.8	27-Sep-19/O		< 0.001		< 0.001
Silver	mg/L	0.0001	EPA 200.8	26-Sep-19/O	< 0.0001		< 0.0001	
Silver	mg/L	0.0001	EPA 200.8	27-Sep-19/O		< 0.0001		< 0.0001
Strontium	mg/L	0.001	SM 3120	02-Oct-19/O	0.012		0.012	
Strontium	mg/L	0.001	SM 3120	26-Sep-19/O		0.012		0.012

R.L. = Reporting Limit

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



Final Report

C.O.C.: G71726 REPORT No. B19-30685

Report To:

City of Iqaluit PO Box 460,

Iqaluit NU X0A 0H0

**Attention:** Emmanuel Kayode

DATE RECEIVED: 25-Sep-19

DATE REPORTED: 08-Oct-19

SAMPLE MATRIX: Drinking Water

**Caduceon Environmental Laboratories** 

2378 Holly Lane

Ottawa Ontario K1V 7P1 Tel: 613-526-0123

Fax: 613-526-1244

JOB/PROJECT NO.: Test A (WTP)

P.O. NUMBER:

WATERWORKS NO.

			Client I.D.		WTP Raw Test A	WTP Raw Test A (Total)	WTP Potable Test A	WTP Potable Test A (Total)
			Sample I.D.		B19-30685-1	B19-30685-2	B19-30685-3	B19-30685-4
			Date Collect	ed	23-Sep-19	23-Sep-19	23-Sep-19	23-Sep-19
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Thallium	mg/L	0.00005	EPA 200.8	26-Sep-19/O	< 0.00005		< 0.00005	
Thallium	mg/L	0.00005	EPA 200.8	27-Sep-19/O		< 0.00005		< 0.00005
Tin	mg/L	0.05	SM 3120	02-Oct-19/O	< 0.05		< 0.05	
Tin	mg/L	0.05	SM 3120	26-Sep-19/O		< 0.05		< 0.05
Titanium	mg/L	0.005	SM 3120	02-Oct-19/O	< 0.005		< 0.005	
Titanium	mg/L	0.005	SM 3120	26-Sep-19/O		< 0.005		< 0.005
Uranium	mg/L	0.00005	EPA 200.8	26-Sep-19/O	< 0.00005		< 0.00005	
Uranium	mg/L	0.00005	EPA 200.8	27-Sep-19/O		< 0.00005		< 0.00005
Vanadium	mg/L	0.005	SM 3120	02-Oct-19/O	< 0.005		< 0.005	
Vanadium	mg/L	0.005	SM 3120	26-Sep-19/O		< 0.005		< 0.005
Zinc	mg/L	0.005	SM 3120	02-Oct-19/O	< 0.005		0.005	
Zinc	mg/L	0.005	SM 3120	26-Sep-19/O		0.006		0.013
Total Organic Carbon	mg/L	0.2	EPA 415.1	26-Sep-19/O	1.7		1.4	
TIC	mg/L	0.5	EPA 415.1	26-Sep-19/O	4.16		2.9	
Fecal Coliform	cfu/100mL	1	MOE E3371	25-Sep-19/O	0		0	
Anion Sum	meq/L		Calc.	02-Oct-19/O	0.393		0.350	
Cation Sum	meq/L		Calc.	02-Oct-19/O	0.408		0.398	
% Difference	%		Calc.	02-Oct-19/O	1.81		6.33	
Ion Ratio	AS/CS		Calc.	02-Oct-19/O	0.964		0.881	
Sodium Adsorption Ratio	-		Calc.	02-Oct-19/O	0.0718		0.0718	
Conductivity (calc.)	µmho/cm		Calc.	02-Oct-19/O	42		42	
EC(calc.)/EC(actual)	-		Calc.	02-Oct-19/O	1.06		1.02	
TDS(calc.)/EC(actual)	-		Calc.	02-Oct-19/O	0.519		0.474	
Langelier Index(25°C)	S.I.		Calc.	02-Oct-19/O	-1.90		-2.57	

1 Subcontracted to Testmark Labs

R.L. = Reporting Limit

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

					Water than		TE	STING	REQ	UIREM	ENTS					<	10	A DEF	PORT U	RILL	1. (e)
			C 170	O.Reg	153	Table			_			MISA Gu	idelines			-	-	VI			
	A.D.U.C	E	N	Surface	e Soil	Sub Surfac	e Soil	W = =	(O.Reg	g 153)		O.Reg 55	8 Leach	ate Analy	sis			•		88	
	ENVIRONMENTAL LA	()		Yes	☐ No	Record of Site Co	onditio	n	(O.Reg	g 153)		Disposal			-	-		-	-1	06	
	Clien	t committed. Quality as	sured.	Province	cial Water Quality C	Objectives						Landfill N	Monitori	ng	1	410		-	NE	SKK	
				Sewer	Use By-Law:							Other:					-	•	C		
Are	any samples to be submitted into	ended for Human Co	nsumption	under any D	rinking Water Re	gulations?		Yes		No	(If yes	, submit al	ll Drink	ing Wate	r Sampl	es on a	Drink	king Water	Chain of	Custody)	
	Indicate Lab	oratory Samples a	re submit	ted to:	☐ King	ston 🔼	Otta	wa		] Rich	mond	Hill	W	indsor	30-24	Barrie		Lon	don	15.	
Organiz	indicate Laboration: Lity of Igaluit momentual Kayole 5147026906	Address and Invoicing	ng Address	(if different)	Marine Tra				AN	VALYS	ES RE	QUESTED	(Print	Test in E	oxes)			T	URNARO	UND SERV	ICE
(	ity of Igaluit	B	0XC	160			0							1			ъ	REC	UESTED	(see back	page)
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	514 10 10 10	Durata No.		Due le et Nom			3	7									ghly	Silve		50% Surc 25% Surc	
Fax:		Quote No.:		Project Nam	ie:			,			14.5						Ηp	Stan		5-7 days	narge
Email:	L CALL F	P.O. No.:		Additional I	nfo:		As	5							11/2		ecte	De Ottain	dara	J-1 days	
e. Ka	yoder city. Igaluic.nu.			, tautionari	Marie I			,							105		Susp	Speci	ific Date:		
	* San	nple Matrix Legend: W	W=Waste Wa	ater, SW=Surfa	ace Water, GW=Gr	oundwater, LS=L	iquid S	Sludge,	SS=S	olid Slu	ıdge, S	S=Soil, Sed=	Sedime	nt, PC=P	aint Chip	s, F=Filte		il = Oil			
Lab				Sample	Date Collected	Time						Test For Eac					~		ield	# Bottles/	
No:	Sample Identification	on	S.P.L.	Matrix *	(yy-mm-dd)	Collected	,		Ву	/ Using	A Che	ck Mark In T	he Box	Provided			_	pH	Temp.	Sample	Filtered(Y/N)
	wwip Influe	ent		MM	Sept. 23		3			70	st	#						7.06	9.5	6	* at
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	Sampled by:	Submitted b	w.	Client's Cou		Invoice		rt by F				Received E				oh	707	Signature			
Drints	D 11	Emmanuel		-				rt by E				Date Recei		(in all short)	all to the second of	SA INCOME			A SECTION OF	11:50	
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Sign:	19-04-73	19-09	3,2		, 🗀	# OI FIECES						Laboratory	гера	reu Doll	U3.		162		110	M	TEAT INC.
		Date (yy-mm-dd		Caduceon (	Pick-up)	To don't	Invoi	ce by	Mail		Ш	Sample Te	mperat	ure °C:	90			Labeled b	v:	X	
Comme	Date (yy-mm-dd)/Time:	Date (yy-min-dd	ji riiile:					No.	TO BUILD	10	7+1	Sample Te	A)/42	11/11	11-60	P160	1		j.	1	
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										15.00				X	2		10.3	G 7	1/2	U	

YD18\_lqaluit\_F Quote #:

City of Igaluit Organization: Contact: Mike Hatfield

Telephone: 867-979-6363

Facsimile:

Email: M.Hatfield@city.lqaluit.nu.ca Project #: **TEST F - Sewage Lagoon** 

Box 460, Iqaluit NU, X0A 0H0 Address: Additional Info:

QUOTE # ('S) MUST BE ON C OF C TO APPLY if not listed, General pricing will be applied. Additional Info: Replacing Quote YD17\_Iqaluit\_F\_REV1

1-Mar-18 Valid Until: 31-Dec-19 Date:

Item #	Quantity	Analysis Request	Matrix	Unit Cost, \$	Amount, \$
1	1	BOD	ww	30.00	30.00
2	1	Total Coliform / Fecal Coliform	ww	31.00	31.00
3	1	Ammonia, NO2/NO3	WW	30.00	30.00
4	1	Total Phosphorus	ww	17.50	17.50
5	1	Orthophosphate	ww	17.50	17.50
6	1	Conductivity	ww	9.45	9.45
7	1 1	TSS	ww	17.50	17.50
8	1	рН	ww	9.00	9.00
9	1	TOTAL METALS ICPOES AI, Ba, Be, Cr, Co, Cu, Fe, Li, Mn, Mo, Ni, Sn, Sr, Ti, V, Zn ICPMS Sb, As, Cd, Pb, Se, Ag, Tl, U CVAAS Ha	ww	92.00	92.00
10	1	Ottawa Airport Pick Up		25.00	25.00
not include shippi	ng unless otherwise state			Subtotal	278.95
		annula aut			22.22

**Environmental Surcharge of \$1.50 per sample set** 

25.00	25.00
Subtotal	278.95
HST	36.26
Total Cost	315.21

Rebecca Marshall **Customer Service Representative Caduceon Environmental Laboratories** rmarshall@caduceonlabs.com 613-526-0123



Final Report

C.O.C.: G71720 **REPORT No. B19-30688** 

**Report To:** 

City of Iqaluit PO Box 460,

Iqaluit NU X0A 0H0

**Attention:** Emmanuel Kayode

DATE RECEIVED: 25-Sep-19

DATE REPORTED: 07-Oct-19

SAMPLE MATRIX: Waste Water

**Caduceon Environmental Laboratories** 

2378 Holly Lane

Ottawa Ontario K1V 7P1

Tel: 613-526-0123

Fax: 613-526-1244

JOB/PROJECT NO.: Test F

P.O. NUMBER:

WATERWORKS NO.

			Client I.D.		WWTP Influent	WWTP Effluent	
			Sample I.D.		B19-30688-1	B19-30688-2	
			Date Collect	ed	23-Sep-19	23-Sep-19	
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed			
BOD(5 day)	mg/L	3	SM 5210B	26-Sep-19/K	320	114	
Total Suspended Solids	mg/L	3	SM2540D	26-Sep-19/K	2000	160	
Conductivity @25°C	µmho/cm	1	SM 2510B	26-Sep-19/O	635	512	
pH @25°C	pH Units		SM 4500H	26-Sep-19/O	7.12	7.43	
Nitrite (N)	mg/L	0.1	SM4110C	01-Oct-19/O	< 0.1	< 0.1	
Nitrate (N)	mg/L	0.1	SM4110C	01-Oct-19/O	< 0.1	< 0.1	
Ammonia (N)-Total	mg/L	0.01	SM4500- NH3-H	26-Sep-19/K	43.5	33.6	
o-Phosphate (P)	mg/L	0.002	PE4500-S	26-Sep-19/K	6.46	3.73	
Phosphorus-Total	mg/L	0.01	E3199A.1	27-Sep-19/K	14.1	4.53	
Aluminum	mg/L	0.01	SM 3120	04-Oct-19/O	5.44	0.84	
Antimony	mg/L	0.0005	EPA 200.8	30-Sep-19/O	0.0025	0.0007	
Arsenic	mg/L	0.0005	EPA 200.8	30-Sep-19/O	0.0030	0.0009	
Barium	mg/L	0.001	SM 3120	04-Oct-19/O	0.102	0.015	
Beryllium	mg/L	0.002	SM 3120	04-Oct-19/O	< 0.002	< 0.002	
Cadmium	mg/L	0.000070	EPA 200.8	30-Sep-19/O	0.00142	0.000313	
Chromium	mg/L	0.002	SM 3120	04-Oct-19/O	0.031	0.003	
Cobalt	mg/L	0.005	SM 3120	04-Oct-19/O	0.007	< 0.005	
Copper	mg/L	0.002	SM 3120	04-Oct-19/O	1.64	0.288	
Iron	mg/L	0.005	SM 3120	04-Oct-19/O	16.9	3.38	
Lead	mg/L	0.0001	EPA 200.8	30-Sep-19/O	0.0723	0.0056	
Lithium	mg/L	0.01	SM 3120	04-Oct-19/O	< 0.01	< 0.01	
Manganese	mg/L	0.001	SM 3120	04-Oct-19/O	0.316	0.202	
Mercury	mg/L	0.00002	SM 3112 B	01-Oct-19/O	0.00147	0.00018	
Molybdenum	mg/L	0.01	SM 3120	04-Oct-19/O	< 0.01	< 0.01	
Nickel	mg/L	0.01	SM 3120	04-Oct-19/O	0.03	< 0.01	
Selenium	mg/L	0.005	EPA 200.8	30-Sep-19/O	< 0.005	< 0.005	

NOTE: Total & Fecal Coliform passed acceptable holding time of 48 hrs upon arrival at lab.

R.L. = Reporting Limit

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

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



**Final Report** 

C.O.C.: G71720 REPORT No. B19-30688

Report To:

City of Iqaluit PO Box 460,

Iqaluit NU X0A 0H0

Attention: Emmanuel Kayode

DATE RECEIVED: 25-Sep-19

DATE REPORTED: 07-Oct-19

SAMPLE MATRIX: Waste Water

**Caduceon Environmental Laboratories** 

2378 Holly Lane

Ottawa Ontario K1V 7P1

Tel: 613-526-0123

Fax: 613-526-1244

JOB/PROJECT NO.: Test F

P.O. NUMBER:

WATERWORKS NO.

			Client I.D.		WWTP Influent	WWTP Effluent	
			Sample I.D.		B19-30688-1	B19-30688-2	
			Date Collect	ed	23-Sep-19	23-Sep-19	
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed			
Silver	mg/L	0.0001	EPA 200.8	30-Sep-19/O	0.0056	0.0002	
Strontium	mg/L	0.001	SM 3120	04-Oct-19/O	0.076	0.052	
Thallium	mg/L	0.0003	EPA 200.8	30-Sep-19/O	< 0.0003	< 0.0003	
Tin	mg/L	0.05	SM 3120	04-Oct-19/O	< 0.05	< 0.05	
Titanium	mg/L	0.005	SM 3120	04-Oct-19/O	0.129	0.021	
Uranium	mg/L	0.0003	EPA 200.8	30-Sep-19/O	0.0013	0.0004	
Vanadium	mg/L	0.005	SM 3120	04-Oct-19/O	0.009	< 0.005	
Zinc	mg/L	0.005	SM 3120	04-Oct-19/O	1.55	0.215	
Total Coliform	cfu/100mL	1	MOE E3371	25-Sep-19/O	71000000	23000000	
Fecal Coliform	cfu/100mL	1	MOE E3371	25-Sep-19/O	8100000	1800000	

NOTE: Total & Fecal Coliform passed acceptable holding time of 48 hrs upon arrival at lab.

R.L. = Reporting Limit

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

							TE	STING	REQUIF	REMENT	S					-	00	REP	as I sally	BER	se)
		ABORATOR ES	ssured.	Sewer	e Soil  No  No  Cial Water Quality (		ce Soil	on (	O.Reg 15	53) 53)	MIS O.F Dis Lar	posal S ndfill M ner:	Leachate Site: onitoring			<u> </u>	**	ידי	13	-	
Are	e any samples to be submitted ir	tended for Human C	onsumption	n under any D	rinking Water Re			Yes	N	O (If ye	es, sub	mit all	Drinking	Water	Sample	s on a D	rinking	Water C	Chain of C	ustody)	
	Indicate La	boratory Samples	are submit	tted to:	☐ King	gston	Otta	wa	☐ R	ichmor	nd Hill		Wind	lsor		Barrie		Lond	on		
Organiz	zation: ity of Igaluit	Address and Invoici	ing Address	(if different)			046.		ANAI	LYSES F	REQUE	STED	Print Tes	t in Bo	xes)		pel		RNAROUI		
Tel:	indicate La zation: Lity of Iggluit t: Kayode 5147026906	XOA C	of Ig	aluet			er Quo	20									pected Highly Contaminated	Platin Gold Silver		200% Surd 100% Surd 50% Surch	charge
Fax:	godo Ocity lapolutina.	Quote No.: YDI 8 _ I 9 P.O. No.:	aluit	Project Nan  E and  Additional I	ne: d YD18_ nfo:	Igduil_B	As per	TC,									spected High	Stand		25% Surci 5-7 days	narge
e. Wa		ample Matrix Legend: V	W=Wasta W	ater SW=Surfa	ace Water GW=Gr	roundwater I S=I	iquid	Sludge	SS=Solio	A Sludge	S=Soil	Sod=	had	ם ביבוי	Date	Filto		TO SITE	OF te		Pyris iron o
Lab No:	Sample Identifica		S.P.L.	Sample Matrix *	Date Collected (yy-mm-dd)	Time Collected		Jidage,		Indicate	e Test F	or Each		vided			v  -	Fiel pH	ld Temp.	# Bottles/ Sample	Field Filtered(Y/N)
	Rentention 3 Detenti	ion Landfill		WW	19-09-24	9-15cm			T.	est	E						7	.98	2.8	10	
	WWTP Influe			WW	19-09-24	9.559m		1		est	B							04	8.3		
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	SAMPLE SUBMISSION	INFORMATION		SH	IIPPING INFORM	ATION	RE	PORTIN	G / INV	OICING	17.5	167	SAMPLE	RECEI	VING IN	FORMA	TION (L	.ABORA	TORY US	E ONLY)	
	Sampled by:	Submitted	by:	Client's Cou	urier 🗡	Invoice	Repo	ort by Fa	ax		Recei	ived B	(print):		7	on	Sig	nature:	OB	>	
Print:		A.		Caduceon's	Courier		Repo	ort by Er	nail	X	Date	Receiv	ed (yy-m	m-dd):	25	109/1	9 Tim	e Recei	ived: 12	:00	
Sign:				Drop Off		# of Pieces	Invoi	ice by E	mail		Labor	ratory	Prepared	Bottles	s:	×	Yes		No		
	Date (yy-mm-dd)/Time:	Date (yy-mm-do	d)/Time:	Caduceon (	Pick-up)		Invoi	ice by M	ail		Samp	le Ten	perature	°C:	817	,	Lab	eled by:			
Comme					Phran	CofC, Jan. 201	Blas	Sere	1/12	C (	NIP	+ IM	+1600	++1	119+	zvoc	Pag G	7 2	04	of	5//
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YD18 Iqaluit E Quote #:

Organization: City of Iqaluit

Contact:

Paul Clow

Telephone:

867-979-6363 Ex233

Facsimile:

Email: Project #: p.clow@city.iqaluit.nu.ca TEST E (Landfill Runoff)

Address:

City Of Igaluit Box 460 Igaluit, NU

Additional Info: Additional Info: QUOTE # ('S) MUST BE ON C OF C TO APPLY if not listed, General pricing will be applied.

Replacing Quote YD17\_Iqaluit\_E

26-Feb-18 Date: Valid Until: 31-Dec-19

Item #	Quantity	Analysis Request	Matrix	Unit Cost, \$	Amount, \$
		Detention Pond			
1	1	pH	WW	9.00	9.00
2	1	Turbidity	WW	14.50	14.50
3	1	TSS	WW	17.50	17.50
4	1	BOD5	WW	30.00	30.00
5	1	COD	WW	17.50	17.50
6	1	TOC	WW	23.75	23.75
		Retention Pond			
7	1	pH	WW	9.00	9.00
8	1	Turbidity	WW	14.50	14.50
9	1	TSS	WW	17.50	17.50
10	1	BOD5	WW	30.00	30.00
11	1	COD	WW	17.50	17.50
12	1	TOC	WW	23.75	23.75
13	1	Ammonia Nitrogen	WW	9.50	9.50
14	1	TKN	WW	17.50	17.50
15	1	Total Phosphorus	WW	17.50	17.50
16	1	Full Metals Scan +Hg	WW	70.00	70.00
17	1	Total Coliform/Fecal Coliform	WW	31.00	31.00
18	1	BTEX	WW	72.75	72.75
19	1	PCB's	WW	78.75	78.75
19	1	Ottawa Airport Pick Up		25.00	25.00
es do not include shippir	ng unless otherwise state	d.		Subtotal	546.50
ironmental Surch	arge of \$1.50 per	sample set		HST	71.05

71.05 **Total Cost** 617.55

Kim Byers

Customer Service Representative

Caduceon Environmental Laboratories

kbyers@caduceonlabs.com

Cell: 613-453-0964 Office 544-2001 Ex 222



Quote #: YD18\_lqaluit\_B

Organization:

City of Iqaluit Mike Hatfield

Contact: Telephone:

867-979-6363

Facsimile:

Email:

M.Hatfield@city.lqaluit.nu.ca

Project #:

**TEST B - Influent** 

Address:

Box 460, Iqaluit NU, X0A 0H0

Additional Info:

QUOTE # ('S) MUST BE ON C OF C TO APPLY if not listed, General pricing will be applied.

Additional Info:

Replacing Quote YD17\_lqaluit\_B\_Rev1

Date:

26-Feb-18

Valid Until:

31-Dec-19

Item #	Quantity	Analysis Request	Matrix	Unit Cost, \$	Amount, \$
1	1	BOD	ww	30.00	30.00
2	1	Total Coliform / Fecal Coliform	WW	31.00	31.00
3	1	Ammonia, NO2/NO3	WW	30.00	30.00
4	11	Total Phosphorus	WW	17.50	17.50
5	1	Orthophosphate	ww	17.50	17.50
6	1	Conductivity	WW	9.45	9.45
7	1	TSS	WW	17.50	17.50
8	1	pH	WW	9.00	9.00
9 1		TOTAL METALS ICPOES AI, Ba, Be, Cr, Co, Cu, Fe, Li, Mn, Mo, Ni, Sn, Sr, Ti, V, Zn ICPMS Sb, As, Cd, Pb, Se, Ag, TI, U CVAAS Hg	ww	92.00	92.00
10	1	Ottawa Airport Pick Up		25.00	25.00
do not include shippir	na unless otherwise state	h		Subtotal	279.05

Prices do not include shipping unless otherwise stated.

Environmental Surcharge of \$1.50 per sample set

20.00	20.00
Subtotal	278.95
HST	36.26
Total Cost	315.21

Rebecca Marshall
Customer Service Representative
Caduceon Environmental Laboratories
rmarshall@caduceonlabs.com
613-526-0123



Final Report

C.O.C.: G72047 REPORT No. B19-30689

Report To:

City of Iqaluit

PO Box 460,

Iqaluit NU X0A 0H0

**Attention:** Emmanuel Kayode

DATE RECEIVED: 25-Sep-19

DATE REPORTED: 08-Oct-19

SAMPLE MATRIX: Waste Water

**Caduceon Environmental Laboratories** 

2378 Holly Lane

Ottawa Ontario K1V 7P1 Tel: 613-526-0123

Fax: 613-526-1244

JOB/PROJECT NO.: Test E

P.O. NUMBER:

WATERWORKS NO.

			Client I.D.		Retention & Detention Landfill		
			Sample I.D.		B19-30689-1		
			Date Collect	ed	24-Sep-19		
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed			
BOD(5 day)	mg/L	3	SM 5210B	26-Sep-19/K	10		
COD	mg/L	5	SM 5220D	26-Sep-19/O	158		
Total Organic Carbon	mg/L	0.2	EPA 415.1	26-Sep-19/O	83.6		
Total Suspended Solids	mg/L	3	SM2540D	26-Sep-19/K	170		
Turbidity	NTU	0.1	SM 2130	26-Sep-19/O	60.8		
pH @25°C	pH Units		SM 4500H	26-Sep-19/O	8.14		
Ammonia (N)-Total	mg/L	0.01	SM4500- NH3-H	26-Sep-19/K	34.8		
Total Kjeldahl Nitrogen	mg/L	0.1	E3199A.1	27-Sep-19/K	46.7		
Phosphorus-Total	mg/L	0.01	E3199A.1	27-Sep-19/K	0.18		
Aluminum	mg/L	0.01	SM 3120	04-Oct-19/O	0.07		
Antimony	mg/L	0.0005	EPA 200.8	30-Sep-19/O	0.0012		
Arsenic	mg/L	0.0005	EPA 200.8	30-Sep-19/O	0.0017		
Barium	mg/L	0.001	SM 3120	04-Oct-19/O	0.017		
Beryllium	mg/L	0.0005	EPA 200.8	30-Sep-19/O	< 0.0005		
Cadmium	mg/L	0.000070	EPA 200.8	30-Sep-19/O	0.000112		
Chromium	mg/L	0.001	EPA 200.8	30-Sep-19/O	0.002		
Cobalt	mg/L	0.0005	EPA 200.8	30-Sep-19/O	0.0009		
Copper	mg/L	0.0005	EPA 200.8	30-Sep-19/O	0.0100		
Iron	mg/L	0.005	SM 3120	04-Oct-19/O	6.21		
Lead	mg/L	0.0001	EPA 200.8	30-Sep-19/O	0.0018		
Lithium	mg/L	0.01	SM 3120	04-Oct-19/O	< 0.01		
Manganese	mg/L	0.001	SM 3120	04-Oct-19/O	0.242		
Mercury	mg/L	0.00002	SM 3112 B	01-Oct-19/O	< 0.00002		
Molybdenum	mg/L	0.0005	EPA 200.8	30-Sep-19/O	0.0042		
Nickel	mg/L	0.001	EPA 200.8	30-Sep-19/O	0.023		

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

R.L. = Reporting Limit

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

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



Final Report

C.O.C.: G72047 REPORT No. B19-30689

Report To:

City of Iqaluit PO Box 460,

Iqaluit NU X0A 0H0

Attention: Emmanuel Kayode

DATE RECEIVED: 25-Sep-19

DATE REPORTED: 08-Oct-19

SAMPLE MATRIX: Waste Water

**Caduceon Environmental Laboratories** 

2378 Holly Lane

Ottawa Ontario K1V 7P1

Tel: 613-526-0123

Fax: 613-526-1244

JOB/PROJECT NO.: Test E

P.O. NUMBER:

WATERWORKS NO.

			Client I.D.		Retention & Detention Landfill		
			Sample I.D.		B19-30689-1		
			Date Collect	ed	24-Sep-19		
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed			
Selenium	mg/L	0.005	EPA 200.8	30-Sep-19/O	< 0.005		
Silver	mg/L	0.0001	EPA 200.8	30-Sep-19/O	< 0.0001		
Strontium	mg/L	0.001	SM 3120	04-Oct-19/O	0.574		
Thallium	mg/L	0.0003	EPA 200.8	30-Sep-19/O	< 0.0003		
Tin	mg/L	0.05	SM 3120	04-Oct-19/O	< 0.05		
Titanium	mg/L	0.005	SM 3120	04-Oct-19/O	< 0.005		
Uranium	mg/L	0.0003	EPA 200.8	30-Sep-19/O	< 0.0003		
Vanadium	mg/L	0.0005	EPA 200.8	30-Sep-19/O	< 0.0005		
Zinc	mg/L	0.005	SM 3120	04-Oct-19/O	0.536		
Benzene	μg/L	0.5	EPA 8260	26-Sep-19/R	0.5		
Toluene	μg/L	0.5	EPA 8260	26-Sep-19/R	2.0		
Ethylbenzene	μg/L	0.5	EPA 8260	26-Sep-19/R	0.6		
Xylene, m,p-	μg/L	1.0	EPA 8260	26-Sep-19/R	1.3		
Xylene, o-	μg/L	0.5	EPA 8260	26-Sep-19/R	8.0		
Xylene, m,p,o-	μg/L	1.1	EPA 8260	26-Sep-19/R	2.1		
Toluene-d8 (SS)	% rec.		EPA 8260	26-Sep-19/R	96.5		
Poly-Chlorinated Biphenyls (PCB's)	μg/L	0.05	EPA 8082	03-Oct-19/K	< 0.05		
Total Coliform	cfu/100mL	1	MOE E3371	25-Sep-19/O	20		
Fecal Coliform	cfu/100mL	1	MOE E3371	25-Sep-19/O	0		

R.L. = Reporting Limit

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

							TE	STING	REQUIF	REMENT	S					-	00	REP	as I sally	BER	se)
		ABORATOR ES	ssured.	Sewer	e Soil  No  No  Cial Water Quality (		ce Soil	on (	O.Reg 15	53) 53)	MIS O.F Dis Lar	posal S ndfill M ner:	Leachate Site: onitoring			<u> </u>	**	ידי	13	-	
Are	e any samples to be submitted ir	tended for Human C	onsumption	n under any D	rinking Water Re			Yes	N	O (If ye	es, sub	mit all	Drinking	Water	Sample	s on a D	rinking	Water C	Chain of C	ustody)	
	Indicate La	boratory Samples	are submit	tted to:	☐ King	gston	Otta	wa	☐ R	ichmor	nd Hill		Wind	lsor		Barrie		Lond	on		
Organiz	zation: ity of Igaluit	Address and Invoici	ing Address	(if different)			046.		ANAI	LYSES F	REQUE	STED	Print Tes	t in Bo	xes)		pel		RNAROUI		
Tel:	indicate La zation: Lity of Iggluit t: Kayode 5147026906	XOA C	of Ig	aluet			er Quo	20									pected Highly Contaminated	Platin Gold Silver		200% Surd 100% Surd 50% Surch	charge
Fax:	godo Ocity lapolutina.	Quote No.: YDI 8 _ I 9 P.O. No.:	aluit	Project Nan  E and  Additional I	ne: d YD18_ nfo:	Igduil_B	As per	TC,									spected High	Stand		25% Surci 5-7 days	narge
e. Wa		ample Matrix Legend: V	W=Wasta W	ater SW=Surfa	ace Water GW=Gr	roundwater I S=I	iquid	Sludge	SS=Solio	A Sludge	S=Soil	Sod=	had	ם ביבוי	Date	Filto		TO SITE	OF te		Pyris iron o
Lab No:	Sample Identifica		S.P.L.	Sample Matrix *	Date Collected (yy-mm-dd)	Time Collected		Jidage,		Indicate	e Test F	or Each		vided			v  -	Fiel pH	ld Temp.	# Bottles/ Sample	Field Filtered(Y/N)
	Rentention 3 Detenti	ion Landfill		WW	19-09-24	9-15cm			T.	est	E						7	.98	2.8	10	
	WWTP Influe			WW	19-09-24	9.559m		1		est	B							04	8.3		
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	SAMPLE SUBMISSION	INFORMATION		SH	IIPPING INFORM	ATION	RE	PORTIN	G / INV	OICING	17.5	167	SAMPLE	RECEI	VING IN	FORMA	TION (L	ABORA	TORY US	E ONLY)	
	Sampled by:	Submitted	by:	Client's Cou	urier 🗡	Invoice	Repo	ort by Fa	ax		Recei	ived B	(print):		7	on	Sig	nature:	OB	>	
Print:		A.		Caduceon's	Courier		Repo	ort by Er	nail	X	Date	Receiv	ed (yy-m	m-dd):	25	109/1	9 Tim	e Recei	ived: 12	:00	
Sign:				Drop Off		# of Pieces	Invoi	ice by E	mail		Labor	ratory	Prepared	Bottles	s:	×	Yes		No		
	Date (yy-mm-dd)/Time:	Date (yy-mm-do	d)/Time:	Caduceon (	Pick-up)		Invoi	ice by M	ail		Samp	le Ten	perature	°C:	817	,	Lab	eled by:			
Comme					Phran	CofC, Jan. 201	Blas	Sere	1/12	C (	NIP	+ IM	+1600	++1	119+	zvoc	Pag G	7 2	04	of	5//
	White: Lab Copy / Yellow: Invoicin	g Copy / Pink: Client Copy				CofC, Jan. 201	7, Revi	sion No: 2	20 12	2+17	34	N/F	419	+ 14	g+1	bact				17	



YD18 Iqaluit E Quote #:

Organization: City of Iqaluit

Contact:

Paul Clow

Telephone:

867-979-6363 Ex233

Facsimile:

Email: Project #: p.clow@city.iqaluit.nu.ca TEST E (Landfill Runoff)

Address:

City Of Igaluit Box 460 Igaluit, NU

Additional Info: Additional Info: QUOTE # ('S) MUST BE ON C OF C TO APPLY if not listed, General pricing will be applied.

Replacing Quote YD17\_Iqaluit\_E

26-Feb-18 Date: Valid Until: 31-Dec-19

Item #	Quantity	Analysis Request	Matrix	Unit Cost, \$	Amount, \$
		Detention Pond			
1	1	pH	WW	9.00	9.00
2	1	Turbidity	WW	14.50	14.50
3	1	TSS	WW	17.50	17.50
4	1	BOD5	WW	30.00	30.00
5	1	COD	WW	17.50	17.50
6	1	TOC	WW	23.75	23.75
		Retention Pond			
7	1	pH	WW	9.00	9.00
8	1	Turbidity	WW	14.50	14.50
9	1	TSS	WW	17.50	17.50
10	1	BOD5	WW	30.00	30.00
11	1	COD	WW	17.50	17.50
12	1	TOC	WW	23.75	23.75
13	1	Ammonia Nitrogen	WW	9.50	9.50
14	1	TKN	WW	17.50	17.50
15	1	Total Phosphorus	WW	17.50	17.50
16	1	Full Metals Scan +Hg	WW	70.00	70.00
17	1	Total Coliform/Fecal Coliform	WW	31.00	31.00
18	1	BTEX	WW	72.75	72.75
19	1	PCB's	WW	78.75	78.75
19	1	Ottawa Airport Pick Up		25.00	25.00
es do not include shippir	ng unless otherwise state	d.		Subtotal	546.50
ironmental Surch	arge of \$1.50 per	sample set		HST	71.05

71.05 **Total Cost** 617.55

Kim Byers

Customer Service Representative

Caduceon Environmental Laboratories

kbyers@caduceonlabs.com

Cell: 613-453-0964 Office 544-2001 Ex 222



Quote #: YD18\_lqaluit\_B

Organization:

City of Iqaluit Mike Hatfield

Contact: Telephone:

867-979-6363

Facsimile:

Email:

M.Hatfield@city.lqaluit.nu.ca

Project #:

**TEST B - Influent** 

Address:

Box 460, Iqaluit NU, X0A 0H0

Additional Info:

QUOTE # ('S) MUST BE ON C OF C TO APPLY if not listed, General pricing will be applied.

Additional Info:

Replacing Quote YD17\_lqaluit\_B\_Rev1

Date:

26-Feb-18

Valid Until:

31-Dec-19

Item #	Quantity	Analysis Request	Matrix	Unit Cost, \$	Amount, \$
1	1	BOD	ww	30.00	30.00
2	1	Total Coliform / Fecal Coliform	WW	31.00	31.00
3	1	Ammonia, NO2/NO3	WW	30.00	30.00
4	11	Total Phosphorus	WW	17.50	17.50
5	1	Orthophosphate	ww	17.50	17.50
6	1	Conductivity	WW	9.45	9.45
7	1	TSS	WW	17.50	17.50
8	1	pH	WW	9.00	9.00
9 1		TOTAL METALS ICPOES AI, Ba, Be, Cr, Co, Cu, Fe, Li, Mn, Mo, Ni, Sn, Sr, Ti, V, Zn ICPMS Sb, As, Cd, Pb, Se, Ag, TI, U CVAAS Hg	ww	92.00	92.00
10	1	Ottawa Airport Pick Up		25.00	25.00
do not include shippir	na unless otherwise state	h		Subtotal	279.05

Prices do not include shipping unless otherwise stated.

Environmental Surcharge of \$1.50 per sample set

20.00	20.00
Subtotal	278.95
HST	36.26
Total Cost	315.21

Rebecca Marshall
Customer Service Representative
Caduceon Environmental Laboratories
rmarshall@caduceonlabs.com
613-526-0123



Final Report

C.O.C.: G72047 REPORT No. B19-30694

Report To:

City of Iqaluit

PO Box 460,

Iqaluit NU X0A 0H0

**Attention:** Emmanuel Kayode

DATE RECEIVED: 25-Sep-19

DATE REPORTED: 08-Oct-19

SAMPLE MATRIX: Waste Water

**Caduceon Environmental Laboratories** 

2378 Holly Lane

Ottawa Ontario K1V 7P1

Tel: 613-526-0123 Fax: 613-526-1244

JOB/PROJECT NO.: Test B

P.O. NUMBER:

WATERWORKS NO.

			Client I.D.		Test B - WWTP Influent		
			Sample I.D.		B19-30694-1		
			Date Collecte	ed	24-Sep-19		
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed			
BOD(5 day)	mg/L	3	SM 5210B	26-Sep-19/K	233		
Total Suspended Solids	mg/L	3	SM2540D	26-Sep-19/K	3400		
Conductivity @25°C	µmho/cm	1	SM 2510B	26-Sep-19/O	529		
pH @25°C	pH Units		SM 4500H	26-Sep-19/O	7.18		
Nitrite (N)	mg/L	0.1	SM4110C	01-Oct-19/O	< 0.1		
Nitrate (N)	mg/L	0.1	SM4110C	01-Oct-19/O	< 0.1		
Ammonia (N)-Total	mg/L	0.01	SM4500- NH3-H	26-Sep-19/K	33.7		
o-Phosphate (P)	mg/L	0.002	PE4500-S	26-Sep-19/K	5.90		
Phosphorus-Total	mg/L	0.01	E3199A.1	27-Sep-19/K	11.2		
Aluminum	mg/L	0.01	SM 3120	04-Oct-19/O	2.40		
Antimony	mg/L	0.0005	EPA 200.8	30-Sep-19/O	0.0007		
Arsenic	mg/L	0.0005	EPA 200.8	30-Sep-19/O	0.0013		
Barium	mg/L	0.001	SM 3120	04-Oct-19/O	0.048		
Beryllium	mg/L	0.002	SM 3120	04-Oct-19/O	< 0.002		
Cadmium	mg/L	0.005	SM 3120	04-Oct-19/O	< 0.005		
Chromium	mg/L	0.002	SM 3120	04-Oct-19/O	0.010		
Cobalt	mg/L	0.005	SM 3120	04-Oct-19/O	< 0.005		
Copper	mg/L	0.002	SM 3120	04-Oct-19/O	0.569		
Iron	mg/L	0.005	SM 3120	04-Oct-19/O	9.15		
Lead	mg/L	0.02	SM 3120	04-Oct-19/O	0.04		
Lithium	mg/L	0.01	SM 3120	04-Oct-19/O	< 0.01		
Manganese	mg/L	0.001	SM 3120	04-Oct-19/O	0.238		
Mercury	mg/L	0.00002		02-Oct-19/O	0.00028		
Molybdenum	mg/L	0.01	SM 3120	04-Oct-19/O	< 0.01		
Nickel	mg/L	0.01	SM 3120	04-Oct-19/O	0.01		

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

R.L. = Reporting Limit

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

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



**Final Report** 

C.O.C.: G72047 REPORT No. B19-30694

Report To:

City of Iqaluit PO Box 460,

Iqaluit NU X0A 0H0

Attention: Emmanuel Kayode

DATE RECEIVED: 25-Sep-19

DATE REPORTED: 08-Oct-19

SAMPLE MATRIX: Waste Water

**Caduceon Environmental Laboratories** 

2378 Holly Lane

Ottawa Ontario K1V 7P1

Tel: 613-526-0123

Fax: 613-526-1244

JOB/PROJECT NO.: Test B

P.O. NUMBER:

WATERWORKS NO.

			Client I D		Test B -	I	1
			Client I.D.		WWTP Influent		
			Sample I.D.		B19-30694-1		
			Date Collect	ed	24-Sep-19		
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed			
Selenium	mg/L	0.005	EPA 200.8	30-Sep-19/O	< 0.005		
Silver	mg/L	0.005	SM 3120	04-Oct-19/O	< 0.005		
Strontium	mg/L	0.001	SM 3120	04-Oct-19/O	0.060		
Thallium	mg/L	0.0003	EPA 200.8	30-Sep-19/O	< 0.0003		
Tin	mg/L	0.05	SM 3120	04-Oct-19/O	< 0.05		
Titanium	mg/L	0.005	SM 3120	04-Oct-19/O	0.077		
Uranium	mg/L	0.0003	EPA 200.8	30-Sep-19/O	0.0006		
Vanadium	mg/L	0.005	SM 3120	04-Oct-19/O	0.005		
Zinc	mg/L	0.005	SM 3120	04-Oct-19/O	0.425		
Total Coliform	cfu/100mL	1	MOE E3371	25-Sep-19/O	85000000		
Fecal Coliform	cfu/100mL	1	MOE E3371	25-Sep-19/O	7900000		

R.L. = Reporting Limit

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

							TES	STING	REQUIR	EMENT	S					V	REF	ORT NUM	BER (Lab	Use)	
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	*ENVIRONMENTAL L			Yes	No	Record of Site C	ondition	1 (	O.Reg 15	3)		sal Site: _				1		21	17.	14	
	Clie	ent committed. Quality s	assured.		cial Water Quality	Objectives				Į		ill Monitori	ng			51	4-	)	U		
					Use By-Law:						Other					-					
Are	any samples to be submitted in							Yes						r Sampl			king Water		Custody)		
		boratory Samples			☐ King	gston	Ottaw	va		chmon			lindsor		Barrie		Lon				
Organiz		Address and Invoic							ANAL	YSES F	EQUEST	ED (Print	Test in I	Boxes)			TURNAROUND SERVICE REQUESTED (see back page)				
	ity of Lagaluit	30	× 46	0			2				1 1					per	REG	UESTED	(see back	page)	
Contact	nanvel Kayode	30 Iq	aluit				st									nina	☐ Plati	num	200% Sur	charge**	
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		Quote No.: YIS_Igal	yt-A			+1	S									cted	Stan	dard	5-7 days		
Email:	yode@igalut.ca	P.O. No.:		Additional I	nfo:		V				1 1					edsr	Casai	C- Detai			
e.ka	yare v	mple Matrix Legend: \	A/\A/=\A/ooto \A/	aton CIMmCunfo	nes Weter CW-C	roundwater I S-	iquid 9	ludas	20-20lid	Cludge	S-Soil S	od=Sodim	ont BC-I	Paint Chir	oc E-Eilt			fic Date:			
Lab	* 58	imple Matrix Legend: V	I vvv=vvaste vva	Sample	Date Collected	Time	I quiu o	nuuge,	33-3011u			Each Sam		ann one	JS, F-FIII	ei, o		eld	# Bottles	Field	
No:	Sample Identifica	tion	S.P.L.	Matrix *	(yy-mm-dd)	Collected			By Us			n The Box				~	pH	Temp.	Sample	Filtered(Y/N)	
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3	WIP P	otable a		(Total)		9:40				17	est	)					5.95	7.5	10		
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	Sampled by:	Submitted	by:	Client's Cou	urier 💢	Invoice	Repo	rt by Fa	ax		Receive	ed By (pri	nt): [	Sen			Signature	: Bly	halah	en	
Print:	Emmanuel Kayade	Emmanuel	Kayade	Layede Caduceon's Courier Report by Email Date Received (yy-mm-dd): 19-10-27 Time Received: (6:30																	
Sign:	Reserve	- part	21.	Drop Off		# of Pieces	Invoid	ce by E	mail		Laborat	ory Prepa	ared Bot	les:	4	Yes		No	CA		
	19-10-21	19-10-	21	Caduceon (	Pick-up)		Invoid	ce by N	lail					1	10	,			V		
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						10, 1104, 1103						,,,,	-				-	116			

Quote #: YD18 Igaluit A

Organization: City of Iqaluit
Contact: Mike Hatfield

**Telephone:** 867-979-6363

Facsimile:

Email:M.Hatfield@city.lqaluit.nu.caProject #:TEST A - Drinking WaterAddress:Box 460, Iqaluit NU, X0A 0H0

Additional Info: QUOTE # ('S) MUST BE ON C OF C TO APPLY if not listed, General pricing will be applied.

Additional Info: Replacing Quote YD17\_lqaluit\_A\_Rev1

Date: 26-Feb-18 Valid Until: 31-Dec-19

Item #	Quantity	Analysis Request	Matrix	Unit Cost, \$	Amount, \$
1	1	Acidity (Subcontracted)	DW	33.50	33.50
2	1	Alkalinity	DW	14.50	14.50
3	1	Bicarbonate/ Carbonate	DW	17.50	17.50
4	1	Chloride/Sulphate	DW	23.75	23.75
5	1	Conductivity	DW	9.45	9.45
6	1	Hydroxide	DW	14.50	14.50
7	1	Redox Potential	DW	15.75	15.75
8	1	TDS	DW	17.50	17.50
9	1	TSS	DW	17.50	17.50
10	1	TOC	DW	23.75	23.75
11	1	TIC	DW	23.75	23.75
12	1	TOTAL METALS ICPOES AI, Ba, Be, Cr, Co, Cu, Fe, Li, Mn, Mo, Ni, Sn, Sr, Ti, V, Zn + Hardness ICPMS Sb, As, Cd, Pb, Se, Ag, TI, U CVAAS Hg	DW	92.00	92.00
13	1	DISSOLVED METALS ICPOES AI, Ba, Be, Cr, Co, Cu, Fe, Li, Mn, Mo, Ni, Sn, Sr, Ti, V, Zn + Hardness ICPMS Sb, As, Cd, Pb, Se, Ag, Tl, U CVAAS Hg	DW	92.00	92.00
14	1	Fecal Coliforms	DW	16.25	16.25
15	1	pH	DW	9.00	9.00
16	1	Turbidity	DW	14.50	14.50
17	1	Ottawa Airport Pick Up		25.00	25.00
ces do not include shippir	ng unless otherwise state			Subtotal	460.20

Prices do not include shipping unless otherwise stated

Environmental Surcharge of \$1.50 per sample set

 Subtotal
 460.20

 HST
 59.83

 Total Cost
 520.03

Rebecca Marshall

**Customer Service Representative** 

Caduceon Environmental Laboratories

rmarshall@caduceonlabs.com

613-526-0123



Received By

#### **GENERAL CHAIN OF CUSTODY FORM**

Page	of
raye	UI

Date

Time

Please use our Drinking Water Chain of Custody Form for regulated drinking water samples REPORT TO: INVOICE TO: (if different from Report) PROJECT INFORMATION: Client: Client: Caduceon Environmental Laboratories TM Quote #: Caduceon Environmental Laboratories Client P.O. #: **P191023\_TM** 2378 Holly Lane Address: 285 Dalton Avenue Address: Ottawa ON, K1V 7P1 Kingston ON Client Project #: Greg Clarkin K7K 6Z1 Contact: qclarkin@caduceonlabs.com tyapici@caduceonlabs.com mmccormick@caduceonlabs.com Email: Email: 6135442001 613-526-0123 Fax: 613-526-1244 Phone: Fax: 6135442770 Phone: REPORTING/INVOICING FORMAT TURN AROUND TIME (TAT)\* ANALYSIS REQUESTED LABORATORY USE ONLY CONTAINERS ☐1 Business Day ☐2 Business Days FIELD FILTERED ☐Fax ☑Email Mail WORK ORDER NUMBER: FIELD TEMP (if applicable) RECEIVED FIELD pH (if applicable) **QC DATA REPORTED** ☐3 Business Days □No □Yes SAMPLE DISPOSAL SPECIFIC DATE: CONTAINERS OF \* Prior arrangements must be made for ☐Hold ☐Dispose ☐Return NUMBER METALS | rush/weekend/holiday work Acidity SAMPLING SAMPLE DESCRIPTION DATE MATRIX\*\* (This Will Appear On The Report) Btl. Type TIME TEMP Lab ID mm-dd-yy) Χ DW 10/21/19 B19-34273-1 am 10/21/19 DW B19-34273-3 am \*\* Non-Regulated DW \*\*Matrix: B=Biota, GW=Ground Water, O=Oil, P=Paint, S=Soil, SL=Sludge, □ O.Reg. 153: (1 □2 □3 □4 □5 □6 □7 □8 □9 □) SW=Surface Water, W=Water, WW=Wastewater, SD=Sediment ☐Industrial / Commercial Residential / Parkland Agricultural Surface □Coarse Soil □Fine Soil Subsurface ☐ High Concentrations Expected O.Reg. 558 PWQO MISA CofA MMER EEM □None Sewer Use: □Sanitary □Storm Municipality: COMMENTS/FIELD NOTES: Other: Relinguished to Testmark By (Signature) Date Time Shipping Reference Sampled By Date Time Shipped By Client

Time

Date

Received at Testmark By



Final Report

C.O.C.: G71721 REPORT No. B19-34273

Report To:

City of Iqaluit PO Box 460,

Iqaluit NU X0A 0H0

Attention: Emmanuel Kayode

DATE RECEIVED: 23-Oct-19

DATE REPORTED: 13-Nov-19
SAMPLE MATRIX: Drinking Water

**Caduceon Environmental Laboratories** 

2378 Holly Lane

Ottawa Ontario K1V 7P1 Tel: 613-526-0123

Fax: 613-526-1244

JOB/PROJECT NO.: Test A (WTP)

P.O. NUMBER:

WATERWORKS NO.

			Client I.D.		WTP Raw	WTP Raw (Total)	WTP Potable	WTP Potable (Total)
			Sample I.D.  Date Collected		B19-34273-1	B19-34273-2	B19-34273-3	B19-34273-4
					21-Oct-19	21-Oct-19	21-Oct-19	21-Oct-19
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Hardness (as CaCO3)	mg/L	1	SM 3120	29-Oct-19/O	20		19	
Hardness (as CaCO3)	mg/L	1	SM 3120	25-Oct-19/O		20		19
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	23-Oct-19/O	15		12	
Bicarbonate(as CaCO3)	mg/L	5	SM 2320B	23-Oct-19/O	15		12	
Carbonate (as CaCO3)	mg/L	5	SM 2320B	23-Oct-19/O	< 5		< 5	
Hydroxide	mg/L	5	EPA 310.2	23-Oct-19/O	< 5		< 5	
Acidity (as CaCO3)	mg/L	5	Subcontract	28-Oct-19	6 1	1	9 1	1
pH @25°C	pH Units		SM 4500H	23-Oct-19/O	6.96		6.82	
Conductivity @25°C	µmho/cm	1	SM 2510B	23-Oct-19/O	44		45	
TDS(ion sum calc.)	mg/L	1	Calc.	29-Oct-19/O	22		22	
Total Suspended Solids	mg/L	3	SM2540D	24-Oct-19/K	< 3		< 3	
Turbidity	NTU	0.1	SM 2130	30-Oct-19/O	0.5		0.4	
REDOX potential	mV		In-House	30-Oct-19/R	360		387	
Chloride	mg/L	0.5	SM4110C	25-Oct-19/O	1.6		3.2	
Sulphate	mg/L	1	SM4110C	25-Oct-19/O	3		3	
Aluminum	mg/L	0.01	SM 3120	29-Oct-19/O	0.01		0.01	
Aluminum	mg/L	0.01	SM 3120	25-Oct-19/O		0.02		0.02
Antimony	mg/L	0.0001	EPA 200.8	24-Oct-19/O	< 0.0001		< 0.0001	
Antimony	mg/L	0.0001	EPA 200.8	30-Oct-19/O		0.0003		0.0003
Arsenic	mg/L	0.0001	EPA 200.8	24-Oct-19/O	< 0.0001		< 0.0001	
Arsenic	mg/L	0.0001	EPA 200.8	30-Oct-19/O		< 0.0001		< 0.0001
Barium	mg/L	0.001	SM 3120	29-Oct-19/O	0.002		0.001	
Barium	mg/L	0.001	SM 3120	25-Oct-19/O		0.002		0.002
Beryllium	mg/L	0.002	SM 3120	29-Oct-19/O	< 0.002		< 0.002	
Beryllium	mg/L	0.002	SM 3120	25-Oct-19/O		< 0.002		< 0.002
Cadmium	mg/L	).000015	EPA 200.8	24-Oct-19/O	< 0.000015		< 0.000015	
Cadmium	mg/L	).000015	EPA 200.8	30-Oct-19/O		< 0.000015		< 0.000015

R.L. = Reporting Limit

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



Final Report

C.O.C.: G71721 REPORT No. B19-34273

Report To:

City of Iqaluit PO Box 460,

Iqaluit NU X0A 0H0

**Attention:** Emmanuel Kayode

DATE RECEIVED: 23-Oct-19

DATE REPORTED: 13-Nov-19

SAMPLE MATRIX: Drinking Water

**Caduceon Environmental Laboratories** 

2378 Holly Lane

Ottawa Ontario K1V 7P1 Tel: 613-526-0123

Fax: 613-526-1244

JOB/PROJECT NO.: Test A (WTP)

P.O. NUMBER:

WATERWORKS NO.

			Client I.D.		WTP Raw	WTP Raw (Total)	WTP Potable	WTP Potable (Total)
			Sample I.D.  Date Collected		B19-34273-1	B19-34273-2	B19-34273-3	B19-34273-4
					21-Oct-19	21-Oct-19	21-Oct-19	21-Oct-19
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Chromium	mg/L	0.002	SM 3120	29-Oct-19/O	< 0.002		< 0.002	
Chromium	mg/L	0.002	SM 3120	25-Oct-19/O		< 0.002		< 0.002
Cobalt	mg/L	0.005	SM 3120	29-Oct-19/O	< 0.005		< 0.005	
Cobalt	mg/L	0.005	SM 3120	25-Oct-19/O		< 0.005		< 0.005
Copper	mg/L	0.002	SM 3120	29-Oct-19/O	< 0.002		0.027	
Copper	mg/L	0.002	SM 3120	25-Oct-19/O		0.002		0.027
Iron	mg/L	0.005	SM 3120	29-Oct-19/O	0.023		0.017	
Iron	mg/L	0.005	SM 3120	25-Oct-19/O		0.043		0.034
Lead	mg/L	0.00002	EPA 200.8	24-Oct-19/O	< 0.00002		0.00006	
Lead	mg/L	0.00002	EPA 200.8	30-Oct-19/O		0.00003		0.00008
Lithium	mg/L	0.01	SM 3120	29-Oct-19/O	< 0.01		< 0.01	
Lithium	mg/L	0.01	SM 3120	25-Oct-19/O		< 0.01		< 0.01
Manganese	mg/L	0.001	SM 3120	29-Oct-19/O	0.007		0.004	
Manganese	mg/L	0.001	SM 3120	25-Oct-19/O		0.009		0.004
Mercury	mg/L	0.00002	SM 3112 B	29-Oct-19/O	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	mg/L	0.01	SM 3120	29-Oct-19/O	< 0.01		< 0.01	
Molybdenum	mg/L	0.01	SM 3120	25-Oct-19/O		< 0.01		< 0.01
Nickel	mg/L	0.01	SM 3120	29-Oct-19/O	< 0.01		< 0.01	
Nickel	mg/L	0.01	SM 3120	25-Oct-19/O		< 0.01		< 0.01
Selenium	mg/L	0.001	EPA 200.8	24-Oct-19/O	< 0.001		< 0.001	
Selenium	mg/L	0.001	EPA 200.8	30-Oct-19/O		< 0.001		< 0.001
Silver	mg/L	0.0001	EPA 200.8	24-Oct-19/O	< 0.0001		< 0.0001	
Silver	mg/L	0.0001	EPA 200.8	30-Oct-19/O		< 0.0001		< 0.0001
Strontium	mg/L	0.001	SM 3120	29-Oct-19/O	0.014		0.014	
Strontium	mg/L	0.001	SM 3120	25-Oct-19/O		0.014		0.014
Thallium	mg/L	0.00005	EPA 200.8	24-Oct-19/O	< 0.00005		< 0.00005	
Thallium	mg/L	0.00005	EPA 200.8	30-Oct-19/O		< 0.00005		< 0.00005

R.L. = Reporting Limit

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



Final Report

C.O.C.: G71721 REPORT No. B19-34273

Report To:

City of Iqaluit PO Box 460,

Iqaluit NU X0A 0H0

**Attention:** Emmanuel Kayode

DATE RECEIVED: 23-Oct-19

DATE REPORTED: 13-Nov-19
SAMPLE MATRIX: Drinking Water

**Caduceon Environmental Laboratories** 

2378 Holly Lane

Ottawa Ontario K1V 7P1 Tel: 613-526-0123

Fax: 613-526-1244

JOB/PROJECT NO.: Test A (WTP)

P.O. NUMBER:

WATERWORKS NO.

			Client I.D.		WTP Raw	WTP Raw (Total)	WTP Potable	WTP Potable (Total)
			Sample I.D.  Date Collected		B19-34273-1	B19-34273-2	B19-34273-3	B19-34273-4
					21-Oct-19	21-Oct-19	21-Oct-19	21-Oct-19
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Tin	mg/L	0.05	SM 3120	29-Oct-19/O	< 0.05		< 0.05	
Tin	mg/L	0.05	SM 3120	25-Oct-19/O		< 0.05		< 0.05
Titanium	mg/L	0.005	SM 3120	29-Oct-19/O	< 0.005		< 0.005	
Titanium	mg/L	0.005	SM 3120	25-Oct-19/O		< 0.005		< 0.005
Uranium	mg/L	0.00005	EPA 200.8	24-Oct-19/O	< 0.00005		< 0.00005	
Uranium	mg/L	0.00005	EPA 200.8	30-Oct-19/O		< 0.00005		< 0.00005
Vanadium	mg/L	0.005	SM 3120	29-Oct-19/O	< 0.005		< 0.005	
Vanadium	mg/L	0.005	SM 3120	25-Oct-19/O		< 0.005		< 0.005
Zinc	mg/L	0.005	SM 3120	29-Oct-19/O	< 0.005		< 0.005	
Zinc	mg/L	0.005	SM 3120	25-Oct-19/O		0.005		0.008
Total Organic Carbon	mg/L	0.2	EPA 415.1	04-Nov-19/O	1.6		1.6	
TIC	mg/L	0.5	EPA 415.1	04-Nov-19/O	4.65		3.84	
Fecal Coliform	cfu/100mL	. 1	MOE E3371	23-Oct-19/O	0		0	
Anion Sum	meq/L		Calc.	29-Oct-19/O	0.412		0.426	
Cation Sum	meq/L		Calc.	29-Oct-19/O	0.437		0.421	
% Difference	%		Calc.	29-Oct-19/O	2.90		0.544	
Ion Ratio	AS/CS		Calc.	29-Oct-19/O	0.944		1.01	
Sodium Adsorption Ratio	-		Calc.	29-Oct-19/O	0.0806		0.0803	
Conductivity (calc.)	µmho/cm		Calc.	29-Oct-19/O	45		46	
EC(calc.)/EC(actual)	-		Calc.	29-Oct-19/O	1.03		1.03	
TDS(calc.)/EC(actual)	-		Calc.	29-Oct-19/O	0.502		0.502	
Langelier Index(25°C)	S.I.		Calc.	29-Oct-19/O	-2.39		-2.63	

<sup>1</sup> Subcontracted to Testmark Labs

R.L. = Reporting Limit

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

						TE	STING REC	QUIREN	MENTS				Ar	L	REP	ORTNUM	BER (Lab	Use)
	A DII C F	7 N 1"	O.Reg	153	Table					MISA G	uidelines		U	A.	00			
	ADUCEZ	1	Surfac	e Soil	Sub Surfac	e Soil	(O.R	eg 153)		0.Reg 5	58 Leacha	e Analysis						
	ENVIRONMENTAL LABORATORIES		Yes	No	Record of Site Co	onditio	n (O.R	eg 153)		Disposa	I Site:					-	100	
	Client committed. Quality	assured.	Provin	cial Water Quality (	Objectives					Landfill	Monitoring	l)		21		31	1)(	
			Sewer	Use By-Law:					_ [	Other:				or	7-	1		
Are	any samples to be submitted intended for Human (	Consumption	under any D	rinking Water Re	gulations?		Yes	No	(If yes	, submit a	II Drinkin	g Water S	amples on a	Drin	king Water	Chain of C	ustody)	
	Indicate Laboratory Samples	are submit	ted to:	☐ King	ston	Ottav	wa 🗆	Rich	nmond	Hill	☐ Wir	dsor	Barri	е	Lond	don		
Organiz	ration: Address and Invoice	ing Address	(if different)			1	P. P.	ANALYS	SES RE	QUESTE	) (Print To	est in Box	es)		TL	RNAROU	ND SERV	CE
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L	mmanuel Kayoda	1901	uct			Quot								amir	☐ Platir	ıum	200% Sur	charge**
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	5147026906	log XC	JA G	#0		1						. 1.8		h	Silve	r	50% Surc	harge
Fax:	Quote No.:		Project Nan	ne:		3						111		Suspected Highly Contaminated	Bron		25% Surc	harge
						1								cted	Stand	lard	5-7 days	
Email:	P.O. No.:		Additional I	nfo:		X								spe		2 12 10		
6. K	Layade @ Igaluitica P.O. No.:					,		0.11.01							Specif	ic Date:		
	* Sample Matrix Legend:	WW=Waste Wa	7	Date Collected		iquid S	Sludge, SS=			S=Soil, Sec Test For Ea			t Chips, F=Fi	iter, O	Fie	14	# Bottles/	Field
Lab No:	Sample Identification	S.P.L.	Sample Matrix *	(yy-mm-dd)	Time Collected					ck Mark In				~	pH	Temp.	Sample	Filtered(Y/N)
NO.	2	J.F.L.	WIGHTA		9:40			- J	1	,	T	Ovided				•	1	
	WWTP Influent	-		Uct 21				-	10	ST	1	_			6.84	12.4	6	
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	SAMPLE SUBMISSION INFORMATION		SH	IPPING INFORM	ATION	REI	PORTING /	INVOIC	CING		SAMPL	E RECEIN	ING INFORM	MATIC	N (LABORA	ATORY US	E ONLY)	1
	Sampled by: Submitted	by:	Client's Cou	ırier 🔀	Invoice	Repo	ort by Fax			Received					Signature:	Berthe	Cock	Me
Print:	Emmanyel Kayod Emmanue	l Layde	4			Repo	rt by Email	I					19-10-2	22	Time Rece	ived: 16	130	
Sign:	Waller 16th	N))	Drop Off		# of Pieces		ce by Emai		,	Laborator		CONTRACTOR OF THE				No		
	19-10-21 19-1	0	Caduceon (	Pick-up)			ce by Mail										X	
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			R. B. C. S. N.				PHE NEW		lein."						G 7	1/2	_	



#### **QUOTATION FOR ANALYTICAL SERVICES**

Quote #: YD18 Igaluit F

Organization:

City of Iqaluit

Contact:

Mike Hatfield

Telephone:

867-979-6363

Facsimile: Email:

M.Hatfield@city.lqaluit.nu.ca

Project #: Address: TEST F - Sewage Lagoon Box 460, Iqaluit NU, X0A 0H0

Additional Info:

QUOTE # ('S) MUST BE ON C OF C TO APPLY if not listed, General pricing will be applied.

Additional Info:

Replacing Quote YD17\_lqaluit\_F\_REV1

Date: 1-Mar-18

Valid Until: 31-Dec-19

ltem #	Quantity	Analysis Request	Matrix	Unit Cost, \$	Amount, \$
1	1	BOD	WW	30.00	30.00
2	1	Total Coliform / Fecal Coliform	ww	31.00	31.00
3	1	Ammonia, NO2/NO3	ww	30.00	30.00
4	1	Total Phosphorus	ww	17.50	17.50
5	1	Orthophosphate	ww	17.50	17.50
6	1	Conductivity	ww	9.45	9.45
7	1	TSS	ww	17.50	17.50
8	1	pH	ww	9.00	9.00
9	1	TOTAL METALS ICPOES AI, Ba, Be, Cr, Co, Cu, Fe, Li, Mn, Mo, Ni, Sn, Sr, Ti, V, Zn ICPMS Sb, As, Cd, Pb, Se, Ag, Tl, U CVAAS Hg	ww	92.00	92.00
10	11	Ottawa Airport Pick Up		25.00	25.00
rices do not include shipp	oing unless otherwise state	d.	_	Subtotal	278.95
nvironmental Surc	harge of \$1.50 per	sample set		HST	36.26
				Total Cost	315.21

Rebecca Marshall

Customer Service Representative

Caduceon Environmental Laboratories

rmarshall@caduceonlabs.com

613-526-0123



Final Report

C.O.C.: --- REPORT No. B19-34282

Report To:

City of Iqaluit

PO Box 460,

Iqaluit NU X0A 0H0

**Attention:** Emmanuel Kayode

DATE RECEIVED: 23-Oct-19

DATE REPORTED: 30-Oct-19

SAMPLE MATRIX: Waste Water

**Caduceon Environmental Laboratories** 

2378 Holly Lane

Ottawa Ontario K1V 7P1

Tel: 613-526-0123

Fax: 613-526-1244

JOB/PROJECT NO.: Test F

P.O. NUMBER:

WATERWORKS NO.

			Client I.D.		WWTP Influent	WWTP Effluent		
			Sample I.D.		B19-34282-1	B19-34282-2		
			Date Collect	ed	23-Oct-19	23-Oct-19		
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed			1	
BOD(5 day)	mg/L	3	SM 5210B	24-Oct-19/K	166	130		
Total Suspended Solids	mg/L	3	SM2540D	24-Oct-19/K	210	95		
Conductivity @25°C	µmho/cm	1	SM 2510B	24-Oct-19/O	425	430		
pH @25°C	pH Units		SM 4500H	24-Oct-19/O	7.26	7.22		
Nitrite (N)	mg/L	0.1	SM4110C	29-Oct-19/O	< 0.1	< 0.1		
Nitrate (N)	mg/L	0.1	SM4110C	29-Oct-19/O	< 0.1	< 0.1		
Ammonia (N)-Total	mg/L	0.01	SM4500- NH3-H	29-Oct-19/K	20.8	21.6		
o-Phosphate (P)	mg/L	0.002	PE4500-S	29-Oct-19/K	3.41	3.11		
Phosphorus-Total	mg/L	0.01	E3199A.1	24-Oct-19/K	4.91	4.48		
Aluminum	mg/L	0.01	SM 3120	25-Oct-19/O	0.29	0.29		
Antimony	mg/L	0.0005	EPA 200.8	24-Oct-19/O	< 0.0005	< 0.0005		
Arsenic	mg/L	0.0005	EPA 200.8	24-Oct-19/O	< 0.0005	< 0.0005		
Barium	mg/L	0.001	SM 3120	25-Oct-19/O	0.009	0.008		
Beryllium	mg/L	0.002	SM 3120	25-Oct-19/O	< 0.002	< 0.002		
Cadmium	mg/L	0.000070	EPA 200.8	24-Oct-19/O	0.000176	0.000144		
Chromium	mg/L	0.002	SM 3120	25-Oct-19/O	< 0.002	< 0.002		
Cobalt	mg/L	0.005	SM 3120	25-Oct-19/O	< 0.005	< 0.005		
Copper	mg/L	0.002	SM 3120	25-Oct-19/O	0.214	0.217		
Iron	mg/L	0.005	SM 3120	25-Oct-19/O	0.544	0.569		
Lead	mg/L	0.0001	EPA 200.8	24-Oct-19/O	0.0043	0.0035		
Lithium	mg/L	0.01	SM 3120	25-Oct-19/O	< 0.01	< 0.01		
Manganese	mg/L	0.001	SM 3120	25-Oct-19/O	0.111	0.111		
Mercury	mg/L	0.00002	SM 3112 B	29-Oct-19/O	0.00003	0.00003		
Molybdenum	mg/L	0.01	SM 3120	25-Oct-19/O	< 0.01	< 0.01		
Nickel	mg/L	0.01	SM 3120	25-Oct-19/O	< 0.01	< 0.01		
Selenium	mg/L	0.005	EPA 200.8	24-Oct-19/O	< 0.005	< 0.005		

R.L. = Reporting Limit

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



**Final Report** 

C.O.C.: --- REPORT No. B19-34282

Report To:

City of Iqaluit PO Box 460,

Iqaluit NU X0A 0H0

Attention: Emmanuel Kayode

DATE RECEIVED: 23-Oct-19

DATE REPORTED: 30-Oct-19

SAMPLE MATRIX: Waste Water

**Caduceon Environmental Laboratories** 

2378 Holly Lane

Ottawa Ontario K1V 7P1

Tel: 613-526-0123 Fax: 613-526-1244

JOB/PROJECT NO.: Test F

P.O. NUMBER:

WATERWORKS NO.

			Client I.D.		WWTP Influent	WWTP Effluent	
			Sample I.D.		B19-34282-1	B19-34282-2	
			Date Collecte	ed	23-Oct-19	23-Oct-19	
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed			
Silver	mg/L	0.0001	EPA 200.8	24-Oct-19/O	< 0.0001	< 0.0001	
Strontium	mg/L	0.001	SM 3120	25-Oct-19/O	0.042	0.042	
Thallium	mg/L	0.0003	EPA 200.8	24-Oct-19/O	< 0.0003	< 0.0003	
Tin	mg/L	0.05	SM 3120	25-Oct-19/O	< 0.05	< 0.05	
Titanium	mg/L	0.005	SM 3120	25-Oct-19/O	< 0.005	< 0.005	
Uranium	mg/L	0.0003	EPA 200.8	24-Oct-19/O	< 0.0003	< 0.0003	
Vanadium	mg/L	0.005	SM 3120	25-Oct-19/O	< 0.005	< 0.005	
Zinc	mg/L	0.005	SM 3120	25-Oct-19/O	0.132	0.129	
Total Coliform	cfu/100mL	1	MOE E3371	23-Oct-19/O	36000000	42000000	
Fecal Coliform	cfu/100mL	1	MOE E3371	23-Oct-19/O	5300000	3600000	·

R.L. = Reporting Limit

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

			,				TEST	ING REQUI	REMENTS	3				AL	. 1	1-3	- ATTUA	R (Lab	Use)
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19	ENVIRONMENTAL LA	BORATORIES		Yes		Record of Site C	ondition	(O.Reg	_		osal Site					20	01	10	
	Client	t committed. Quality a	ssured.		ial Water Quality (	Objectives			Ę	Land		toring		K	10	1- :	)X L	19	7
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Are	any samples to be submitted inte					-										king Water (		ustody)	
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Organiz	ation:	ddress and Invoici	ng Address	(if different)		1		AN/	ALYSES R	EQUES	TED (Pi	int Test i	n Boxes)				RNAROUI		
	City of Igaluit	ū	30x 4	60			Qude								ted	REQ	JESTED (	see back	page)
Contact	1 1/2 10	10	s aluit				3								ninat	☐ Platin	um	200% Sur	chargo**
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Fax:	C	Quote No.:		Project Nam	ie:		S								Suspected Highly Contaminated	☐ Bronz	ze	25% Surc	harge
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Email:	IP.	P.O. No.: 46		Additional In	nfo:										spec	,			
8. Kay	yode @ City. Igalul wis	ple Matrix Legend: V		ton CW-Confe	M-4 CM-C-	and dustan I Cal	iaurial Clusa	1-2-22	id Cludes	C=C=1	Cadmea	diment D	C=Deint C	aino EmEilt		Specif	c Date: _		
Lab	- Sam	ipie matrix Legend: v	vvv=vvaste vva	Sample	Date Collected	Time	Iquia Siud	ige, 55-501		Test Fo			6-Paint G	iips, r-riid	er, U	Fie	ld	# Bottles/	Field
No:	Sample Identification	on	S.P.L.	Matrix *	(yy-mm-dd)	Collected		Ву	Jsing A Ch				ded		~	pН	Temp.	Sample	Filtered(Y/N)
0	WTP Rau	2) Tota	l Meta	el. Din	Nov. 25		1		Te	ct	X					7.02	5.0	ġ	
(2)	WIP Potal	1-10 (y) -	Total 1		Nov. 25				T		1	II ye				6.42	8.6	9	
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	Sampled by:	Submitted I	by:	Client's Cou	rier 💢	Invoice	Report b	oy Fax		Receiv	ed By (	print): -	Tas	lia		Signature:	Cut	ttt	1
Print:	Emmanuel Kayide	Emmanuel	Kayode	Caduceon's	Courier		Report b	y Email		Date R	eceived	d (yy-mm	-dd): 10	1112	7	Time Rece	ived: /	30	
Sign:	Ka Hall	Kalen	5,	Drop Off		# of Pieces		by Email		THE RESERVE		epared B	1	1	/		No		
	19-11-25	19-11-2	5	Caduceon (I	Pick-up)		Invoice I	by Mail		Commi	o Tom-	erature °	C.	(-)		I aboled to	-		
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	White: Lab Copy / Yellow: Invoicing C	Copy / Pink: Client Copy				CofC, Jan. 201	7, Revision	No: 20	11	M, IA	9 X	2			)				

IM, IHG X2



# **QUOTATION FOR ANALYTICAL SERVICES**

Quote #:

YD18\_lqaluit\_A

Organization:

City of Iqaluit

Contact: Telephone: Mike Hatfield 867-979-6363

Facsimile:

Email:

M.Hatfield@city.lgaluit.nu.ca

Proiect #: Address:

**TEST A - Drinking Water** Box 460, Iqaluit NU, X0A 0H0

Additional Info:

QUOTE # ('S) MUST BE ON C OF C TO APPLY if not listed, General pricing will be applied.

Additional Info:

Replacing Quote YD17\_lqaluit\_A\_Rev1

Date:

26-Feb-18

Valid Until:

31-Dec-19

Item #	Quantity	Analysis Request	Matrix	Unit Cost, \$	Amount, \$
1	1	Acidity (Subcontracted)	DW	33.50	33.50
2	1	Alkalinity	DW	14.50	14.50
3	1	Bicarbonate/ Carbonate	DW	17.50	17.50
4	1	Chloride/Sulphate	DW	23.75	23.75
5	1	Conductivity	DW	9.45	9.45
6	1	Hydroxide	DW	14.50	14.50
7	1	Redox Potential	DW	15.75	15.75
8	1	TDS	DW	17.50	17.50
9	1	TSS	DW	17.50	17.50
10	1	TOC	DW	23.75	23.75
11	1	TIC	DW	23.75	23.75
12	1	TOTAL METALS ICPOES AI, Ba, Be, Cr, Co, Cu, Fe, Li, Mn, Mo, Ni, Sn, Sr, Ti, V, Zn + Hardness ICPMS Sb, As, Cd, Pb, Se, Ag, Tl, U CVAAS Hg	DW	92.00	92.00
13	1	DISSOLVED METALS ICPOES AI, Ba, Be, Cr, Co, Cu, Fe, Li, Mn, Mo, Ni, Sn, Sr, Ti, V, Zn + Hardness ICPMS Sb, As, Cd, Pb, Se, Ag, Tl, U CVAAS Hg	DW	92.00	92.00
14	1	Fecal Coliforms	DW	16.25	16.25
15	1	рН	DW	9.00	9.00
16	1	Turbidity	DW	14.50	14.50
17	1	Ottawa Airport Pick Up		25.00	25.00
es do not include shippi	ng unless otherwise state			Subtotal	460.20

Environmental Surcharge of \$1.50 per sample set

HST 59.83 Total Cost 520.03

Rebecca Marshall **Customer Service Representative** 

**Caduceon Environmental Laboratories** 

rmarshall@caduceonlabs.com

613-526-0123



#### **GENERAL CHAIN OF CUSTODY FORM**

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Page	UI UI

Please use our Drinking Water Chain of Custody Form for regulated drinking water samples REPORT TO: INVOICE TO: (if different from Report) PROJECT INFORMATION: Client: Client: Caduceon Environmental Laboratories TM Quote #: Caduceon Environmental Laboratories Address 2378 Holly Lane Address: 285 Dalton Avenue Client P.O. #: **P191127\_TM** Ottawa ON, K1V 7P1 Kingston ON Client Project #: Greg Clarkin Contact: K7K 6Z1 Email: qclarkin@caduceonlabs.com tyapici@caduceonlabs.com Email: mmccormick@caduceonlabs.com 613-526-0123 Fax: 613-526-1244 Phone: Phone: 6135442770 6135442001 REPORTING/INVOICING FORMAT TURN AROUND TIME (TAT)\* **ANALYSIS REQUESTED** LABORATORY USE ONLY FIELD FILTERED? CONTAINERS ☐1 Business Day 2 Business Days Mail WORK ORDER NUMBER: FIELD TEMP (if applicable) RECEIVED FIELD pH (if applicable) **QC DATA REPORTED** ☐3 Business Days Standard No Yes SAMPLE DISPOSAL SPECIFIC DATE: CONTAINERS OF \* Prior arrangements must be made for Hold Dispose Return NUMBER rush/weekend/holiday work Acidity METALS SAMPLING (Y/N?) SAMPLE DESCRIPTION DATE MATRIX\*\* TIME (This Will Appear On The Report) TEMP Btl. Type Lab ID (mm-dd-yy) 11/27/2019 DW B19-38495-1 Х am 11/23/2019 DW B19-38495-3 X am \*\* Non-Regulated DW \*\*Matrix: B=Biota, GW=Ground Water, O=Oil, P=Paint, S=Soil, SL=Sludge, O.Reg. 153: (1 2 3 4 5 6 7 8 9 ) SW=Surface Water, W=Water, WW=Wastewater, SD=Sediment REGULATION Industrial / Commercial Residential / Parkland Agricultural Coarse Soil Fine Soil Surface Subsurface High Concentrations Expected O.Reg. 558 PWQO MISA CofA MMER EEM None Sewer Use: Sanitary Storm Municipality: COMMENTS/FIELD NOTES: Other: Relinquished to Testmark By (Signature) Date Time Sampled By Date Time Shipped By Shipping Reference Client Received By Date Time Received at Testmark By Date Time



Final Report

C.O.C.: G72045 REPORT No. B19-38495

Report To:

City of Iqaluit PO Box 460,

Iqaluit NU X0A 0H0

Attention: Emmanuel Kayode

DATE RECEIVED: 27-Nov-19

DATE REPORTED: 13-Dec-19
SAMPLE MATRIX: Drinking Water

**Caduceon Environmental Laboratories** 

2378 Holly Lane

Ottawa Ontario K1V 7P1 Tel: 613-526-0123 Fax: 613-526-1244

JOB/PROJECT NO.: Test A (WTP)

P.O. NUMBER: WATERWORKS NO.

			Client I.D.		WTP Raw	WTP Raw (Total)	WTP Potable	WTP Potable (Total)
			Sample I.D.		B19-38495-1	B19-38495-2	B19-38495-3	B19-38495-4
			Date Collect	ed	25-Nov-19	25-Nov-19	25-Nov-19	25-Nov-19
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Hardness (as CaCO3)	mg/L	1	SM 3120	03-Dec-19/O	21		21	
Hardness (as CaCO3)	mg/L	1	SM 3120	28-Nov-19/O		21		21
Alkalinity(CaCO3) to pH4.5	mg/L	5	SM 2320B	28-Nov-19/O	17		13	
Bicarbonate(as CaCO3)	mg/L	5	SM 2320B	28-Nov-19/O	17		13	
Carbonate (as CaCO3)	mg/L	5	SM 2320B	28-Nov-19/O	< 5		< 5	
Hydroxide	mg/L	5	EPA 310.2	28-Nov-19/O	< 5		< 5	
Acidity (as CaCO3)	mg/L	5	Subcontract	05-Dec-19	< 5 <sup>1</sup>		< 5 1	
pH @25°C	pH Units		SM 4500H	28-Nov-19/O	7.26		6.88	
Conductivity @25°C	µmho/cm	1	SM 2510B	28-Nov-19/O	50		49	
TDS(ion sum calc.)	mg/L	1	Calc.	03-Dec-19/O	19		18	
Total Suspended Solids	mg/L	3	SM2540D	28-Nov-19/K	3		< 3	
Turbidity	NTU	0.1	SM 2130	29-Nov-19/O	0.4		0.3	
REDOX potential	mV		In-House	03-Dec-19/R	100		408	
Chloride	mg/L	0.5	SM4110C	29-Nov-19/O	< 0.5		1.5	
Sulphate	mg/L	1	SM4110C	29-Nov-19/O	< 1		< 1	
Aluminum	mg/L	0.01	SM 3120	03-Dec-19/O	< 0.01		< 0.01	
Aluminum	mg/L	0.01	SM 3120	28-Nov-19/O		0.01		0.05
Antimony	mg/L	0.0001	EPA 200.8	29-Nov-19/O	< 0.0001		< 0.0001	
Antimony	mg/L	0.0001	EPA 200.8	28-Nov-19/O		0.0002		0.0003
Arsenic	mg/L	0.0001	EPA 200.8	29-Nov-19/O	< 0.0001		< 0.0001	
Arsenic	mg/L	0.0001	EPA 200.8	28-Nov-19/O		< 0.0001		< 0.0001
Barium	mg/L	0.001	SM 3120	03-Dec-19/O	0.002		0.002	
Barium	mg/L	0.001	SM 3120	28-Nov-19/O		0.002		0.002
Beryllium	mg/L	0.002	SM 3120	03-Dec-19/O	< 0.002		< 0.002	
Beryllium	mg/L	0.002	SM 3120	28-Nov-19/O		< 0.002		< 0.002
Cadmium	mg/L	).000015	EPA 200.8	29-Nov-19/O	< 0.000015		< 0.000015	
Cadmium	mg/L	).000015	EPA 200.8	28-Nov-19/O		< 0.000015		< 0.000015

R.L. = Reporting Limit

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



Final Report

C.O.C.: G72045 REPORT No. B19-38495

Report To:

City of Iqaluit PO Box 460,

Iqaluit NU X0A 0H0

**<u>Attention:</u>** Emmanuel Kayode

DATE RECEIVED: 27-Nov-19

DATE REPORTED: 13-Dec-19

SAMPLE MATRIX: Drinking Water

**Caduceon Environmental Laboratories** 

2378 Holly Lane

Ottawa Ontario K1V 7P1 Tel: 613-526-0123

Fax: 613-526-1244

JOB/PROJECT NO.: Test A (WTP)

P.O. NUMBER:

WATERWORKS NO.

			Client I.D.		WTP Raw	WTP Raw (Total)	WTP Potable	WTP Potable (Total)
			Sample I.D.		B19-38495-1	B19-38495-2	B19-38495-3	B19-38495-4
			Date Collect	ed	25-Nov-19	25-Nov-19	25-Nov-19	25-Nov-19
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Chromium	mg/L	0.002	SM 3120	03-Dec-19/O	< 0.002		< 0.002	
Chromium	mg/L	0.002	SM 3120	28-Nov-19/O		< 0.002		< 0.002
Cobalt	mg/L	0.005	SM 3120	03-Dec-19/O	< 0.005		< 0.005	
Cobalt	mg/L	0.005	SM 3120	28-Nov-19/O		< 0.005		< 0.005
Copper	mg/L	0.002	SM 3120	03-Dec-19/O	< 0.002		0.056	
Copper	mg/L	0.002	SM 3120	28-Nov-19/O		< 0.002		0.061
Iron	mg/L	0.005	SM 3120	03-Dec-19/O	0.017		0.011	
Iron	mg/L	0.005	SM 3120	28-Nov-19/O		0.039		0.027
Lead	mg/L	0.00002	EPA 200.8	29-Nov-19/O	< 0.00002		0.00010	
Lead	mg/L	0.00002	EPA 200.8	28-Nov-19/O		< 0.00002		0.00011
Lithium	mg/L	0.01	SM 3120	03-Dec-19/O	< 0.01		< 0.01	
Lithium	mg/L	0.01	SM 3120	28-Nov-19/O		< 0.01		< 0.01
Manganese	mg/L	0.001	SM 3120	03-Dec-19/O	0.008		0.002	
Manganese	mg/L	0.001	SM 3120	28-Nov-19/O		0.008		0.003
Mercury	mg/L	0.00002	SM 3112 B	03-Dec-19/O	< 0.00002	< 0.00002	< 0.00002	< 0.00002
Molybdenum	mg/L	0.01	SM 3120	03-Dec-19/O	< 0.01		< 0.01	
Molybdenum	mg/L	0.01	SM 3120	28-Nov-19/O		< 0.01		< 0.01
Nickel	mg/L	0.01	SM 3120	03-Dec-19/O	< 0.01		< 0.01	
Nickel	mg/L	0.01	SM 3120	28-Nov-19/O		< 0.01		< 0.01
Selenium	mg/L	0.001	EPA 200.8	29-Nov-19/O	< 0.001		< 0.001	
Selenium	mg/L	0.001	EPA 200.8	28-Nov-19/O		< 0.001		< 0.001
Silver	mg/L	0.0001	EPA 200.8	29-Nov-19/O	< 0.0001		< 0.0001	
Silver	mg/L	0.0001	EPA 200.8	28-Nov-19/O		< 0.0001		< 0.0001
Strontium	mg/L	0.001	SM 3120	03-Dec-19/O	0.014		0.014	
Strontium	mg/L	0.001	SM 3120	28-Nov-19/O		0.014		0.014
Thallium	mg/L	0.00005	EPA 200.8	29-Nov-19/O	< 0.00005		< 0.00005	
Thallium	mg/L	0.00005	EPA 200.8	28-Nov-19/O		< 0.00005		< 0.00005

R.L. = Reporting Limit

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



Final Report

C.O.C.: G72045 REPORT No. B19-38495

Report To:

City of Iqaluit PO Box 460,

Iqaluit NU X0A 0H0

**Attention:** Emmanuel Kayode

DATE RECEIVED: 27-Nov-19

DATE REPORTED: 13-Dec-19

SAMPLE MATRIX: Drinking Water

**Caduceon Environmental Laboratories** 

2378 Holly Lane

Ottawa Ontario K1V 7P1 Tel: 613-526-0123

Fax: 613-526-1244

JOB/PROJECT NO.: Test A (WTP)

P.O. NUMBER:

WATERWORKS NO.

			Client I.D.		WTP Raw	WTP Raw (Total)	WTP Potable	WTP Potable (Total)
			Sample I.D.		B19-38495-1	B19-38495-2	B19-38495-3	B19-38495-4
			Date Collecte	ed	25-Nov-19	25-Nov-19	25-Nov-19	25-Nov-19
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed				
Tin	mg/L	0.05	SM 3120	03-Dec-19/O	< 0.05		< 0.05	
Tin	mg/L	0.05	SM 3120	28-Nov-19/O		< 0.05		< 0.05
Titanium	mg/L	0.005	SM 3120	03-Dec-19/O	< 0.005		< 0.005	
Titanium	mg/L	0.005	SM 3120	28-Nov-19/O		< 0.005		< 0.005
Uranium	mg/L	0.00005	EPA 200.8	29-Nov-19/O	< 0.00005		< 0.00005	
Uranium	mg/L	0.00005	EPA 200.8	28-Nov-19/O		< 0.00005		< 0.00005
Vanadium	mg/L	0.005	SM 3120	03-Dec-19/O	< 0.005		< 0.005	
Vanadium	mg/L	0.005	SM 3120	28-Nov-19/O		< 0.005		< 0.005
Zinc	mg/L	0.005	SM 3120	03-Dec-19/O	< 0.005		0.008	
Zinc	mg/L	0.005	SM 3120	28-Nov-19/O		0.010		0.011
Total Organic Carbon	mg/L	0.2	EPA 415.2	09-Dec-19/O	2.1		2.1	
TIC	mg/L	0.5	EPA 415.1	09-Dec-19/O	4.59		4.03	
Fecal Coliform	cfu/100mL	1	MOE E3371	27-Nov-19/O	< 2		< 2	
Anion Sum	meq/L		Calc.	03-Dec-19/O	0.341		0.320	
Cation Sum	meq/L		Calc.	03-Dec-19/O	0.450		0.453	
% Difference	%		Calc.	03-Dec-19/O	13.8		17.2	
Ion Ratio	AS/CS		Calc.	03-Dec-19/O	0.758		0.706	
Sodium Adsorption Ratio	-		Calc.	03-Dec-19/O	0.0775		0.0795	
Conductivity (calc.)	µmho/cm		Calc.	03-Dec-19/O	40		40	
EC(calc.)/EC(actual)	-		Calc.	03-Dec-19/O	0.799		0.818	
TDS(calc.)/EC(actual)	-		Calc.	03-Dec-19/O	0.375		0.373	
Langelier Index(25°C)	S.I.		Calc.	03-Dec-19/O	-2.02		-2.51	

<sup>1</sup> Subcontracted to Testmark Labs

R.L. = Reporting Limit

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		10.5					TE	STING	REQU	IREM	ENTS						2 1	-	PE	LOOKT NUM	Ler Lat	Use)
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	ENVIRONMENTAL L	ABORALORIES ent committed. Quality as	sured.		ial Water Quality		onunio	11	(O.Reg	153)	Г	_		nitoring		9	2	V	1	20	UO	
	1 1/4				Use By-Law:		М. у.				. [	Othe					0		1-	10	77	0
Are	e any samples to be submitted ir	tended for Human Co	nsumption	under any D	rinking Water R	egulations?		Yes		No	(If yes	, subn	nit all [	rinking V	Vater S	ample	s on a	Drinl	king Water	Chain of (	Custody)	
	Indicate La	boratory Samples a				gston	Ottav	va		Rich	mond	Hill		Winds	or		Barrie	9	Lon	don		
Organia	, ,	Address and Invoicing						,	AN	ALYS	ES RE	QUES	TED (F	rint Test	in Box	es)		2		URNAROU		
Contac	city of Igaluit		50x 4	160			v											ated	REG	QUESTED (	see back	page)
(	Emmanue ( Kayod	ę	Igalu	it			Quot					3	-					amina	☐ Plati	num	200% Sur	charge**
Tel:	5147026906	1	Nu X	LGO LIE DA OF	10		0					- 4						Suspected Highly Contaminated	Gold		100% Sur 50% Surc	
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					ie: Test	+.												cted I	Stan	dard	5-7 days	
Email:	yode@ city. Igaluit.nu.cg	P.O. No.: 460		Additional I	nfo:		As											edsn	Speci	fic Date:		
CRA	* Sa	ımple Matrix Legend: W	W=Waste Wa	ter, SW=Surfa	ce Water, GW=G	roundwater, LS=	Liquid S	Sludge,	SS=So	lid Slu	ıdge, S	S=Soil,	Sed=Se	ediment, P	C=Pain	t Chips	, F=Filt			ic Date.	- 201	The second
Lab				Sample	Date Collected	Time								Sample		39		~		eld	# Bottles/	Field
No:	Sample Identifica		S.P.L.	Matrix *	(yy-mm-dd)	Collected			Ву	Using	A Che	CK Mark	The The	Box Provi	aea	Г			pH	Temp.	Sample	Filtered(Y/N)
		went		WW	Nov25	4: 40	-			-	es		+						7.37	15.1	6	
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#### **QUOTATION FOR ANALYTICAL SERVICES**

Quote #:

YD18\_lqaluit\_F

Organization:

City of Iqaluit Mike Hatfield

Contact: Telephone:

867-979-6363

Facsimile:

Email:

M.Hatfield@city.lgaluit.nu.ca

Project #: Address:

**TEST F - Sewage Lagoon** Box 460, Iqaluit NU, X0A 0H0

Additional Info:

QUOTE # ('S) MUST BE ON C OF C TO APPLY if not listed, General pricing will be applied.

Additional Info:

Replacing Quote YD17\_Iqaluit\_F\_REV1

Date: 1-Mar-18 Valid Until: 31-Dec-19

Item #	Quantity	Analysis Request	Matrix	Unit Cost, \$	Amount, \$
1	1	BOD	ww	30.00	30.00
2	1	Total Coliform / Fecal Coliform	ww	31.00	31.00
3	1	Ammonia, NO2/NO3	WW	30.00	30.00
4	1	Total Phosphorus	ww	17.50	17.50
5	1	Orthophosphate	WW	17.50	17.50
6	1	Conductivity	ww	9.45	9.45
7	1	TSS	ww	17.50	17.50
8	1	pH	WW	9.00	9.00
9	1	TOTAL METALS ICPOES AI, Ba, Be, Cr, Co, Cu, Fe, Li, Mn, Mo, Ni, Sn, Sr, Ti, V, Zn ICPMS Sb, As, Cd, Pb, Se, Ag, TI, U CVAAS Ha	ww	92.00	92.00
10	1	Ottawa Airport Pick Up		25.00	25.00
es do not include shippir	ng unless otherwise state	d.		Subtotal	278.95
vironmental Surch	arge of \$1.50 per s	samnle set		HST	36.26

nvironmental Surcharge of \$1.50 per sample set:

HST 36.26 **Total Cost** 315.21

Rebecca Marshall **Customer Service Representative Caduceon Environmental Laboratories** rmarshall@caduceonlabs.com 613-526-0123



**Final Report** 

C.O.C.: G72044 **REPORT No. B19-38496** 

**Report To:** 

City of Iqaluit PO Box 460,

Iqaluit NU X0A 0H0

**Attention:** Emmanuel Kayode

DATE RECEIVED: 27-Nov-19

DATE REPORTED: 11-Dec-19

SAMPLE MATRIX: Waste Water

**Caduceon Environmental Laboratories** 

2378 Holly Lane

Ottawa Ontario K1V 7P1

Tel: 613-526-0123

Fax: 613-526-1244

JOB/PROJECT NO.: Test F

P.O. NUMBER:

WATERWORKS NO.

			Client I.D.		WWTP Influent	WWTP Effluent	
			Sample I.D.		B19-38496-1	B19-38496-2	
			Date Collected		25-Nov-19	25-Nov-19	
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed			
BOD(5 day)	mg/L	3	SM 5210B	29-Nov-19/K	189	147	
Total Suspended Solids	mg/L	3	SM2540D	28-Nov-19/K	470	240	
Conductivity @25°C	µmho/cm	1	SM 2510B	28-Nov-19/O	611	505	
pH @25°C	pH Units		SM 4500H	28-Nov-19/O	7.11	7.09	
Nitrite (N)	mg/L	0.1	SM4110C	09-Dec-19/O	< 0.1	< 0.1	
Nitrate (N)	mg/L	0.1	SM4110C	09-Dec-19/O	< 0.1	< 0.1	
Ammonia (N)-Total	mg/L	0.01	SM4500- NH3-H	29-Nov-19/K	43.2	30.6	
o-Phosphate (P)	mg/L	0.002	PE4500-S	29-Nov-19/K	7.19	4.70	
Phosphorus-Total	mg/L	0.01	E3199A.1	29-Nov-19/K	7.89	6.48	
Aluminum	mg/L	0.01	SM 3120	28-Nov-19/O	0.52	0.32	
Antimony	mg/L	0.0005	EPA 200.8	29-Nov-19/O	< 0.0005	< 0.0005	
Arsenic	mg/L	0.0005	EPA 200.8	29-Nov-19/O	< 0.0005	< 0.0005	
Barium	mg/L	0.001	SM 3120	28-Nov-19/O	0.012	0.009	
Beryllium	mg/L	0.002	SM 3120	28-Nov-19/O	< 0.002	< 0.002	
Cadmium	mg/L	0.000070	EPA 200.8	29-Nov-19/O	0.000212	0.000194	
Chromium	mg/L	0.002	SM 3120	28-Nov-19/O	0.004	< 0.002	
Cobalt	mg/L	0.005	SM 3120	28-Nov-19/O	< 0.005	< 0.005	
Copper	mg/L	0.002	SM 3120	28-Nov-19/O	0.390	0.326	
Iron	mg/L	0.005	SM 3120	28-Nov-19/O	1.02	0.828	
Lead	mg/L	0.0001	EPA 200.8	29-Nov-19/O	0.0042	0.0071	
Lithium	mg/L	0.01	SM 3120	28-Nov-19/O	< 0.01	< 0.01	
Manganese	mg/L	0.001	SM 3120	28-Nov-19/O	0.095	0.099	
Mercury	mg/L	0.00002	SM 3112 B	03-Dec-19/O	0.00004	0.00071	
Molybdenum	mg/L	0.01	SM 3120	28-Nov-19/O	< 0.01	< 0.01	
Nickel	mg/L	0.01	SM 3120	28-Nov-19/O	0.01	< 0.01	
Selenium	mg/L	0.005	EPA 200.8	29-Nov-19/O	< 0.005	< 0.005	

R.L. = Reporting Limit

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



Final Report

C.O.C.: G72044 REPORT No. B19-38496

Report To:

City of Iqaluit PO Box 460,

Iqaluit NU X0A 0H0

Attention: Emmanuel Kayode

DATE RECEIVED: 27-Nov-19

DATE REPORTED: 11-Dec-19

SAMPLE MATRIX: Waste Water

**Caduceon Environmental Laboratories** 

2378 Holly Lane

Ottawa Ontario K1V 7P1 Tel: 613-526-0123

Fax: 613-526-1244

JOB/PROJECT NO.: Test F

P.O. NUMBER:

WATERWORKS NO.

			Client I.D.		WWTP Influent	WWTP Effluent	
			Sample I.D.		B19-38496-1	B19-38496-2	
			Date Collect	ed	25-Nov-19	25-Nov-19	
Parameter	Units	R.L.	Reference Method	Date/Site Analyzed			
Silver	mg/L	0.0001	EPA 200.8	29-Nov-19/O	0.0006	0.0005	
Strontium	mg/L	0.001	SM 3120	28-Nov-19/O	0.039	0.036	
Thallium	mg/L	0.0003	EPA 200.8	29-Nov-19/O	< 0.0003	< 0.0003	
Tin	mg/L	0.05	SM 3120	28-Nov-19/O	< 0.05	< 0.05	
Titanium	mg/L	0.005	SM 3120	28-Nov-19/O	0.009	0.005	
Uranium	mg/L	0.0003	EPA 200.8	29-Nov-19/O	< 0.0003	< 0.0003	
Vanadium	mg/L	0.005	SM 3120	28-Nov-19/O	< 0.005	< 0.005	
Zinc	mg/L	0.005	SM 3120	28-Nov-19/O	0.208	0.188	
Total Coliform	cfu/100mL	1	MOE E3371	27-Nov-19/O	21000000	880000	
Fecal Coliform	cfu/100mL	1	MOE E3371	27-Nov-19/O	3800000	460000	

R.L. = Reporting Limit

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

Batch Code	Site	Package	Client	Submitted By	Batch Name	Туре	Samples Received	Status	Flags
B19-01024	Holly Lane		City of Iqaluit	Maria Karveli	Test A (WTP)	Drinking Wate	2 10-Jan-19	invoiced	DW-Drinkin
B19-01028	Holly Lane		City of Iqaluit	Maria Karveli	Test F - WW	Waste Water	1 10-Jan-19	invoiced	W-WASTE
B19-02364	Holly Lane		City of Iqaluit	Maria Karveli	Test F - WW	Waste Water	1 24-Jan-19	invoiced	W-WASTE
B19-03486	Holly Lane		City of Iqaluit	Maria Karveli	Test F - WW	Waste Water	1 07-Feb-19	invoiced	W-WASTE
B19-08580	Holly Lane		City of Iqaluit	Pat Wolfe	Test A (WTP)	Drinking Wate	2 03-Apr-19	invoiced	DW-Drinkin
B19-11566	Holly Lane		City of Iqaluit	Pat Wolfe	Test A (WTP)	Drinking Wate	2 01-May-19	invoiced	DW-Drinkin
B19-11569	Holly Lane		City of Iqaluit	Pat Wolfe	Test F - WW	Waste Water	2 01-May-19	invoiced	W-WASTE
B19-14176	Holly Lane		City of Iqaluit	Pat Wolfe	Test F - WW	Waste Water	2 21-May-19	invoiced	W-WASTE
B19-15462	Holly Lane		City of Iqaluit	Paul Clow	Test E - Check	Waste Water	3 30-May-19	invoiced	W-WASTE
B19-15905	Holly Lane		City of Iqaluit	Pat Wolfe	Test A (WTP)	Drinking Wate	2 03-Jun-19	invoiced	DW-Drinkin
B19-15915	Holly Lane		City of Iqaluit	Pat Wolfe	Test F - WW	Waste Water	2 04-Jun-19	invoiced	W-WASTE
B19-22803	Holly Lane		City of Iqaluit	Pat Wolfe	Test A (WTP)	Drinking Wate	4 25-Jul-19	invoiced	DW-Drinkin
B19-22809	Holly Lane		City of Iqaluit	Emmanuel Kayo	Test F - WW	Waste Water	2 25-Jul-19	invoiced	W-WASTE
B19-26341	Holly Lane		City of Iqaluit	Emmanuel Kayo	Test A (WTP)	Drinking Wate	4 21-Aug-19	invoiced	DW-Drinkin
B19-26346	Holly Lane		City of Iqaluit	Emmanuel Kayo	Test F - WW	Waste Water	2 21-Aug-19	invoiced	W-WASTE
B19-30685	Holly Lane		City of Iqaluit	Emmanuel Kayo	Test A (WTP)	Drinking Wate	4 25-Sep-19	invoiced	DW-Drinkin
B19-30688	Holly Lane		City of Iqaluit	Emmanuel Kayo	Test F - WW	Waste Water	2 25-Sep-19	invoiced	W-WASTE
B19-30689	Holly Lane		City of Iqaluit	Emmanuel Kayo	Test E	Waste Water	1 25-Sep-19	invoiced	W-WASTE
B19-30694	Holly Lane		City of Iqaluit	Emmanuel Kayo	Test B	Waste Water	1 25-Sep-19	invoiced	W-WASTE
B19-34273	Holly Lane		City of Iqaluit	Pat Wolfe	Test A (WTP)	Drinking Wate	4 23-Oct-19	invoiced	DW-Drinkin
B19-34282	Holly Lane		City of Iqaluit	Emmanuel Kayo	Test F - WW	Waste Water	2 23-Oct-19	invoiced	W-WASTE
B19-38495	Holly Lane		City of Iqaluit	Emmanuel Kayo	Test A (WTP)	Drinking Wate	4 27-Nov-19	invoiced	DW-Drinkin
B19-38496	Holly Lane		City of Iqaluit	Emmanuel Kayo	Test F - WW	Waste Water	2 27-Nov-19	invoiced	W-WASTE

# APPENDIX B SPILL REPORTS

Monday, February 11, 2019 - 08:37

### **Spill Status**

**Lead Agency:** GN - Government of Nunavut

Occurance Date/Time: Friday, February 8, 2019 - 12:00

Received Method: Email

Potential Spill: No

## **Spill Information**

**Spill Region:** Baffin

Spill Location: Iqaluit, Community, Nunavut

Spill Location Description: AV 337

**Geolocation:** Geolocation is 63.74669300000001, -68.5169669

Product Spilled Description: Sewage

### **Reporter Information**

**Reporting Date and Time:** Monday, February 11, 2019 - 08:30

Monday, February 18, 2019 - 10:58

#### **Spill Status**

**Lead Agency:** GN - Government of Nunavut

Occurance Date/Time: Saturday, February 16, 2019 - 10:45

Received Method: Email

Potential Spill: No

#### **Spill Information**

Spill Region: Baffin

Spill Location: Iqaluit, Community, Nunavut

**Spill Location Description:** AV 415

**Geolocation:** Geolocation is 63.74669300000001, -68.5169669

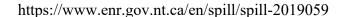
Land Sea Indicator: Land

**Product Spilled:** Wastewater (sewage, mine tailings)

Product Spilled Description: Sewage

# Reporter Information

Reporting Date and Time: Monday, February 18, 2019 - 10:45



Monday, February 18, 2019 - 11:28

#### Spill Status

**Lead Agency:** GN - Government of Nunavut

Occurance Date/Time: Sunday, February 17, 2019 - 08:45

Received Method: Email

Potential Spill: No

#### **Spill Information**

Spill Region: Baffin

Spill Location: Iqaluit, Community, Nunavut

Spill Location Description: AV 356

**Geolocation:** Geolocation is 63.74669300000001, -68.5169669

Land Sea Indicator: Land

**Product Spilled:** Wastewater (sewage, mine tailings)

Product Spilled Description: Sewage

# Reporter Information

Reporting Date and Time: Monday, February 18, 2019 - 11:30

Monday, February 18, 2019 - 11:30

#### Spill Status

**Lead Agency:** GN - Government of Nunavut

Occurance Date/Time: Monday, February 18, 2019 - 08:30

Received Method: Email

Potential Spill: No

#### **Spill Information**

Spill Region: Baffin

**Spill Location:** Iqaluit, Community, Nunavut **Spill Location Description:** Manhole #1

**Geolocation:** Geolocation is 63.74669300000001, -68.5169669

Land Sea Indicator: Land

**Product Spilled:** Wastewater (sewage, mine tailings)

Product Spilled Description: Seage

# Reporter Information

Reporting Date and Time: Monday, February 18, 2019 - 11:30



Friday, February 22, 2019 - 14:30

### **Spill Status**

Lead Agency: GN - Government of Nunavut

Occurance Date/Time: Friday, February 22, 2019 - 13:00

Received Method: Email

Potential Spill: No

# **Spill Information**

Spill Region: Baffin

**Spill Location:** Iqaluit, Community, Nunavut **Spill Location Description:** House 2643

**Geolocation:** Geolocation is 63.74669300000001, -68.5169669

### **Supporting Information**

Additional Information: Fire at the house

# **Reporter Information**

**Reporting Date and Time:** Friday, February 22, 2019 - 14:30

Friday, March 1, 2019 - 12:04

### **Spill Status**

Occurance Date/Time: Friday, March 1, 2019 - 09:00

Potential Spill: No

### **Spill Information**

Spill Region: Baffin

**Spill Location:** Iqaluit, Community, Nunavut

Spill Location Description: Manhole 1

**Geolocation:** Geolocation is 63.74669300000001, -68.5169669

**Product Spilled:** Wastewater (sewage, mine tailings)

Product Spilled Description: Sewage

### Reporter Information

**Reporting Date and Time:** Friday, March 1, 2019 - 11:00

Monday, March 4, 2019 - 13:34

#### **Spill Status**

**Lead Agency:** GN - Government of Nunavut

Occurance Date/Time: Friday, March 1, 2019 - 15:00

Received Method: Email

Potential Spill: No

#### **Spill Information**

Spill Region: Baffin

**Spill Location:** Iqaluit, Community, Nunavut **Spill Location Description:** Manhole 1

**Geolocation:** Geolocation is 63.74669300000001, -68.5169669

Land Sea Indicator: Land Spill Cause: Breakage

**Product Spilled:** Wastewater (sewage, mine tailings)

**Product Spilled Description:** Sewer/Water

### **Reporter Information**

Reporting Date and Time: Monday, March 4, 2019 - 13:30

Monday, March 4, 2019 - 13:39

#### **Spill Status**

**Lead Agency:** GN - Government of Nunavut

Occurance Date/Time: Monday, March 4, 2019 - 09:00

Received Method: Email

Potential Spill: No

#### **Spill Information**

Spill Region: Baffin

**Spill Location:** Iqaluit, Community, Nunavut **Spill Location Description:** Manhole 82

**Geolocation:** Geolocation is 63.74669300000001, -68.5169669

**Product Spilled:** Wastewater (sewage, mine tailings)

Product Spilled Description: Sewage

### **Reporter Information**

Reporting Date and Time: Monday, March 4, 2019 - 13:30

Thursday, March 14, 2019 - 11:18

#### **Spill Status**

**Lead Agency:** GN - Government of Nunavut

Occurance Date/Time: Thursday, March 14, 2019 - 11:15

Received Method: Email

Potential Spill: No

#### **Spill Information**

Spill Region: Baffin

Spill Location: Iqaluit, Community, Nunavut Spill Location Description: House 639, Iqaluit

**Geolocation:** Geolocation is 63.74835398056387, -68.51875861562195

Land Sea Indicator: Land Spill Cause: Fitting Leak

**Product Spilled:** Petroleum - fuel oil (jet A, diesel, turbo A, heat)

**Product Spilled Description:** Heating Fuel

# **Reporter Information**

Reporting Date and Time: Thursday, March 14, 2019 - 11:15









4/28/2020

Tuesday, March 19, 2019 - 12:12

#### Spill Status

**Lead Agency:** GN - Government of Nunavut

Occurance Date/Time: Tuesday, March 19, 2019 - 11:30

Received Method: Email

Potential Spill: No

# **Spill Information**

Spill Region: Baffin

Spill Location: Iqaluit, Community, Nunavut

**Spill Location Description:** Flowing out from under unit 2713 **Geolocation:** Geolocation is 63.7466930000001, -68.5169669

Land Sea Indicator: Land

Product Spilled: Wastewater (sewage, mine tailings)

Product Spilled Description: Sewage

### Reporter Information

Reporting Date and Time: Tuesday, March 19, 2019 - 12:15

Thursday, March 21, 2019 - 08:52

#### **Spill Status**

**Lead Agency:** GN - Government of Nunavut

Occurance Date/Time: Thursday, March 21, 2019 - 08:45

Received Method: Email

Potential Spill: No

#### **Spill Information**

Spill Region: Baffin

**Spill Location:** Iqaluit, Community, Nunavut **Spill Location Description:** 1538 Ukkivik Lane

**Geolocation:** Geolocation is 63.74669300000001, -68.5169669

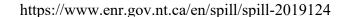
Land Sea Indicator: Land Spill Cause: Overflow Event

**Product Spilled:** Petroleum - fuel oil (jet A, diesel, turbo A, heat)

**Product Spilled Description:** Heating Fuel

# Reporter Information

**Reporting Date and Time:** Thursday, March 21, 2019 - 08:45



Wednesday, March 27, 2019 - 12:57

#### **Spill Status**

**Lead Agency:** GN - Government of Nunavut

Occurance Date/Time: Monday, March 18, 2019 - 12:45

Received Method: Email

Potential Spill: No

# **Spill Information**

Spill Region: Baffin

Spill Location: Iqaluit, Community, Nunavut

Spill Location Description: Utilidor line servicing Inukshuk High School

**Geolocation:** Geolocation is 63.74669300000001, -68.5169669

Land Sea Indicator: Land Spill Source: Pipe or Line

Spill Cause: Damage due to weather

**Product Spilled:** Wastewater (sewage, mine tailings)

Product Spilled Description: Sewage

Spill Quantity: 6000.00

Measurement: Litres

Area of Contamination: 700.00

### **Reporter Information**

**Reporting Date and Time:** Wednesday, March 27, 2019 - 12:45

Thursday, March 28, 2019 - 07:31

#### Spill Status

**Lead Agency:** GN - Government of Nunavut

Occurance Date/Time: Saturday, January 5, 2019 - 07:30

Received Method: Phone

**Involved Parties Type:** Municipal Government

Potential Spill: No

### **Spill Information**

Spill Region: Baffin

**Spill Location:** Iqaluit, Community, Nunavut **Spill Location Description:** 140 Nipsa St

**Geolocation:** Geolocation is 63.74669300000001, -68.5169669

Spill Source: Unknown

Spill Cause: Unkown Cause

**Product Spilled:** Wastewater (sewage, mine tailings)

Product Spilled Description: Sewage

Area of Contamination: 19.00

### **Supporting Information**

**Additional Information:** Sewage has been leaking from the house for

months.

### **Reporter Information**

**Reporting Date and Time:** Thursday, March 28, 2019 - 07:30

Friday, March 29, 2019 - 07:45

#### **Spill Status**

**Lead Agency:** GN - Government of Nunavut

Occurance Date/Time: Saturday, March 23, 2019 - 09:00

Received Method: Email

Potential Spill: No

#### **Spill Information**

Spill Region: Baffin

Spill Location: Iqaluit, Community, Nunavut

Spill Location Description: AV 340

**Geolocation:** Geolocation is 63.74669300000001, -68.5169669

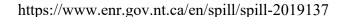
**Spill Source:** Pipe or Line **Spill Cause:** Overflow Event

**Product Spilled:** Petroleum - other (bunker, asphalt, propane)

Product Spilled Description: Sewage

# Reporter Information

**Reporting Date and Time:** Friday, March 29, 2019 - 07:45



Friday, March 29, 2019 - 09:41

#### **Spill Status**

**Lead Agency:** GN - Government of Nunavut

Occurance Date/Time: Thursday, March 28, 2019 - 07:00

Received Method: Email

Potential Spill: No

#### **Spill Information**

Spill Region: Baffin

**Spill Location:** Iqaluit, Community, Nunavut **Spill Location Description:** Sewer Lift Station 1

**Geolocation:** Geolocation is 63.74669300000001, -68.5169669

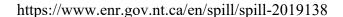
Land Sea Indicator: Land Spill Cause: Overflow Event

**Product Spilled:** Wastewater (sewage, mine tailings)

Product Spilled Description: Sewage

# Reporter Information

**Reporting Date and Time:** Friday, March 29, 2019 - 09:30



Friday, March 29, 2019 - 09:46

#### **Spill Status**

**Lead Agency:** GN - Government of Nunavut

Occurance Date/Time: Sunday, March 17, 2019 - 13:00

Received Method: Email

Potential Spill: No

## **Spill Information**

Spill Region: Baffin

**Spill Location:** Iqaluit, Community, Nunavut

Spill Location Description: MH 81

**Geolocation:** Geolocation is 63.74669300000001, -68.5169669

Land Sea Indicator: Land
Spill Source: Pipe or Line
Spill Cause: Overflow Event

**Product Spilled:** Wastewater (sewage, mine tailings)

Product Spilled Description: Sewage

## **Reporter Information**

**Reporting Date and Time:** Friday, March 29, 2019 - 09:45

Friday, March 29, 2019 - 09:54

#### Spill Status

**Lead Agency:** GN - Government of Nunavut

Occurance Date/Time: Saturday, March 23, 2019 - 09:00

Received Method: Email

Potential Spill: No

#### **Spill Information**

Spill Region: Baffin

Spill Location: Iqaluit, Community, Nunavut

Spill Location Description: AV 340

**Geolocation:** Geolocation is 63.74669300000001, -68.5169669

Land Sea Indicator: Land
Spill Source: Pipe or Line
Spill Cause: Overflow Event

**Product Spilled:** Wastewater (sewage, mine tailings)

Product Spilled Description: Sewage

## **Reporter Information**

Reporting Date and Time: Friday, March 29, 2019 - 09:45



Friday, March 29, 2019 - 09:59

#### Spill Status

**Lead Agency:** GN - Government of Nunavut

Occurance Date/Time: Saturday, March 23, 2019 - 09:00

Received Method: Email

Potential Spill: No

#### **Spill Information**

Spill Region: Baffin

Spill Location: Iqaluit, Community, Nunavut

Spill Location Description: AV 340

**Geolocation:** Geolocation is 63.74669300000001, -68.5169669

Land Sea Indicator: Land
Spill Source: Pipe or Line
Spill Cause: Overflow Event

**Product Spilled:** Wastewater (sewage, mine tailings)

**Product Spilled Description:** Seage

## **Reporter Information**

Reporting Date and Time: Friday, March 29, 2019 - 10:00



Monday, April 1, 2019 - 13:30

#### Spill Status

**Lead Agency:** GN - Government of Nunavut

Occurance Date/Time: Friday, March 29, 2019 - 17:00

Received Method: Email

Potential Spill: No

#### **Spill Information**

Spill Region: Baffin

Spill Location: Iqaluit, Community, Nunavut

**Spill Location Description:** AV 5

**Geolocation:** Geolocation is 63.74669300000001, -68.5169669

**Product Spilled:** Wastewater (sewage, mine tailings)

Product Spilled Description: Sewage

### **Reporter Information**

Reporting Date and Time: Monday, April 1, 2019 - 13:30

Monday, April 1, 2019 - 13:41

### Spill Status

**Lead Agency:** GN - Government of Nunavut

Occurance Date/Time: Monday, April 1, 2019 - 12:00

Received Method: Email

Potential Spill: No

#### **Spill Information**

Spill Region: Baffin

Spill Location: Iqaluit, Community, Nunavut

**Spill Location Description:** AV 5

**Geolocation:** Geolocation is 63.74669300000001, -68.5169669

Land Sea Indicator: Land

**Product Spilled:** Wastewater (sewage, mine tailings)

Product Spilled Description: Sewage

### Reporter Information

Reporting Date and Time: Monday, April 1, 2019 - 13:45

Monday, April 15, 2019 - 11:59

## Spill Status

**Lead Agency:** GN - Government of Nunavut

Occurance Date/Time: Wednesday, April 10, 2019 - 12:00

Received Method: Email

Potential Spill: No

#### **Spill Information**

Spill Region: Baffin

**Spill Location:** Iqaluit, Community, Nunavut **Spill Location Description:** House 140/144

**Geolocation:** Geolocation is 63.74669300000001, -68.5169669

Land Sea Indicator: Land

**Product Spilled:** Wastewater (sewage, mine tailings)

Product Spilled Description: Raw Sewage

Spill Quantity: 50.00

Area of Contamination: 4.00

# **Reporter Information**

Reporting Date and Time: Monday, April 15, 2019 - 12:00



Sunday, April 28, 2019 - 14:47

#### Spill Status

**Lead Agency:** GN - Government of Nunavut

Occurance Date/Time: Sunday, April 28, 2019 - 12:00

Received Method: Email

**Involved Parties Type:** Other

Potential Spill: No

## **Spill Information**

Spill Region: Baffin

**Spill Location:** Iqaluit, Community, Nunavut **Spill Location Description:** house 430 I Iqualuit

**Geolocation:** Geolocation is 63.74535858119082, -68.49978769615188

Land Sea Indicator: Land Spill Source: Fuel Tank

**Spill Cause:** Damage due to weather

**Product Spilled:** Petroleum - fuel oil (jet A, diesel, turbo A, heat)

Product Spilled Description: p50

Area of Contamination: 2.00

## **Supporting Information**

**Additional Information:** today is sunday and we cannot get the fill records from fuel supplier to determine amount of spill. I met with department of environment head Kristi Lowe on site and agreed to absorb any loose product and get the cap replaced by Baffin Building Systems, (BBS) and will get heat back on in the house. GPS and quantity will be updated as soon as information is available.

Factors Affecting Spill or Recover: under house

# Reporter Information

Reporting Date and Time: Sunday, April 28, 2019 - 03:15

Monday, May 13, 2019 - 08:40

## Spill Status

**Lead Agency:** GN - Government of Nunavut

Occurance Date/Time: Monday, May 13, 2019 - 08:30

Received Method: Email

Potential Spill: No

# **Spill Information**

Spill Region: Baffin

**Spill Location:** Iqaluit, Community, Nunavut

**Spill Location Description:** CGS - Federal Warehouse Building **Geolocation:** Geolocation is 63.74669300000001, -68.5169669

Land Sea Indicator: Land Spill Source: Pipe or Line Spill Cause: Breakage

**Product Spilled:** Wastewater (sewage, mine tailings)

**Product Spilled Description:** Grey Water

Area of Contamination: 4840.00

## **Reporter Information**

Reporting Date and Time: Monday, May 13, 2019 - 08:30

Monday, May 27, 2019 - 17:02

#### Spill Status

Lead Agency: INAC - Indigenous and Northern Affairs Canada

Occurance Date/Time: Monday, May 27, 2019 - 16:30

Received Method: Email

**Involved Parties Type:** Government

Potential Spill: No

## **Spill Information**

Spill Region: Baffin

**Spill Location:** Iqaluit, Community, Nunavut **Spill Location Description:** City of Iqaluit

**Geolocation:** Geolocation is 63.74669300000001, -68.5169669

**Product Spilled:** Wastewater (sewage, mine tailings)

Product Spilled Description: Sewage

Spill Quantity: 30.00

# **Supporting Information**

Water User Permit Number: 3AM-IQA1626

## **Reporter Information**

Reporting Date and Time: Monday, May 27, 2019 - 16:30

Thursday, July 4, 2019 - 13:05

#### **Spill Status**

**Lead Agency:** GN - Government of Nunavut

Occurance Date/Time: Saturday, June 1, 2019 - 13:00

Received Method: Email

Potential Spill: No

## **Spill Information**

Spill Region: Baffin

Spill Location: Iqaluit, Community, Nunavut

Spill Location Description: At the end of Akilliq Road

**Geolocation:** Geolocation is 63.74669300000001, -68.5169669

Land Sea Indicator: Land

**Spill Source:** Other Transportation

**Product Spilled:** Petroleum - lubricating oil (lube, hydraulic)

Product Spilled Description: Hydraulic Oil

Spill Quantity: 5.00

Measurement: Litres

Area of Contamination: 1.00

## **Supporting Information**

Land Use Permit Number: N2018X0011

# Reporter Information

Reporting Date and Time: Thursday, July 4, 2019 - 13:00

Sunday, July 21, 2019 - 15:16

#### Spill Status

**Lead Agency:** GN - Government of Nunavut

Occurance Date/Time: Friday, July 19, 2019 - 14:00

Received Method: Email

**Involved Parties Type:** Construction Companies

Potential Spill: No

Known Hazards: contaminated soil

## **Spill Information**

Spill Region: Baffin

**Spill Location:** Iqaluit, Community, Nunavut **Spill Location Description:** akiliq road, iqaluit

**Geolocation:** Geolocation is 63.74669300000001, -68.5169669

Spill Source: Truck
Spill Cause: Breakage
Product Spilled: Other

**Product Spilled Description:** Anitfreeze

Spill Quantity: 5.00

Measurement: Litres

Area of Contamination: 2.00

# **Supporting Information**

Land Use Permit Number: N2018X0011

U.N. Number: 58 15 07

**Additional Information:** Breakage of a hose of the engine coolant.

Absorbent and spill tray have been placed until the truck repair. On July 21th the contaminated soils (apporx 0,2 m<sup>3</sup>) were excavated and will be sent for disposal at nunnata environmental services in Iqaluit (Waste receiver NUR

#300002). The excavation was carried until no odors were observed in the ground.

# **Reporter Information**



Reporting Date and Time: Sunday, July 21, 2019 - 14:30

Friday, August 9, 2019 - 13:03

## Spill Status

**Lead Agency:** GN - Government of Nunavut

Occurance Date/Time: Friday, August 9, 2019 - 07:00

Received Method: Email

Potential Spill: No

# **Spill Information**

Spill Region: Baffin

**Spill Location:** Iqaluit, Community, Nunavut **Spill Location Description:** Crystal Road

**Geolocation:** Geolocation is 63.74669300000001, -68.5169669

Land Sea Indicator: Land Spill Cause: Breakage

**Product Spilled:** Petroleum - lubricating oil (lube, hydraulic)

Product Spilled Description: Hydraulic Oil

Spill Quantity: 10.00

Measurement: Litres

Area of Contamination: 2.00

## **Reporter Information**

Reporting Date and Time: Friday, August 9, 2019 - 13:00

Friday, September 13, 2019 - 10:13

## Spill Status

**Lead Agency:** GN - Government of Nunavut

Occurance Date/Time: Friday, September 13, 2019 - 10:15

Received Method: Phone

Potential Spill: No

# **Spill Information**

Spill Region: Baffin

**Spill Location:** Iqaluit, Community, Nunavut **Spill Location Description:** In front of Fire hall

**Geolocation:** Geolocation is 63.74669300000001, -68.5169669

Land Sea Indicator: Land Spill Source: Unknown

**Spill Cause:** Unkown Cause **Product Spilled:** Unknown

Product Spilled Description: Unknown

Area of Contamination: 10.00

## **Supporting Information**

**Additional Information:** Caller who did not want to leave their information noticed what was described as a huge sheen of some product in front of the fire hall on the ground moving down a hill towards four corners. Unknown product, unknown amount, unsure where it came from.

## **Reporter Information**

**Reporting Date and Time:** Friday, September 13, 2019 - 10:15

Monday, September 23, 2019 - 09:48

## Spill Status

**Lead Agency:** GN - Government of Nunavut

Occurance Date/Time: Saturday, September 21, 2019 - 09:45

Received Method: Email

Potential Spill: No

#### **Spill Information**

Spill Region: Baffin

Spill Location: Iqaluit, Community, Nunavut

Spill Location Description: Unit 1000

**Geolocation:** Geolocation is 63.74669300000001, -68.5169669

Land Sea Indicator: Land

Product Spilled: Wastewater (sewage, mine tailings)Product Spilled Description: Contaminated Water

# Reporter Information

Reporting Date and Time: Monday, September 23, 2019 - 09:45

Monday, September 30, 2019 - 08:34

#### Spill Status

**Lead Agency:** GN - Government of Nunavut

Occurance Date/Time: Sunday, September 29, 2019 - 15:30

Received Method: Email

Potential Spill: No

# **Spill Information**

Spill Region: Baffin

Spill Location: Iqaluit, Community, Nunavut

**Spill Location Description:** At the equipment pad of TA, Crystal Road **Geolocation:** Geolocation is 63.72853923939008, -68.53198727048343

Land Sea Indicator: Land

Spill Source: Truck

Spill Cause: Damage due to weather

**Product Spilled:** Petroleum - fuel oil (jet A, diesel, turbo A, heat)

Product Spilled Description: Diesel

**Spill Quantity:** 0.05 **Measurement:** Litres

Area of Contamination: 12.00

# **Supporting Information**

Land Use Permit Number: N2018X0009

# Reporter Information

Reporting Date and Time: Monday, September 30, 2019 - 08:30

Wednesday, October 2, 2019 - 07:44

## Spill Status

**Lead Agency:** GN - Government of Nunavut

Occurance Date/Time: Tuesday, October 1, 2019 - 03:30

Received Method: Email

Potential Spill: No

# **Spill Information**

Spill Region: Baffin

Spill Location: Iqaluit, Community, Nunavut

Spill Location Description: Iqaluit end of Akilliq road

**Geolocation:** Geolocation is 63.727950376270094, -68.52632244504393

Spill Cause: Breakage

**Product Spilled:** Petroleum - lubricating oil (lube, hydraulic)

Product Spilled Description: Hyrolic Oil

**Spill Quantity:** 10.00 **Measurement:** Litres

Area of Contamination: 4.00

## **Supporting Information**

U.N. Number: 651504

# Reporter Information

**Reporting Date and Time:** Wednesday, October 2, 2019 - 08:30

Thursday, October 3, 2019 - 08:34

#### Spill Status

Lead Agency: CCG/TCMSS - Canadian Coast Guard/Transport Canada,

Marine Safety and Security

Occurance Date/Time: Thursday, October 3, 2019 - 07:45

Received Method: Email

Potential Spill: No

## **Spill Information**

Spill Region: Baffin

Spill Location: Iqaluit, Community, Nunavut

Spill Location Description: At the end of Akilliq Road

**Geolocation:** Geolocation is 63.74669300000001, -68.5169669

Land Sea Indicator: Salt Water

Spill Cause: Fitting Leak

**Product Spilled:** Petroleum - lubricating oil (lube, hydraulic) **Product Spilled Description:** Bio-degradable hydraulic oil

Spill Quantity: 5.00

Measurement: Litres

Area of Contamination: 4.00

## **Supporting Information**

Land Use Permit Number: N2018X0011

U.N. Number: barge flexi-float

# Reporter Information

**Reporting Date and Time:** Thursday, October 3, 2019 - 08:30

Monday, October 21, 2019 - 11:37

#### **Spill Status**

Lead Agency: GN - Government of Nunavut

Occurance Date/Time: Sunday, October 20, 2019 - 16:30

Potential Spill: No

## **Spill Information**

Spill Region: Baffin

**Spill Location:** Iqaluit, Community, Nunavut

**Spill Location Description:** North Breakwater (Small Craft Arbour) **Geolocation:** Geolocation is 63.7278933886583, -68.52812488950195

Land Sea Indicator: Land Spill Cause: Breakage

**Product Spilled:** Petroleum - lubricating oil (lube, hydraulic) **Product Spilled Description:** Biodegradeable hydraulic oil

**Spill Quantity:** 0.50 **Measurement:** Litres

Area of Contamination: 1.00

## **Supporting Information**

Land Use Permit Number: N2018X0009

**U.N. Number:** 65 15 04

# Reporter Information

**Reporting Date and Time:** Monday, October 21, 2019 - 11:30

Monday, October 21, 2019 - 13:55

#### **Spill Status**

**Lead Agency:** GN - Government of Nunavut

Occurance Date/Time: Monday, October 21, 2019 - 14:30

Received Method: Email

Potential Spill: No

## **Spill Information**

Spill Region: Baffin

Spill Location: Iqaluit, Community, Nunavut

**Spill Location Description:** 1552 Federal Rd. Seacan

**Geolocation:** Geolocation is 63.74669300000001, -68.5169669

Land Sea Indicator: Land Spill Source: Fuel Tank Spill Cause: Breakage

**Product Spilled:** Petroleum - fuel oil (jet A, diesel, turbo A, heat)

Product Spilled Description: Diesel

Spill Quantity: 129.00

Area of Contamination: 3.00

## **Supporting Information**

**U.N. Number:** 1202

# Reporter Information

Reporting Date and Time: Monday, October 21, 2019 - 13:45

Monday, November 18, 2019 - 09:01

## Spill Status

**Lead Agency:** GN - Government of Nunavut

Occurance Date/Time: Sunday, November 17, 2019 - 19:00

Received Method: Email

Potential Spill: No

# **Spill Information**

Spill Region: Baffin

Spill Location: Iqaluit, Community, Nunavut

Spill Location Description: in between MH82 and MH81

**Geolocation:** Geolocation is 63.74669300000001, -68.5169669

Land Sea Indicator: Land

**Product Spilled:** Wastewater (sewage, mine tailings)

Product Spilled Description: Sewage

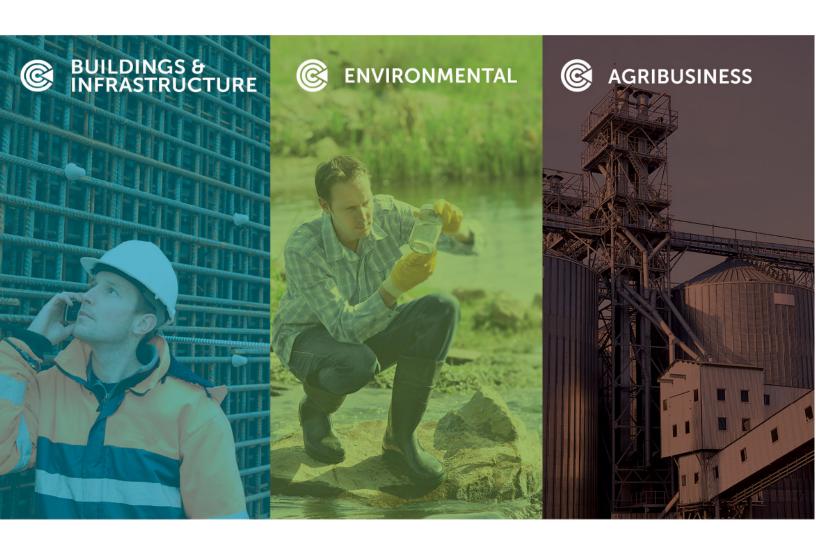
# **Reporter Information**

Reporting Date and Time: Monday, November 18, 2019 - 09:00

# APPENDIX C OTHER REPORTS



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LAKE GERALDINE DAM
SAFETY INSPECTION 2019
IQALUIT, NUNAVUT

PRODUCED FOR: THE CITY OF IQALUIT

C/O COLLIERS PROJECT LEADERS

PRODUCED BY: CONCENTRIC ASSOCIATES INTERNATIONAL INCORPORATED

**CONCENTRIC REFERENCE NUMBER: 19-8293** 

**DATE:** MAY 31, 2019



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	DAM SAFETY GUIDELINES DESCRIPTION OF STRUCTURE BACKGROUND SCOPE OF WORK  ISTORICAL PERSPECTIVE  LAKE GERALDINE LG DAM HISTORY  AM SAFETY INSPECTION  SITE INSPECTION  DATA AND RECORDS CONSEQUENCES OF DAM FAILURE DAM SAFETY ANALYSIS OPERATION, MAINTENANCE, AND SURVEILLANCE EMERGENCY PREPAREDNESS PUBLIC SAFETY AND SECURITY DAM SAFETY MANAGEMENT SYSTEM

#### LIST OF APPENDICES

Appendix A: Site Photographs



#### 1. INTRODUCTION AND SCOPE OF WORK

Colliers Project Leaders (CPL) requested that Concentric Associates International (CAI) conduct a Dam Safety Inspection (DSI) on behalf of the City of Iqaluit (City), and in accordance with our proposal, dated March 27, 2019. As the owner of the dam, the City is responsible for the safe management of the dam. The purpose of this DSI is to assist the City by identifying any visual changes in the condition of the dam, identifying any new concerns, and making recommendations on maintenance, repairs, or further investigations.

#### 1.1 Dam Safety Guidelines

The most recent Dam Safety Guidelines (DSG), published by the Canadian Dam Association, were first released in 2007 and further revised in 2013. The DSG applies, in general, to those structures that are at least 2.5 meters in height, and which have at least 30,000 cubic meters of storage capacity. The Lake Geraldine (LG) Dam exceeds these minimum requirements and therefore requires Dam Safety Inspections (DSI) and Dam Safety Reviews (DSR).

The most recent DSR was performed in 2013 and indicated that a DSR is required every five (5) years. The LG Dam is therefore overdue for a DSR.

The most recent DSI was completed in 2018. The City has typically complied with annual DSI requirements, with some exceptions.

This DSI forms part of the record documentation of history, condition, repairs, alterations, monitoring, operating, safety and emergency procedures. The DSI is considered to be an Engineering Inspection which is recommended by the DSG's to be performed annually or semi-annually by a professional engineer.

The DSG's recommended that more frequent routine visual inspections be performed. It is recommended that City staff trained in dam surveillance inspect the dam on a weekly or monthly basis to identify any conditions that might indicate a change in the dam's performance.

#### 1.2 Description of Structure

The Lake Geraldine Dam is comprised of a concrete section with a concrete spillway and three earth berms; north, center, and south. See Appendix A for site photographs and Appendix B for a reference site plan.

The 15.3m wide spillway top is approximately 0.95m lower than the concrete dam sections on either side.

The southern section of the concrete dam extends approximately 39.1m to the south rock abutment. The northern section of the concrete dam extends 13.3m to the north of the spillway section, where it joins the center earth berm.

The concrete sections of the dam are reportedly founded in rock.



The center earth berm extends north approximately 75m where it meets the north access road, with the north extending a further 60m to the north rock abutment. A south earth berm, approximately 68.5m long, is located in a valley to the south of the concrete dam. The berm sections of the dam incorporate a concrete cutoff wall which is reportedly founded in rock.

#### 1.3 Background

CPL advised Concentric, by email dated March 7, 2019, of an ice accumulation observed just downstream of the Lake Geraldine (LG) Dam structure.

As most DSI's have been conducted in summer months, we have limited information on the nature and extent of past accumulations. Ice accumulations have been observed on the few occasions that we were on site in winter months, however no mapping or measurements were performed. As a result, the nature and extent of the recently reported accumulation cannot be compared to any baseline data.

CAI staff have a history of inspection and assessment of, reporting on, and design of repairs to, the LG Dam, dating back to 1997. Through-dam leakage dates back to some of our earliest inspections, and has resulted in several grouting programs being implemented on the concrete portions of the dam.

Through-berm leakage has been suspected in previous DSI's however it has never been definitively confirmed, and cause/origin has never been established. We recommended to the City circa 2011 to implement a monitoring program under our direction.

A visual monitoring program was in place over portions of 2012/2013 that the City elected not to continue. Select invasive work was done, and the overall results were largely inconclusive. We believe this was due in part to the limited amount of data obtained prior to the termination of the program.

Our March 27 2019 DSI proposal included that a visual assessment of the reported downstream ice accumulation be included, and any results incorporated into the current DSI.

#### 1.4 Scope of Work

The combined inspection consisted of an on-site visual assessment, notation of significant changes in condition since the 2018 DSI, preparation of a written report, and a photographic record.

The following is a summary of our activities for this assignment.

- Review of available record documentation.
- Mobilization to the site and for a visual assessment.
- Visual assessment of the area of ice accumulation reported by CPL, and identification of any "next steps" we believe should be considered.
- Preparation of a photographic record documenting general and representative conditions.



- Risk-assessment of any actual or potential concerns.
- Preparation of this written report summarizing our observations and recommendations, prioritization of any action items, and provision of preliminary cost estimates for any recommended repairs

#### 2. HISTORICAL PERSPECTIVE

#### 2.1 Lake Geraldine

Lake Geraldine is a natural body of water with an irregularly shaped basin. It is fed by rainfall and snow/ice melt from a watershed with an area of approximately 385 hectares.

The City of Iqaluit derives its water supply from Lake Geraldine, which has had its storage capacity increased by phased infrastructure development.

#### 2.2 LG Dam History

In the late 1950's, the demand for a reliable year-round source of water resulted in the construction of a cast in place concrete gravity dam, and a section of earth berm with a central cast in place concrete cut off wall. The project was designed and built by the Department of National Defense. According to the literature, the original construction took place circa 1958.

Since that time, as the City has grown and water demands have risen, the dam has been raised four times to increase the storage capacity.

The first height increase of 0.3m reportedly took place in 1979. This involved a concrete extension, which was dowelled into the existing structure.

The second construction took place in 1985, and increased the height of the spillway structure by approximately 1.15m. The berm portion was widened and heightened as well to accommodate the increased storage capacity. Again, the extension was constructed of concrete dowelled into the existing structure, and incorporated a steel formwork frame over the spillway section.

The third extension was done in 1995, and increased the height of the gravity dam structure by a further 1.5m of concrete, with a corresponding increase in berm geometry. Based on analysis done prior to the extension, it was determined that the gravity dam would not have an adequate factor of safety against overturning if the extension was simply "dowelled-in" as before. The 1995 alteration therefore included an extensive rock-anchoring program for the gravity dam portion to provide the required stability to the structure.

The latest extension was completed in two phases over 2005/06. Additional rock anchors were installed thought the gravity dam in 2005 in preparation for a further height extension of 2m in 2006. The existing berms were enlarged and the existing cut-of-walls were extended in height. A new berm and cut off wall were installed to the south of the existing dam structures.



#### 3. DAM SAFETY INSPECTION

#### 3.1 Site Inspection

#### Previous DSI

The most recent DSI is dated August 28, 2018 and was prepared by CAI.

Relevant observations and recommendations from the on-site assessment of August 18, 2018 are as follows:

- No significant changes were noted in the general condition of the concrete and earthworks portions of the dam.
- The visible portions of the concrete structures are generally in good condition.
- Two previously identified through-dam seepage locations were noted in close proximity to each other, just south of the spillway, in the concrete section.
- The north, center and south berms exhibited no significant changes since the 2017 Repair Program.

#### Current DSI

A visual site inspection of the dam structures was performed on April 29 and April 30, 2019.

Relevant observations and are as follows:

- The concrete structures and berm components were mostly snow covered preventing an acceptable level of visual assessment.
- The visible portions of the concrete structures and berm components are in a similar condition to that observed in the 2018 DSI.
- One minor through-dam seepage location was noted to be active, in the concrete section south of the spillway at a vertical joint location. Refer to Photograph 5. We observed sealant present on the joint which is an ineffective repair measure. This area was previously pressure grouted.
- An area of ice accumulation was observed in the valley just downstream of the dam. As discussed in Section 1.3, above, most DSI's are conducted in summer months when the dam components are most accessible and visible. However, we have observed ice accumulations in the past on the few occasions that we have been on site in winter months. Regardless, we have limited information on the nature and extent of past accumulations, and cannot rely on anecdotal evidence.

We therefore do not know if the 2019 accumulations are a naturally occurring formation, and within historical norms, or represent a significant deviation from those norms, suggesting unusual winter conditions, longer-term climate change factors, and/or the involvement of other processes such as reservoir leakage.

# Project No.: 19-8293 The City of Iqaluit Lake Geraldine Dam Safety Inspection 2019 – Final Report



We can confirm that we did not observe any significant change in the visual nature of the accumulations, when viewed from overhead, based on our early-April and late-April drone photographs.

However, without a more mapping and measurement based approach, the significance of the current accumulation cannot be further commented on, nor can the volume of future accumulations be compared the 2109 accumulation.

#### 3.2 Data and Records

Table 3-1 summarizes a list of data and records for the Lake Geraldine Dam. These documents have not been reviewed as part of this inspection. The list has been updated from the previous DSR; new items are indicated with an "\*".



#### **TABLE 3-1: Lake Geraldine Dam Relevant Record Documentation**

No.	Date	Description	Author
		Water Storage Dam at Lake Geraldine	
1	December 1957	(3 Drawings)	DND
2	August 1984	Lake Geraldine Water Supply Report	OMM
3	January 1985	Water Supply Improvement Report	OMM
4	June 1990	General Diving Report	Arctic Divers
5	June 1990	Dam Inspection for Blast Damage	Hardy BBT
6	July 1990	Dam Inspection & Leakage Repair	Acres
7	July 1990	Dam Stability	Acres
8	September 1990	Diving Report	Arctic Divers
9	February 1995	Lake Geraldine Storage Report	OMM
10	June 1995	Lake Geraldine Storage Design Drawings & Specifications	ОММ
11	October 1997	Dam Inspection	Trow
12	June 1998	Dam Failure Study	EBA
13	March 2001	Dam Safety Review	Trow
14	October 2002	Dam Safety Inspection	Trow
15	August 2003	Lake Geraldine Dam Repairs 2003	Dillon
16	2003	Dam Safety Inspection	Concentric
17	March 2005	Geotechnical Investigation	Trow
18	May 2005	Lake Geraldine Dam Rock Anchors 2005 (Specifications and 4 Drawings)	Trow
19	February 2006	Lake Geraldine Dam Earth and Concrete Work 2006 (Specifications and 11 Drawings)	Trow
20	2005	Dam Safety Inspection	Concentric
21	2006	Dam Safety Inspection	Concentric
22	December 2006	Dam Safety Review	Concentric
23	2007	Permanent Record File (PRF)	Concentric
24	2007	Operations, Maintenance, and Surveillance (OMS) Manual	Concentric
25	2007	Logbook	Concentric
26	October 2009	Dam Safety Inspection	Concentric
27	August 2010	Underwater Survey	Concentric
28	November 2010	Dam Safety Inspection	Concentric
29	February 2011	Permanent Record File Update	Concentric
30	August 2011	Grouting Repairs	Concentric
31	September 2011	Dam Safety Inspection	Concentric
32	July 2012	Dam Safety Inspection	Concentric
33	September 2012	North Berm Repairs	Concentric



TABLE 3-1: Lake Geraldine Dam Relevant Record Documentation

No.	Date	Description	Author
35	2013	Dam Safety Review	Concentric
36	October 2014	Dam Safety Inspection	McMillen
37	November 2015	Dam Safety Inspection	Concentric
38	July 2017	Lake Geraldine Dam Repair Program 2017	Concentric
39*	July 2018	Emergency Preparedness Plan (EPP) Issued	AMEC
40*	August 7, 2018	PRF Update	Concentric
41*	August 29, 2018	DSI	Concentric

#### 3.3 Consequences of Dam Failure

The July 2018 Emergency Preparedness Plan (EPP) by AMEC has revised the Dam Consequence Class to "Extreme".

#### 3.4 Dam Safety Analysis

There was no obvious visual evidence that would indicate a significant change in the dam safety since the 2013 DSR. A dam safety analysis was not completed as part of this inspection.

Numerous items remain outstanding from the previous DSR; these items are currently being tendered by public process for completion by CPL on behalf of the City.

#### 3.5 Operation, Maintenance, and Surveillance

This DSI falls under the requirements of a visual inspection by an engineer as stated in section 3.6 "Surveillance" of the DSG.

A staffed or automated monitoring system remains outstanding.

Operation and maintenance record documentation has been an ongoing concern.

#### 3.6 Emergency Preparedness

An Emergency Preparedness Plan (EPP) was issued in July 2018 by AMEC.

#### 3.7 Public Safety and Security

As part of the 2017 Repair Program, security gates and signage were installed at two locations.

#### 3.8 Dam Safety Management System

The dam safety management system should be addressed through the public tender process referenced in 3.4, above.



#### 4. RECOMMENDATIONS & REQUIRED ACTION

Based on our inspection and review, we recommend the following:

- 1. Follow-up visual assessments of the LG Dam are recommended this season, when snow accumulations have melted and the visible dam components can be readily accessed. Two assessments are recommended early summer; ideally in early July, and late summer, ideally in early September. During the assessments, any through-dam, through-berm, or locations of upwelling be identified and flowrates estimated.
- 2. At this time, the ice accumulations observed in the valley immediately downstream of the dam cannot be determined to be either a natural occurrence, or a result of reservoir leakage, as discussed in Section 3.1, above.

We had recommended to CPL that this DSI would be a good opportunity to determine the extent and volume of the 2019 accumulation. We had offered to use mapping software with our drone to create baseline 3-D imaging that would allow us to determine existing volumes, and thus allow us to compare to accumulations moving forward. This approach could potentially establish whether accumulation rates were a concern and indicative of reservoir leakage or other influences. Alternatively, the mapping program may point to a natural accumulation based on valley geometry and solar gain.

The City chose not to proceed with our baseline mapping.

It is strongly recommended that a mapping survey be done this summer season to establish base topography. This will allow accumulation rates and volumes to be calculated during the 2020 winter season by subsequent mapping surveys.

- 3. Consideration should be given to including the vertical joint in Photograph 5 in a future re-grouting program.
- 4. A DSR was not completed in 2018. The DSR is now overdue. The outstanding items from the previous DSR (2013), which are necessary to complete the new DSR, are currently being tendered by CPL on behalf of the City.
- 5. The following items were recommended in the 2018 DSR and remain outstanding:
  - Automated/remote monitoring equipment should be incorporated as triggers for the emergency plans and security measures.
  - Records indicate that the valves within the valve chamber are in an advanced state of corrosion. Exercising and testing of the valves is recommended as the valves may not operate correctly when needed.
  - New signage in conformance with the DSG's should be installed and maintained at the two access roads and around the periphery of the dam.
  - > To our knowledge the visual monthly inspection program has not been implemented. Inspection reports should be added to the permanent record file.

#### 5. LIMITATIONS

This report was prepared for the sole use of CPL and the City.



This report was prepared exclusively for the purposed project and site locations outlined in this report. The report is based on information provided to, or obtained by Concentric as indicated in the report, and applies solely to site conditions existing at the time of the site investigations.

Concentric's report represents a review of available information with an established work scope, schedule, and budget. The material in the report reflects Concentric's judgement in light of the information available to it at the time of preparation. Any uses that a third party makes of this report, or any reliance on decisions made based on it, are the responsibilities of such third parties.

Concentric accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made based on this report.

Should there be any questions, please contact the undersigned.

Yours sincerely,

CONCENTRIC

Allan Murray, P.Eng. President Steve Parker, P.Eng. Project Manager



#### APPENDIX A

Site Photographs





**Photograph1:** Overhead view of concrete portion – note snow accumulation and limited visual access.



**Photograph 2:** Overhead view of north berms – note snow accumulation and limited visual access.



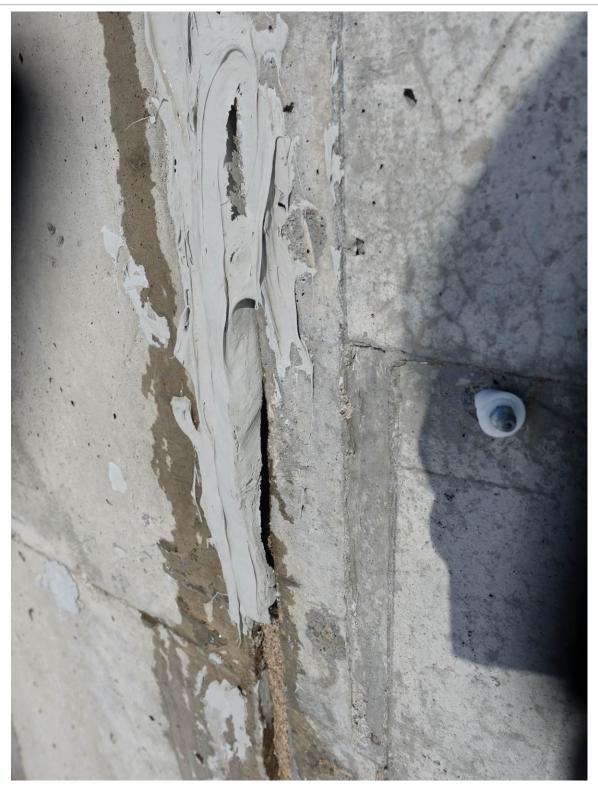


**Photograph 3:** Close-up of north concrete structure showing magnitude of snow accumulations.



**Photograph 4:** Close-up of south concrete structure – note circled area exhibits active seepage; see also Photograph 5.





**Photograph 5:** Close-up of Photograph 4 – note seepage and ineffective use of sealant.



Our File No. 19-8293

December 13, 2019

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C/O Colliers Project Leaders Erik Marko, P.Eng. 1900 City Park Drive, Suite 402 Ottawa, Ontario K1J 1A3

via email: Erik. Marko@colliersprojectleaders.com

Attn: Mr. Erik Marko, P.Eng., PMP, Project Manager

Re: Lake Geraldine Dam

**Investigation of Reported Ice Accumulation** 

**Supplemental Report** 

Dear Erik,

This letter report is supplemental to our previous report titled "Lake Geraldine Dam Safety Inspection 2019" issued to the City of Igaluit care of Colliers Project Leaders on May 31, 2019.

The purpose of this supplemental report was to conduct a more thorough visual assessment of the ground surface in the general area of the reported ice accumulation.

The City of the Iqaluit was made aware of the ice accumulation by a local in the area in March 2019.

Concentric returned to the Lake Geraldine Dam on July 11, 2019 to review the ground conditions once the majority of snow had melted.

Concentric was also onsite to observe and direct the underwater concrete repairs being performed on the concrete dam structure in late August 2019.

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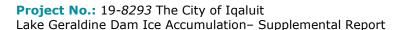
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#### **OBSERVATIONS**

See Appendix A1 for photographs of our site review and Appendix B1 for the site layout drawing of the Lake Geraldine Dam showing approximate locations of photographs, areas of snow/ ice accumulation, moving surface water, and soil/ granular washout.

Photographs 1-12 were taken on July 11, 2019. We have provided commentary for each photograph as follows:

<u>Photograph 1-</u> A portion of the ice buildup observed in our previous report issued in May 2019 still remains (located downstream of the center berm).

<u>Photograph 2-</u> View of the north berm which was observed to be dry; the north access road is shown on the right side of the photograph.

<u>Photograph 3-</u> Overview looking south of the center berm with the north access road shown on the left side of the photograph. On the right side of the photograph is the low point of the center berm toe where moving surface water was observed (see photograph 5).

<u>Photograph 4-</u> Overview looking north of the center berm (looking back towards photograph 3). The low point of the center berm toe where moving surface water was observed is located near the center of the photograph (see photograph 5).

<u>Photograph 5-</u> Close up of moving water located at the low point along the center berm toe. This photograph has taken while standing on the roadway facing towards the berm. The direction of the moving water appears to originate from the center berm and flows downhill towards the remaining ice and snow.

<u>Photograph 6-</u> Directly downhill of the low point along the center berm toe, this photograph was taken at the same location as photograph 5 however facing away from the center berm. The moving water appears to be passing thought the roadway and continuing downhill towards the remaining ice and snow.

<u>Photograph 7-</u> Minor leakage through the concrete dam structure was observed at midheight near Gridline J1, slightly north of the spillway.

<u>Photograph 8-</u> Minor leakage through the concrete dam structure was observed at midheight and continuing down the face of the concrete dam on both sides of Gridline J3, just south of the spillway, and within the spillway.

<u>Photograph 9-</u> Minor leakage through the concrete dam structure was observed at Gridline J4 at the bottom of the vertical wall. An expansion joint is located at this Gridline that is in poor condition and requires the installation of new sealant. Soil washout appears to originate in this area. The soil washout is likely due to a combination of water leaking through the dam and surface runoff during the spring melt.

<u>Photograph 10-</u> Moving surface water was observed at the base of the concrete dam structure where the dam meets exposed bedrock. This moving surface water appears to be originating from the bottom of the expansion joint located at Gridline J5 and/or passing through the pour joint where the concrete meets the exposed bedrock. Soil washout appears to originate in this area. The soil washout is likely due to a combination of water leaking through the dam and surface runoff during the spring melt.



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<u>Photograph 11-</u> A close up photograph at the base of the expansion joint located at Gridline J5. The soil uphill and to the right of the expansion joint has remained intact.

<u>Photographs 9, 10, and 11</u> corelate to photograph 4 of our original report issued in May 2019. The active seepage identified in the original report would be located near the granular material washout viewed in photograph 12 below.

<u>Photograph 12-</u> A overview looking north at the concrete dam structure. Note the area of granular material that has washed out in the bottom left corner of the photograph.

#### **Post Underwater Repair Observations:**

Photographs 13-14 were taken August 27, 2019 as part of our construction inspection work related to the underwater repairs. We have the following observations:

<u>Photograph 13</u>- Overview looking north at the concrete dam structure. No leaking was observed at Gridline J4 where leaking was observed in Photograph 9 in July.

<u>Photograph 14</u>- This photograph of the spillway at Gridline J3 which no longer <del>have</del> had active water leaking through the concrete dam structure.

As part of the underwater repair work all expansion joints were injected with a water activated resin compound. Various cracks were also injected. In addition, localized areas of deteriorated concrete near the previously observed leaking locations were chipped and patched with new concrete.

During our August inspection work, it was reported that the Lake Geraldine Reservoir was being filled via a system of pipes and pumps. It is our understanding that the reservoir water level was increased to near the top of the spillway (full reservoir).

#### **DISCUSSION**

The ice accumulation observed during the winter months of early 2019 may have been due, in part, to surface water emanating from the low point of the center berm toe, and the southeast end of the concrete dam structure.

#### **Moving Surface Water at Centre Berm Toe**

Water located at the low point of the center berm toe has been observed for approximately 10 years or longer. Previously, Concentric has been involved in piecemeal monitoring programs and one (1) invasive investigation to evaluate the condition of the existing concrete cutoff wall (see section 1 on drawing S1.0 in Appendix B1 for the general configuration of the cutoff wall).

Results of this previous investigation determined that the concrete cutoff wall was in good condition where exposed and appeared to be constructed as per the original design intent. The investigation was not able to identify with certainty the source of the surface water. The primary recommendation from the invasive investigation was continued monitoring 3 to 4 times per year to identify any changes in condition. The City of Iqaluit did not continue with the recommended monitoring program.

The City of Iqaluit could further investigate the moving surface water by excavating at the location of the surface water and continuing to follow the source of the moving surface/ground water. This excavation should be executed under direction from a licensed engineer and may only return limited results.

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At this time, and similar to recommendations make in previous years, Concentric is of the opinion that a further invasive investigation is not required, provided a continued monitoring program is implemented now. The monitoring program should include scheduled inspections by the City or Representative conforming to the surveillance and monitoring requirements of the Dam Safety Guidelines. The monitoring program should include inspections by a licensed engineer 4 times per year.

## **Moving Surface Water at Southeast End of Concrete Dam**

Moving surface water downhill of Gridline J5 and the associated soil/granular washouts have not been previously investigated to the extent of the center berm low point as described above. The source of this moving surface water appears to be inline with the base of the J5 expansion joint and/or seeping through the pour joint where the concrete dam structure meets the exposed bedrock.

With the completion of the underwater repairs, Concentric is unable to confirm/deny at this time if the underwater repairs have stopped the water leakage in this area. Additional monitoring of this area is recommended to determine if the moving surface water is increasing in volume or if the repairs to the concrete dam structure have reduced the flow of water.

If additional monitoring identifies continued water flow in this area, the City of Iqaluit should consider crack injection along the pour joint where the concrete meets the bedrock. Once the water flow is reduced or eliminated fill should be returned to this area to reduce the chance of further washouts.

#### Water Leaks Adjacent to the Concrete Spillway

Similar to our discussion above regarding the moving surface water at the southeast end of the concrete dam further monitoring should be implemented to determine if the water leaks are no longer of concern or if additional rehabilitation work is required.

# **RECOMMENDATIONS**

Based on our supplemental onsite observations and our previous report, we have the following recommendations related to the ice accumulation:

- 1. City of Iqaluit Monitoring- The City of Iqaluit should include monthly monitoring of the 3 discussion items identified above as part of the City's established monitoring policy. Observations should be recorded and included in the dam record file.
- 2. Engineer Monitoring- A monitoring program under the direction of a licensed engineer should be implemented and continued for a 3-year period. The monitoring program would involve 4 site visits per year.
- 3. Follow through with the recommendations made in our previous May 31<sup>st</sup> report including 3D mapping to establish trends in the ice accumulation.

The engineer monitoring recommendation will require, at minimum \$5,000 per inspection (\$ 60,000 over a 3-year period) plus travel and accommodation costs where applicable.



**Project No.:** 19-8293 The City of Iqaluit Lake Geraldine Dam Ice Accumulation – Supplemental Report

Should the City of Iqaluit wish to proceed with any of our recommendations above Concentric would be pleased to provide a formal proposal.

## **CLOSING**

Concentric thanks Colliers Project Leaders for the opportunity to provide services. Should there be any questions please contact the undersigned.

Yours sincerely,

**CONCENTRIC** 

Steve Parker, P.Eng. Lead Project Manager Allan Murray, P.Eng., President Business Development Manager



Appendix A1
Site Photographs





**Photograph 1:** Overview of dam and berm south of dam (downstream). Remains of ice buildup remain.



**Photograph 2:** North berm at service road looking north. Ditch to the north is dry.





**Photograph 3:** Centre berm at service road looking south.



Photograph 4: Centre berm looking north.

Low point of berm located in foreground of photograph with moving water noted (see photograph 5).





**Photograph 5:** Base of centre berm at lowest point. Moving water observed.



**Photograph 6:** Base of centre berm at lowest point looking south. The moving water appears to be moving through the gravel road way and towards the remaining ice in Photograph 1.





**Photograph 7:** Concrete spillway. Minor leakage through concrete left of the spillway.



**Photograph 8:** Concrete spillway. Minor leakage through concrete right side of spillway.





**Photograph 9:** Minor leakage to the right of the spillway at expansion joint.



**Photograph 10:** Moving water observed at base on concrete dam below expansion joint.





**Photograph 11:** Moving water observed at base on concrete dam below expansion joint.



**Photograph 12:** Overview of concrete dam looking north. Soil/ granular washout bottom left of photograph.





**Photograph 13:** August 27 2019 Overview of concrete dam after the completion of upstream concrete repair and crack injection. Leaking as shown in Photograph 9 is no longer present. Soil/ granular washout filled in by the contractor in August 2019.



**Photograph 14:** August 27 2019 Leaking as shown in Photograph 8 is no longer present.



# Appendix B1 Site Layout Drawings

