



Water Resources Division  
Resource Management Directorate  
Nunavut Regional Office  
918 Nunavut Drive  
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Your file - Votre référence  
3AM-IQA1626  
Our file - Notre référence  
GCDOCS#128361721

August 6, 2024

Richard Dwyer  
Manager of Licensing  
Nunavut Water Board  
P.O. Box 119  
Gjoa Haven, NU, X0B 1J0  
E-mail: [licensing@nwb-oen.ca](mailto:licensing@nwb-oen.ca)

**Re: Crown-Indigenous Relations and Northern Affairs Canada's review of the City of Iqaluit 2023 Annual Report for Type A Water Licence No. 3AM-IQA1626 in the Qikiqtani Region of Nunavut**

Dear Mr. Dwyer,

Thank you for the June 5, 2024 invitation to review the referenced City of Iqaluit 2023 Annual Report for Type A Water Licence No. 3AM-IQA1626. As directed by the Nunavut Water Board on November 6, 2023, the 2023 Annual Report was to also address intervenor outstanding comments from the City of Iqaluit 2021 and 2022 Annual Reports.

Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) reviewed the 2023 annual report pursuant to its mandated responsibilities under the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* and the *Department of Crown-Indigenous Relations and Northern Affairs Act*. **CIRNAC has 1 outstanding comment from the City of Iqaluit 2021 Annual Report, 6 outstanding comments from the City of Iqaluit 2022 Annual Report, and 16 comments for the City of Iqaluit 2023 Annual Report.** Please find CIRNAC comments and recommendations in the attached Technical Memorandum. The annual report, and its corresponding reporting requirements, is a term and condition of the water licence. Opting not to fulfill all the terms and conditions of the water licence places the City of Iqaluit in noncompliance.

If there are any questions or concerns, please contact me at [michelle.blade@rcaanc-cirnac.gc.ca](mailto:michelle.blade@rcaanc-cirnac.gc.ca) or Andrew Keim at [andrew.keim@rcaanc-cirnac.gc.ca](mailto:andrew.keim@rcaanc-cirnac.gc.ca).

Sincerely,

Michelle Blade,  
Regulatory and Science Advisor



## **Technical Review Memorandum**

**Date:** August 6, 2024

**To:** Richard Dwyer, Manager of Licensing, Nunavut Water Board

**From:** Michelle Blade, Regulatory and Science Advisor, CIRNAC

**Subject: Crown-Indigenous Relations and Northern Affairs Canada's review of the City of Iqaluit 2023 Annual Report for Type A Water Licence No. 3AM-IQA1626 in the Qikiqtani Region of Nunavut**

**Region:** ☐ Kitikmeot ☐ Kivalliq ☒ Qikiqtani

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### **A. BACKGROUND**

The City of Iqaluit (City) maintains an existing Type "A" Water Licence No. 3AM-IQA1626 that has undergone 7 amendments. Through the amendments, the quantity of water permitted for extraction from the environment has increased from 1,100,000 cubic metres (m<sup>3</sup>) to 2,000,000 m<sup>3</sup> annually from Lake Geraldine Reservoir. In addition, 600,000 m<sup>3</sup> is pumped annually from Unnamed Lake to Niaqunguk (Apex) River, 900,000 m<sup>3</sup> is pumped annually from Apex River to Lake Geraldine Reservoir, and 2,500 m<sup>3</sup> removed annually from Imiqtarviviniq (Dead Dog) Lake. Permitted discharges to the environment under Type "A" Water Licence No. 3AM-IQA1626 include:

- landfill run-off from the West 40 Landfill; and
- wastewater from the West 40 Wastewater Treatment Plant and backup Sewage Lagoon.

The following amendments are relevant to the period covered by the City of Iqaluit's 2023 Annual Water Licence Report:

❖ Amendment No. 4

- effective April 1, 2020
- allows seasonal replenishment of Lake Geraldine Reservoir from the Niaqunguk River (Apex River)

❖ Amendment No. 5

- effective March 15, 2021
- allows for construction and operation of new solid waste management facilities and water use from Imiqtarviviniq Lake (Dead Dog Lake)

❖ Amendment No. 6

- effective October 15, 2021
- allows for construction, operation, and removal of temporary facilities to truck water from the Sylvia Grinnell River



- expires upon resolution of the state of emergency

The water treatment plant returned to normal operation on April 25, 2023. Amendment #6 is therefore in effect for all of the 2022 Annual report and a portion of the 2023 Annual report.

❖ Amendment No. 7

- effective August 22, 2022
- allows replenishment of the Lake Geraldine Reservoir through withdrawal of water from an unnamed lake to the Niaqunguk (Apex) River and an increase in withdrawal from the Apex River
- expires upon completion of the temporary withdrawals required to replenish the Lake Geraldine Reservoir in 2022

**In the 2022 Annual Report, the City of Iqaluit reports that Amendment No. 7 has not been implemented.**

The following annual reporting requirements are listed in **Schedule B** of Water Licence No. 3AM-IQA1626 issued on June 17, 2016:

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



- n. A brief update on the implementation plan of all facilities within the scope of this Licence including changes projected implementation and status of the Upgraded Wastewater Treatment Plant
- o. A summary of any studies, reports and plans requested by the Board that relate to Waste disposal, Water use or reclamation and a brief description of any future studies planned
- p. Any other details on the use of Water or Waste disposal requested by the Board by November 1st of the year being reported

**Amendment No. 4** added the following annual reporting requirements to Schedule B of Water Licence No. 3AM-IQA1626:

- q. The 2019 Annual Report referred to in Part B, Item 1, shall provide the following information about the Supplementary Pumping Program (SPP) including:
  - 1. A summary of the SPP program, including lessons learned, based on monitoring and mitigation efforts.
  - 2. GPS co-ordinates (in degrees, minutes and seconds of latitude and longitude) and datum for the locations of all water withdrawals.
  - 3. The daily and monthly quantities in cubic metres of freshwater withdrawn from the Niaqunguk River (Apex River) watershed at Monitoring Station No. IQA-10.
  - 4. The daily water levels and/or flow rates in the Niaqunguk River when withdrawals are occurring at Monitoring Station No. IQA-10.
  - 5. All other monitoring conducted to meet the Fisheries and Oceans Canada requirements.
  - 6. Discussion of any observed trends, exceedances, or unanticipated impacts.

**Amendment No. 5** added the following annual reporting requirements to Schedule B of Water Licence No. 3AM-IQA1626:

- r. The monthly and annual quantities in cubic metres of freshwater withdrawn from Imiqtarviviniq Lake (Dead Dog Lake) at Monitoring Station No. IQA-14
- s. The monthly and annual quantities, and general types of Wastes brought to the Waste Transfer Station and disposed of at the New North Landfill
- t. A review of procedures for packaging, storage, and shipment of harmful hazardous Waste
- u. An update on the capacity of the landfill cell currently in use, including the installation timing calculation (inputs and results), including discussion on the required actions/schedule for the design and installation of the next lined disposal area in the sequence

**Amendment No. 6** added the following annual reporting requirements to Schedule B of Water Licence No. 3AM-IQA1626:

- v. The 2021 Annual Report referred to in Part B, Item 1, shall provide the following information:
  - 1. A summary of the investigation of the petroleum hydrocarbon contamination in the City's water supply system, including lessons learned, based on monitoring and mitigation efforts



2. GPS co-ordinates (in degrees, minutes and seconds of latitude and longitude) and datum for the locations of all water withdrawals
3. The daily and monthly quantities in cubic metres of fresh Water withdrawn from the Sylvia Grinnel River at Monitoring Station No. IQA-17
4. Discussion of any observed trends, exceedances, or unanticipated impacts

The water treatment plant returned to normal operation on April 25, 2023. Amendment #6 is therefore in effect for all of the 2022 Annual report and a portion of the 2023 Annual report.

**Amendment No. 7** added the following annual reporting requirements to Schedule B of Water Licence No. 3AM-IQA1626:

- v. The 2022 Annual Report referred to in Part B, Item 1, shall provide the following information:
  1. GPS co-ordinates (in degrees, minutes and seconds of latitude and longitude) and datum for the locations of all water withdrawals
  2. The daily and monthly quantities in cubic metres of fresh Water withdrawn from the Unnamed Lake at Monitoring Station No. IQA-13
  3. All other monitoring conducted to meet DFO requirements
  4. Discussion of any observed trends, exceedances, or unanticipated impacts

Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) reviewed the 2023 Annual Report pursuant to its mandated responsibilities under the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* and the *Department of Crown-Indigenous Relations and Northern Affairs Act*. As directed by the Nunavut Water Board on November 6, 2023, the 2023 Annual Report was to also address intervener outstanding comments from the City of Iqaluit 2021 and 2022 Annual Reports. **CIRNAC has 1 outstanding comment from the City of Iqaluit 2021 Annual Report, 6 outstanding comments from the City of Iqaluit 2022 Annual Report, and 16 comments for the City of Iqaluit 2023 Annual Report.**

A summary of the subjects of CIRNAC's comments and recommendations regarding the renewal application can be found in Table 1. Documents reviewed as part of this submission can be found in Table 2 of Section B. Detailed technical review comments are in Section C (2021 Annual Report), Section D (2022 Annual Report), and Section E (2023 Annual Report).



**Table 1: Summary of CIRNAC Comments and Recommendations**

## 2021 Annual Report

Recommendation Number	Subject	Status
R-01	Quantify and report the volume of spills or unauthorized discharges in the future	Unresolved
R-02	Address the additional reporting requirements as described in Water Licence Amendments #5 and #6 (i.e., Items r, s, t, u and v of Schedule B).	Resolved
R-03	Clarify if and how the term and condition stipulated in Item 11 of Amendment #4 was implemented with respect to water withdrawal from Apex River in 2021.	Resolved

## 2022 Annual Report

Recommendation Number	Subject	Status
R-01	Sludge removed from Wastewater Treatment Facility	Resolved
R-02	Quantities of wastes disposed of at the West 40 landfill	Resolved
R-03a to R-03e	Sampling for the monitoring and QA/QC program	R-03a – Resolved R-03b – Unresolved R-03c – Resolved R-03d – Resolved R-03e – Unresolved
R-04	Construction activities and maintenance work	Resolved
R-05	Updated plans, manuals, and reports in 2022	Unresolved
R-06a and R-06b	Un-authorized discharges and spills	R-06a – Resolved R-06b – Unresolved
R-07	Procedures for hazardous waste	Resolved
R-08a to R-08c	Withdrawals from Niaqunguk (Apex) River	R-08a – Unresolved R-08b – Resolved R-08c – Resolved
R-09a and R-09b	Supplementary Lake Geraldine Water Balance Modelling for 2022	R-09a – Resolved R-09b – Unresolved
R-10a and R-10b	Water Treatment Plant 2021 Spill	R-10a – Resolved R-10b – Resolved



## 2023 Annual Report

Recommendation Number	Subject
R-01	Sewage volumes discharged from IQA-02
R-02a to R-02b	Sampling for the monitoring and QA/QC program
R-03	ATCO Loop decommissioning and Federal Road Utilidor Extension
R-04	Water Treatment and Waste Treatment Facilities modifications and/or major maintenance work
R-05	Changes projected implementation and status of the Upgraded Wastewater Treatment Plant
R-06	Future Wastewater Treatment Plant studies planned
R-07a to R-07d	Un-authorized discharges and spills
R-08a to R-08b	Updated plans, manuals and reports
R-09a and R-09b	Dam Safety Inspection Reports – Construction Works
R-10	Dam Safety Inspection Reports – Engineering Studies/Investigations and Design Works
R-11a and R-11b	2023 Sample Results
R-12	Water Treatment Plant Report
R-13	2023 Apex Pumping Final Report
R-14	Chlorine and Bacteria Results from the WTP (2023)
R-15	2024 Lake Geraldine Water Balance Assessment
R-16	Concerns Raised in Inspection Reports

## B. DOCUMENTS REVIEWED AND REFERENCED

The following table (Table 2) provides a list of the documents reviewed under the submission and reference during the review.

**Table 2: Documents Reviewed and Referenced**

Document Title, Author, File No., Rev., Date
AECOM. 2024. City of Iqaluit West 40 Landfill Operations and Maintenance Manual.
City of Iqaluit. 2024. City of Iqaluit Water Licence 3AM-IQA1626 2023 Annual Water License Report.
City of Iqaluit. 2023. City of Iqaluit Water Licence 3AM-IQA1626 2022 Annual Water Licence Report.
Concentric Associates International Incorporated. 2023a. Lake Geraldine Dam, Dam Safety Inspection 2023 #1 Rev 1, Iqaluit, Nunavut. Dated June 8, 2023
Concentric Associates International Incorporated. 2023b. Lake Geraldine Dam, Dam Safety Inspection 2023 #2, Iqaluit, Nunavut. Dated July 23, 2023





Document Title, Author, File No., Rev., Date
Concentric Associates International Incorporated. 2023c. Lake Geraldine Dam, Dam Safety Inspection 2023 #3, Iqaluit, Nunavut. Dated August 24, 2023
Concentric Associates International Incorporated. 2023d. Lake Geraldine Dam, Dam Safety Inspection 2023 #4, Iqaluit, Nunavut. Dated October 4, 2023
Dillon Consulting. 2023. City of Iqaluit Operations and Maintenance Manual, Landfill and Waste Transfer Station.
Nunami Stantec Limited. 2022. Comparative Evaluation of Sylvia Grinnell River and Unnamed Lake as Long-Term Water Supply for City of Iqaluit. Final. Dated December 6, 2022. Prepared for the City of Iqaluit.
Nunami Stantec Limited. 2023. Project Summary Report: Iqaluit 2022 Lake Geraldine Resupply (Apex River Supplementary Pumping Program): Report of Activities 3AM-IQA1626 and 22-HCAA-02043. Dated March 15, 2023. Prepared for the City of Iqaluit.
Nunami Stantec Limited. 2023. Analysis of Fisheries and Hydrologic Information of Apex River, Analysis to Support Request to DFO for Water Withdrawal to Exceed 10% Flow.
Nunavut Water Board. 2016. Type “A” Water Licence No. 3AM-IQA1626. Issued to the City of Iqaluit. Dated June 17, 2016.
Nunavut Water Board. 2019. Licence No. 3AM-IQA1626 – City of Iqaluit; Amendment No. 4 – Seasonal Replenishment of Lake Geraldine Reservoir from the Niaqunguk River (Apex River). Dated September 14, 2019.
Nunavut Water Board. 2021. Licence No: 3AM-IQA1626 – City of Iqaluit; Amendment No. 5 – New Solid Waste Management Facility and Additional Water Source. Dated March 15, 2021.
Nunavut Water Board. 2021. City of Iqaluit, Application to Amend Type “A” Water Licence No: 3AM-IQA1626 – Request for the Minister’s Consent to Process the Application on an Emergency Basis and Attached Reasons for Decision and Recommended Text of Amendment No. 6 to Water Licence No: 3AM-IQA1626 for the Minister’s Consideration. Dated October 15, 2021.
Nunavut Water Board. 2022. NWB Water Licence Type “A” No: 3AM-IQA1626, City of Iqaluit – Request for the Minister’s Consent to Process the Application on an Emergency Basis and Attached Reasons for Decision and Amendment No. 7 for the Minister’s Consideration. Dated August 22, 2022.
Nunavut Water Board. 2023. Licence No: 3AM-IQA1626, Type “A”; City of Iqaluit; 2021 and 2022 Annual Reports Review. Dated November 06, 2023.
Qikiqtaaluk environmental. 2016. Spill Contingency Plan, City of Iqaluit Landfill Water Treatment Program, Iqaluit, Nunavut.
Qikiqtaaluk environmental. 2021. Environmental Support for the removal of Hydrocarbon-Contaminated Water at the City’s Potable Water Treatment Plant, Iqaluit, Nunavut.
Qikiqtaaluk environmental. 2021. Phase II Environmental Site Assessment, City of Iqaluit, Potable Water Treatment Plant, Iqaluit, Nunavut.
Qikiqtaaluk environmental. 2022. Surface Soil Remediation at the Iqaluit Water Treatment Plant located in Iqaluit, Nunavut Final Report.





Document Title, Author, File No., Rev., Date
Qikiqtaaluk environmental. 2023. Final Surface Soil Remediation at the Iqaluit Water Treatment Plant located in Iqaluit, Nunavut Final Report.
WSP. 2024. 2024 Lake Geraldine Water Balance Assessment. Technical Memorandum. Dated June 3, 2024. Prepared for the City of Iqaluit.
WSP. 2023. Supplementary Lake Geraldine Water Balance Modelling for 2022. Technical Memorandum. Dated May 2, 2023. Prepared for the City of Iqaluit.

## C. LICENSEE RESPONSE TO CIRNAC RECOMMENDATIONS/CONCERNS ON 2021 ANNUAL REPORT

### 1. Quantify and report the volume of spills or unauthorized discharges in the future

#### **CIRNAC Comment:**

Item K of Schedule B of Water Licence 3AM-IQA1626 requires that the annual report provide “(A) list and description, including volumes and Spill Report Line Identification Numbers, of all un-authorized discharges, spills and summaries of follow-up action taken.” Table 6 of the annual report summarized the reported spills or un-authorized discharges in 2021. CIRNAC notes that in all the reported incidents, the volumes of spills or un-authorized discharges were reported as unknown. CIRNAC recommended that the licensee make efforts in quantifying and reporting the volumes of spills or un-authorized discharges in the future.

#### **Comment on the City of Iqaluit’s Response:**

The City continues to not provide information on the volume of spills. The City’s response provided in the 2023 Annual Report that spill volumes typically do not exceed 100 litres raises concerns. If precise quantification is challenging, it is unclear how the city can guarantee that spill volumes are less than 100 litres. Additionally, while the Spill Line has a limit of 100 L as their reporting threshold, that is not the same for the water license where all uncontrolled releases of waste that may affect water are required to be reported. This is a requirement of the water license and failure to comply brings the proponent into non-compliance. The City is strongly encouraged to address this issue.

#### **Status:**

Unresolved.

### 2. Address the additional reporting requirements as described in Water Licence Amendments #5 and #6 (i.e., Items r, s, t, u and v of Schedule B).

#### **CIRNAC Comment:**

Both amendments #5 and #6 stipulated additional requirements for annual reporting (i.e., Items r, s, t, u and v of Schedule B). The 2021 annual report does not adequately address



these additional requirements. CIRNAC recommended the Licensee address the additional reporting requirements as described in water licence amendments #5 and #6.

**Comment on the City of Iqaluit's Response:**

The City provided information in response to Schedule B, item r monthly and annual volumes of withdrawals from Imiqtarviviniq (Dead Dog Lake) in the 2022 Annual Report Update and reported no withdrawals in 2023. The City stated in the 2023 Annual Report that the Waste Transfer Station is not yet operational; this is in response to Schedule B, item s. The City provided information in response to Schedule B, item t procedures for packaging, storage and shipment of hazardous waste in the 2023 Annual Report. The City stated in the 2023 Annual Report that the North 40 Landfill cell is not yet operational; this is in response to Schedule B, item u. CIRNAC acknowledges that Schedule B, item v.1, reporting on the petroleum hydrocarbon investigation has been resolved.

**Status:**

Resolved.

**3. Clarify if and how the term and condition stipulated in Item 11 of Amendment #4 was implemented with respect to water withdrawal from Apex River in 2021.**

**CIRNAC Comment:**

*In the Executive Summary section of the 2021 annual report, it is stated that “(T)he City executed the replenishment of the Lake Geraldine Reservoir, via supplemental pumping of water from the Apex River. Pumping activities were completed between June 24, 2021 and June 24, 2021. A total of 76,320 m<sup>3</sup> of water was pumped with maximum daily pumped volumes of 17,280 m<sup>3</sup>. The Lake Geraldine water level as of October 1, 2021 was recorded at 111.239 mASL.”*

*In its response to Item o of Schedule B, the licensee stated that “(T)he City executed the replenishment of the Lake Geraldine Reservoir, via supplemental pumping of water from the Apex River. Pumping activities were completed between June 24, 2021 and July 28, 2021. A total of 76,320 m<sup>3</sup> of water was pumped, with maximum daily pumped volumes of 17,280 m<sup>3</sup>. Pumping records were maintained by the contractor at the pumping site but had not been provided to City's representative (Nunami Stantec Limited) for review and tabulation at the time of issuance of this report. No supplementary pumping occurred between June 29, 2021 and September 17, 2021, when Lake Geraldine water level was recorded at 111.295 masl, or approximately 1,667,097 m<sup>3</sup>.”*

*In Appendix G (i.e., Iqaluit 2021 Lake Geraldine Resupply (Apex Pumping): Report of Activities, by Nunami Stantec Limited on November 26, 2021), it is stated that “(A) total of*



*76,320 m<sup>3</sup> were withdrawn from the Niaqunguk River and directed to Lake Geraldine during the SPP in 2021. Lake Geraldine was filled to the spillway elevation by June 28, 2021 and continued overflowing for a period of time due to natural recharge” and that “(P)rior to, during and after supplementation activities, Nunami Stantec conducted daily monitoring of river discharge and Lake Geraldine levels (WSC stations), as well as daily monitoring and guidance of pumping rates to the contractor (Tower Arctic Ltd., TAL).”*

Based on the Lake Geraldine Dam Safety Inspection 2021 reports (Appendix A), Lake Geraldine Reservoir has a maximum operating elevation at 111.1 masl and the spillway of the reservoir has an elevation of 112.3 masl.

Item 11 of Amendment #4 of Water Licence 3AM-IQA1626 stipulates that “(T)he Licensee shall, at least thirty (30) days prior to the intended annual start of water withdrawals referred to in Part D, Item 10, submit to the Board, for review, an updated Lake Geraldine Water Balance Model completed with the most up to date data available.”

It is not clear if and how the term and condition stipulated in Item 11 of Amendment #4 was implemented in 2021. CIRNAC recommended that the licensee clarify if and how the term and condition stipulated in Item 11 of Amendment #4 was implemented in 2021.

#### **Comment on the City of Iqaluit’s Response:**

The City provided Supplementary Lake Geraldine Water Balance Modelling for 2022; CIRNAC’s comments on this report were addressed in the 2024 Lake Geraldine Water Balance Assessment Report.

#### **Status:**

Resolved.

### **D. LICENSEE RESPONSE TO CIRNAC RECOMMENDATIONS/CONCERNS ON 2022 ANNUAL REPORT**

#### **1. Sludge removed from Wastewater Treatment Facility**

##### **Comment:**

Schedule B item d of Water Licence No. 3AM-IQA1626 requires that the annual report provide “*the monthly and annual quantities in cubic metres of sludge removed from the Wastewater Treatment Facilities.*”

The monthly quantities and annual total included in Table 3 of the 2022 Annual Report do not match the description following Table 3. The annual total is reported as 424 m<sup>3</sup> in Table 3, while the text says 1,248 m<sup>3</sup> was removed. The monthly volumes reported are the same



for each month (35.3 m<sup>3</sup>). It appears an average value of 424 m<sup>3</sup> per 12 months is being reported rather than the measured monthly quantities.

**Recommendation:**

(R-01) CIRNAC recommended the City of Iqaluit confirm the annual volume of sludge removed from the Wastewater Treatment Facility and update the monthly volumes of sludge removed with the measured quantities in the 2022 Annual Report.

**Comment on the City of Iqaluit's Response:**

Annual volume of sludge removed from the Wastewater Treatment Facility and monthly volumes of sludge removed with the measured quantities was provided in the City's response to the 2022 Annual Report and presented in the 2023 Annual Report.

**Status:**

Resolved.

**2. Quantities of wastes disposed of at the West 40 landfill**

**Comment:**

Schedule B item e of Water Licence No. 3AM-IQA1626 requires that the annual report provide "*the monthly and annual quantities of Wastes disposed of at the West 40 landfill.*"

The monthly quantities of wastes reported in Table 4 of the 2022 Annual Report are the same for each month (1,460 m<sup>3</sup>). It appears an average value of 17,520 m<sup>3</sup> per 12 months is being reported rather than the measured monthly quantities.

**Recommendation:**

(R-02) CIRNAC recommended the City of Iqaluit update the 2022 Annual Report with the measured monthly quantities of wastes disposed of at the West 40 landfill.

**Comment on the City of Iqaluit's Response:**

Monthly and annual quantities of waste disposed of at the West 40 Landfill are included in Table 2 (page 12) of the 2023 Annual Report.

**Status:**

Resolved

**3. Sampling for the monitoring and QA/QC program**

**Comment:**



Schedule B item f of Water Licence No. 3AM-IQA1626 requires that the annual report provide “*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.*”

Schedule I of the City of Iqaluit Water Licence No. 3AM-1QA1626 outlines the conditions applying to Monitoring, which includes Water Quality Parameters and Water Quality Monitoring Criteria. Additional station IDs were added in Amendment No.5. Table 5 (Summary of 2022 Sampling Conducted) of the 2022 Annual Report does not reference samples collected at the following stations included in Schedule I of the Water License, Amendment No. 4 and Amendment No.5:

- IQA-06 (Sludge from Waste Water Treatment Plant (WWTP))
- IQA-15 (Waste Transfer Station Runoff/ Leachate Discharge Point)
- IQA-16 (Landfill Runoff/ Leachate Discharge Point)
- SW1, SW2, SW3 (Waste Transfer Station surface water monitoring)
- WS-100, WS-101, WS-102 (New North Landfill surface water monitoring)
- 19MW-01, 19MW-02, 19MW-03, 19MW-04, 19MW-05 (Waste Transfer Station ground water monitoring)
- W-107, W-108, W-109, W-110, W-111 (New North Landfill ground water monitoring)

In addition, the following samples are missing from the monthly sampling that was reported for the Water Treatment Plant (WTP) and WWTP:

- June 2023 WWTP (IQA-04, IQA-05)
- June 2023 WTP (IQA-01)
- July 2023 WTP (IQA-01)
- July 2023 WWTP (IQA-04, IQA-05)
- Aug 2023 WTP (IQA-01)
- Sept 2023 WTP (IQA-01)
- Acute toxicity testing for IQA-04 (annual sampling)
- Decant effluent results from IQA-02 and IQA-08

Included in the criteria is sampling of the effluent during lagoon discharge for the Sewage Lagoon (IQA-02) and the West 40 Landfill Discharge (IQA-08). The testing frequency outlined in Schedule I is “*once prior to discharge; once during discharge; and once prior to the completion of discharge*” for each station ID. Referring to the Water Quality Sampling Results and Summary of 2022 Sampling Conducted (Table 5 of 2022 Annual Report), there was only one sample collected at IQA-02 and two collected at IQA-08.

Schedule I requires annual acute toxicity testing annually following the commissioning of the WWTP on the WWTP effluent (IQA-04). The 2022 Annual Report and Appendix B Water Quality Sampling Results does not indicate that the acute toxicity testing was completed in 2022.



The frequency of sampling required for the WWTP Influent (IQA-05) is listed as “*no testing requirements following commissioning of the WWTP*”. The 2022 Annual Report states “*the final completion certificate was presented to the City in March 2022 for construction related to the WWTP Upgrades project. The WWTP has been in operation; however, with outstanding deficiency and troubleshooting items still ongoing.*” The City of Iqaluit continues to sample and report influent results.

2022 Potable WTP pH results (monthly laboratory samples) do not meet the Canadian Drinking Water Quality Guidelines (CDWQG) of 7-10.5.

**Recommendation:**

(R-03a) CIRNAC recommended the City of Iqaluit update the 2022 Annual Report with the monitoring and sampling analytical results in accordance with Schedule I of the Water Licence.

(R-03b) CIRNAC recommended the City of Iqaluit update the 2022 Annual Report with the sample results from S::CAN monitoring device located at the water treatment plant in the 2022 Annual Report.

(R-03c) CIRNAC recommended the City of Iqaluit update the 2022 Annual Report with the chlorine and bacteria sample results from the distribution system sampling in the 2022 Annual Report.

(R-03d) CIRNAC recommended the City of Iqaluit clarify the commissioning date of the Wastewater Treatment Plant in the 2022 Annual Report.

(R-03e) CIRNAC recommended the City of Iqaluit review and update operating procedures for pH control in the treated water entering the treated water reservoir to meet CDWQG.

**Comment on the City of Iqaluit's Response:**

(R-03a) The requested information was provided in the response to the 2022 comments.

(R-03b) The requested information was not provided in the updated 2022 Annual Report or 2023 Annual Report. Comment makes reference that data from S::CAN is similar to grab samples collected by plant operators, but readings for hydrocarbons do not appear to be included in the daily log sheets for the WTP. The City of Iqaluit made comment about limited storage capacity for S::CAN system, but there is reference in the Water Treatment Plant Report (Appendix C of 2023 Annual Report) that the data is stored and they have capability





to review present and historical data. A plot of the S::CAN data should be provided annually in the Annual Reports if there are issues with data storage.

(R-03c) The requested information was provided in the response to the 2022 comments and provided in the 2023 Annual Report.

(R-03d) The requested information was provided in the response to the 2022 comments.

(R-03e) In 2015 the Canadian Drinking Water Quality Guideline (CDWQG) for pH was updated to be 7-10.5 for treated water. Monthly third-party laboratory results included in the 2022 and 2023 Annual Reports along with the 2023 WTP log sheets included in appendix F of the 2023 Annual Report regularly have pH readings on finished water below the CDWQG guideline. Review of the WTP O&M manuals indicated that a caustic soda system is included at the WTP for treated water pH control, however an updated operating procedures for pH control in the treated water entering the treated water reservoir to meet CDWQG is not included.

**Status:**

R-03a – Resolved.

R-03b – Unresolved.

R-03c – Resolved.

R-03d – Resolved.

R-03e – Unresolved.

**4. Construction activities and maintenance work**

**Comment:**

Schedule B items g and h of Water Licence No. 3AM-IQA1626 requires that the annual report provide “a summary of all construction activities carried out for facilities under the Licence” and “a summary of modifications and/or major maintenance work carried out on the potable Water Treatment and Waste Treatment Facilities, including all associated structures.”

The 2021 Annual Report (p. 15 of 27) states “substantial completion of the [Wastewater Treatment] Plant’s secondary treatment system was achieved on March 15, 2021. At which point, operations of the facility was handed over to the City. The City continued to work through outstanding deficiencies and operational issues with the Plant’s primary and secondary treatment systems following substantial completion. This work is anticipated to continue into 2022” and “following the water contamination event at the WTP in October 2021, the City applied for a modification to the Licence in order to construct an internal by-pass within the WTP, which would by-pass all tankage systems, while the City develops a



*plan for required remediation and repairs. The construction of the by-pass was completed in February 2022, and is currently in operation.”*

In the 2022 Annual Report, there is no reference nor update on addressing the outstanding deficiencies and operational issues with the WWTP’s primary and secondary treatment systems following substantial completion. Furthermore, construction of the WTP bypass (completed in February 2022) was not included in the 2022 Annual Report as a modification nor major maintenance item.

**Recommendation:**

(R-04) CIRNAC recommended the City of Iqaluit update the 2022 Annual Report with the information to address Schedule B items g and h of the Water Licence.

**Comment on the City of Iqaluit’s Response:**

Details of the construction works carried out on the Water Treatment Plant bypass and efforts relating to the Return to Service Plan were provided in the “City of Iqaluit Return to Service Plan – Commissioning Report” provided in Appendix C of the 2023 Annual Report.

**Status:**

Resolved

**5. Updated plans, manuals, and reports in 2022**

**Comment:**

Schedule B item j of Water Licence No. 3AM-IQA1626 requires that the annual report provide “*any revisions required, in the form of addenda, to Plans, Manuals and Reports approved under the Licence.*”

Review of available documentation identified revisions to the following documents in 2022 that were not captured in the 2022 Annual Water Licence Report:

- General Site Information and Guide for the Iqaluit Water Treatment Plant (220726 3AM-IQA 1626 2022-07-21 Iqaluit General O&M-IMLE) (revisions in March, May, and June 2022),
- Iqaluit Water Treatment Plant Operation and Maintenance Manual (220331 3AM-IQA 1626 Water Treatment Plant O&M Manual 2022 Update -IMLE) (revisions in March 2022 for Process O&M Manual not included). Furthermore, the O&M manual was not updated to reflect the modifications of the filters to Granular Activated Carbon (GAC) media.
- City of Iqaluit Operations and Maintenance Manual Landfill and Waste Transfer Station (Aug 2022 Version 6.0) (220907 3AM-IQA1626 Appendix A – WTS and Landfill O&M Manual August 2022)



- Updates to WWTP O&M Manual following substantial completion/commissioning (did not receive document to review).

### **Recommendation:**

(R-05) CIRNAC recommended the City of Iqaluit update the 2022 Annual Report and corresponding documents to address Schedule B item j of the Water Licence. The plans, manuals, and reports to be addressed include, but are not limited to, the following:

- March, May, and June 2022 revisions to the General Site Information and Guide for the Iqaluit Water Treatment Plant,
- March 2022 Iqaluit Water Treatment Plant Operation and Maintenance Manual,
- City of Iqaluit Operations and Maintenance Manual Landfill and Waste Transfer Station (Aug 2022 Version 6.0),
- Updates to WWTP Operations and Maintenance Manual following substantial completion/commissioning, and
- Updates to the Iqaluit Water Treatment Plant Operation and Maintenance Manual to reflect the modifications of the filters to GAC media.

### **Comment on the City of Iqaluit's Response:**

The updated 2022 Annual report, section J makes reference to updates that were completed to the respected O&M manuals. The text in the report does not include references to the wastewater treatment plant that had final completion in 2022 nor modifications to the process of the water treatment plant so it is unclear what was updated in these manuals.

The versions of the Iqaluit Water Treatment Plant Operation and Maintenance Manuals provided for review do not reflect the modifications of the filters to GAC media (it is listed as pending and has details on the old filter media throughout).

### **Status:**

Unresolved.

## **6. Un-authorized discharges and spills**

### **Comment:**

**Schedule B** item k of Water Licence No. 3AM-IQA1626 requires that the annual report provide *"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."*

In the City of Iqaluit's 2022 Annual Report, there is a discrepancy in the reporting on the year that the reported spills occurred on pages 16 and 17 of 24; the year is stated as 2021 in the text, 2020 in the table heading, and 2022 in the table. For clarity in the report, the correct year should be used consistently.



Only wastewater spills were reported in Table 6 of the 2022 Annual Report. Table 6 of the 2021 Annual Report reported sewage, fuel and glycol spills.

Table 6 of the 2022 Annual Report summarizes the reported spills or un-authorized discharges, but the volumes of spills or unauthorized discharges are reported as unknown. CIRNAC made the same comment regarding Table 6 of the 2021 Annual Report.

The City of Iqaluit Sewage Lagoon Operation and Maintenance Manual was updated in March 2020 (200506 3AMIQA1626 WWTP Sewage Lagoon O&M Manual-IMLE) and includes a reference to “*Spill Contingency Plan (Ref. No. XXX, dated 20XX)*” to be followed in the event of an accidental or unauthorized discharge of waste. It is unclear if the City of Iqaluit’s Spill Contingency Plan has been updated since the May 2016 version.

**Recommendation:**

(R-06a) CIRNAC recommended that the City of Iqaluit update the 2022 Annual Report with the information to address Schedule B items k of the Water Licence including:

- the year the spills took place,
- all spills and unauthorized discharges in addition to wastewater and
- estimates of each volume spilled included in Table 6.

(R-06b) CIRNAC recommended the City of Iqaluit specify the most common causes of spills and unauthorized discharges in the 2022 Annual Report, and submit an updated Spill Contingency Plan that addresses these causes.

**Comment on the City of Iqaluit’s Response:**

The city’s response adequately specifies the most common causes of spills, as requested. However, it does not address the submission of an updated Spill Contingency Plan that incorporates these causes, leaving this aspect of the recommendation unmet. Additionally, the city’s assurance that spill volumes typically do not exceed 100 litres raises concerns. If precise quantification is challenging, it is unclear how the city can guarantee that spill volumes are less than 100 litres. Therefore, the response is partially adequate but lacks comprehensive action and assurance regarding spill volumes.

**Status:**

R-06a – Resolved.

R-06b – Unresolved.

**7. Procedures for hazardous waste**

**Comment:**



Schedule B item t of Water Licence No. 3AM-IQA1626 requires that the annual report provide “*a review of procedures for packaging, storage, and shipment of harmful hazardous waste.*”

A review was not included in the 2021 Annual Report nor the 2022 Annual Report.

**Recommendation:**

(R-07) CIRNAC recommended the City of Iqaluit update the 2022 Annual Report with:

- the review information to address Schedule B items t of the Water Licence including details on current procedures for packaging, storage, and shipment of harmful hazardous waste, and
- the anticipated date when the City of Iqaluit Landfill and Waste Transfer Station Operations and Maintenance Manual updated for the new solid waste landfill site and transfer station will be submitted for review, including procedures for packaging and shipping hazardous waste.

**Comment on the City of Iqaluit’s Response:**

Procedures for packaging, storage and shipment of hazardous waste are presented in Section T, page 24 of the 2023 Annual Report.

**Status:**

Resolved.

**8. Withdrawals from Niaqunguk (Apex) River**

**Comment:**

Amendment No. 4 inserts the following condition into Water Licence No. 3AM-IQA1626: “*withdrawals from the Niaqunguk River (Apex River) at Monitoring Station No.: IQA-10 only occur when the natural flow in the Niaqunguk River (Apex River) is above 30% of the mean annual discharge (MAD) and the withdrawals will not exceed 10% of the instantaneous flow of the Niaqunguk River (Apex River).*”

Schedule B item q no. 4 of Water Licence No. 3AM-IQA1626 requires that the annual report provide “*the daily water levels and/or flow rates in the Niaqunguk River when withdrawals are occurring at Monitoring Station No. IQA-10.*”

Table 4.1 provides “*Relative Water Level and Wetted Width Measured at Monitoring Stations from September 13 to September 19, 2022.*” However, this is not quite the same as daily water levels and/or flow rates. Figures 4.1 to 4.3 show graphs of daily flows, but the precise numbers are not available from the graphs. Table 4.2 provides daily flows for period 2 (September 13, 2022, to September 19, 2022), but not period 1 (between June 12 and September 12, 2022). This reporting requirement is therefore incomplete.



Schedule B item q no. 6 of Water Licence No. 3AM-IQA1626 requires that the annual report provide “*discussion of any observed trends, exceedances, or unanticipated impacts.*” No trends were discussed, other than the mention of “*observed water levels in the reservoir and hydrologic trends in the Iqaluit area*” in the report. Exceedances were reported, but not commented on, and no unanticipated impacts were discussed. This reporting requirement is therefore incomplete.

**Recommendation:**

(R-08a) CIRNAC recommended the City of Iqaluit update the 2022 Annual Report with the daily water levels and/or flow rates in the Niaqunguk River when withdrawals occurred at Monitoring Station IQA-10 for Period 1 (between June 12 and September 12, 2022).

(R-08b) CIRNAC recommended the City of Iqaluit update the 2022 Annual Report with discussion of observed trends, exceedances, and unanticipated impacts – especially when the natural flow in the Niaqunguk River (Apex River) is below 30% of the mean annual discharge (MAD) and withdrawals exceeded 10% of the instantaneous flow of the Niaqunguk River (Apex River).

(R-08c) CIRNAC recommended the City of Iqaluit update the 2022 Annual Report with a discussion of observed trends comparing the 2021 and 2022 volume pumped from the Niaqunguk River (Apex River) and the corresponding water levels in Lake Geraldine. This could provide an insight to potential trends of both usage and natural conditions that could change over time.

**Comment on the City of Iqaluit’s Response:**

Response R-08a: Daily Water Levels and Flow Rates

The City of Iqaluit did not provide the updated report that includes the daily water levels and flow rates from June 1 to September 12, 2022.

Response (R-08b): Discussion of Trends and Exceedances

In Appendix C of the 2022 Apex Pumping Final Report, Figure 4.2 visualizes instances where the daily average pumping rate exceeded 10% of the instantaneous flow. There were 15 occurrences of such exceedances during the specified Second Pumping Period (SPP). Section 4.3.2 of the Apex Pumping Report provides a comprehensive summary of these exceedances, emphasizing that no observable impacts were noted.

Response (R-08c): Comparative Analysis

The response provides an adequate level of information concerning observed trends.

**Status:**

R-08a – Unresolved.

R-08b – Resolved.

R-08c – Resolved.





## 9. Supplementary Lake Geraldine Water Balance Modelling for 2022

### **Comment:**

The *Supplementary Lake Geraldine Water Balance Modelling for 2022* (WSP, 2023) provides relevant information. The calibration model validation period is short (a little more than one year) given that several years of data is available for model calibration. The 2023 Water Balance Model report, page 5, notes that model adjustments were tested for the validation period (October 1, 2021 to February 17, 2023). Model calibration needs to be restarted when model parameters are modified and additional processes are included (in this case, snow sublimation and “new adjustments”). Calibration for one year of data is not considered representative of model validation.

Page 3 of the *Supplementary Lake Geraldine Water Balance Modelling for 2022* states that *“it should be noted that communications with Nunami Stantec (June 2, 2019) suggest that relative to the digital elevation model representation derived using survey data received from Natural Resources Canada (2008), Lake’s Geraldine’s active stage-storage capacity may have been reduced by up to 195,000 m<sup>3</sup> (from 1,875,000 m<sup>3</sup> estimated by Golder to 1,680,000 m<sup>3</sup> estimated by Nunami Stantec). Formal validation of this change in physiography has not been presented at the time of reporting.”* Since this could have potentially significant repercussions on the available volume of water for withdrawal from Lake Geraldine, and that the importance of Lake Geraldine as a water source is growing with population growth, more detail on Lake Geraldine bathymetry is considered important information to obtain.

### **Recommendation:**

(R-09a) CIRNAC recommended the City of Iqaluit update the 2022 Annual Report with the model calibrated for the entire period of record, a comparison of updated modelled results with the daily water level measurements, and any model discrepancies discussed.

(R-09b) CIRNAC recommended the City of Iqaluit conduct a bathymetric survey in 2023, and include a comparison of it to the bathymetry used for the Lake Geraldine Water Balance modelling in the 2023 Annual Report.

### **Comment on the City of Iqaluit’s Response:**

(R-09a) Model Calibration has been addressed in the 2024 Lake Geraldine Water Balance Assessment (WSP) dated June 3, 2024.

(R-09b) Bathymetric Survey



It is understood that weather delays prevented completion of this item before submission of the 2023 Annual Report. CIRNAC recommends an updated schedule and plan be provided to complete this work.

**Status:**

R-09a – Resolved.

R-09b – Unresolved.

## **10. Water Treatment Plant 2021 Spill**

**Comment:**

On October 12, 2021, the City of Iqaluit declared a state of emergency after analytical results revealed that the city's drinking water supply may be contaminated with petroleum products. A supplementary letter provided by Qikiqtaaluk Environmental (QE) (December 8, 2021) indicates that an underground storage tank (UST) was uncovered during inspection of the void space beneath the North and South clear wells of the Water Treatment Plant. Information pertaining to the contents, condition, and depth of the UST tank is not provided nor the location of the UST in any site figure. QE removed the UST along with 69,300 litres of contaminated water from the void and *"a lot of sediments that seemed contaminated"* (QE, December 8, 2021). QE conducted a Phase II Environmental Site Assessment (ESA) that consisted of 4 boreholes drilled to bedrock to the north, northwest, south, and southeast of the Iqaluit Water Treatment Plant. QE (November 22, 2021) state runoff is towards the southwest. None of the boreholes are on the downstream southwest side of the Iqaluit Water Treatment Plant. Groundwater was not encountered during the borehole investigation, therefore no analysis of groundwater was completed. Depth to permafrost is not reported. Details regarding the condition of an above ground storage tank (AST) located southeast of the Iqaluit Water Treatment Plant were not provided.

From the 4 boreholes, 32 soil samples total were analyzed for petroleum hydrocarbons (PHC) (C<sub>10</sub> to C<sub>50</sub>), volatile organic compounds, polycyclic aromatic hydrocarbons, and glycols. Analytical results were compared to Canadian Council of Ministers of the Environment (CCME) "Canadian Soil Quality Guidelines for the Protection of the Environmental and Human Health" criteria for commercial land use and coarse grain conditions. Analytical results indicate PHC F2 impacted soils from 0.5 to 1.0 metres below ground surface (bgs) in borehole 3 (BH3). Borehole 3 is located downstream (southwest) of the AST, and south of the Water Treatment Plant. The report does not specify if the impacted soils correspond to the contents of the UST or AST.

In June 2022, approximately 10 m<sup>3</sup> of soil was removed in the vicinity of BH3 between 0.5 and 1.0 m bgs. Five confirmatory samples were collected corresponding to the base and each wall of the excavation. Four of the five samples exceeded PHC F2 guidelines - the northwest, northeast, and southwest walls, and the base of the excavation. On June 22, 2022, Mr. Simon Ghosh approved a complementary ESA should be conducted. *"A remediation plan will be developed with a more accurate estimate of the lateral and vertical PHC-impacted soils to be remediated in the fall of 2022, when the existing AST serving the*



*Iqaluit Water Treatment Plant is scheduled to be replaced and relocated, allowing the soil remediation work to be performed securely over the entire contaminated area.” (QE, July 21, 2022).*

**Recommendation:**

(R-10a) CIRNAC recommended the City of Iqaluit update the 2022 Annual Report with the results of the fall 2022 remediation activities and include:

- the AST and UST tank details (i.e. container type, contents, condition, etc.) in the report,
- the location of both the AST and UST on figures, and
- the depth bgs of the void space lower limit beneath the North and South clear wells of the Water Treatment Plant.

(R-10b) CIRNAC recommended the City of Iqaluit conduct a Phase III ESA that:

- assesses potentially impacted soils downstream (southwest) of the water treatment plant. Depth of the downstream assessment should be to bedrock and/or deeper than the void space depth bgs;
- defines the extent of impacts (delineation) in soil both vertically and horizontally in the vicinity of BH3,
- clarifies if the impacts in the vicinity of BH3 are attributed to the AST, UST, or both, and
- determines the potential for off-site migration.

It is recommended the Phase III ESA is included in the 2023 Annual Report.

**Comment on the City of Iqaluit’s Response:**

The City of Iqaluit has satisfied the information request for both R-10a and R-10b.

**Status:**

R-10a – Resolved.

R-10b – Resolved.

**E. CIRNAC COMMENTS ON THE 2023 ANNUAL REPORT**

**1. Sewage volumes discharged from IQA-02**

**Comment:**

Schedule B item b of Water Licence No. 3AM-IQA1626 requires that the annual report provide “*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).*”

The 2023 Annual Water License Report states that “*Effluent was discharged from the Sewage Lagoon to Frobisher Bay (Station ID IQA-02) between May 31, 2023 and June 16,*



2023.” The 2023 Annual Report does not include volumes discharged from the Sewage Lagoon as specified in Schedule B of the Water Licence.

**Recommendation:**

(R-01) CIRNAC recommends the City of Iqaluit record and report the annual treated sewage volumes discharged from the Sewage Lagoon (IQA-02) for 2023.

**2. Sampling for the monitoring and QA/QC program**

**Comment:**

Schedule B item f of Water Licence No. 3AM-IQA1626 requires that the annual report provide “*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.*”

Schedule I of the Water Licence outlines the water quality monitoring criteria and water quality parameters. The following samples are missing from the monthly sampling that was reported for the Water Treatment Plant and Wastewater Treatment Plant:

- October and December 2023 Water Treatment Plant (IQA-01) however, the 2023 report notes that this was due to construction at the facility.
- Temperature prior to discharge, conductivity (field) data (IQA-02).
- Temperature (except for May 2023) and conductivity (field) readings (IQA-04 & IQA-05).
- pH (field) readings from January to April and November 2023 (IQA-04 & IQA-05).
- Sludge samples for Q1, Q2 & Q3 2023 (IQA-06), however the 2023 report notes that this was due to a staffing shortage and the City is working to train staff as well as investigating options for automation/semi-automation of this testing.

Schedule I outlines requirements for stations relating to the Waste Transfer Station and North 40 landfill. These include the following monitoring stations: IQA-15, IQA-16, SW-1 to SW-3, WS-100, WS-101, WS-102, 19MW-01 to 19MW-05, and W-107 to W-111.

The City has stated that these sites are currently not active and are under construction, and that samples have not been collected. The City has committed to “*maintaining the regular monitoring program for the identified stations, as per Schedule B of the Water License, during the construction period in 2024. Monitoring of the leachate discharge will commence when the facilities are in use for municipal waste collection. The schedule for commissioning will be communicated to the Board, along with the final closure design report of the West 40 Landfill (as per Amendment 5 of the Water License).*”

**Recommendation:**



(R-02a) CIRNAC recommended the City of Iqaluit update the 2023 Annual Report with the monitoring and sampling analytical results in accordance with Schedule I of the Water Licence.

(R-02b) CIRNAC recommended the City of Iqaluit provide an update if they are on track for meeting the Schedule I of the Water Licence commitments for 2024. In particular, it is requested that the City follows the monitoring and sampling requirements in 2024 for the following monitoring stations:

- that had missing samples in 2023 (i.e. IQA-01, IQA-02, IQA-04, IAQ-05, and IAQ-06), and
- related to the Waste Transfer Station and North 40 Landfill (i.e. IQA-15, IQA-16, SW-1 to SW-3, WS-100, WS-101, WS-102, 19MW-01 to 19MW-05, W-107 to W-111).

### **3. ATCO Loop decommissioning and Federal Road Utilidor Extension**

#### **Comment:**

Schedule B item g of Water Licence No. 3AM-IQA1626 requires that the annual report provide “a summary of all construction activities carried out for facilities under the Licence

In the 2023 Annual Report, the City made the following statements on construction activities carried out in 2023:

- *“the City focused on construction services for the ATCO Loop decommissioning and Federal Road Utilidor Extension, both integral components of the Long-Term Water Distribution Upgrades project,”*
- *“Construction for the Federal Road Watermain Extension project commenced in September 2023. The scope of work encompassed extending the utilidor watermain along Federal Road, including the installation of approximately 240 meters of underground water main and recirculation, as well as the installation of four new access vaults. The project achieved substantial completion on November 18, 2023,”* and
- *“Construction services for the ACTO Loop Decommissioning, [sic] commencing in July 2023, included the decommissioning existing sanitary sewer and selected water mains within the ATCO Loop area. Substantial completion was issued in November 15, 2023.”*

These construction activities are not specified or defined in Water Licence No. 3AM-IQA1626 nor amendments.

#### **Recommendation:**

(R-03) CIRNAC recommends the City of Iqaluit clarify whether construction activities on the ATCO Loop sanitary sewer and watermain decommissioning and Federal Road Utilidor/



Watermain Extension were undertaken under Water Licence 3AM-IQA1626 and, if not, whether approval from the Nunavut Water Board has been obtained for these construction activities.

#### **4. Water Treatment and Waste Treatment Facilities modifications and/or major maintenance work**

##### **Comment:**

Schedule B item h of Water Licence No. 3AM-IQA1626 requires that the annual report provide *“a summary of modifications and/or major maintenance work carried out on the potable Water Treatment and Waste Treatment Facilities, including all associated structures.”*

In the City of Iqaluit response (R-03a and R-03d) to CIRNAC Comment R-03 for the 2022 Annual Report, the City states *“at the start of 2023, remedial actions were taken, resulting in the restoration of the DAF system and the resumption of the clarification process”* and *“the deficiencies referenced in the Annual Report pertain to the operation challenges with the HVAC system. The City is addressing and resolving these operational challenges with the WWTP HVAC System.”* Details on the work performed at the Wastewater Treatment Plant to restore the DAF system and HVAC system is not referenced under item h of the 2023 Annual Report.

In the updated City of Iqaluit 2022 Annual report (January 10, 2024), reference is made to replacement of the UV disinfection system in 2023 as the current system has exceeded its expected design life. The 2023 Annual Report does not make reference or provide an update on the UV replacement project.

##### **Recommendation:**

(R-04) CIRNAC recommends the City of Iqaluit provide a summary of the following:

- any modifications or major maintenance work carried out at the Wastewater Treatment Plant in 2023 to address the DAF clarifier and HVAC system deficiencies noted in the 2022 Annual Report (R-04).
- any modifications and/or major maintenance work carried out in 2023 for the UV disinfection system at the Water Treatment Plant.

#### **5. Changes projected implementation and status of the Upgraded Wastewater Treatment Plant**

##### **Comment:**

Schedule B item n of Water Licence No. 3AM-IQA1626 requires that the annual report provide *“a brief update on the implementation plan of all facilities within the scope of this*





*Licence including changes projected implementation and status of the Upgraded Wastewater Treatment Plant.”*

In the City of Iqaluit response to CIRNAC Comments for the 2022 Annual Report (R-03) regarding troubleshooting the DAF clarifier and addressing deficiencies in the HVAC system, the response outlines that the City continues to address operational challenges at the Wastewater Treatment Plant that was brought online in 2022. This work includes troubleshooting the DAF clarifier and addressing deficiencies in the HVAC system, which was identified as one of the reasons limiting sludge sample collection. An update on the implementation plan and status of the upgraded Wastewater Treatment Plant is not referenced under item n of the 2023 Annual Report.

No update or reference to other sections was made on implementation plans for the WWTP, landfill or pumping project or the status of their implementation.

**Recommendation:**

(R-05) CIRNAC recommends the City of Iqaluit provide an update on the implementation plan for the Wastewater Treatment Plant, Landfill and Pumping Project, including changes projected implementation and status of their implementation.

**6. Future Wastewater Treatment Plant studies planned**

**Comment:**

Schedule B item o of Water Licence No. 3AM-IQA1626 requires that the annual report provide “*a summary of any studies, reports and plans requested by the Board that relate to waste disposal, water use or reclamation and a brief description of any future studies planned.*”

In the City of Iqaluit response to CIRNAC Comments for the 2022 Annual Report (R-04), the response outlines that the City has dedicated funds to perform a review of the plant and to initiate updates. The 2023 Annual report does not include a reference to this future study.

**Recommendation:**

(R-06) CIRNAC recommends the City of Iqaluit provide an update on future Wastewater Treatment Plant studies planned as per Schedule B item o.

**7. Un-authorized discharges and spills**

**Comment:**



Schedule B item k of Water Licence No. 3AM-IQA1626 requires that the annual report provide *“a list and description, including volumes and Spill Report Line Identification Number, of all un-authorized Discharges, spills and summaries of follow-up action taken.”*

Spill entries report the spill volume as "Unknown," making it difficult to assess the impact of spills and adequacy of follow-up actions. The follow-up actions are repetitive and lack specificity.

Only wastewater spills were reported in Table 6 of the 2023 Annual Report; however, it is understood by CIRNAC that other spills have occurred, but are not being reported. All spills must be reported. While the Spill Line has a limit of 100 L as their reporting threshold, that is not the same for the water license where all uncontrolled releases of waste that may affect water are required to be reported. This is a requirement of the water license and failure to comply brings the proponent into non-compliance. The City is strongly encouraged to address this issue.

### **Recommendation:**

(R-07a) CIRNAC recommends the City of Iqaluit provide the estimates or ranges for spill volumes when precise measurements are not available. If estimating is not possible, explain why.

(R-07b) CIRNAC recommends the City of Iqaluit provide clarification on how it was determined that the average volume spilled was less than 100 litres.

(R-07c) CIRNAC recommends the City of Iqaluit provide more details on the follow-up actions, especially if they differ between incidents. Provide details on how spills were collected and disposed of and specify if additional monitoring or corrective actions were taken.

(R-07d) CIRNAC recommends the City of Iqaluit provide information on spills in addition to the reported wastewater spills.

## **8. Updated plans, manuals and reports**

### **Comment:**

Schedule B item j of Water Licence No. 3AM-IQA1626 requires that the annual report provide *“any revisions required, in the form of addenda, to Plans, Manuals and Reports approved under the Licence.”*

The 2023 Annual Report indicates that the wastewater treatment plant O&M manual following substation completion and commission was provided. In the package of



documents provided for review, the WWTP O&M manual was not included. The O&M manual for the sewage lagoon was included. The Water Treatment Plant O&M documents provided by the City do not include updates capturing the modification of the filters to GAC media.

**Recommendation:**

(R-08a) CIRNAC recommends the City of Iqaluit provide any new or updated Plans, Manuals and Reports that differ from those approved under the Licence to the Nunavut Water Board for review.

(R-08b) CIRNAC recommends the City of Iqaluit provide a summary on updates or revisions that were made to the WWTP and WTP O&M manuals, and in the summary provide confirmation of the most recent upgrades at both facilities.

## **9. Dam Safety Inspection Reports – Construction Works**

**Comment:**

In the 2023 Annual Water Licence Report, the City of Iqaluit states that they undertook Dam Safety Inspections (DSI) in 2023 and provided the following four DSI reports in Appendix A of the report:

- Lake Geraldine Dam, Dam Safety Inspection 2023 #1 Rev 1, Iqaluit, Nunavut (Concentric Associates International Incorporated, 2023), Dated June 8, 2023
- Lake Geraldine Dam, Dam Safety Inspection 2023 #2, Iqaluit, Nunavut (Concentric Associates International Incorporated, 2023), Dated July 23, 2023
- Lake Geraldine Dam, Dam Safety Inspection 2023 #3, Iqaluit, Nunavut (Concentric Associates International Incorporated, 2023), Dated August 24, 2023
- Lake Geraldine Dam, Dam Safety Inspection 2023 #4, Iqaluit, Nunavut (Concentric Associates International Incorporated, 2023), Dated October 4, 2023

The DSI reports outline several construction-related recommendations that are summarized in the 2023 Annual Water Licence Report including the following:

*1) Items deemed to be of an immediate need include:*

- a) Removal of the contaminated soil around the base of the hydro pole adjacent to the south berm.*
- b) Removal and replacement of the contaminated soil atop the center and north berms. The contractor undertaking the 2022 dam repairs has been directed to complete this work.*
- c) New rip-rap material should be installed within the upstream face of the north and center berms before the reservoir is re-filled. This work should be scheduled for the spring of 2024.*



- d) *Minor work will be required to repair erosion damage within the north access road and new steel culverts will need to be installed at the two locations where erosion is most active.*
- e) *Reinstate the cap on the piezometer at the South end of the spillway.*
- f) *The two sink holes observed on the top of the center berm should be excavated and examined to assess the depth of the sink hole after which the excavated area should be refilled and compacted in 12" lifts. Experts should be present to identify the possible cause and record the depth, size and potential impact on the berm.*
- g) *Outstanding deficiencies remaining to be corrected by Nunavut Excavation should be completed no later than the 2nd week of October 2023.*
- h) *The depressions at the base of the upstream face of the center and north berms should be repaired in the spring of 2024 when the water level is low.*
- 8) *Concentric conducted a delamination survey of the downstream elevation of the concrete dam on October 27, 2022, and subsequently issued a report of our findings and recommendations. Due to the minor delamination areas identified, a localized repair program should be conducted in 2025.*
- 9) *Repair of cracks within the concrete dam, this work is tentatively scheduled for summer 2024.*
- 10) *Repair of spalled concrete within the concrete dam, this work is tentatively scheduled for summer 2024.*
- 11) *The protective galvanized metal enclosure installed over the pipeline from the dam to the water treatment plant should be re-instated.*
- 12) *The metal posts/markers installed along the north side of the south access road should be re-instated.*
- 13) *The aggregate stockpiles maintained at the west side of the north berm should be replenished.*

Recommendation 1a) is related to contaminated soil that should be removed and has been deemed to be of an immediate need. This item has been ongoing since the 2022 Annual report. It is unclear when the City of Iqaluit will address this item.

Recommendation 1b) is related to contaminated soil that should be removed. The 2023 Annual Report states that *"the contractor undertaking the 2022 dam repairs has been directed to complete this work."* It is assumed that '2022' was a typo and this should have instead said '2023'. Based on the DSI 2023 #4 report dated October 4<sup>th</sup>, 2023, it does not appear that this item was addressed in 2023 (at least not before the DSI was conducted on October 4<sup>th</sup>, 2023). It is unclear if this item has been addressed or when the City of Iqaluit will address this item.



Recommendation 1c) was recommended in the 2023 DSI reports to be completed in the Spring of 2024. It is unclear if the City of Iqaluit is committed to completing this item in 2024.

Recommendation 1d). The City of Iqaluit has not provided a timeline for completion of this item.

Recommendations 1e) and 1f) appear to have been addressed.

Recommendation 1g) was recommended in the 2023 DSI reports to be completed no later than the 2<sup>nd</sup> week of October 2023. It is unclear if this item has been addressed or when the City of Iqaluit will address this item.

Recommendation 1h) was recommended in the 2023 DSI reports to be completed in the Spring of 2024. It is unclear if the City of Iqaluit is committed to completing this item in 2024.

Recommendation 8 was recommended in the 2023 DSI reports to be completed in 2025. It is unclear if the City of Iqaluit is committed to completing this item in 2025.

Recommendation 9 was recommended in the 2023 DSI reports and is tentatively scheduled for summer 2024. This item has been ongoing since the 2022 Annual report. It is unclear if the City of Iqaluit is committed to completing this item in 2024.

Recommendation 10 was recommended in the 2023 DSI reports and is tentatively scheduled for summer 2024. This item has been ongoing since the 2022 Annual report. It is unclear if the City of Iqaluit is committed to completing this item in 2024.

Recommendation 11 was recommended in the 2023 DSI reports. This item has been ongoing since the 2022 Annual report. It is unclear when the City of Iqaluit will address this item.

Recommendation 12 was recommended in the 2023 DSI reports. This item has been ongoing since the 2022 Annual report. It is unclear when the City of Iqaluit will address this item.

Recommendation 13 appears to have been addressed.

**Recommendation:**

(R-09a) CIRNAC recommends the City of Iqaluit provide a table in the 2023 Annual Report that lists the outstanding recommendations from the DSI reports. The table should list the DSI recommendations, list the proposed actions to address the recommendations and/or updates on continuing actions to address the recommendations, provide a column showing



the recommended timeline for completion of the recommendations (as stated in the DSI reports), and a column showing the date when the City intends to resolve the recommendations.

(R-09b) CIRNAC recommends the City of Iqaluit clarify the required timeline for completion of the following:

- a) Removal of the contaminated soil around the base of the hydro pole adjacent to the south berm.
- b) Removal and replacement of the contaminated soil atop the center and north berms.
- c) Installation of new rip-rap material within the upstream face of the north and center berms before the reservoir is re-filled.
- d) Minor work required to repair erosion damage within the north access road and new steel culverts.
- e) Outstanding deficiencies remaining to be corrected by Nunavut Excavation.
- f) Repair of the depressions at the base of the upstream face of the center and north berms.
- g) Repair of cracks within the concrete dam.

## **10. Dam Safety Inspection Reports – Engineering Studies/Investigations and Design Works**

### **Comment:**

In the 2023 Annual Water Licence Report, the City of Iqaluit states that they undertook Dam Safety Inspections (DSI) in 2023 and provided the following four DSI reports in Appendix A of the report:

- Lake Geraldine Dam, Dam Safety Inspection 2023 #1 Rev 1, Iqaluit, Nunavut (Concentric Associates International Incorporated, 2023), Dated June 8, 2023
- Lake Geraldine Dam, Dam Safety Inspection 2023 #2, Iqaluit, Nunavut (Concentric Associates International Incorporated, 2023), Dated July 23, 2023
- Lake Geraldine Dam, Dam Safety Inspection 2023 #3, Iqaluit, Nunavut (Concentric Associates International Incorporated, 2023), Dated August 24, 2023
- Lake Geraldine Dam, Dam Safety Inspection 2023 #4, Iqaluit, Nunavut (Concentric Associates International Incorporated, 2023), Dated October 4, 2023

The DSI reports outline several engineering studies/investigations and design works related recommendations that are summarized in the 2023 Annual Water Licence Report including the following:

- 2) *Updating of the permanent record file and its storage in a central location with an index that documents the date and contents of all records. The permanent record file needs to include:*
  - a) *As-built drawings and specification for work undertaken at the dam.*





- b) Weekly/monthly inspections completed by City staff.*
- c) Dam Safety Inspections and Dam Safety Reviews generated by third parties on behalf of the City of Iqaluit.*
- d) All maintenance records.*
- e) Correspondence with regulatory agencies.*
- f) Dam operation, maintenance, and surveillance documents.*
- g) Reports and documentation generated by third parties on behalf of the City of Iqaluit.*
- 3) Implement a public awareness program to educate and inform the public that:*
  - a) The dam and earthen berms are a no trespass area.*
  - b) Dog walkers should not allow their pets to travel atop and across the earthen berms due to the risk of (dog) fecal matter contamination of the potable water supply.*
  - c) ATV and skidoos should not be traveling atop the berms and across Lake Geraldine.*
- 4) The installation of video surveillance should be considered in the future.*
- 5) Exercising and testing of the valves within the valve chamber is required as part of preventative measures. The condition of the valves within the valve chamber at the base of the dam was previously identified as being in an advanced state of corrosion. To our knowledge no maintenance or testing has been completed on the controls valve in the last 10+ years. There is a significant potential for the valves to fail and not operate correctly when needed in an emergency. A study to address this issue is currently underway.*
- 6) Underwater survey of the concrete dam and spillway in 2024.*
- 7) Undertake a test opening on the downstream side of the concrete dam and center berm in late January – early February 2024 to ascertain the source of the water that forms large ice sheets within the valley in the winter months.*
- 14) The installation of video surveillance should be considered with a scheduled implementation in the next 5 years.*

Recommendation 2 was recommended in the 2023 DSI reports. This item has been ongoing since the 2022 Annual report. It is unclear when the City of Iqaluit will address this item. This recommendation is a critical component of an effective dam safety management system and should be addressed.

Recommendation 3 was recommended in the 2023 DSI reports. This item has been ongoing since the 2022 Annual report. It is unclear when the City of Iqaluit will address this item. This recommendation is critical for the safe operation of the dam and to help mitigate potential impacts to surface water quality (i.e., dog waste contamination of the potable water supply, or ATV falling into potable water supply) and should be addressed.



Recommendation 4 was recommended in the 2023 DSI reports with a scheduled implementation in the next 5 years. This item has been ongoing since the 2022 Annual report. It is unclear when the City of Iqaluit will address this item.

Recommendation 5 was recommended in the 2023 DSI reports, and it is stated that a study to address this issue is currently underway. This item has been ongoing since the 2022 Annual report. It is unclear when the study to address this issue will be completed, and when the City of Iqaluit will address this item.

Recommendation 6 was recommended in the 2023 DSI reports and is tentatively scheduled for 2024. This item has been ongoing since the 2022 Annual report. It is unclear if the City of Iqaluit is committed to completing this item in 2024.

Recommendation 7 was recommended in the 2023 DSI reports and suggested to be completed in late January – early February 2024. This item has been ongoing since the 2022 Annual report. It is unclear if the City of Iqaluit is committed to completing this item in late January – early February 2024.

Recommendation 14 is a duplicate of 4.

### **Recommendation:**

(R-10) CIRNAC recommends the City of Iqaluit provide a table in the Annual Reports that lists the outstanding recommendations from the DSI reports. In the table list the DSI recommendations, list the proposed actions to address the recommendations and/or updates on continuing actions to address the recommendations, provide a column showing the recommended timeline for completion of the recommendations (as stated in the DSI reports), and provide a column showing the date when the City intends to resolve the recommendations.

## **11. 2023 Sample Results**

### **Comment:**

2023 Potable Water Treatment Plant pH results (monthly laboratory samples) do not meet the Canadian Drinking Water Quality Guidelines of 7 to 10.5 for samples provided at IQA-01.

Several sets of results for TOC (July 2023, Sept 2023 as examples) show that treated water concentrations were equal to or greater than concentrations measured in the raw water, indicating that the GAC media is likely not removing TOC. This could be an indication that the GAC media is becoming exhausted for TOC removal. Further consideration/review is



recommended be completed to determine if GAC media exhausted for TOC still has capacity to remove hydrocarbons in the event hydrocarbons are present in the source water.

**Recommendation:**

(R-11a) CIRNAC recommends the City of Iqaluit advise if consideration has been given for exhaustion of GAC media and its ability to continue to remove hydrocarbons.

(R-11b) CIRNAC recommends the City of Iqaluit compile the lab results in an Appendix table with comparison to the applicable guidelines.

## **12. Water Treatment Plant Report**

**Comment:**

The dual media filters were upgraded to replace the existing anthracite/sand media with granular activated carbon in response to the petroleum hydrocarbon (PHC) event. While not stated in the report, it is assumed that the GAC media was selected for its ability to adsorb target parameters such as PHC. With adsorptive media such as GAC, the media over time reaches its adsorptive capacity and becomes exhausted. At this stage the filter media would act similarly to the dual media that the Water Treatment Plant had previously, with some limited adsorptive capacity. From the City of Iqaluit Return Service Plan, it is unclear if there are steps in place to evaluate the GAC capacity over time for removing PHC to determine if the media is reaching exhaustion.

**Recommendation:**

(R-12) CIRNAC recommends the City of Iqaluit provide information on how GAC capacity is being tracked and steps that are in place in the event that the GAC media has reached capacity and requires replacement.

## **13. 2023 Apex Pumping Final Report**

**Comment:**

The 2023 Apex Pumping Final Report includes discussions on exceedances and visualizations where pumping exceeded 10% of the instantaneous flow in Figure 4.2. However, the impact of these exceedances is not fully detailed, with the report merely stating that no harmful impacts were noted. This falls short of CIRNAC's 2022 recommendation (R-08b) to include a detailed discussion of observed trends, exceedances, and unanticipated impacts, especially when natural flow is below 30% of the mean annual discharge (MAD) and withdrawals exceed 10% of the instantaneous flow. The City had previously requested a meeting to collaborate with CIRNAC to determine the appropriate format and approach for



this discussion. It would be beneficial to follow up on this meeting to ensure comprehensive coverage of these aspects.

The demobilization process is briefly described in Section 5 of the 2023 Apex Pumping Final Report but lacks details on the monitoring and maintenance activities conducted post-season. The description of post-season activities, including equipment maintenance and site monitoring, is minimal.

**Recommendation:**

(R-13) CIRNAC recommends the City of Iqaluit provide a detailed analysis of the monitoring data that supports the conclusion of no harmful impacts, and provide information on the methods used to assess potential impacts and any specific observations or findings related to ecological effects.

**14. Chlorine and Bacteria Results from the WTP (2023)**

**Comment:**

2023 daily water quality results do not meet the CDWQG pH of 7 to 10.5.

The daily log sheets indicate that the UVT readings were consistently reported as 92.5% or 94%. This parameter normally should vary day to day as the source water changes, and consistent readings for several days at a time would be an indicator that the analyzer is not operating properly. This parameter is useful for tracking the performance of the GAC filter media.

In technical review of the 2022 Annual report, a request (R-03) was made to include the data from S::CAN in the 2023 Annual report submission. Response R-03b from the City indicated that it was not provided because the system has limited storage capacity. From the Appendix C Water Treatment Plant Report (section 3.1.4), it is mentioned that the data is stored internally as well as online which allows for review of current and historical PHC data.

**Recommendation:**

(R-14) CIRNAC recommends the City of Iqaluit complete the following:

- review the UVT analyzer performance to confirm the system is working as intended and provide an update, and
- provide sample results from S::CAN monitoring device located at the water treatment plant.

**15. 2024 Lake Geraldine Water Balance Assessment**



**Comment:**

CIRNAC's 2023 review of the Supplementary Lake Geraldine Water Balance Modelling for 2022 (WSP, 2023) found deficiencies in the calibration period and methodology. These items were addressed in the 2024 Lake Geraldine Water Balance Assessment Report (WSP, 2024).

It appears that the water balance model is focused on watershed (basin) yield, not on the hydraulic balance within the lake itself. There appears to be missing lake balance components such as lake evaporation and groundwater exchange. It is recommended that a full hydraulic lake balance model be developed or more information on the methodology be provided.

Lake bathymetry uncertainty was flagged as an important issue for water supply during CIRNAC's review of the 2022 Annual Report. The bathymetric survey and development of new stage-storage curve is still incomplete. While this may not affect the stage-storage curve near full service level, it could affect the calculation of lake volume residence time (inflow vs outflow).

The 2024 Lake Geraldine Water Balance Assessment Report (WSP) clarifies assumptions made regarding ice cover exerting pressure on water level levels. CIRNAC is in agreement that pressurization due to ice cover should be assumed to not influence water level measurements for the purpose of model validation.

In "*Table 2: Average (Arithmetic) Precipitation and Meteorological Surplus....*" the final row of "*November 1 to Freeze-Up (varies)*" has only 0.53 mm and 0.4 mm of precipitation and meteorological runoff, respectively. These are an order of magnitude different from rest of table. It is recommended that these values be checked for accuracy.

**Recommendation:**

(R-15) CIRNAC recommends the City of Iqaluit provide the following:

- A full hydraulic lake balance model or more information on the watershed runoff approach,
- Update the bathymetric survey and development of new stage-storage curve, and
- Check the values in Table 2 for accuracy.

**16. Concerns Raised in Inspection Reports**

**Comment:**

One inspection report was completed in 2023 on June 23. It identified the following action items:



1. The document indicates that there is hazardous waste present within the landfill, posing potential safety and environmental hazards.
2. There is an issue with blown away refuse, litter, and garbage found outside the landfill perimeter, including areas outside the fencing and nearby ditches, as well as across the road from the West 40 Landfill.

**Recommendation:**

(R-16) CIRNAC recommends the City of Iqaluit provide a response on how and when these concerns and non-compliances were rectified and required actions were completed. If any have not been addressed, provide a timeline for when they will be addressed.