Crown-Indigenous Relations and Northern Affairs Canada | Relations Couronne-Autochtones et Affaires du Nord Canada

Water Resources Division
Resource Management Directorate
Nunavut Regional Office
918 Nunavut Drive
Iqaluit, NU, X0A 3H0

Your file - Votre référence
3AM-IQA1626
Our file - Notre référence
GCDocs# 148337052

June 30, 2026

Richard Dwyer
Manager of Licensing
Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU, X0B 1J0
sent via e-mail: licensing@nwb-oen.ca

Re: Water Licence No: 3AM-IQA1626 Type A, City of Iqaluit; Renewal and Amendment Application by the City of Iqaluit – Technical Review

Dear Mr. Dwyer,

Thank you for the May 28, 2026, invitation to review the above-referenced Type A Water Licence Renewal and Amendment Application and supporting documentation by the City of Iqaluit for Water Licence No: 3AM-IQA1626.

Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) assessed the application 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*. Please find CIRNAC's Technical Review Memorandum for the Nunavut Water Board's consideration in the attached memorandum.

This review is based on the information submitted by the City of Iqaluit. Identified gaps in the information required to assess potential effects and proposed management measures have limited the scope of the review. CIRNAC has repeatedly requested the City to provide information on the potential effects of water use and waste disposal on surface water, groundwater, and soils. The requested information is needed for an integrated evaluation of the entire undertaking.

Fo any questions or concerns, please contact Michelle Blade at michelle.blade@rcaanc-cirnac.gc.ca or Andrew Keim at andrew.keim@rcaanc-cirnac.gc.ca.

Sincerely,

Andrew Keim , For…
Michelle Blade,
Regulatory and Science Advisor

Crown-Indigenous Relations and Northern Affairs Canada | Relations Couronne-Autochtones et Affaires du Nord Canada

Technical Review Memorandum

Date: June 30, 2026

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 Water Licence No: 3AM-IQA1626 Type A, City of Iqaluit; Renewal and Amendment Application**

Region: ☐ Kitikmeot ☐Kivalliq ☒Qikiqtani

A. BACKGROUND

The City of Iqaluit (City) was issued Water Licence No. 3AM-IQA1626 on June 17, 2016, for a 10-year period that expires June 16, 2026. 3AM-IQA1626 authorizes the following activities, works, and undertakings:

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

Since the Licence was issued in 2016, the City has applied for and received a series of amendments to the Licence up to amendment number 7.

Through the amendments, the quantity of water withdrawal permitted has increased from 1,100,000 m^3 extracted annually from the Lake Geraldine Reservoir, authorized under Water Licence No. 3AM-IQA1626 issued in 2016, to the current annual withdrawal limits:

- 2,000,000 m^3 from the Lake Geraldine Reservoir (Amendment 4, 2020)
- 500,000 m^3 from Niaqunguk River (Apex River) for transfer to Lake Geraldine Reservoir (Amendment 5, 2021)
- 2,500 m^3 from Imiqtarviviniq Lake (Dead Dog Lake) (Amendment 5, 2021)

The City submitted their Application on December 31, 2025; with an updated application on April 30, 2026; seeking both a 20-year license renewal and an amendment allowing the City to commence the Long Term Water Program. The Long Term Water Project is the City of Iqaluit's plan to accommodate increased water usage for the next 100 years, and is undergoing concurrent review by the Nunavut Impact Review Board (NIRB). The amendment proposal will include the following new infrastructure:

- New water intakes at Niaqunngut (Apex) River and Lake Qikiqtalik.
- A new reservoir immediately east of Lake Geraldine Reservoir.
- Pipelines to convey raw water between each water source and the new reservoir.
- A pipeline and outfall allowing for water transfer from the new reservoir to Lake Geraldine.
- All weather access roads between the new facilities.

Constructing these new facilities will require the development of several quarries, the use of heavy equipment and explosives, and the dewatering of multiple small unnamed lakes. The Application notes that the City plans to construct new facilities over the period of mid-2026 to October 2029.

A summary of the subjects of CIRNAC's Technical Comments and recommendations regarding the renewal and amendment application is provided in Table 1. Documents reviewed as part of this submission are listed in Table 2 of Section B. Detailed Technical Comments are provided in Section C.

Table 1: Summary of CIRNAC's Technical Review

Recommendation Number / Technical Comment Number	Subject	Status
TR-01	Predicted Environmental Effects and Proposed Mitigation Measures – Surface Water Quality and Dewatering	
TR-02	Predicted Environmental Effects and Proposed Mitigation Measures – Soil Contamination, Surface Water Quality, and Blasting	
TR-03	Predicted Environmental Effects and Proposed Mitigation Measures – Soil Contamination	

Recommendation Number / Technical Comment Number	Subject	Status
TR-04	Studies and Designs: Site Specific Data and Analysis to Support the Design and Management Decisions - Cascading Effects of Upstream Dam Structure Failures	
TR-05	Studies and Designs: Site Specific Data and Analysis to Support the Design and Management Decisions - Dam Safety Inspections / Dam Safety Review	
TR-06	Studies and Designs: Site Specific Data and Analysis to Support the Design and Management Decisions - Permafrost	
TR-07	Studies and Designs: Site Specific Data and Analysis to Support the Design and Management Decisions - Water Balance	
TR-08	Studies and Designs: Site Specific Data and Analysis to Support the Design and Management Decisions - Lake Qikiqtalik Volume and Withdrawal Guidance Values	
TR-09	Studies and Designs: Site Specific Data and Analysis to Support the Design and Management Decisions - Climate Projection Horizons	
TR-10	Annual Report Template - Water Quality Monitoring Data	
TR-11	Compliance Assessment – Potable Water and Sewage Lagoon	
TR-12	Seasonal Water Quality	
TR-13	Construction Monitoring	
TR-14	Operation and Maintenance Plans for Water Works	
TR-15	Temporary Storage of Waste Materials during Construction of the LTWP	
TR-16	Wastewater System Capacity	
TR-17	Spill Contingency and Emergency Response Plans	
TR-18	Proposed Modification to the Scope of the Current Water Licence – Wastewater Effluent Sampling Requirements	
TR-19	Monitoring Plans	
TR-20	Environmental Investigation Requirements	

B. DOCUMENTS REVIEWED

The following table (Table 2) provides a summary of the documents reviewed under the submission.

Table 2: Documents Reviewed

Document Title	Author, File No., Rev., Date
160617 3AM-IQA1626 Water Licence ONME	Nunavut Water Board, File 3AM-IQA1626, June 2016
250423 3AM-IQA1626 2025-04-23 NPC File No. 150798 [Long Term Water Project (LTWP)]-IMLE	Nunavut Planning Commission, File No. 150798, April 2025
260424-3AM-IQA---- Applic-Main-Doc	City of Iqaluit, Rev 01, April 24, 2026
260424-3AM-IQA---- Attach-01-NWB-Application-Form	City of Iqaluit, December 23, 2025
260424-3AM-IQA---- Attach-02a-NPC-Determination	Nunavut Planning Commission, NPC File No. 150798, April 23, 2025
260424-3AM-IQA---- Attach-02b-NPC-Determination	Nunavut Planning Commission, NPC File No. 151186, April 21, 2026
260424-3AM-IQA---- Attach-04-DFO-Advice	Fisheries and Oceans Canada, 23-HCAA-02636, March 25, 2024
260424-3AM-IQA---- Attach-05-SIG-Concordance	City of Iqaluit, Rev 01. April 24, 2026
260424-3AM-IQA---- Attach-07-Compliance-Assessment	City of Iqaluit, Rev 01. April 24, 2026
260424-3AM-IQA---- Attach-08-Lake-Geraldine-Dam-Safety-Review	Mitchelmore Consulting International Limited. Rev 1. February 17, 2025
260424-3AM-IQA---- Attach-09-Lake-Geraldine-Dam-Breach-Analysis	AMEC Environment & Infrastructure, May 2011
260424-3AM-IQA---- Attach-10-Lake-Geraldine-Intake-Replacement-Conceptual-Design	WSP, April 29, 2024
260424-3AM-IQA---- Attach-11 Water Treatment Plant O&M Manual	City of Iqaluit, April 2026
260424-3AM-IQA---- Attach-12-Lake-Geraldine-Water-Balance-2013	Golder Associates, August 20, 2013
260424-3AM-IQA---- Attach-13-Lake-Geraldine-Water-Balance-Update	WSP, November 12, 2025
260424-3AM-IQA---- Attach-14-LTWP-Site-Plans	Arcadis Canada Inc.; Rev 1; April 24, 2026

Document Title	Author, File No., Rev., Date
260424-3AM-IQA---- Attach-15-LTWP-Detailed-Design-Rpt	Arcadis Canada Inc.; January 17, 2026
260424-3AM-IQA---- Attach-16-LTWP-Detailed-Design-Rpt-Append-A-Detailed-Design-Drawings	Arcadis Canada Inc.; December 19, 2025
260424-3AM-IQA---- Attach-17-LTWP-Detailed-Design-Rpt-Append-B-Survey-Rpt	Arcadis Canada Inc., File No. 30192375, January 2024
260424-3AM-IQA---- Attach-18-LTWP-Detailed-Design-Rpt-Append-C-Geotech-Workplan	Arcadis Canada Inc., File No. 30192375, February 2024.
260424-3AM-IQA---- Attach-19-LTWP-Detailed-Design-Rpt-Append-D-Draft-Spec	City of Iqaluit; April 24, 2026
260424-3AM-IQA---- Attach-20-LTWP-Detailed-Design-Rpt-Append-E-Pump-Calcs	Arcadis Canada Inc., File No. 144081, August 28, 2024
260424-3AM-IQA---- Attach-21-LTWP-Detailed-Design-Rpt-Append-F-Pump-Curves	Xylem, File No. NP 3231/706 3~ 480, April 24, 2026
260424-3AM-IQA---- Attach-22-LTWP-Detailed-Design-Rpt-Append-G-Hydrology	Arcadis Canada Inc., File: No. 30192375, March 25, 2024.
260424-3AM-IQA---- Attach-23-LTWP-Detailed-Design-Rpt-Append-H-Liner-Memo	Arcadis Canada Inc., File: No. 30192375, October 20, 2023.
260424-3AM-IQA---- Attach-24-LTWP-Detailed-Design-Rpt-Append-I-Slope-Stability	Arcadis Canada Inc., File: No. 301192375, February 29, 2024.
260424-3AM-IQA---- Attach-25-LTWP-Detailed-Design-Rpt-Append-J-Blasting-Assessment	Explotech Engineering Limited, December 15, 2023.
260424-3AM-IQA---- Attach-26-LTWP-Detailed-Design-Rpt-Append-K-Facility-Manual	Arcadis Canada Inc., File: No. 30192375, March 22, 2024
260424-3AM-IQA---- Attach-28-LTWP-Detailed-Design-Rpt-Append-M-EMP	Arcadis Canada Inc., File: No. 30192375, September 2024.
260424-3AM-IQA---- Attach-29-LTWP-Detailed-Design-Rpt-Append-M-EPP	Arcadis Canada Inc., File: No. 30192375, September 2024
260424-3AM-IQA---- Attach-30-LTWP-Detailed-Design-Rpt-Append-M-ERP	Arcadis Canada Inc., File: No. 30192375, September 2024
260424-3AM-IQA---- Attach-31-LTWP-Detailed-Design-Rpt-Append-M-ESCP	Arcadis Canada Inc., File: No. 30192375, September 2024
260424-3AM-IQA---- Attach-32-LTWP-Detailed-Design-Rpt-Append-M-Climate-Lens	Arcadis Canada Inc., File: No. 30192375, April 2024

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Document Title	Author, File No., Rev., Date
260424-3AM-IQA---- Attach-34-Lake-Qikiqtalik-Water-Withdrawal-Study	Tetra Tech Canada Inc. File No: 704-ENG.WTRI03087-01, July 24, 2025
260424-3AM-IQA---- Attach-35-Lake-Qikiqtalik-WQ-Rpt	Nunami Stantec, File:144902884, October 1, 2019
260424-3AM-IQA---- Attach-36-Env-Screening-Rpt	Arcadis Canada Inc., File: No. 30192375, September 2025
260424-3AM-IQA---- Attach-37-Apex-River-Water-Withdrawal-Study	Tetra Tech Canada Inc. File No: 704-ENG.WTRI03087-01, Memo 1, July 24, 2025
260424-3AM-IQA---- Attach-38-Geotech-Report-Reservoir&Pipeline-Crossing	Arcadis Canada Inc., File: No. 30192375, August 2025
260424-3AM-IQA---- Attach-39-Aggregate-Sources-Assessment-Rpt	Arcadis Canada Inc., File: No. 30192375, May 16, 2025
260424-3AM-IQA---- Attach-42-Phase-I-ESA.	Arcadis Canada Inc., File: No. 30192375, April 2024
260424-3AM-IQA---- Attach-43a-WWTP-Arch-Stru-Civ-O&M-Manual	City of Iqaluit, April 24, 2020.
260424-3AM-IQA---- Attach-43b-WWTP-Process-O&M-Manual	City of Iqaluit, April 24, 2020.
260424-3AM-IQA---- Attach-43c-WWTP-Mech-O&M-Manual	City of Iqaluit, April 24, 2020.
260424-3AM-IQA---- Attach-43d-WWTP-EIC-O&M-Manual	City of Iqaluit, April 24, 2020.
260424-3AM-IQA---- Attach-43e-WWTP-Generator-O&M-Manual	Bluestar Power Systems Inc., November 1, 2019
260424-3AM-IQA---- Attach-44-WWTP-Redesign-Report	Nunami Stantec, November 27, 2017
260424-3AM-IQA---- Attach-45-Sewage-Lagoon-O&M-Manual	City of Iqaluit, Rev 8, April 24, 2026
260424-3AM-IQA---- Attach-46-Solid-Waste-Mgnt-Plan	City of Iqaluit, January 2014
260424-3AM-IQA---- Attach-47-West40-Landfill-O&M-Manual	AECOM, January 8, 2024
260424-3AM-IQA---- Attach-48-West40-Landfill-Decomissioning-TM	AECOM, January 2014

Document Title	Author, File No., Rev., Date
260424-3AM-IQA---- Attach-49-North40-Landfill-CSR	City of Iqaluit, December 19, 2025
260424-3AM-IQA---- Attach-50-Waste-Transfer-Station-CSR	City of Iqaluit, December 19, 2025
260424-3AM-IQA---- Attach-51-North40-Landfill-WTS-O&M-Manual	Dillion Consulting, Rev 6. August 2022
260424-3AM-IQA---- Attach-52-North40-Landfill-Leachate-Characteriz-Plan	Dillion Consulting, February 2, 2023
260424-3AM-IQA---- Attach-53-North40-Landfill-Closure-Plan	Dillion Consulting, August 2022
260424-3AM-IQA---- Attach-54-North-Landfill-WTS-EMP	Dillion Consulting, August 2022
260424-3AM-IQA---- Attach-55-North40-Landfill-WTS-EPP	Dillion Consulting, October 2020
260424-3AM-IQA---- Attach-56-Spill-Plan	City of Iqaluit, Rev 1, April 24, 2026
260424-3AM-IQA---- Attach-57-Apex-Site-Specific-Spill-Plan	Nunami Stantec, December 21, 2018
260424-3AM-IQA---- Attach-58-Env-Monitoring-QA-QC-Plan	City of Iqaluit, Rev 4, April 24, 2026
260424-3AM-IQA---- Attach-59-North-Landfill-WTS-Facility-Monitoring-Program	Dillion Consulting, December 2020,
260424-3AM-IQA---- Attach-60-Historical-Streamflow-Statistics-Apex-River	Stantec Consulting Ltd. Project/File: 144903621. August 20, 2025
260430 3AM-IQA1626 City of Iqaluit Table 1 - IR Responses-IMLE	City of Iqaluit, April 24, 2026
RE: NWB Technical Review of 2024 Annual Report for the City of Iqaluit; Water Licence No: 3AM-IQA1626	Nunavut Water Board (NWB), File: 3AM-IQA1626, November 20, 2025
Guide 7 - Licensee Requirements following the Issuance of a Water Licence	Nunavut Water Board (NWB), July 2015

C. CIRNAC TECHNICAL REVIEW COMMENTS AND RECOMMENDATIONS

1. Predicted Environmental Effects and Proposed Mitigation Measures – Surface Water Quality and Dewatering

Reference:

- City of Iqaluit. April 24, 2026. City of Iqaluit Type A Water Licence Amendment and Renewal Application
    - Attachment 29 – LTWP Detailed Design Report - Appendix M - Environmental Protection Plan (EPP)
    - Attachment 36 – Physical, Biological and Socioeconomic Screening Report, Long Term Water Project – Supply and Storage (PBSSR-LTWP)

Comment:

The application does not provide sufficient information to assess the effects of discharging pond dewatering effluent to the Niaqunnguk (Apex) River. The PBSSR-LTWP states that several ponds in the LTWP area (i.e., within the access road alignment and reservoir footprint) will be permanently dewatered. Each of the ponds will be dewatered during construction, with the water discharged such that it will runoff into the Niaqunguk (Apex) River. It is noted that these ponds were sampled in 2024 but *"the sampling parameters were those typically used to determine ecological potential and not for contaminants."* As a result, the application lacks the water quality characterization necessary to determine whether the proposed discharge could adversely affect the receiving environment, whether treatment would be required, and what discharge criteria and monitoring should apply.

The EPP and PBSSR-LTWP report list as a mitigation measure that a water treatment reservoir will be constructed to collect water from dewatering and construction areas, ensuring the removal of harmful substances, such as nitrogen compounds and sediment, before releasing the treated water into the natural environment. However, confirmatory sampling of surface water prior to discharge of such water to the Niaqunguk (Apex) River is not listed as a mitigation measure. Further, there are no discharge criteria (e.g., TSS, turbidity) or stop/trigger thresholds identified.

Surface water monitoring at the proposed water sources (i.e., Niaqunngut (Apex) River and Lake Qikiqtalik) during the construction and operation of the LTWP is not listed as a mitigation measure for water quality although the Application notes that the City will identify new surveillance network program (SNP) stations for the LTWP prior to the start of construction.

A mitigation measure listed in the EPP and the PBSSR-LTWP report is that an Erosion and Sediment Control Plan will be developed and implemented to effectively mitigate the

environmental impacts of erosion and sediment runoff. It is unknown what this Erosion and Sediment Control Plan will contain.

The EPP indicates that the environmental aspects for the LTWP were developed based on the Valued Environmental Components (VECs) identified in the Draft Physical, Biological and Socioeconomic Impact Assessment (PBSEIA) report dated November 2023, and in alignment with the Proponent's Guide – NIRB Technical Guide Series (February 2020). However, the November 2023 PBSEIA is now outdated. The most current version of the report is dated September 29, 2025, which includes updates to previously identified "unknown" impacts, as well as revised analyses and reporting.

Recommendation

(TR-01) CIRNAC recommends that the City of Iqaluit provide the following:

a) Confirmation of whether ponds have any known or suspected contaminant sources in their catchments or footprints
b) A monitoring plan for dewatering discharge (pre-discharge, during discharge, and downstream verification as appropriate) including discharge criteria
c) A plan for surface water monitoring during construction and operation, including for contaminants, with the number of samples and their general locations
d) Clarification on the content of the Erosion and Sediment Control Plan, including stockpile management
e) An updated EPP that considers changes made in the PBSSR-LTWP report

2. Predicted Environmental Effects and Proposed Mitigation Measures – Soil Contamination, Surface Water Quality, and Blasting

Reference:

- City of Iqaluit. April 24, 2026. City of Iqaluit Type A Water Licence Amendment and Renewal Application.
    - Attachment 25 – LTWP Detailed Design Report - Appendix J - Preliminary Blast Assessment
    - Attachment 29 – LTWP Detailed Design Report - Appendix M - Environmental Protection Plan (EPP)
    - Attachment 36 – Physical, Biological and Socioeconomic Screening Report, Long Term Water Project – Supply and Storage (PBSSR-LTWP)

Comment:

The application does not identify or assess the potential effects of blasting on surface water quality. While the PBSSR-LTWP states that ammonium nitrate fuel oil (ANFO) explosives will not be used, blasting activities will occur within the Project footprint, including in areas

that will be dewatered. The EPP does not identify a pathway of effects between blasting residue and soil or surface water quality.

The Blasting Assessment focuses on water overpressure but does not consider the potential for blasting-related residues (i.e., energetics) to affect soil and water quality. As a result, the application does not provide sufficient information to assess whether blasting activities could contribute to increases in parameters such as nitrogen compounds in runoff or dewatering effluent, and the potential effects on the receiving environment.

In the absence of this information, it is not possible to evaluate potential soil or water quality impacts associated with blasting or to determine whether specific mitigation, discharge criteria, or monitoring requirements are necessary.

Additional information is required to characterize the potential effects of blasting on water quality and to identify appropriate mitigation and monitoring measures.

Recommendation

(TR-02) CIRNAC recommends that the City of Iqaluit provide the following:

a) Identify the types of explosives to be used and their potential to generate residues that may affect soil or surface water quality
b) Describe the pathways by which blasting-related substances may enter surface water (e.g., runoff, seepage, or dewatering)
c) Assess the potential effects of these inputs on the receiving environment
d) Include mitigation measures to minimize the release of blasting-related contaminants to soil and surface water in the EPP

3. Predicted Environmental Effects and Proposed Mitigation Measures – Soil Contamination

Reference:

- City of Iqaluit. April 24, 2026. City of Iqaluit Type A Water Licence Amendment and Renewal Application.
    - Attachment 42 - LTWP Enhanced Phase I ESA

Comment:

While Arcadis completed an Enhanced Phase I Environmental Site Assessment (ESA) for the LTWP in 2023 and identified several Areas of Potential Environmental Concern (APECs), including the Iqaluit Shooting Range, the assessment did not fully consider the implications of reusing borrow material from these locations at other sites with different future land use designations.

Soil sampling at the Shooting Range identified lead concentrations exceeding the Government of Nunavut (GN) Tier 1 Residential/Parkland criterion (70 mg/kg), although below the Industrial criterion (260 mg/kg). The application of Industrial criteria at the source location is understood; however, if this material is excavated and reused during construction, the suitability of the receiving environment must be considered.

It is currently unclear whether the landfill would accept this lead-impacted soil as landfill disposal criteria have not been defined.

Recommendation

(TR-03) CIRNAC recommends that the City of Iqaluit provide the following:

a) Further investigation be conducted at the Shooting Range to delineate the extent of lead impacts prior to excavation or re-use of such soil
b) A reuse assessment be completed that considers the land use and exposure pathways at proposed placement locations, to ensure consistency with applicable GN soil quality criteria
c) In the absence of sufficient delineation or reuse analysis, soils from the Shooting Range and surrounding area be conservatively managed as contaminated and not reused in areas accessible to the public
d) The Proponent confirm whether the West 40 Landfill would accept this material, recognizing that landfill acceptance criteria have not been defined to date
e) Potential pathways for migration of lead-impacted material to nearby water bodies be evaluated and, if warranted, incorporated into mitigation and management measures

4. Studies and Designs: Site Specific Data and Analysis to Support the Design and Management Decisions - Cascading Effects of Upstream Dam Structure Failures

Reference:

- City of Iqaluit. April 24, 2026. City of Iqaluit Type A Water Licence Amendment and Renewal Application.
    - Attachment 8 – 2024 Dam Safety Review, Lake Geraldine Dam
    - Attachment 9 – Lake Geraldine Dam, Dam-Breach Analysis & Inundation Mapping Study

Comment:

The 2024 Dam Safety Review indicates that the Lake Geraldine Dam remains an Extreme Consequence dam based on Canadian Dam Association (CDA) Dam Safety Guidelines classification (2013). The review also notes that the inundation maps used to support this classification were developed in 2012 and have not been updated, although the downstream environment was considered generally comparable to conditions at the time those maps were prepared. The Dam Safety Review is focused specifically on Lake Geraldine Dam,

including a condition assessment, design adequacy, hydrotechnical review, freeboard, structural stability, instrumentation, and dam safety management. The review does not include an assessment of cascading effects arising from failure of dam structures as proposed upstream of Lake Geraldine.

The 2012 Dam Breach Analysis & Inundation Mapping Study evaluated hypothetical breach scenarios for the Lake Geraldine concrete dam/spillway and central berm, including breach hydrographs, mapped inundation extent, and infrastructure at risk. The objectives and methodology of that study are directed toward understanding the consequences of a Lake Geraldine Dam failure. The study does not include any upstream breach scenario, compounding failure scenario, or cascading failure assessment.

None of the documentation provided includes an assessment of cascading failure on the Lake Geraldine Dam from a dam break of the proposed structures upstream of Lake Geraldine included in the licence renewal application.

Recommendation:

(TR-04) CIRNAC recommends that the City of Iqaluit provide the following:

a) Clarification of whether failure of any proposed upstream dam structures, reservoirs, or other hydraulic controls could result in cascading effects at Lake Geraldine.
b) If such structures and/or scenarios exist, an assessment of the potential effects on Lake Geraldine Dam performance, reservoir conditions, flood routing, inundation, and consequence assessment.

5. Studies and Designs: Site Specific Data and Analysis to Support the Design and Management Decisions - Dam Safety Inspections / Dam Safety Review

Reference:

- City of Iqaluit. April 24, 2026. City of Iqaluit Type A Water Licence Amendment and Renewal Application.
    - Attachment 8 – 2024 Dam Safety Review, Lake Geraldine Dam
    - Attachment 9 – Lake Geraldine Dam, Dam-Breach Analysis & Inundation Mapping Study

Comment:

Dam Safety Inspections (DSI), and/or Dam Safety Reviews (DSR) are required to be completed each year for the Lake Geraldine water supply facility.

Twelve deficiencies from the 2024 DSI are noted in the 2024 DSR along with their recommended mitigations.

CIRNAC acknowledges that the City is monitoring thermistors and recognizes that temperature trends are important for permafrost/embankment thermal regime and seasonal stability considerations. However, monitoring only thermistors does not satisfy the full intent of data collection from installed instrumentation. From a dam safety perspective, pore pressure data that can be collected using a piezometer is typically the most direct early indicator of internal erosion potential, changing seepage gradients, and hydraulic response during reservoir level changes and freeze thaw cycles.

CIRNAC acknowledges the City has retained a third party to repair or relocate the Lake Geraldine intake valve, and that design in progress will be implemented in 2026. CIRNAC acknowledges that the City is "looking into" installing monitoring instrumentation at the spillway in 2026.

Recommendation:

(TR-05) CIRNAC recommends that the City of Iqaluit provide the following:

a) Report on the design progress and anticipated implementation of the Lake Geraldine intake valve
b) A detailed plan that describes how the identified deficiencies will be addressed within the timelines provided in the DSR and DSI

6. Studies and Designs: Site Specific Data and Analysis to Support the Design and Management Decisions - Permafrost

Reference:

- City of Iqaluit. April 24, 2026. City of Iqaluit Type A Water Licence Amendment and Renewal Application
    - Attachment 08 – Lake Geraldine Dam Safety Review
    - Attachment16 – LTWP Detailed Design Report – Appendix A – Drawings
    - Attachment 38 – LWTP Geotechnical Report

Comment:

Section 3.3.7 of the Application indicates that the dam and dykes will be founded on prepared bedrock surfaces, suggesting limited influence of permafrost on foundation conditions. However, the Application does not clearly demonstrate how permafrost dynamics have been considered over the long term. Reservoir impoundment is expected to result in thawing of underlying permafrost and development of a talik, including along reservoir margins, which may create potential seepage pathways beneath containment

structures or through adjacent terrain. The Application does not clearly indicate whether potential seepage losses associated with permafrost degradation have been evaluated, or how such risks would be managed.

Section 3.3.8.3 of the Application describes a buried, heated service corridor between the reservoir and Lake Geraldine. Available geotechnical information (Attachment 38) does not clearly demonstrate that this alignment has been fully characterized. While portions of the alignment may be founded on bedrock, localized fractured bedrock and/or thicker overburden may be present. The potential for permafrost degradation associated with the heated corridor, and the resulting risk of preferential seepage along or adjacent to the structure, are not clearly addressed.

In addition, the *Lake Geraldine Dam Safety Review* (Attachment 8) includes recommendations related to monitoring and potential permafrost impacts, including:

- implementation of additional monitoring (pore pressure, temperature, and displacement) at the spillway; and
- establishment of a performance monitoring program for existing instrumentation, including data management and reporting (e.g., dashboard development).

Section 3.1 of the Application indicates that deficiencies and associated deadlines were identified in the 2025 Dam Safety Review; however, the Application does not clearly describe the status of these recommendations or progress toward their implementation, nor how they have been incorporated into the proposed project design and monitoring framework.

Recommendation:

(TR-06) CIRNAC recommends that the City of Iqaluit provide the following:

a) Clarification of how permafrost conditions, including potential thaw and talik development associated with reservoir impoundment, have been considered in the design of the dam, dykes, and adjacent terrain
b) Assessment of the potential for seepage losses resulting from permafrost degradation beneath and adjacent to containment structures, and describe how such risks will be monitored, managed, and mitigated
c) Additional geotechnical characterization along the service corridor alignment, as required, to confirm subsurface conditions relevant to design and permafrost stability
d) Evaluation of the potential for permafrost degradation associated with the heated service corridor and its implications for seepage and structural performance, and description corresponding mitigation measures

e) Clear description of how investigative findings, design assumptions, and mitigation measures related to permafrost and seepage are integrated into construction and operational plans
f) An update on the status of Dam Safety Review recommendations (Attachment 8), including actions taken or planned with respect to the following:
    a. enhanced monitoring of pore pressure, temperature, and displacement at the spillway; and
    b. implementation of a performance monitoring program for existing instrumentation, including data management and reporting.
g) Confirmation of how these monitoring recommendations have been incorporated into the overall monitoring and adaptive management framework for the Project

7. Studies and Designs: Site Specific Data and Analysis to Support the Design and Management Decisions - Water Balance

Reference:

- City of Iqaluit. April 24, 2026. City of Iqaluit Type A Water Licence Amendment and Renewal Application
    - Attachment 12 – Lake Geraldine Water Balance Assessment
    - Attachment 13 – Lake Geraldine Water Balance Model Calibration Update – 2024 Refinement and Validation
    - Table 1 – City of Iqaluit Water Licence Renewal/Amendment Application Response to Initial Information Requests

Comment:

As part of the Completeness Assessment submitted to the City of Iqaluit on February 6, 2026, CIRNAC recommended that the City provide an updated Lake Geraldine Water Balance Model (Comment 2026-02-06-IR#08). In the City of Iqaluit's Table 1 – City of Iqaluit Water Licence Renewal/Amendment Application Response to Initial Information Requests document, the City indicated that Attachments 12 and 13 as part of the April 24, 2026 (Rev 1) application include the original Lake Geraldine Water Balance Model and associated updates. A review of this material indicates that an updated Lake Geraldine Water Balance Model, incorporating the most current available data, has not been provided. An updated water balance model is required under Part D, item 11, of the current licence at least 30 days prior to the start of water withdrawals from the Niaqunguk River (Apex River) at Monitoring Station No.: IQA-10. No updated water balance model has been submitted since new bathymetric data of Lake Geraldine was captured. The Attachment 13 – Lake Geraldine Water Balance Model Calibration Update – 2024 Refinement and Validation technical memorandum included in the Rev 1 application documents the recalibration and validation of the Lake Geraldine Reservoir Water Balance Model using the 2024 bathymetry data, and

does not include forecasting or reporting-year analysis. The technical memorandum does not assess projected 2025 reservoir conditions or forecast potential risk for the 2026 winter period.

The Lake Geraldine Water Balance Model Calibration Update report identifies gaps in available data and notes the potential influence of ice pressure, which was not considered in the calibration and validation process. The report notes: *"It is recommended to complete the identified data gaps, including daily water consumption and emergency pumping volumes from 2018 and 2019, to allow for an extended calibration period. Also, it is recommended to verify the potential impact of ice pressure on water level measurements during the lake's ice-covered period.*"

Recommendation:

(TR-07) CIRNAC recommends that the City of Iqaluit provide the following in accordance with previous recommendations:

a) An updated completion schedule for the Lake Geraldine Water Balance Model and submit the updated Water Balance Model report once it is finalized
b) An updated and recalibrated Lake Geraldine Water Balance Model to include water consumption data and emergency pumping volumes for 2018 and 2019
c) An updated and recalibrated Lake Geraldine Water Balance Model with verification of the potential impact of ice pressure on water level measurements during the lake's ice-covered period

8. Studies and Designs: Site Specific Data and Analysis to Support the Design and Management Decisions - Lake Qikiqtalik Volume and Withdrawal Guidance Values

Reference:

- City of Iqaluit. April 24, 2026. City of Iqaluit Type A Water Licence Amendment and Renewal Application
    - Attachment 36 Physical, Biological and Socioeconomic Screening Report, Long Term Water Project – Supply and Storage
    - Attachment 32 LTWP Lake Qikiqtalik Water Withdrawal Study

Comment:

The Water Withdrawal Study relies on Water Survey of Canada (WSC) hydrometric stations to estimate runoff and flow conditions; however, limitations in the underlying datasets introduce uncertainty that is not fully addressed.

- Station 10UH015 (“Apex River 1 km Above Bridge to Nowhere”) is identified as having intermittent data and lacking a sufficient period of record, yet is used to support the development of a synthetic dataset. The basis for this approach and the suitability of this station to represent watershed conditions are not clearly demonstrated.
- The dataset for Station 10UH002 was modified to exclude the period from 1973 to 1988 due to transition issues between manual and digital records. The implications of excluding this data on the robustness of the analysis, including model calibration and flow estimation, are not clearly described.

Collectively, the Application does not clearly demonstrate that the selected stations are representative of the study watershed in terms of physiography, storage characteristics, and permafrost conditions, as required to support the hydrologic analysis.

An inconsistency was noted in the Physical, Biological and Socioeconomic Screening Report, Long Term Water Project – Supply and Storage for Lake Qikiqtalik under ice volume. Volume is stated as 4,737,900 cubic metres on page 2-20 and 4,616,900 cubic metres on page 1 in section 2.2.4.3.

The LTWP Lake Qikiqtalik Water Withdrawal Study states median annual discharge of approximately 1,681,676 m³ and proposes a withdrawal of approximately 1,284,184 m³ as *“best estimate to use for planning”*. The report also states that “*We remain confident that 1,100,000 m³/yr per year previously presented should be used in the design of the proposed conveyance and storage systems”* while acknowledging the value *“could be closer to 1,300,000 m³.”*

Recommendation:

(TR-08) CIRNAC recommends that the City of Iqaluit provide the following:

a) A comparative assessment of physiography, watershed storage characteristics, and permafrost conditions among the selected WSC stations to demonstrate their suitability for estimating runoff and flow conditions for the Project
b) Description of the methodology used to develop the synthetic dataset for Station 10UH015, including assumptions, limitations, and associated uncertainties
c) Assessment of the implications of excluding the 1973–1988 dataset from Station 10UH002 on the hydrologic analysis
d) Confirmation of whether a sensitivity analysis of the model environmental assessment (MEA) or hydrologic model was completed to evaluate the influence of dataset exclusions and assumptions, and provide the results of such analysis. Reconcile the inconsistency and confirm the volume of Lake Qikiqtalik.
e) Clarification of the target withdrawal limit for Lake Qikiqtalik

9. Studies and Designs: Site Specific Data and Analysis to Support the Design and Management Decisions - Climate Projection Horizons

Reference:

- City of Iqaluit. April 24, 2026. City of Iqaluit Type A Water Licence Amendment and Renewal Application
    - ATTACHMENT 32 LTWP Detailed Design Report – Appendix M – Climate Lens Assessment.

Comment:

The project is expected to operate until 2128; however, the climate projections and risk assessment go up to the 2080s (2071–2100). The assessment does not clearly demonstrate that climate impacts have been evaluated over the full design life of the infrastructure.

Recommendation:

(TR-09) CIRNAC recommends that the City of Iqaluit extend the temporal scope of the climate projections and Climate Lens Assessment to align with the anticipated operational life of the project (i.e., to 2128), or provide clear justification demonstrating that the current projection horizon (2071–2100) is sufficient to characterize climate-related risks over the full design life of the infrastructure.

10. Annual Report Template - Water Quality Monitoring Data

Reference:

- City of Iqaluit. April 24, 2026. City of Iqaluit Type A Water Licence Amendment and Renewal Application.
    - Water Licence 3AM-IQA1626 - 2025 Annual Water Licence Report (City of Iqaluit, March 31, 2026)

Comment:

As part of the Completeness Assessment submitted to the City of Iqaluit on February 6, 2026, CIRNAC recommended that the City provide a revised Annual Report template that includes (i) a comparison of water quality data to predictions/standards for the annual reports and (ii) a section relevant to the NIRB screening within their annual report template (Comment 2026-02-06-IR#09).

In the City of Iqaluit's Table 1 – City of Iqaluit Water Licence Renewal/Amendment Application Response to Initial Information Requests document, the City responded to (i) that such a comparison was not possible as no predictions had been provided. However, in the current application, the effects of the Project on water quality are characterized as

negative and mitigable. This indicates that an effect prediction has been made, but the basis, magnitude, and parameters of this prediction are not defined. Clearly articulated predictions of impacts to water quality (e.g., expected changes in parameters, magnitude, spatial extent, and duration) should be made to establish a framework for comparing future monitoring results or to evaluate whether mitigation measures are effective.

In the City of Iqaluit's Table 1 – City of Iqaluit Water Licence Renewal/Amendment Application Response to Initial Information Requests document, the City responded to (ii) with a summary regarding the 2014 NIRB screening decision report. CIRNAC's Comment 2026-02-06-IR#09 was to provide a revised Annual Report template that includes a section relevant to the NIRB screening. The City's response does not address the request.

Recommendation:

(TR-10) CIRNAC recommends that the City of Iqaluit provide a revised Annual Report template that includes a comparison of water quality data to predictions/standards for the annual reports and a section relevant to the NIRB screening.

11. Compliance Assessment – Potable Water and Sewage Lagoon

Reference:

- City of Iqaluit. April 24, 2026. City of Iqaluit Type A Water Licence Amendment and Renewal Application.
    - Attachment 7- Compliance Assessment
- City of Iqaluit. April 24, 2026. City of Iqaluit Type A Water Licence Amendment and Renewal Application.
    - Application Main Document
- 160617 3AM-IQA1626 Water Licence ONME

Comment:

Part E item 1 of the Compliance Assessment states that *"the licensee is authorized to use the Sewage Lagoon Facility and the Wastewater Treatment Plant to treat and dispose of Wastewater Generated by the undertaking authorized under this Licence until such time that the Upgraded Wastewater Treatment Plant authorized by the Licensee is constructed and commissioned, or as otherwise approved by the Board in writing."* The Application indicates that the upgraded wastewater treatment plant has been constructed and commissioned; however, the sewage lagoon continues to be used for management of certain waste streams, including industrial (brewery) waste and WWTP sludge.

Table 2.2, item H of the Application main document indicates that the City is not requesting any changes to the Licence for the sewage lagoon. As presented, the Application does not clearly reconcile current lagoon use with existing licence wording.

Recommendation:
(TR-11) CIRNAC recommends that the City of Iqaluit provide the following:

a) Confirmation of the current and intended future role of the Sewage Lagoon, including whether it is to remain in operation (e.g., for industrial waste, sludge management, and/or contingency storage for the WWTP)
b) Request for amendments to the Water Licence, as required, to ensure that licence conditions accurately reflect current and proposed operations of the Sewage Lagoon

12. Seasonal Water Quality

Reference:

- City of Iqaluit. December 23, 2025. City of Iqaluit Type A Water Licence Amendment and Renewal Application.
    - Application Main Document
    - Attachment 36 – Physical, Biological and Socioeconomic Screening Report, Long Term Water Project – Supply and Storage (PBSSR-LTWP)
- Water License 3AM-IQA1626 Table 2 Water Quality Monitoring Criteria

Comment:
The reference document includes water quality sampling from a single sampling event (July 2024) for Lake Qikiqtalik rather than for each season and each source water.

Recommendation:
(TR-12) CIRNAC recommends that the City provide sampling results for relevant water quality parameters from each season and source water.

13. Construction Monitoring

Reference:

- City of Iqaluit. April 24, 2026. City of Iqaluit Type A Water Licence Amendment and Renewal Application.
    - Attachment 31 LTWP Preliminary Design Report – Appendix M – Erosion and Sediment Control Plan

Comment:
The Erosion and Sediment Control Plan identifies that inspections will be carried out by an Environmental Monitor; however, it does not establish quantitative monitoring parameters or define thresholds that would trigger corrective actions or remediation.

Recommendation:
(TR-13) CIRNAC recommends that the City of Iqaluit provide the following:

a) Identification of specific monitoring parameters (e.g., turbidity, total suspended solids) for construction activities
b) Definition of baseline conditions and established quantitative thresholds and/or duration criteria that would trigger corrective actions or remediation
c) Clear description of the scope and frequency of routine monitoring to ensure consistent implementation during construction

14. Operation and Maintenance Plans for Water Works

Reference:

- City of Iqaluit. April 24, 2026. City of Iqaluit Type A Water Licence Amendment and Renewal Application.
    - Application Main Document Section 8, table 8.1

Comment:
Table 8.1 identifies the existing plans and operation and maintenance manuals required under the current licence. It does not include an operation and maintenance plan for the Water Treatment Facility, as required under the current Licence (Part D, item 2), or details for the Lake Geraldine Dam/Intake. The Application did not include an operation and maintenance plan for the existing or proposed water works.

Recommendation:
(TR-14) CIRNAC recommends that the City of Iqaluit provide an operation and maintenance plan for the Water Treatment Facility and Lake Geraldine Intake.

15. Temporary Storage of Waste Materials during Construction of the LTWP

Reference:

- City of Iqaluit. April 24, 2026. City of Iqaluit Type A Water Licence Amendment and Renewal Application.

Comment:

Table 4.1 in the Application lists the types, projected amounts, and methods of disposal during LTWP construction. As an example, wood is to be disposed of at the City's landfill. It is not clear whether there are temporary measures for storing such waste at the construction site prior to final disposal (i.e., waste bins, stockpiles, etc.).

Recommendation

(TR-15) CIRNAC recommends that the City of Iqaluit clarify the temporary measures for storing such waste at the construction site prior to final disposal.

16. Wastewater System Capacity

Reference:

- City of Iqaluit. April 24, 2026. City of Iqaluit Type A Water Licence Amendment and Renewal Application.
    - Application Main Document
    - Table 1 IR Responses
    - Attachment 44 WWTP Redesign Report

Comment:

The Application refers to the WWTP Redesign Report (2017), which indicates that the facility has been designed to process up to 151 L/s (13,046 m³/d), corresponding to the forecasted peak hour flow for 2041. The same report identifies an average day demand in 2041 as 4,328 m³/d (50.3 L/s) and maximum day demand of 8,696 m³/d (60.4 L/s).

Wastewater treatment facilities are generally designed to convey peak hourly flows through hydraulic components without surcharge, treatment processes are generally sized based on average and maximum daily conditions, with peak flows assumed to occur over short durations and managed through storage and process resilience. Sustained operation at peak hourly flow rates may result in reduced treatment performance and effluent quality.

As presented, the Application does not clearly distinguish between hydraulic conveyance capacity and effective treatment capacity, nor does it identify the flow rate at which the facility is expected to reliably meet effluent quality objectives under long-term operating conditions.

Recommendation:

(TR-16) CIRNAC recommends that the City of Iqaluit provide the following:

a) Clarification of the basis for the reported WWTP capacity, including whether it reflects peak hourly flow, maximum day flow, or average day flow

b) Identification of the flow rate at which the treatment processes are designed to consistently achieve effluent quality requirements over sustained operating conditions
c) Update on the reported treatment capacity in the Application, as required, to distinguish between hydraulic conveyance capacity and effective treatment capacity

17. Spill Contingency and Emergency Response Plans

Reference:

- City of Iqaluit. April 24, 2026. City of Iqaluit Type A Water Licence Amendment and Renewal Application.
    - Attachment 18 - LTWP Detailed Design Report - Appendix C - Geotechnical Workplan - Appendix B – Emergency Spill Response Plan
    - Attachment 30 - LTWP Detailed Design Report - Appendix M - Emergency Response Plan
    - Attachment 47 - West 40 Landfill O&M Manual – Appendix G – Landfill Emergency Response Plan and Appendix H – Spill Contingency Plan
    - Attachment 51 - North 40 Landfill and Waste Transfer Station O&M Manual – Appendix B – Emergency Response Plan
    - Attachment 56 - Spill Contingency Plan
    - Attachment 57 - Apex River Water Withdrawal: Site Specific Spill Contingency Plan)

Comment:

Emergency response and spill contingency procedures are provided across multiple documents submitted with the City of Iqaluit Type A Water Licence Amendment and Renewal Application. Some documents are specific to investigative work (e.g., Attachment 18), whereas others apply to construction, or current or future site operations (e.g., Attachments 47, 51, 56 and 57). Where multiple documents address similar topics, including spill response, minor discrepancies among these documents introduce uncertainty for personnel, contractors, and other parties responsible for emergency response.

Attachment 56 - Spill Contingency Plan, Revision 1, dated April 24, 2026, appears to be the primary plan for spill response. Review of this document identified that the Safety Data Sheets (SDSs) included in Appendix D of this Plan reference additional chemicals (e.g., propylene glycol antifreeze and engine coolant, hydrofluorosilicic acid, sodium hypochlorite, and proprietary water treatment chemicals) that are not addressed within the body of the plan. In addition, while the plan addresses sewage spills associated with facilities such as

lift stations and lagoons, it does not address potential spills from the sewage force main, which fully buried and is not actively monitored.

Recommendation:

(TR-17) CIRNAC recommends that the City of Iqaluit provide the following:

a) Provide a single, consolidated Emergency Response and Spill Contingency Plan applicable to all activities and facilities under the Water Licence, or clearly specify within each document which plan governs in the event of overlap to ensure consistency and avoid conflicting direction.
b) Update Attachment 56 - Spill Contingency Plan to include within the body of the plan all chemicals identified in the SDSs, including applicable handling, response, and contingency measures
c) Expand the plan to address potential sewage spills from the sewage force main, including appropriate detection, response, and contingency measures given the absence of active monitoring.

18. Proposed Modification to the Scope of the Current Water Licence – Wastewater Effluent Sampling Requirements

Reference:

- City of Iqaluit. April 24, 2026. City of Iqaluit Type A Water Licence Amendment and Renewal Application.
    - Application Main Document
- 160617 3AM-IQA1626 Water Licence ONME

Comment:

Table 2.2 of the Application indicates that no changes are requested to monitoring requirements under the current licence. However, the existing wastewater effluent monitoring program requires monthly analysis of a broad suite of parameters, including a full ICP metals scan. While comprehensive, this approach is more consistent with detailed characterization programs than long-term operational monitoring.

Under a CCME-based framework, sampling programs are intended to provide data that is directly relevant to ecological risk characterization. Once key constituents of potential concern have been identified, ongoing monitoring programs should be refined to focus on those parameters that are demonstrably linked to treatment performance and environmental risk.

For the parameters currently required under the Effluent (E), Nutrients (N), and Biological (B) groups, continued routine monitoring at the current frequency is generally appropriate, as these parameters are known to vary over time and are directly relevant to effluent quality and potential effects on the receiving environment. For systems with predominantly domestic inputs, metals concentrations are typically stable, and frequent full-suite metals analysis may not be necessary to support compliance or risk-based environmental protection. As such, the current program does not clearly reflect a risk-based monitoring approach aligned with comparable municipal systems.

Under the current water licence, the wastewater treatment plant and sewage lagoon do not have wastewater effluent discharge requirements. This makes it difficult for the City to evaluate the treatment performance of each facility and to report effluent compliance.

Recommendation:

(TR-18) CIRNAC recommends that the City of Iqaluit provide the following:

a) A review of wastewater effluent monitoring requirements, including sampling frequency and analytical parameters, to align with a risk-based monitoring approach and practices applied to comparable municipal systems in Nunavut and elsewhere in Canada
b) Where changes are warranted based on the review, request corresponding amendments to the Water Licence
c) Identify effluent discharge quality requirements for monitoring treatment performance and effluent compliance

19. Monitoring Plans

Reference:

- City of Iqaluit. April 24, 2026. City of Iqaluit Type A Water Licence Amendment and Renewal Application.
    - Attachment 45 - Sewage Lagoon O&M Manual
    - Attachment 47 - West 40 Landfill O&M Manual
    - Attachment 50 - Waste Transfer Station Construction Summary Report
    - Attachment 51 - North 40 Landfill and Waste Transfer Station O&M Manual
    - Attachment 58 - Environmental Monitoring and Quality Assurance / Quality Control Plan
    - Attachment 59 - Facility Monitoring Plan - Landfill and Waste Transfer Station

Comment:

Monitoring requirements are described across multiple documents submitted with the City of Iqaluit Type A Water Licence Amendment and Renewal Application; however, these

requirements are not consistently presented. Variations in sampling frequency, analytical parameters, and field methods are noted among documents and, in some cases, within the same document.

For example, Attachment 45 - Sewage Lagoon O&M Manual states that sewage lagoon effluent is to be sampled during periods of low flow, while elsewhere in the document it specifies monthly sampling during periods of active flow. This differs from the current Water Licence, which requires sampling once prior to discharge, once during discharge, and once prior to completion of discharge.

Attachment 58 - Environmental Monitoring Program and Quality Assurance/Quality Control (QA/QC) Plan, Revision 4 (April 24, 2026) appears to be the primary monitoring plan; however, several updates and considerations are not reflected:

- Consideration of low-flow groundwater monitoring methods, which are recommended in the Landfill Facility Monitoring Plan (Attachment 59) but not incorporated into Attachment 58
- Field procedures to minimize sediment disturbance during surface water sampling
- Inclusion of equipment blanks, in addition to trip and field blanks.
- Explicit alignment of field procedures with recognized industry guidance (e.g., the Guidance Manual for Environmental Site Characterization in Support of Environmental and Human Health Risk Assessment by the CCME, 2016).
- Updating references to Canadian Environmental Quality Guidelines, noting that CCME guidelines are no longer maintained as a single consolidated document

In addition, baseline investigations completed by Dillon in 2019 at the proposed Water Treatment System (WTS) and North 40 Landfill identified exceedances for petroleum hydrocarbons (PHCs), polycyclic aromatic hydrocarbons (PAHs), and dissolved metals in soil and groundwater. Where such exceedances occur at locations subject to ongoing monitoring under the Water Licence, the Application does not identify whether follow-up investigation or remediation is required.

Further, it is noted that leachate monitoring at the North 40 Landfill is expected to include frequent initial sampling (e.g., weekly sampling, followed by monthly sampling if conditions stabilize), as well as seepage and soil sampling based on landfill performance, these components are not reflected in the current Water Licence requirements or proposed changes to the surveillance network program.

Recommendation:

(TR-19) CIRNAC recommends that the City of Iqaluit provide the following:

a) A single, consolidated Monitoring Plan applicable to all facilities and activities under the Water Licence. Alternatively, clearly identify within each document which plan governs in the event of overlap to ensure consistency and avoid conflicting requirements. If Attachment 58 is intended to serve as the consolidated plan, it should be updated to address the considerations outlined above.
b) Confirm that monitoring at the WTS and North 40 Landfill will be initiated in advance of commissioning to further characterize and assess previously identified soil and groundwater impacts. Where exceedances are identified at monitored stations, provide a framework for follow-up investigation and/or remediation, as applicable.

20. Environmental Investigation Requirements

Reference:

- City of Iqaluit. April 24, 2026. City of Iqaluit Type A Water Licence Amendment and Renewal Application
  - Attachment 18 - LTWP Detailed Design Report - Appendix C - Geotechnical Workplan
  - Attachment 29 - LTWP Detailed Design Report - Appendix M - Environmental Protection Plan
  - Attachment 38 - LTWP Geotechnical Report

Comment:

In addition to developing a monitoring plan, investigative activities undertaken in advance of construction should be presented in a consistent and integrated manner across all project documents. Methodologies, material handling practices, and mitigation measures described in supporting reports should be aligned to ensure a coherent and environmentally protective approach.

Discrepancies are noted between documents. For example, Attachment 18 - LTWP Detailed Design Report - Appendix C - Geotechnical Workplan indicates that drilling spoils will be used as borehole backfill or discharged locally. In contrast, Attachment 29 - LTWP Detailed Design Report - Appendix M - Environmental Protection Plan requires drill cuttings, fluids, and sludge to be contained, reused, or disposed of off-site to prevent their entry into any water body. These approaches are not consistent and should be reconciled.

Further, where environmental samples are collected as part of investigative work, analytical results should be evaluated against applicable regulatory or guideline criteria to support conclusions. For example, Attachment 38 - LTWP Geotechnical Report presents groundwater chemistry results and concludes that concentrations are “of no concern”;

however, it is not clear whether these results were compared to applicable criteria to support this conclusion.

Recommendation

(TR-20) CIRNAC recommends that the City of Iqaluit provide the following:

a) A single, consolidated plan or framework for investigative work that clearly defines methodologies, material handling procedures, mitigation measures, and applicable comparison criteria.
b) Alternatively, where multiple documents are maintained, clearly identify which document governs in the event of overlap to ensure consistency and avoid conflicting requirements.
c) Demonstrate that all environmental analytical results from investigative programs have been and will be evaluated against applicable regulatory or guideline criteria to support conclusions regarding environmental risk.
d) Clearly describe how investigative field activities will transition to construction activities, including identification of applicable mitigation measures (e.g., handling and disposal of drilling spoils, fluids, and potentially contaminated materials) to ensure consistency between investigative and construction-phase environmental management.