CITY OF IQALUIT

WATER LICENCE 3AM-IQA1626

2022 ANNUAL WATER LICENCE REPORT

April 28, 2023

EXECUTIVE SUMMARY

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

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

This Licence was issued by the Nunavut Water Board (NWB) in 2016 and expires on June 16, 2026. During the 2022 calendar year, the City obtained Amendment No. 7 (emergency) to it's water licence, as a result of a state of emergency declared due to low raw water levels in Lake Geraldine. The amendment was not implemented, as the City was able to supplement water from the Apex River via existing Amendment No. 4.

This Annual Water Licence Report summarizes the activities conducted by the City in 2022, pursuant to the requirements stipulated in Schedule B of the Licence.

Monitoring Program

The City continued to perform monitoring requirements as per the City's approved Environmental Monitoring Program and Quality Assurance/ Quality Control Plan (the Monitoring Plan).

Long-Term Water Supply and Storage

The City completed a high-level options analysis evaluation for the long-term supply strategy for the City raw water supplemental supply. The options analysis considered two (2) options – the Sylvia Grinnell River and Unnamed Lake. Through this analysis, and completed consultations with the local Hunter's and Trappers Assocation, Qikiiqtani Inuit Association, a recommendation was provided to and accepted by City Council to proceed with Unnamed Lake as the long-term option for supplementing the City's Lake Geraldine raw water reservoir. The City will begin with planning for further assessment, design development and initial permitting activities in 2023.

Niaqunguk River (Apex River) Supplementary Pumping Program

The City executed the replenishment of the Lake Geraldine Reservoir, via supplemental pumping of water from the Apex River. Pumping activities were completed between June 18, 2022 and September 18, 2022 (apart from between July 10 and July 23, 2022, when flows in the Niaqunguk River were below 30% of the Mean Annual Discharge. The City was granted emergency amendment No. 7 in order to supplement further raw water supply from Unnamed Lake, as a result of high water consumption volumes and dry weather conditions in the Niaqunguk River. The City did not exercise activities under Emergency Amendment No. 7, as it was able to acquire required volumes from the Apex River prior to the winter season.

A total of 419,324 m³ of water was pumped with maximum daily pumped volumes of 14,519 m³. The Lake Geraldine water level as of October 1, 2021 was recorded at 111.239 mASL.

Water Treatment Plant

The City continued water quality monitoring and sampling efforts, as per the City's Public Water Systems Monitoring and Reporting Plan – a plan which was developed and

implemented to petroleum hydrocarbon (PHC) contamination events in the City's municipal water distribution system.

In response to the 2021 WTP contamination event, the existing filter media material was removed and replaced with Granular Activated Carbon (GAC). Remediation and sealing of the concrete wall structures for the North Clearwell, South Clearwell, Mixing Chamber, Pumping Chamber, Backwash to Waste Chamber, and Surge Tank walls was completed. Lastly, two critical isolation valves located at the Mixing Chamber and South Clearwell were replaced in order to resume normal operation. Return to normal operation is being planned for April 2023, pending final review and approval from the Government of Nunavut.

Wastewater Treatment

In 2022, the City estimates that it discharged approximately 1,115,694 m^3 of effluent from the Wastewater Treatment Plant. It also estimates that it removed approximately 424 m^3 of sludge from the Wastewater Treatment Plant, which was deposited at the City's West 40 Landfill.

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.

Solid Waste Management

Construction of the new landfill began in the summer of 2022, along with the installation of the thermosyphon system supporting the foundation of the new Waste Transfer Station. The project has began the procurement of major long-lead equipment, such as the biomass boiler and conveyance systems.

The City continues to accept and manage waste at the West 40 Landfill – this will be continued until the construction of the new landfill and waste transfer station is completed in Q4-2024.

Lake Geraldine Dam

In 2022, the City completed concrete crack repairs, the installation of survey monuments and signage at the dam, and obtained a stockpile of riprap, granular and medium sized fill material to support annual maintenance related activities at the dam. The City also completed the installation of monitoring stations and data loggers (at the same location of the survey monuments) in order to monitor activities at the dam for asset integrity purposes. This work was initiated based on recommendations identified in previous DSI's.

The City will continue to advance necessary engineering studies and design assignments in 2023, in support of previous dam safety inspections. In addition, the City will continue to undertake continued concrete delamination and crack repair work.

ᐊᖏᔪᖅᑲᐅᑎᓄᑦ ᐅᓂᒃᑳᑦᓯᑦ ᐱᓪᓗᐊᑕᐅᔪᓂᑦ

ᒪᓕᑦᑐᑎᒃ ᐆᕕᖓ ᐃᒪᓕᕆᔪᓐᓇᐅᑎᒥᑦ ᓚᐃᓯᒥᑦ (Type A Water Licence 3AM-IQA1626) (ᓚᐃᓯ), ᓄᓇᓕᐸᐅᔭᐃᑦ ᐃᖃᓗᐃᑦ (ᓄᓇᓕᐸᐅᔭᒃᑯᑦ):

- ᐃᒥᖅᑕᐸᑦᑐᑦ ᐃᒥᖅᑕᕕᒻᒥᑦ ᓄᓇᓕᖕᓂ ᐊᑐᖅᑕᐅᔪᑦᓴᒥᑦ;
- ᐊᑦᓯᕕᒻᒥᑦ ᑭᓈᔪᒥᑦ ᐃᒥᕈᔪᒻᒥᑦ ᑯᕕᑎᑦᓯᕙᑦᑐᑦ ᑰᓕᐊᓇᐊᒥᑦ ᐊᑦᓯᕕᒻᒥᑦ; ᐊᒻᒪ
- ᑯᕕᑎᑦᓯᕙᑦᑐᑦ ᐃᒥᕈᔪᒻᒥᑦ ᓴᓂᕐᒥᑦ ᑰᓕᐊᓇᐊᒥ ᐃᒥᕈᔪᒻᒥᑦ ᐃᒋᑕᑦᓴᒥᑦ ᓴᓗᒻᒪᖅᓴᐃᕕᒻᒥᑦ ᐊᒻᒪ ᑭᖑᕝᕕᐅᑎᒥᑦ ᑭᓈᓗᓐᓄᑦ ᑕᖏᓗᒻᒥᑦ.

ᐅᓇ ᓚᐃᓯ 2016-ᖑᑎᓪᓗᒍ ᖃᐃᑕᐅᓚᐅᖅᑐᖅ ᓄᓇᕗᑦ ᐃᒪᓕᕆᓂᕐᒥᑦ ᑲᑎᒪᔨᓂᑦ ᐊᒻᒪ ᐃᓱᓕᕝᕕᑦᓴᖃᖅᑐᓂ ᔪᓂ 16, 2026. 2022-ᖑᓂᖓᓂ, ᓄᓇᓕᐸᐅᔭᒃᑯᑦ ᐱᑎᑕᐅᓚᐅᖅᑐᑦ ᐊᓯᔾᔨᐅᑎ 7-ᒥᑦ (ᑐᐊᕕᕐᓇᑐᒃᑯᑦ) ᐃᒥᓕᕆᔪᓐᓇᐅᑎᒥᓄᑦ ᓚᐃᓯᑎᒍᑦ, ᐱᔾᔪᑎᐅᓗᓂ ᑐᐊᕕᕐᓇᖅᑐᓕᕆᔾᔪᑎᐅᓚᐅᖅᑐᖅ ᐃᒪᑭᑦᓴᓕᕐᓂᖓᓄᑦ ᐃᒥᖅᑕᕐᕕᐅᑉ. ᐊᓯᔾᔨᐅᑎᐅᔪᖅ ᐱᒋᐊᖅᑎᑕᐅᓚᐅᖏᑦᑐᖅ, ᓄᓇᓕᐸᐅᔭᒃᑯᑦ ᐃᒥᖅᑕᕈᓐᓇᕐᓯᓚᐅᕐᒪᑕ ᓂᐊᕐᑯᖖᒎᑎᐅᑉ ᑰᖓᓂᑦ ᐊᑐᖅᑕᐅᓗᓂ ᐊᓯᔾᔨᐅᑎ 4 ᓯᓕ ᐊᑐᖅᑕᐅᔪᓐᓇᓚᐅᖅᑐᖅ.

ᐊᕐᕌᒍᑕᒫᕐᓯᐅᑎ ᐅᓇ ᐃᒥᓕᕆᔪᓐᓇᐅᑎ ᓚᐃᓯ ᐱᓪᓗᒍ ᐅᓂᒃᑳᓕᐊᖅ ᐱᓪᓗᐊᑕᖏᓐᓂᑦ ᐱᓯᒪᔪᖅ 2022-ᒥ ᖃᓄᐃᓕᐅᕈᑎᒋᓚᐅᖅᑕᖏᓐᓂᑦ ᓄᓇᓕᐸᐅᔭᒃᑯᑦ, ᒪᓕᑦᑕᐅᓗᑎᒃ ᒪᓕᒋᐊᓖᑦ ᑎᑎᕋᕐᓯᒪᔪᑦ ᐅᐃᒍ B ᓚᐃᓴᒧᑦ.

ᖃᐅᔨᓴᐃᓐᓇᓂᕐᒥᑦ ᐱᓕᕆᐊᑦᓴᖅ

ᓄᓇᓕᐸᐅᔭᒃᑯᑦ ᖃᐅᔨᓵᖃᐃᓐᓇᓚᐅᖅᑐᑦ ᒪᓕᑦᑕᐅᓗᑎᒃ ᐊᑐᖅᑕᐅᒋᐊᓖᑦ ᓄᓇᓕᐸᐅᔭᒃᑯᑦ ᐊᕙᑎᒥᑦ ᖃᐅᔨᓴᐃᓐᓇᓂᕐᒥᑦ ᐱᓕᕆᐊᑦᓴᖓᑦ ᐊᒻᒪ ᖃᓄᐃᖏᓐᓂᖓᓄᑦ ᓇᓗᓇᐃᔭᐃᑎᓂᑦ/ᖃᓄᐃᖏᓐᓂᖓᓂᑦ ᐊᐅᓚᑦᑎᔾᔪᑎᓂᑦ ᐸᕐᓇᐅᑎ (ᖃᐅᔨᓴᐃᓐᓇᓂᕐᒧᑦ ᐸᕐᓇᐅᑎ).

ᐊᑯᓂᐅᔪᒧᑦ ᐃᒥᖃᖅᑎᑦᑎᓂᖅ ᐊᒻᒪ ᓴᓂᕐᕗᐃᓯᒪᓂᖅ

ᓄᓇᓕᐸᐅᔭᒃᑯᑦ ᐱᔭᕇᓚᐅᖅᑐᑦ ᓇᓛᕿᑎᓕᕆᓪᓗᑎᒃ ᖃᐅᔨᓴᖅᑐᑎᒃ ᓇᓛᕿᑎᑦᓴᖏᓐᓂᑦ ᐊᑯᓂᐅᔪᒧᑦ ᐃᒥᖃᖅᑎᑦᓯᓂᕐᒨᖓᔪᓂᑦ ᐸᕐᓇᒍᑎᑦᓴᓂᑦ ᓄᓇᓕᐸᐅᔭᒃᑯᑦ ᐃᒥᖃᕐᕕᑦᓴᖏᓐᓄᑦ. ᓇᓛᕿᑎᓂᑦ ᖃᐅᔨᓴᐅᑎᒍᑦ ᐃᓱᒪᑦᓴᕐᓯᐅᕈᑎᖃᓚᐅᖅᑐᑦ ᒪᕐᕉᓐᓂᒃ (2) ᓇᓛᕿᑏᓐᓂᑦ - ᐃᖃᓗᐃᑦ ᑰᖓᓂᑦ ᐊᒻᒪ ᐊᑎᖃᖏᑦᑐᒥᑦ ᑕᓯᕐᒥᑦ. ᖃᐅᔨᓴᓚᐅᖅᑐᑎᒃ ᐊᒻᒪ ᑐᑭᓯᒋᐊᕈᑎᓕᕆᓚᐅᖅᑐᑎᒃ ᓄᓇᓕᖕᓂ ᐆᒪᔪᕐᓂᐊᑎᒃᑯᓐᓂᑦ, ᕿᑭᖅᑕᓂ ᐃᓄᐃᑦ ᑲᑐᔾᔨᖃᑎᒌᓂᑦ, ᐊᑐᕐᑯᔭᐅᔪᒥᑦ ᓴᖅᑮᓕᓚᐅᖅᑐᑦ ᐊᒻᒪ ᓈᒻᒪᒋᔭᐅᓗᓂ ᓄᓇᓕᐸᐅᔭᐃᑦ ᑲᑎᒪᔨᖏᓐᓄᑦ ᑲᔪᓯᒋᐊᕐᑯᔭᐅᓗᑎᒃ ᐊᑎᖃᖏᑦᑐᒥᑦ ᑕᓯᕐᒥᑦ ᐃᒥᖅᑕᕐᑯᔭᐅᓗᑎᒃ ᐊᑐᖅᑕᐅᓂᐊᕐᓗᓂ ᐊᑯᓂᐅᔪᒧᑦ ᐃᒥᖃᐅᑎᐅᓂᐊᕐᓗᓂ ᓄᓇᓕᐸᐅᔭᒃᑯᑦ ᐃᒥᖅᑕᕐᕕᖓᓂᑦ ᐃᑲᔫᑎᐅᓗᓂ. ᓄᓇᓕᐸᐅᔭᒃᑯᑦ ᐸᕐᓇᐅᑎᓕᐅᕆᐊᒌᓕᖅᑐᑦ ᖃᐅᔨᓴᒃᑲᓐᓂᕐᓗᑎᒃ, ᖃᓄᖅ ᓴᓇᔭᐅᒐᔭᕐᓂᖓᓄᑦ ᐅᐸᓗᖓᐃᔭᐃᓗᑎᒃ ᐊᒻᒪ ᓯᕗᓪᓕᐹᕐᓯᐅᑎᓂᑦ ᐆᕐᒥᑦᓕᕆᓗᑎᒃ ᐱᔪᓐᓇᐅᑎᑦᓴᓂᑦ ᖃᓄᐃᓕᐅᕈᑎᑦᓴᓄᑦ 2023-ᒥ.

ᓂᐊᕐᑯᖖᒎᑎᐅᑉ ᑰᖓᓂᑦ ᐃᒥᖅᑕᕐᓂᖅ ᒥᓪᓗᐊᕐᓯᓂᒃᑯᑦ ᐱᓕᕆᐊᑦᓴᖅ

ᓄᓇᓕᐸᐅᔭᒃᑯᑦ ᐃᒻᒪᐃᒋᐊᓯᓚᐅᖅᑐᑦ ᐃᒥᖅᑕᕕᒻᒥᑦ, ᒥᓪᓗᐊᑎᑦᓯᓪᓗᑎᒃ ᓂᐊᕐᑯᖖᒎᑎᐅᑉ ᑰᖓᓂᑦ. ᒥᓪᓗᐊᕆᓂᕐᒥᑦ ᐱᔭᕇᓚᐅᖅᑐᑦ ᐊᑯᓐᓂᖏᓐᓂ ᔪᓂ 18, 2022 ᐊᒻᒪ ᓯᑏᐱᕆ 18, 2022 (ᒥᓪᓗᐊᕿᑎᒃ ᐊᑯᓐᓂᖏᓐᓂ ᔪᓚᐃ 10 ᐊᒻᒪ ᔪᓚᐃ 23, 2022, ᓂᐊᕐᑯᖖᒎᑎᐅᑉ ᑰᖓ ᑰᖏᓗᐊᓕᓚᐅᕐᒪᑦ ᑐᖔᓃᑦᑐᓂ 30%-ᐳᓴᓐᑦ ᑰᓐᓂᕆᕙᑦᑕᖓᓂᑦ. ᓄᓇᓕᐸᐅᔭᒃᑯᑦ ᐱᑎᑕᐅᒍᓐᓇᓚᐅᖅᑐᑦ ᑐᐊᕕᕐᓇᖅᑐᖅ ᐱᓪᓗᒍ ᐊᓯᔾᔨᐅᑎᒥᑦ 7 ᐃᒥᖅᑕᕈᓐᓇᕈᒪᓪᓗᑎᒃ ᐊᑎᖃᖏᑦᑐᒥᑦ ᑕᓯᕐᒥᑦ, ᐱᔾᔪᑎᐅᓗᑎᒃ ᐃᒥᖅᑐᓗᐊᒐᓚᓕᓚᐅᖅᑐᑦ ᐊᒻᒪ ᓂᐊᕐᑯᖖᒎᑎᐅᑉ ᑰᖓ ᐃᒪᑭᓪᓕᓂᕆᓚᐅᖅᑕᖓ ᐱᓪᓗᒍ ᓯᓚᓗᓗᐊᖃᑦᑕᖏᓐᓂᖓ. ᓄᓇᓕᐸᐅᔭᒃᑯᑦ

ᖃᓄᐃᓕᐅᕈᑎᖃᓚᐅᖕᒥᑦᑐᑦ ᐊᑐᖅᑕᐅᓗᓂ ᑐᐊᕕᕐᓇᖅᑐᖅ ᐱᓪᓗᒍ ᐊᓯᔾᔨᐅᑎ 7, ᓂᐊᖁᖕᖑᑎᐅᑉ ᑰᖓᓂᑦ ᐃᒥᖅᑕᕈᓐᓇᕐᓯᓚᐅᕐᓂᖏᓐᓄᑦ ᓈᒻᒪᑦᑐᒥᑦ ᐅᑭᐅᓚᐅᖅᑎᓐᓇᒍ.

ᑲᑎᑦᑐᒍ 419,324 m^3 ᐃᒥᕐᒥᒃ ᒥᓪᓗᐊᕐᓯᒍᓐᓇᓚᐅᖅᑐᑦ ᖃᐅᑕᒫᑦ ᐊᖏᒑᖑᔪᓐᓇᖅᑐᒥᑦ ᒥᓪᓗᐊᕐᓯᕙᑦᑐᑎᒃ ᐃᒪᓐᓇᓂᒃ 14,519 m^3. ᐃᒥᖅᑕᕐᕕᐅᑉ ᐃᒪᖓ ᐃᑎᓂᖓ ᐋᑦᑑᑉ 1-ᒥ, 2021 ᓇᓗᓇᐃᖅᑕᐅᓯᒪᓚᐅᖅᑐᖅ ᐃᒪᓐᓇᐅᓂᖓᓄᑦ 111.239 mASL.

ᐃᒥᕐᒥᒃ ᓴᓗᒻᒪᖅᓴᐃᕕᒃ

ᓄᓇᓕᐸᐅᔭᒃᑯᑦ ᓱᓕ ᐃᒥᐅᑉ ᖃᓄᐃᓐᓂᖓᓂᑦ ᖃᐅᔨᓴᐃᓐᓇᖅᑐᑦ ᐊᒻᒪ ᐆᑦᑕᐃᖏᓐᓇᖅᑐᑎᒃ ᖃᓄᐃᓐᓂᖓᓂᑦ, ᒪᓕᑦᑐᑎᒃ ᓄᓇᓕᐸᐅᔭᒃᑯᑦ ᑭᒃᑯᑐᐃᓐᓇᕐᓂᑦ ᐃᒥᓕᕆᔾᔪᑎᓂᑦ ᖃᐅᔨᓴᐃᓐᓇᕆᐊᖃᕐᓂᖏᓐᓂᑦ ᐊᒻᒪ ᐅᓂᒃᑳᓕᐅᕈᑎᐅᕙᓪᓗᑎᒃ ᐸᕐᓇᐅᑎᒥᑦ - ᐸᕐᓇᐅᑎᐅᔪᖅ ᓴᓇᔭᐅᓚᐅᕐᓯᒪᔪᒥᓂᖅ ᐊᒻᒪ ᐱᒋᐊᖅᑎᑕᐅᓗᓂ ᐅᕐᓱᐊᓗᕈᔪᒻᒧᑦ ᓱᕈᑦᑕᐅᓚᐅᖅᑎᓪᓗᒍ ᐃᒥᖅ ᓄᓇᓕᐸᐅᔭᒃᑯᑦ ᓄᓇᓕᖏᓐᓂ ᐃᒥᓕᕆᔾᔪᑎᖏᑰᖅᐸᑦᑐᓂᑦ.

ᓴᖅᑭᕈᑎᐅᓗᑎᒃ 2021-ᒥ ᐃᒥᕐᒧᑦ ᓴᓗᒻᒪᖅᓴᐃᕕᒃ ᓱᕈᑦᑕᐅᓚᐅᖅᑎᓪᓗᒍ, ᐊᑐᖅᑕᐅᓚᐅᖅᑐᑦ ᑲᖕᖙᑎᑦᑎᓯᔾᔪᑎᖏᑦ ᐲᖅᑕᐅᓚᐅᖅᑐᑦ ᐊᒻᒪ ᑭᖑᕝᕕᑕᐅᓗᑎᒃ ᑐᐊᐸᓄᑦ ᐲᔭᐃᔪᓐᓇᖅᑐᓂᑦ ᓱᕈᓐᓇᖅᑐᓂᑦ ᐸᐅᕈᔪᓐᓂᑦ. ᐱᔭᓐᓃᖅᑕᐅᓗᑎᒃ ᓴᓇᔭᐅᒋᐊᓚᐅᖅᑐᑦ ᐊᒻᒪ ᓯᒻᒥᑦᑐᑕᐅᓗᑎᒃ ᖁᐊᖅᑕᖅᑐᑦ ᐊᑭᓐᓇᖏᑦ ᐅᐊᖕᓇᖓᓂ ᐃᒥᒃᑯᕕᐅᑉ, ᓂᒋᐊᓂ ᐃᒥᒃᑯᕕᐅᑉ, ᐃᓚᐅᕈᑎᓕᕆᔾᔪᑎᖓ, ᒥᓪᓗᐊᕈᑎᖃᕐᕕᖓ, ᑭᖑᕝᕖᕕᖓ ᓴᓂᖃᕐᕕᒻᒧᑦ, ᐊᒻᒪ ᑯᕕᔾᔪᑎᖏᓐᓂ ᐊᑭᓐᓇᐃᑦ. ᑭᖑᓪᓕᖅᐹᒥ, ᒪᕐᕉᓐᓂᒃ ᐊᑐᖅᑐᒻᒪᓃᓐᓂᒃ ᑯᕕᔾᔪᑏᓐᓂᒃ ᐃᓚᐅᕈᑎᖃᕐᕕᖏᓐᓃᖅᑑᓐᓂᒃ ᐊᒻᒪ ᓂᒋᐊᓂ ᑭᖑᕝᕕᖅᑕᐅᓚᐅᖅᑑᒃ ᐱᐅᓯᖏᓐᓂᑦ ᐊᐅᓚᑕᐅᔪᓐᓇᖁᓗᒍ ᐱᓕᕆᔾᔪᑎ. ᐃᐳᑭ 2023 ᐱᐅᓯᖏᓐᓄᑦ ᐅᑎᔾᔭᖕᖚᕆᔭᐅᔪᖅ ᐱᓕᕆᔾᔪᑎ ᐸᕐᓇᐅᑕᐅᓗᓂ, ᑭᖑᓪᓕᖅᐹᕐᓯᐅᑎᒥᑦ ᖃᐅᔨᓴᖅᑕᐅᓚᐅᖅᑎᓪᓗᒍ ᐊᒻᒪ ᑲᔪᓯᑎᑕᐅᓚᐅᖅᑎᓪᓗᒍ ᐊᑐᕈᓐᓇᓕᕐᓂᖓᓄᑦ ᒐᕙᒪᒃᑯᖏᓐᓂᑦ ᓄᓇᕘᑉ.

ᐃᒥᕈᔪᒻᒥᑦ ᐃᒋᑕᑦᓴᒥᑦ ᓴᓗᒻᒪᖅᓴᐃᓂᖅ

2022-ᒥ, ᓄᓇᓕᐸᐅᔭᒃᑯᑦ ᓇᓚᐅᑦᑖᓚᐅᖅᑐᑦ ᑯᕕᓯᓯᒪᓂᕐᒥᓂᒃ ᐃᒪᓐᓇᓂᒃ 1,115,913 m^3 ᑭᓈᒥᓂᕐᓂᒃ ᐃᒥᕈᔪᒻᒥᑦ ᐃᒋᑕᑦᓴᒥᑦ ᓴᓗᒻᒪᖅᓴᐃᕕᒻᒥᑦ. ᓇᓚᐅᑦᑖᕐᓯᒪᒻᒥᔪᑦ ᐲᕐᓯᓯᒪᓂᕐᒥᓂᒃ ᐃᒪᓐᓇᓂᒃ 14,976 m^3 ᑲᖕᖙᒥᓂᕐᓂᒃ ᑕᖏᓕᓐᓂᑦ ᐃᒥᕈᔪᒻᒥᑦ ᐃᒋᑕᑦᓴᒥᑦ ᓴᓗᒻᒪᖅᓴᐃᕕᒻᒥᑦ, ᐃᒋᑕᐅᓚᐅᖅᑐᓂᑦ ᓄᓇᓕᐸᐅᔭᒃᑯᑦ ᑰᓕᐊᓇᐊᒥ ᐊᑦᓯᕕᖓᓄᑦ.

ᐱᔭᓃᕈᑎ ᓇᓗᓇᐃᔭᐃᑎ ᑭᖑᓪᓕᖅᐹᖅ ᓄᓇᓕᐸᐅᔭᒃᑯᓐᓅᖅᑕᐅᓚᐅᖅᑐᖅ ᒫᕐᓯ 2022 ᓴᓇᔭᐅᒋᐊᓕᓐᓄᑦ ᐊᑦᑐᐊᔪᓂᑦ ᐃᒥᕈᔪᒻᒥᑦ ᐃᒋᑕᑦᓴᒥᑦ ᓴᓗᒻᒪᖅᓴᐃᕕᒻᒥᑦ ᓴᓇᒋᐊᕈᑎᑦᓴᓄᑦ. ᐃᒥᕈᔪᒻᒥᑦ ᐃᒋᑕᑦᓴᒥᑦ ᓴᓗᒻᒪᖅᓴᐃᕕᒃ ᐱᓕᕆᕝᕕᐅᕙᑦᑐᖅ; ᑭᓯᐊᓂᓕ, ᐃᓚᖏᑦ ᓱᕋᒃᐸᓪᓕᑦᑐᑦ ᓱᓕ ᐊᒻᒪ ᖃᐅᔨᓴᖅᑕᐅᕙᑦᑐᑎᒃ ᓱᕋᖕᓂᐅᓴᓕᖕᖏᒃᑲᓗᐊᕐᒪᖔᑕ ᐃᓚᖏᑦ.

ᑎᓯᔪᓂᑦ ᓴᓂᕐᓂᒃ ᐊᐅᓚᑦᑎᓂᖅ

ᓴᓇᔭᐅᒋᐊᓕᓚᐅᖅᑐᖅ ᓄᑖᖅ ᐊᑦᓯᕕᑦᓴᖅ ᐊᐅᔭᖓᓂ 2022, ᐋᖅᑭᑦᑕᐅᒥᓪᓗᑎᒃ ᐆᓇᐃᓐᓇᕐᓂᖓᓄᑦ ᐱᓕᕆᔾᔪᑎᐅᔪᑦ ᐃᑲᔪᕐᓯᐃᔾᔪᑎᐅᔪᑦ ᑐᖕᖓᕕᖓᓂ ᓴᓂᓕᕆᕝᕕᐅᑉ. ᐱᓕᕆᐊᑦᓴᖅ ᐱᒋᐊᕐᓯᒪᓕᖅᑐᖅ ᓂᐅᕕᐊᖑᕙᓪᓕᐊᓕᖅᑐᑎᒃ ᐱᒻᒪᕆᐅᓂᖏᑦ ᓴᕕᖁᔭᑯᑖᑦ ᓱᓇᒃᑯᑖᑦᓴᖏᑦ, ᑰᕐᓗ ᐊᖏᔪᖅ ᐳᐊᓗᖓ ᐊᒻᒪ ᐊᐅᓚᑦᑎᔾᔪᑎᑦᓴᖏᑦ ᐱᓕᕆᔾᔪᑏᑦ.

ᓄᓇᓕᐸᐅᔭᒃᑯᑦ ᐊᑦᓯᕕᖓᑦ ᓱᓕ ᐃᒋᑦᓯᕕᐅᕙᑦᑐᓂᑦ ᐊᐅᓚᑦᑐᐊᕙᑦᑐᓂᑦ ᑰᓕᐊᓇᐊᒥ ᐊᑦᓯᕕᒻᒥ - ᑕᒪᓐᓇ ᑲᔪᓯᓂᐊᖅᑐᖅ ᓄᑖᖅ ᐊᑦᓯᕕᑦᓴᖅ ᐊᒻᒪ ᓴᓂᓕᕆᕝᕕᑦᓴᖅ ᐱᔭᓐᓂᖅᑕᐅᓇᓱᐊᕐᓂᖓᓂ ᑕᖅᑭᓂ ᑭᖑᓪᓕᖅᐹᓕᖓᓂ 2024.

ᐃᒥᖅᑕᕐᕕᐅᑉ ᓴᐴᓗᑎᖓ

2022-ᒥ, ᓄᓇᓕᐸᐅᓴᓯᑦ ᐱᓴᓱᓪᓚᐅᖅᑐᑦ ᓯᕐᓂᓯᒪᓂᖏᓐᓂᓪᓂ ᓴᓇᓂᕆᑦ, ᖃᐅᔨᓴᐅᑎᑦᓴᓂᓪᓂ ᐋᖅᑭᑦᓯᐃᓚᑎᑲ ᐊᒻᒪ ᑎᑎᕐᓂᓯᒪᔪᓂᓪᓂ ᓴᐃᓗᓕᑦ, ᐊᒻᒪ ᐃᓚᓪᓕᕐᓂᓯᐃᑦᔨᐸᑎᑦᓴᓂᓪᓂ ᓯᓇᑐᐃᓐᓇᖅᓂᓪᓂ, ᑐᐊᐸᓂᓪᓂ ᐊᒻᒪ ᐊᑯᓐᓇᖏᑦᓂᓪᓂ ᐃᑲᔪᓯᐃᑦᔨᐸᑎᑦᓴᓂᓪᓂ ᐊᖏᕐᕋᔨᒫᖅ ᖃᐅᔨᓴᐅᑎᓄᓪᓂ ᖃᓄᐃᓕᖏᓐᓄᖅ ᓴᐃᓗᑐᑦ. ᓄᓇᓕᐸᐅᓴᓯᑦ ᐱᓴᓱᓪᓚᐅᖅᑎᒋᔪᓂ ᐋᖅᑭᑦᓯᐃᓚᐅᖅᑎᑦᓴᓂᓪᓂ ᐊᒻᒪ ᐱᓕᓀᐸᐃᑦᓴᓂᓪᓂ (ᑕᐃᑲᓂᕆᐃᓐᓇᖅ ᖃᐅᔨᓴᐅᑎᖓᓕᒃ ᐃᓂᖓᓄᓪ) ᖃᐅᔨᓴᖅᑕᐅᕐᓯᓚᑦᓂᓪᓂ ᖃᓄᐃᓕᓚᐅᑭᐅᓂᐊᖅᑐᑦ ᓴᐃᓗᑐᑦ ᐱᓴᓱᓪᓚᐅᖅᑎᑦᓴᓂᓪᓂ ᐱᐸᐃᑎᖃᕆᓂᖅ. ᐱᓕᓀᐊᑦᓴᖅ ᐱᒋᐊᖅᑎᑕᐅᓕᐅᖅᑐᖅ ᒪᓕᑦᑕᐅᓚᑎᑲ ᐊᑐᖅᑕᐅᔨᒪᔪᓂ ᓇᓚᓇᐃᓴᖅᑕᐅᔨᒪᔪᓂ ᔨᐳᓕᓕᓐᓂ ᓴᐃᓗᑐᑦ ᖃᐅᔨᓴᐅᑎᓂᓪᓂ.

ᓄᓇᓕᐸᐅᓴᓯᑦ ᑲᔪᓯᓴᓇᓂᐊᖅᑐᑦ ᖃᐅᔨᒪᔨᑕᐃᑦ ᓴᓇᒋᐊᓕᑐᓂᓪᓂ ᖃᐅᔨᓴᖅᑎᑕᐅᐳᓕᓚᑎᑲ ᐊᒻᒪ ᖃᓄᖅ ᓴᓇᔨᒪᓂᐊᕐᓂᖓᓄᓪᓂ ᐱᓕᓀᐊᑦᓴᓂᓪᓂ 2023-ᒥ, ᐃᑲᔪᓯᐃᑦᔨᐸᑎᒋᓕᒋᑦ ᓴᐃᓗᑐᑦ ᖃᐅᔨᓴᐅᑎᐅᓕᐅᖅᑐᑦ ᐊᑦᑕᓇᓴᐃᓄᖅᑎᒋᑐᓂᓪᓂ. ᐊᒻᒪᑦᑕᐅᖅ, ᓄᓇᓕᐸᐅᓴᓯᑦ ᐱᓕᓀᐊᖃᐃᓇᓂᐊᖅᑐᑦ ᕿᐸᐊᖅᑕᖅᑐᖓᒍᑕ ᖃᓄᐃᓕᓂᖓᓂᓪᓂ ᐊᒻᒪ ᓴᓇᒋᐊᖃᓄᖅᑐᒋᓂᓪᓂ ᓴᓇᓭᓕᑐᓂᖅ.

INTRODUCTION

In June 2016, the City of Iqaluit (the City) was issued Water Licence number 3AM-IQA1626 (the Licence) by the Nunavut Water Board (NWB). This licence was issued for a ten-year period concluding in June 2026. The City has been granted seven (7) amendments to its licence so far to date, the last being an emergency Amendment No. 7 in 2022 due to a State of Emergency declared by the Territorial Government.

A requirement of the Licence is an annual report due March 31 of each year, summarizing activities governed by the Licence for the previous calendar year. The City was granted an extension on the submission of the 2022 Annual Report until April 28, 2023. In accordance with Schedule B of the Water Licence, this Annual Water Licence Report summarizes the activities conducted by the City of Iqaluit in 2022.

ANALYSIS

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

Table 1 summarizes the estimated monthly and annual quantities of water drawn from Lake Geraldine, the City of Iqaluit's raw water source. The total water usage for 2022 was 1,238,380 cubic metres, which is below the maximum allowable withdrawal allowance of 2,000,000 cubic metres (amended withdrawal allowance, as per Amendment No. 4).

Table 1 2022 Raw Water Drawn from Lake Geraldine Reservoir

Month	Volume (m^3)
January	105,520
February	101,500
March	118,610
April	111,037
May	126,059
June	113,603
July	93,571
August	87,797
September	84,980
October	98,539
November	99,268
December	97,896
Total	**1,238,380**

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

No effluent was discharged from the Sewage Lagoon to Frobisher Bay (Station ID IQA-02) between January 1, 2022 and December 31, 2022.

A total volume of 1,115,913 cubic metres of effluent was discharged from the City's WWTP to Frobisher Bay (Station ID IQA-04) in 2022. As summary of this is presented in Table 2.

Table 2 IQA-04 – Discharge from the WWTP in 2022

Month	Volume (m^3)
January	100,258
February	97,232
March	112,641
April	70,357
May	88,914
June	107,975
July	88,914
August	83,378
September	85,363
October	93,601
November	94,229
December	93,052
Total	**1,115,913**

A total volume of 1,500 cubic metres of effluent was discharged from West 40 Landfill Pond #2 to the environment (Station ID IQA-08). The effluent was discharged from Pond #2 to the environment between August 22, 2022 to August 26, 2022. Testing was completed at the start and at the end of the discharge period.

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

The City undertook Dam Safety Inspections (DSI) in 2022, as per requirements of the Canadian Dam Association (CDA) *Dam Safety Guidelines*. Four (4) separate inspections were conducted between April and September 2022. A Dam Safety Review (DSR) was not completed in 2022, as one was previously completed in 2021. The requirement for a DSR is every five (5) years as part CDA guidelines.

Details of the DSI's are highlighted below.

Lake Geraldine Dam Safety Inspection

Concentric Associates International Inc. was retained to conduct a Dam Safety Inspection in 2022. Four (4) inspections were completed April 28, 2022, June 22,

2022, August 4, 2022, and September 29, 2022. The purpose of the DSI is to assist the City by identifying any visual changes in the condition of the dam, identifying any new concerns, and making recommendations on maintenance, repairs, or further investigations. It is conducted in order to ensure adherence to the Canadian Dam Safety Guidelines.

The DSI produced the following recommendations:

- Items deemed to be of an urgent need include:
    - The contaminated soil around the base of the hydro pole adjacent to the south berm should be removed.
    - Replace stockpile material that Nunavut Excavating (contractor) used.
- 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:
    - As-built drawings and specification for work undertaken at the dam.
    - Weekly/ monthly inspections completed by City staff.
    - Dam Safety Inspections and Dam Safety Reviews generated by third parties on behalf of the City of Iqaluit.
    - All maintenance records.
    - Correspondence with regulatory agencies.
    - Dam operation, maintenance, and surveillance documents.
    - Reports and documentation generated by third parties on behalf of the City of Iqaluit.
- Implement a public awareness program to educate and inform the public that:
    - The dam and earthen berms are a "*no trespass area*."
    - Dog walkers should not allow their pets to travel atop and across the earthen berms due to risk of (dog) fecal matter contamination of the potable water supply.
    - ATV and skidoos should not be traveling atop the berms and across Lake Geraldine.
- The protective galvanized metal enclosure installed over the pipeline from the dam to the water treatment plant should be re-instated.
- The metal posts/ markers that were installed along the north side of the south access road should be re-instated.
- The aggregate stockpiles maintained at the west side of the north berm should be replenished by Nunavut Excavating.
- The installation of video surveillance should be considered with a scheduled implementation in the summer of 2023.
- 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 control valves in the last 5+ 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.
- Underwater survey of the concrete dam and spillway in 2023.
- Undertake a test opening on the downstream side of the concrete dam and center berm in late January – early February 2023 to ascertain the source of the water that forms large ice sheets within the valley in the winter months.
- Repair of cracks within the concrete dam, this work is tentatively scheduled for summer 2023.
- Repair of spalled concrete within the concrete dam, this work is tentatively scheduled for summer 2023.

A copy of the DSI's completed in 2022 have been included in Appendix A.

As it relates to construction works completed in 2022, the City performed the following work which was identified in previous DSI's:

- Installation of survey monuments.
- Stockpile of riprap, granular and medium sized fill material to support annual maintenance related activities at the dam.
- Installation of monitoring stations and data loggers (at the same location of the survey monuments) in order to monitor activities at the dam for asset integrity purposes.
- Installation of signage at the dam.
- Concrete crack injection at the dam.

In 2023, the City will be planning to undertake the following:

- <u>Engineering Studies/ Investigations and Design Works:</u>
    - Annual Dam Safety Inspections
    - Intake Valve Replacement Study
    - Dam Underwater Survey
    - Dam Structural Upgrades, which considers:
        - Increase the height of the concrete core wall.
        - Raise the crests of the north, centre, and south berms.
    - Scoping Study to evaluate the implementation of a warm water return line or bubbler system to prevent ice build-up/ loading against the concrete dam wall.
- <u>Construction Works:</u>
    - Installation of pressure and temperature sensors for all monitoring stations, as well as, a water depth sensor to monitor reservoir levels.
    - Concrete delamination and crack repairs.

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

Table 3 summarizes the monthly and annual quantities of sludge removed from the City of Iqaluit's Wastewater Treatment Plant (WWTP) in 2022 and disposed of at the City's West 40 Landfill.

Table 3 Sludge removed from the WWTP Treatment Plant (2022)

Month	Volume (m^3)
January	35.3
February	35.3
March	35.3
April	35.3
May	35.3
June	35.3
July	35.3
August	35.3
September	35.3
October	35.3
November	35.3
December	35.3
Total	**424**

On average, approximately 1,248 cubic metres of sludge was removed from the WWTP on a monthly basis and deposited at a designated area in the West 40 Landfill. This equated to an annual total of approximately 424 cubic metres of sludge deposited at the West 40 Landfill.

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

A survey and assessment of airspace consumption of the West 40 Landfill was completed by City consultant AECOM. The airspace consumption compares the waste surface and includes deposited waste and cover soil placement.

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

Table 4 Waste deposited at the West 40 Landfill (2022)

Month	Volume (m^3)
January	1,460
February	1,460
March	1,460

Month	Volume (m^3)
April	1,460
May	1,460
June	1,460
July	1,460
August	1,460
September	1,460
October	1,460
November	1,460
December	1,460
Total	**17,520**

A total volume of 17,520 cubic metres of airspace consumed, or waste disposed of at the West 40 Landfill in 2022. This translates to approximately 1,460 cubic metres of airspace consumed per month.

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

In 2022, the City continued testing procedures as described in the City's Type A water licence 3AM-IQA1626, and Environmental Monitoring Program and Quality Assurance/ Quality Control Plan. Table 5 lists all samples that were taken in 2022. The complete monitoring results are provided in Appendix B.

Table 5 Summary of 2022 Sampling Conducted

Date	Test	Station ID	Sample Name	Lab Sample ID
07-Jan-2022	A	IQA-01	WTP Raw	B22-00715-1
07-Jan-2022	A	IQA-01	WTP Raw (Total)	B22-00715-2
07-Jan-2022	A	IQA-01	WTP Potable	B22-00715-3
07-Jan-2022	A	IQA-01	WTP Potable (Total)	B22-00715-4
07-Jan-2022	F	IQA-05	WWTP Influent	B22-00719-1
07-Jan-2022	F	IQA-04	WWTP Effluent	B22-00719-2
07-Feb-2022	F	IQA-05	WWTP Influent	B22-03737-1
07-Feb-2022	F	IQA-04	WWTP Effluent	B22-03737-2
14-Feb-2022	A	IQA-01	WTP Raw	B22-04569-1
14-Feb-2022	A	IQA-01	WTP Raw (Total)	B22-04569-2
14-Feb-2022	A	IQA-01	WTP Potable	B22-04569-3
14-Feb-2022	A	IQA-01	WTP Potable (Total)	B22-04569-4

Date	Test	Station ID	Sample Name	Lab Sample ID
10-Mar-2022	F	IQA-05	WWTP Influent	B22-06771-1
10-Mar-2022	F	IQA-04	WWTP Effluent	B22-06771-2
10-Mar-2022	A	IQA-01	WTP Raw	B22-06774-1
10-Mar-2022	A	IQA-01	WTP Raw (Total)	B22-06774-2
10-Mar-2022	A	IQA-01	WTP Potable	B22-06774-3
10-Mar-2022	A	IQA-01	WTP Potable (Total)	B22-06774-4
04-Apr-2022	F	IQA-05	WWTP Influent	B22-09300-1
04-Apr-2022	F	IQA-04	WWTP Effluent	B22-09300-2
05-Apr-2022	A	IQA-01	WTP Raw	B22-09529-1
05-Apr-2022	A	IQA-01	WTP Raw (Total)	B22-09529-2
05-Apr-2022	A	IQA-01	WTP Potable	B22-09529-3
05-Apr-2022	A	IQA-01	WTP Potable (Total)	B22-09529-4
04-May-2022	F	IQA-05	WWTP Influent	B22-13155-1
04-May-2022	F	IQA-04	WWTP Effluent	B22-13155-2
04-May-2022	A	IQA-01	WTP Raw	B22-13165-1
04-May-2022	A	IQA-01	WTP Raw (Total)	B22-13165-2
04-May-2022	A	IQA-01	WTP Potable	B22-13165-3
04-May-2022	A	IQA-01	WTP Potable (Total)	B22-13165-4
01-May-2022	F	IQA-05	WWTP Influent	B22-16642-1
01-May-2022	F	IQA-04	WWTP Effluent	B22-16642-2
08-Jun-2022	E	IQA-08	Detention Pond 2	B22-17677-1
13-Jul-2022	E	IQA-08A	Landfill Station Up-Gradient	B22-22252-1
13-Jul-2022	E	IQA-08B	Landfill Station Down-Gradient	B22-22252-2
13-Jul-2022	F	IQA-02	Pond #2 (Middle Decant)	B22-22252-3
19-Jul-2022	F	IQA-08	Pond #2 (End Decant)	B22-23005-1
03-Aug-2022	F	IQA-05	WWTP Influent	B22-24732-1
03-Aug-2022	F	IQA-04	WWTP Effluent	B22-24732-2
06-Sep-2022	F	IQA-05	WWTP Influent	B22-28893-1
06-Sep-2022	F	IQA-04	WWTP Effluent	B22-28893-2
03-Oct-2022	A	IQA-01	WTP Raw	B22-31153-1
03-Oct-2022	A	IQA-01	WTP Raw (Total)	B22-31153-2
03-Oct-2022	A	IQA-01	WTP Potable	B22-31153-3

Date	Test	Station ID	Sample Name	Lab Sample ID
03-Oct-2022	A	IQA-01	WTP Potable (Total)	B22-31153-4
04-Oct-2022	F	IQA-05	WWTP Influent	B22-31298-1
04-Oct-2022	F	IQA-04	WWTP Effluent	B22-31298-2
07-Nov-2022	F	IQA-05	WWTP Influent	B22-33946-1
07-Nov-2022	F	IQA-04	WWTP Effluent	B22-33946-2
30-Nov-2022	A	IQA-01	WTP Raw	B22-35266-1
30-Nov-2022	A	IQA-01	WTP Raw (Total)	B22-35266-2
30-Nov-2022	A	IQA-01	WTP Potable	B22-35266-3
30-Nov-2022	A	IQA-01	WTP Potable (Total)	B22-35266-4
01-Dec-2022	F	IQA-05	WWTP Influent	B22-35431-1
01-Dec-2022	F	IQA-04	WWTP Effluent	B22-35431-2
12-Dec-2022	A	IQA-01	WTP Raw	B22-36009-1
12-Dec-2022	A	IQA-01	WTP Raw (Total)	B22-36009-2
12-Dec-2022	A	IQA-01	WTP Potable	B22-36009-3
12-Dec-2022	A	IQA-01	WTP Potable (Total)	B22-36009-4

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

Solid Waste Facility

The City awarded the major civil contract for the construction of the new landfill and access road. Construction of the new landfill began, which included the commencement of construction activities for the west and south perimeter road, excavating and placement of excavated material for Cell Number 1.

Similarly, the City awarded the major contract for the construction of the new Waste Transfer Station. Construction activities consisted of preparatory work for the installation of the facility's thermosyphon system, Pilitak Enterprise was appointed and completed the installation of the thermosyphon system, which is a requirement for the construction works to commence during the 2023 construction season.

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

Water Treatment Plant

Several upgrades and improvements were made to the WTP. The heating system was updated by replacing the existing boilers, burners, heat exchangers, and adding a flow transmitter. Additionally, the laboratory and washrooms were renovated to enhance the functionality of the facility. This included installing new stainless-steel countertops and dual sinks, replacing overhead cupboards and counter cabinets, flooring and new toilets.

In response to the 2021 WTP contamination event, the existing filter media material was removed and replaced with Granular Activated Carbon (GAC). Remediation and sealing of the concrete wall structures for the North Clearwell, South Clearwell, Mixing Chamber, Pumping Chamber, Backwash to Waste Chamber, and Surge Tank walls was completed. Lastly, two critical isolation valves located at the Mixing Chamber and South Clearwell were replaced in order to resume normal operation. The City anticipates that the WTP will return to normal operation in April 2023, pending final approval from the Government of Nunavut.

In 2023, the City will undertake the replacement of the UV disinfection system, as the current system has exceeded its design services life and is no longer supported for spare parts by the Original Equipment Manufacturer (OEM).

Reheat Station 222

Reheat Station 222 underwent several upgrades and improvements to its equipment and infrastructure. The stations boilers, glycol pumps, water service pumps, heat exchangers, and fuel transfer pumps were replaced with new technology. Old piping and chimney flues were also replaced, while the existing instrumentation (integrated with the WTP SCADA system) was recalibrated. The work was completed in order to improve the efficiency, reliability, and safety of the station. The new boilers, pumps, and heat exchangers will improve the heating performance, while the new fuel transfer pumps will ensure that the fuel is delivered efficiently to the boilers. The replacement of the old piping and chimney flues will improve the safety of the station, while the recalibration of instrumentation will ensure that the station is being monitored accurately – this will better serve operations and maintenance requirements for the facility.

Lift Station #1

A temporary by-pass of Lift Station #1 wet-well was in place in order to perform cleaning of the wet-well. An engineered by-pass system was constructed in order to divert flows away from the wet-well in order to perform the work safely. The work was successfully completed on June 7, 2022.

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.

Apex River Supplemental Pumping

In 2022, supplementary pumping of water from the Niaqunguk River to Lake Geraldine was undertaken in support of recharging the City's raw water reservoir prior to the forthcoming winter season. Pumping activities took place between June 13 and September 18, 2022 (apart from between July 10 and July 23, 2022, when flows in the Niaqunguk River were below 30% of the Mean Annual Discharge (MAD)).

On August 12, 2022 the City declared a public health situation due to a raw water shortage. This situation arose due to unforeseen water usage over the prior winter and spring seasons (contamination of treated water and firefighting), and ongoing exceptionally dry conditions (including historically low flow conditions in Apex

River). In line with the City's existing water licence (Type A Water Licence 3AM-IQA1626, Amendment No. 4), the City sought and received authorization from Fisheries and Oceans Canada (DFO) to take additional water from the Apex River. At the completion of pumping activities, and once Lake Geraldine approached its capacity limit, pumping activities were stopped with a total of 419,324 m^3 transferred to Lake Geraldine Reservoir during the season. The maximum daily pumped volume was 14,519 m^3. Pumping records were maintained by the contractor at the pumping site and were provided to City's representative (Nunami Stantec Limited) for review and tabulation throughout the program.

It is noted that supplementation from Unnamed Lake, as authorized through Emergency Amendment No. 7, was not undertaken during the 2022 calendar year.

The final DFO/ CIRNAC report can be found in Appendix C.

A non-technical executive summary can be found in Appendix D.

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

Revisions were made to the following O&M manuals, as the City undertook projects to either replace or upgrade existing equipment that was either at end of service life, or had failed.

- WTP Heating System Upgrades
  - Replacements of existing boilers, burners, heat exchangers, and flow meters
- Reheat Station 222 Mechanical Upgrades
  - Replacements of existing boilers, burners, heat exchangers, and flow meters

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

Table 6 below provides a summary of all reported spills/ un-authorized discharges that occurred in 2021.

Table 6 Summary of spills/ un-authorized discharges in 2020

Spill ID	Date	Location	Type	Volume	Cause	Follow-Up Action
2022044	17-Feb-2022	WWTP (63.745833, -68.538889)	Wastewater	Unknown	Other	Electrical repairs conducted to start the pumps and blasting of the over flow line into the lagoon.
2022070	09-Mar-2022	MH69 (63.748574369774104, -68.50649598466433)	Wastewater	Unknown	Overflow Event	Clean up of sewage overflow and remediation work carried out on overflow line done by the city crew
2022090	20-Mar-2022	Qikitani Correctional Facility (63.758933762490535, -68.54340355102609)	Wastewater	Unknown	Other	Clean out of the blockage in the manhole and cleanup of the sewage spill done by city crew
2022093	23-Mar-2022	MH23B (Behind Lift Station #2)	Wastewater	Unknown	Overflow Event	Clean up conducted by city crew

2022110	03-Apr-2022	AV253 (63.74889469999999, -68.5203835)	Wastewater	Unknown	Breakage	Pump out and blasting of the backed up sewer line. Clean up of the overflow
2022129	12-Apr-2022	WWTP (63.7450875, -68.5452656)	Wastewater	Unknown	Unknown	Pumping out of the sewage backup and cleanup of the spill
2022174	09-May-2022	MH69 (63.7480625, -68.5061094)	Wastewater	Unknown	Overflow Event	Pumping out of the sewer blockage to restore flow
2022219	20-May-2022	MH76 (63.7483155, -68.5067765)	Wastewater	Unknown	Overflow Event	Pumping out of the manhole and blasting of the main to cleanout debris. Cleanup of the sewage spill
2022247	09-Jun-2022	MH76 (63.7483155, -68.5067765)	Wastewater	Unknown	Breakage	Pumping out of the manhole and cleanup of spill
2022268	13-Jun-2022	Nakasuk School (63.74669300000001, -68.5169669)	Wastewater	Unknown	Breakage	Pumping out of the manhole and blasting of the main to cleanout debris. Cleanup of the sewage spill and dump the sewer spill at the lagoon
2022428	21-Aug-2022	WWTP (63.745833, -68.538889)	Wastewater	Unknown	Overflow Event	PLC failure addressed by onsite electrician. Cleanup of the sewage spill at the pump dump station
2022431	23-Aug-2022	Lift Station #1 (63.745278, -68.522778)	Wastewater	Unknown	Unknown	Pump out and blasting of the blocked sewage main. Clean up of the spill
2022452	08-Sep-2022	MH58 (63.742222, -68.503611)	Wastewater	Unknown	Unknown	Pump out and blasting of the blocked sewage line
2022482	02-Oct-2022	Between MH63B and MH63A	Wastewater	Unknown	Other	Pump out and blasting of the sewer main

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.

No closure and reclamation work was undertaken in 2022.

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

No inspections or compliance reports were filed requiring actions to address concerns or deficiencies in 2022.

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

<u>Wastewater Treatment Plant</u>

No further works were completed in 2022 with all substantial completion of the generator granted in November 2021. The City continued to manage the completion of deficiencies and troubleshooting activities with the General Contractor in 2022. Final completion certificate presented to the City in March 2022.

<u>Landfill and Waste Transfer Station</u>

Construction began on the new landfill in 2022. The City also awarded the major construction contract for the construction of the new Waste Transfer Station (WTS). Construction mobilization and installations began for the thermosyphon foundation system for the new WTS. The project also began procurement of major

long-lead equipment, such as the biomass boiler and conveyor system. Construction efforts will resume in 2023.

The City continued to engage its consultant and NWB on leachate characterization plan, and lagoon constructability options for the new Landfill.

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

Long-Term Water Supply and Storage

In 2022, the City's Consultant Nunami Stantec (Stantec) continued their high-level options analysis evaluation of the two alternatives being considered for Long-Term Water Supply – i.e.: Sylvia Grinnell River and Unnamed Lake. Through this engagement, the City and Nunami Stantec completed stakeholder engagement activities with both the local Hunters and Trappers Association (HTA), as well as the Qikiqtani Inuit Association (QIA). A further presentation to the City's Public Works and Engineering Committee of the Whole meeting was completed. Following presentation of the options analysis outcomes to the City's Council, the City has now identified the Unnamed Lake water supply source as the preferred option to take forward for further assessment, design development and permitting activities. Also in 2022, the City has secured Infrastructure Canada funding (through the Disaster Mitigation and Adaptation Fund) to secure Iqaluit's Long Term Water security, and specifically to progress the supply and storage aspects of the Long-Term Water project. A copy of Stantec's final evaluation report can be found in Appendix E.

In 2023 and beyond, the City will progress a combined approach to the preferred Long-Term storage and supply alternatives under one project. With the engagement of an overall project management consultant in late 2022, the City will now look to commence Preliminary Engineering Design for the recommended options in Q2-2023. Future preliminary engineering design (set to commence in Q2-2023) will consider the technical, constructability, environmental, and economic viability of the supply source to the Lake Geraldine and adjacent independent reservoirs.

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

There are no additional details to be shared.

R. Monthly and annual quantities in cubic metres of fresh water withdrawn from Imiqtarviviniq (Dead Dog Lake) at Monitoring Station No. IQA-14.

A total volume of 150 cubic metres of water was withdrawn from Dead Dog Lake (Station ID IQA-014) in 2022. A summary of this is presented in Table 7.

Table 7 IQA-14 – Water Withdrawn from Dead Dog Lake

Month	Volume (m^3)
January	0
February	0
March	0
April	0
May	90
June	60
July	0
August	0
September	0
October	0
November	0
December	0
Total	**150**

APPENDIX A

DAM SAFETY INSPECTION REPORTS

APPENDIX B

WATER QUALITY SAMPLING RESULTS

APPENDIX C

2022 APEX PUMPING FINAL REPORT

APPENDIX D

APEX RIVER SUPPLEMENTAL PUMPING NON-TECHNICAL EXECUTIVE SUMMARY

APPENDIX E

LONG-TERM WATER OPTIONS ANALYSIS REPORT