



May 14, 2019

File: 3AM-IQA1626

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Attention: Derek Donald

Technical Advisor, Nunavut Water Board

[via email: derek.donald@nwb-oen.ca]

Dear Mr. Donald,

Reference: 3AM-IQA1626 City of Iqaluit 2019 Application for Water Licence Amendment – Response to Technical Review Comments

The City of Iqaluit has reviewed Technical Review Comments submitted by Crown Indigenous Relations and Northern Affairs Canada (CIRNA) in respect of the City of Iqaluit (City)'s application to amend water licence 3AM-IQA1626.

The City's response to CIRNA's comments is provided in the attachment to this letter. Should you have any questions regarding this information, please don't hesitate to contact me or the City's technical team: Josip Deronja (Josip.Deronja@colliersprojectleaders.com); Erica Bonhomme (erica.bonhomme@stantec.com).

The City will participate fully during the ongoing technical review of this licence.

Thank you,

Amy Elgersma
Chief Administrative Officer

Cc. Matthew Hamp, Josip Deronja, Erica Bonhomme

3AM-IQA1626 Response to Technical Review Comments of May 6, 2019

Comment	Request
TR-CIRNA-1 Drinking Water Management Plan	Comment: In its 2019 Application for Water Licence Amendment Response to Information Requests, the City has identified initiatives made by various Task Teams in response to the water shortage situation in Lake Geraldine. These initiatives include: - Development of a Drinking Water Management Program; - Development of an asset management program for the distribution system; - Monitoring of water demand, usage, and leaks in the distribution system; - Investigation of a viable long-term water supplementation solution; - Public consultations; and - Promotion of water conservation. While the initiatives listed above are a start to managing future water needs, CIRNAC would like the City to provide commitments on timelines to complete these efforts, as was requested in CIRNAC's Second Reply to City of Iqaluit Response to Information Requests. The NWB indicated in its review of the City's 2017 Annual Report that the City initiated the development of a Drinking Water Management Plan in August, 2017, which was not provided to the NWB. CIRNAC encourages the City to continue consolidating its water management efforts listed above into a comprehensive Drinking Water Management Plan to be shared with the NWB. Recommendation: CIRNAC encourages the City to continue developing a comprehensive Drinking Water Management Plan and to include provisions to mitigate the risk of requiring another emergency extraction situation in the future. CIRNAC also suggests that the plan be finalized within the remaining seven year term of the licence to prepare for the implementation of a long-term solution. This plan should incorporate the initiatives which the City is currently undertaking, and should consider the following: 1. Current and projected water supply needs • Current and projected water demand and conservation activities • The anticipated growth rate and development pattern • The ability of current water supply systems to accommodate future needs 2. Water supply options • A feasibility assessment of each identified water source • Watershed protection considerations 3. How the selected water supply approach will be put into operation
Response	The City approaches water management along two distinct but related fronts: supply and demand. Water supply management includes the production and distribution of water from Lake Geraldine and aims to reduce losses and wastage along the distribution system. The City as operator of the water supply and distribution system has full control of supply management. Water demand management includes the consumption of water by end users such as residents, businesses, facilities and emergency and maintenance services. The City can influence but does not control water consumption. The City is continuing its development of a Drinking Water Management Plan, as it looks to find and implement actions that could reduce water demand and improve water use efficiency. This is a demand-related initiative. The first step was to analyze how water is used today, and to identify opportunities and challenges to improving water efficiency in the community from a strategic level. This assessment would then facilitate the development of a framework for a Drinking Water Management Plan. The objective of the assignment was to highlight key findings through interviews with various stakeholder groups (high-volume users, property owners, etc.), while identifying options for a long-term water demand strategy. The assessment was completed in November 2018. Several opportunities and recommendations were identified to the following themes: 1) Early identification of leaks on private property, 2) User Pay, 3) Access & Affordability, and 4) Attitudes and Behaviours. The City is assessing the recommendations and will be developing an action plan on how to approach the next phase of this initiative through public engagement sessions/ workshops, negotiations with GN/ key stakeholder groups, and/or amendment to City water-by-law.

Comment	Request
The City would welcome CIRNA's contributions to demand management strategies if the department has local expertise in this subject area.	Regarding supply, the City understands that if the population continues to grow as projected (Nunavut Bureau of Statistics), so might water demand, leading to increases in annual raw water usage rates and volumes, and an evaluation of whether the City can reliably supply water to meet the demand. As was indicated in previous IR responses, addressing water supply requires examining the adequacy of water sources, storage and distribution systems to reliably supply water to end users. Lake Geraldine reservoir is the City's primary source of water and the City's primary means of storing water. The City does not anticipate evaluating an alternate primary source of water. Lake Geraldine, which recharges naturally from the Lake Geraldine watershed, currently provides adequate potable water to the City during open-water season. Over winter, while the reservoir does not recharge, the City relies on the water available under ice to address water demand throughout the winter. For this reason, the City's has greatest confidence in being able to supply enough potable water throughout the winter, when the Lake Geraldine reservoir is completely full prior to freeze-up. The Apex River is being proposed as a supplemental source of water to help "top up" the reservoir prior to winter when needed. It is a contingency plan for when Lake Geraldine is predicted to not replenish fully due to natural recharge. Apex is an appropriate contingency source for supplementation, as supplementing from Apex doesn't require installation of major infrastructure and is the shortest distance from the Lake Geraldine reservoir, making it the most cost-effective solution to implement for the residents of Iqaluit. Lake Geraldine reservoir is estimated to have approximately 1.10 million cubic metres (m³) of water available for withdrawal during winter months, and approximately 1.68 million m³ available during open water conditions, when the reservoir is full. Current winter water demand, as based on a population of 8,011 (Nunavut Bureau of Statistics, 2018) and maximum average recorded consumption rate of 0.438 m³/person/day, is approximately 0.85 m³. Based on a projected population of 8,700 in 2026, the ability of Lake Geraldine to supply and store enough water over the long term is not certain, even taking into account improvements related to supply and demand. The City has been studying the feasibility of permanent means of providing additional storage and supply of water while retaining Lake Geraldine as the primary source of potable water for the City. Some of these initiatives include: • Studies and concept designs for supplementary supply from Sylvia Grinnell River • Initiating water balance studies for Unnamed Lake as a supplementary supply (collection of bathymetric and topographic data and development of a water balance model) in order to determine whether this alternative is in fact viable. • Researching additional water storage options, including evaluations to optimize Lake Geraldine for withdrawal capabilities • Development of an Asset Management Plan, which includes an inventory for all water and sewer assets, condition assessment of existing assets, capital execution strategy for the upgrade and optimization of infrastructure in order to ensure reliable and sustain water/ sewer services, projected growth and demand requirements. These initiatives take into consideration current and projected water demand, anticipated growth rate and development patterns. The City has developed an action plan as to the execution of these initiatives; however, understands that the execution must follow a phased approach which considers analysis (i.e. data collection, water balance modelling), concept development, public engagement, preliminary engineering, permitting, detailed design, construction, operational readiness, and start-up. The City will decide which option to carry into detailed design within the timeframe necessary to apply to the Nunavut Water Board and other regulators to obtain approval concurrent with the renewal of the City's water licence in 2026. Watershed protection, if needed, and if within the City's jurisdiction to do so, is currently not addressed within this timeframe, though the City's General Plan has measures in place to protect the Apex and Lake Geraldine watersheds within the Municipal limits. In summary, the City will continue with the development of a Drinking Water Management Plan to address demand-related actions, and will continue to advance supply-related initiatives all in support of implementing a long-term solution for potable water supply to the City.

Comment	Request
TR-CIRNA-2 Contingency Plan	Comment: In its response to CIRNAC's request for justification on the City's withdrawal of the proposed contingency plan, the City acknowledged that based on the historical record, "there may be years when the full applied for withdrawal volume is not possible to achieve whilst adhering to DFO criteria," and in the worst case, only 200,000 cubic meters of water could be withdrawn from the Apex River. To make up for this potentially significant shortfall, the City has proposed in its response (Response to CIRNAC Comments, page 2) that "In a situation where the full required amount may not be able to be withdrawn, the City may: implement additional mandatory water conservation measures; or supplement using desalinization." It is not clear what additional mandatory water conservation measures could or will be implemented and if such measures, along with desalinization, will be able to save or supplement the full volume of shortfall, potentially at 300,000 cubic meters based on the historical record. Furthermore, given the relatively short historical record, the City's intention of relying on the Apex River for the next seven years, the projected increases in population and water demand, the observed increase in the cases of water infrastructure breakdown in the City in recent years, and the uncertainties on future precipitation patterns due to climate change, CIRNAC believes that a contingency plan should be provided by the City. Recommendation: CIRNAC recommends that the City provide a contingency plan. This Contingency Plan should address the City's response to a situation in which the City's demand for water from the Apex River cannot be supplied by the available flow while maintaining a pumping rate within the 10% instantaneous flow and 30% mean annual discharge.
<u>Response</u>	The City's primary water supply source is the Lake Geraldine reservoir. The City has proposed to supplement from the Apex as a contingency to the reservoir not being able to supply sufficient water over the winter months. The City has conservatively requested approval to withdraw up to 500,000 m³ for the Apex River as the City does not wish for the maximum withdrawal number to be unnecessarily limiting to its approach. The City's is looking for approval to withdraw as much as it needs to fill the Lake Geraldine reservoir prior to freeze-up, if needed, while remaining protective of the aquatic environment in the Apex River. The City's annual supplementation needs may vary from none, to 500,000 m³. The City previously presented in response to CIRNA-1 of April 19, 2019, that based on the historical record of flows in the Apex River during open water (July to October), at least 220,000 m³ would be available for supplementation in any given year, with the average availability of 626,825 m³. This analysis of availability of water in Apex River is based on adhering to the DFO criteria for protection of fish (<10%IF when >30% MAD) and while not exceeding a maximum proposed withdrawal rate of 150 litres per second. The City's current contingency supply to Lake Geraldine is the Apex River. A decision whether supplementation from Apex will be made in June of each year after the spring freshet after predicting whether natural recharge through the watershed will be sufficient for overwinter supply. Regarding measures considered as contingencies to supplementary supply from the Apex River: • Apex flows decrease rapidly in the fall prior to freeze-up, as such, the City will be able to determine by October whether Apex supplementation, if required, has been successful in topping up the Lake Geraldine Reservoir. At this time, the City will make a decision whether additional measures need to be implemented to improve confidence in over-winter supply • The City may execute the implementation of GN supplied Reverse Osmosis system to further assist with water supplementation activities, should pumping from Apex River not be able to provide sufficient water volume for recharge. Note however, that due to current status of design, desalination would not be available until 2020. • The City could implement mandatory water conservation measures The City can commit to providing further details regarding these measures as information to the Nunavut Water Board as they become available.

Comment	Request
TR-CIRNA-3 Monitoring and Reporting	<u>Comment:</u> In the e-mail correspondence between the City and the Qikiqtani Inuit Association, Mr. Bathory questioned Ms. Bonhomme on the City's preparedness to take on additional up- and downstream monitoring of the Apex River. Ms. Bonhomme responded that monitoring will be undertaken when and if withdrawals from the river and flow conditions exceed DFO's low risk criteria. In addition, Section 4.3.2 of the Supporting Submission references a new hydrometric station to be installed and Section 5.1.1 of the Supporting Submission references planned monitoring activities. With the retraction of the Fish and Fish Habitat Monitoring Plan from the application, it is unclear whether any monitoring activities discussed above will be implemented, as they were designed to inform actions to protect fish and fish habitat. Water level monitoring stations can be useful to provide valuable data regarding water use and availability over the next seven years. In addition, they can provide evidence that withdrawal rates remain within the allowable limits (10% of the instantaneous flow and 30% of the mean annual discharge). <u>Recommendation:</u> CIRNAC recommends that the City maintain its plans to install water level monitoring stations, carry out pre-pumping surveys, monitor water level and water withdrawal, and report the findings in its Annual Reports each year.
<u>Response</u>	
The City is committed to daily monitoring during pumping from the Apex River: • Flows will be monitored daily at a new hydrometric station to be installed upstream of the pumping location • Withdrawal volumes will be estimated from meters installed on the withdrawal infrastructure (pumps) • Flows and withdrawals at the pumping station will be reconciled with daily flows at the Water Survey Canada Apex River station (10UH002) Weekly reports can be made available for review, if required. A final summary of monitoring will be included within the Water Licence Annual Report.	
TR-CIRNA-4 MSDS	<u>Comment:</u> In version 2 of the Apex River Water Withdrawal: Site Specific Spill Contingency Plan, the City states (page 2), "MSDS for substances to be stored on site are to be included with this Spill Contingency Plan." There were no material safety data sheets (MSDS) attached to the plan. <u>Recommendation:</u> CIRNAC recommends that the City attach the MSDS for substances to be stored on site to the Site Specific Spill Contingency Plan.
<u>Response</u>	
The Spill Contingency Plan for the Apex River Pumping Project will be finalized once a Contractor is retained by the City to undertake the work. This final plan will include the current MSDS specific to the Contractor's operation.	

References: