



April 8, 2019

File: 3AM-IQA1626

Attention: Derek Donald  
Technical Advisor, Nunavut Water Board  
[via email: derek.donald@nwb-oen.ca]

**Reference: 3AM-IQA1626 City of Iqaluit 2019 Application for Water Licence Amendment  
– Response to CIRNAC Comments April 1, 2019**

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Dear Mr. Donald,

The City of Iqaluit has reviewed Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC)'s response to City of Iqaluit responses to CIRNAC's R-01 Information Requests, provided March 22, 2019.

The City's response to these additional CIRNAC 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).

We look forward to working with the Nunavut Water Board and other parties during the technical review of this licence.

Thank you,

**Matthew Hamp**

*Director of Public Works & Engineering, City of Iqaluit*

CC: Amy Elgersma – Chief Administrative Officer, City of Iqaluit

Josip Deronja – Acting Manager of Engineering, City of Iqaluit (Colliers Project Leaders)

Erica Bonhomme – Team Lead, Environmental Services North, Stantec

### 3AM-IQA1626 Response to Information Requests Round 2 April 1, 2019

Comment	Request	City of Iqaluit Response	Reference
CIRNA-1	<p><u>Comment:</u> The City stated the following in its IR response letter to the NWB (page 1): To address uncertainties raised in the Nunavut Impact Review Board process in regard to impacts of the proposal to the river ecosystem, the City is withdrawing its proposed contingency of pumping at a rate that exceeds DFO criteria (10% instantaneous flow; flows &gt;30% mean annual discharge), and correspondingly, is also withdrawing its proposed Fish and Fish Habitat Monitoring Plan, which is only applicable under these conditions. The City demonstrates that the proposed annual withdrawal amount at the proposed withdrawal rate can be achieved. However, the data presented in the response to CIRNAC's IR-1 indicate that "This analysis shows that, of the 35 years analyzed here, 29 years would have had available extraction volumes at or above the requested 500,000 cubic meter." In other words, based on this data set, there is a one in six chance that the proposed withdrawal rate could not be achieved. Furthermore, CIRNAC notes that there are a number of recent peer-reviewed scientific publications (e.g., Bakaic et al, 2017) which suggest significant deficiencies in using the Apex River as a short term water replenishing source.</p> <p><u>Recommendation for Resolution:</u> CIRNAC recommends that the City provide justification for its decision to withdraw the proposed contingency by addressing the uncertainties associated with the 35 years hydrometric data and conclusions made by relevant independent scientific studies.</p>		
<p><b><u>Response</u></b></p> <p>The City does not dispute the findings of the independent studies conducted on the Apex River (e.g., Bakaic et al 2017). The City's proposes to implement a variable extraction rate, dependent on the daily flows observed in the Apex River, and will cap maximum withdrawal either at the cumulative volume available under allowable extraction rates; or, by the 500,000 m<sup>3</sup> upper withdrawal volume requested. This extraction configuration and scenario is intended to be used as a short-term measure for the duration of the permit period.</p> <p>The requested annual withdrawal volume (500,000 m<sup>3</sup>) is the maximum that may be extracted from the Apex River during each open-water season over the licence term. Year-to-year, the amount required to be withdrawn from the Apex River will vary, depending on the naturally-occurring spring recharge to Lake Geraldine Reservoir, and the predicted supplementation requirements as based on the recharge model.</p> <p>Over the next seven years covered by this application, there may be years where the maximum withdrawal quantity is not required to meet municipal water use needs – in this case, only the required quantity will be extracted, which will be less than 500,000 m<sup>3</sup>. For example, in 2018, the City withdrew 194,000 m<sup>3</sup> to top up the Lake Geraldine reservoir.</p> <p>There will also be years where the natural variability of flow of the Apex River will require that withdrawal rates be reduced day-to-day in order to not exceed low-impact criteria of 10% instantaneous flow when flow is &gt;30% of mean annual discharge. In this case, the City will extract what is allowable based on the DFO criteria within the open-water-season. Based on the historical record:</p> <ul style="list-style-type: none"> <li>the full withdrawal amount of 500,000 m<sup>3</sup> was achievable 29 of 35 years</li> <li>400,000 m<sup>3</sup> could have been obtained in 31 of 35 years</li> <li>300,000 m<sup>3</sup> could have been obtained in 34 of 35 years</li> <li>200,000 m<sup>3</sup> could have been obtained in all 35 years</li> </ul> <p>In short, there may be years when the full applied for withdrawal volume is not possible to achieve whilst adhering to DFO criteria, and also years when the full applied for withdrawal volume is not necessary. 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.</p>			
CIRNAC-2	<u>Comment:</u>		

Comment	Request	City of Iqaluit Response	Reference
	<p>CIRNAC finds that there are still details lacking in this response regarding which water sources are being studied, what information remains to be collected and analyzed within each study, and the dates that these studies are expected to be completed. In their response to IR-5, the City does not provide its plans to further the study at the Sylvia Grinnell River, does not provide timelines for the studies at the Unnamed Lake, and does not clearly state which water source studies are still being pursued. The City reintroduces the Apex River as a potential long-term water source, which counters the information provided in the 2019 Amendment Application Support Document (page 10), in which the City states, “A permanent solution is considered an alternative to the temporary supplementation from Apex River.” This contradictory information decreases CIRNAC’s confidence in the City’s progress to find a long-term supplemental water source.</p> <p><u>Recommendation for Resolution:</u> CIRNAC recommends that the City provide a strategic plan to complete the proposed studies within the seven year term of the amended licence. This plan should outline concrete commitments and timelines so that a long-term supplemental water source can be determined within this timeframe. This plan should include the following details:</p> <ul style="list-style-type: none"> <li>a) If the Apex River is being further considered as a long-term water source beyond the proposed seven year licence term</li> <li>b) How long data is expected to be collected at the hydrometric station and at the water level loggers at Unnamed Lake</li> <li>c) When the water level model for Unnamed Lake is expected to be completed</li> <li>d) When the conveyance study for Unnamed Lake is expected to be completed</li> <li>e) Whether the comparison study of the two potential intake sites at the Sylvia Grinnell River has been completed, and <ul style="list-style-type: none"> <li>a. if so, report the feasibility results as part of the strategic plan</li> <li>b. if not, outline what tasks are still required before feasibility can be reported</li> </ul> </li> <li>f) What findings will be reported in the annual reports for each potential water source</li> <li>g) When a feasibility determination is expected to be made available for each potential water source</li> </ul>		
	<p><b><u>Response</u></b></p> <p>As previously stated in response to Round 1 Information Requests WRD-4, addressing the City’s water shortages is not just about water sourcing. Identifying an alternate source of water is one of four ongoing coordinated initiatives to address long-term water supply for the growing population:</p> <ul style="list-style-type: none"> <li>• Water conservation</li> <li>• Distribution</li> <li>• Storage</li> <li>• Sourcing</li> </ul> <p>The City is currently studying three potential long-term water supplementation sources (Unnamed Lake, the Sylvia Grinnell River and Apex River). All options are being investigated using a phased approach. The evaluation of feasibility of concepts (current phase) will be used to identify one or more options for which additional environmental studies, design development and engagement will be advanced.</p> <p><u>Unnamed Lake:</u> The City has retained a consultant to complete required studies to determine the feasibility of using Unnamed Lake (a large lake approximately 3 km northeast of the City) as a raw potable water source. Several data gaps were identified, including whether Unnamed Lake can reliably supply enough water based on its volume and recharge rate. Investigations to address this initial data gap began in 2018. Preliminary studies that will be completed by the end of 2019 or early 2020 include:</p> <ul style="list-style-type: none"> <li>• A bathymetry survey to determine lake morphometry and volume, and to identify potential intake locations –planned for summer of 2019</li> <li>• Water level data collection and analysis to determine variability in water levels and therefore volume throughout the year – level loggers were installed in 2018 and the first year of data collection will be completed summer of 2019</li> <li>• Watershed analysis including topographic survey via LiDAR – planned for 2019</li> <li>• Water balance modelling (using local and regional climate and hydrometric data) to determine the inputs and outputs to Unnamed Lake and to support assessment of the lake’s ability to support withdrawals for water supply – preliminary model results to be available by end of 2019 or early 2020</li> </ul> <p>Should Unnamed Lake be identified as a potential candidate for providing a long-term water supply based on these water balance results, further investigations</p>		

Comment	Request	City of Iqaluit Response	Reference
		<p>into other constraints and considerations (such as water quality, conveyance configuration, and presence of fish and fish habitat) will be conducted in 2020 and beyond.</p> <p><u>Sylvia Grinnell River:</u>  In 2018, the City retained Nunami Stantec Ltd. to conduct a study of the feasibility of using the Sylvia Grinnell River as a long-term source for potable water. The study concluded that the Sylvia Grinnell River would not be able to supply water year-round due to low flows in the winter. Five potential intake sites for open-water supply were identified. Two of these potential intake sites were further evaluated for their suitability for permanent intake structures and types, and two overland pipeline conveyance concepts were identified. A final concepts report is in preparation.</p> <p><u>Apex River</u>  The investigation of Apex River as a long-term water source began in 2014, as is presented in exp (2014). Studies of fish and fish habitat were completed in 2017 (Nunami Stantec, 2017). The evaluation of Apex River as a long-term water source differs from its proposed use as a short-term source, in that the consideration of the Apex River as a long term source will contemplate unrestricted withdrawal from the river, leading to potential permanent changes to the hydrology and riverine ecosystem of the river. The current proposal for amending the water license does not propose these changes.</p> <p><u>Lake Geraldine Storage</u>  Complementary to studies of supplementary supply, the City has also evaluated the storage capacity and/or accessibility of available water within the existing reservoir, along with identifying options for additional storage capacity.</p> <p>The comparison and evaluation of these concept options will continue over the next two years and will be complemented by ongoing engagement with the residents of Iqaluit and Amaruq HTA.</p> <p>The City is of the opinion that these topics can be discussed further during the Technical Review of the licence amendment application.</p>	

#### References:

- Bakaic M., Medeiros A. S, Peters J.F., and Wolfe B.B. (2018). Hydrologic monitoring tools for freshwater municipal planning in the Arctic: the case of Iqaluit, Nunavut, Canada. *Environ Sci Pollut Res* (2018) 25:32913–32925.
- Exp. 2014. City of Iqaluit Supplementary Water Supply Study. Prepared for the City of Iqaluit, August, 2014.
- Nunami Stantec. 2017. Fish and Fish Habitat Assessment of the Niaqunguk (Apex) River, Lake Geraldine and the Lake Geraldine Drainage Channel. Prepared for the City of Iqaluit, September 2017.



Water Resources Division  
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Nunavut Regional Office  
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Your file - Votre référence  
3AM-IQA1626  
Our file - Notre référence  
CIDM#1245514

April 1, 2019

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

**Re: Crown-Indigenous Relations and Northern Affairs Canada Reply to City of Iqaluit Response to Information Requests for Application to Amend Water Licence No. 3AM-IQA1626 – Municipal Undertaking**

Dear Mr. Dwyer,

Thank you for your March 25, 2019 invitation to reply to responses provided by the City of Iqaluit (City) to the Information Requests (IRs) provided by Crown Indigenous Relations and Northern Affairs Canada (CIRNAC) regarding the Application to Amend Water Licence No. 3AM-IQA1626 – Municipal Undertaking. CIRNAC examined the response. The reply provided in Attachment A is pursuant to CIRNAC's mandated responsibilities under the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* and the *Department of Indian Affairs and Northern Development Act*.

If there are any questions or concerns, please contact me at (867) 975-4282 or [bridget.campbell@canada.ca](mailto:bridget.campbell@canada.ca) or Godwin Okonkwo at (867) 975-4550 or [godwin.okonkwo@canada.ca](mailto:godwin.okonkwo@canada.ca).

Sincerely,

Bridget Campbell,  
Water Resource Coordinator

CC: Matthew Hamp, Erica Bonhomme, City of Iqaluit



## **Attachment A: Reply to Responses to Information Requests**

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

From: Bridget Campbell, Water Resource Coordinator, Water Resources Division,  
CIRNAC

Date: April 1, 2019

**Re: Crown-Indigenous Relations and Northern Affairs Canada Reply to City of  
Iqaluit Response to Information Requests for Application to Amend Water  
Licence No. 3AM-IQA1626 – Municipal Undertaking**

Applicant: City of Iqaluit  
Project: Municipality  
Region: Qikiqtani

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### **A. BACKGROUND**

The City of Iqaluit (City) provided the Nunavut Water Board (NWB) on February 1, 2019, with an amendment application (the Application) and supporting documentation for their municipal Type “A” Water Licence No. 3AM-IQA1626. Additional information was provided for clarity on February 12, 2019. The Application proposes two major changes which are intended to continue to the expiration of the licence in 2026; the City is applying to withdraw 500,000 cubic metres from the Upper Niaqunguk River (Apex River) to supplement the Lake Geraldine reservoir, and to increase the permitted withdrawal volume from Lake Geraldine from 1,100,000 cubic metres to 2,000,000 cubic metres. Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) submitted Information Requests (IRs) on March 1, 2019, to which the City replied on March 22, 2019. CIRNAC expects the information requested in the outstanding IRs, as presented in Part C, to form part of our Technical Review.

### **B. RESOLVED INFORMATION REQUESTS**

CIRNAC considers the following Information Requests to be clarified and resolved:

IR Number	Subject of IR
IR-3	Fuel Transportation to Site
IR-4	Mitigations to Date
IR-6	Timing of Activities
IR-7	Reporting Erosion and Sedimentation Control Measures



## C. UNRESOLVED INFORMATION REQUESTS

CIRNAC considers the following Information Requests to be unresolved:

IR Number	Subject of IR
IR-1, IR-2	Apex River Flow and Water Level Data at Apex Hydrometric Station (10UH002) to Determine Withdrawal Rates and Adequacy of Apex River as a Viable Supplementary Water Source
IR-5	Plans for Research of Alternatives

### 1. Apex River Flow and Water Level Data at Apex Hydrometric Station (10UH002) to Determine Withdrawal Rates and Adequacy of Apex River as a Viable Supplementary Water Source

**(IR-1):** CIRNAC requests that the proponent present and analyze all the available historic flow and water level data at Station 10UH002 to predict if the Apex River has sufficient quantity of water to meet the predicted needs.

**(IR-2):** CIRNAC requests the City demonstrate how the limit will be set for daily withdrawals if a rate of less than 10% of the instantaneous flow, when natural flow is above 30% MAD, is not possible to meet the water supplementation requirements of Lake Geraldine.

#### Comment:

The City stated the following in its IR response letter to the NWB (page 1):

To address uncertainties raised in the Nunavut Impact Review Board process in regard to impacts of the proposal to the river ecosystem, the City is withdrawing its proposed contingency of pumping at a rate that exceeds DFO criteria (10% instantaneous flow; flows >30% mean annual discharge), and correspondingly, is also withdrawing its proposed Fish and Fish Habitat Monitoring Plan, which is only applicable under these conditions. The City demonstrates that the proposed annual withdrawal amount at the proposed withdrawal rate can be achieved.

However, the data presented in the response to CIRNAC's IR-1 indicate that "This analysis shows that, of the 35 years analyzed here, 29 years would have had available extraction volumes at or above the requested 500,000 cubic meter." In other words, based on this data set, there is a one in six chance that the proposed withdrawal rate could not be achieved. Furthermore, CIRNAC notes that there are a number of recent peer-reviewed scientific publications (e.g., Bakaic et al, 2017) which suggest significant deficiencies in using the Apex River as a short term water replenishing source.

#### Recommendation for Resolution:



CIRNAC recommends that the City provide justification for its decision to withdraw the proposed contingency by addressing the uncertainties associated with the 35 years hydrometric data and conclusions made by relevant independent scientific studies.

## 2. Plans for Research of Alternatives

**(IR-5):** *CIRNAC seeks further details on the City of Iqaluit's strategies to complete the studies to determine potential long term water sources.*

### Comment:

CIRNAC finds that there are still details lacking in this response regarding which water sources are being studied, what information remains to be collected and analyzed within each study, and the dates that these studies are expected to be completed. In their response to IR-5, the City does not provide its plans to further the study at the Sylvia Grinnell River, does not provide timelines for the studies at the Unnamed Lake, and does not clearly state which water source studies are still being pursued. The City reintroduces the Apex River as a potential long-term water source, which counters the information provided in the 2019 Amendment Application Support Document (page 10), in which the City states, "A permanent solution is considered an alternative to the temporary supplementation from Apex River." This contradictory information decreases CIRNAC's confidence in the City's progress to find a long-term supplemental water source.

### Recommendation for Resolution:

CIRNAC recommends that the City provide a strategic plan to complete the proposed studies within the seven year term of the amended licence. This plan should outline concrete commitments and timelines so that a long-term supplemental water source can be determined within this timeframe. This plan should include the following details:

- a) If the Apex River is being further considered as a long-term water source beyond the proposed seven year licence term
- b) How long data is expected to be collected at the hydrometric station and at the water level loggers at Unnamed Lake
- c) When the water level model for Unnamed Lake is expected to be completed
- d) When the conveyance study for Unnamed Lake is expected to be completed
- e) Whether the comparison study of the two potential intake sites at the Sylvia Grinnell River has been completed, and
  - a. if so, report the feasibility results as part of the strategic plan
  - b. if not, outline what tasks are still required before feasibility can be reported
- f) What findings will be reported in the annual reports for each potential water source
- g) When a feasibility determination is expected to be made available for each potential water source





## **D. REFERENCES**

Bakaic M., Medeiros A. S, Peters J.F., and Wolfe B.B. (2018). Hydrologic monitoring tools for freshwater municipal planning in the Arctic: the case of Iqaluit, Nunavut, Canada. *Environ Sci Pollut Res* (2018) 25:32913–32925.

City of Iqaluit, Response to Information Requests Round 1, March 22, 2019.

City of Iqaluit, 3AM-IQA1626 Application for Amendment – Supporting Submission, Revision 1, February 1, 2019.