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Keith Morrison, Technical Advisor
Nunavut Impact Review board
P.O. Box 1360 Cambridge Bay, Nunavut X0B 0C0
NIRB File No.: 19UN013

March 06, 2019

Re: Notice of Screening for the City of Iqaluit's "Apex River Drinking Water Supply" project proposal. NWB Water Licence 3AM-IQA1626 Amendment No.1, DFO Authorization 18-HCAA-01025

Dear Keith Morrison,

With regards to the proposed amendment to the emergency authorization to water licence 3AM-IQA1626 Amendment No. 1 (NIRB File No.19WA006) by the city of Iqaluit, and subsequent screening file 12UN013, please accept the following testimonial and material evidence provided herein with respect to this proposal. As I have been actively researching the Lake Geraldine watershed since 2005, and am an expert in northern hydrology and indicators of ecosystem health, I put forward the following response to the proposed extraction of 500,000 m^3 from the Apex River for extended supplemental replenishment of Lake Geraldine as outlined in this proposal as well as material evidence that directly contradicts the efficacy of the proposal put forward.

My research has exhaustively examined multiple proposed scenarios for the use of supplemental water from the Apex River for summer replenishment of Lake Geraldine, to which are outlined in detail in a peer-reviewed scientific publication; Bakaic, M., Medeiros, A. S., Peters, J. F., & Wolfe, B. B. (2018). Hydrologic monitoring tools for freshwater municipal planning in the Arctic: the case of Iqaluit, Nunavut, Canada. Environmental Science and Pollution Research, 25(33), 32913-32925. This publication includes data and discussion that is able to inform and forecast the effect of the supplemental withdrawal of water from the Apex River as proposed. I present a summary of my direct knowledge of the proposal, calculated hydrological forecasting, and detailed understanding of the eco-hydrology of the Apex River watershed;

The Apex River is a fish bearing river, which includes a resident population of Arctic Char. This includes both a resident Char population as well as anadromous behavior during a period from September – November. I have witnessed, and documented, the presence of Arctic Char on a yearly basis since 2007. This is also well known to the residents of Iqaluit, but especially to those that regularly use the Apex River for recreational purposes. The community use of the Apex River

includes sourcing untreated drinking water from numerous locations upstream of Apex, several camping sites along the river, and fishing at the mouth of the river. As such, this is a river that has extreme cultural importance to residents of Iqaluit.

Environmental management guidelines established by the Department of Fisheries and Oceans Canada (2013) state that limiting extraction to only 10% of the instantaneous river discharge will result in a low probability of detectable ecosystem impacts. With this limit applied to the forecasted river flows and historic discharge probabilities of the Apex River, I have forecasted a normalized summer replenishment season would result in 166,925 m^3 of water transferred to Lake Geraldine adhering to this 10% threshold. **The proposal herein is three times this threshold.**

In order to calculate the feasibility of supplemental water from the Apex River, we estimated three scenarios of withdrawal. The first scenario was based on the 10% threshold outlined by the DFO for a total supplemental amount of 166,925 m^3 of water transferred to Lake Geraldine, resulting in an extension of the available water supply by 2-5 years. The second scenario was based on 845,000 m^3 of water transferred to Lake Geraldine, exceeding 50% of the total available flow and extending the available water supply by 10-15 years. The third scenario examined using all available flow from the Apex River, estimated at 1,853,000 m^3 of water transferred to Lake Geraldine. This scenario is not technically possible, as well as unethical – but highlights the limited supply of water provided by the Apex River as a supplemental supply source.

The proposal herein suggests that up to 500,000 m^3 will be extracted from the Apex River for supplementing the freshwater supply of Lake Geraldine. The withdrawal of this amount of water would require upwards of 0.1 m^3/s instantaneous withdrawal, which would have an 80% probability of exceeding 30% of the instantaneous flow of the Apex River during the summer period. Indeed, at this rate there is the possibility of complete desiccation of the Apex River downstream of the extraction locations, especially during drier years. **The Department of Fisheries and Oceans Canada outline cumulative flow alterations of >30% of the mean annual discharge have a heightened risk of environmental impact. This proposal exceeds that risk threshold.**

It is my testimony, and expert opinion, that the Apex River is an insufficient supplemental source of freshwater for the City of Iqaluit as outlined above and within the appended documentation. Further, this proposal directly risks the ecological health of the Apex River. The ecological and financial cost of extending the freshwater supply of Lake Geraldine by an estimated 10-15 years through the annual supplemental withdrawal of 500,000m^3 from the Apex River is unjustified. As a matter of both conscious and ethical conduct, I ascertain that this proposal violates both established

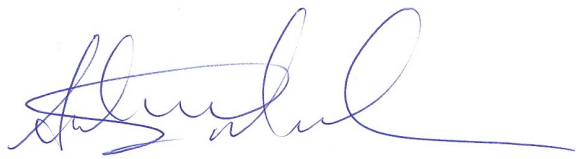
guidelines for the use of fish-bearing waters as set forth by the Department of Fisheries and Oceans, as well as a standard of acceptable practice.

Therefore, I strongly encourage the Nunavut Impact Review Board reject the proposal set forth by Stantec Consulting Ltd on behalf of the City of Iqaluit. I also strongly encourage that the City of Iqaluit cease further considerations of the use of the Apex River as a supplemental source of freshwater for Lake Geraldine, as we have presented strong, independently reviewed, evidence that there is no scenario in which the use of the Apex River is a justified or ethical supplemental long-term source of freshwater. There are multiple other sources of freshwater available that can be used, of which the City of Iqaluit has already had the ability to plan and implement – this includes a reverse osmosis system that was announced August 28, 2018.

On a final note, I wish to express extreme frustration that there is a belief that the Apex River will 'be fine' due to an abnormally rainy period during August of 2018. Weather is variable year to year, climate is a trajectory that accounts for variation across multiple years. One cannot assume that August of 2019, or any subsequent year, will provide an instantaneous flow that will mirror the situation of 2018. I have based my results on measured flow data, which is also publically available, that spans over a decade. This captures both years of high and low precipitation. Our estimates capture these as both an average and a probability of exceedance, where we base our conclusions on both minimum expected flow, as well as average expected flow. There should not be a rush for a "quick and dirty" solution (personal correspondence of Erica Bonhomme, Stantec, August 7, 2018). The development of supplemental freshwater supply sources for the City of Iqaluit should be made with the outmost adherence to science-based decision making and an informed planning process. This has yet to occur.

If I can be of any further assistance, or provide you with any further information, please do not hesitate to contact me.

Sincerely,



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