Appendix-F: Scope of works and schedule of the study on Fish habitat in the wetland area or small pond upstream of the receiving body prepared for Nunami Stantec Ltd.

Appendix- F

Scope of Works and Schedule of the study on Fish habitat in the Kimmirut wetland area or small pond upstream of the Sewage Effluent receiving body for the consultant.

Background

The GN-CGS department is responsible for working with the territory's community governments to build their capacity to ensure the needs of the residents are met. This includes the funding and development of infrastructure including wastewater treatment (WWT) systems. These WWT systems must meet the regulatory standards of the Fisheries Act, Environmental Protection Act, and the conditions set in each community's water license issued by the Nunavut Water Board (NWB). The NWB has power over the use, management and regulation of inland water. They are responsible for setting regulations with regards to water use and effluent water quality.

The Hamlet of Kimmirut currently does not have an active water license and are in the process of a renewal application for their newly constructed WWT system. This system has been designed to treat wastewater through two exfiltration lagoons discharging into a natural tundra wetland area. The wetland area will be the main method of treatment with the lagoons acting as a primary treatment process. To approve renewal of the water license the NWB has requested a fish study be performed in the wetland area to ensure there will be no harmful effects on the possible fish population and fish habitat of the wetland and the receiving lakes.

Construction of the WWT system was approved by the NWB in 2009 and construction was completed in 2011. However, the system has not yet been commissioned due to concerns from the community and from the NWB. Reviewers of the water license application had expressed several concerns with the new system which need to be addressed prior to commissioning. One concern is fish inhabiting the wetland, thus necessitating the need for this fish assessment study.

The GN-CGS does not have qualified personnel to conduct such fish studies and thus are requesting proposals for this study from proponents with Qualified Aquatic Environment Specialist(s).

Scope of Work

The successful proponent will be responsible for conducting a fish and fish habitat assessment of the proposed WWT wetland area in Kimmirut, NU. The purpose of the assessment will be to determine the risk to the fish and fish habitat and to provide information to GN-CGS on how to comply with the regulatory requirements of Fisheries and Oceans (DFO), the NWB and the Department of Environment (GN-DoE). Thus, to provide recommendations to ensure the requirements of the Environmental Protection

Act, Fisheries Act, and any other Act that may pertain to the release of deleterious substances and their effect on fish and fish habitat are met. In addition, adhering to the conditions set in the Hamlet's water license.

The potential impacts to the fish habitat need to be identified as well as possible mitigation measures to reduce these impacts if possible. It will be necessary to determine the following:

- *Fish presence/absence*- are there fish within the wetland system? The wastewater leaving the lagoons flows into a fairly defined river within the wetland. This river connects two large lakes, one located upstream and the other downstream of the wetland area.

- *Type of fish (species at risk)*-if there are fish that travel through the wetland, what species of fish are they? Are they an endangered species or a species at risk? Are they consumable or non-consumable fish species?

- *Effect of effluent on fish and fish habitat*-will the operation of the wastewater treatment system cause disruption, destruction or harmful alteration to the fish habitat? Are the types of fish in the wetland susceptible to pollutants? Do the regulations under section 36(3) of the *Fisheries Act* apply to the waters in the wetland system?

- *Seasonal migration patterns/potential migration routes*- are there fish travelling through the wetland year round or only seasonally? Can the flow of wastewater effluent be diverted away from their migration routes or habitat locations?

- *How will the increase in flow affect fish and fish habitat*- will the addition of effluent flow increase the likelihood for fish habitat? Will it negatively affect fish habitat? How will it change the flow patterns within the wetland?

- *Hydrology of the WWT System*- develop a detailed topographic map of the entire sewage effluent treatment path. Determine definitive flow patterns, discharge location into wetlands, predicted flow course through the wetlands, discharge into small ponds and discharge into Lake Tuullitsut.

- *Establish baseline water quality of the wetland*- the baseline water quality of the wetland and receiving waters need to be established in order to accurately determine the treatment efficiency of the wetland once commissioned. Thus it will be necessary to conduct water quality analysis to determine a suite of baseline water quality parameters.

- The successful proponent will work closely with the GN project team who will provide guidance throughout the project. Site visit(s) will be coordinated through the GN Project manager who may decide that a GN representative will accompany the project team. The final report will address the aforementioned matters and any additional issues the consultant believes to be relevant.

Deliverables

The final report will present the findings of the fish and fish habitat assessment. It will answer the questions posed in the Scope of Work as well as recommend potential mitigation measures to reduce impacts to fish habitat if necessary. The report should clearly state if any regulations will be violated and/or how to comply with relevant regulations. It will explain the hydrology of the WWT system as well as present the baseline water quality data. The report should include any other findings or information that is considered applicable by the specialists of the project team.

The Consultant Nunami Stantec Ltd is on Board and their Schedule is as follows:

Task	Deadline
Project Award	July 2013
Field Sampling	September 2013
Preliminary Finding	March 2014
Field Sampling Program	June 2014
Draft Report	August 2014
Final Report	November 2014