ᓄᓇᕘᒥ ᐊᕙᑎᓕᕆᔨᒃᑯᑦ ᑲᑎᒪᔨᖏᑦᑎᒍᑦ ᑐᒃᓯᖅᑑᑦ ᕐᑭᒥᕐᕈᔭᒃᓴᖅ #125406

Concept Advancement for a Raw Water Intake

ᑐᒃᓯᖅᑑᑕᐅᔪᖅ ᕐᑲᓄᐃᑦᑑᓂᖓ:	New
ᐱᓕᕆᐊᕆᔭᐅᔪᒪᔫᑉ ᕐᑲᓄᐃᑦᑑᓂᖓ:	Scientific Research
ᐅᓪᓗᖓ ᑐᒃᓯᖅᑏᑎᓕᐊᕕᓂᐅᑉ:	8/16/2018 6:14:43 PM
Period of operation:	from 0001-01-01 to 0001-01-01
ᑲᔪᓯᒃᑲᐃᔨᐅᓂᐊᕐᓱᒋᔭᐅᔪᑦ:	from 0001-01-01 to 0001-01-01
ᐱᓕᕆᐊᖅᑲᕈᒪᔪᖅ:	Stantec Consulting Ltd., Carey Sibbald Stantec Consulting Ltd. 202, 107 Main Street Whitehorse Yukon Y1A 2A7 Canada ᐅᖄᓚᐅᑏᑦ: 18676332400, ᓯᑲᔪᒃᑯᑦ:

ᑐᓴᐅᒪᔭᒃᓴᑦ

ᖃᓄᐃᑦᑑᑎᓂᒃ ᐱᓕᕆᐊᖅᑲᖅᓂᐊᕆᐊᖕᒐᓐᓂᒃ

ᖃᓪᓗᓈᑎᑐᑦ: PROJECT DESCRIPTIONNunami Stantec Ltd. (Nunami) is currently assisting the City of Iqaluit (the City) with identifying additional drinking water sources to supplement their existing drinking water reservoir at Lake Geraldine. As the community grows, so does the demand for drinking water. The City's initial plan to pump water from the Apex (Niaqunguk) River to the reservoir was determined not feasible due to low water availability in that river. In 2017, Nunami identified a resident population of Arctic Char that would require limits placed on the volume of water withdrawn to protect aquatic habitat. In 2018, Nunami completed a feasibility study to evaluate the Sylvia Grinnell River as a potential drinking water source. The study recommended two intake sites for further investigation – Site A and Site B (1 and 2). These sites are located along the Sylvia Grinnell River, north (outside) of the Sylvia Grinnell Territorial Park, and outside of any Inuit-Owned Land. This current Project Proposal is aimed at identifying which of the two intake sites is most suitable for a raw water intake by completing a field study along the Sylvia Grinnell River. All field work will be completed within the municipal limits of the City of Iqaluit. See included Figure 1 for a map of study sites.The field study at the Sylvia Grinnell River will involve two components: a Bathymetry Survey and a Geotechnical Survey. The Bathymetry Survey will involve the use of a small, remote-controlled, battery-powered boat to collect water depth measurements across the channel at each of the two sites. The Geotechnical Survey will use a non-intrusive method to measure the depth to bedrock at each of the sites using sound and pressure waves. These sound and pressure waves are generated by low-speed blast charges from cables laid out on the ground surface. Geophones are installed along the cables at select intervals to receive sound and pressure waves bounced back from sub-surface materials. The data are then interpreted by technicians and used to map the material types below ground surface. Depth to bedrock will be mapped over an area up to 100 square metres along the shore, and upgradient, of the Sylvia Grinnell River. No geotechnical survey work will occur in the river.The field study is estimated to take a maximum of two weeks in September 2018. Nunami's field team will consist of two Nunami personnel, including one based out of Iqaluit, plus one sub-contractor (Frontier Geoscience) with a maximum team of three people. No structures will be built or erected during the course of the field study. See also attached Project Description (English) in the Documents tab

ᐅᐃᕖᑎᑐᑦ: Project description not provided in French.

ᐃᓄᒃᑎᑐᑦ: See attached Project Description (Inuktitut) in the Documents tab

Inuinnaqtun: Project description not provided in Inuinnaqtun.

Personnel

Personnel on site: 3

Days on site: 14

Total Person days: 42

Operations Phase: from 2018-09-07 to 2018-09-22

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ᓇᒥ	ᖃᓄᐃᑦᑑᒥᑦ ᐱᓕᕆᐊᖃᕐᓂᐊᖅᐸ	ᑭᒃᑯᑦ ᓄᓇᖁᑖᓂ	ᑐᓴᐅᒪᔭᒃᓴᑦ ᓄᓇᐅᑉ ᖃᓄᖅ ᐊᑐᒐᐅᓚᐅᖅᓯᒪᔭᕆᐊᖓᓐᓂᒃ	ᐃᑦᓴᕐᓂᑕᖃᕐᕕᐅᕙᓚᐅᖅᐸ ᐃᓄᒃᑯᑦ ᓇᔪᖅᑕᐅᖃᑦᑕᕐᓂᑰᕙᓗ ᑕᐃᑦᓱᒪᓂᑐᖃᐅᓕᖅᑐᖅ	ᖃᓂᓐᓂᖅᐹᖅ ᓄᓇᓕᒥᔭᐅᔪᖅ ᐊᒻᒪᓗ ᓴᐳᒻᒥᒃᓰᕕᐅᕙᓗ ᓱᓇᓄᑦ
Site A	Scientific/International Polar Year Research	Municipal	A 2018 feasibility study examined Site A for potential use as a raw water intake	Unknown	Site A is situated within the municipal limits of the City of Iqaluit
Site B1	Scientific/International Polar Year Research	Municipal	A 2018 feasibility study examined Site B1 for potential use as a raw water intake	Unknown	Site B1 is situated within the municipal limits of the City of Iqaluit
Site B2	Scientific/International Polar Year Research	Municipal	A 2018 feasibility study examined Site B2 for potential use as a raw water intake	Unknown	Site B2 is situated within the municipal limits of the City of Iqaluit

ᓄᓇᓕᐅᑉ ᐃᓚᐅᖃᑕᐅᓂᖓ ᓄᓇᓖᑉᓗ ᐊᕕᒃᑐᖅᓯᒪᐅᕐᓂᖓᓄᑦ ᐃᑲᔪᑕᐅᔫᓐᖅᑐᑦ

ᓄᓇᓕᒥᔭᖅ	ᐊᑎᑦ	ᑲᑐᔾᔨᐊᖃᑎᒌᒥᔭᖅ	ᖃᖓᓗ ᑐᓴᖅᑎᑕᐅᓚᐅᕆᐊᖏᓐᓂᒃ
ᐃᖃᓗᐃᑦ	Manasie Mark	Amaruq Hunters and Trappers Association	2018-08-01
ᐃᖃᓗᐃᑦ	Michael	Amaruq Hunters and Trappers Association	2018-08-16

ᓚᐃᓴᓐᓰᑦ ᐱᒧᖕᓇᐅᑏ ᐊᖏᖅᑕᐅᓯᒪᔪᑦ

ᓇᒦᒥᐊᖅᒥᓐᓂᒃ ᐱᓕᕆᐊᕆᕝᕕᐅᓂᐊᖅᑐᑦ ᑎᑎᕋᕐᓗᒥᑦ:

South Baffin

ᓚᐃᓴᓐᓰᑦ ᐱᒧᖕᓇᐅᑏ ᐊᖏᖅᑕᐅᓯᒪᔪᑦ

ᒐᕙᒪᒥᔭᐅᔫᑉ ᐊᕕᒃᑐᖅᓯᒪᐅᕐᓂᖓᓐᓂ ᒪᓕᒐᕐᓅᖓᔪᓂᒃ ᐱᕐᑯᔭᕐᓅᖓᔪᓂᒡᓗ ᑲᒪᔩᑦ ᐱᔪᖕᓇᐅᑎᑖᕈᑎᓂᒃ ᓚᐃᓴᓐᓯᓄᑦᓗ ᑲᔪᓯᒃᑲᐃᔩᑦ	ᖃᓄᐃᑦᑐᓪᓚᓇᐅᑉ ᓚᐃᓴᓐᓯᑖᕈᑕᐅᔪᖅ ᐱᔪᖕᓇᐅᑎᑖᕈᑕᐅᔪᖅ ᐊᖏᖅᑕᐅᔪᕐᓘᓐᓃᑦ	ᒫᓐᓇ ᖃᓄᐃᓕᖓᕙ	ᐅᓪᓗᒥ ᑐᓂᔭᖅ/ ᑐᒃᓯᖅᑑᑕᐅᓚᐅᖅᓯᒪᔪᖅ	ᑭᒡᓕᖃᕐᕕᖓ
ᓄᓇᕗᒥ ᖃᐅᔨᓴᖅᑐᓕᕆᔨᒃᑯᑦ	Scientific Research Licence	Applied, Decision Pending		

Project transportation types

Transportation Type	ᓱᓇᒧᑦ ᐊᑐᒐᐅᓂᐊᖅᐸ	Length of Use
Air	Access to Iqaluit, by out-of-town field personnel (up to two) will be via commercial scheduled flights	
Land	Access to Site A, Site B1, and Site B2 will be overland on existing roads and trails, via truck and ATV	

Project accomodation types

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ᐱᖅᓂ ᐊᖏᕆᔨᖅ ᐊᑐᖅᑕᐅᓂᐅᖏᔨᖅ ᐃᓕᖅᓱᐅᑎᓄᕆᑦ ᐃᓱᑕᐃᑦ, ᒥᑦᓄᐊᕐᑭᑎᑦ, ᖃᖅᑲᑕᓱᖅ, ᓄᓇᓱᐅᑦ ᐊᓱᖏᑦᓄ

ᐊᖏᕆᔨᖅ ᐱᖅᓂ ᐊᑐᖅᑕᐅᓂᐅᖏᔨᖅ ᖃᖅᓄᐃᑦᑐᓂᖅᑲ	ᖃᖅᑦᓱᐅᐅᑦ	ᐊᖏᕐᓂᖏᑦ - ᐳᖅᑐᓂᖏᑦ	ᓱᓇᒧᑦ ᐊᑐᖅᑕᐅᓂᐊᖅᐸ
ATV	4	4 x 3 ft	For access to Site A and Site B (1 & 2) along the Sylvia Grinnell River; transportation within the community
Truck	1	15 x 6 ft	Access/transportation within Iqaluit
Geotechnical Equipment	200 lbs	Unk.	Includes sledge hammer, cables, geophones, low-speed blast charges; to complete geotechnical survey at Site A and Site B
Remote-controlled boat	1	3 x 6 ft	Remote-controlled survey boat, battery-powered, equipped with depth sounding and survey equipment; to complete bathymetric surveys at Site A and Site B

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ᓱᓇᒧᑦ ᐅᖃᓱᐊᓚᑦᑎᐊᖅ ᐊᑐᖅᑕᐅᓂᐊᖅᐸ	ᖃᖅᑦᓱᐅᐅᑦᑐᑦᓯᓇᐅᔪᑦ ᐅᖃᓱᐊᓚᑦᑎᐊᖅ	ᖃᖅᑦᓱᐅᐅᔪᖃᖅᐅᑎᑦ	ᐃᓱᓚᐅᑦ ᐃᒪᖃᖅᑎᑎᓂᐊᕐᓇᕐᓂᖏᓐᓄᑦ	ᑲᑎᒪᓗᒍ	ᐃᓱᓚᐃᑦ ᐊᒥᓱᓂᖏᑦ	ᓱᓇᒧᑦ ᐊᑐᖅᑕᐅᓂᐊᖅᐸ
Diesel	fuel	0	50	0	Liters	Fueling of rental truck (if diesel truck used); only to be completed at in-town fueling stations
Gasoline	fuel	0	40	0	Liters	Fueling of ATVs and rental truck (if gasoline truck used); only to be completed at in-town fueling stations - no re-fueling out near the Sylvia

						Grinnell River or on existing trails

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ᐅᓪᓗ ᑕᒧᖅ ᐊᑐᖅᑕᐅᓂᐊᖅᑐᖅ	ᖃᓄᖅ ᐃᒥᖅᑕᖃᖅᑕᕐᓂᐊᖅᐸᑦ	ᓇᑭᑦ ᐃᒥᖅᑕᖃᖅᑕᕐᓂᐊᖅᐸᑦ
0		

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ᐊᑲᑕᔪᓕᓇᓂᐊᕐᓂᖅ

ᐱᓕᓇᐊᓇᔭᐅᔾᔨᒪᔨᒍᑦ ᐱᓕᓇᐊᓇᔭᐅᓂᐊᖅᑐᖅ	ᖃᓄᐃᐃᑦᑐᖅ ᐊᑲᑕᔪᖅ	ᖃᓄᐃᑎᒋ ᐊᑲᑕᔪᑦ ᓴᖅᑭᐊᓂᐊᖅᑐᓇᔭᐅᕐᓗᑦ	ᖃᓄᐃᓂᖅ ᐊᑲᑕᖅᑕᐅᓂᐊᖅᓯ	ᓴᓗᒪᖅᓴᐅᑎᑲᑲᓄᓂᐅᓂᐊᖅᑐᑦ
Scientific/International Polar Year Research	ᐊᑲᑕᔪᑦ ᐃᓄᐊᓕᑕᐅᔾᔪᓇᖅᑐᑦ	< 1 cubic metre	Domestic waste, from field personnel lunches and inert blast caps following the geotechnical survey, will be disposed of via Iqaluit's municipal waste collection system.	n/a

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Environmental impacts associated with the field study are expected to be negligible. The sites will be accessed using existing roads and trails via ATV and/or truck. The ATVs will be equipped with small spill kits to manage any small spills or leaks that may occur. The non-intrusive geotechnical survey will not cause any ground or land disturbance and the remote-controlled, battery-powered survey boat, used in the river, will be clean of any potential contaminants before entering the river. Potential fisheries effects from the geotechnical survey are also expected to be minimal and not cause residual serious harm to fish. Erosion and sediment control measures will be used to reduce the risk of erosion of bank sediments into the river, or the potential for run-off from the survey area to enter the river. All geotechnical work will also occur on-land (not in the river) and geotechnical blast charges will be low-speed and, as a result, below known thresholds that cause effects to fish (i.e., Linton et al. 1985, DFO 2010).

Additional Information

SECTION A1: Project Info

SECTION A2: Allweather Road

SECTION A3: Winter Road

SECTION B1: Project Info

SECTION B2: Exploration Activity

SECTION B3: Geosciences

SECTION B4: Drilling

SECTION B5: Stripping

SECTION B6: Underground Activity

SECTION B7: Waste Rock

SECTION B8: Stockpiles

SECTION B9: Mine Development

SECTION B10: Geology

SECTION B11: Mine

SECTION B12: Mill

SECTION C1: Pits

SECTION D1: Facility

SECTION D2: Facility Construction

SECTION D3: Facility Operation

SECTION D4: Vessel Use

SECTION E1: Offshore Survey

SECTION E2: Nearshore Survey

SECTION E3: Vessel Use

SECTION F1: Site Cleanup

SECTION G1: Well Authorization

SECTION G2: Onland Exploration

SECTION G3: Offshore Exploration

SECTION G4: Rig

SECTION H1: Vessel Use

SECTION H2: Disposal At Sea

SECTION I1: Municipal Development

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SITE ASite A is at the end of the Iqaluit Airport (YFB) runway and near the northern border of the Sylvia Grinnell Territorial Park . The site is a deep run following a riffle and located on a gradual bend to the west. The channel is approximately 150 m wide and river's thalweg is poorly pronounced but running in the middle of the channel. Substrates consist of large coarse material, primarily large cobble and boulders. A bedrock outcrop is present and is the site of the WSC hydrometric station 10UH001. The outcrop protrudes into the flow path slightly and it was noted that this protrusion was not sufficient to induce scour in the bed substrate. Erosion of the left bank is minimized by the presence of the outcrop.SITE BSite B (1 and 2) is a run located on a more pronounced outside bend of the river. The left (north) bank at Site B is actively eroding and would require stabilization for any infrastructure placed at this site. A bedrock outcrop is present downstream and that outcrop runs under the thalweg at a shallow depth. It is anticipated that the outcrop provides some limit to the progression of erosion at left bank. Bed substrates consist of cobble and large gravel with the occasional boulder. The high banks are comprised of loose gravel and sand and the extent of the bedrock in the left bank is unclear. The river's thalweg is moderately pronounced and runs near the outside of the bend. At the time of the site visit (August 2017), a depth of 1.5 m was measured near the thalweg. Its potential depth may also be limited by the downstream bedrock. The channel is 130 m wide but the shallow slip-off slope on the inside of the bend (right [south] bank) suggests flood flow is not confined at this location and may further limit the deepening of the thalweg by existing processes. The profile of the bend suggests the thalweg will never run up against the toe of the bank and the observed depth of the thalweg may be at its limit without the addition of training structures.

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The Sylvia Grinnell River supports an anadromous population of Arctic char (Gallagher and Dick 2010). Arctic char (Salvelinus alpinus) exhibit anadromous and freshwater resident populations and are found in rivers, lakes, estuaries, and marine environments throughout their life cycle (Evan et al. 2002). Anadromous Arctic char that are part of the fishery in the area migrate to marine waters during the summer to feed and return to freshwater habitats to overwinter and spawn. Arctic char use the Sylvia Grinnell River for migration, overwintering, spawning and rearing; however, it is believed that most char likely overwinter and spawn in Sylvia Grinnell Lake. Personal communication with DFO (C. Lewis, 21 August 2017) indicate that large deep pools in the Sylvia Grinnell River are also used for

overwintering. The Arctic char population in the Sylvia Grinnell River is an important resource for subsistence and recreation of people in Iqaluit (DFO 2013). Unfortunately, current stock abundance estimates are not available for the Sylvia Grinnell Arctic char. During a 2009 to 2011 mark-recapture study by DFO, insufficient fish were recaptured and estimates could not be developed (DFO 2013b). DFO is currently completing a five-year study to evaluate stock status of Sylvia Grinnell Arctic char; the study is expected to be complete by 2020 (Ducharme 2016).There has been some concern about the Arctic char population in the Sylvia Grinnell River due to historical exploitation. A commercial fishery was attempted in the late 1940s and late 1950s, at the Sylvia Grinnell estuary (in addition to subsistence and recreational fishing), however the fishery was closed due to declining catch-per-unit-effort (CPUE) and smaller-sized fish (Kristofferson and Sopuck 1983; Gallagher and Dick 2010). An assessment of the stock in the late 1970s indicated that it had not yet recovered from the exploitation in the 1940s and 1950s, based on the size and age composition of the stock, and it was thought that current subsistence and recreational fishing rates were likely preventing recovery (Kristofferson and Sopuck 1983). More recent assessments in 2002 and 2004 suggest some recovery of the stock since the late 1970s, based on increased length-at-age, increased mean weight, longer and older fish, reduced mortality rates, and improved CPUE (Gallagher and Dick 2010). The 2009 to 2011 DFO mark-recapture study found some recovery of the stock from the 1970s/1980s, based on the stock age structure, and estimated age-at-maturity (8 to 9 years) and proportion of reproductive fish (DFO 2013b). However, it is believed that the population has not yet returned to that of the late 1940s when a large portion of the population was estimated between 12 and 23 years of age (DFO 2013b). SITE ASite A has a riffle flowing into a deep run associated with backwater formed from gravel deposits upstream of a bedrock intrusion on the east bank. The river channel is approximately 150 m wide at the bedrock intrusion. Water depth is primarily less than 1 m, with depths exceeding 1 m in the backwater and likely in locations in the main channel. Substrates consist of large coarse material, primarily large cobble and boulders with bedrock intrusions. Substrates in the backwater had a deposition layer of fine sediment.Deep backwater pool habitat along the east bank, upstream of the WSC hydrometric station may provide habitat for downstream migrating young Arctic char and the backwater pool may provide rearing habitat for Arctic char and habitat for small fish, such as stickleback species. Site A is unlikely to provide overwintering habitat to adult Arctic char due to shallow water depths. SITE BSite B is run habitat along the east bank, turning into a riffle, then a rapid formed at the downstream end where a bedrock intrusion narrows the channel. Sub-site B1 and B2 are adjacent, with B2 being upstream at the mid-point of the bend and B1 being at the lower portion of the bend. The channel is approximately 130 m wide. Along the middle and upstream portions of the east bank, substrates consist of cobble and large gravel, with high loose gravel banks. Occasional boulders provide instream cover. Site B is unlikely to provide overwintering habitat due to low water depth, nor act as a holding pool for upstream migratory Arctic char. Nearshore habitat would provide cover for downstream moving fish, but rearing habitat is poor because of the absence of cover.

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Site A and Site B (1 and 2) are situated within the municipal limits of the City of Iqaluit. Iqaluit has been ranked as the fastest growing community in Nunavut, and between 2001 and 2006, was among the top 15 fastest growing communities in Canada (City of Iqaluit 2010). The Nunavut Bureau of Statistics (2014) provides population projections, currently based on the 2011 Canadian census, and estimates a 5.5% population increase in Iqaluit over the next five years, from 2018 to 2022 (from 7,881 individuals, to 8,318). However, based on the 2016 Canadian census, Iqaluit has already experienced a 15.5% population increase between 2011 and 2016, from 6,699 individuals (2011) to the current estimate of 7,740 individuals (Statistics Canada 2017). Based on the 2016 Canadian census (Statistics Canada 2017), the unemployment rate in Iqaluit is 9.6%. Of the workforce 15 years of age and older (5,675 individuals), 74% are employed and the primary occupations include those in education, law, social, community and government services (935 individuals), as well as business, finance and administration (915 individuals), and sales and service (795 individuals).

Miscellaneous Project Information

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Environmental impacts associated with the field study are expected to be negligible. The sites will be accessed using existing roads and trails via ATV and/or truck. The ATVs will be equipped with small spill kits to manage any small spills or leaks that may occur. The non-intrusive geotechnical survey will not cause any ground or land disturbance and the remote-controlled, battery-powered survey boat, used in the river, will be clean of any potential contaminants before entering the river. Potential fisheries effects from the geotechnical survey are also expected to be minimal and not cause residual serious harm to fish. Erosion and sediment control measures will be used to reduce the risk of erosion of bank sediments into the river, or the potential for run-off from the survey area to enter the river. All geotechnical work will also occur on-land (not in the river) and geotechnical blast charges will be low-speed and, as a result, below known thresholds that cause effects to fish (i.e., Linton et al. 1985, DFO 2010).

Cumulative Effects

No cumulative effects from the Project are expected given its short duration and negligible environmental impacts

Impacts

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	PHYSICAL	Designated environmental areas	Ground stability	Permafrost	Hydrology / Limnology	Water quality	Climate conditions	Eskers and other unique or fragile landscapes	Surface and bedrock geology	Sediment and soil quality	Tidal processes and bathymetry	Air quality	Noise levels	BIOLOGICAL	Vegetation	Wildlife, including habitat and migration patterns	Birds, including habitat and migration patterns	Aquatic species, incl. habitat and migration/spawning	Wildlife protected areas	SOCIO-ECONOMIC	Archaeological and cultural historic sites	Employment	Community wellness	Community infrastructure	Human health
ᓴᓇᓂᖅ																									
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ᐅᔨᕋᑲᑦᓂᖅ																									
Scientific/International Polar Year Research		-	-	-	-	N	-	-	-	N	-	-	-		-	-	-	N	-		-	-	-	-	-
ᐃᑐᑦᑎᓇᓂᖅ																									
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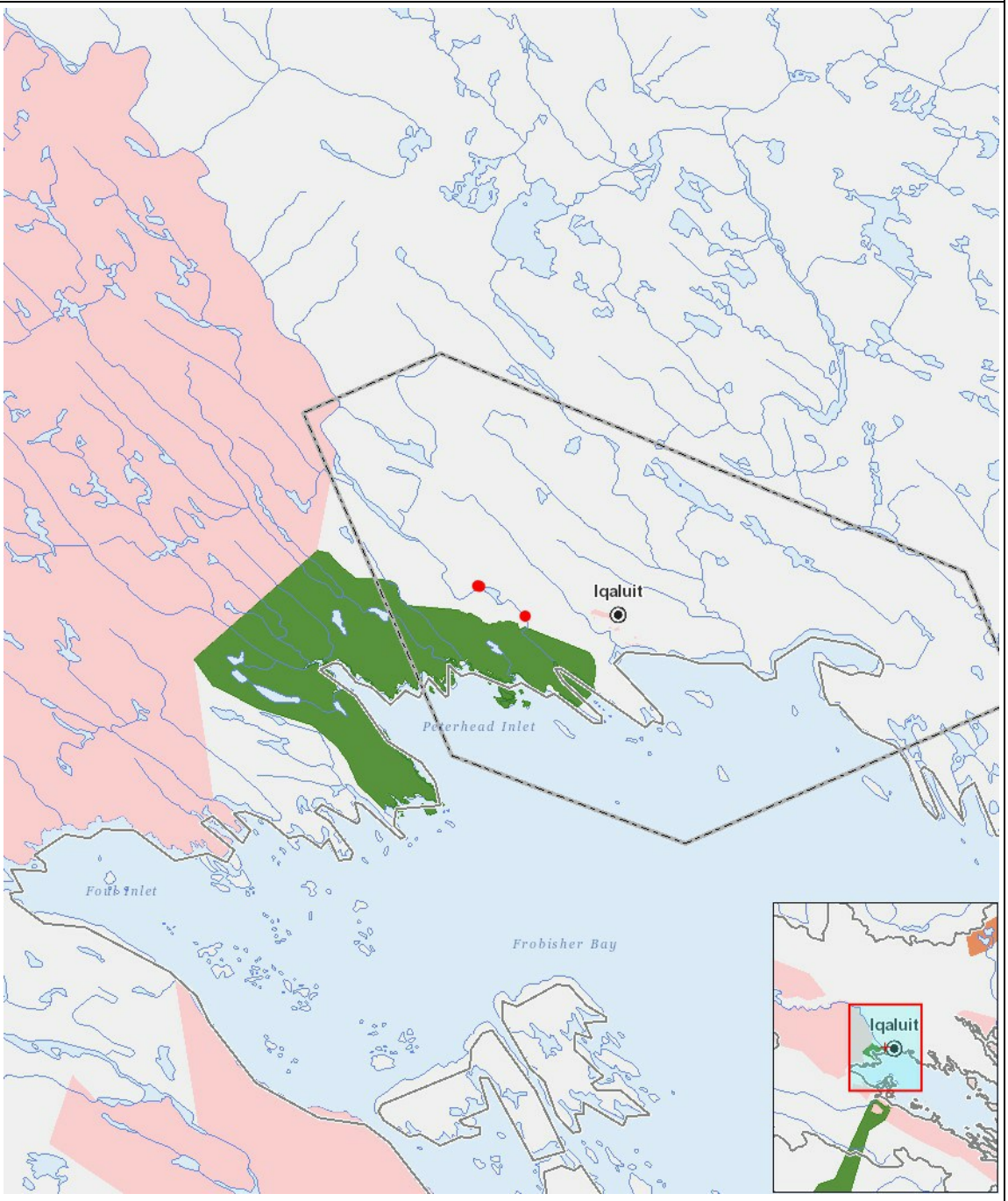
(P = ᐊᑲᐅᔪᑭᑎᔨᓇᖅᑐᑦ, N = ᐊᑲᐅᖅᑭᓴᔨᑕᐅᔨᓇᖅᑐᑦ ᕿᓕᐅᒥᓴᔪᖅᑐᑕᐅᔨᓇᖅᑐᓕᖅᓗ, M = ᐊᑲᐅᖅᑭᓴᔨᑕᐅᔨᓇᖅᑐᑦ ᕿᓕᐅᒥᓴᔪᖅᑐᑕᐅᔨᓇᖅᑐᓕᖅᓗ, U = ᖁᐅᐅᓴᒪᓇᖅᑭᑐᑦ)

PROJECT MAP



LIST OF PROJECT GEOMETRIES:

1	point	Site A
2	point	Site B1
3	point	Site B2