



NIRB Uuktuutinga Ihivriughikhamut #125883

Baseline Studies for Qikiqtarjuaq Marine Infrastructure

Uuktuutinga Qanurittuq:	New
Havaap Qanurittunia:	Alaanut
Uuktuutinga Ublua:	2/13/2024 7:18:49 AM
Period of operation:	from 2024-04-01 to 2024-09-30
Havauhikhaq	Justin
Ikayuqtinga:	Government of Nunavut PO Box 1000 Stn 620 Iqaluit Nunavut (NU) X0A 0H0 Canada Hivayautit Nampanga:: 867-975-5441, Kayumiktukkut Nampanga::

QANURITTUT

Tukihiannaqtunik havaariyaumayumik uqauhiyun

Qablunaatitut: CBCL Limited (CBCL) has been retained by Government of Nunavut (GN) to provide architectural and engineering services for a deep-water port facility in Qikiqtarjuaq Nunavut. To support the design, CBCL along with their sub-consultants propose to carry out baseline field studies and traditional knowledge or Inuit Qaujimajatuqangit (IQ) gathering in the spring and summer of 2024 to assess the proposed port area and quarry locations. The information obtained will be used to design the deep-water port facility, to evaluate the environmental risks, and to obtain the necessary permits to construct the port. The field studies planned for spring and summer 2024 in Qikiqtarjuaq include the following: •Geotechnical investigation •Terrestrial surveys (wildlife, vegetation, topographic) •Marine surveys (marine fish and habitat, marine mammals, water and sediment quality, bathymetry, tides) •Archaeological assessment •IQ gathering The baseline field studies will be carried out in Qikiqtarjuaq, primarily in the area planned for the future marine infrastructure. The Study Area includes a Marine Study Area in Broughton Channel surrounding the future marine infrastructure, an Upland Study Area, and three potential quarry locations. The purpose of the baseline field studies and IQ gathering is to collect baseline information to support the design and permitting of the Qikiqtarjuaq Marine Infrastructure project. The geotechnical drilling program is needed to evaluate the ocean bottom sediments in the proposed port area, obtain sediment samples for physical and chemical analysis, and obtain bedrock core. The environmental baseline field program, archaeological assessment and IQ gathering will be done to gather background knowledge about the study area, determine the potential impacts of the Qikiqtarjuaq infrastructure project, and develop appropriate mitigation and monitoring plans. The baseline field studies and IQ gathering will be carried out over the late winter, spring, and summer of 2024. The geotechnical site program will be conducted over 10 to 15 days between April 1 and May 4, 2024. The environmental baseline field program and archaeological assessment will be completed over five to six days between July 15 and August 30, 2024. The IQ gathering will take place over two to four days between May 1 and August 30, 2024.

Uiviitutut: Le gouvernement du Nunavut a sélectionné la société CBCL Limited (CBCL) afin qu'elle fournisse des services d'architecture et d'ingénierie dans le cadre d'un projet de construction d'une installation portuaire en eau profonde à Qikiqtarjuaq, au Nunavut. Pour appuyer la conception, CBCL et ses sous-experts-conseils proposent de mener des études de référence sur le terrain ainsi que des collectes de connaissances traditionnelles, ou Qaujimajatuqangit Inuit (QI), au printemps et à l'été 2024 afin d'évaluer les propositions de zone portuaire et d'emplacements de carrière. Les renseignements ainsi recueillis serviront à concevoir l'installation portuaire en eau profonde, à évaluer les risques environnementaux et à obtenir les permis nécessaires pour la construction du port. Les études sur le terrain prévues pour le printemps et l'été 2024 à Qikiqtarjuaq comprennent ce qui suit : •une étude géotechnique; •des levés terrestres (faune, végétation, topographie); •des levés marins (habitat et poissons marins, mammifères marins, qualité de l'eau et des sédiments, bathymétrie, marées); •une évaluation archéologique; •des collectes de QI. Les études de référence sur le terrain seront réalisées à Qikiqtarjuaq, principalement dans la zone prévue pour l'infrastructure maritime. La zone d'étude comprend une zone d'étude marine dans le chenal Broughton entourant la future infrastructure maritime, une zone d'étude de haute terre et trois potentiels emplacements de carrière. Le but des études de référence sur le terrain et des collectes de QI est de recueillir de l'information de base qui sert à appuyer la conception du projet d'infrastructure maritime de Qikiqtarjuaq et la délivrance de permis pour ce dernier. Le programme de forage géotechnique est nécessaire pour évaluer les sédiments du fond océanique dans la zone portuaire proposée, recueillir des échantillons de sédiments aux fins d'analyse chimique et physique, et prélever du noyau rocheux. L'évaluation archéologique, les collectes de QI et le programme sur les données environnementales de référence sur le terrain seront réalisés afin de recueillir des connaissances de base sur la zone d'étude, de déterminer les répercussions possibles du projet d'infrastructure de Qikiqtarjuaq et d'élaborer des plans d'atténuation et de surveillance appropriés. Les études de référence sur le terrain et les collectes de QI seront menées à la fin de l'hiver, au printemps et à l'été 2024. Le programme géotechnique du site sera effectué sur une période de 10 à 15 jours entre le 1er avril et le 4 mai 2024. L'évaluation archéologique et le programme sur les données environnementales de référence sur le terrain seront réalisés sur une période de 5 à 6 six jours entre le 15 juillet et le 30 août 2024.

Inuktitut:

Personnel

Days on site: 22

Operations Phase: from 2024-04-01 to 2024-09-30

Hulilukaarutit

Inigiya	Hulilukaarut Qanurittuq	Nunannga Qanurittaakhaanik	Initurlinga qanuritpa	Initurlinga utuqqarnitat unaluuniit Ingilraaqnitat Uyarannguqtut akhuurninnga	Qanitqiyauyuq qanitqiamut nunallaat kitulluuniit ahiruqtaliyainnit nuna
Upland/Quarry Study Areas	Baseline data	Municipal	Qikiqtarjuaq was established as a hamlet in 1979. Prior to 1955, when a Distant Early Warning (DEW) line station was built on Broughton Island, Qikiqtarjuarmiut used the area seasonally or occasionally for hunting, fishing and trading. After establishment of the DEW line station, Qikiqtarjuarmiut began to settle on the island.	There are remnant structures including rock and sod houses, indicating traditional habitations and burial sites along the coast of Qikiqtarjuaq, remnants of the Thule culture.	The work will be carried out in the Hamlet of Qikiqtarjuaq. The closest protected area is Auyuittuq National Park, approximately 20 km southwest of the study area.
Marine Study Area	Baseline data	Municipal	Qikiqtarjuaq was established as a hamlet in 1979. Prior to 1955, when a Distant Early Warning (DEW) line station was built on Broughton Island, Qikiqtarjuarmiut used the area seasonally or occasionally for hunting, fishing and trading. After establishment of the DEW line station, Qikiqtarjuarmiut began to settle on the island.	None identified	The work will be carried out in the Hamlet of Qikiqtarjuaq. The closest protected area is Auyuittuq National Park, approximately 20 km southwest of the study area.

Nunaliin Ilauyun, Aviktuqhimayuniitunullu Ikayuuhiarunguyun

Nunauyuq	Atia	Timiuyuq	Upluani
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			Uqaqatigiyaungmata
Qikiqtarjuaq	Daisy Arnaquq	Mayor - Hamlet of Qikiqtarjuaq	2023-12-12
Qikiqtarjuaq	Geela Kooneeliusie	SAO - Hamlet of Qikiqtarjuaq	2023-12-12
Qikiqtarjuaq	Daisy Nuqingaq	Hamlet of Qikiqtarjuaq	2023-12-12
Qikiqtarjuaq	Edelmira Cabugao	Hamlet of Qikiqtarjuaq	2023-12-12
Qikiqtarjuaq	Samuel Nuqingaq	Hamlet of Qikiqtarjuaq	2023-12-12
Qikiqtarjuaq	Arthur Nicomeyes	Hamlet of Qikiqtarjuaq	2023-12-12
Qikiqtarjuaq	Geela Qiyuqtaq	Nattivak Hunters and Trappers Association	2023-12-12
Qikiqtarjuaq	Jordon Audlakiak	Nattivak Hunters and Trappers Association	2023-12-12
Qikiqtarjuaq	Tommy Atsanilk	Nattivak Hunters and Trappers Association	2023-12-12
Qikiqtarjuaq	Lizzie Natsiapik	Nattivak Hunters and Trappers Association	2023-12-12
Qikiqtarjuaq	Lucyanna Nookiguak	Nattivak Hunters and Trappers Association	2023-12-12
Qikiqtarjuaq	Juilie Kuksiak	Nattivak Hunters and Trappers Association	2023-12-12
Qikiqtarjuaq	Ahmie Nauyavik	Nattivak Hunters and Trappers Association	2023-12-12
Qikiqtarjuaq	Jonah Audlakiak	Nattivak Hunters and Trappers Association	2023-12-12
Qikiqtarjuaq	Stevie Aulaqiaq	Qikiqtani Inuit Association	2023-12-12
Qikiqtarjuaq	Lorne Kullualik	Qikiqtani Inuit Association	2023-12-12
Qikiqtarjuaq	Mia	Economic Development Officer - Hamlet of Qikiqtarjuaq	2023-12-12
Iqaluit	Romeyn Stevenson	Qikiqtani Inuit Association	2023-12-13
Iqaluit	Navarana Beveridge	Qikiqtani Inuit Association	2023-12-13

Angiuttauvaktunik

Naunaiqlugu nunanga talvani havauhikhaq ittuq:

Angiuttauvaktunik

Munariniqmut Ayuittiaqtuq	Angirutinga Qanurittuq	Tadja Qanurittaakhaanik	Ublua Tuniyauyuq/Uuktuqtuq	Umikvikhaa Ublua
Nunavunmi Ihivriuqniqmut Timiqutigiyanga	Social Sciences Research License	Not Yet Applied		
Nunavut Kavamanga, Avatiliriyikkut	Wildlife Research Permit	Not Yet Applied		
Iqalukhiurniqmut Tariuqmilu Kaanata	License to Catch Fish for Scientific Purposes	Not Yet Applied		
Government of Nunavut, Department of Culture, Language, Elders, and Youth	Class 1/Class 2 Nunavut Territory Archaeologist Permit	Not Yet Applied		

Project transportation types

Transportation Type	Qanuq Atuqtauniarmangaa	Length of Use
Water	Boat (provided by community member)	
Land	Pick-up trucks	

Project accomodation types

Nunauyuq

Ihuaqutivaluin Atuqtauyukhan

Hanalrutit atuqtaunahuat (ukuallu ikuutat, pampiutainnik, tingmitinik, akhaluutinik, hunaluuniit)

Hanalrutit Qanurittuq	Qaffiuyut	Aktikkulaanga – Qanurittullu	Qanuq Atuqtauniarmangaa
Motorboat	1	Approx. 5 to 8 m	Marine baseline studies (fish, plankton, benthos, sediment sampling)
Coring/Sampling CME Drill Rig on skids with Drill shack	1	approx. 5 m x 6 m	geotechnical coring/sampling
Front-end loader	1	TBD	transportation of drill rig and shack
Pick-up trucks	4	approx. 2 m x 6 m	personnel and equipment transportation
Diesel generators	2	approx. 2 m x 3 m	portable power source for drill shack
Water pump	1	approx. 0.5 m x 0.5 m	marine water for drilling
Herman nelson heaters	2	approx. 1 m x 2 m	heat for drill shack
Oil-fired coil heaters for waterline	1	approx. 1 m x 2 m	prevent waterline freezing
Survey equipment (binoculars, spotting scope, tape measure, iPad, GPS, noise meter, camera, hand lens, plant press, transit/total station)	1	approx. 0.5 m x 0.5 m x 0.5 m	Field data collection (vegetation, wildlife, topographic, noise)
Remotely operated boat	1	approx. 1 m x 1.5 m	Bathymetric survey
Underwater camera or underwater ROV	1	approx. 1 m x 1.5 m	Fish and fish habitat surveys
Survey equipment (fishing equipment, depth sounder, sediment sampler, water sampler, water meter, plankton tow nets, GPS, transect line, sample jars, coolers)	1	approx. 0.5 m x 1 m x 0.5 m	Fish and fish habitat surveys, sediment sampling, water quality sampling
Tide gauge	1-2	approx. 3.5 m x 0.5 m	Water level measurement
Current meter	1-2	approx. 1 m x 0.75 m	Water current measurement
Survey equipment (tape measure, iPad, GPS, trowels, brushes)	1	approx. 0.15 m x 0.15 m x 0.15 m	Field data collection (archaeology)

Qanurittuq Urhuqyuaq unalu Qayangnaqtut Hunavaluit Aturninnga

Qanurittuq urhuqyuaq hunavaluit aturninnga:	Urhuqyuaq Qanurittuq	Qaffiuyut qattaryut	Qattaryuk Aktikkulaanga	Atauttimut Qaffiuyut	Ilanga	Qanuq Atuqtauniarmangaa
Sample preservative	hazardous	1	1	1	Liters	Sample preservation
Diesel	fuel	34	250	8500	Liters	fuel for diesel

						generator and equipment
Gasoline	fuel	17	40	680	Liters	fuel for equipment
Propane	fuel	4	30	120	Lbs	for heating torch
Drilling Mud	hazardous	36	50	1800	Lbs	drilling additive for bedrock coring
Hydraulic oil	hazardous	30	20	600	Liters	Drill rig
0/30 oil	hazardous	30	4	120	Liters	Drill rig
Heavy duty bearing grease	hazardous	64	1	64	Liters	Drill rig
Transmission fluid	hazardous	10	4	40	Liters	Drill rig
SAE 90 transmission oil	hazardous	30	4	120	Liters	Drill rig
Antifreeze	hazardous	68	4	272	Liters	Drill rig

Imaqmik Aturninnga

Ubluq qanuraaluk (m3)	Aturumayain imavaluin utiqittagaani qanuq	Atulirumayain imavaluin utiqittagani humi
38	Marine water will be extracted from the marine environment using a water pump. Water samples will be collected in polyethylene bottles.	The marine environment at or near the borehole location

Iqqakuq

Ikkakunik Munakgiyauyunik

Havauhikhaq Hulilukaarut	Qanurittuq Iqqakut	Ihumagiyauyuq Qanuraaluktut Atuqtait	Qanuq Iqqakuurniarmangaa	Halummaqtirarnirutikhan piyutin
Baseline data	Ikulalaaqtun iqqakuuvaluin	17 garbage bags	Qikiqtarjuaq municipal waste disposal facility	N/A
Baseline data	Hivuuranaqtun iqqakuuvaluin	Four 250 L drums	Packed into sealed containers and transported south for disposal at an approved facility in accordance with regulations	N/A

Avatiliriniqmut Ayurhautingit:

Disturbance of wildlife - Local field assistants will accompany the field program personnel to monitor for disturbance to marine and terrestrial wildlife and their habitat. Drilling will occur when bay is ice covered and marine mammals are not expected to be present. If marine mammals are observed within 500 m of the drilling location, drilling activities will cease until the marine mammal has left the area. Disruption of fish habitat through direct alteration of the seabed, increased turbidity, or accidental spills. The alteration of the seabed is temporary and limited to the small area occupied by each borehole. A low magnitude increase in suspended sediment will be temporary and limited to the area surrounding each in-water borehole. The alteration of the seabed is limited to the small area occupied by each borehole. The borehole diameter will be limited to approximately 10 cm. The amount of fuel and drilling additive will be limited to that required to complete the drilling for each day. A non-toxic, biodegradable drilling additive will be used, if required. Secondary containment will be in place under the drill rig motor. A spill response plan and spill response kit adequate to contain the potential volume of fuel in the equipment will be maintained on-site and implemented in the event of a spill. Loss of fish- DFO's Interim code of practice: End-of pipe fish protection screens for small water intakes in freshwater will be followed. Loss of shellfish - Shellfish mortality may occur where sedentary species are in the direct path of the drill head. This is limited to the small area occupied by each borehole. The drill head will be advanced slowly to allow mobile species to leave the borehole area.

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

Small boat from the community will be used to support marine baseline studies.

SECTION H2: Disposal At Sea

SECTION I1: Municipal Development

Qanurittuq Ittunik Avatinga: Avatingalluanga

Air Quality Ambient air quality is only measured at a few stations in Nunavut and data are not available for Qikiqtarjuaq. Qikiqtarjuaq has air quality that is typical of a remote northern community. There are no large industrial or commercial operations that would impact Qikiqtarjuaq air quality besides the existing airport and three quarries. Ambient air quality data collected by the National Air Pollution Surveillance (NAPS) program in 2016 in Iqaluit, 470 km from Qikiqtarjuaq, showed that the measured concentrations for NO_x, PM_{2.5}, and ozone were below the Nunavut Ambient Air Quality Standards. Generally, the air quality in Iqaluit is good most of the time (Nunami Stantec Limited, 2018). The region has typical air temperatures ranging between lows near -35°C and highs near 10°C (Nunami Stantec Limited, 2018). Winds prevail from north and south-southwesterly directions in Qikiqtarjuaq. They are strongest from the north and northwest in winter, and north and northeast in summer (Nunami Stantec Limited, 2018). Ambient Noise Noise data specific to Qikiqtarjuaq is not available. Natural sounds such as winds, waves, precipitation, marine life, and cracking ice are the most common noises in the Arctic region of Baffin Bay and Davis Strait. Sounds from marine traffic, snowmobiles, non-industrial machinery, and rifle-fire are also present (Nunami Stantec Limited, 2018). Underwater ambient noise levels in the Arctic region vary largely depending on the season and environmental conditions. Weather, ice conditions, marine mammals, and marine traffic are main contributors to underwater noise levels. Ambient Light In late June and early July, there is almost 24-hours of daylight in Qikiqtarjuaq, but just a few hours of daylight during December. A small amount of artificial light is produced, mainly from the residences in Qikiqtarjuaq. Terrain and Soils Most of the terrain on Broughton Island consists of glacial-scoured bare rock. Shorelines around Qikiqtarjuaq typically consist primarily of bedrock with pockets of sand with gravel and cobble veneer. Cryosolic soils dominate what little soil is found in the region. (Nunami Jacques Whitford Limited, 2008). Most of the project area is flat or undulating but is surrounded by hills and mountainous terrain. Surface Water Resources Several intermittent watercourses intersect with roads that will be used to travel from the Hamlet of Qikiqtarjuaq to the Marine and Upland Study Areas and the three quarries that occur within the baseline study area. A river crosses the road that provides access to the quarries. The drinking water reservoir for Qikiqtarjuaq is located a significant distance from the Marine and Upland Study Areas. High terrain separates the drinking water reservoir from the study areas and the three quarries. It is not expected that the drinking water reservoir will be impacted by the baseline studies. Marine Water and Sediment Quality Water in Baffin Bay and Davis Strait exhibits temperatures that range from approximately -1°C in the surface layer (less than 200 m depth), 1°C in the intermediate layer (200-1,000 m depth) and 0°C in the bottom layer (greater than 1,000 m depth) (Nunami Stantec Limited, 2018). Surface water at Qikiqtarjuaq was measured in 2007 and found to range from 0.1°C to 1.2°C (Nunami Jacques Whitford Limited, 2008). The breakup of sea ice in Broughton Channel typically occurs by mid-July to early August. The channel is usually free of ice from July to September and starts to freeze again in early October (ECCC, 2017). Limited information on marine water quality and sediment quality in the Qikiqtarjuaq area currently exist.

Qanurittuq Ittunik Avatinga: Inuuhimayunut Avatinga

Qikiqtarjuaq is located in the Arctic Cordillera Ecozone. The Arctic Cordillera Ecozone consists of an extensive mountain chain, where ice barrens and rock are dominant. Extreme cold, winds and lack of soils on the higher elevations of the ecozone mean few plants or animals are found there, however vegetation and wildlife are present at lower elevations (Canadian Council on Ecological Areas, 2014).

Vegetation is largely absent in the Arctic Cordillera Ecozone, and is mainly limited to hardy plants, mosses, and lichens. The vegetation grows along sheltered coastlines, slopes and animal dense areas. Mosses and lichens such as the Crustose Lichen (*Acarospora badiofusca*) can be found on rocky surfaces (Canadian Council on Ecological Area, 2014). Plants found in the Arctic Cordillera Ecozone include Arctic Poppy (*Papaver radicatum*), Arctic White Heather (*Cassiope tetragona*), Arctic Willow (*Salix arctica*), Bilberry (*Vaccinium uliginosum*), Cottongrass (*Eriophorum angustifolium*), Diapensia, Purple Saxifrage (*Saxifraga oppositifolia*), Moss Campion (*Silene acaulis*), Mountain Aven (*Dryas octopetala*), Mountain Sorrel (*Oxyria digyna*) and River Beauty (*Chamerion latifolium*) (McGill University, 2024).

Wildlife and Habitat

Terrestrial mammals found in the Arctic Cordillera Ecozone include Polar Bears (*Ursus maritimus*), Barren-Ground Caribou (*Rangifer tarandus groenlandicus*), Arctic Wolves (*Canis lupus arctos*), Arctic Hares (*Lepus arcticus*), Collared Lemmings (*Dicrostonyx groenlandicus*), Arctic Foxes (*Vulpes lagopus*), Ermines (*Mustela erminea*), and Wolverines (*Gulo gulo*) (McGill University, 2024). Polar Bears and Barren-Ground Caribou are pushed to land when the sea ice begins to melt in the spring. Birds found in the Arctic Cordillera Ecozone include the Rock Ptarmigan (*Lagopus muta*), Gryfalcon (*Falco rusticolus*), and Snowy Owl (*Bubo scandiacus*). Songbirds that can be found in the Arctic Cordillera Ecozone include the Hoary Redpoll (*Acanthis hornemanni*), Common Redpoll (*Acanthis flammea*), Snow Bunting (*Plectrophenax nivalis*), and Lapland Longspur (*Calcarius lapponicus*). Waterfowl include the Snow Goose (*Anser caerulescens*), Common Eider (*Somateria mollissima*), King Eider (*Somateria spectabilis*), and Red-Throated Loon (*Gavia stellata*). Shore and seabirds found in the coastal areas include Thick Billed Murre (*Uria lomvia*), Black-Legged Kittiwake (*Rissa tridactyla*), Ruddy Turnstone (*Arenaria interpres interpres*), Red Knot (*Calidris canutus*), Black Guillemot (*Cephus grylle*), Common Ringed Plover (*Charadrius hiaticula*), Little Ringed Plover (*Charadrius dubius*), and Northern Fulmar (*Fulmarus glacialis*) (McGill University, 2024). With the exception of the Rock Ptarmigan and the Snowy Owl, the listed birds migrate and are most commonly seen in Nunavut in the spring and summer months. Terrestrial Species at Risk and Species of Conservation Concern

Listed bird and terrestrial mammal species known to occur in or near the Qikiqtarjuaq baseline study areas are shown in the table below (see section 4.1.2.4 of attached document). Likelihood of occurrence in the baseline study areas was based on a traditional knowledge report prepared for the Qikiqtani Inuit Association (Qikiqtani Inuit Association, 2018), Nunavut Coastal Resource Inventory (Nunavut Coastal Resource Inventory, 2010), and Government of Canada information on species at risk in Nunavut (Government of Canada, 2021).

Freshwater Fish and Fish Habitat

Arctic Char (*Salvelinus alpinus*) can be found in freshwater watercourses on Qikiqtarjuaq. The community of Qikiqtarjuaq traditionally harvest Arctic Char from adjacent lakes and rivers (Fisheries and Oceans Canada (DFO), 2016). No watercourses are located within the project area. There are no freshwater resources in the area that the baseline studies will occur. There are a few watercourses in proximity to the airport and hamlet. The most predominant watercourse in the area is the Kuruluk River, which is used for Qikiqtarjuaq's water supply. Marine Fish and Fish Habitat

Qikiqtarjuaq experiences a tidal range of approximately 1.6 m. Subtidal habitats around Qikiqtarjuaq typically consist primarily of fine substrates with limited boulder cover (Nunami Jacques Whitford Limited, 2008). Benthic substrate behind the breakwater at Qikiqtarjuaq consists of mostly sand with more fine silt and limited boulder cover. Limited aquatic vegetation is found nearshore Qikiqtarjuaq and consists primarily of Rockweed (*Fucus* sp.) and some Kelp (*Laminaria longicruris* and *Alaria esculenta*) (Nunami Jacques Whitford Limited, 2008). Sandy and mixed substrates near Qikiqtarjuaq provide suitable habitat for Arctic Soft-shelled Clams (*Mya* spp.) (International Council for the Exploration of the Sea (ICES), 2019). Ice breakup typically occurs from mid June to early July, with Arctic Char (*Salvelinus alpinus*) appearing in the Hamlet of Qikiqtarjuaq later in July, when the ice is fully gone. Arctic Cod (*Boreogadus saida*), sculpins, shellfish and kelp are also commonly harvested from the hamlet (Nunami Jacques Whitford Limited, 2008). Other fish found in Baffin Bay and Davis Strait are American Eel (*Anguilla rostrata*), Atlantic Cod (*Gadus morhua*), Atlantic Salmon (*Salmo salar*), Capelin (*Mallotus villosus*), Greenland Shark (*Somniosus microcephalus*), Grenadier (*Coryphaenoides acrolepis*), Herring (*Clupea harengus*), Northern Wolfish (*Anarhichas denticulatus*), Sand Lance (*Ammodytes hexapterus*) and Greenland Halibut (*Reinhardtius hippoglossoides*) (Qikiqtani Inuit Association, 2018).

Marine Mammals

Marine mammals important to the Qikiqtarjuaq community include seals, Narwhals (*Monodon monoceros*), and Bowhead Whales (*Balaena mysticetus*) (Nunami Jacques Whitford Limited, 2008). Ringed Seals (*Pusa hispida*) and Bearded Seals (*Erignathus barbatus*) can be found on the coast near Qikiqtarjuaq throughout the year, while Hooded Seals (*Cystophora cristata*) and Harp Seals (*Pagophilus groenlandicus*) pass by during open water periods. Atlantic Walruses (*Odobenus rosmarus rosmarus*) and Polar Bears are also found near the coast of Qikiqtarjuaq (Qikiqtani Inuit Association, 2018). Killer Whales (*Orcinus orca*), Atlantic White-Sided Dolphins

(Lagenorhynchus acutus), Harbour Porpoises, (Phocoena phocoena), Minke Whales (Balaenoptera acutorostrata), North Atlantic White Whales (Eubalaena glacialis), and Northern Bottlenose Whales (Hyperoodon ampullatus) have been found in the waters near Qikiqtarjuaq. Beluga Whales (Delphinapterus leucas) were historically more common in the waters off Qikiqtarjuaq, but are rarely seen today (Qikiqtani Inuit Association, 2018). Marine Species at Risk and Species of Conservation Concern Listed marine species known to occur in or near the Qikiqtarjuaq baseline study areas are shown in the table below (see section 4.1.4.4 of attached document). The likelihood of occurrence in the baseline study areas was determined based on a traditional knowledge report prepared for the Qikiqtani Inuit Association (Qikiqtani Inuit Association, 2018), the Nunavut Coastal Resource Inventory (Nunavut Coastal Resource Inventory, 2010), and Government of Canada information on species at risk in Nunavut (Government of Canada, 2021).

Qanurittuq Ittunik Avatinga: Inungit-maniliurutingit Avatinga

Population and Language According to Statistics Canada, the population of Qikiqtarjuaq in 2021 was 593 (Statistics Canada, 2023). The languages spoken are Inuktitut and English. **Education and Employment** Qikiqtarjuaq has a 42.4% employment rate and 33.3% unemployment rate (TriNav Fisheries Consultants Inc. (TFC), 2020). With the decommissioning of the distant early warning line system, the economy of Qikiqtarjuaq has declined (Nunami Stantec Limited, 2018). Employment comes mainly from government and natural resources industries such as fishing. Seal, walrus, narwhal, and Arctic char are commonly hunted and fished for subsistence (Nunami Stantec Limited, 2018). There is also a small clam fishery. A Parks Canada office supports Auyuittuq National Park (Nunami Stantec Limited, 2018). There is also an airport, hotel, and lodge, as well as two supply and retail stores located in Qikiqtarjuaq which provide some employment (TFC, 2020). **Housing and Community Infrastructure** The total number of occupied private dwellings in Qikiqtarjuaq is 160 (Statistics Canada, 2023). Infrastructure in Qikiqtarjuaq includes a hamlet office, RCMP office, fire hall, health centre, maintenance garage, parking garage, power plant, airport, small craft harbour, school, college, daycare, public and staff housing, pool, arena, playground, water system, and wastewater and sewage disposal infrastructure. **Transportation** Existing roads connect the Hamlet of Qikiqtarjuaq to the marine, upland, and quarry study areas. The roads in Qikiqtarjuaq are narrow and gravel surfaced. **Archaeological and Cultural Historic Resources** There are remnant structures including rock and sod houses, indicating traditional habitations and burial sites along the coast of Qikiqtarjuaq, remnants of the Thule culture (Nunavut Coastal Resource Inventory, 2010).

Miscellaneous Project Information

Naunaiyainiq ukuninnga Ayurhautingit unalu Piumayaat Iikiklyuumiutinahuarutit

Disruption of Terrestrial and Marine Wildlife: Terrestrial and marine wildlife may be disturbed and move away from or be attracted to land-based and in-water activities. **Disruption or Injury Due to Underwater Sound:** The use of an underwater borehole drill has the potential to temporarily increase underwater sound levels in the harbour for the duration of the Project. Underwater noise generated by the drilling is not expected to reach levels that are likely to disturb marine mammals and is being carried out when the bay is ice-covered and marine mammals are not expected to be present. **6.3 Sediment and Water Quality** Borehole drilling has the potential to temporarily resuspend a minute quantity of marine sediment into the water column near the borehole, which could potentially affect water quality and temporarily increase suspended sediment near the boreholes during the Project. Marine water will be pumped into the borehole and later returned to the harbour, and contains a moderate quantity of suspended sediment. Temporary impacts associated with increased levels of suspended sediments in the water column may include decreased visibility, avoidance of the Project Area, gill abrasion and potential stress increases, and accidental mortality (Cairns, 2002). **Fish Mortality:** Fish could be drawn into water intakes while pumping water from Broughton Channel for use during drilling. Fish mortality in the harbour may temporarily increase during the Project if fish become impinged on water intake screens or entrained in the water pumping system. Shellfish mortality may occur where sedentary species are in the direct path of the drill head. This is limited to the small area occupied by each borehole. Motile species are expected to temporarily relocate to other areas in the harbour and nearby suitable habitats. These species are expected to return to the Project area soon after completion of the Project. **6.5 Alteration and Destruction of Fish Habitat** Disruption of fish habitat can occur through direct alteration of the seabed, increased turbidity, or accidental spills. The alteration of the seabed due to borehole drilling is temporary and limited to the small area occupied by each borehole. A low magnitude increase in suspended sediment will be temporary and limited to the area surrounding each in-water borehole. **Risk of Spills and Environmental Pollution:** Hazardous materials such as diesel fuel, oil, and lubricants are common on geotechnical worksites as part of the operation and maintenance of drilling

equipment. Proper transportation, storage, and handling of these materials must conform to territorial regulations and guidelines. Suppliers of these materials have recommendations for the appropriate transportation, storage, and handling of these materials, and these will be used in conjunction with best management practices. Disruption of Traditional Use: Traditional use of the Project area is not anticipated to be affected during the completion of the Project.

Tamatkiumayunik Ihuikgutivaktunik

None anticipated

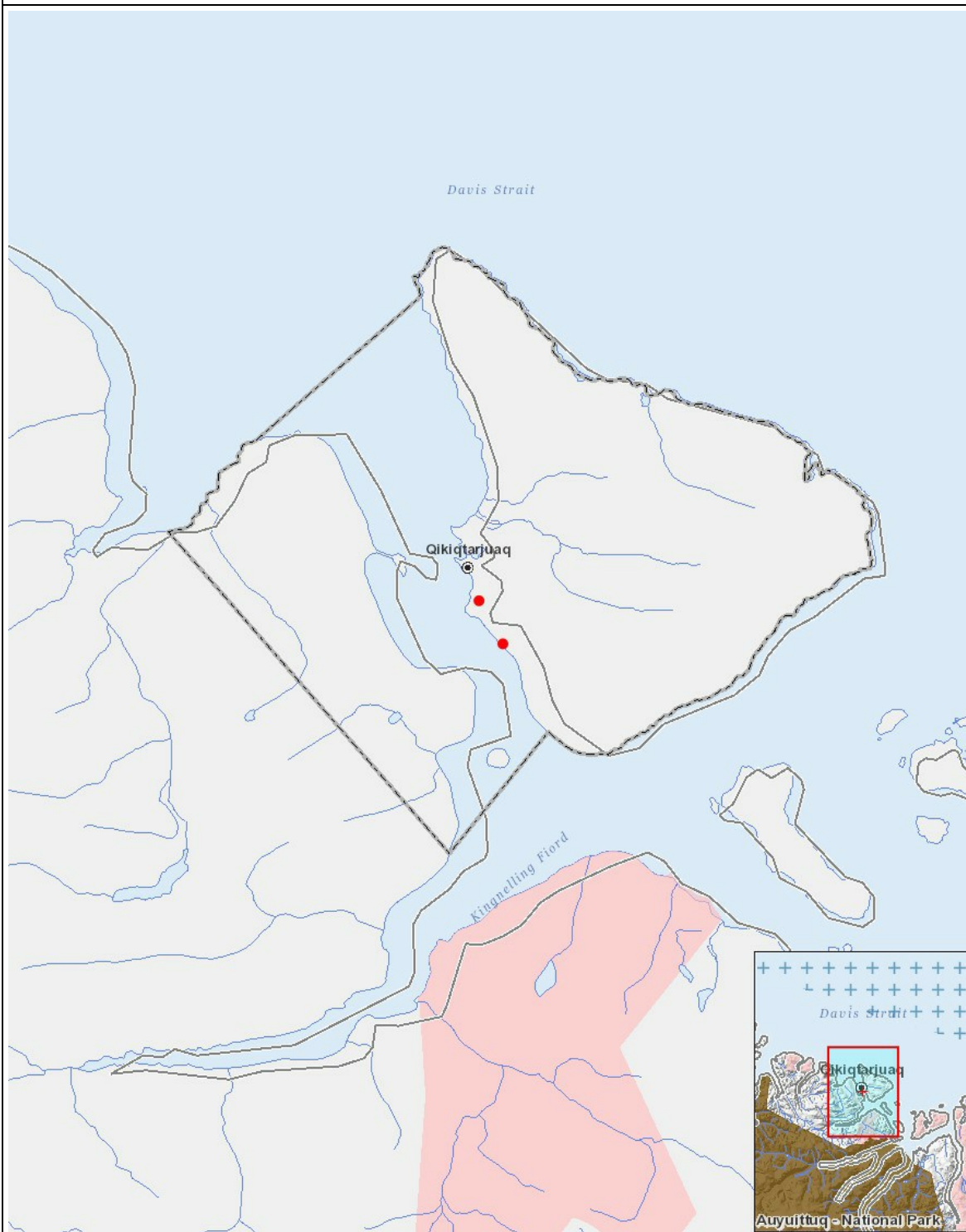
Impacts

Ilitariyauniq Avatiliriniqmut Ayurhautingit

	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
Havakvinga	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aulapkaininnga																									
Baseline data		-	-	-	-	M	-	-	-	M	-	-	M		-	M	-	M	-		-	P	-	-	-
Piiqtauniq	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-		-	-	-	-	-

(P = Nakuuyuq, N = Nakuungittut unalu mikhilimaittuq, M = Nakuungittut unalu mikhittaaqtuq, U = Naluyauyuq)

Havaariyauyukhamut Nayugaa



List of Project Geometries

- | | | |
|---|-------|---------------------------|
| 1 | point | Marine Study Area |
| 2 | point | Upland/Quarry Study Areas |