



NIRB Application for Screening #126136

Resolute Bay Community Harbour Project

Application Type: New

Project Type: Coastal Infrastructure

Application Date: Friday, April 4, 2025

Period of operation: from 2030-03-22 to 2080-03-22

Project Proponent: Justin
Government of Nunavut
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Non-technical project proposal description

[illegible]

Post-Closure Phase: from to

Activities

Location	Activity Type	Land Status	Site history	Site archaeological or paleontological value	Proximity to the nearest communities and any protected areas
Community Harbour Footprint	Dredging	Crown	see Section 1.3 of PSIR Report	in the marine environment N/A	see Section 1.17 of PSIR Report
Community Harbour Footprint	Harbour infrastructure	Crown	see Section 1.3 of PSIR Report	in the marine environment N/A	see Section 1.17 of PSIR Report
Community Harbour Footprint	Marine Based Activities	Crown	see Section 1.3 of PSIR Report	in the marine environment N/A	see Section 1.17 of PSIR Report
Community Harbour Footprint	Offshore Infrastructure (port, break water, dock)	Crown	see Section 1.3 of PSIR Report	in the marine environment N/A	see Section 1.17 of PSIR Report
Northern Quarry Option	Quarry/Borrow pit	Municipal	Please note, while there are two options for the quarry , only one will be selected and used during construction.	An Archaeological Impact Assessment (AIA) was completed in August 2024 under Class 2 Archaeologist Permit 2024-59A and no archaeological sites were recorded within the northern quarry (or within a 100 m buffer). See Sections 5.4.1, 6.5.7, 7.2.3.6 of PSIR Report	see Section 1.17 of PSIR Report
Southern Quarry Option	Quarry/Borrow pit	Municipal	Please note, while there are two options for the quarry, only one will be selected and used during construction.	An Archaeological Impact Assessment (AIA) was completed in August 2024 under Class 2 Archaeologist Permit 2024-59A. Up to five archaeological sites were recorded within the south quarry (and within a 100 m buffer). See Sections 5.4.1, 6.5.7, 7.2.3.6 of PSIR Report	see Section 1.17 of PSIR Report
Haul Route on Existing Road/Track	Access Road	Municipal	see Section 1.6.3 of PSIR Report	An Archaeological Impact Assessment (AIA) was completed in August 2024 under	see Section 1.17 of PSIR Report

				Class 2 Archaeologist Permit 2024-59A and no archaeological sites were recorded within the haul route (or within a 100 m buffer). See Sections 5.4.1, 6.5.7, 7.2.3.6 of PSIR Report	
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Community Involvement & Regional Benefits

Community	Name	Organization	Date Contacted
Resolute Bay	Randy Nungaq	Cabin Owners	2024-08-09
Resolute Bay	Randy Nungaq	Cabin Owners	2024-09-13
Resolute Bay	Randy Nungaq, Randy Idlout	Cabin Owners	2024-12-10
Resolute Bay	Hamlet Council	Hamlet of Resolute Bay	2022-05-13
Resolute Bay		Community Open House	2022-05-13
Resolute Bay	Ian Dudla (SAO)	Hamlet of Resolute Bay	2024-08-08
Resolute Bay	Nancy Amarualik (HTA manager) / Joe Amarualik (crew supervisor)	Resolute Bay HTA / Guardians (Nauttiqsuqtiit)	2024-08-09
Resolute Bay	Ian Dudla and Nancy Amarualik	Hamlet of Resolute Bay and Resolute Bay HTA	2024-09-12
Resolute Bay	Nancy Amarualik / Joe Amarualik	Resolute Bay HTA / Guardians	2024-12-10
Resolute Bay	Ian Dudla (SAO)	Hamlet of Resolute Bay	2024-12-04
Resolute Bay		Community Open House	2024-12-10
Resolute Bay	SAO	Hamlet of Resolute Bay	2021-12-03
Resolute Bay	HTA manager	Resolute Bay HTA	2021-12-03
Resolute Bay	HTA Manager	Resolute Bay HTA	2022-05-13
Resolute Bay	Paddy Agiatusuk, Joadamee Amagoalik, Nancy Amarualik (manager)	Resolute Bay HTA	2018-11-18
Resolute Bay	Tabitha Mullin (Mayor), Martha Idlout, Lori Nungaq, Doreen McDonald, Zipporah Kalluk, Kimberley Young (SAO)	Hamlet of Resolute Bay	2018-11-13
Resolute Bay	Tabitha Mullin (Mayor), Martha Idlout, Lori Nungaq, Jonathan Craig, Steve Piercey (EDO), Kimberley Young (SAO)	Hamlet Council / Hamlet of Resolute Bay	2019-06-04
Resolute Bay	Philip Manik (Chair), Joadamee Amagoalik (Vice-Chair), Paddy Agiatusuk (Board	Resolute Bay HTA	2019-06-03

	Member)		
Resolute Bay	Tabitha Mullin, Martha Idlout (previous councillor), Saroomie Manik, Susan Salluviniq (also QIA CLO), Kimberley Young (SAO)	Hamlet of Resolute Bay	2019-11-08
Resolute Bay	Philip Manik (Chair), Joadamee Amagoalik, Paddy Agiatusuk, Katissie Idlout, Simon Idlout	Resolute Bay HTA	2019-11-09

Authorizations

Indicate the areas in which the project is located:

Authorizations

Regulatory Authority	Authorization Description	Current Status	Date Issued / Applied	Expiry Date
Government of Nunavut, Community and Government Services	Land Use Permit (LUP) for construction above the ordinary high-water line for land tenure under Commissioners or Untitled Municipal lands.	Not Yet Applied		
Other	Nunavut Planning Commission - Conformity Determination	Active	2024-12-15	
Hamlets and Municipalities	quarry permit (to be obtained by the contractor)	Not Yet Applied		
Hamlets and Municipalities	construction camp and laydowns (to be obtained by the contractor)	Not Yet Applied		
Hamlets and Municipalities	development permit for community harbour components that are above the HWL	Not Yet Applied		
Nunavut Water Board	Water License Type B for potential for withdrawal of freshwater or the need to cross freshwater crossings for haul road construction (to be obtained by the contractor).	Not Yet Applied		
Fisheries and Oceans Canada	Section 35(2) Fisheries Act Authorization (FAA). In-water or near-water works associated with the construction of the community harbour that have the ability to result in the HADD to fish or fish habitat, as defined under the Fisheries Act. Typically, when it is determined a HADD will occur (residual effects), it	Not Yet Applied		

	is primarily due to the Project footprint (areas of seabed that are no longer available to fish).			
Transport Canada	Notice of Works (NoW) Application for Approval. In-water works associated with the construction and operations of the community harbour that have the potential to interfere with navigation.	Not Yet Applied		
Aboriginal Affairs and Northern Development Canada	Land Use Permit (LUP) Class A. In-water works relative to the use of the seabed (areas below the OHWL (and thus considered Crown Land).	Not Yet Applied		
Natural Resources Canada	Authorization of Explosives and Magazine License Application. Blasting – For any industrial explosive that is to be imported into or manufactured, transported, possessed or used in Canada. Transport, storage and acquisition of explosives (to be obtained by the contractor).	Not Yet Applied		

Project transportation types

Transportation Type	Proposed Use	Length of Use
Air	The Project is expected to rely on scheduled flights for personnel but may need to use chartered flights, as required, to avoid the Project filling seats on scheduled flights that the community depends on.	

Project accommodation types

Temporary Camp

Other,

Material Use

Equipment to be used (including drills, pumps, aircraft, vehicles, etc)

Equipment Type	Quantity	Size - Dimensions	Proposed Use
Drills	2-3	5 tons	Quarrying
Front end loader	2-3	966-988	Loading rock and moving cargo/equipment.
Compactor	1	20 ton	Compacting road surface.
Dozer	1	D8	Leveling placed rock and road surfaces.
Grader	1	140	Road maintenance.
Spud barge/derrick	1	20 m x 50 m deck with 150 ton crane	Dredging, moving/lifting materials and equipment.
Work boats	1-2	50-500 horsepower	Floating equipment, movement and surveys.
Pickup truck	5	Crew cab, 3/4 ton	Crew and supplies movement
Mini-bus	1	15 passanger	Daily crew mobilization from hotel/accommodation to Project site.
Rough terrain crane	1	80 ton	Lifting materials.
Rock crusher	1-2	--	Crushing run of quarry materials.
Excavators	3-5	30-40 tons	Quarrying, handling armour stone, loading trucks, excavating, dredging, material placement.
Trucks	3-5	35-40 tons articulating	Hauling quarried rock.
Fuel/service truck	1	10 ton	Daily refueling and servicing of major mobile equipment, fueled from Government of Nunavut-Petroleum Products Division (GN-PPD) dispensers in Resolute Bay and/or Contractor supplied fuel storage facilities.
Telehandler	1	5 ton	Moving materials and equipment.

Detail Fuel and Hazardous Material Use

Detail fuel material use:	Fuel Type	Number of containers	Container Capacity	Total Amount	Units	Proposed Use
Oxyacetylene	hazardous	10	140	1400	Cubic ft	Welding and cutting of steel
Gasoline	fuel	1	15000	15000	Liters	Pick-up trucks, small work boats, small generators, and All Terrain Vehicles.
Lube and Oils	hazardous	20	100	2000	Liters	Maintenance of mobile equipment.

Paint	hazardous	10	4	40	Liters	Painting steel hardware and miscellaneous components.
Explosives	hazardous	4	10	40	Metric Tons	Quarrying.
Propane	fuel	20	30	600	Liters	Heaters.
Diesel	fuel	1	1500000	1500000	Liters	Mobile equipment; remote generators and heaters.

Water Consumption

Daily amount (m3)	Proposed water retrieval methods	Proposed water retrieval location
5	From the existing water supply infrastructure in Resolute Bay. Delivered by water truck if local supply is unable to meet needs.	hamlet reservoir / water system

Waste

Waste Management

Project Activity	Type of Waste	Projected Amount Generated	Method of Disposal	Additional treatment procedures
Waste disposal	Combustible wastes	5 tons	Hamlet landfill	n/a
Waste disposal	Hazardous waste	2,000 liters	Returned to south in sealed drums or lined bags, transported in 20' shipping containers and disposed in accordance with regulatory procedures.	n/a
Waste disposal	Non-Combustible wastes	1 ton	Hamlet landfill	n/a
Waste disposal	Overburden (organic soil, waste material, tailings)	Negligible	What little overburden exists at the quarry will be set aside and stockpiled at the quarry.	n/a
Waste disposal	Sewage (human waste)	1000 m3	sewage and greywater will be transported by either the local sewage truck or the contractor's own sewage truck and disposed of in the Hamlet's sewage lagoon	n/a

Environmental Impacts:

Please refer to Section 7 of the PSIR Report included in this application for detailed information on the predicted environmental impacts and proposed mitigation measures.

Additional Information

SECTION A1: Project Info

see Section 1.2 of PSIR Report

SECTION A2: Allweather Road

see Sections 1.6.3, 2.2.2, Figure 1-1 of PSIR Report. The majority of the haul road to be used to transport rock material from the quarry (borrow pits) to the community harbour will utilize existing road infrastructure

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

see Sections 1.6.2, 2.2.1, Figure 1-1 of PSIR Report. Two potential quarry locations were selected, but only one will be used by the contractor during construction.

SECTION D1: Facility

see Sections 1.6.1, 2.1, Figure 1-1, Drawing 1-1 of PSIR Report

SECTION D2: Facility Construction

see Section 2.1.2 of PSIR Report

SECTION D3: Facility Operation

see Sections 2.1.4, 8.4 of PSIR Report

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

see Sections 1.3, 1.4 of PSIR Report

SECTION H2: Disposal At Sea

N/A there is no DAS associated with the Project.

SECTION I1: Municipal Development

Description of Existing Environment: Physical Environment

6.3Physical ConditionsResolute Bay, located on the southern shore of Cornwallis Islands in Parry Channel, experiences long, cold winters and short ice-free periods in the open-water season. Marine and tundra environments with exposed valley walls, talus slopes, and steep cliff faces rising above the ocean are characteristic of the area. 6.3.1Designated Environmental AreasDesignated areas in Canada meet the International Union for Conservation of Nature (IUCN) definition of protected area, which states protected areas are “a clearly defined geographic space, recognized, dedicated and managed through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural value” (ECCC, 2016). The United Nations Convention on Biological Diversity known as Aichi Target 11 (Convention on Biological Diversity, 2010), committed countries, including Canada, to conserving 10% of coastal and marine areas and 17% of terrestrial areas and inland waters by 2020. In December 2022, The United Nations Convention on Biological Diversity adopted the Kunming-Montreal Global Biodiversity Framework (GBF), which ensure that committed countries, including Canada, must enable that at least 30% of terrestrial and inland water areas, and of marine and coastal areas are conserved through governed systems of protected areas and other effective area-based conservation measures, as outlined in Target 3 (Convention on Biological Diversity, 2022; DFO, 2021). As of 2022, terrestrial protected areas covered over 213,000 km² (10.2%) of Nunavut, achieving the 2020 target, but falling short of the 2030 targets for terrestrial and inland waters (ECCC, 2023). The RNLUP (NPC, 2023b) has also presented existing and proposed protected areas, some of which are included in the NMCA described in Section 7.1.1.1. While Resolute Bay is within the NBRLUP (NPC, 2000), it will be replaced with the RNLUP (NPC, 2023b) once it is approved. For the purposes of this Report, the RNLUP has been used. Interactive maps from 2014, 2016, 2021 and 2023 are available on Interactive Maps website of the NPC (NPC, 2023a).The designated areas

were considered in the existing conditions and effects review are summarized in Table 6 3, with a more detailed description provided in Section 3.2 (Figures 3-1, 3-2) of the ESEB Report (Dynamic Ocean & Worley Consulting, 2025c).

6.3.2 Geological Site Conditions

The surficial geology surrounding the community of Resolute Bay is discussed in "Soils and Terrain Units Around Resolute, Cornwallis Island" (Cruickshank 1971), as shown on the map extract on Figure 6 1. As shown on the surficial geology map, the shoreline has been classified as polar desert (symbols 1A and 1B) as well as alluvium. Polar desert deposits include active beach (1A (1)) with recent marine deposits, stones, ice push features, and unsorted materials up to 3 m above mean sea level (symbol 1A) and raised marine features with fresh form (1A (2)), usually with rounded or subangular stones, shelly and fine sand materials, patterned and sorted on level areas up to 18 m above mean sea level. Higher marine terrace features (1B) are found between 70 m to 90 m above mean sea level and include stones of variable roundness, sandy fine material, sorted and patterned ground, and solifluction modification on slopes. Alluvial deposits are found along and at the mouth of active streams and creeks feeding into Resolute Bay. Raised marine terraces are present up to 120 m above present sea level (Cruickshank, 1971) due to isostatic uplift following deglaciation. Bedrock in the Resolute Bay area is taken from Canadian Geoscience Map 33, Geology, Tectonic Assemblage Map of Wellington Channel, Cornwallis and Western Devon Islands, Nunavut (Harrison et al., 2014) and an extract is provided in Figure 6 2. Bedrock is within the Douro, Cape Storm and Allen Bay groups which are Ordovician to Silurian in age (416 to 488 million years ago) and part of the Franklinian Shelf. To the north of the community, bedrock also includes the Prince Alfred group which are Early Devonian in age (Devonian period occurred 358 to 416 million years ago) and are part of the Boothia Uplift. Rock types typically comprise sedimentary rocks including limestone, dolostone, dolomite and shale as shown (symbols Sdo1, Scs, and Osa1, Figure 6 2) and siltstone and pebble to boulder grade conglomerate (symbol Dpa1, Figure 6 2). The geotechnical field survey confirmed that both quarry sites south of the community comprise predominantly slightly to highly weathered, frost shattered, limestone. An assessment of ARD and metal leaching (ML) potential was conducted on one rock sample representative of the major rock type from the proposed quarry locations in 2019. Both ARD/ML testing results indicated basic or alkaline tendency, with very low concentrations of Acid Generating Potential (AGP). Subsequent testing of two (2) rock samples collected from drilling is currently underway. It is likely that the rock is non potentially acid generating (PAG).

6.3.3 Surface Features

The community of Resolute Bay and the surrounding area is relatively flat and is part of a series of raised beach terraces. The surface is strewn with patterned ground, which is evidence for ice wedges and gelifluction lobes on slopes surrounding the community. Drainage into Resolute Bay comes from two main sources. Resolute River to the west of the community (western side of Resolute Bay) is fed by Resolute Lake and Char Lake as well as other smaller lakes. Mecham River to the south of the community (east side of Resolute Bay) is fed by numerous small lakes and a small creek approximately 300 m south of the community (east side of Resolute Bay). In general, the shoreline comprises mainly medium to coarse sub-rounded to angular gravel in the supratidal zone with various sedimentary lithologies (beach deposits). Within the intertidal zone on the east side of Resolute Bay, surrounding Mecham River, just south of the community, the material is generally fine and comprises fine to medium gravel fining to gravelly sand to sandy gravel near the lower water tidal level. The sands are typically medium to coarse grained, sub-rounded to angular. Moving away from the river, both to the west and south, the presence of the sand layer at the low water level is absent.

6.3.4 Ground Stability and Permafrost

All of Baffin Island is in the Continuous Permafrost Zone (Osterkamp, 2001), where the ground remains below 0°C for a minimum of two years (International Permafrost Association). As per Journeaux Associates (2012) there is no sub-sea permafrost in Nunavut (Figure 6 3). However, Worley Consulting has experienced other projects (Nanisivik and Milne Inlet) where sub-sea permafrost was detected, therefore is likely to be present in Resolute Bay. The permafrost of Baffin Island uplands has been estimated to be 400 to 700 m thick (Aarluk, 2012) with a surface active layer that can vary widely from less than 1 m in wet soils to greater than 5 m in rock outcrop. While melting permafrost could affect the structures, it is unlikely in this case since melting sub-sea permafrost is a relatively slow process (hundreds of years), and it is typically located well below the seabed surface, which in this case is within the stable bedrock.

6.3.5 Hydrology

The freshwater and marine watersheds pertinent to Resolute Bay are displayed in Figure 1 4 and described below.

6.3.5.1 Fresh Water

In proximity of the community harbour, there are two lakes (Char Lake and Resolute Lake; see Figure 4 1) and three waterways (Creek No. 1 (unnamed), Mecham River and Resolute River; see Figure 1 1). Two waterway crossings, Creek No. 1 and Mecham River, intersect the haul road, and are non-fish bearing. Resolute River is on the opposite side of Resolute Bay to the community harbour and is fish bearing with potential for anadromous Arctic char (described in Section 4.4 of the ESEB Report (Dynamic Ocean & Worley Consulting, 2025c)).

- Creek No. 1 (unnamed), located approximately 2 km southeast of the community harbour, and 0.3 km north of the northern quarry. An existing damaged set of culverts are present at the existing haul road crossing.
- Mecham River, located 0.8 km southeast of the community harbour footprint. There are no culverts present at the river near the existing haul road alignment; locals currently drive through the shallow river.
- Resolute River, located about 1.5 km northwest of the community harbour on the western shore of Resolute Bay, and is fed mainly by Resolute Lake and Char Lake (see Figure 4 1 for lake locations).
- Two

drainage paths with culvert crossings are located in proximity to the community harbour (Culvert Nos. 1 and 2, see Figure 6 4 for culvert locations). oCulvert No. 1: on the foreshore of the community harbour. This culvert is damaged and discharges run-off from the adjacent slope. oCulvert No. 2: approximately 0.3 km east of the community harbour.

6.3.5.2 Marine

Situated on the eastern shore of McDougall Sound, water from Resolute Bay flows into Parry Channel, which feeds into Baffin Bay on the eastern side. To the northwest, McDougall Sound connects to Wynniatt Bay, where water flows in from the Arctic Ocean (see Figure 1 4).

6.3.6 Air Quality

While air pollution is often thought of as being associated with industrial cities, construction activities taking place in Nunavut can have an impact on local ambient air quality as well. For air quality monitoring within Nunavut, the GN has established the Nunavut Ambient Air Quality Standards (NAAQS), adopted in part from the Canadian Ambient Air Quality Standards (CAAQS). It is noted that the most recent NAAQS are current to 2011, and the CAAQS standards are current to 2020, with new standards being established for 2025 (GN, 2011). A summary of the NAAQS and CAAQS is presented in Table 6 4. The DoE works with ECCC to operate air quality monitoring in Nunavut, which is part of the National Air Pollution Surveillance (NAPS) program. ECCC coordinates the operation of the NAPS program, which operates approximately 600 air-monitoring stations in over 175 locations in Canada. There are currently two active monitoring stations in Nunavut as part of the NAPS Program (current to 2022). These monitoring stations are located in Iqaluit (Water Lab, NAPS ID: 129303) and Alert (NAPS ID: 129401). Between these two, the Water Lab monitoring station has more complete data, current to 2019. Results are summarized in Table 6 4 and are compared to the NAAQS and CAAQS. Regional air quality monitoring was conducted in 2020 for North Baffin Island as part of the Baffinland Project Annual Report on Air Quality, Dustfall and Meteorology (Nunami Stantec Limited, 2021). At the Mary River Mine Site, the annual average sulphur dioxide (SO₂) was measured at 0.12 µg/m³, well below the NAAQS annual standard of 30 µg/m³. The annual average nitrogen dioxide (NO₂) was measured at 18.3 ppb, within the NAAQS of 32 ppb but above the CAAQS of 17 ppb. Ozone (O₃), Total Suspended Particles (TSP), and fine particulate matter were not measured as part of the 2020 Annual Report. The Baffinland Project also released Air Quality Monitoring Results for 2019 (RWDI Air Inc., 2020). The annual average SO₂ was measured at 0.7 µg/m³, far below the NAAQS annual standard of 30 µg/m³. The annual average NO₂ was measured at 19.2 ppb, within the NAAQS of 32 ppb but above the CAAQS of 17 ppb, the same trend from the 2020 report. O₃, TSP, and fine particulate matter were again not measured as part of the 2020 Annual Report. Air quality monitoring was conducted in Resolute Bay and Kinngait (formerly Cape Dorset) from 2013-2017. It was determined that waste burn, airport operations and town activities such as vehicle traffic, residential combustion and power generators contributed to Particulate matter less than 2.5 µm (PM_{2.5}) pollution (Aliabadi et al., 2015). SO₂ pollution was affected by airport activities and ships anchoring in position (Aliabadi et al., 2015). The maximum measured SO₂ concentration was 1.05 µg/m³, which is much lower than the Nunavut standards: 450 µg/m³ (1-hour); 150 µg/m³ (24-hour); and 30 µg/m³ (annual). The PM_{2.5} concentration was recorded up to 10 µg/m³, which is lower than the 24-hour standard of 30 µg/m³.

6.3.7 Noise

Noise data specific to the Project Study Area was not available. It is assumed that noise would be generated from several sources including marine vessel traffic, automobiles, aircrafts and ATVs/snowmobiles and general equipment and infrastructure used in the Hamlet. The Project site is adjacent to a road which is currently used frequently by trucks and other vehicles traveling along the foreshore. The area is also frequently used in winter by snowmobiles accessing the ice. The sources described may emit noise for short periods of time and noise effects diminish with distance from a source.

6.3.8 Climate Conditions

Typical of high latitude areas, Resolute Bay experiences 24 hours of sunlight from late April to late August, with an average high temperature of 5 °C in July. During the winter, the community experiences 24 hours of darkness, reaching an average low of -32 °C in February (Time and Date, 2024). Precipitation in Resolute Bay typically falls as snow through all twelve months of year, with the greatest rainfall occurring during July and August. Average monthly snowfall ranges from 43 mm in February to 184 mm in October (Government of Canada, 2024a). Snow depth ranges from 180 mm in December to clear of snow from June to August (Government of Canada, 2024a). In general, the strongest winds in Resolute Bay occur in the fall (September to November), ranging between 40 – 43 km/h on average and peaking in October. Annual mean sea ice extent has on average declined since 1979, at a current rate of 13.1% per decade (ECCC, 2021). Depending on the region, Canadian Arctic summer sea ice area has decreased by 5% to 20% per decade from 1968 to 2016 (Derksen et al., 2019). Recent years are seeing the effects of climate change, and the 30-year averages are not necessarily applicable.

6.3.9 Marine Water Quality

Marine water quality in Resolute Bay was assessed over one sampling event on 18 August 2019 by an experienced marine scientist and a local Inuit assistant. Water samples were taken from four locations as shown in Figure 7-4 of the ESEB Report (Dynamic Ocean & Worley Consulting, 2025c). Sample locations were selected to give a broad overview of water quality in the vicinity of the Community Harbour Study Areas. Marine water quality in Resolute Bay was consistent across sites and depth profiles. Metal concentrations were below respective (CCME, 2003) guidelines for all metals, except cadmium and chromium. Both exceeded Canadian Council of Ministers of the Environment (CCME) guidelines at the same location (RB 4), and for both shallow and deep water. Chromium is a naturally occurring mineral and increased levels can be attributed to industrial waste leakage and disposal (EPA,

2019). Across all sample locations, dissolved metal concentrations were comparable to total concentrations, indicating that metals typically are not bound to solids. pH, hardness, alkalinity, Total Organic Carbon (TOC), Total Suspended Solids (TSS), sulphur and metal concentrations were consistent across shallow and deep samples. Due to the remote nature of Resolute Bay, it is unlikely that the raised levels of chromium are due to industry and are naturally occurring. Fluctuations in mineral levels in Arctic waters are common due to dilution from sea ice melt (Zhang et al., 2019) and this could be responsible for the raised levels of chromium observed. Polycyclic Aromatic Hydrocarbons (PAHs) were all below CCME guidelines, and Polychlorinated Biphenyls (PCBs) were below laboratory Reachable Detectable Limits (RDLs) across all sites. Detailed information regarding the water quality field survey including methods and laboratory analysis, is provided in the Sections 5 of the ESEB Report (Dynamic Ocean & Worley Consulting, 2025c).

6.3.10 Coastal Morphology In general, the shoreline comprises mainly medium to coarse sub-rounded to angular gravel in the supratidal zone with various sedimentary lithologies (beach deposits). Within the intertidal zone on the east side of Resolute Bay, surrounding Mecham River, just south of the community, the material is generally finer and comprises fine to medium gravel fining to gravelly sand to sandy gravel near the lower water tidal level. The sands are typically medium to coarse grained, sub-rounded to angular. Moving away from the river, both to the west and south, the presence of the sand layer at the low water level is absent.

6.3.11 Bathymetry Bathymetric surveys have been completed by Frontier Geosciences Inc (Frontier) during the feasibility (2019) and detailed design (2024) phases of the Project. The 2024 bathymetric survey results were not available at the time of this PSIR development, however Figure 6 5 shows the feasibility phase results. Seabed elevation at the seaward extent of the Community Harbour Study Area is approximately 8.5 m CD.

6.3.12 Tides and Currents Tide levels for Resolute Bay station were obtained from Canadian Hydrographic Services (CHS) Canadian Tide and Current Tables, Volume 4 (CHS, 2025), and are provided in Table 6 5. There are two major wind-driven currents in the Arctic Ocean, the Beaufort Gyre and the Transpolar Drift Stream. Surface water circulates clockwise from east to west. The Arctic Ocean connects to the Atlantic Ocean through the Baffin Island Current, a combination of the West Greenland current inflow, and Arctic outflow from channels of the Canadian Arctic Archipelago (Britannica & The Editors of Encyclopaedia, 1998). In 2024, surface current data was collected in Resolute Bay using a drogue (a surface float with a Global Positioning System [GPS] tracker). The drogue was visually monitored using binoculars to track its location. Current data was collected for approximately one hour. The average and maximum current speed were 0.73 km/h and 4.10 km/h, respectively, with a net displacement towards the southeast (Section 4.6 of the ESEB Report (Dynamic Ocean & Worley Consulting, 2025c).

Description of Existing Environment: Biological Environment

6.4 Biological Conditions Given the harsh climates of the region, biological diversity surrounding Resolute Bay are mostly limited to treeless landscapes, migratory birds, and marine ecosystems.

6.4.1 Terrestrial Vegetation (Including Rare Plants) Most of Nunavut, including the Project area, is situated within the Tundra Biome and Northern Arctic Ecozone (Ecological Stratification Working Group [ESWG] 1995). This ecozone is characterized by cold, dry landscapes with high winds and shallow soils, resulting in sparse, low-growing plant life. Dominant vegetation includes herb and lichen communities, with lichens found in rocky upland areas and herbs in wetter, sheltered valleys and along streams. The Project is specifically located within Ecoregion 12 – Parry Islands Plateau, where vegetation is sparse and discontinuous, dominated by mosses, low-growing herbs, and shrubs such as arctic willow (*Salix arctica* Pall.) and sedges (*Carex* spp.).

Vegetation surveys of the terrestrial environment in the HRQ Study Area were conducted from 17 to 19 August 2019 by an experienced vegetation ecologist. An ecological land classification (ELC) field survey was completed to classify vegetation communities. All vascular and non-vascular species encountered were inventoried. Specimens of unknown species were collected and identified by a taxa expert. Five distinct vegetation communities were identified including Upland Lichen Barren, Wetland Moss Lowland, Coastal Shoreline and Flats, Disturbed Human-Caused, and Open Water. The HRQ Study Area was covered predominantly by the Upland Lichen Barren community, which mostly consisted of barren shales and talus slopes with crustose lichens on rock surfaces. There were 46 vegetation species identified, including four shrub, six graminoid, 12 forb, 16 bryophyte, and eight lichen species. No rare plants or invasive plants were identified during field surveys.

There 46 vegetation species were identified, including four shrub, six graminoid, 12 forb, 16 bryophyte, and eight lichen species. No rare plants or invasive plants were identified during field surveys. The Upland Lichen Barren predominantly consisted of lichens, along with shrubs and forbs. Meanwhile, the Wetland Moss Lowland community was dominated by moss, followed by graminoids.

6.4.2 Terrestrial Wildlife (including Habitat and Migratory Patterns) In general, habitat near the Community Harbour Study Area is heavily disturbed and offers limited value for terrestrial wildlife. The human development in the Hamlet extends to the ocean's edge, with the beach area featuring structures, roads, and boats. Dogs along the shoreline likely deter wildlife, although buildings may provide cover for small mammals and weasels. The intertidal zone offers some foraging opportunities at low tide, but overall, the habitat quality is low due

to frequent human activity and disturbance. Within the HRQ Study Area, habitats available for wildlife are of low quality. The terrain is mostly barren rock with minimal vegetation, primarily crustose lichens, and some small lowland areas with graminoids and mosses. These areas provide limited cover or foraging opportunities for terrestrial wildlife. Security, escape, and thermal cover for small mammals are scarce across the HRQ Study Area. A general reconnaissance survey of the HRQ Study Area was the focus of the wildlife fieldwork, which was conducted in conjunction with the vegetation survey. Incidental observations made outside the HRQ Study Area were included as part of the survey because some terrestrial wildlife are migratory or nomadic and travel long distances and have large home ranges. Terrestrial wildlife species identified or detected included arctic fox (*Vulpes lagopus*) and polar bear (*Ursus maritimus*). No other land mammals or terrestrial wildlife features (e.g. dens, burrows, diggings) were observed during the field survey.

6.4.3 Migratory and Marine Birds (including Habitat and Migratory Patterns)

Habitat in the Community Harbour Study Area is of limited value to migratory and marine birds due to extensive human development, including structures, boats, and dogs along its length. Species that may breed here are those tolerant of human disturbance, such as snow buntings (*Plectrophenax nivalis*) and common ravens (*Corvus corax*), which typically nest on bare ground or gravel. However, human presence and dogs likely discourage nesting. The intertidal zone offers foraging opportunities only for species tolerant of human activity, such as gulls and ravens. In contrast, the HRQ Study Area provides more natural habitats, including wet, dry, and barren areas, offering some value for nesting birds. No bird species are expected to nest in the DAS Study Area. The field survey focused on the Community Harbour and HRQ Study Areas, but incidental observations were also recorded outside this area, which included the DAS Study Area. Eleven bird species were identified during the field survey including flocks of arctic terns (*Sterna paradisaea*), brants (*Branta bernicla*), glaucous gulls (*Larus hyperboreus*), parasitic jaegers (*Stercorarius parasiticus*), and snow buntings within the HRQ Study Area. In addition, a flock of snow geese (*Anser caerulescens*) were observed approximately 500 metres offshore and a flock of Baird's sandpiper (*Calidris bairdii*) were identified southwest and outside the Project Study Area. IQ indicates that eider ducks (*Somateria* spp.), gulls (*Larus* spp.), sandpipers (*Calidris* spp.), and northern fulmars (*Fulmarus glacialis*) are active during August and September, and ptarmigan (*Lagopus* spp.) are usually found more near ponds and lakes (IQ Workshop 2019 - Joadamee Amagoalik). According to ECCC, the general nesting season for the region (N10: Arctic Plains and Mountains, Bird Conservation Region 3) is between late-May and mid-August, and the primary season (61-100% of birds nesting) is from early-June to late-July (ECCC, 2018). No nesting or breeding behaviour was identified, but the survey was conducted at the end of the general nesting season. Therefore, the lack of observed breeding behaviour does not preclude the potential for birds to nest in the area. IQ indicates that migratory birds, including arctic terns (*Sterna paradisaea*), nest in the south quarry location and within about 15 m of the shoreline (IQ Workshop 2019 - Joadamee Amagoalik).

6.4.4 Fish Habitat (including Marine Vegetation)

Habitat function and structure is driven by the physical characteristics and assemblage of species that comprise an ecosystem. For most focal species in the community harbour of the Project, habitat use is primarily for feeding or migration. For example, the anadromous Arctic char (*Salvelinus alpinus*) utilizes the marine habitat exclusively for feeding, while freshwater environments are required for spawning. However, five focal species found in Resolute Bay – Amphipod, Arctic char, Arctic cod, Arctic sculpin (*Myoxocephalus* spp.) and Truncate softshell clam (*Mya truncata*) – rely on the soft sediment and marine vegetation that make up the benthic habitat of the Community Harbour Study Area for all life history stages (feeding, spawning etc.). Field surveys were conducted in the Community Harbour Study Area in 2019 (18 to 19 August 2019) and 2024 (27 to 28 August 2024) to assess habitat conditions. The intertidal shoreline was primarily consisted of cobble, gravel and sand. Habitat characteristics shifted from largely sandy substrate in 2019, to cobble and gravel dominant in 2024. The tide range was 1.8 m in 2019 and 2.5 m in 2024. In the subtidal habitat, the depth range of the area observed in 2019 was 0.2 m to 6.6 m CD, 2.2m to 68 m in 2024. Substrates within the Community Harbour Study Area were primarily soft sediments, including silt and sand, with occasional gravel, cobble, and boulders. In both 2019 and 2024, hard substrates were typically associated with marine vegetation, such as kelp and rockweed. Sugar kelp (*Saccharina latissima*) was the most abundant, observed in multiple transects with cover ranging from trace to abundant. Winged kelp (*Alaria* sp.) and other unidentified kelp were also observed, usually between 0.9m and 7.9m CD. Rockweed (*Fucus* sp.) was also present in trace to moderate densities across several transects, usually associated with hard substrate in shallower depths. Brown filamentous algae (likely *Chordaria* sp.) and green filamentous algae were observed at both hard (boulders) and soft substrates (sand). Overall, the habitat quality within the community harbour site was classified as low in the intertidal zone and moderate in the subtidal areas. The intertidal zone showed minimal marine vegetation and no marine invertebrates, likely due to contamination from a nearby wastewater outfall to the south. Habitat biomass and biodiversity were similar between the community harbour site and reference sites in both 2019 and 2024. However, marine vegetation at the community harbour site appeared noticeably less healthy compared to the surrounding reference sites. Given the potential impacts from wastewater contamination, the habitat quality of the community harbour site may be reclassified as low.

6.4.5 Fish and Marine Mammals

Focal fish and marine mammal species were selected based on several variables which included: their importance to Inuit

for subsistence and food security, their geographic ranges which includes the potential to occur in the Project Study Area, and for their representative role in food chain dynamics. Species identified as focal are listed in Table 6.6. Species categories were defined based on their use of the habitat (e.g. migratory, resident) to understand their potential for occurrence within the Project Study Area. These definitions are provided in Section 6.4.5.1.6.4.5.1 Species Spatial Categories 6.4.5.1.1 Fish Marine fish species that are found in the Arctic occupy the ocean either as residents, migratory species, or anadromous, as defined below:

- Migratory: species that migrate exclusively in the marine environment on an annual or seasonal basis, triggered by local climate, food availability, or for mating reasons.
- Resident: species that occupy the same general area throughout the year.
- Anadromous: species that move between freshwater and marine environments for the purposes of feeding in one environment and spawning.

The coastal marine environment fronting the Community Harbour Study Area may be used by migratory species such as Arctic char and Arctic cod (*Boreogadus saida*). Both species are present predominantly during the open-water season. Arctic char are an important subsistence and commercial fishery species in Nunavut that have both a lacustrine and anadromous life history. Anadromous Arctic char live primarily in fresh water, and migrate to the ocean for a short summer migration (~20 to 45 days) (Bégout et al., 1999; Klemetsen et al., 2003) in order to increase energy reserves, at which time they may double their body mass (Jørgensen et al., 1997). There are not considered to be common in the high Arctic, but they sometimes occur where outflows are substantial enough to ensure a return migration in August (GN, 2010). There is limited documented information on Arctic char community in Resolute Bay. Fishing of Arctic char in Resolute Bay was documented during the IQ Workshop (May 2019), and Priest and Usher (2004) documented that a total of 50 harvesters were fishing for Arctic char during the five-year Nunavut Wildlife Harvest Study (NWHs) (June 1996 to May 2001). Arctic cod are a pelagic marine species believed to be the single most important species in the trophic link between plankton, and marine birds and mammals in the Arctic ecosystem (Welch et al., 1992). Arctic cod are not considered as valuable as Arctic char and thus are not a primary subsistence fishery in Nunavut. Arctic cod have been observed in large schools in the vicinity of Resolute Bay during a study that spanned 1985 to 1988 (Welch et al., 1993). There was no mention of Arctic cod harvesting by residents in Resolute Bay during the IQ Workshop. During the NWHs five-year study period (1996 to 2001) just two harvesters were documented for fishing for Arctic cod (Priest & Usher, 2004). During the field surveys, a school of approximately 300 Arctic cod were observed, along with one sculpin and two unidentifiable fish species. The presence of Arctic cod in Resolute Bay was confirmed during the IQ Workshop (IQ Workshop - Joadamee Amagoalik) while sculpins were not mentioned during IQ Workshop. Marine invertebrates, including amphipods and truncated soft-shell clams, are a common part of the benthic ecosystem in Nunavut. Amphipods are a key link in the Arctic food web and are a significant food source for marine fish, mammals and bird (Coad & Reist, 2017; Oceans North Conservation Society et al., 2018). When amphipods are present in intertidal benthic environment, there is a tendency to be associated with moist habitats, including areas that remain moist during low tide and small tide-pools (pers. obs. Victoria Burdett-Coutts). The truncate soft-shell clam (*Mya truncata*) is an in-faunal species in the Arctic that plays an important role in carbon cycling. Given the sedentary adult life stage of the soft-shell clam, they are a valuable and predictable food source for these higher trophic level species (Highsmith & Coyle, 1990). During field surveys, no amphipods were observed or collected at intertidal and subtidal. Truncate soft-shell clam was observed and estimated to occur in densities that ranged from 5/m² to upwards of 30/m². Clam presence at Resolute Bay was confirmed during IQ Workshop, but were not harvested over concerns due to the wastewater outfall (IQ Workshop 2019 - Peter Amarualik). Truncated soft-shell clams used to be harvested on western side of Resolute Bay and in Allen Bay. Other marine invertebrates observed included:

- Brittle stars (*Ophiocten* or *Ophiura* spp.).
- Tube worms (*Chone* sp., *Echone papillosa*).
- Pelagic tunicate (*Oikopleura labradoriensis*).
- Tube dwelling anemones (*Pachycerianthus borealis*).
- Anemones (*Hormathia* sp.).
- Jelly (*Aglantha digitale*, hydromedusa species, unidentified species).
- Comb jelly (*Ctenophora*).
- Pteropod (*Clione limacine*, *Limacina helicina*).
- Hydroid (species not identified).

6.4.5.1.2 Freshwater Fish Resolute River is located on the western shore of Resolute Bay and fed by Resolute and Char lakes (Figure 7-11 in the ESEB Report (Dynamic Ocean & Worley Consulting, 2025c)). Resolute Creek may facilitate sea run Arctic char into the connecting lakes (see Figure 4.1) (IQ Workshop 2019 - Peter Amarualik), and into nearby creeks (IQ Workshop 2019 - Joadamee Amagoalik). Fishing of Arctic char in Resolute Bay was documented during the IQ Workshop (May 2019), and Priest and Usher (2004) documented that a total of 50 harvesters were fishing for Arctic char during the five-year NWHs Study (June 1996 to May 2001).

6.4.5.1.3 Marine Mammals Marine mammals that are found in the Arctic were categorized as either Arctic Residents or Seasonal Visitors, as defined below:

- Arctic Resident: species that resides in the Arctic year-round.
- Seasonal Visitor: species that predictably resides within the Arctic region for a portion of the year, which most typically is the open-water season.

Seven species of marine mammals are considered residents of the Resolute Bay area (see Table 6.6). These include three species of cetacean—narwhal (*Monodon monoceros*), beluga (*Delphinapterus leucas*), and bowhead whale (*Balaena mysticetus*)—which seasonally occur during the spring, summer, and early winter months. Beluga whales in this region are part of the Eastern High Arctic population. Resolute Bay, located on Cornwallis Island, lies

within their summer range (Vard Marine Inc., 2016). According to IQ, the habitat and distribution of beluga whales extends along the east coast of Ellesmere Island, where they travel northward as the ice recedes and open water increases, before returning to Jones Inlet as the ice begins to freeze again (QIA, 2018). IQ also indicates that the presence of beluga whales in the region is influenced by the North Water Polynya, which extends into Jones Sound, enabling belugas to remain in the area year-round (QIA, 2018). Narwhals primarily encountered near Resolute Bay belong to the Somerset Island population, which is commonly found in the waters around the area (DFO, 2010; Watt et al., 2013). This subpopulation summers in the waters between Cornwallis Island and the fjords of Somerset Island. Large numbers of narwhals from the Somerset subpopulation are also known to feed along the southwest coast of Devon Island (Higdon, 2017; Remnant R.A. & Thomas, 1992). Mating and calving areas have been identified around Resolute Bay (Higdon, 2017). According to IQ, narwhals calve in July north of Cornwallis Island, between Bathurst, Cornwallis, and Devon Islands, and they feed in these areas throughout July and August. (Carter et al., 2019). Bowhead whales seasonally migrate into the area during the spring, summer, and early fall, following the ice edge and occurring in open bays and straits. While they are occasionally seen in the waters just south of Resolute Bay, sightings are infrequent (GN, 2018a; QIA, 2018). None of these cetacean species are commonly found within the area, with bowhead whales relying mainly on pelagic food sources such as zooplankton and beluga and narwhal relying on Arctic cod as they migrate through the region. Ringed seals (*Pusa hispida* ssp. *Hispida*), bearded seals (*Erignathus barbatus* ssp. *Barbatus*), and Atlantic walrus (*Odobenus rosmarus* ssp. *Rosmarus*) are resident to the Resolute Bay area, feeding on fish, invertebrates and other benthic prey in shallow coastal environments. Ringed seals are a non-migratory species that remain in Arctic waters year-round and can be found throughout the Arctic year-round and can be found in Lancaster Sound and the contiguous waterways, including Parry Channel and in Resolute Bay (COSEWIC, 2019; Goodwin, 1990; Natures Edge, 2015). Resolute Bay is located within the Viscount Melville Sound (DFO, 2011a), near a high-density area of ringed seals (NPC, 2008). While less is known about the ecology of bearded seals, Resolute Bay and its surrounding waters fall within the species' known spring-summer distribution range (COSEWIC, 2019). Bearded seals are known to winter in Lancaster Sound and Davis Strait (COSEWIC, 2007). According to the NPC, Resolute Bay lies just south of a high-density area identified for bearded seals (NPC, 2017), and they can be seen here year-round, particularly feeding in the waters south of Bathurst Island (Carter et al., 2019). Bearded seals also winter in Lancaster Sound and Davis Strait and are present in these areas throughout the year (DFO, 2011b). Atlantic walrus are year-round residents of the Arctic, though their distribution varies seasonally with changes in ice cover (COSEWIC, 2017). Resolute Bay is located within Viscount Melville Sound (DFO, 2011a), an area where walrus have been documented at haul-out sites and feeding along the coast (DFO, 2018). The waters surrounding Resolute Bay fall within the Nirjutiqavvik National Wildlife Area, which provides important feeding grounds for walrus (Government of Canada, 2022b). Additional summer haul-out sites have been reported throughout Ellesmere Island and Devon Island (Government of Nunavut, 2012c). Polar bears (*Ursus maritimus*) are found throughout the high Arctic, preferring shallow, ice-covered areas with productive upwelling. Globally classified as Vulnerable by the IUCN, there are 19 recognized subpopulations of polar bears, 14 of which are found in Canada (COSEWIC, 2018). The Lancaster Sound subpopulation (Lancaster Sound Management Unit) overlaps with the Resolute Bay area, while the Grise Fiord, Norwegian Bay, and Kane Basin subpopulations are nearby (Government of Canada, 2023). Polar bear life history is closely tied to that of the ringed seal, their primary prey species (QIA, 2018). Polar bears give birth before ringed seals do and hunt ringed seal pups either in their dens or out on open ice (QIA, 2018). Coburg Island and its surrounding waters are part of the Nirjutiqavvik National Wildlife Area, which provides critical feeding grounds for polar bears (Government of Canada, 2024b). Though resident to the region, each of these marine mammals are often passing through the area, utilizing pelagic and benthic habitats primarily for feeding during migration. It is likely that habitat surrounding the Project site can support the lower trophic species that marine mammals feed on, and thus there are minimal impacts expected from the Project construction on resident marine mammals.

6.4.6 Species at Risk Species discussed in this section have been assessed by international (IUCN), federal (Committee on the Status of Endangered Wildlife in Canada [COSEWIC] and Species at Risk Act [SARA]), territorial agencies (GN-DoE), and the Draft Nunavut LUP (NPC, 2000). A list of at-risk marine fish, mammals, and terrestrial species potentially occurring in the Project Study Area, and their likelihood of occurrence, is provided in Table 3-1 of the ESEB Report (Dynamic Ocean & Worley Consulting, 2025c). Threatened or Endangered species may occur, but none were identified during field program (see applicable sections for more information). No relevant species are identified for Resolute Bay from the DFO Aquatic SAR map (DFO, 2024b).

Description of Existing Environment: Socio-economic Environment

6.5 Socioeconomic Conditions The Hamlet of Resolute or Resolute Bay, also known locally as Quaasuittuq meaning "the place with no dawn" in Inuktitut, is located on the southern coast of Cornwallis Island. It is

the second most northern community in Nunavut, after Grise Fiord. Due to its northern location, Resolute Bay is a gateway for expeditions to the North Pole and Quttinirpaaq (Ellesmere Island) National Park. The nearest communities are Grise Fiord, Arctic Bay, and Pond Inlet (see Section 1.17, Figure 1 4).

6.5.1 Population and Education

According to 2021 census data from Statistics Canada, the total population of Resolute Bay is 183, representing a decrease of 7.6% since 2016. The population is young, with children aged 0-14 years representing just under a third of the total population (60 individuals) and a median age of 25.8 years for the total population. The total self-declared Inuit population is 165 or 91.7% of the total population according to Statistics Canada 2021 census data. In 2021, of the total population 15 years old and over in Resolute Bay: 20% (25 individuals) held a secondary school diploma (or equivalent) as their highest educational attainment and an additional 25 individuals held a postsecondary certificate, diploma or degree. Of the 25 individuals with postsecondary accreditations, 10 individuals (40%) held apprenticeship or trades certificates; and 15 individuals (60%) graduated with a Vocational College, Collège d'enseignement général et professionnel (CEGEP), or other non-university certificate or diploma. Of the total population 15 years old and over, 70 individuals (61.5%) held no certificate, diploma or degree. According to the 2021 census, 47.2 % of respondents identified English as their mother tongue, 38.9% identified Inuktitut, and 13.9 % reported both languages. This reflects the community's bilingual nature, with English and Inuktitut as the primary languages spoken. Among employed residents in Resolute Bay, English was reported as the language most often used in work settings.

6.5.2 Employment and Economic Activity

Resolute Bay has a higher participation rate, and a lower unemployment rate compared to Nunavut as a whole according to 2021 census data. The participation rate in Resolute Bay was reported as 64.0 % compared to 58.6 % for Nunavut and the unemployment rate was reported as 12.5 % in Resolute Bay compared to 16.8 % for Nunavut. The employment rate was 56% for Resolute Bay vs. 48.7 % for the territory. The economy in Resolute Bay can be characterized as a combination of traditional subsistence activities (including hunting, fishing, trapping and gathering) and wage based economic activities. The main employers in Resolute Bay are the Hamlet, GN, ATCO, the Tudjaat Co-op and the airport. Many residents continue to rely heavily on fish, seal and whale hunting, both for subsistence and as a cultural activity, including customary resource sharing practices.

6.5.3 Land and Resource Use

6.5.3.1 Harvesting and Food Security

Hunting remains essential to life in Resolute Bay. Harvesting of ringed seal, Arctic char, narwhal, and caribou are of particular importance. The availability of traditionally harvested foods in Resolute Bay is crucial because it lowers the demand for imported food which is expensive and most often less nutritious. Additionally, the harvesting, preparation, and sharing of meat and skins offers important opportunities for community members to maintain Inuit cultural practices. Residents also buy food at the Co-Op and order food via the sealift. However, "Low incomes and high food prices mean most Inuit households can afford less than half the cost of a healthy food basket, while very low-income households can afford only 6–13% of the cost of a healthy food basket" (ITK, 2021). Harvesting locations identified during the IQ program have been provided in the Land Use and Occupancy map (Figure 4 1). Apart from the occasional marine mammal, harvesting does not occur in Resolute Bay due to the wastewater outfall (IQ Workshops 2019 and 2024). There is no harvesting for clams or other bivalves, kelp or seaweed, and there is no fishing in Resolute Bay (IQ workshops 2019 and 2024). Although belugas are occasionally harvested in the bay during the open water season, the practice is discouraged by the HTA due to community safety concerns (Joadamee Amagoalik. pers. comm. December 2019). Seals are also occasionally harvested in the bay between July and August (IQ Workshop 2019 - Allie Salluviniq) and in the winter from freeze up to about March along cracks in the ice (IQ Workshop 2019 - Simon Idlout) (Figure 4 1). "The seal (ice) cracks have sustained this community since we got here" (IQ Workshop 2019 - Joadamee Amagoalik). Fishing with gillnets occurs at Allen Bay (see Figure 4 1) but there is no fishing in Resolute Bay (IQ workshop 2019 and 2024). Clams and other shellfish, although present in Resolute Bay, are also not harvested due to the outfall. "Sea urchins, whelks and clams are all over, we know they're there from research that's been done here, and from some people harvesting many years ago, but we don't harvest anything in the bay anymore due to the outfall" (IQ Workshop 2019 - Peter Amarualik). Trapping for Arctic fox or any other land animals does not occur anywhere in or around the community (IQ Workshops 2019 and 2024). Knowledge holders stated that there was no sense in marking polar bear sightings in the area because "they are everywhere" and "unlike other communities, we (Resolute Bay residents) see bears here consistently 365 days a year" (IQ Workshop 2019 - Joadamee Amagoalik). Polar bear tracks are a common sighting all over town and especially at the dump and near any food left out (IQ Workshop 2019 and 2024). Harvesting of plants or berries does not occur in or around the Study Areas. Plants in the area are considered too sparse for picking (IQ Workshops 2019 and 2024). Additionally, seaweed and kelp, although present in Resolute Bay, are not harvested anywhere near the community due to the outfall (IQ workshops 2019 and 2024).

6.5.3.2 Access and Navigation

Boats and skidoos are critical for subsistence harvesting in the Arctic. The majority of hunting and fishing activities are conducted far from Resolute Bay and require boats and skidoos for access. The community does not currently have a protected boat harbour, and the only existing marine infrastructure consists of bollards for the fuel vessel. There have been previous attempts to construct breakwaters and dredge the bay, however, these efforts were unsuccessful. Most boats are pulled up on the beach in the northeast corner of the bay, which is closest to

the townsite, although some boats are also stored in the industrial area on the west side of the bay. Dry cargo from the sealift is lightered to shore in the conventional manner, that is, using small tugs and barges that are carried on board the arriving ship. The barges are brought into the western beach adjacent the industrial part of the community. Sealift is therefore segregated from boat activities that occur on the eastern shore nearest the community.

6.5.3.3 Tourism Resolute Bay offers a unique tourist destination. It is a place of historic interest because it served as a crucial junction along the infamous Northwest Passage in the 18th and 19th centuries. Resolute Bay was named after the British ship, HMS Resolute, which was abandoned in 1850 while searching for the Northwest Passage and the lost Franklin expedition. Resolute Bay has since become the major stopover point for extreme adventure expeditions to the North Pole and to Ellesmere Island (Quttiniruaq) National Park. The main outfitters in town are Polar Ice Adventures and Outfitting run by Randy Nungaq and Devon Manik providing dog sledding expeditions. The HTA can also arrange for local Inuit guides for various trips in the region. Cruise ship visitation to the community has increased steadily in the last couple of years since the 2-year ban on cruising during the global pandemic. According to the Senior Administrative Office (SAO), at least 20 cruise ships visited in 2024, and an even higher number of cruise ship visits are expected in 2025. Currently, tender boats carry passengers from the anchored cruise ships to landing locations provided in Figure 3-1, including Dynamite Beach (HTA members. pers. comm. November 2018, June 2019, and August 2024). According to the HTA, there has also been an increase in sail boats and pleasure craft (including very large yachts) visiting the community in recent years.

6.5.4 Local and Regional Traffic Patterns Resolute Bay is serviced daily by scheduled commercial flights provided by Canadian North via Iqaluit. The ATCO South Camp Inn and complementary hotel airport shuttles. As the hub for Arctic research (Polar Continental Shelf Program [PCSP]) and military training operations (Canadian Armed Forces Air Traffic Control [CAF ATC]), Resolute Bay has a much more extensive road system compared to other communities in Nunavut. The roads in Resolute Bay are gravel surface with no walkways. Pedestrians, ATVs, snow machines, cars and trucks all share the road. The Hamlet is responsible for snow clearing and dust suppression on roads; however, maintaining Resolute Bay's extensive road network remains challenging with the current resources. Spring runoff, which frequently washes out sections of the roads, poses a significant issue (Ian Dudla, SAO. pers. comm. December 2024). The sealift is a vital link for all communities in Nunavut. Details on the sealift operations are provided in Section 1.2.

6.5.5 Human Health and Community Wellness The Resolute Bay Health Centre is nearly 50 years old and in need of major structural repairs. The 2024-2025 Infrastructure Plan for Resolute Bay indicates that the Health Centre needs to be replaced. The Health Centre is staffed by two to three nurses: a supervising nurse and support nurse(s). It has limited laboratory facilities and can provide basic X-rays (Supervising nurse. pers. comm. December 2024). The nurses are equipped to provide plaster casts and splints but not circumferential casts. They deal with basic infections and are authorized to prescribe and dispense medications. The Health Centre is not equipped to allow overnight stays and patients are stabilized and then evacuated by medevac services to hospital in Iqaluit. There are visiting specialists who fly into the community and Resolute Bay also uses tele-med services. The Health Centre delivers community health programs that include Pre-natal and Post-natal Care, Well Adult, Well Child and Chronic Disease Clinics. According to the most recent data available, the Resolute Bay Health Centre had a total of 2,279 visits in 2016 and 10.9 visits per capita (GN, 2018b). The nursing team reported that the Health Centre is adequately staffed and equipped to address the community's current health care needs. They noted that the clinic accepts workers from the south requiring medical attention beyond the capabilities of ATCO Frontec Ltd. (ATCO) or other companies working in the community. The nurses have the capacity to address these medical needs effectively. Based on prior experience with ATCO, the team indicated that the expected construction workforce for the community harbour should not place significant strain on the Health Centre, provided that workers are fit-for-work and in good health. However, they advised that workers requiring prescriptions bring sufficient medication with them, as Resolute Bay does not maintain a fully stocked pharmacy.

Beyond public health programs and the health centre, Inuit traditional activities such as harvesting, preserving food, preparing skins and resource sharing contribute greatly to familial and cultural cohesion which are critical to community wellness. In addition, social activities such as sports, Inuit games, dog sledding competitions, storytelling, arts and crafts and land-based programs are important factors in promoting community health and personal well-being in Resolute Bay.

6.5.6 Housing and Community Infrastructure and Services The 2021 census reported Resolute Bay having a total of 65 occupied private dwellings of which 60 dwellings were rented. Of the 60 rented dwellings, 83.3% were public (subsidized) housing. Over half (53.8%) of occupied dwellings were also in need of major repairs (Statistics Canada, 2023). The NHC's Annual report for 2023-2024 listed Resolute Bay's housing stock at 34.0%, indicating a high need for housing as compared to other communities in Nunavut (NHC, 2024). Temporary accommodation in Resolute Bay is currently provided by the ATCO South Camp Inn with 28 rooms and a total capacity for 52 guests and the Airport Hotel with 21 rooms and a total capacity for 32 guests (ATCO hotel manager. pers. comm. November 2024). The GN contracts ATCO to maintain the water and wastewater services in Resolute Bay, supplied through the Utilidor System. The Utilidor System, constructed in the 1970s, was originally designed for an anticipated population of 1500; however, the expected growth

was not realized, and the current population is just under 200 (Dillon, 1999). As the system was designed for 1500 people, there was insufficient flow, leading to numerous freeze-ups and failures within the system. Significant upgrades to the system including a new intake system, pump station and water treatment plant have recently been completed. The upgrades include a new 720 L/min pump station with three intakes, three boilers and a backup power generator. Water is supplied to the treatment plant from Char Lake via 2.7 km of electrically heat-traced insulated high-density polyethylene pipe. The new treatment plant houses first-stage multi-media filters (gravel, sand and anthracite), second-stage cartridge filters, ultraviolet (UV) disinfection and new chlorination equipment. The water supply is integrated with the Hamlet's sewage collection system through the utilidor. Water in the utilidor is continuously supplied, circulated, and heated to prevent pipes from freezing. The Hamlet is served entirely by the Utilidor system with the exception of the RCMP building, the airport site and the PCSP, which rely on water truck delivery (Ian Dudla, SAO. pers. comm. November 2024). Sewage and municipal wastewater are collected through the Utilidor system, macerated and discharged to the ocean. The system uses bleed water from the water mains to provide freeze protection to the sewer mains, which also serves to dilute the wastewater prior to discharge. The effluent discharge occurs just above the low tide mark. The effluent is discharged continually into the ocean at high tide and on land at low tide. The airport site has a separate sewage lagoon system. The GN is expected to build a new sewage treatment plant for the community in the near future. The municipal waste facilities include a domestic waste site located 4 km south-west of the Hamlet, on the shoreline of the Arctic Ocean and a metal wastes and hazardous goods site within the Hamlet. The domestic waste site is not lined or contained, and the facility is managed by the burn and cover procedure. The metal waste and hazardous goods site is located within the Hamlet. This site receives all the metal wastes without any segregation. The hazardous waste is segregated in a berm-like structure that is at maximum capacity. The current landfill is nearing capacity and requires new double fencing. The Hamlet has proposed to construct a new municipal waste site at a location approximately 75 m north of the existing bulk metals disposal site. The community harbour site was originally built in 2001 as a waste disposal site but was never licenced or used (GN, 2024a). The site has an existing perimeter fence with an entrance gate and an approximate area of 50,000 m² (GN, 2024a). Funding for the solid waste site upgrades was approved by Infrastructure Canada in 2017 with an expected completion by 2027 (Infrastructure Canada, accessed November 2024). Electricity is provided via diesel generators that are owned and operated by the Qulliq Energy Corporation, a territorial corporation 100% owned by the Government of Nunavut. Qulliq Energy is the only generator, transmitter and distributor of electrical energy in Nunavut. Both power and heat in Nunavut are entirely derived from an estimated 55 million litres of diesel shipped annually to each of the 25 remote communities during the summer months (open water season). Each community relies entirely on their own QEC operated diesel plant. Fuel in Resolute Bay is stored at a tank farm located in the industrial area approximately 3 km south-west of the centre of town with some volume stored at the airport for jet fuel. There have been no significant issues with fuel delivery or storage capacity in the community in recent years, except for a jet fuel shortage in 2022. Table 6.7 outlined bulk fuel storage capacity for Resolute Bay. The current fuel storage capacity adequately meets the community's needs, and no shortages have been reported since (Ian Dudla, SAO. pers. comm. December 2024). Fire protection is the responsibility of the Hamlet and currently relies on 8 volunteer firefighters. The Hamlet has a pumper fire truck, and firefighters are trained to hook up to the fire hydrants for fire suppression. Although the Hamlet reports that no fires have occurred over the past year, it is a constant struggle for the community to ensure that enough firefighters are in town at any given time to respond should one occur. The RCMP detachment office is staffed with two full time officers. Landline, mobile, and internet services are provided by NorthwesterTel/Bell Mobility and Qiniq. The local community radio has recently started broadcasting again, although it currently operates without a host.

6.5.7 Archaeological and Culturally Significant Sites

Two AIAs were conducted in support of the Project, in 2019 and 2024. The 2024 AIA program was conducted under NU Permit 2024-59 and focused on areas that were not included in the previous AIA and may be impacted by the development, including two proposed quarry areas and access road corridor. The 2024 AIA was completed between 23 and 25 August and 01 September 2024 consisting of pedestrian survey of all areas that may be impacted by the development of the Project. This includes areas that were not included in the 2019 survey for portions of the small craft harbour, potential borrow sites and access roads. Five previously recorded sites were revisited, and four new sites were documented. No archaeological or paleontological sites were identified within the proposed northern quarry study area or along the haul route. In contrast, the alternative Southern Quarry area contains up to five sites that would require mitigation.

Miscellaneous Project Information

Identification of Impacts and Proposed Mitigation Measures

Refer to Section 7 of the attached PSIR Report.

Cumulative Effects

All Project effects previously described are expected to be negative and mitigatable, or positive. Using the NIRB Public Registry all past, present and reasonably foreseeable projects were screened for potential to interact with the Project. At this time, no other projects have been identified to incur cumulative effects with those of the Project.

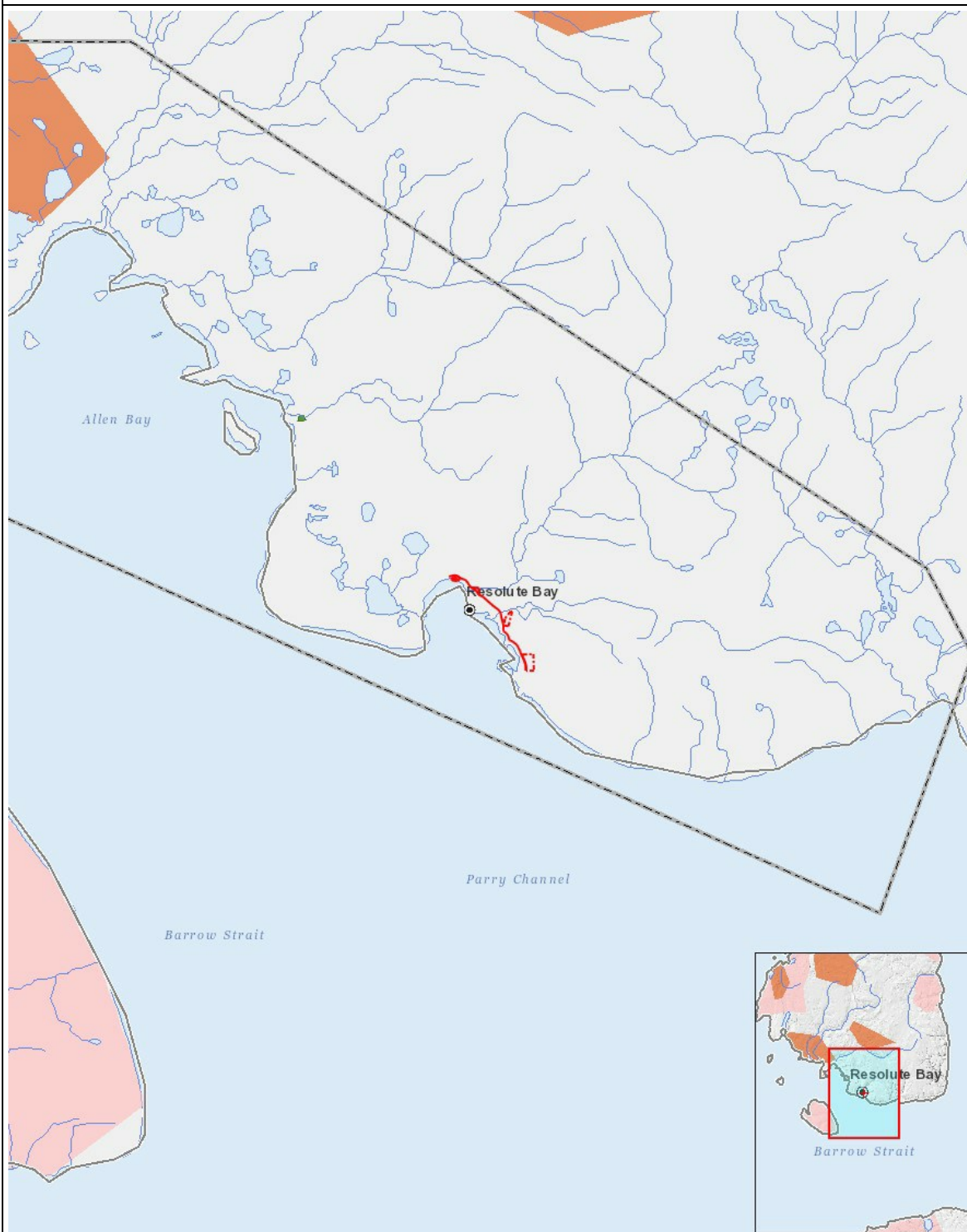
Impacts

Identification of Environmental Impacts

	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
Construction																									
Dredging		-	-	-	-	M	-	-	-	M	M	M	M		-	-	M	M	-		-	P	M	M	M
Harbour infrastructure		-	-	-	-	M	-	-	-	M	M	M	M		M	M	M	M	-		-	P	M	M	M
Quarry/Borrow pit		-	M	M	-	M	-	-	-	M	-	M	M		-	M	-	M	-		-	P	M	M	M
Access Road		-	-	-	-	-	-	-	-	-	-	-	-		M	M	M	-	-		-	P	M	M	M
Offshore Infrastructure (port, break water, dock)		-	-	-	-	M	-	-	-	M	M	M	M		-	-	M	M	-		-	P	M	M	M
Operation																									
Harbour infrastructure		-	-	-	-	-	-	-	-	-	-	M	M		M	M	M	M	-		-	P	P	P	P
Access Road		-	-	-	-	-	-	-	-	-	-	M	M		-	M	M	-	-		-	-	-	-	-
Offshore Infrastructure (port, break water, dock)		-	-	-	-	-	-	-	-	-	-	M	M		-	-	M	M	-		-	P	P	P	P
Decommissioning																									
-		-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-	-		-	-	-	-	-

(P = Positive, N = Negative and non-mitigatable, M = Negative and mitigatable, U = Unknown)

Project Location



List of Project Geometries

- | | | |
|---|----------|-----------------------------------|
| 1 | polyline | Community Harbour Footprint |
| 2 | polyline | Northern Quarry Option |
| 3 | polyline | Southern Quarry Option |
| 4 | polyline | Haul Route on Existing Road/Track |
| 5 | polyline | Alternate Haul Route |