GREAT NORTHERN PORT INC.
Crémaillère Harbour Marine Port Development
Environmental Preview Report - Revised

Submitted by:

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Wood Project #: TA1883001

IMPORTANT NOTICE

This report was prepared exclusively for Great Northern Port Inc. by Wood Environment & Infrastructure Solutions, a Division of Wood Canada Limited (Wood). The quality of information, conclusions and estimates contained herein is consistent with the level of effort involved in Wood's services and based on: i) information available at the time of preparation, ii) data supplied by outside sources and iii) the assumptions, conditions and qualifications set forth in this report. This report is intended to be used by Great Northern Port Inc. only, subject to the terms and conditions of its contract with Wood. Any other use of, or reliance on, this report by any third party is at that party's sole risk.

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1.0 INTRODUCTION AND NAME OF THE UNDERTAKING

This Undertaking is referred to as the "***Crémaillère Harbour Marine Port Development***" (also referred to herein as "the Project").

Great Northern Port Inc. (GNP Inc.) is proposing to develop an Industrial Subdivision and Marine Port at Crémaillère Harbour on the Great Northern Peninsula of Newfoundland and Labrador (Figure 1-1).

The Project was registered by the Proponent for environmental assessment (EA) review pursuant to the Newfoundland and Labrador *Environmental Protection Act* (Part X) (*NL EPA*) on November 14, 2017 (Registration # 1933). Following public and governmental review of that EA Registration the Minister of Municipal Affairs and Environment announced, on January 21, 2018, that an Environmental Preview Report (EPR) was required for the Project. An EA Committee was appointed to provide advice to the Minister on the EPR on March 6, 2018, and on March 22, 2018 Guidelines for the preparation of the EPR were issued to the Proponent (Appendix A).

This EPR has been prepared and submitted by GNP Inc. with the assistance of Wood Environment & Infrastructure Solutions, in accordance with the *NL EPA* and its *Regulations* and the above referenced EPR Guidelines. The document is intended to provide further information on the Project and its existing environmental setting, potential environmental interactions, and proposed mitigation in order to address the questions and environmental considerations raised during governmental and public review of the EA Registration. The EPR has been planned and prepared in accordance with the organization and structure of the EPR Guidelines themselves in order to optimize its utility and readability, and a Table of Concordance indicating where each of the specific requirements of the Guidelines are addressed is also included in Appendix A.

The EPR will be subject to governmental and public review, and eventually, a decision will be made by the Minister of Municipal Affairs and Environment as to whether the Project may proceed, subject to any associated terms and conditions resulting from the EA and/or subsequent permitting, or whether further environmental review may be required.

Figure 1-1 Crémaillère Harbour Marine Port Development: General Location

2.0 THE PROPONENT

GNP Inc. is a St. John's, NL based company, registered in the province, and formed to investigate the feasibility of, and generate investment in, the proposed port Project.

Name of Corporate Body:	Great Northern Port Inc.
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The proponent commits, and agrees to commit its assigns, to adhere to all applicable regulations and best practices of environmental stewardship and social responsibility in the planning, engineering, construction and operation of the Project. The proponent and its assigns will obtain all approvals, licenses, and permits as may be required through relevant Federal, Provincial and Municipal permitting processes prior to commencement of any part and/or each Phase of development and as may be required thereafter for any aspect of construction, installation, maintenance, and/or operations at the Project site throughout the life of the project.

The mandate of GNP Inc. is, and will continue to be, as far as is practicable, the protection of natural and historic resources and mitigation of environmental impacts through informed and environmentally conscious planning, engineering, and oversight through its own offices and through contracts and agreements with contractors, employees, and associates. The mindset of 21st century environmental awareness and responsibility, and a deep appreciation of the value of the region's culture, history, and historic resources drives the GNP Inc. approach to the Crémaillère Harbour Marine Port Project and is a key component of the GNP Inc. value proposition for the peoples of St. Anthony, the province, and the Arctic.

3.0 THE UNDERTAKING: NATURE, PURPOSE AND SCOPE

The following sections provide a brief introduction to, and overview of, the proposed Project, including its overall nature and its underlying purpose, need and rationale, as background and context for the EPR.

3.1 Nature of the Project

GNP Inc. proposes to develop an Industrial Subdivision and Marine Port at Crémaillère Harbour on the Great Northern Peninsula of Newfoundland and Labrador. Beyond regional logistical needs and business potential, GNP Inc. has taken into account proximate and regional environmental concerns, cultural and social impacts, and direct and dispersed economic benefits of the proposed port at Crémaillère Harbour.

GNP Inc.'s economic objective is to create a catalyst for growth based on a cluster of port services driven by current, and projected, onshore and offshore logistics requirements as well as military and Coast Guard needs. The Project has the potential not only to invigorate the Great Northern Peninsula commercially but also to realize the value of the natural and historic resources that already attracts active international interest. Moreover, by raising awareness and setting the bar for Arctic and Far North development through research, commitment to best practices, and ice-ready, harsh environment response and rescue, GNP Inc. proposes that the Crémaillère Harbour Marine Port will be a value-added benefit both economically and environmentally to the Great Northern Peninsula and to the Province of Newfoundland and Labrador.

3.2 Project Purpose, Need and Rationale

Historically ports primarily provided a safe haven; a shelter, from waves, tides, currents, ice, and hostile attack. A port was a place where goods were exchanged, supplies and fresh water sourced, repairs made, and crews rested. The early rationale even for intercontinental ports and port-related development evolved according to the needs of shipping technology, trade routes, and colonialism. As political boundaries solidified, and global trade markets increased, and with the eventual rise of globalism, the strategic role of ports within regional and sub continental economic contexts was realized. Ports are now seen as vital hubs of commerce and transportation. The understanding of ports has changed from simply a transport vector where land and sea transport routes meet to strategic International Industrial Zones competing in a global marketplace.

The clustering of industry and port-related services around seaports offers numerous economic advantages; in particular long-term, quality employment, and the inclusion of municipalities and regions in international exchange and trade (Jakomin 2003). It was determined, through a multifaceted comparative site selection assessment, that Crémaillère Harbour best fulfilled a key range of criteria for development as a northern marine port. The value-added components of this Port's development are noteworthy: proximity to the Arctic and the Northwest passage; proximity to transatlantic shipping routes and offshore natural resources; its proximity to exploration and high-traffic corridors affording quick disaster response time; a deep-water port able to accommodate the largest of vessels, and available land providing exceptional onshore storage.

The Project will compete as a farthest-north, ice-free port and International Industrial Zone located at the eastern extent of the Canadian North and the Arctic Ocean connecting to transatlantic shipping and eastern North America. Crémaillère Harbour is normally ice-free for 7-8 months annually and such an extended ice-free port is necessary to support the north as arctic shipping routes open up with the reduction of multi-year sea ice and the shortening of the single year ice season. In its final phase the proposed Project will provide advanced port facilities and intermodal transport logistics infrastructure, a full-service capable regional marine services base, onshore human resources and personnel transport, a reliable tax and fiscal legislation environment, and internationally sanctioned environmental stewardship.

GNP Inc.'s Canadian North proximity and access criteria is driven in part by the need to react quickly in potential emergency situations. Currently the Arctic has minimal means to mitigate the impact of potential disasters on the environment and lives. There is a need for proactive infrastructure planning to help prevent and respond to

these potential risks. As the Arctic opens for more commercial and domestic traffic, there will be further demand for Arctic emergency support and search and rescue. GNP Inc.'s Crémaillère Harbour Project is strategically located to be an all-encompassing, one-stop Arctic support location that can provide emergency response, search and rescue, Coast Guard and military support. Crémaillère Harbour is ideally located to serve the "New Arctic" and help fulfil Canadian involvement in Arctic preparedness and response.

It is GNP Inc.'s intent that the Crémaillère Harbour Marine Port will provide the range of services required to address the needs of potential full-service harbour users including wharfage, fuelling, warehouse and lay down areas as well as maintenance and repair requirements while minimizing the potential for negative environmental, social and economic effects. This will address a growing need for such services on the northern coast related to transportation to the north, oil and gas exploration and development, mining, and other economic development.

The target market for the proposed port facility is a combination of northern activities and, without entering into specific commercial arrangements, several technical factors have a direct impact on the commercial viability of the location of the proposed Project. One of the key selling points is the port's ability to turn around ships in a minimal amount of time, as efficiency of the fleet is key in achieving GNP Inc.'s client objectives.

1. The port of St. Anthony does not have the draft required to service one of the key prospective clients of GNP Inc.
2. The port of St. Anthony has an overall lower winter navigability than the Crémaillère Harbour. This would require extensive ice breaking. In light of the current Coast Guard ice breaking capabilities, this would add additional time and cost to the ship owner, making it economically unfeasible.
3. Any port that requires sailing through the Straight of Belle-Isle would potentially require ice breaking support in ice season. This adds time and cost and makes the project economically unfeasible. This de facto eliminates Port aux Basques, Marystown or Argentia.
4. The port of St. John's, due to its city setting and the current high usage of the facilities by the oil and gas operators, does not have the space to accommodate the proposed ore storage facilities.
5. Most other ports around the Island have either a challenging ice season requiring ice breaking in critical shipping season (Clarenville, Lewisporte, Corner Brook) or have added sail time (St. John's, Argentia, Holyrood). This added sail time eliminates the unique time advantage of fleet optimisation that the Northern Peninsula offers.

In relation to the existing repair facilities on the Island, the New Dock facility has insufficient beam capacity for the ship size in consideration. More so, its location in the city of St. John's makes it challenging to have a facility that is sufficiently isolated to facilitate security arrangements to satisfy client needs. The facility, as highlighted in the initial document, will need to be covered with a fit for purpose building provided by our client, amongst other security measures. The second facility on the Island would potentially be Marystown. However, that facility is in the process of being repurposed for fish farming support.

Figure 3-1 Crémaillère Harbour North to South View

Crémaillère Harbour was selected based on the following criteria:

- Location
  - Proximity to Resource Development
  - Proximity to Regional Electrical Grid
  - Proximity to Regional, Arctic, and Global shipping routes
  - Proximity to Land Transportation (TCH link)
  - Proximity to Air Services
  - Proximity to St. Anthony

- Geophysical Factors
  - Harbour Depth and Size
  - Extended Ice-free Season
  - Distance from Residential Areas
  - Available Landside Area
  - Navigational Accessibility

- Market Factors
  - Missing Regional Logistics Link
  - Under capacity in Regional Logistics and Marine Services
  - Congested Regional and Global Ports
  - Highly-Skilled Available Workforce

- Economic Factors
  - Government and Industry Supports
  - Low Corporate Tax Rates
  - Available Crown Land

4.0 DESCRIPTION OF THE UNDERTAKING

The following sections provide a description of the Project, including its location, main components, and the various activities that will be associated with its construction and operations phases. The information provided in this Chapter addresses each of the Project description information requirements specified in the EPR Guidelines (see Appendix A).

4.1 Geographic Location

Crémaillère Harbour is located on the eastern coast of the Northern Peninsula of Newfoundland and Labrador at latitude 51° 20' 0.2" (51.3334°) north, longitude 55° 36' 52.8" west. The Harbour lies Approximately 4.1 kilometres south of the Town of St. Anthony, Figure 4-1.

Figure 4-1 Google Earth View of Crémaillère Harbour and St. Anthony Harbour

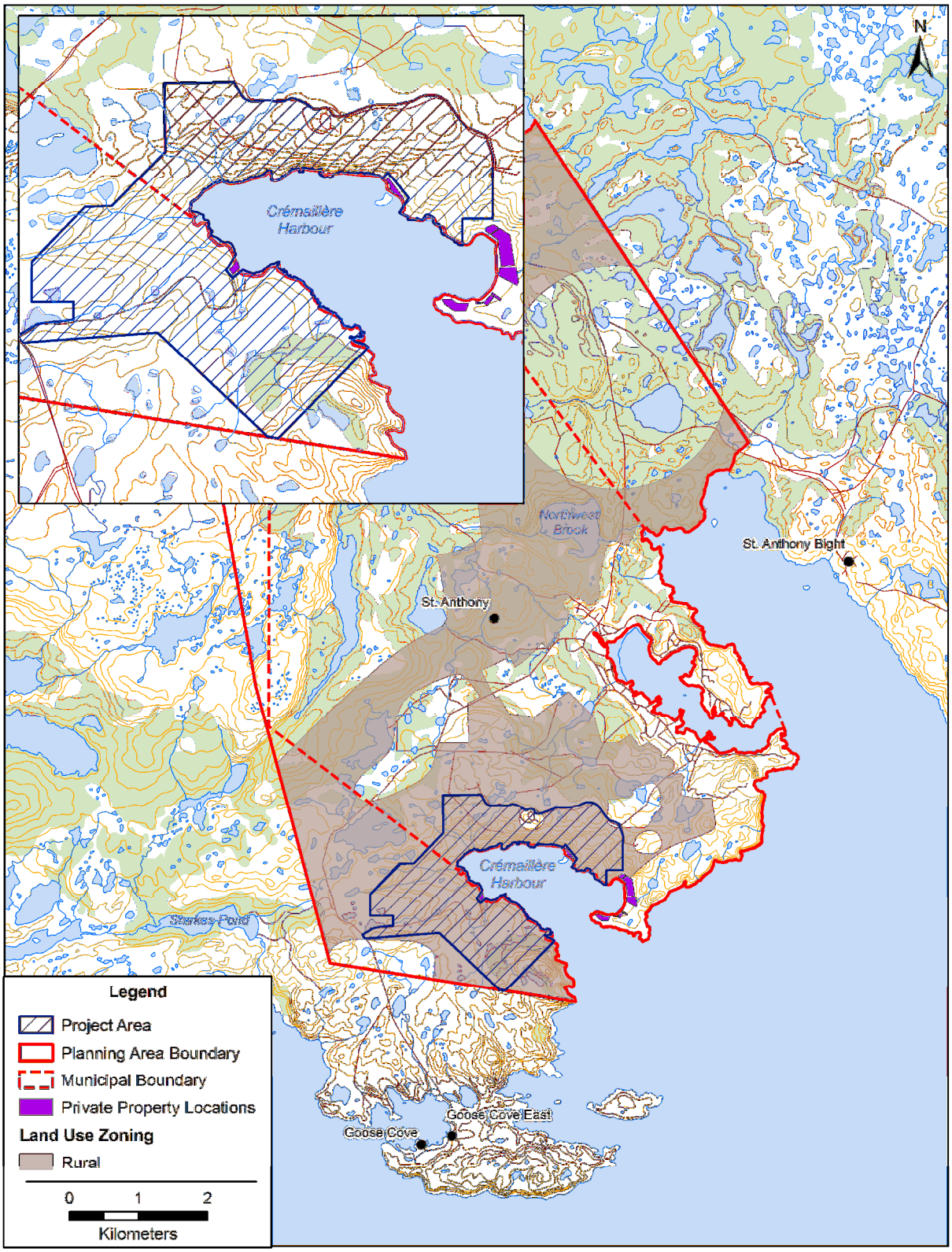
GNP Inc. currently has applications registered with Crown Lands, (File No. 3020712; Application No: 151500 and 151508) for the proposed Project area, Figure 4-2. There is presently no development within the boundaries of the proposed land area and harbour water lots. The next step in acquiring the applied-for Crown land is a release from the Dept. of Fisheries and Land Resources to allow for environmental surveys and geotechnical assessments, in order to provide delineation for detailed geological, hydrological, and bathymetric surveys for planning and engineering purposes. These studies must follow the preliminary release as the site is Crown property and requires access permits.

- The proposed Crown Land lease area is described as follows:
  - Bounded on the North by Goose Cove Road (route 430)
  - Bounded on the East by the Atlantic Ocean
  - Bounded on the South by the Town of St. Anthony (Crown Land)
  - Bounded on the West by Hare Bay (Crown)

- and,
- Containing an area of 72,450 square metres

The Project is located within the Town of St. Anthony Municipal Boundary and/or Planning Area Boundary, Figure 4-2. The proposed Project area is generally within the municipality of St. Anthony but outside of the developed area of the Town, off Route 430 and between the Towns of St. Anthony and Goose Cove East. Private property identified in Figure 4-2 is excluded from the Project area and existing access to these properties will be maintained.

Figure 4-2 Project Boundary in Relation to Existing Municipal Boundaries and Private Properties in Crémaillère Harbour



4.1.1 Project Components

GNP Inc. anticipates three Phases of development taking place across the entire site area or as contingency allows. GNP Inc. anticipates the parts of the project described can progress more or less within the time frames indicated for site preparation and construction. Once approval in principle is obtained and the framework for environmental and geotechnical assessment is established, studies and engineering surveys may begin. Detailed topographic terrestrial and bathymetric surveys will precede site planning and determine actual time frames for excavation and construction. GNP anticipates a two-year time frame for these activities with a possible start up for environmental and geotechnical site work in 2019.

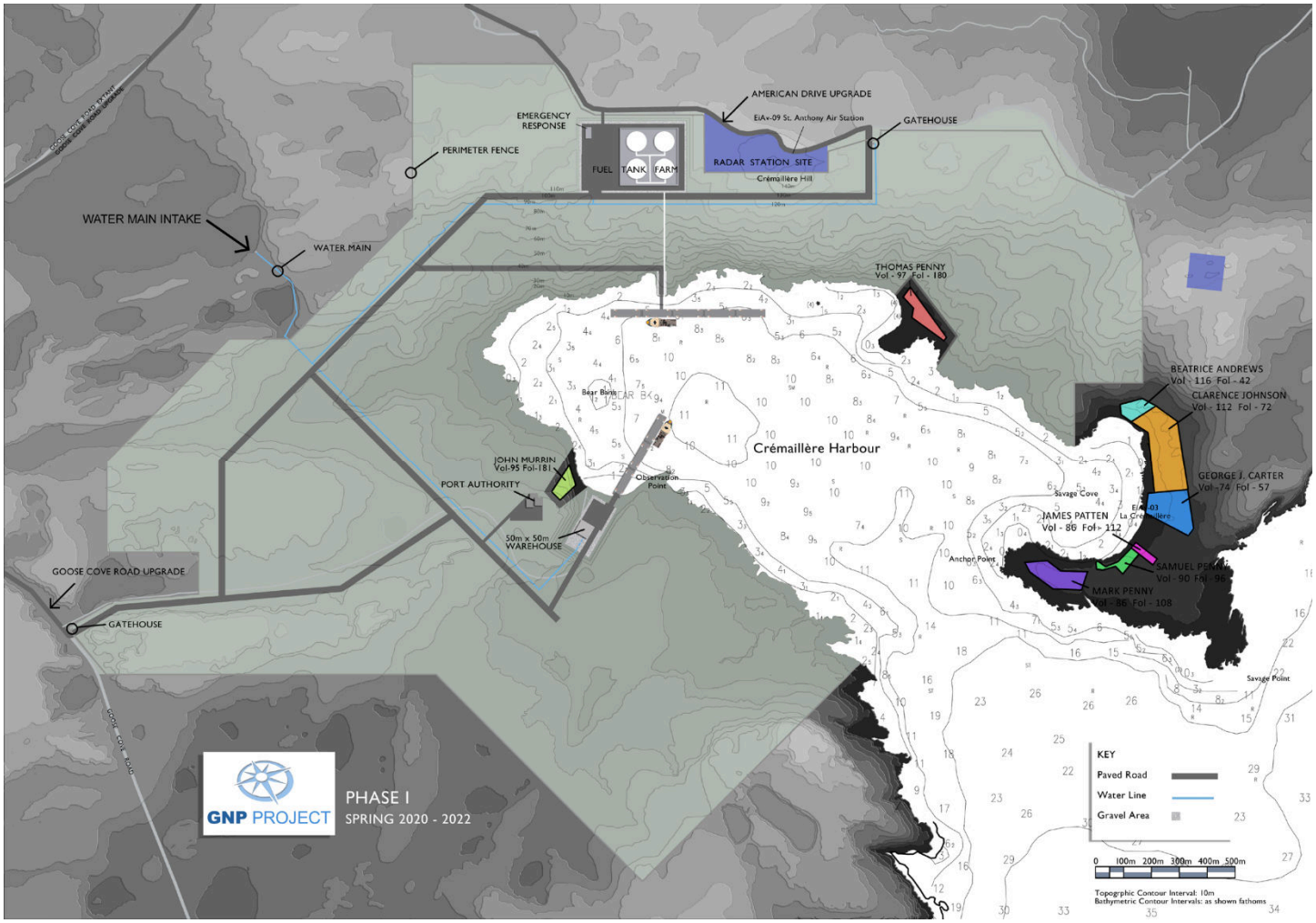
- Phase I - Facilities and Infrastructure List:

  - Perimeter Security Fencing and Gates, Signage, Lighting, Surveillance, and Gatehouse
  - American Drive Road Upgrade
  - Goose Cove Road Upgrade
  - Site Service Roads (inside site boundaries)
  - Electrical Power Service Grid (not shown)
  - Communications Cabling (not shown)
  - Navigation Markers and Beacons (not shown)
  - Service Dock
  - 50m x 50m warehouse
  - Fuel Tank Farm
  - Emergency Response Building
  - Potable Water Supply Infrastructure
  - Sanitary Wastewater (Sewer) System(s) (not shown)

It is anticipated that surveys and engineering for Phase I construction will take two years with a startup for site preparation in the Spring of 2020. Site excavation, grading and preparation for roads and building lots and installation of services and utilities infrastructure will take until the Spring of 2022.

The location of the facilities and infrastructure proposed in Phase I of the harbour development are identified in Figure 4-3 These locations are not referenced to specific geographical coordinates at present and may be adjusted in response to site specific engineering and environmental considerations from future engineering studies and environmental protection planning. The infrastructure will also be subject to specific regulatory permit and approval processes, as identified in Appendix D.

Figure 4-3 Phase I Site Plan



Electrical service grid, sanitary wastewater treatment, and communications cabling will be engineered and installed based on a detailed site plan which takes into account geology, ground water and related factors.

Road width as indicated by the 2mm grey lines describe the footprint of a two-lane road with standard 3.7m lane width plus shoulders and ditches for a total width of 20 metres.

Where proposed road upgrades deviate from existing road bed routes; the road is moved to reduce curves, follow existing grades, and create buffers between the road bed and fresh water ponds.

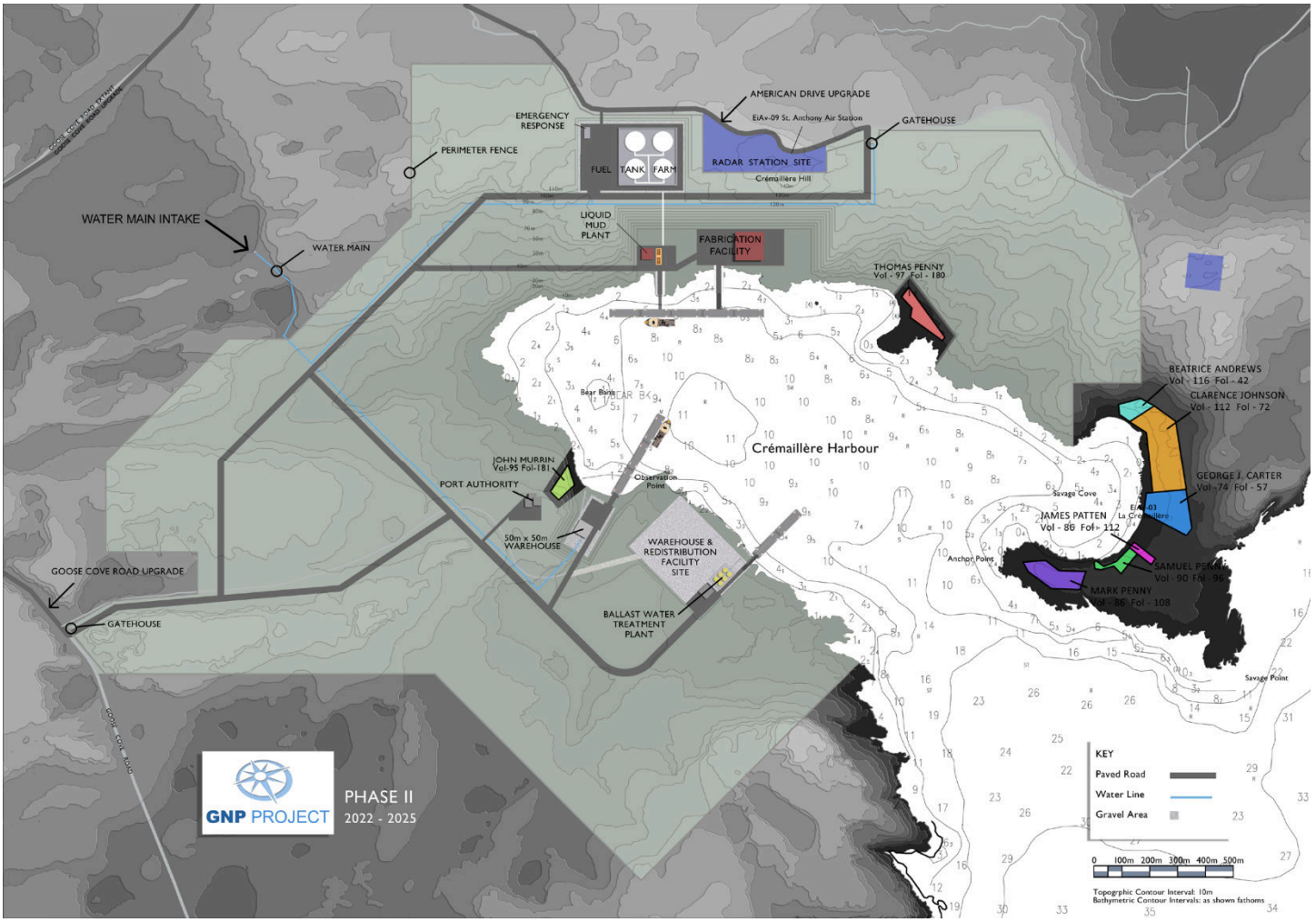
- Phase II - Facilities and Infrastructure List:

  - Port Authority Administration and Office Complex
  - Fabrication Building and Dock
  - Liquid Drilling Mud Plant (LMP) (If Required)
  - Ballast Water Disposal and Treatment Facility (If Required)
  - Warehousing and Redistribution Facility Site Preparation

The start of Phase II is marked by construction of the Port Administration building, fuel tank farm and possible drill mud tank farm, docks assemblies, and other structures related to the warehousing. Construction of structures for waterside related services and operations such as supply and freight handling will take place primarily in Phase II. Construction of buildings, structures, and paved areas related to ancillary services such as machine shops for refit and repair will take place as required on back lots of the site. Phase II is anticipated to take 3 to 5 years from the Spring of 2022 until 2025 and beyond.

The location of the facilities and infrastructure proposed in Phase II of the harbour development are identified in Figure 4-4. These locations are not referenced to specific geographical coordinates at present and may be adjusted in response to site specific engineering and environmental considerations from future engineering studies and environmental protection planning. The infrastructure will also be subject to specific regulatory permit and approval processes, as identified in Appendix D.

Figure 4-4 Physical Features of Undertaking / Phase II



- Phase III - Facilities and Infrastructure List:
  - Enclosed Graving Dock
  - Warehouse and Distribution Facility

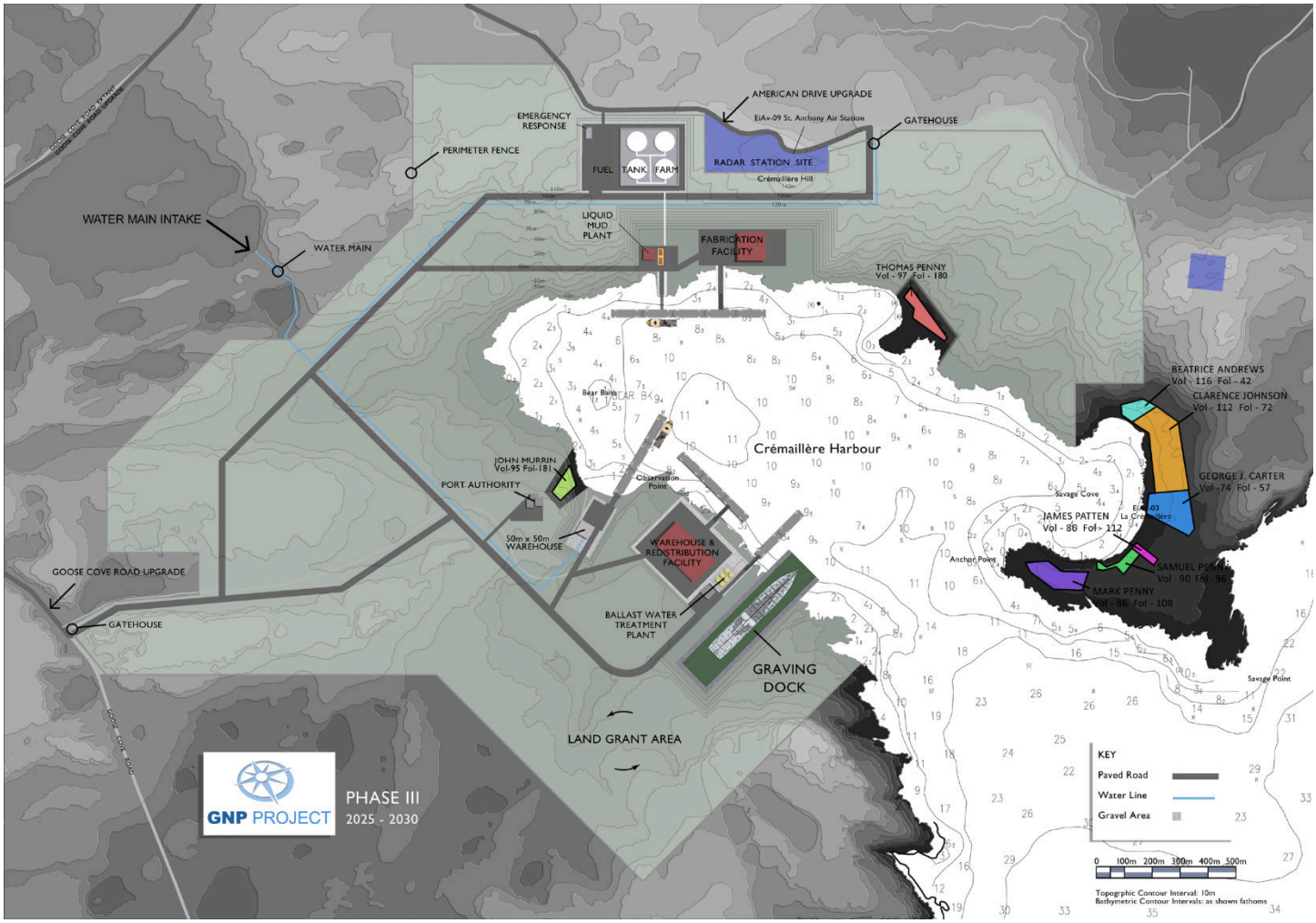
Phase III will see the construction of the graving dock and warehousing and redistribution hub on the south shore of the harbour basin. The graving dock will serve as a refit and repair and construction facility for larger vessels including offshore service ships and drill rigs. Construction of the graving dock may require blasting and excavation depending on how it is engineered. For this reason the construction time frame is anticipated to extend into the latter Phase of the Project. The amount of time required to excavate the basin and to build the superstructure is estimated at three to five years; the latter case placing the completion date at 2030 assuming a 2025 start up.

The warehousing and redistribution centre is an intermodal logistics hub intaking trucked and seaborne bulk and containerized freight for redistribution by sea and air to Labrador and the Arctic. The paved laydown yard and warehouse as shown in Figure 4-5 will occupy approximately 10,000m^2 excluding dock and waterside quay

areas. While the warehouse facility may take as long as 5 years to construct, depending on demand and site preparation and permitting requirements, the construction start date may be as early as 2022.

The location of the facilities and infrastructure proposed in Phase III of the harbour development are identified in Figure 4.5. These locations are not referenced to specific geographical coordinates at present and may be adjusted in response to site specific engineering and environmental considerations from future engineering studies and environmental protection planning. The infrastructure will also be subject to specific regulatory permit and approval processes, as identified in Appendix D.

Figure 4-5 Physical Features of Undertaking / Phase III



4.2 Construction

The physical infrastructure to be constructed during Phases I, II, and III of construction, identified in Figure 4-5, include upgraded and new roadways, office, warehouses and fabrication buildings, a bulk fuel storage tank farm, potentially a liquid drilling mud plant, a ballast water treatment facility (if required), berthing docks, and an enclosed graving dock. Construction activities associated with these major features of the proposed Project are described in the sections below.

Location and dimensions of facilities indicated in Phases I, II and III are based on estimates of required area, proximity to deep water, and topography. Dock section lengths may be considered relatively accurate as these will be manufactured as components of a modular, reconfigurable and scalable dock system. Actual locations of onshore buildings and infrastructure will be finalized in the fully engineered Site Plan following detailed survey and study of topography, geology, hydrology, etc. of the land areas and harbour basin.

4.2.1 Roads and Utilities

The proposed Project area is presently accessible via American Drive, between St. Anthony and Goose Cove road, to the north, and Goose Cove Road to the east. American Drive is located along the northern boundary of the proposed Project area, but does not provide access to the harbour. Goose Cove Road is located between the communities of St. Anthony and Goose Cove, Figure 4-2, to the west of the proposed development area, and intersects with an existing access road that provides access to the south side of Crémaillère Harbour

Figure 4-3 shows a proposed road route running west to east and then northeast roughly parallel to the existing access road from Goose Cove Road to Observation Point. The actual road route will depend upon roadbed construction requirements and environmental considerations such as drainage and runoff. Similarly, a proposed access road route from American Drive provides access to proposed facilities and the north side of Crémaillère Harbour. Roads as shown are a general indication of an approach to the layout of the Project road system.

Proposed roads will be a total of 20 metres in width with two standard 3.7 metre wide lanes plus shoulder and ditches. Sections of American Drive and Goose Cove Road may need to be upgraded as part of the proposed development.

The project is anticipated to be completed over multiple years and phases with the initial phase anticipated to create a low volume of construction and operational traffic. Traffic impacts will generally be limited to on-site workers and a limited amount of service delivery traffic during construction and while in operation. A traffic impact study will be conducted and a traffic impact statement will be issued in conjunction with conceptual and preliminary engineering and planning. The traffic impact study will outline the potential traffic impacts for each of the three phases of the proposed development as each phase of the development may have varying degrees of traffic impacts from a road traffic generation perspective. The traffic impact statement will identify potential impacts and mitigation to American Drive, Goose Cove Road and Route 430, including the section running through the Town of St. Anthony. Detailed traffic studies and projections will inform a roads upgrade plan which will set standards and scheduling for any necessary upgrading. The features of road improvements, such as paved shoulders, turning lanes etc., will rely on relevant provincial and municipal standards for roads with loads and levels and types of traffic anticipated. Standards for road verges, drainage, erosion mitigation, and environmental remediation will be consistent with road construction standards within the project site boundaries including landscaping and replanting of exposed areas. Road improvements proposed as a result of this process, such as changes to intersections with American Drive and Goose Cove Road, will be subject to the Department of Transportation and Works' highway access permit approval process.

Although the Project is in close proximity to the water supplies for the towns of St. Anthony and Goose Cove East, it is proposed that the Project will have its own water and sewer infrastructure, outside and separate from that of either of these towns. GNP Inc. proposes to utilize an unnamed pond adjacent to the western Project boundary, near Goose Cove Road, as the primary water source for the Project, Figure 4-3. At this stage in the Project design it is proposed to construct a water intake on the eastern shoreline of the pond to supply a main water line which will distribute water to Project facilities. This will be subject to design engineering determining suitability of the quality and quantity of the water from this source for the needs of the Port development, and subsequent approval under the *Water Resources Act*. GNP Inc. has investigated waste water treatment options and will integrate advanced sewage treatment technologies into the Development Plan for the Project. Waste water treatment proposals will be developed, based on an engineering study of the suitability of sewage

treatment options and on-site conditions, and implemented, subject to receiving approvals from Service NL under the *Water Resources Act* or *Health and Community Services Act*, as appropriate.

An electrical service grid and communications cabling system will also be developed based on future design engineering, taking into account Project specific factors and environmental considerations.

Site assessment for the Project will include a comprehensive study of surface and ground water and marine hydrology to establish targets for the application of Low Impact Design (LID) methodologies for storm water design. GNP Inc. will integrate current knowledge and best practices of LID methodologies in designing drainage and flow regulation models for the Project area.

4.2.2 Office, Warehouses and Fabrication Buildings

Proposed buildings include a port authority and office complex, as well as two warehouses on the south side of Crémaillère Harbour, and a fabrication facility on the north side of the Harbour, Figure 4-5

Construction of all buildings will ensure building envelope design and construction are engineered utilizing best energy-efficient practices in minimizing energy consumption, to include, heating/cooling systems, lighting, ventilation, sound/air control, as well as fire and safety. Engineering and construction will utilize and adhere to, at a minimum, building code practices Leadership in Energy and Environmental Design (LEED), ASHRAE 90.1 and the National Energy Code for Building (NECB) in the engineering and design of all buildings on site. Prior to the start of construction, all building drawings will be registered with Services NL for compliance with *Fire and Life Safety Act* and the *Buildings Accessibility Regulations* as contained within the *Building Accessibility Act* (O.C. 96-865).

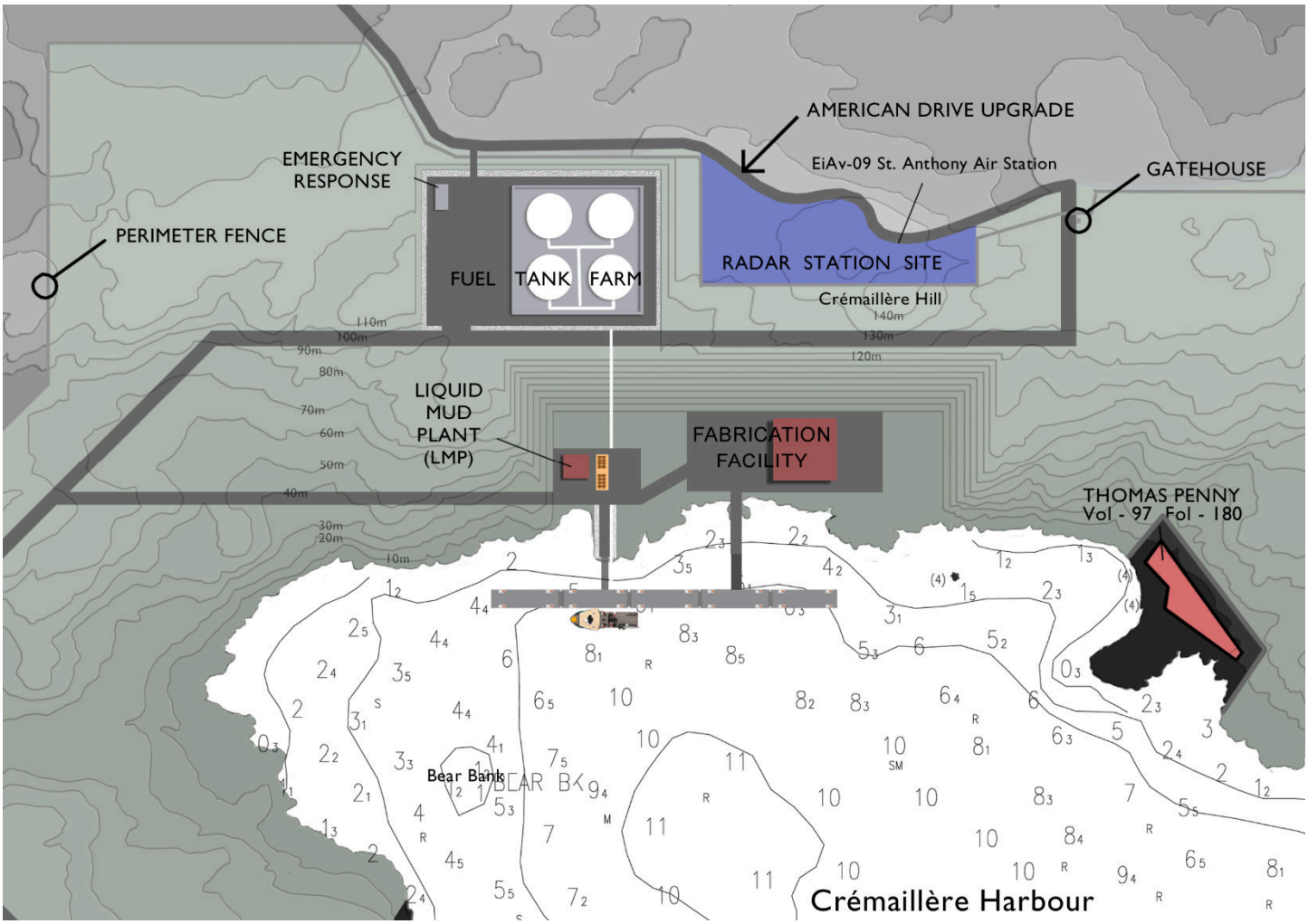
Buildings included in the Project will be engineered and constructed to minimize maintenance. Anticipated environmental effects include runoff from roofs and paved areas which will be captured in storm-capacity catchments and grassed ditches to allow natural filtration before entering ground water or natural water systems.

GNP Inc. will promote the use of inclined metal roofing with non-soluble reflective coatings. This approach reduces loading caused by freezing and drain damming in winter and microbial contamination in warmer months. Reflective coating will reduce artificial atmospheric warming. Rapid runoff will be mitigated by storm-capacity terraced catchments. Capture and repurposing of rooftop rainwater may be considered; however, it is anticipated that the long periods of below freezing temperatures will render this option impractical.

4.2.3 Bulk Fuel Storage Tank Farm

The proposed tank farm is presently planned to be located on an elevated area west of the St. Anthony Radar Station site. The location is not referenced to specific geographical coordinates at present and may be adjusted in response to site specific engineering and environmental considerations from future engineering studies and environmental protection planning. The tank farm will consist of four holding tanks, Figure 4-6, with each tank holding approximately 40 million litres of diesel fuel, 160 million litres collectively. This facility is intended to provide fuel to ships that are involved in the movement of materials at the proposed wharehousing and ore handling facilities to be located within the harbour as part of the Port development. Accessibility to fueling services within the harbour will minimize the additional travel time for these vessels that would be involved if they were required to travel to an alternate harbour for fueling services. The availability of fuel storage within the harbour will also address the fuel servicing needs of vessels that cannot access such services at other northern ports because of water depth or icing restrictions.

Figure 4-6 Fuel Tank Farm and LMP Phase II detail of north shore of Crémaillère Harbour Including Proposed Fuel Storage Tank Farm



A lined concrete containment basin will be built around the tanks to prevent spills that can cause fire, property damage or contaminate the environment. The capacity of the basin volume will be equal to the capacity of the largest tank plus 10% of the sum of the capacities of others. To prevent a spill or other emergency the walls of the containment basin will be resistant to the solvent properties of the contained product and will be engineered to exceed the pressure of the containment capacity.

Tank design will ensure the tanks are both liquid and vapour tight. Actual construction details will rely on recommendations from engineers based on current best practices for fixed fuel storage at high latitude. As is required by volumes required to service shipping at the port, it is anticipated the number of tanks at the tank farm will start at one and the others added as needed over the three Phases of construction. All petroleum storage tanks will be registered in accordance with Services NL guidelines and will be designed and operated in accordance with the *Storage and Handling of Gasoline and Associated Products Regulations*.

4.2.4 Liquid Drilling Mud Plant (If Required)

Present Project planning includes development of a Liquid Drill Mud Plant (LMP). to be located at the supply dock area of the proposed port, Figure 4-5. However, the need for this infrastructure will be dependent on service needs identified during the detailed project planning phase. At this point in time, the infrastructure would only include a storage facility. The need for this infrastructure will also be dependent on a detailed engineering and economic analysis of alternative service supply potential, to be conducted during the detailed project planning phase. The potential location identified is not referenced to specific geographical coordinates at present and may be adjusted in response to site specific engineering and environmental considerations from future engineering studies and environmental protection planning. If liquid storage facilities are required, then their design requirements will be coordinated with Services NL to ensure compliance with Provincial guidelines and regulatory requirements.

The LMP will provide drilling mud to offshore drill rigs engaged in exploratory drilling. The LMP will be used to blend base fluids and materials into drill mud to meet the specifications of its customers. This blending/mixing facility will not be manufacturing chemicals and does not employ processes and equipment used in chemical manufacturing.

The active drilling-fluid volume on a deep-water well can be several thousand barrels (bbl). An offshore supply boat typically carries 540 m^3 or 3400 bbl of drilling fluid. The proposed tank farm is based on a standard, pre-engineered configuration consisting of 16 - 400 bbl (64m^3) upright tanks situated within a spill containment berm. Tank size and volume specifications are as shown in Figure 4-7.

Figure 4-7 Typical Liquid Mud Tank Farm Arrangement

Specifications	
Volume (BBL)	400 BBL / 64m^3
Volume US gallons	16,643
Size (H x D)	24' x 12'
Weight	13,500 lbs

Spill containment capacity will be at least 100% of a single tank plus 10% of the remaining combined tank capacity. The LMP tank storage will be fully enclosed in a warehouse constructed according to applicable regulations. In addition, a separate warehouse of approximately 2400 ft^2 of enclosed storage space for unmixed materials.

The main components of the LMP are the mixing tank and pumping unit. The LMP blends base fluids and materials into drill mud and brines to customer specifications. The pumping unit pressurizes the blended fluids which keeps them combined the solution. The components of the LMP are modular giving the plant the advantage of scalability.

A 75m^3 mixing tank for mixing drilling fluid will be situated in the building near the storage tanks. The mixing tank will be surrounded by a steel StradEnergy SuperBerm® containment berm (Strad Energy Services No Date).

A Pumping Unit is connected to the mixing tank to provide additional shear to increase efficiency of the mixing system. The same pumping unit will pressurize the storage to dockside delivery pipe system.

Centrifugal pumps are used for mixing and transferring fluids. These pumps will be electrical with diesel back-up. The amount of diesel stored on-site will be limited to the generator's tank which has a 100 L capacity.

Bulk materials are pneumatically transferred. Dust generated by transfer of dry bulk materials is controlled and contained in dust collectors. This system is built into the equipment as a standard mitigation for dust.

A mix hopper is an in-line platform with a conical opening for adding materials to the fluid mix. The hopper is installed so that a reduction in fluid pressure is created causing materials to be vacuumed" into the flow stream.

Air compressors are used to blow out lines.

4.2.5 Ballast Water Treatment

Canada is a signatory of the 2004 International Convention for The Control and Management of Ship's Ballast Water and Sediments. The convention aims to prevent the spread of harmful aquatic organisms from one region to another. Canada has enacted regulations, including Canada's *Ballast Water Control and Management Regulations,* and the guidance document "A Guide to Canada's Ballast Water and Management Regulations", TP 13617 E (2018), to guide compliance with the requirements of the Convention. These Conventions and Regulations place responsibility for compliance with vessel owners/operators. Modern vessels are equipped with, or are being equipped with, ballast treatment plants on board the vessel, as opposed to onshore, to enact compliance.

As the present Canadian regulatory regime for ballast water control and management does not require ports to provide land based treatment capacity, GNP Inc. is not presently proposing to have dedicated port based facilities for this purpose. However, if vessels utilizing facilities within the port have need for bilge and sludge disposal, GNP Inc. will ensure that contractual arrangements are in place with liquid waste transport and treatment service suppliers certified under applicable federal and provincial regulations so that these services can be provided to individual vessels as needed. It is noted that several companies presently hold Certificates of Approval under *Environmental Protection Act* to provide such services in the Province.

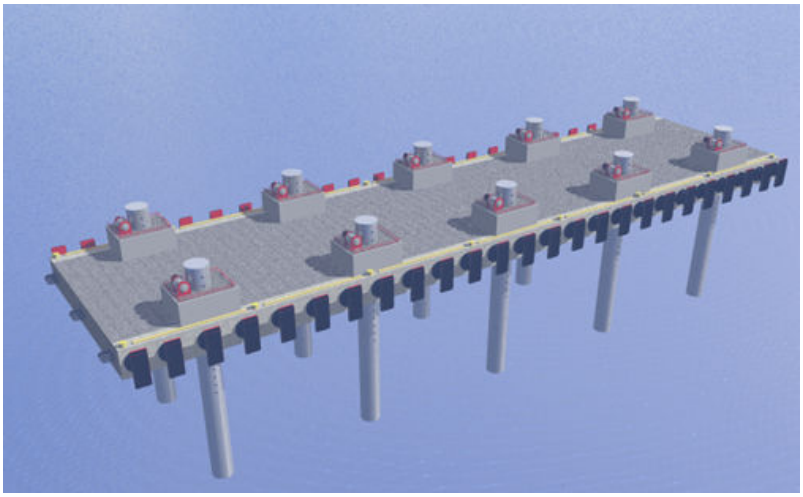
4.2.6 Berthing Docks

For initial installations GNP Inc. proposes to employ a system of wharfs, docks, and quays based upon prefabricated jackpile dock sections of approximately 25m x 100m, Figure 4-8. This approach allows for off-site fabrication of the principle components thus significantly reducing on-site environmental impact. It also allows for periodic adjustment of dock heights.

Jackpile docking systems can be installed and removed within a relatively short period of time with a significantly smaller physical footprint than conventional docks. Jackpile docking systems have been shown to reduce impacts and costs related to remediation and decommissioning of sites such as remote mining projects as the dock components can be disassembled and transported intact without the decommissioning impacts associated with conventional docks.

Jackpile elevated docks are more flexible than conventional docks. The proposed docks will be custom-designed to meet maximal loading requirements of the proposed port facility and offshore terminal. As shown in previous applications and installations these docks can accommodate all operational requirements and vessels types: bulk carriers, container ships, oil tankers, LNG carriers, Ro-Ro ships, cruise ships and ferries, general project and heavy lift cargo etc.

Figure 4-8 Jackpile Dock Model



The Project specific Environmental Protection Plan (EPP) will be prepared in advance of construction and will include environmental protection and control requirements associated with construction and operation of berthing docks within the Crémaillère Harbour Development and will, as a minimum, ensure adherence to the Department of Municipal Affairs and Environment's *Environmental Guidelines for Construction and Maintenance of Wharves, Breakwaters, Slipways and Boathouses*, latest edition, pursuant to the *Water Resources Act, SNL 2002 cW-4.01*.

Laydown areas from which the dock sections will be accessed will be constructed above the upper extents of the intertidal zone of the existing and forecast high water mark. Landside construction will consist of steel piling and/or concrete retaining wall, back-filled with stone and crushed rock and surfaced with prefabricated, steel reinforced, concrete paving sections. In the initial stages prior to waterside road access materials and concrete paving sections may be transported by sea to the cove site and offloaded by crane from the offshore dock.

The landside back-filled sheet piling, or concrete retaining wall will be constructed 80 vertical centimeters above the high water mark of the current intertidal zone. The access ramp will span the intertidal zone from the top of the landside laydown area to the dock. Depending on the span length pilings may be driven into the beach.

4.2.7 Ore Loading Infrastructure

Should bulk ore storage take place at the Crémaillère Harbour Development the area supporting the storage would be a section of 100m berthing, likely of the Flexiport family of designs customized to transport materials safely and efficiently. The wharf will be designed to follow Canadian Coast Guard guidelines.

The storage area will be a simple surface allowing for offloading of products and, should the project proceed, this facility will be designed to receive material from mining sites, store it and then transport it to the ship loader for eventual shipment to markets. A storage yard will be built to the right size to allow sufficient storage and shipment of materials during the season where it is challenging to ship from the North. The material will simply by piled for retrieval by mechanical means.

The substrate of the yard will contain a liner that will act as a barrier to ensure that water from rain, snow and dust control (i.e., runoff water) is collected and treated to prevent runoff water issues. As no processing of the ore will occur on site, the potential for contamination of runoff water is low. Runoff water will be directed to collection points to allow for periodic sampling to ensure compliance with the *Environmental Control Water and Sewage Regulations* and the *Fisheries Act* prior to release.

A stacker-reclaimer will be designed to meet yard and ship loading requirements. Supply conveyors will be constructed in the yard to feed material to and from dumper and from there to the stacker-reclaimer. The yard will also include maintenance facilities.

GNP Inc. will secure all required permits including approvals to construct and operate ore loading infrastructure under the *Environmental Protection Act* during the planned engineering phase. In particular, this infrastructure may require a Certificate of Approval from the Department of Municipal Affairs and Environment, as indicated in Appendix D.

Photographs of the current set up in the port of Sept-Iles, QC are provided in Figures 4-8 and 4-9 as an example of infrastructure associated with such an operation.

Figure 4-9 Photographs of Current Iron Ore Loading Infrastructure at Sept Iles, QC

Figure 4-10 Overview Photograph of Current Iron Ore Loading Infrastructure at Sept Iles, QC

4.2.8 Graving Dock

The graving dock is conceptual at this point in time and subject to engineering and the required technical studies. There are several alternatives considered and final selection will depend on market opportunity and cost. The basis of design for the tonnage to be serviced will be a railway dock system, which involves a mechanical means of moving and hoisting the vessel out of water to an elevation above high tides. Such design minimizes costs and footprint in the wet section by having most of the work performed in the dry. For the section where excavation would be necessary, the dock will be excavated using conventional earth moving equipment and, only if and when necessary, blasting operations. The location is not referenced to specific geographical coordinates at present and may be adjusted in response to site specific engineering and environmental considerations from future engineering studies and environmental protection planning.

The preliminary size of the excavation will be 100m x 30m, subject to revision for ship size. Depending on the final location of the dock and the ability of the proponent to minimize the excavation, the volume of material moved could be from 3,000 m^3 to 15,000 m^3. The exact type of material is yet unknown, however, the site is a greenfield industrial site and initial plans are to reuse the material to allow for levelling of areas to be developed, subject to an acceptable test program and results as identified in the Department of Municipal Affairs and Environment's *Protocol for the Management of Excavated Soils, Concrete Rubble and Dredged Materials* guidance document. The shoreline in the area of the proposed graving dock is rocky and the quantity of sediment is expected to be low. The excavated material will be used around the site and in areas such as that to be developed for wharehouse and redistribution facilities to the west of the graving dock, Figure 4-5, subject to approval by the relevant regulatory authorities. In the unlikely event that the excavated materials do not satisfy specified Canadian Council of Ministers of the Environment *Canadian Soil Quality Guidelines* for reuse on areas of the Port development, or the volume of excavated materials is greater than that required for beneficial use, then the material will be either used for beneficial purposes at another industrial site, subject to approval by Services NL, or trucked to a suitable soil treatment facility provincially certified for handling any identified contaminants. An appropriate material testing program will be developed in conjunction with regulatory authorities to ensure all material is handled and used, or disposed of, in an environmentally responsible and safe manner. Confirmatory soil sampling to ensure appropriate soil quality will be conducted during the engineering design stage of the Project and during graving dock excavation.

Drainage water from the areas surrounding the graving dock excavation will be diverted away from the excavation area to minimize the quantity of water requiring treatment. Seepage water entering the graving dock excavation during construction will be controlled by pumping and treatment to ensure that all discharge is in compliance with applicable regulations, including provincial *Environmental Control Water and Sewage Regulations*, and the federal *Fisheries Act*. As much of the Project area is a greenfield development, the seepage water is expected to be relatively free of contamination, but would be expected to require treatment to control the level of suspended solids, such as sediment and silt, resulting from the excavation process prior to discharge. It is proposed that the seepage water from the graving dock excavation will be pumped into one or more settling ponds that will be designed during the detailed engineering design phase of this development to ensure removal of sediment and silt from the water prior to discharge. Suitable area for construction of the settling pond arrangement should be available in the adjacent wooded area to the east of the proposed graving dock site, Figure 4-5. However, if suitable area for a settling pond treatment process is not available in this area then a combination of settling pond and commercially available geotextile silt and sediment removal processes, such as Tencate Geotube® Containment and Dewatering Tubes (Tencate, 2007), will be designed and implemented. Whichever system is designed will include allowance for suitable sampling to ensure that the quality of the discharge water conforms to applicable regulatory requirements including provincial *Environmental Control Water and Sewage Regulations*, and the federal *Fisheries Act*.

4.2.9 Ancillary Activities Related to Construction

Development of areas for roads and infrastructure requires site preparation, excavation, and construction activities that will result in disturbance to the landscape of the Project area.

Clearing and excavation onshore will occur only where necessary and will be, as much as practicable, kept within the footprint of the finished structures. Areas exposed beyond the footprint will be replanted with native plants to prevent erosion and inhibit foothold and growth of invasive plant species.

Blasting will be required where bedrock has to be removed. Handling and transport of explosives will be conducted in accordance with the *Explosives Act* (Canada), the *Fire Prevention Act, 1991*, and the *Dangerous Goods Transportation Act*. All reasonable precautions will be taken to ensure that people, property, wildlife, and vegetation at or near the site are protected as much as is practicable from flying material, air blast, ground vibration and/or fumes caused by the blast. Wherever possible blasting mats will be used to mitigate blasting impacts.

Due to the distance from human habitation, infrastructure such as potable water sources, as well as the topography of the area, contamination or disruption caused by blasting is not expected. Depending on the type of rock, if applicable, to reduce possible acidification, rock piles produced by blasting and/or crushing will be stockpiled under cover until sequestered as back fill beneath foundations and paved areas.

Use of explosives in or near water will be avoided wherever possible. Where explosives are required in or near rivers or bodies of fresh or salt water, or inter tidal zones, impacts to fish and fish habitat will be minimized by adhering to "Guidelines for the Use of Explosives in or Near Canadian Fisheries Waters" (Wright and Hopky, 1998) and mitigation measures provided therein where applicable.

Where quarry materials are required for any aspect of the Port development the source will be from a site within the Project boundary, wherever practicable. All quarry materials will be sourced from sites, whether within the Project boundary or from outside of the Project site, that have been permitted under the *Quarry Materials Act, 1998,* and for which required royalties will be paid. It is planned to minimize the footprint of the Port by using aggregates produced from excavations when creating outside storage areas which may be required. This will minimize the environmental footprint and construction traffic in the area. The excavated material will be used, when practicable, around the site and within the area, subject to approval by the relevant regulatory authorities. As well, material suitable for shoreline protection may be used along the Port to mitigate shoreline erosion or

facilitate navigation. The opportunity also exists to use suitable surplus materials in other parts of the harbour for infilling and levelling. An appropriate material testing program will be developed, in conjunction with regulatory authorities, to ensure all material is handled and used, or disposed of, in an environmentally responsible and safe manner. If contamination is detected above applicable guidelines, the material will be moved to a quarantined area and treated, as necessary. Excavation and aeration would be considered the preferred remediation method.

Dredging of materials may be required as part of the construction and operations associated with components of the Project. Should this be required, dredging will be managed in compliance with all applicable regulatory requirements and the Project specific EPP. This will include application of the Department of Municipal Affairs and Environment's Policy for Development in Shore Water Zones and applicable approval under the *Water Resources Act*, as well as, the *Fisheries Act,* the *Canadian Environmental Protection Act*, and Transport Canada's Navigation Protection Program. If disposal of dredged materials is required, sufficient samples will be collected, and analysed at an accredited laboratory, to accurately assess any potential contaminants and to further inform intended use or disposal of the dragged material. Land based use or disposal of dredged materials is preferred, however, if disposal at sea is considered necessary, then compliance with the *Disposal at Sea Permit Application Regulations* of the *Canadian Environmental Protection Act* will be applied.

It is anticipated that a construction camp may be required during phases of the construction period as the number of contractors and workers required for site construction components exceeds local capacity. Camp construction and operation will be contracted to a supplier with proven expertise in providing accommodations and services. Associated camp services including water supply, waste water disposal and solid waste disposal will be subject to approval requirements under the *Environmental Protection Act* and the *Water Resources Act*.

Solid wastes will also be generated during construction of the Project infrastructure. Solid and hazardous waste handling and disposal requirements and procedures will be detailed in the Project specific EPP and will be subject to approval requirements of the provincial *Environmental Protection Act*.

All construction activities will be controlled to limit the extent of potential disturbance and ensure that appropriate planning is in place to address emergency situations that may occur. Project specific EPPs and Emergency Response Plans (ERPs) will be developed which will identify responsibilities and requirements for implementation of these controls and response requirements.

4.2.10 Construction Codes and Standards

Where applicable, design of the Port facilities will be in compliance with the following codes and standards:

- American Association of State Highway and Transportation Officials (AASHTO)
- American Iron and Steel Institute (AISI)
- American National Standards Institute (ANSI)
- American Petroleum Institute (API)
- Recommended Practice for Planning, Designing (API RP 2A-LRFD) and Constructing Fixed Offshore Platforms – Load and Resistance Factor Design
- Specification for Fabricated Structural Steel Pipe (API SPEC 2B)
- Specification for Line Pipe (API 5L)
- Carbon Steel bolts and Studs (ASTM A307)
- Structural bolts, Steel, Heat Treated 120/105 ksi Minimum Tensile Strength (ASTM A325)
- Part 1: British Standard Code of Practice for Maritime Structures – Part 1 General Criteria (BS 6349)
- Part 2: British Standard Code of Practice for Maritime Structures – Part 2 Design of Quay Walls, Jetties & Dolphins (BS 6349)

- Part 4: British Standard Code of Practice for Maritime (BS 6349) Structures – Part 4 Design of Fendering and Mooring Systems
- CAN/CSA-S6: Canadian Highway Bridge Design Code (CHBDC)
- CSA A23.1: Concrete Materials & Methods of Concrete Construction
- CSA A23.2: Methods of Test for Concrete
- CSA A23.3: Design of Concrete Structures
- CSA A23.4: Precast Concrete – Materials and Construction
- CAN/CSA-S16.01: Limits States Design of Steel Structures
- N/CSA G40.20 General Requirements for Rolled or Welded Structural Quality Steel
- CAN/CSA G40.21 Structural Quality Steels
- CSA S37: Antennas, Towers and Antenna Supporting Structures
- CISC Handbook of Steel Construction
- CISC Design Guide for Hollow Structural Section Connections and Trusses
- CPCA Concrete Design Handbook
- National Building Code of Canada (NBCC)
- National Fire Code of Canada (NFCC)
- National Fire Protection Association (NFPA)
- Fire Commissioner of Canada FC No. 373 Standard for Piers and Wharves
- Oil companies International Marine Forum (OCIMF)
- Permanent International Association of Navigation Congresses (PIANC)
- Steel Structures Painting Council (SSPC) Transport Canada TP 743: Code of Recommended Standards for the Safety and Prevention of Pollution for Marine Transportation Systems and Related Assessment Procedures (TERMPOL CODE)
- Workplace Hazards Materials Information System (WHMIS)
- Canadian Foundation Engineering Manual

In accordance with the applicable rules and regulations of the NFPA, the National Electrical Code, OSHA and API RP-500, all material and equipment shall be new and in accordance with Ul, ANSI, IEEE, NEMA or applicable Standards.

Fire Protection and Life Safety Systems and equipment will be in accordance with the best practices of industry. The protection systems shall conform to applicable codes and standards of the NFPA.

4.2.11 Construction Period

The physical structures to be installed and erected in the three Phases of the project are listed in Table 4-1. The actual time frame in which studies and planning will be completed and work begun to construct these, and as-yet-unidentified facilities is subject to a number of contingencies. However, GNP Inc. anticipates the parts of the project described can progress more or less within the time frames indicated for site preparation and construction. Once approval in principle is obtained and the framework for environmental and geotechnical assessment is established, studies and engineering surveys may begin. Detailed topographic terrestrial and bathymetric surveys will precede site planning and determine actual time frames for excavation and construction. GNP Inc. anticipates a two year time frame for these activities with a possible start up for environmental and geotechnical site work in 2019.

4.2.11.1 Construction Period / Phase I

It is anticipated that surveys and engineering for Phase I construction will take two years with a startup for site preparation in 2020. Site excavation, grading and preparation for roads and building lots and installation of services and utilities infrastructure will take until the Spring of 2022.

4.2.11.2 Construction Period / Phase II

The start of Phase II is marked by construction of the Port Administration building, fuel tank farm and possible drill mud tank farm, docks assemblies, and other structures related to the warehousing. Construction of structures for waterside related services and operations such as supply, and freight handling will take place primarily in Phase II. Construction of buildings, structures, and paved areas related to ancillary services such as machine shops for refit and repair will take place as required on back lots of the site. Phase II is anticipated to take 3 to 5 years from the Spring of 2022 until 2025 and beyond.

4.2.11.3 Construction Period / Phase III

Phase III will see the construction of the graving dock and warehousing and redistribution hub on the south shore of the harbour basin. The graving dock will serve as a refit and repair and construction facility for larger vessel including offshore service ships and drill rigs. Construction of the graving dock may require blasting and excavation depending on how it is engineered. For this reason the construction time frame is anticipated to extend into the latter Phase of the Project. The amount of time required to excavate the basin and to build the superstructure is estimated at three to five years; the latter case placing the completion date at 2030 assuming a 2025 start up.

The warehousing and redistribution centre is an intermodal logistics hub taking in trucked and seaborne bulk and containerized freight for redistribution by sea and air to Labrador and the Arctic. The paved laydown yard and warehouse as shown in the will occupy approximately 10,000m^2 excluding dock and waterside quay areas. While the warehouse facility may take as long as 5 years to construct, depending on demand and site preparation and permitting requirements the construction start date may be as early as 2022.

Table 4-1 Construction Period Time Table

	START	**COMPLETION**
Phase I	2020	2022
Phase II	2022	2025
Phase III	2025	2030

4.2.12 Labour Force and Diversity

The Project, through its construction and operations phases, will result in positive economic effects. The Project will create employment opportunities in a variety of occupations. In addition, the requirement for goods and services during Project construction and operation will provide opportunities for local businesses. These direct economic benefits will be supplemented by indirect and induced "spin-off" effects through, for example, spending by Project employees and contractors.

GNP Inc. will adhere to all attributes contained within, and not limited to:

- Canadian Labour Code

- Women in Resource Development Corporation
- Office to Advance Women Apprentices
- Labour Legislation
- OHSS
- WHMISS
- Canadian Human Rights Activities

GNP Inc. will ensure that early engineering and planning will encompass the universal design components necessary to provide an all-inclusive workplace usable by all regardless of age, size or ability. Accessibility regulations for buildings, parking lots, parking spaces, ramp grades, floors and counters will be adhered to and form part of GNP Inc's mandate of an 'all-inclusive' workplace.

Washrooms and change facilities, where applicable, will be available for male, female and gender neutral employees.

As part of Employee orientation workplace diversity training will be conducted for all employees and Contractors to help support an inclusive and supportive workplace environment. GNP Inc. will implement a zero-tolerance discrimination and harassment policy. GNP Inc. will have a zero tolerance policy for anyone who condemns any other person based on colour, gender, religion, nationality or political views.

As part of the tender process Contractors vying for a specific project will have to outline in detail their women's employment strategies, targets, potential apprentice and training opportunities. Preference will be given to those tender applicants that exhibit and foster, women in the workplace as a societal priority.

GNP Inc. hiring practices will be such that residents of Newfoundland and Labrador will be given priority based on their abilities to perform the specified job for which they are applying. GNP Inc. does not anticipate having to go extra-provincially to fulfill any job placements and will do so only after it has exhausted the job pool provincially or a specialized area is required that cannot be fulfilled inter-provincially.

GNP Inc. will be engaging a diverse consortium of individuals, groups, companies and organizations to fulfill the requirements in bringing the project from inception to completion. A host of experts, trades people, apprentices and journey persons will be engaged to bring the Project to fruition. Each phase of the Project will require input from varying sources with specific areas of expertise.

Construction work will be tendered locally, where practicable, and tenders awarded based on the ability and expertise of the Contractor to complete the project within the tender guidelines and within the applicable time lines. Successful Contractors will be responsible for utilizing their own workforce and/or hiring the required personnel to complete their specific project. In addition to all other responsibilities, successful contractors will be responsible for ensuring compliance with all aspect of the Newfoundland and Labrador *Occupational Health and Safety Act* and Regulations.

GNP Inc. will be responsible for, and oversee, the hiring of all management related to the Project to include, at a minimum, Project Controllers, Construction and Operations Management.

Preliminary construction consultation indicates that between 75-100 job opportunities will be created during the construction phase of Project.

During the construction phase quarterly employment reports will be compiled from all Contractors, as well as GNP Inc. Reports to include, at a minimum:

- Total employment numbers by 4 digit National Occupancy Classification (NOC) code
- Full/Part-time employment numbers

- Location and source of workforce
- Employment by gender
- Number of apprentices and journey persons for each NOC

It is anticipated that the demand for accommodations through the construction phase of the Project will surpass the accommodation availability in the immediate area and therefore accommodations in the form of a work camp will be required during the construction phase.

The successful tender will be experts in providing accommodations and services to remote commercial site locations and will be responsible to provide accommodations and services in each phase of the camp from initial construction to permanent accommodations as need dictates. Additionally, the successful tender will be responsible for all applications, permits and any/all requirements for the inception, management and decommissioning on the Commercial Camp.

GNP Inc. values gender diversity and more broadly a workplace that promotes equality, equity, acceptance and promotion of both females and males in the work environment. More to this is the acceptance and promotion of a workplace that brings together the collective and diverse talents, perspectives, behaviours and attributes of all individuals. Although much effort has been made to improve the inclusion and advancement of women in construction projects, GNP Inc. recognizes the challenges women face in securing stable employment and biased-free work environments where occupational opportunities have traditionally been male-dominated.

GNP Inc. has developed a Women's Employment Plan for implementation during Project construction and operation. A copy of the Great Northern Port Inc. Women's Employment Plan, which has been reviewed and accepted by the Office for the Status of Women, is included in Appendix C. GNP Inc. will continue to consult with the Office of the Status of Women during Project construction and operation to ensure that the Women's Employment Plan continues to address issues or concerns that may arise.

4.3 Operations and Maintenance

Because the Crémaillère Harbour Marine Port will be a federally regulated international port, and for health and safety reasons certain operational activities will commence as soon as site preparation begins and carry on throughout the life of the project such as security, site and port administration, and environmental monitoring.

The Executive of GNP Inc. have experience in operation of a Canadian regulated public port and the practices and procedures pursuant to Section 76 of the *Canada Marine Act*. GNP is also aware of environmental regulations regarding port development in Canada as referred to in the *Canada Port Authority Environmental Assessment Regulations SOR/99-318*.

GNP Inc. will develop a Health, Safety and Environmental Management System (HSEMS) as the principal mechanism by which GNP Inc. will integrate the project activities including design and engineering, construction and operation, with the environment and health and safety responsibilities of the operation of the Port. Permitting, approval and authorization requirements, Standard Operating Procedures (SOPs) and Emergency Preparedness and Response Plans (EPRPs) are key elements of this HSEMS and the Proponent representatives, contractors/vendors and other Project personnel will be responsible for ensuring they are familiar with and abide by these requirements. Detailed Project–Specific Environmental Management Plans will be developed as part of the proposed Project HSEMS.

Environmental Management Plans (EMPs) incorporated within the HSEMS will include, at a minimum:

- Waste Management
- Water Management
- Noise and Dust Control

- Air Emission Control
- Marine Safety
- Emergency Preparedness
- Community Liaison
- Avifauna Management
- Historic Resources

The HSEMS will be prepared and implemented for all Port operational activities. Components of the HSEMS such as waste management, water management, and air emission control may be subject to approval requirements of the provincial *Environmental Protection Act* and *Water Resources Act*. A specific Occupational Health and Safety Plan will also be developed under the HSEMS to ensure the undertaking is carried out in accordance with the Occupational Health and Safety Act and Regulations. These measures will provide the necessary equipment, systems and tools to ensure a safe workplace is maintained and that proper information, instruction, training, supervision, and facilities.

The kinds and scope of activities described herein are as presently anticipated and estimated. Where not stated explicitly it is understood that GNP Inc. will operate the proposed port in accordance with all applicable regulations and environmental best practices, which will be detailed in the HSEMS. Potential concerns related to activities and proposed mitigation practices and procedures will be detailed in the HSEMS and in the EPRP contained in the HSEMS. Operations not considered in the first iteration of the HSEMS will undergo separate registration and permitting as required.

Specific operation and maintenance activities and requirements associated with the proposed Project infrastructure and operations are detailed in the sections below.

4.3.1 Vessel Traffic

The Port will operate according to the Practices and Procedures for Public Ports including those regulations pertaining to refueling, ballast water discharge, painting, and other operations with potential environmental impacts. The Project HSEMS will take into account current best practices regarding all aspects of navigation and movement and operation of vessels within the Port's authority.

4.3.2 Pilotage Risk Assessment

GNP Inc. will apply to the Atlantic Pilotage Authority to conduct a risk assessment according to the Pilotage Risk Management Methodology (PRMM) of the harbour and approaches to determine whether there is a need for compulsory pilotage designation for the port. Areas of risk examined will include:

- degree of difficulty and hazard in the approaches and within the port;
- size and number and maneuverability of vessels entering the port;
- design of wharves, slips, and space available for maneuvering;
- nature of cargo;
- potential for incidental environmental impacts.

If it is determined that compulsory pilotage is required no ship that is subject to compulsory pilotage pursuant to the provisions of the Atlantic Pilotage Regulations will be allowed to move within the harbour unless there is a pilot duly licensed by the Atlantic Pilotage Authority on board. Regulations relating to operations of the pilot boat will be cited in the Project HSEMS along with Standard Operating procedures specific to GNP Inc.

4.3.3 Mooring and Berthing

Moorings, anchorage, and berthage will follow best practices to ensure least amount of disturbance to the sea floor and water column inside the harbour. Berthing will be favoured over mooring or anchoring unless a vessel has need of harbouring necessitated by weather or emergency and there is not sufficient berthage available in the harbour.

4.3.4 Drayage

Unloading, dockside handling, and short haul transport of cargo to on-site storage or laydown may take place at any time as determined by schedules and vessel traffic levels. This activity will cause noise and light effects primarily within the harbour basin. Scheduling of freight movement operations and other measures to mitigate light and noise effects as well as environmentally responsible equipment maintenance commitments to reduce emissions and to avoid contamination by fuel and lubricants or other hazardous substances will be detailed in the Project HSEMS.

4.3.5 Ship Refueling

Refueling operations will be carried out according to Transport Canada regulations and guidelines. Spill kits equipped to contain and recover spills on land or water will be maintained at all refuelling sites. SOPs for refueling practices and spill response will be detailed in the Project HSEMS and EPRP.

4.3.6 Mechanical Repair / Machine and Milling

Mechanical repairs are anticipated to take place aboard ship or inside an enclosed shop. Should work be performed outside, containment of fluids and spill cleanup for accidental events will be identified according to measures detailed in the Project HSEMS and EPRP. Work done outside will be limited to daylight hours where possible. Where work such as welding must be done at night light barriers will be used where practicable. These and other effect mitigation measures will be detailed in the Project HSEMS.

4.3.7 Ballast Water Treatment (If Required)

Canada is a signatory of the 2004 International Convention for The Control and Management of Ship's Ballast Water and Sediments. The convention aims to prevent the spread of harmful aquatic organisms from one region to another. Canada has enacted regulations, including Canada's *Ballast Water Control and Management Regulations,* and the guidance document "A Guide to Canada's Ballast Water and Management Regulations", TP 13617 E (2018), to guide compliance with the requirements of the Convention. These Conventions and Regulations place responsibility for compliance with vessel owners/operators. Modern vessels are equipped with, or are being equipped with, ballast treatment plants on board the vessel, as opposed to onshore, to enact compliance.

As the present Canadian regulatory regime for ballast water control and management does not require ports to provide land based treatment capacity, GNP Inc. is not presently proposing to have dedicated port based facilities for this purpose. However, if vessels utilizing facilities within the port have need for bilge and sludge disposal, GNP Inc. will ensure that contractual arrangements are in place with liquid waste transport and treatment service suppliers certified under applicable federal and provincial regulations so that these services can be provided to individual vessels as needed. It is noted that several companies presently hold Certificates of Approval under *Environmental Protection Act* to provide such services in the Province.

4.3.8 Drill Mud Mixing, Storage, and Loading (If Required)

Drilling fluids and muds typical to the offshore industry may be stored and handled at the site and may include non-aqueous drilling fluids of Group I, II or III, Figure 4-11. Depending on predicted demand there could be as many as 12-150 m^3 storage tanks full of drilling fluids at one time, for a total quantity of 1800 m^3 of drilling fluid.

Drilling Fluids to be processed and handled at the GNP port site consist of three types or groups of non-aqueous mixes.

Group I Non-Aqueous drilling fluid is most hazardous with the highest percentage of Aromatic Hydrogen content (5-35%). Group I use Crude Oil, Diesel and conventional Mineral Oil as it is a Non Aqueous fluid. If a Group I non-aqueous drilling fluid is required to be stored at the site, appropriate handling and storage protocols will be established that follow requirements of the Department of Environment and Climate Change. The storage of such materials will be limited to a tank farm enclosed in designated warehouses specifically designed for such storage. A containment dyke will be constructed around the tanks to prevent environmental contamination.

Group II Drilling fluid contains low-toxicity Mineral Oil as it is Non-Aqueous fluid. It has an Aromatic Hydrocarbon content 0.5-5%.

Group III drilling fluids contain highly refined Mineral Oils (Ester, Linear Paraffin, highly processed Mineral Oil, etc.) as it is Non-Aqueous fluid. It has an Aromatic Hydrocarbon content of less than 0.5%.

Figure 4-11 Typical Non-Aqueous Drilling Fluid Composition by Volume

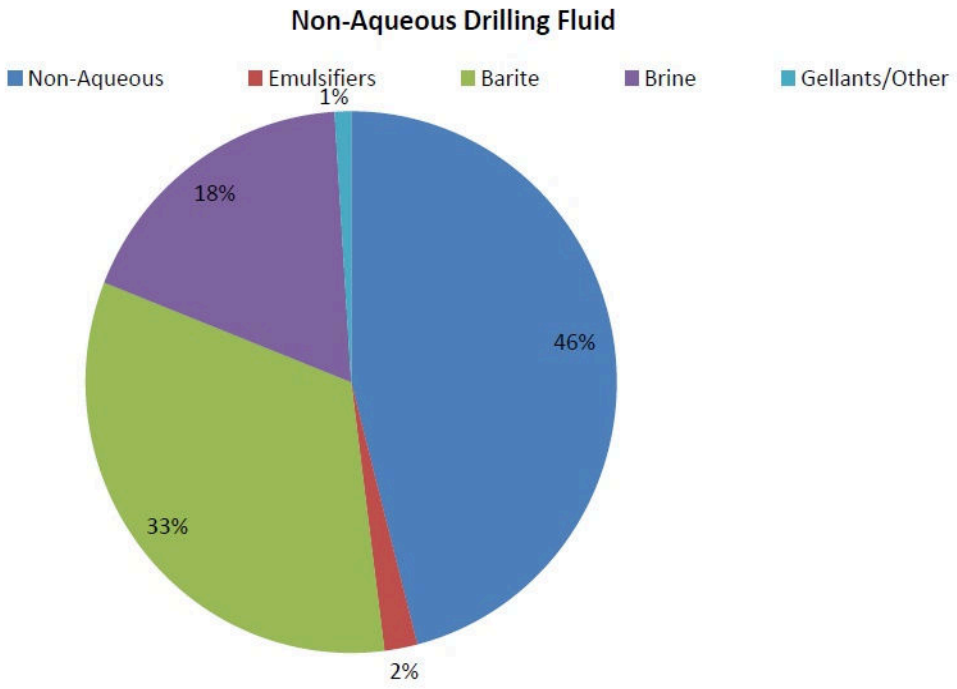


Table 4-2 Potential Additives to Drilling Fluids below lists all potential additives to drilling fluids. It is unknown which (if any) of these chemicals will be stored on site. If storage or handling of any of these additives is required, it will be done following all applicable regulations for the storage, handling and transport of such materials.

Table 4-2 Potential Additives to Drilling Fluids

Fresh Water	Sea Water	Brine
Saturated NaCl	CaC12	Salts (KCl)
ZnBr/CaBr	Formates	Barite (barium sulphate)
Calcium Carbonate	Iron Carbonate	Hematite
Ilmenite	Bentonite (or other clays)	Organophillic clay
Biopolymers	Carboxymethyl cellulose	Polyanionic cellulose
Polysaccharide	Synthetic polymers	Modified polyacrylates
Lignosulphonates	Tannins	Starch
Modified lignites	Asphalt	Resins
Gilsonite	Clycols (polyglycols)	Silicate
Gypsum	Polyacrylamides	Modified PAC
NaOH/KOH	Ca(OH)2	Citric acid
NaHCO3	Bactericides	Lubricants
Lost circulation material	Polymer stabilizers	

Outbound drilling fluid service management will vary based on specific offshore production requirements and will include the variety of well-known and accepted chemicals and minerals, e.g., bentonite (gels), barite, calcium carbonite, methanol, glycol, base oil, potassium formate, brinds, gravel packs, cement, etc.

About 80% of these chemicals and minerals are listed as benign under Transport Canada's Transportation of Dangerous Goods (TDG) safety standards and regulations. The remaining substances fall under TDG rules, e.g., items carrying HAZMAT Class 3 or 8 designations. Potential chemicals carrying Hazmat Class 3 and Class 8 designations can be found in Table 4-3 and Table 4-4, respectively. Estimated quantities of chemicals to be stored on site are provided in Table 4-5

Table 4-3 Hazmat Class 3 Substances

Crude Oil	Tannins	Mineral Oil
Asphalt	Diesel	Lubricates
Biopolymers	Lignosulphonates	

Table 4-4 Hazmat Class 8 Substances

Brine	Ilmenite	ZnBr/CaBr
Bentonite	Barite	Organophillic clay
Calcium Carbonate	Lignosulphonates	Iron Carbonate
Silicates	Hermatite	NaOH/KOH
Ca(OH)2	Citric Acid	Bactericides
Emulsifier		

Table 4-5 Estimated Quantity of Chemicals to be Stored on Site

Substance	% Drill Fluid	Estimated Quantity
Barite	33.00%	600 m3
Brine	18.00%	325 m3
Emulsifier	2.00%	40 m3
Non Aqueous Fluid (Crude, Diesel, Mineral Oil)	46.00%	830 m3
All other Additives Combined	~ 10% of Drilling Fluid Volume	

The volumes of materials and fluids kept on-site will vary, depending on the mud needs of the client. Detailed records of material and fluid volumes on-site, as well as mud volumes produced. When possible, drilling-fluid additives, base fluids, and whole mud will be transported in bulk-tote tanks or are containerized. These transport

methods help reduce packaging-related waste, and minimize the risk of harming personnel, polluting the environment, and impairing operations.

Blended mud, as well as base fluids (brine and base oil), will be stored in the tank farm. Base fluids will be used in the blending of mud. The mud storage facility will match the specification typified by the StradEnergy brand of storage and containment systems which exceed all provincial, federal and safety regulations.

The physical characteristics of the proposed Liquid Mud Plant (LMP) are detailed in Section 4.2.4 of this document. Containment systems specified exceed existing legislated standards and will be verified to do so in the HSEMS. Handing procedures and best practices are well documented in industry guidelines for both mixture components storage and handling and mixed mud transfers. These guidelines will be documented in the HSEMS, cross referenced with applicable Provincial and Federal Environmental and Health and Safety regulations. Operation of the drilling mud storage facility may require approval under the *Environmental Protection Act* and will be subject to standard operating procedures under the HSEMS. As well, the Project EPRP will include emergency response procedures developed to address requirements that may arise during drilling mud storage operations.

4.3.9 Graving Dock

The graving dock is conceptual at this point in time and subject to engineering and the required technical studies. There are several alternatives considered and final selection will depend on market opportunity and cost. The basis of design for the tonnage to be serviced will be a railway dock system, which involves a mechanical means of moving and hoisting the vessel out of water to an elevation above high tides. It is envisaged that the graving dock will be at least partially enclosed with a structure incorporating Faraday shielding to limit exposure of vessels with sensitive electronic instrumentation during maintenance at the facility.

Operation of the graving dock may require approval under the *Environmental Protection Act* and will be subject to standard operating procedures under the HSEMS, developed to address the human and environmental safety of the graving dock operations. As well, the Project EPRP will include emergency response procedures developed to address requirements that may arise during graving dock operations.

4.3.10 Bulk Ore Loading, Offloading and Storage

Should bulk ore storage take place at the Crémaillère Harbour Development the area supporting the storage would be a section of 100m berthing, likely of the Flexiport family of designs customized to transport materials safely and efficiently. The wharf will be designed to follow Canadian Coast Guard guidelines.

The storage area will be a simple surface allowing for offloading of products and, should the project proceed, this facility will be designed to receive material from mining sites, store it and then transport it to the ship loader for eventual shipment to markets. A storage yard will be built to the right size to allow sufficient storage and shipment of materials during the season where it is challenging to ship from the North. The material will simply by piled for retrieval by mechanical means.

The substrate of the yard will contain a liner that will act as a barrier to ensure that water from rain, snow and dust control (i.e., runoff water) is collected and treated to prevent runoff water issues. The ore that will be received at Crémaillère Harbour will already be crushed and sorted. As no processing of the ore will occur on site, the potential for contamination of runoff water is low, however, finer materials from the stockpile may be transported as suspended solids in the runoff water. Should dust suppression be required water spray will be used to control the presence of dust in the area in and around the ore stockpile. Runoff water will be directed to collection points to allow for periodic sampling to ensure compliance with the *Environmental Control Water and Sewage Regulations* and the *Fisheries Act* prior to release. If sampling indicates the need sediment removal prior to discharge in order to ensure compliance with regulatory requirements an appropriate sediment removal system will be engineered based on flow volumes and level of treatment required. Such a system would likely

include installation of a suitably sized commercially available geotextile silt and sediment removal process such as Tencate Geotube® Containment and Dewatering Tubes, Tencate, 2007 adjacent to the ore storage area.

Construction and operation of bulk ore storage facilities may require approval under the *Environmental Protection Act* and will require consultation with the Department of Municipal Affairs and Environment during detailed design planning. Potential environmental effects specifically related to operation of offloading/loading, and storage of ore at the site will be detailed in the Project HSEMS along with mitigating measures.

4.3.11 Freight Handling, Laydown and Warehousing

Freight handling and storage will occur either on outside laydown areas or in enclosed warehouses. SOPs and best practices will be documented in the Project HSEMS. The Project EPRP will address requirements for response to any emergencies involving products with the potential for causing air, soil, or groundwater contamination.

4.3.12 Security and Administration

Security and port administration operations will take place over the entire life of the project. It has been shown that marking fences significantly reduces bird collisions, particularly those by woodland grouse, and hence is a useful conservation technique. This effect mitigation measure will be examined and best practices determined prior to the planning stage of the Project and implement according to the findings which will be documented in the HSEMS.

4.3.13 Roads

Road repair and repainting, and road clearing and ice control measures are considered under the environmental effects of road maintenance during the operation of the GNP Inc. site. Road maintenance effects will be documented along with mitigating measures and SOPs for implementation in the HSEMS.

Road de-icing chemicals are an environmental concern. Salt run-off from roads and sidewalks then enters the natural environment through bounce and scatter from spreaders, wind, splash and spray from vehicles, snow melt, and runoff. The greatest environmental impact of salt is its effect on fresh water. Salt in solution contaminates surface water and infiltrates groundwater via storm drains. Chloride from dissolved salt is potentially toxic to fish, macro invertebrates, insects and amphibians and remain in solution with no natural means of removal except dilution with more fresh water.

The best practice for minimizing salt impact is applying the least amount of salt necessary. Custodial managers should understand what ice control products to use, when to use them and how much is necessary. Other strategies include matching de-icer application rate to temperature conditions, reducing accumulation of snow and ice on roadways through the use of snow fences or other measures, predicting when to apply de-icers, improving the application and distribution methods, and allowing de-icers sufficient time to work before plowing and reapplication.

To minimize environmental impacts, the HSEMS will emphasize the importance of using smaller quantities of de-icers, use of snow fences and barriers, and increased efficiency of mechanical ice removal.

4.3.14 Buildings

Buildings will be engineered and constructed to minimize maintenance. Anticipated environmental effects include runoff from roofs and paved areas which will be captured in storm-capacity catchments and grassed ditches to allow natural filtration before entering ground water or natural water systems. As relatively little airborne pollution is anticipated the principle sources of potential contamination of roof runoff are leaching of chemical compounds in roofing materials and deposited organic substances deposited on the roof; plant matter,

insect matter, and bird excrement. The toxicity of this material is exacerbated by elevated temperature of stagnant water under direct sunlight.

GNP Inc. will promote the use of inclined metal roofing with non soluble reflective coatings. This approach reduces loading caused by freezing and drain damming in winter and microbial contamination in warmer months. Reflective coating will reduce artificial atmospheric warming. Rapid runoff will be mitigated by storm-capacity terraced catchments. Capture and repurposing of rooftop rainwater may be considered; however, it is anticipated that the long periods of below freezing temperatures will render this option impractical.

4.3.15 Supply and Services

The environmental effects of supply and services related to the operations of the port will be documented in the HSEMS in reference to operation of each facility. Where new facilities are added the relevant measures and SOPs etc. will be appended to the HSEMS and associated documentation. Effects may include but are not necessarily limited to:

- Transport of Hazardous Materials
- Refueling of Commercial Vehicles and Equipment (Liquid and Compressed Gas)
- On-site Equipment Servicing

Consideration will be given to the applicability of the *Canadian Environmental Protection Act* and associated regulations for substance stored or used on site, including *Environmental Emergency Regulations*, *Interprovincial Movement of Hazardous Waste Regulations*, and *New Substances Notifications Regulations*. In addition, any reporting requirements under the National Pollutant Release Inventory process will be assessed and identified.

4.3.16 Infrastructure Maintenance

The environmental effects of infrastructure maintenance as it relates to the operations of the Port will be documented in the HSEMS in reference to operation of each facility. Where new facilities are added the relevant measures and SOPs etc. will be appended to the HSEMS and associated documentation. Environmental effects of infrastructure maintenance during the operation of the proposed Port may include but are not limited to:

- Painting and Scaling
- Grass Mowing, Trimming,
- Brush Cutting and Removal
- Pressure Washing and Cleaning of Tanks
- Lubrication
- Repair of Curbs and Catchments and Concrete Structures

5.0 ALTERNATIVE PROJECT LOCATIONS AND APPROACHES

As indicated in Section 3.2, Crémaillère Harbour is proposed as a preferred location which will compete as a deep water, ice-free port located at the eastern extent of the Canadian North and the Arctic Ocean, connecting to transatlantic shipping and eastern North America. GNP Inc. evaluated the potential of the Crémaillère Harbour in comparison to three other potential deep water ports in Newfoundland and Labrador and in the Eastern Arctic. The other potential ports evaluated were Iqaluit on Baffin Island, Rigolet on the mid-Labrador coast, and Cartwright on the mid-Labrador coast, Figure 5-1. Other potential ports on the Island of Newfoundland, such as Bull Arm, Argentia, Cow Head, Marystown and St. John's, do not satisfy the proximity criteria to the Canadian North and the Arctic Ocean identified by GNP Inc. as a rationale for the Project. The existing port at St. Anthony does not fulfil the draft requirements identified by GNP Inc. for potential client needs. Each potential deep water port identified was evaluated using a ranked comparison based on the following five major criteria:

- Proximity to major industries such as oil and gas endeavors and mining operations, as well as proximity to oil spill response capability, community infrastructure and shipping lanes;
- Intermodal connectivity including air services, roads and marine infrastructure;
- Hub potential related to land availability, labour supply and government and industry support;
- Water depth; and
- Navigation accessibility related to months free of ice as well as wind, wave and current factors relating to port usage.

Crémaillère Harbour received the highest ranking for potential deep water port development when the rankings provided by GNP Inc. for each of these five major criteria were combined.

Proximity to major industries, including mining operations, was considered as a major factor when evaluating the potential for the Crémaillère Harbour Port Development Project in comparison to alternatives. However, the business model of the port is not centered on one particular revenue stream, such as mining. The potential year-round operational capability of the port will serve to provide continuous access for other activities that will foster economic development in the area. This year round access could also serve for emergency support to remote oil and gas operations, vessel support services, and other year round operations. All four of the potential deep water ports considered ranked similarly in terms of this criteria, although Iqualuit and Rigloet ranked slightly higher than Crémaillère Harbour and Cartwright because of closer proximity to existing mining and industrial operations.

Crémaillère Harbour ranked significantly higher than the other locations evaluated in terms of intermodal connectivity with the most significant factor being potential road connectivity.

Crémaillère Harbour also ranked significantly higher than the other locations in terms of hub potential, with both land availability and labour supply availability being the most significant differences.

Water depth was similar in each of the potential sites evaluated and was not a significant factor in the overall ranking among the potential locations evaluated.

Navigation accessibility was a major criteria considered. This criteria is most significantly influenced by the ice free nature of the port itself, but is also influenced by the presence of sea ice. The ice-free season for Crémaillère Harbour normally occurs between May and January, providing roughly 7-8 months of ice free conditions. The presence of sea ice outside of Crémaillère Harbour is an annual occurrence dependent on weather conditions, but, the harbour entrance itself is shielded from ice bearing currents and wind-blown ice flows by geographic features of the surrounding coast, and the southeast to northwest orientation of the harbour. Should there be sea ice outside of Crémaillère Harbour, as is the case in most years, then access to the

port will need to be managed through existing or alternative solutions including Canadian Coast Guard services or potential ice resistant harbour tugs. Due to its unique exposure, Crémaillère Harbour is free of ice under pressure year round with only minimal ice breaking support required in the heaviest ice seasons. This is a major economic and logistical advantage and Crémaillère Harbour ranked highest in GNP Inc.'s evaluation of potential northern deep water port developments with this factor considered.

GNP Inc.'s economic objective is to create a catalyst for growth based on the cluster of port services driven by current, and projected onshore and offshore logistics requirements as well as military and Coast Guard needs. GNP Inc. is planning a phased approach to development of planned infrastructure based on projected need and contingencies. The overall marine port development is projected to occur over a twelve year period between 2018 and 2030. The first phase of the proposed development will include a period of intensive surveying and engineering design, as well as hydrogeological, bathymetric, environmental and geotechnical assessments to guide site specific excavation and construction planning for specific infrastructure. This phase will also involve the development of roads and utility infrastructure for buildings and other structures. The port related infrastructure will be developed after this initial detailed planning period and will include development of site specific mitigative measures for inclusion in the Project EPP. Infrastructure requirements for the Crémaillère Harbour Port development may vary based on projected and identified needs, however, infrastructure development planning will be guided by the results of the engineering, environmental geotechnical studies to be undertaken. The locations of proposed infrastructure are not presently referenced to specific geographical coordinates and may be adjusted in response to site specific engineering and environmental considerations from future engineering studies and environmental protection planning. The infrastructure will also be subject to specific regulatory permit and approval processes, as identified in Appendix D.

Figure 5-1 Alternative Locations Evaluated for Deep Water Ice-Free Port Project

6.0 ENVIRONMENTAL SETTING, POTENTIAL INTERACTIONS AND MITIGATION

The following provides an overview of the existing environmental setting for the proposed Project, including a description of relevant components of the biophysical and socioeconomic environments. This is followed by an analysis of the Project's potential environmental interactions and the identification and description of mitigation measures which will be put in place to avoid or reduce any such effects.

6.1 Natural Environment

6.1.1 Wildlife

Wildlife species are an integral component of local and regional environments and have a range of ecological and socio-cultural roles and values. From an ecological perspective, mammals and birds occupy multiple trophic levels as scavengers, predators and prey (Marquis and Whelan 1994), function as seed dispersers (Levey et al. 2005), and can sometimes influence landscape composition through herbivory (e.g. moose and American beaver). Some groups, including waterfowl, ungulates, and small game are harvested as a food source or are hunted and trapped for recreational enjoyment or a source of income. Wildlife may also provide recreational and aesthetic value through non-consumptive activities including bird watching and photography.

Mammals

There have been few structured wildlife surveys conducted that include the proposed Project site. Therefore, most inference on the assemblage of mammals and birds that occur within the Project area is based on their known occurrence in similar habitats throughout the Northern Peninsula Ecoregion as well as on local knowledge. Mammalian species that are expected to occur throughout the varied habitats within the Project area include moose (*Alces alces*), snowshoe hare (*Lepus americanus*), river otter (*Lontra Canadensis*), red fox (*Vulpes vulpes*), and meadow vole (*Microtus pennsylvanicus*). The occurrence of two bat species in the Project area (little brown myotis (*Myotis lucifugus*) and northern myotis (*Myotis septentrionalis*)) is unknown. Understanding the distribution and abundance of these two species is important given the recent confirmation of white nose syndrome on insular Newfoundland and the susceptibility of these federally listed (Endangered) species to population declines as a result of this fungal disease. The range of both species is known to include the Island of Newfoundland in general, and both species occur in suitable habitat within this range. Little brown myotis are generalists and use a variety of habitat types for foraging and roosting, including forests, clearings, edges, wetlands, freshwater sources, and coastal areas. This species is considered likely to occur within the Project area. Northern myotis is more specialized and generally occurs in mature forests, often roosting in large-diameter trees; however, this species may use other habitats for foraging and travelling. Therefore, it is possible that northern myotis may occur in the Project area.

Woodland caribou (*Rangifer tarandus caribou*) are native to insular Newfoundland and have important ecological, cultural, and socio-economic value. As top-level herbivores, caribou influence the composition and structure of plant communities and function as prey species for multiple carnivores and scavengers. From a cultural perspective, caribou have long been utilized by indigenous peoples as a source of food and clothing and for ceremonial and spiritual purposes. Furthermore, caribou are an important big-game species for both residents and non-residents and provide economic benefits through the outfitting industry. Though demographic data on caribou is lacking for the immediate Project area, caribou are known to occur in the greater St. Anthony area (Morgan and Doucet 2007) so may potentially use parts of the Project area during some times of the year.

Avifauna

Long term data from regional breeding bird survey routes (Environment Canada 2014) and online data sources (eBird Canada 2018) indicates that a number of taxonomic and functional groups occur within the general region including seabirds, waterfowl, shorebirds, wood warblers, birds of prey, sparrows and finches. Collectively, these

species inhabit all available terrestrial, wetland and marine habitats including sparsely forested habitats, upland barrens, coastal shorelines and offshore environments. Common species known to breed throughout the St. Anthony region include American Black Duck (*Anas rubripes*), Herring gull (*Larus argentatus*), Common tern (Sterna hirundo), Greater Yellowlegs (*Tringa melanoleuca*), American robin (Turdus migratorius), Blackpoll Warbler (*Dendroica striata*), Osprey (*Pandion haliaetus*), Savannah sparrow (*Passerculus sandwichensis*), Pine Grosbeak (*Pinicola enucleator*), and Common Eider (*Somateria mollissima*). Less common species that have been documented to occur in this region, but for which demographic information is lacking, include Gray-cheeked Thrush (*Catharus minimus*), and Short-eared Owl (*Asio flammeus*). Short-eared Owl have been identified as occurring along the road to Goose Cove during annual breeding bird surveys conducted by the Newfoundland and Labrador Wildlife Division. Other species that primarily utilize the Northern Peninsula Ecoregion during migration include White-rumped sandpiper (*Calidris fuscicollis*), Snow Bunting (*Plectrophenax nivalis*), and American pipit (*Anthus rubescens*). The assemblage of species at the site is expected to be reflective of bird communities that have been more extensively described for this region of Newfoundland.

Listed and rare species

There are twenty-one species of birds and mammals that are listed on Schedule 1 of the federal *Species at Risk Act* (SARA) and/or the Newfoundland and Labrador *Endangered Species Act* (NLESA) that have the potential to occur within the immediate Project area and surrounding landscape. However, the probability of occurrence varies depending on the species considered, their habitat requirements and their general abundance throughout this region of insular Newfoundland. For example, Piping Plovers (*Charadrius melodus melodus*) are primarily restricted to sandy coastal beaches in western Newfoundland during the breeding season (Calvert et al. 2006, Intervale Conservation and Heritage Associates, Inc.) and are therefore unlikely to occur in the Project area. Conversely, Ivory Gulls (*Pagophila eburnea*) irregularly overwinter along coastal Newfoundland during years of heavy pack ice (Stenhouse 2004) and are likely to occasionally occur in the Project area. Other species that may occasionally occur in the Project area (given the availability of suitability nesting or foraging habitat) include Short-eared Owl (*Asio flammeus*), Harlequin Duck (*Histrionicus histrionicus*), Gray-cheeked Thrush (*Catharus minimus minimus*), little brown myotis, northern myotis. Species for which there is insufficient data to assess their occurrence in the Project area include, Red Crossbill (*Percna curvirostra*) and Common Nighthawk (*Chordeiles minor*). Table 6-1 provides a complete list of these listed species along with their probability of occurrence in the Project area. As described above, the lack of comprehensive and long-term survey data limits our ability to fully assess the status of the species in the Project area.

Table 6-1 Species at risk that potentially occur within the Project Area

Species	Scientific name	Legal designation	SAR status	Expected status in the Project Area
Avifauna				
Harlequin duck	*Histrionicus histrionicus*	NL ESA SARA	Vulnerable Special Concern	Likely
Barrow's goldeneye	*Bucephala islandica*	NL ESA SARA	Vulnerable Special Concern	Possible
Eskimo curlew	Numenius borealis	NL ESA SARA	Endangered	Not expected
Red knot	*Calidris canutus rufa*	NL ESA SARA	Endangered	Possible
Piping Plover	*Charadrius melodus melodus*	NL ESA SARA	Endangered	Not expected

Species	Scientific name	Legal designation	SAR status	Expected status in the Project Area
Ivory Gull	*Pagophila eburnea*	NL ESA SARA	Endangered	Likely
Peregrine falcon	*Falco peregrinus anatum*	NL ESA SARA	Vulnerable Special Concern	Possible
Short-eared owl	*Asio flammeus*	NL ESA SARA	Vulnerable Special Concern	Likely
Olive-sided flycatcher	*Contopus cooperii*	NL ESA SARA	Threatened	Not expected
Gray-cheeked thrush	*Catharus minimus minimus*	NL ESA	Threatened	Possible
Rusty blackbird	*Euphagus carolinus*	NL ESA SARA	Vulnerable Special Concern	Possible
Red crossbill	*Loxia curvirostra*	NL ESA	Endangered	Not expected
Common nighthawk	*Chordeiles minor*	NL ESA SARA	Threatened	Not expected
Bobolink	*Dolichonyx oryzivorus*	NL ESA SARA	Vulnerable Threatened	Not expected
Barn swallow	*Hirundo rustica*	SARA	Threatened	Possible
Bank swallow	*Riparia riparia*	SARA	Threatened	Not expected
Buff-breasted sandpiper	Tryngites subruficollis	SARA	Special Concern	Possible
Chimney swift	*Chaetura pelagica*	NL ESA SARA	Threatened	Not expected
Mammals				
Newfoundland marten	Martes americana atrata	SARA	Threatened	Not expected
Little brown myotis	Myotis lucifugus	SARA	Endangered	Likely
Northern myotis	*Myotis septentrionalis*	SARA	Endangered	Possible

6.1.2 Vegetation, Streams and Wetlands

Crémaillère Harbour is contained within the Northern Coastal Subregion of the EcoRegions of Newfoundland. The region is flat or gently rolling, with elevations under 150 m. Balsam fir is the dominant tree cover at lower elevations and black spruce at higher elevations. Most of the Northern Coastal Subregion is dominated by bogs and shrub forest. A number of plant species listed as endangered, threatened or vulnerable under the

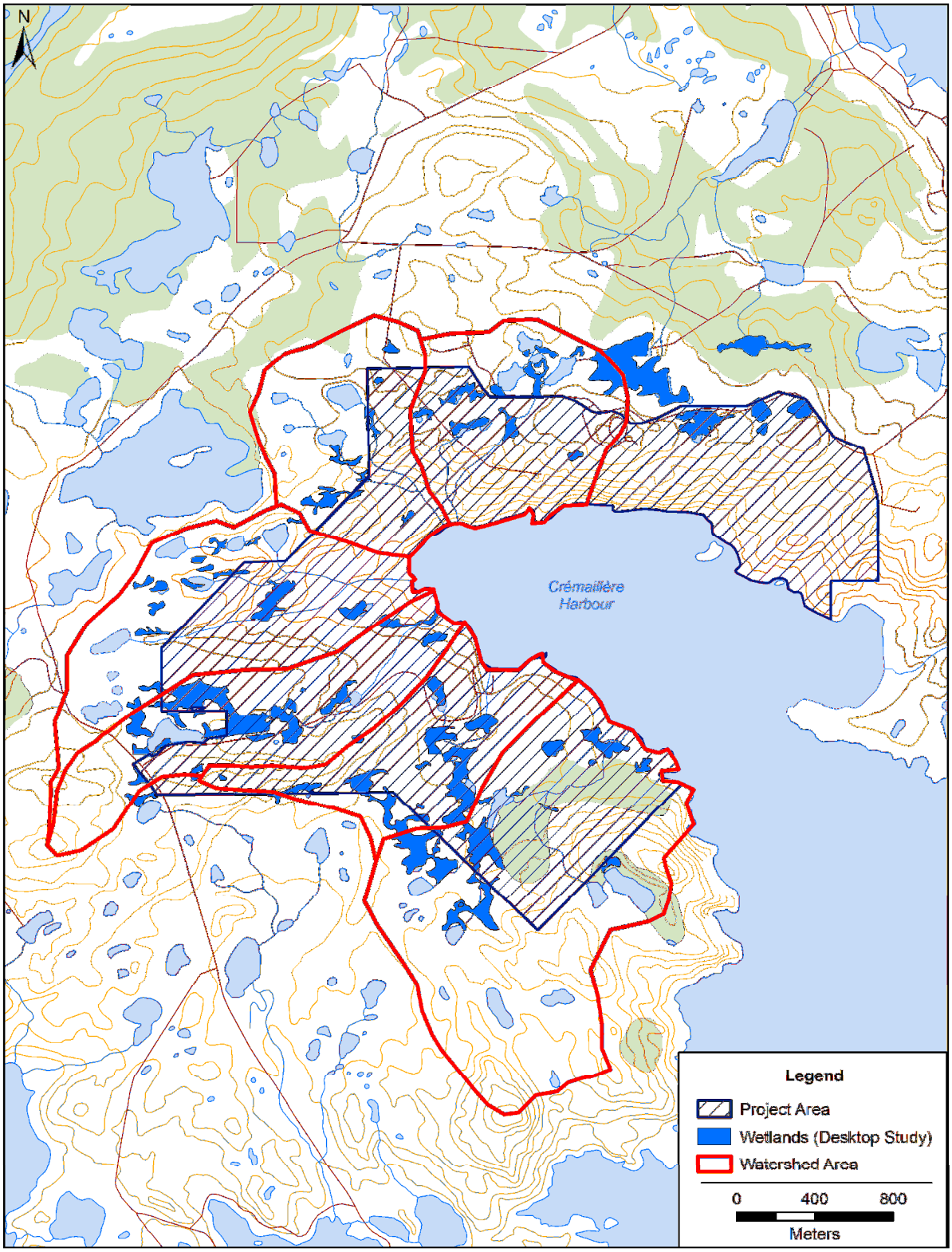
Newfoundland and Labrador *Endangered Species Act* occur in habitats found on the Great Northern Peninsula and may occur in habitats within the Project area.

Six streams are located within the Project area, Figure 6-1. These are relatively small streams with watersheds ranging from 76 ha to 206 ha and stream widths in the 3 to 5 m range. Some streams located in the project area include small ponds, but in most cases headwater ponds for these streams are located outside of the Project area.

Wetland areas have been defined as low-lying areas of vegetated habitat with visible pockets of standing water. Given the resolution and availability of imagery, a differentiation into various wetland types is not possible at this time with any certainty. A total of 67 ha of wetland habitat is located within and near the Project area. Potential wetland habitat within and near the Project area was delineated using geographic information system and available satellite and aerial imaging, Figure 6-1. This includes wetlands that are wholly within the Project area as well as wetlands that are adjacent to or intersect the Project area. In order to remain conservative, any potential wetland area that is near the current boundary of the project was included because final design may adjust the project footprint and due to proximity, construction/operation activities may affect them. However, of the 67 ha of wetland that was identified, 49 ha occurs fully within or intersects with the Project boundary and this represents 10% of the overall area within the Project boundary.

Streams and wetlands can be used as habitat by various animal and plant species. Some bird and plant species that reside in wetlands can be uncommon or rare.

Figure 6-1 Streams and Wetlands Within or Near the Project Area



6.1.3 Freshwater and Marine Fish

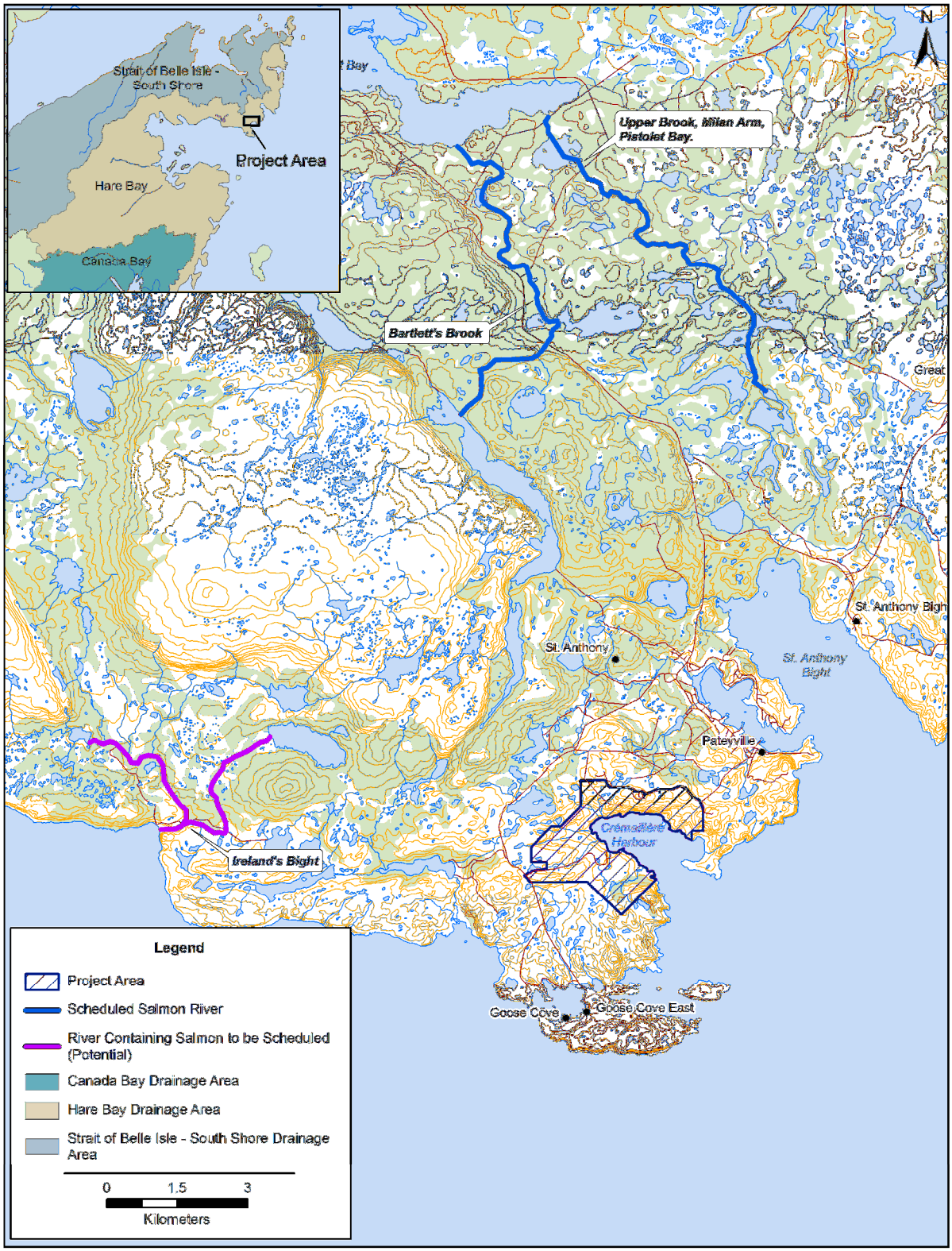
The Project Area and adjacent areas includes various freshwater small waterbodies and watercourses, and coastal marine environments. The waterbodies and watercourses are primarily toward the eastern and southern parts of the Project Area. Crémaillère Harbour's shore is made of exposed rocky outcrops with interspersed gravel/pebble beaches similar to the coastal geomorphology of the region (Sikumiut Environmental Management 2010). The drop-off is very steep at the rocky out-crops and shallow where beaches occur. This variation of slope provides habitat for a wide range of fish and invertebrates. Fish may directly or indirectly use these habitats for nursery, rearing, spawning, migration and foraging. The fish and invertebrates present in this habitat may be of commercial, cultural and/or ecological importance and support regionally important areas of biodiversity and marine productivity.

Macroalgal species distributions are dependent on variables such as water turbulences, substrate, depth, and nutrients. Likely species encountered for this region include Coralline algae (*Corillina* spp), Crustose algae (*Liththamnium* spp), Red fern (*Ptilota* spp), Dulse (*Palmaria palmata*), Brown algae species, Sea colander (*Agurum crubosum*), Sour weed (*Desmarestia* spp), Kelp (*Laminaria* spp), Knotted wrack (*Ascophyllum nodosum*), Edible kelp (*Alaria* spp), Rockweed (*Fucus* spp), Brown filamentous algae (Phaeophyceae), and Green filamentous algae (Sikumiut Environmental Management 2010).

Based on regional distributions, freshwater fish species that may be found in streams within the Project Area include brook trout, three-spined stickleback and nine-spined stickleback (Scott and Scott 1988). American eel and rainbow smelt may also be found in these streams or coastal areas occasionally as part of their migratory patterns (Wildlife Division 2010; Scott and Scott 1988). The province of Newfoundland and Labrador's rivers are the spawning ground for 80 percent of the Atlantic Salmon in North America and the federal government has scheduled rivers that have a significant salmon run to enable application of appropriate fishing regulations and other protections to these rivers. There are no scheduled salmon rivers within Crémaillère Harbor. The nearest scheduled salmon rivers to the Project area are Bartlett's Brook and Upper Brook, which both drain to Pistolet Bay on the west side of the Great Northern Peninsula, away from the Project area, Figure 6-2. An unscheduled salmon bearing river on the east side of the Peninsula (Ireland Brook) is located approximately 9 km south of Crémaillère Harbour, Figure 6-2.

Marine fish in the area may be characterized from regional surveys and commercial fisheries information. Fisheries and Oceans Canada Commercial Fisheries Data (2011-2016) indicate that Atlantic cod, snow crab, capelin, Atlantic herring, and shrimp occur in the Cremaillere Harbour area. Other marine species occurring regionally that may be found in the area include various fish (i.e., winter flounder, Greenland halibut, lumpfish, mackerel, redfish, skate, sculpin, cunner, ocean pout, alligator fish), shellfish (i.e., clam, scallop, whelk, mussel, crab, lobster, snow crab) and other invertebrates (i.e., sea stars, sea anemone, sea cucumber, sea urchin) (Gibson 2013; Amec 2010; Sikumiut Environmental Management 2010).

Figure 6-2 Scheduled Salmon Rivers



There are freshwater and marine fish species that may potentially occur regionally that been designated as species at risk and have associated protections under provincial or national legislation (Species at Risk Act [SARA], Newfoundland and Labrador Endangered Species Act [NL ESA]), or have otherwise been identified as being of special conservation concern by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) or under other processes. Banded Killifish (*Fundulus diaphanus*) is a freshwater fish species that is listed as Special Concern under SARA (SARA, 2018). However, the closest known occurrence of this species is on the west side of the Great Northern Peninsula, near Plum Point. No specimens have been found in surveys on the east coast of the Peninsula. The American eel (*Anguilla rostrata*), a diadromous fish that spawns in the Sargasso Sea and returns to the rivers to attain adulthood, is listed as Vulnerable under the NL ESA and is assessed by COSEWIC as Threatened (Wildlife Division 2010; Environment and Climate Change 2018). The main threats to this species are largely in freshwater systems including habitat degradation and fragmentation, food web changes, fisheries and chemical and biological contamination (COSEWIC 2012; Chaput et al. 2014).

Marine fish species of conservation concern that may occur regionally include Atlantic wolffish, lumpfish, and thorny skate. Lumpfish (*Cyclopterus lumpus*) are assessed as Threatened under COSEWIC, has preferred habit between 50 and 150m depth, but it can occur in coastal shallow areas (Environment and Climate Change, 2018). Another species assessed by COSEWIC potentially occurring in the region is the thorny skate (*Amblyraja radiata*) (Environment and Climate Change, 2018) and has been assessed as Special Concern. As with the lumpfish, the preferred habitat is deeper than the harbour (50 – 100m) but can be encountered in shallower waters. Its preferred habitat is sandy and muddy substrate. Atlantic Wolffish (*Anarhichas lupus*) are listed as vulnerable in Schedule 1 of SARA (SARA, 2018) and may occur in the shallow waters of the Project Area (<20 m). Adults and juveniles of this species inhabit rocky or sandy bottoms. Although this species may occur from nearshore to great depths (~918 m), abundance peaks around 250 m depth in Newfoundland waters(COSEWIC 2013). No critical habitat has been established for this species.

Summaries of the general biology of species that may be encountered in this area are in Table 6-2 and Table 6-3.

Table 6-2 Freshwater, Brackish and Diadromous Species Presence Potential in The Project Area (Sources: DFO, Ministry for Fisheries and Land Resources, SARA Registry, Fisheries Act.)

Common Name	Scientific Name	Biological/Habitat Details
American eel	*Anguilla rostrata*	Typical Habitat • Preferred temperature: 0-19ºC • Preferred depth: typically <1m • Preferred substrate: boulder, rubble, gravel, sand, silt and mud Biology and Ecology • Catadromous species which spawn in the Saragasso Sea • Juvenile eels typically reach Canadian waters 8-12 months after hatching • Seaward migrations of sexually mature adults occur in the fall Recreational/Commercial Value • Recreational fishery • Commercial fishery

Common Name	Scientific Name	Biological/Habitat Details
		Conservation Status • COSEWIC: Threatened • SARA: No Status • NL ESA: Vulnerable
Atlantic salmon	*Salmo salar*	Typical Habitat • Preferred temperature: 8-16ºC • Preferred depth: Variable • Preferred substrate: gravel, cobble, boulder Biology and Ecology • Distributed throughout Newfoundland and Labrador • Occurs as landlocked (Ouananiche) and anadromous life histories • Spawn in clean, well aerated, gravel bottom riffle sections of stream • Diet depends on the size and habitat of fish, as well as season • Juvenile anadromous salmon remain in natal watersheds for 2-7 years • Adult salmon generally remain at sea for 1-3 years before returning to their natal stream to spawn Recreational/Commercial Value • Recreational fishery • There has not been a commercial salmon fishery in Newfoundland since 1997 Conservation Status • COSEWIC: Not at risk • SARA: No status • NL ESA: No status
Banded Killifish	*Fundulus diaphanus*	Typical Habitat • Preferred temperature: 10-25ºC • Preferred depth: Variable • Preferred substrate: mud, sand Biology and Ecology • Distributed throughout Newfoundland • Quiet margins of lakes, ponds and slow streams • Enters brackish water occasionally • Spawn in vegetation • Diet consists of small crustation

Common Name	Scientific Name	Biological/Habitat Details
		• Reach maturity at 1 year, can live up to 3 years • Form shoals Recreational/Commercial Value • None Conservation Status • COSEWIC: Special Concern • SARA: Special Concern (Schedule 1) • NL ESA: Vulnerable
Brook trout	*Salvelinus fontinalis*	Typical Habitat • Preferred temperature: 11-16°C • Preferred depth: 0.06-0.90 m • Preferred substrate: gravel, cobble, boulder Biology and Ecology • Inhabits lakes and rivers throughout Newfoundland and Labrador • Can be landlocked or anadromous • Feed mainly on aquatic and terrestrial insects and fish • Can hybridize with other salmonid species Recreational/Commercial Value • Recreational fishery • No commercial fishery Conservation concern • COSEWIC: No Status • SARA: No Status • NL ESA: No Status
Eastern River Pearl Mussel	*Margaritifera margaritifera*	Typical Habitat • Clean, fast-flowing streams/rivers • Preferred depth: requires a healthy population of salmonids • Preferred substrate: gravel, cobbles Biology and Ecology • Up to 14cm length • Occurs in beds • Long lived • Complicated life-cycle involving a salmonid pseudo-host during juvenile stages • World-wide populations threatened with some Critically

Common Name	Scientific Name	Biological/Habitat Details
		endangered. Canada has the largest population and it is considered safe Recreational/Commercial Value • Recreational fishery: none • Commercial fishery: none Conservation concern • COSEWIC: No Status • SARA: No Status • NL ESA: No Status
Newfoundland Floater	*Pyganodon fragilis*	Typical Habitat • Freshwater • Preferred depth: Submerged • Preferred substrate: silt, sand, gravel Biology and Ecology • Not much is known about this species • Reproductive cycle: unknown Recreational/Commercial Value • Recreational fishery: none • Commercial fishery: none Conservation concern • COSEWIC: No status • SARA: No Status • NL ESA: No Status
Nine-spine Stickleback	*Pungitius pungitius*	Typical Habitat • Preferred temperature: 10-20°C • Preferred depth: 0 -100m • Preferred substrate: within or near vegetation Biology and Ecology • Lives in freshwater, brackish water, and marine water • Marine populations are anadromous • Fees on small invertebrates • Nest builder during spawning Recreational/Commercial Value • Limited; may be a food source for larger recreational / commercial

Common Name	Scientific Name	Biological/Habitat Details
		species Conservation concern • COSEWIC: No Status • SARA: No Status • NL ESA: No Status
Rainbow Smelt / Smelt	*Osmerus mordax*	Typical Habitat • Preferred temperature: 2-18ºC • Preferred depth: 0-2m • Preferred substrate: cobble, gravel, sand Biology and Ecology • Schooling fish species found in mid water column and surface areas of estuaries and lakes • Anadromous species which migrate upriver during the spring to spawn • Not often found inhabiting riverine areas, apart from during migrations Recreational/Commercial Value • Recreational fishery Important prey species for larger commercially and recreationally important species. Conservation Status • COSEWIC: No status for NL Population • SARA: No Status • NL ESA: No Status
Threespine stickleback	*Gasteroteus aculeatus*	Typical Habitat • Preferred temperature: 9-12ºC • Preferred depth: variable, generally <1m • Preferred substrate: within or near vegetation Biology and Ecology • Common throughout Newfoundland and Labrador, in fresh, brackish and marine environments • Maximum lifespan is typically 2-2.5 years Recreational/Commercial Value • Limited; may be a food source for larger recreational / commercial species

Common Name	Scientific Name	Biological/Habitat Details
		Conservation concern • COSEWIC: No status for NL Population • SARA: No Status • NL ESA: No Status

Table 6-3 Marine Species Presence Potential in The Project Area (Sources: DFO, Ministry for Fisheries and Land Resources, SARA Registry, Fisheries Act.)

Common Name	Scientific Name	Biological/Habitat Details
American Lobster	*Homarus americanus*	Typical Habitat • Preferred temperature: -1-5°C • Preferred depth: 1-400m (generally no deeper than 40m) • Preferred substrate: Rocky outcrops Biology and Ecology • Can reach 1m in total length (but generally do not due to fishing pressure) • Female carries eggs Recreational/Commercial Value • Recreational fishery: none • Commercial fishery: Highly valued species Conservation concern • COSEWIC: No Status • SARA: No Status • NL ESA: No Status
Atlantic Cod	*Gadus morhua*	Habitat • Preferred temperature: 0.5-10°C • Preferred depth: generally <500 m • Preferred substrate: observed on a variety of substrates Biology and Ecology • Juveniles are found in greater abundance in inshore areas • They settle to the bottom for the first 1-4 years of life, preferring areas with habitat complexity that help reduce predation risk. • Across the Canadian Atlantic region, spawning begins in northern areas as early as February and ends in the south as late as December.

Common Name	Scientific Name	Biological/Habitat Details
		• Cod spawn at a variety of depths based on particular stock, locality, and temperature. Varies from 110 m to 182 m. • Cod are broadcast spawners and fertilized eggs drift toward nursery areas in surface currents. Recreational/Commercial Value • Recreational fishery: none • Commercial fishery: Highly valued species Conservation concern • COSEWIC: Endangered • SARA: No Status • NL ESA: No Status
Atlantic Wolffish	*Anarhichas lupus*	Typical Habitat • Preferred temperature: Variable • Preferred depth: 1-600m (usually 18-110m) • Preferred substrate: mud, sand, rocky Biology and Ecology • Distributed throughout northern Atlantic • Solitary, except during mating season. • Guards egg clutches, after internal fertilisation • Diet consists of hardshelled mollusks, crabs, lobster, sea urchin • Important ecological regulator of echinoderm populations Recreational/Commercial Value • None Conservation Status • COSEWIC: Special Concern • SARA: Special Concern (Schedule 1) • NL ESA: No Status
Blue Mussel	*Mytilus edulis*	Typical Habitat • Preferred temperature: 5-20ºC • Preferred depth: 0-10m (preferred intertidal zone) • Preferred substrate: Rocky areas Biology and Ecology • 5-15cm long • Lives in brackish water, estuaries or marine habitats • Spawning continuous throughout spring and summer

Common Name	Scientific Name	Biological/Habitat Details
		Recreational/Commercial Value • Recreational fishery: some mussel collecting • Commercial fishery: unknown in NL Conservation concern • COSEWIC: No status • SARA: No Status • NL ESA: No Status
Capelin	*Mallotus villosus*	Typical Habitat • Preferred temperature: Variable • Preferred depth: 0-725 m • Preferred substrate: gravel (for spawning), otherwise pelagic species Biology and Ecology • Circumpolar in the Arctic • Known spawning beaches in area • Spawns on beaches (“rolling capelin”) • Larvae release due to wave action from beaches • Highly important in the North-West Atlantic food web, keystone species • Feeds on zooplankton Recreational/Commercial Value • Recreational fishery • Commercial fishery in Newfoundland Conservation Concern • Stock is in decline and conservation efforts are under way to remediate beaches • COSEWIC: No Status • SARA: No Status • NL ESA: No Status
Herring	*Clupea harengus*	Typical Habitat • Preferred temperature: 1-18 °C • Preferred depth: 0 - 364m • Preferred substrate: pelagic Biology and Ecology • North Atlantic • Seasonal migration

Common Name	Scientific Name	Biological/Habitat Details
		• Spawning on rocky or gravel bottom • Feed mainly on zooplankton • Moves inshore for spawning • Spawning grounds around the NP Recreational/Commercial Value • Some commercial bait fishery in Newfoundland Conservation concern • COSEWIC: No Status • SARA: No Status • NL ESA: No Status
Lumpfish	*Cyclopterus lumpus*	Typical Habitat • Preferred temperature: Variable • Preferred depth: 0-868m (usually 50-150m) • Preferred substrate: rocky substrate Biology and Ecology • Western Atlantic • Undergoes seasonal migration to deep waters (winter) • Feed mainly sessile invertebrates • Juveniles live in coastal areas with algal bloom Recreational/Commercial Value • None Conservation Status • COSEWIC: Threatened • SARA: No Status • NL ESA: No Status
Mackerel	*Scomber scombrus*	Typical Habitat • Preferred temperature: 11-14°C • Preferred depth: 0-1000m (typical 0-200m) • Preferred substrate: Pelagic Biology and Ecology • Annual migration inshore in spring, fall and winter in deep offshore waters • Feeds on zooplankton and small fish • Spawning occurs mainly in Gulf of St Lawrence in June and July

Common Name	Scientific Name	Biological/Habitat Details
		Recreational/Commercial Value • Recreational fishery • Commercial fishery (bait and for consumption) Conservation Status • COSEWIC: No Status • SARA: No Status • NL ESA: No Status
Northern Shrimp	*Pandalus borealis*	Typical Habitat • Preferred temperature: 1-6ºC • Preferred depth: >180 m • Preferred substrate: mud and silt substrates Biology and Ecology • Spawns once a year around late June or early July. • Feeds on polychaetes, small crustaceans, detritus, marine plants, copepods and euphausiids. • Prey for Greenland halibut, Atlantic halibut, cod redfish and harp seals. Recreational/Commercial Value • Commercial fishery Conservation Status • COSEWIC: No status • SARA: No Status • NL ESA: No Status
Softshell Clam	*Mya arenaria*	Typical Habitat • Preferred temperature: 6-14ºC • Preferred depth: 0-190m (preferred intertidal zone) • Preferred substrate: Mud, Sand, rarely gravel Biology and Ecology • 10-15cm long and 8 to 19cm wide. • Lives in brackish water, estuaries or marine habitats • Spawning events: spring and late summer Recreational/Commercial Value • Recreational fishery: unknown • No commercial fishery Conservation concern

Common Name	Scientific Name	Biological/Habitat Details
		• COSEWIC: No Status • SARA: No Status • NL ESA: No Status
Scallop	*Placopecten magellanicus*	Typical Habitat • Preferred temperature: 6.5-16 ºC • Preferred depth: 15–180m • Preferred substrate: sand, gravel, shells, and cobble Biology and Ecology • 8-17cm long • Form "beds" that are either periodic (several years) or are permanent • Spawning occurs in September/October Recreational/Commercial Value • Recreational fishery: some scallop diving • Commercial fishery: unknown in NL inshore Conservation concern • COSEWIC: No Status • SARA: No Status • NL ESA: No Status
Snow Crab	*Chionoecetes opilio*	Typical Habitat • Preferred temperature: -1-5ºC • Preferred depth: 13-2100m (generally no deeper than 110m) • Preferred substrate: Muddy Biology and Ecology • 40mm to 160mm carapace length • Egg hatching occurs April to late May (carried by females) • Long lived (up to 5 years past terminal molt, longer for males) Recreational/Commercial Value • Recreational fishery: none • Commercial fishery: Highly valued species Conservation concern • COSEWIC: No status • SARA: No Status • NL ESA: No Status

Common Name	Scientific Name	Biological/Habitat Details
Thorny skate	*Amblyraja radiata*	Typical Habitat • Preferred temperature: 2-5 °C • Preferred depth: 20-1000m (usually 50-100m) • Preferred substrate: variable, mainly muddy and sandy Biology and Ecology • Northern Atlantic • Feed mainly fish, crusteacea and polychates • Juveniles can take up to 3 years to hatch from "mermaid's purses" Recreational/Commercial Value • None Conservation Status • COSEWIC: Special Concern • SARA: No Status • NL ESA: No Status
Whelk	*Buccinum undatum*	Typical Habitat • Preferred temperature: 6.5-16 °C • Preferred depth: 15–180m • Preferred substrate: Soft bottoms Biology and Ecology • Up to 10cm long • Drills holes in the shell of its prey • Spawning occurs in October to May Recreational/Commercial Value • Recreational fishery: unknown • Commercial fishery: unknown Conservation concern • COSEWIC: No Status • SARA: No Status • NL ESA: No Status
Winter Flounder or Flounder	*Pseudopleuro-nectes americanus*	Typical Habitat • Preferred temperature: Variable • Preferred depth: 5-143m • Preferred substrate: muddy to moderately hard Biology and Ecology

Common Name	Scientific Name	Biological/Habitat Details
		• Daytime feeder • Feeds on zooplankton invertebrates • Batch spawner • Migrates into shallow waters for spawning during winter Recreational/Commercial Value • Recreational fishery • Commercial fishery (bait and for consumption) Conservation Status • COSEWIC: No Status • SARA: No status • NL ESA: No Status

6.1.4 Marine Mammals

The waters off the Great Northern Peninsula support a diverse assemblage of marine mammals. Marine mammals regularly found in areas around Crémaillère Harbour include seals (pinnipeds), baleen whales (mysticetes) and toothed whales including porpoises and dolphins (odontocetes). Whale watching tours operate out of St. Anthony, making marine mammals an economically important resource for the area. The Strait of Belle Isle has been identified as an area of importance to marine mammals on the west coast of the Island of Newfoundland. Within the northwest Atlantic, the Strait of Belle Isle supports an exceptionally high abundance of piscivorous marine mammals, likely due to the abundance of feed fish such as capelin in the area (DFO 2007).

Marine mammal species that are likely to be present for at least part of the year in or around Crémaillère Harbour include harp and harbour seals, baleen whales (mostly humpback and fin whales), white-beaked and Atlantic white-sided dolphins, and occasionally other toothed whale species including harbour porpoises, killer whales, long-finned pilot whales and sperm whales. Key life history information for each of these species is presented below in Table 6-4.

Table 6-4 Marine mammal species known to occur in and near Crémaillère Harbour

Common Name	Scientific Name	Biological/Habitat Details
Harp Seal	*Pagophilus groenlandicus*	**Habitat and Movements** • Widespread in pack ice in coastal and offshore waters of the North Atlantic. • Highly migratory; summers in the Canadian Arctic and Greenland, and wintering in the waters off Newfoundland. • Present in Newfoundland waters December - April. **Foraging and Ecology** • Feed on a wide variety of fish and invertebrates. Highly social, typically travelling and foraging in

Common Name	Scientific Name	Biological/Habitat Details
		groups. **Status** • Populations are considered secure; the most abundant pinniped in the northern hemisphere.
Harbour Seal (Atlantic and Eastern Arctic subspecies)	*Phoca vitulina concolor*	**Habitat and Movements** • Very widespread distribution; occurs in temperate to polar latitudes in the northern hemisphere in coastal waters, bays, rivers, estuaries and intertidal areas. • Generally considered to be non-migratory. • Present in Newfoundland waters year-round. **Foraging and Ecology** • Generalist feeders, taking a wide variety of fish, cephalopods and crustaceans from surface, mid-water, and benthic habitats, typically diving to a depth of 100 m. Gregarious at haul-out areas, but at sea, most often seen alone or in small groups. **Status** • Not at Risk (COSEWIC). Populations have been stable and likely increasing since the 1980s.
Humpback Whale (Western North Atlantic population)	Megaptera novaeangliae	**Habitat and Movements** • Usually found in coastal waters, but also may occur in offshore habitats. • Highly migratory between temperate-to-arctic feeding areas and tropical breeding areas. • Present in Newfoundland waters April - December. **Foraging and Ecology** • Feed on krill and small schooling fishes such as capelin. Usually observed singly or in small groups of 2 or 3. **Status** • Not at Risk (COSEWIC). The humpback whale is the most frequently reported cetacean species within Crémaillère Harbour.
Blue Whale (Atlantic population)	Balaenoptera musculus	**Habitat and Movements** • Found in both coastal and pelagic waters; frequently at continental shelf edge where food production is high.

Common Name	Scientific Name	Biological/Habitat Details
		• Migration patterns are poorly understood, but variable and apparently related to food availability. • Present in Newfoundland waters year-round. **Foraging and Ecology** • Primarily feeds on euphausiids. Usually observed singly or in small groups. **Status** • Endangered (SARA Schedule 1 and COSEWIC). Rarely off the east coast of the Northern Peninsula.
Fin Whale (Atlantic population)	Balaenoptera physalus	**Habitat and Movements** • Usually found at shelf edge and further offshore. • Migration habitats are not well understood; however, Newfoundland stocks appear to migrate southward in the winter. • Present in Newfoundland waters April - December. **Foraging and Ecology** • Feed on krill and small schooling fishes such as capelin. Usually observed singly or in pairs. **Status** • Special Concern (SARA Schedule 1 and COSEWIC). Most frequently observed baleen whale off the east coast of the Northern Peninsula.
Sei Whale (Atlantic population)	Balaenoptera borealis	**Habitat and Movements** • Usually found in offshore waters near the shelf edge. • Migrate between tropical to subtropical latitudes in winter, and temperate and subpolar latitudes in summer. • Present in Newfoundland waters June - November. **Foraging and Ecology** • Feed on copepods, krill and small shrimp. Usually observed singly or in small groups of 2 or 3. **Status** • Data deficient (COSEWIC). Rarely observed off the east coast of the Northern Peninsula.

Common Name	Scientific Name	Biological/Habitat Details
Common Minke Whale (North Atlantic subspecies)	Balaenoptera acutorostrata acutorostrata	**Habitat and Movements** • Found in both coastal and offshore waters. • Migration patterns poorly understood. • Present in Newfoundland waters year-round, but more commonly from April to August. **Foraging and Ecology** • Feed on small schooling fishes such as capelin and sandlance; copepods and krill also taken. Usually observed singly or in small groups of 2 to 6 individuals. **Status** • Not at Risk (COSEWIC). Occasionally observed off the east coast of the Northern Peninsula.
Sperm Whale	Physeter macrocephalus	**Habitat and Movements** • Generally, a deep-water species (>1000 m) but has also been sighted in coastal waters. • Widespread distribution, but most abundant in tropical and temperate waters. • Present in Newfoundland waters year-round. **Foraging and Ecology** • Feed primarily on squid. Males commonly observed in higher altitudes outside of the breeding season, while females and juveniles generally remain in tropical and subtropical waters. **Status** • Not at Risk (COSEWIC). Rarely observed off the east coast of the Northern Peninsula.
Northern Bottlenose Whale (Davis Strait-Baffin Bay-Labrador Sea population)	Hyperoodon ampullatus	**Habitat and Movements** • Usually found in deep waters, typically 800 m to 1500 m in depth. • The Scotian Shelf population is believed to be non-migratory. While the Davis Strait population appears to move north to south seasonally, patterns are not consistent, as there have been sightings off Newfoundland in the winter months. • Present in Newfoundland waters year-round. **Foraging and Ecology** • Feed on deepwater squid. Usually observed in groups numbering up to 20 individuals.

Common Name	Scientific Name	Biological/Habitat Details
		Status • Special Concern (COSEWIC). Single observation off the east coast of the Northern Peninsula.
Killer Whale (Northwest Atlantic / Eastern Arctic population)	Orcinus orca	**Habitat and Movements** • Found in nearshore and pelagic environments. • Not reliably migratory. • Present in Newfoundland waters year-round. **Foraging and Ecology** • Feed on a wide variety of prey including marine mammals, seabirds, fish and squid. Known to use cooperative tactics to herd prey. **Status** • Special Concern (COSEWIC). Rarely observed off the east coast of the Northern Peninsula.
Long-finned Pilot Whale	Globicephala melas	**Habitat and Movements** • Typically found in deep water with steep bottom topography in temperate to subpolar latitudes. • Not known to migrate north-south but undertakes inshore-offshore movements in response to prey availability. • Present in Newfoundland waters year-round. **Foraging and Ecology** • Feed primarily on squid, but known to consume octopus, cuttlefish and some fish species as well. Highly social, often seen in pods of 20 to 90 individuals. **Status** • Not at Risk (COSEWIC). Rarely observed off the east coast of the Northern Peninsula.
Short-beaked Common Dolphin	Delphinus delphis	**Habitat and Movements** • Occurs in nearshore and offshore environments. • Moves to follow prey aggregations. • Present in Newfoundland waters year-round. **Foraging and Ecology** • Feed on small schooling fishes and squid. Usually observed in small groups of 50 to 200 individuals.

Common Name	Scientific Name	Biological/Habitat Details
		Status • Not at Risk (COSEWIC). Rarely observed off the east coast of the Northern Peninsula.
Atlantic White-sided Dolphin	Lagenorhynchus acutus	**Habitat and Movements** • Usually found along the continental slope and shelf, and offshore. • Non-migratory. • Present in Newfoundland waters year-round. **Foraging and Ecology** • Feed on small schooling fishes, shrimp and squid. Usually observed in groups of 30 - 70 individuals, often with other cetaceans including other dolphins and large whales. **Status** • Not at Risk (COSEWIC). Commonly observed off the east coast of the Northern Peninsula.
White-beaked Dolphin	Lagenorhynchus albirostris	**Habitat and Movements** • Usually found in coastal and continental shelf waters. • Non-migratory; moves with aggregations of prey. • Present in Newfoundland waters year-round. **Foraging and Ecology** • Feed on small schooling fishes, shrimp and squid. Usually observed in groups of 30 - 70 individuals, often with other cetaceans. **Status** • Not at Risk (COSEWIC). Commonly observed off the east coast of the Northern Peninsula.
Harbour Porpoise (Northwest Atlantic population)	Phocoena phocoena	**Habitat and Movements** • Usually found coastal shelf waters in shallow bays and estuaries less than 200 m in depth, although occasionally observed offshore. • Movements are poorly understood. • Present in Newfoundland waters year-round. **Foraging and Ecology** • Feed on krill and small schooling fishes and

Common Name	Scientific Name	Biological/Habitat Details
		cephalopods. Usually observed singly or in small groups of 2 or 3. **Status** • Special Concern (COSEWIC). Rarely observed off the east coast of the Northern Peninsula.

Source: AMEC (2014); SARA (2018)

The Crémaillère Harbour entrance channel has a depth of approximately 45 m, and the basin ranges from 22.74 to 33.83 m at lowest normal tide. Based on their distributions, habitat preferences and reported observations (Figures 6-3 and 6-4), the species most likely to occur in Crémaillère Harbour, or adjacent waters, include humpback whales, fin whales, common minke whales, Atlantic white-sided dolphins, white-beaked dolphins and harbour porpoises. Of these species, the fin whale is listed as Special Concern on SARA Schedule 1, and both it and the harbour porpoise are considered species of special concern by COSEWIC. Other species listed in Table 6.3 have the potential to interact with Project-associated vessel traffic in the vicinity of the harbour, including the Blue Whale (SARA: Endangered), Northern Bottlenose Whale (Davis Strait-Baffin Bay-Labrador Sea population; COSEWIC: Special Concern) and Killer Whale (COSEWIC: Special Concern).

Figure 6-3 Location of Whale Sittings near Crémaillère Harbour (Source: Ocean Biogeographic Information System)

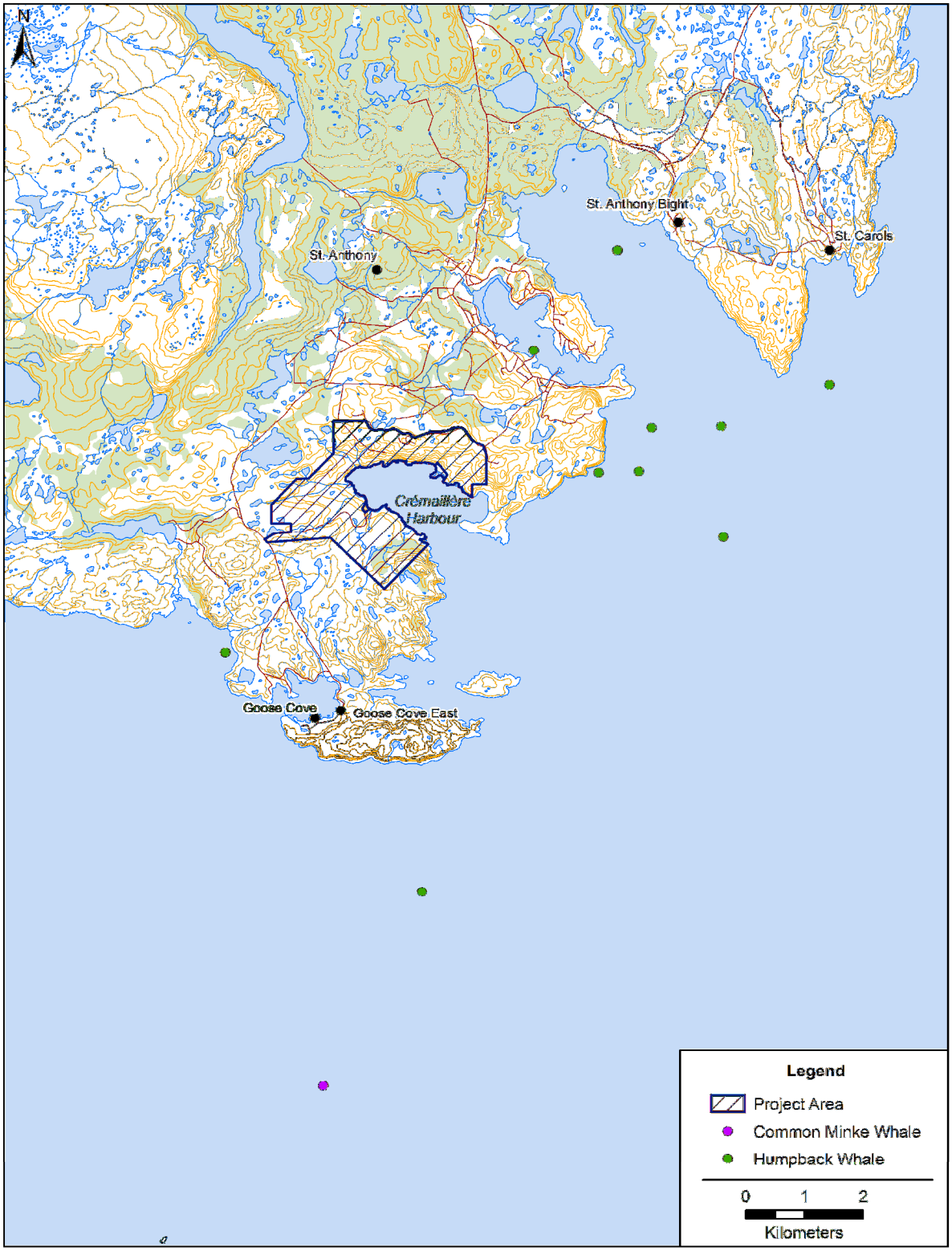
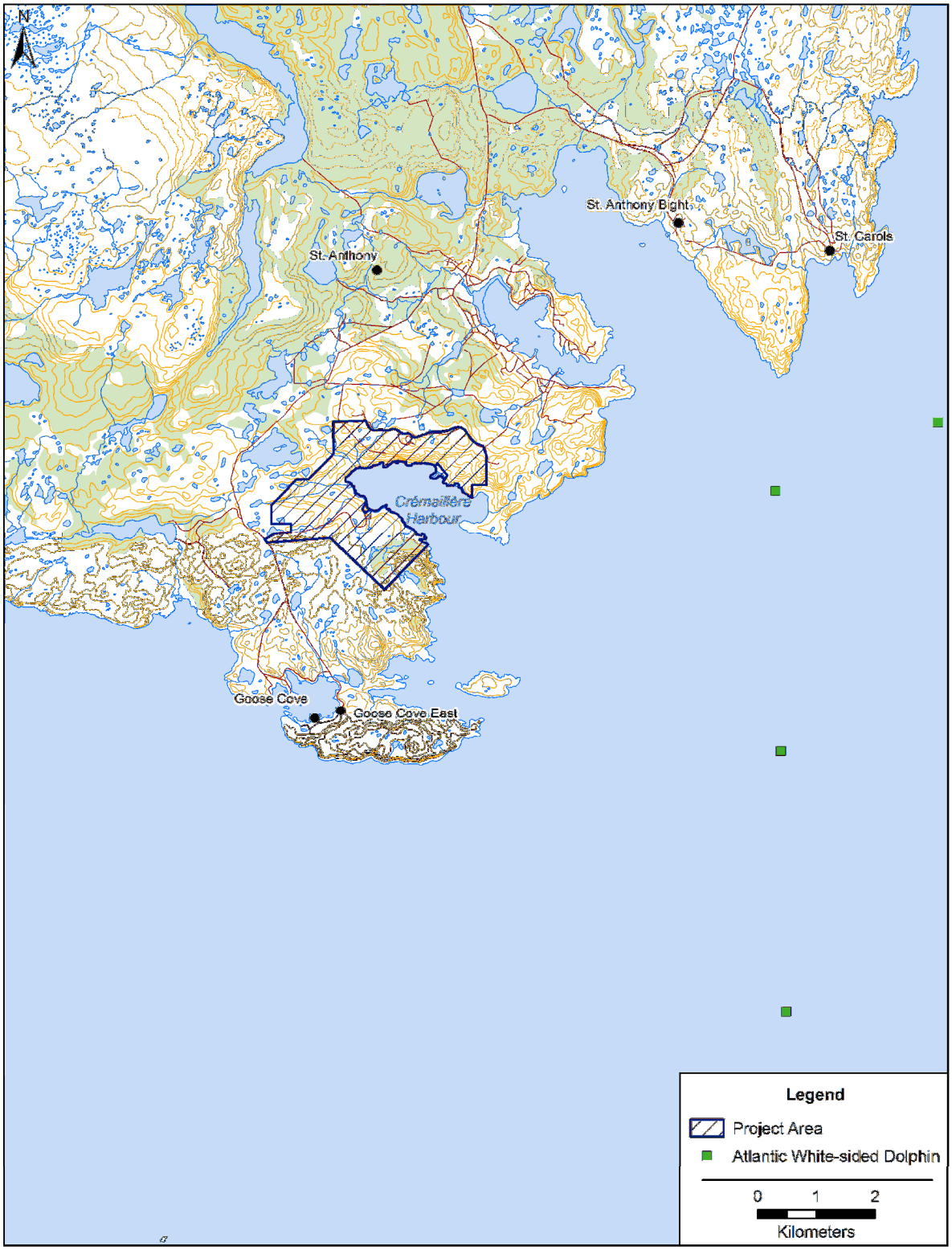


Figure 6-4 Location of Dolphin Sittings near Crémaillère Harbour(Source: Ocean Biogeographic Information System)



6.2 Human Environment

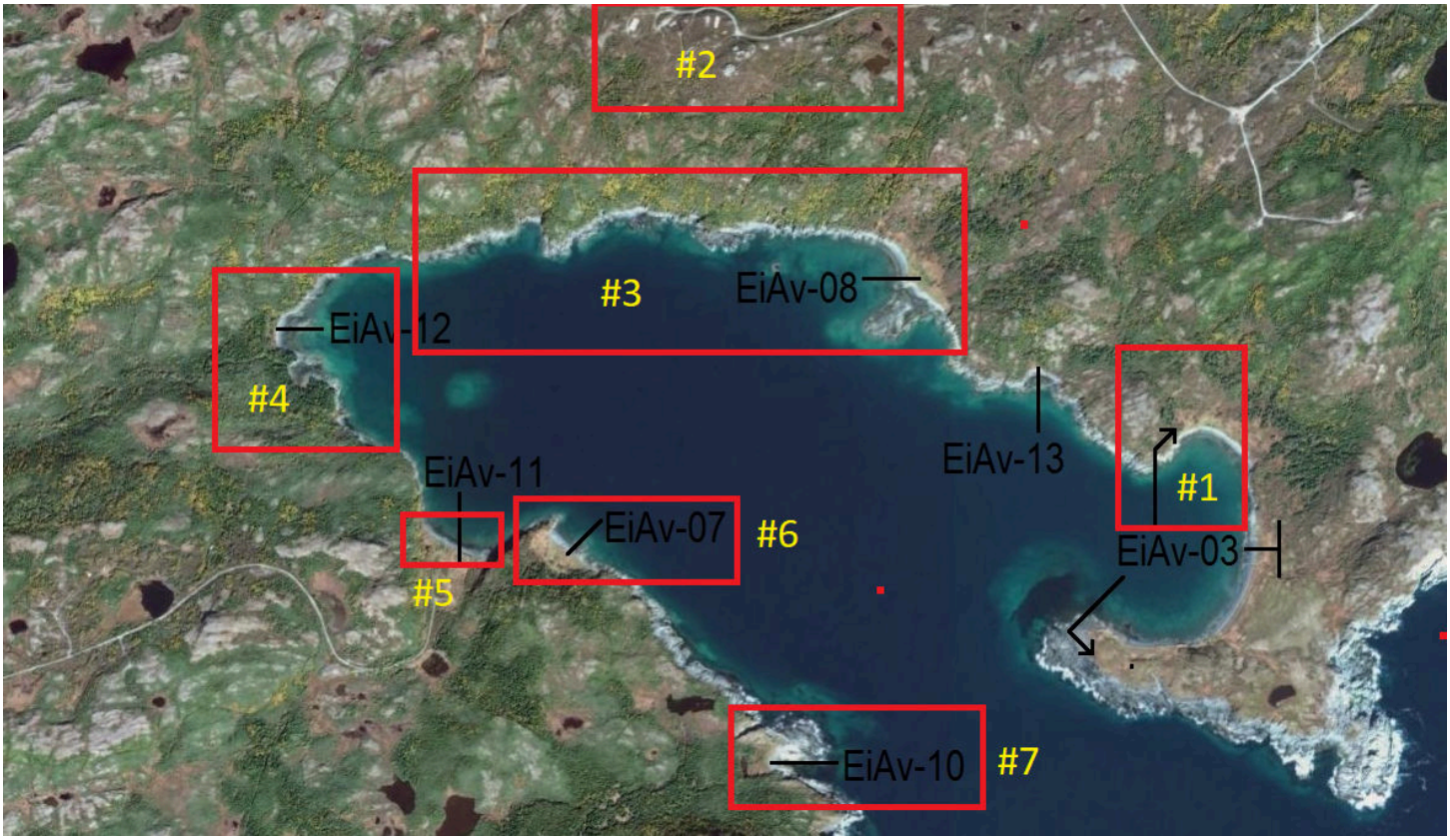
6.2.1 Historic Resources

Gerald Penney Associates (GPA) Limited were contracted in July 2018 to undertake a Stage 1 Historic Resources Assessment of Crémaillère Harbour in relation to the proposed Project, in consultation with the Newfoundland and Labrador Provincial Archaeology Office (PAO). GPA first completed a desk-based historic resources assessment for the proposed Project at Crémaillère Harbour. Based on the desk-based assessment, GPA identified seven areas of interest for subsequent field investigations, Figure 6-5. GPA received an Archaeological Investigation Permit #18.31 from the PAO and conducted field investigations in August 2018. A report detailing the combined results of the desk-based assessment and field investigations is provided in Appendix C.

GPA identified that Crémallière Harbour was a summer base for the French migratory fishery in the 16th, 17th, 18th and 19th centuries (Tapper 2014), and was a small inshore fishing settlement from the late 19th century until approximately 1915. Prior to GPA's 2018 field investigations there were six known French fishing rooms in Crémallière Harbour, which are represented by three archaeological sites registered with the PAO. Four of these rooms are encompassed by archaeological site La Crémallière (EiAv-03, designated 2007; Pope et al 2007). One La Crémallière room, historically known as *Grand Rochelle*, is very close to the Project's proposed eastern boundary. A fifth room, *Petit Rochelle*, at Russells Cove, archaeological site La Crémallière North (EiAv-08, designated 2013; Tapper and Pope 2014) is roughly equivalent to an enclave or excluded area, not included within the Project's Crown grant application area as it is private property. On the south side, a sixth French room, archaeological site Crémallière Observation Point (EiAv-07, designated 2013; Tapper and Pope 2014), is in an area which encompasses proposed Project facilities, including two buildings, three piers, a container yard and a graving dock. EiAv-07 is the only archaeological site registered by the PAO prior to this historic resource assessment that lies within the Crown grant application area.

As a result of the historic resources assessment undertaken by GPA the PAO has determined that there are four new archaeological sites in Crémaillère Harbour, EiAv-10, EiAv-11, EiAv-12 and EiAv-13, Figure 6-5. However, only one of these (AOI#5/EiAv-11) is in an area where Project groundworks are proposed.

Figure 6-5 Areas of Interest and designated Archaeological Sites Identified as a Result of Historic Resources Assessment Undertaken by GPA, 2018



6.2.2 Municipal Land Use

The Project is located off Route 430 between the Towns of St. Anthony and Goose Cove East. The Project is located within the Town of St. Anthony Municipal Boundary and/or Planning Area Boundary (Figure 6.5). The Town of St. Anthony Municipal Plan (2010-2020) indicates that this area is zoned as Rural (RU) and Industrial Uses are included as a Discretionary Use. This means that approval of this Project within the Rural Zone is a decision of the Town Council of St. Anthony (TSA 2010).

The process for approval of a Discretionary Use is outlined in subsection 32(3) of Section B of the Development Regulations, which specify that Council must post written notice, including a synopsis of the proposed development, on the Town of St. Anthony's website at least ten (10) days prior to the date scheduled for the Council meeting to consider the application. Council must consider any objections or representations received on the Discretionary Use application. If Council has satisfied the public notification requirements under subsection 32(2) and is satisfied that the application is not contrary to the Municipal Plan and Development Regulations, and to public interest, then it may approve the Discretionary Use application (TSA 2010). St. Anthony Town Council approved the Discretionary Use Application for development of the Project within the Rural Land Use Zone on November 28, 2017.

6.2.3 Land Ownership

Land to be used for development of the Project area is Crown land (Figure 4-2). GNP has registered applications with Crown Lands File No. 3020712; Application No: 151500 (Grant) and 151508 (Lease). These applications are under review by relevant Government Departments and other agencies: Service NL, Natural Resources (Mines

Branch, Energy Branch, Forestry & Agrifoods Agency), Municipal Affairs and Environment (Water Resources Management Division, Environmental Assessment Division), Department of Tourism, Culture, Industry and Innovation (Provincial Archaeology Office) and Newfoundland & Labrador Hydro. In response to the requirements stated in Application No.: 151508, GNP Inc. advertised a Notice of Intent to acquire title to Crown lands at Crémaillère Harbour in the NL Gazette on June 2, 2017 (GNL 2017). GNP anticipates that once the Project is released from the environmental assessment process, the final approval process will be completed.

Parcels of privately owned land have been identified within and near the Project area (Figure 4.2). These include two properties surrounded by the Project footprint and six properties in proximity to the Project Area. GNP Inc. will ensure that access is maintained to the private properties identified.

6.2.4 Protected Public Water Supply

A portion of the original Project area was located inside the Goose Cove East Public Water Supply Area (Jack's Pond), which is protected by the Provincial *Water Resources Act* (DMAE 2018). Industrial uses are not permitted within the Water Supply Area (DMAE 2018a). GNP Inc. has subsequently altered the site plan to avoid the water supply area (Figure 6-6).

Figure 6-6 Town of St. Anthony Rural Land Use Zone

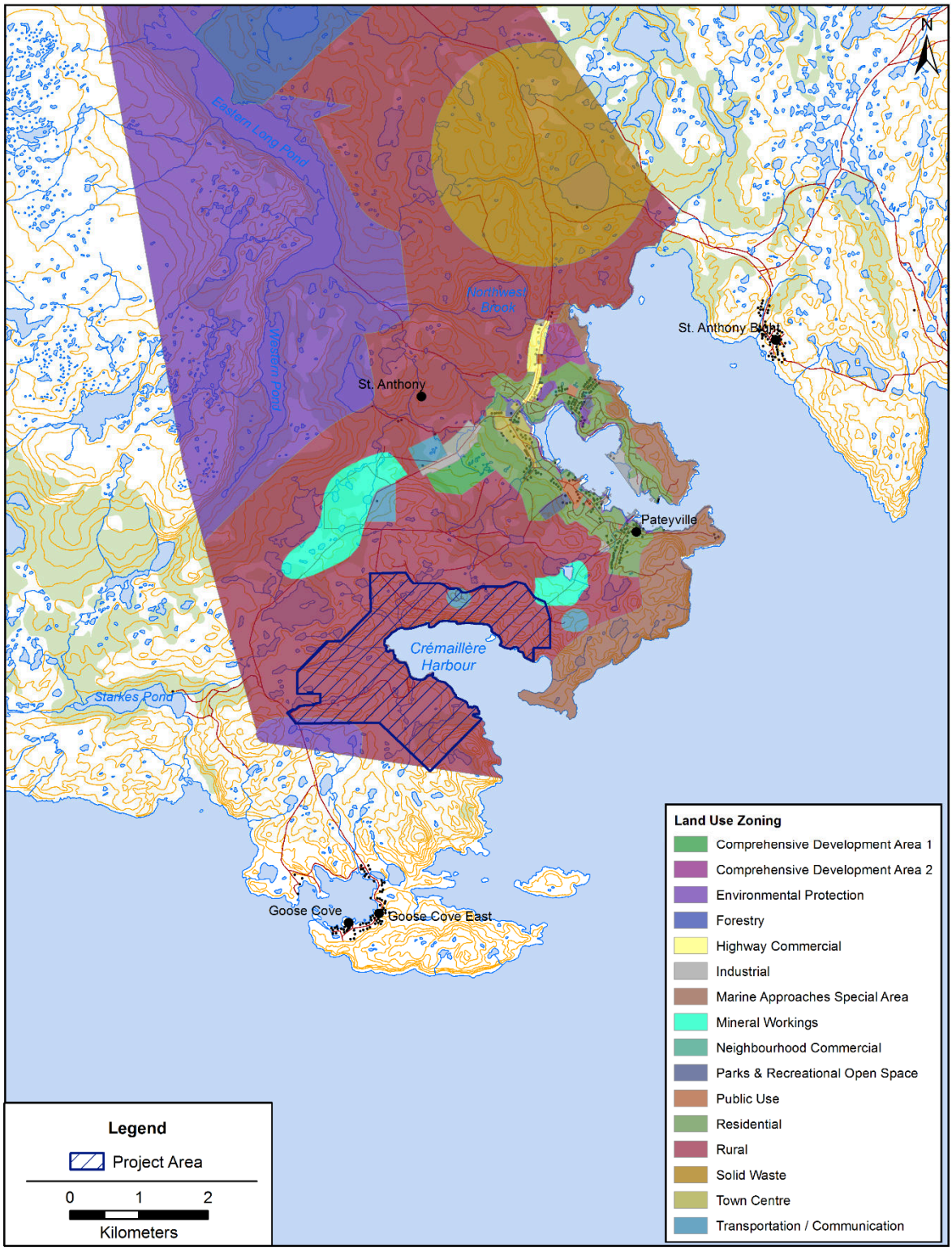
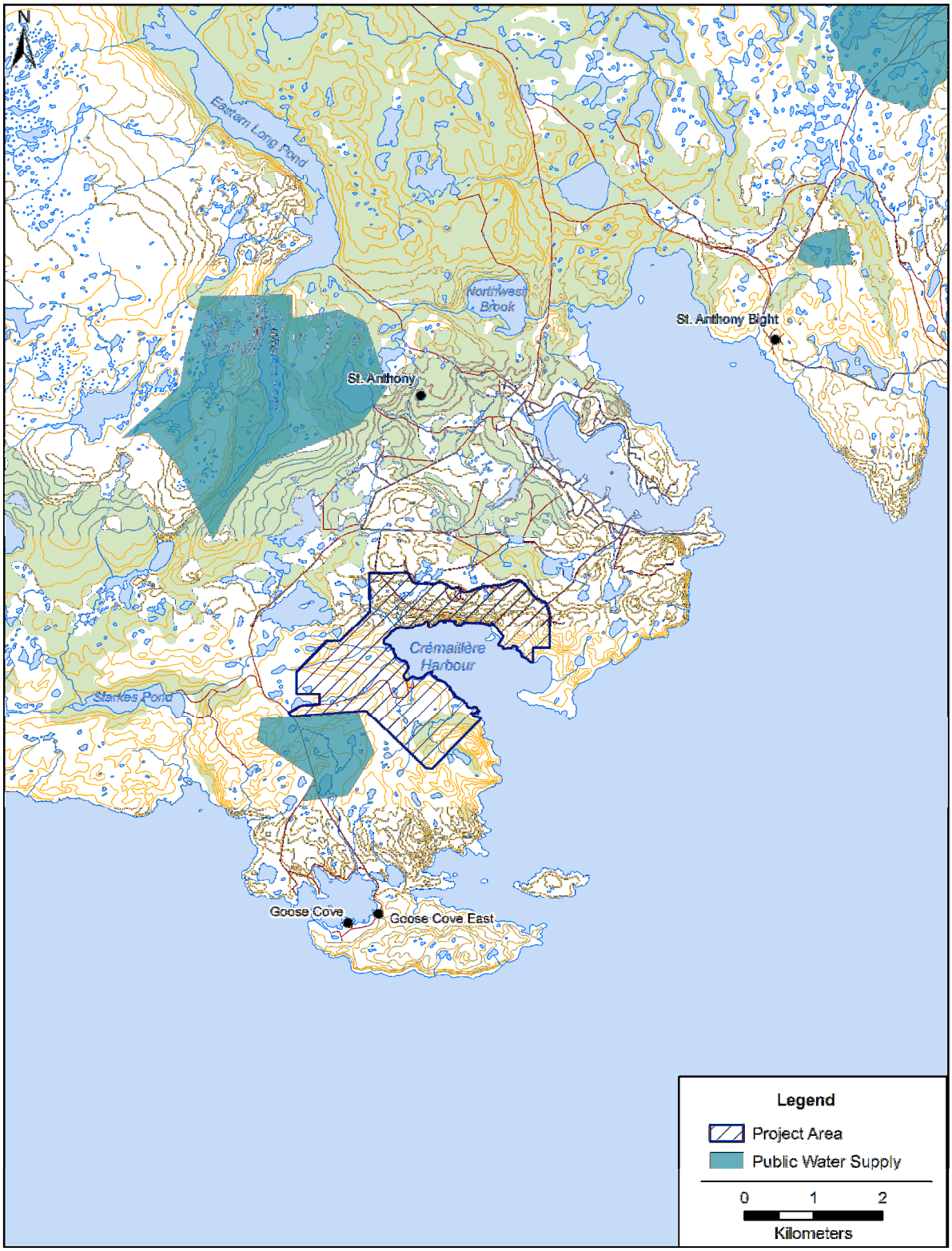


Figure 6-7 Protected Public Water Supplies



6.2.5 Tourism and Recreation

St. Anthony is one of the main service centres for the regional tourism industry. Some concern has been expressed regarding the potential visibility of the Project from tourism and recreation areas.

St. Anthony is located on the east side of the tip of the Northern Peninsula. The Strait of Belle Isle area is home to various provincially, nationally and internationally identified and/or designated sites of interest for tourism and recreation. These include L'Anse aux Meadows National Historic Site/World Heritage Site and Red Bay National Historic Site/World Heritage Site (TNL2018). The region also includes Hare Bay Islands Ecological Reserve, Burnt Cape Ecological Reserve, Watts Point Ecological Reserve, Pistolet Bay Provincial Park and Point Amour Lighthouse Historic Site (DFLR 2018). Several scheduled salmon rivers exist on the tip of the Northern Peninsula but these flow into Pistolet Bay on the Gulf of St. Lawrence (DFO 2018). None of these sites are within a 10-km radius of the Project area.

The majority of tourism and recreation amenities near the Project area are attractions in St. Anthony and walking trails in the community and surrounding areas (Figure 6-8). Local attractions include the Grenfell Interpretation Centre, Grenfell House, Grenfell Memorial Site, Grenfell Park & Dock Facility, Fishing Cove Point Municipal Park and Fox Point Lighthouse. The harbour has two boat tour operators that provide outings to view whales, icebergs and seabirds (TSA No Date). St. Anthony is a cruise ship port-of-call that had six scheduled, and four actual visits, in 2017 (CNL 2018). Two coastal caves and the Hare Bay Islands Ecological Reserve are located in nearby waters (MVL 2014, DFLR 2018).

A variety of hiking trails are available in and around St. Anthony. American Drive Trail, Bottom Brook Trails, Fox Point Lighthouse & Fishing Point Trails (i.e., Whale Watchers Trail, Santana Trail, Iceberg Alley Trail, Carter's View Trail), Lamage Point Trail, Military Base Trail and Tea House Trail are located within or near the Town (Figure 6-8). Other trails are located in the surrounding hills and coastal areas. These include Pumley Cove Trail (Goose Cove), John Patey's Trail, Little Brehat Trail and Flat Point Trail (MVL 2014, TSA No Date).

Other recreation amenities include the Northern Drifters Snowmobile Trails, Aurora Cross Country Ski Trails and the Triple Falls RV Park (MVL 2014, TFRVP No Date). The area surrounding the Project area has open areas for hunting moose, caribou, black bear, small game (i.e., willow and rock ptarmigan, ruffed and spruce grouse, snowshoe hare) and migratory game birds as well as trapping furbearers (DFLR 2018 H&T).

6.2.6 Natural Resources

Various resource extraction and harvesting activities occur in the St. Anthony area. These include gravel quarries and domestic wood harvesting areas (Figure 6-9). A number of mineral exploration licences are located in the area, two of which overlap with the Project area footprint (DMAE 2018b).

Commercial fisheries information, Fisheries and Oceans Canada Commercial Fisheries Data (2011-2016), indicates that Atlantic cod, snow crab, capelin, Atlantic herring, and shrimp occur in the Crémaillère Harbour area. No commercial fishing activity has been identified within Crémaillère Harbour through public information sessions held in the area, however, it is adjacent to NAFO Division 3Kd, fishing area 3 for various species (e.g., capelin, herring, mackerel), seal harvesting area 5 and shrimp harvesting area 6. No indigenous food, social or ceremonial fishing areas have been identified in these areas, however, each of the five Newfoundland and Labrador Indigenous Groups holds commercial-communal licences in these harvest areas..

Figure 6-8 Tourism and Recreation areas of interest

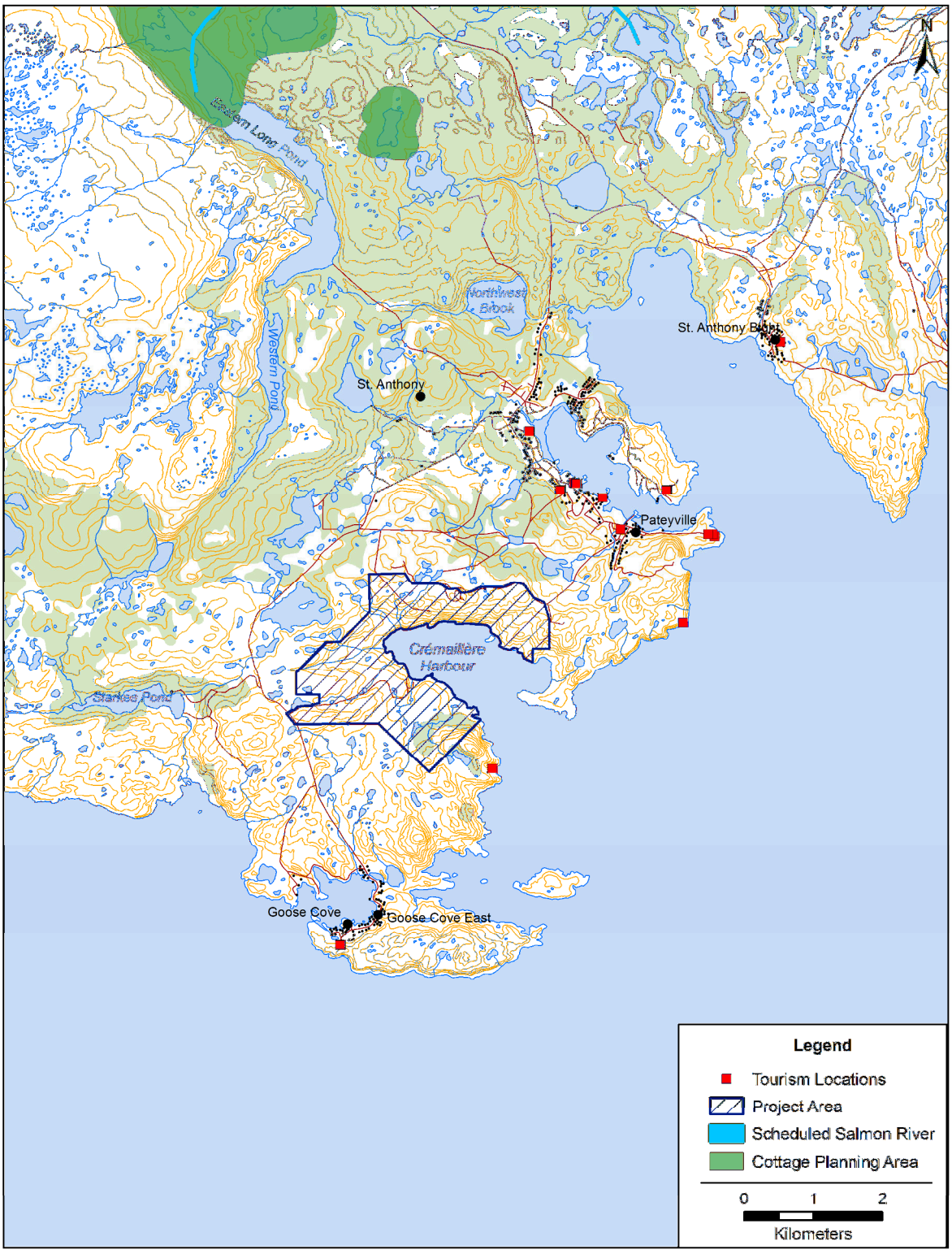
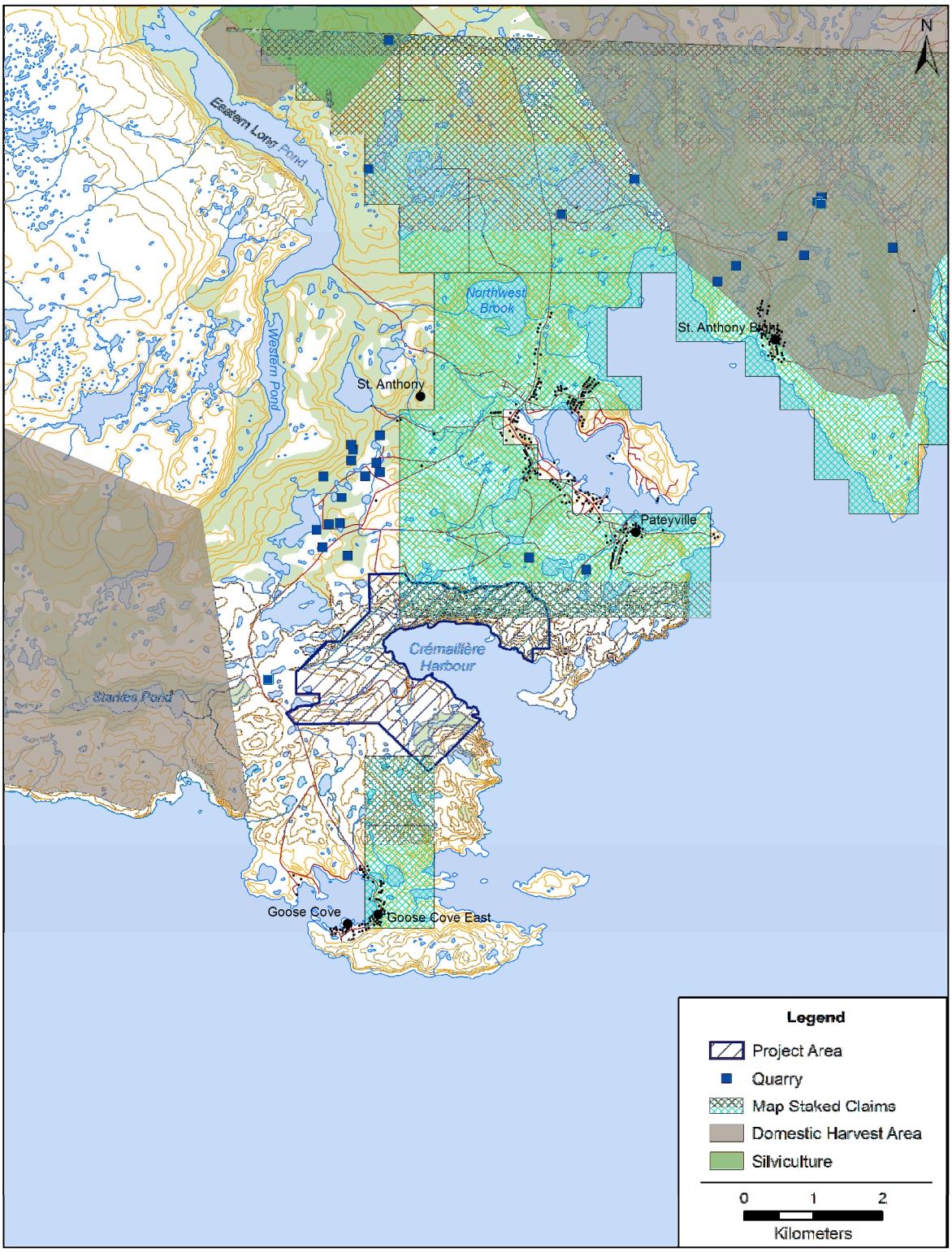


Figure 6-9 Natural Resources Extraction Areas



6.2.7 Stakeholder Engagement and Public Consultation

GNP has actively engaged with stakeholders to identify and address any issues relevant to the Project. The proponent has also held public consultation events to receive input from the public. The following table outlines these activities.

Table 6-5 Stakeholder Engagement and Public Consultation Activities

Date	Event	Location	Number of Participants
May 19, 2018	Public information session	St. Anthony	60
November 5, 2018	Meeting with St. Anthony Town Council	St. Anthony	8
November 6, 2018	Meeting with Great Northern Peninsula Joint Council	Anchor Point	5
November 7, 2018	St. Anthony Chamber of Commerce	St. Anthony	30

As well, GNP Inc. has received letters of support for the proposed Project from twenty-six communities on the Great Northern Peninsula.

6.2.8 Public Information Session

GNP Inc. held a public information session on May 19, 2018 from 2:00-4:00 PM at the Grenfell Historic Properties in St. Anthony. Notice of the Information Session was advertised in The Western Star, regional newspaper on Saturday May 12th, Wednesday May 16th, Thursday May 17th and Friday May 18th and in weekly The Northern Pen newspaper on Wednesday May 16th. The notice was also posted on the Town of St. Anthony website from May 11th to 19th, inclusive and at the Town Hall, Post Office and Grenfell Historic Properties in St. Anthony.

The meeting was attended by GNP Inc. Directors: Francois-Xavier Morency, Colleen Oliver and Daniel Villeneuve as well as GNP HR Consultant: Nicole Parsons. The purpose of the information session was to describe all aspects of the proposed Project, to describe associated activities and to provide an opportunity for all interested persons to request information or state their concerns. Government representatives included the Honourable Christopher Mitchelmore, Minister of Tourism, Culture, Industry and Innovation and Member for St. Barbe – L'Anse aux Meadows and Dwayne Cull from Fisheries and Oceans Canada. Mayor Desmond McDonald, Councillors and the Town Manager of the Town of St. Anthony attended along with a group of Mayors from the Great Northern Peninsula Joint Council.

The presentation received a favourable response with most questions and comments regarding employment and business opportunities, education and training, Project timeline and willingness to support the Project, along with specific comments about the Project site, opportunities for St. Anthony, relationship to a fixed transportation link to Labrador, potential use by the Canadian Navy and providing additional opportunities to share Project information on the Northern Peninsula. Identified issues or concerns included the presence of private land, access to the Project site, water supply source for the Project and effects on the Goose Cove protected water supply.

Throughout the stakeholder engagement and public consultation, several potential issues have been identified. Table 6-6 provides a summary of these issues, additional information, Project amendments to avoid land use conflicts and identifies the relevant section in the EPR report.

Table 6-6 Summary of Identified Issues

Issue	How the Issue has been Addressed	Location in EPR
Private Land	The Project will be located on Crown land and not require any private land	Section 6.2.3
Site Access	The Project will be accessed from an existing road off Goose Cove Road	Section 4.2.1
Water Supply	The Project will have its own proposed water supply and septic systems	Section 4.2.1
Protected Water Supply	The site plan has been redesigned to exclude any of the Goose Cove East Protected Water Supply Area	Section 6.2.4
Municipal Permit	The Project has been approved by the Town of St. Anthony as a Discretionary Use within the Rural Zone	Section 6.2.2
Mineral Exploration Licences	The site plan overlaps with mineral exploration licences	Section 6.2.6
Viewscapes	The Project may be visible from some tourism and recreation areas/activities	Section 6.2.5

6.3 Potential Environmental Interactions and Mitigation

The following sections provide the results of an environmental effects analysis for the proposed Project, including each of its associated components and activities. The analysis focuses upon, and is organized according to, the environmental setting components described in sections 6.1 and 6.2:

1. Wildlife
2. Vegetation, Streams and Wetlands
3. Freshwater and Marine Fish
4. Marine Mammals
5. Historic Resources
6. Human Environment

The analysis for each includes a discussion and description of the likely environmental issues (adverse and positive) that may be associated with the Project, with separate subsections for the Construction and Operations and Maintenance phases. Environmental planning and mitigation measures to avoid or reduce environmental effects are identified and considered integrally within the analyses. The assessment also includes possible accidental events and malfunctions that could potentially occur during each phase (construction, operations) of the Project. This is followed by a summary and evaluation of the likely residual (after mitigation) environmental effects of the Project. The environmental analysis concludes with an overview of any environmental monitoring and follow-up which may be required during one or multiple phases of Project implementation.

6.3.1 Wildlife

Construction

The physical undertaking of the proposed Project consists of three phases and includes the construction of site buildings and structures, lay down and fabrication areas, upgrades and expansion of road networks, the establishment of a power grid, and the creation of docks. These undertakings (as well as possible malfunctions and accidents), will result in habitat degradation and loss in the immediate Project area as naturally occurring vegetation is removed. This will directly affect the distribution and abundance of select wildlife species that are dependent on these habitats for nesting, denning, and foraging and may lead to the local displacement of these species if critical habitats are extensively altered. For example, ground nesting Northern Harriers (*Circus cyaneus*) and Short-eared Owls are low-density raptor species which breed in open, coastal regions and may potentially occur in the Project area. Removal of ground cover and associated noise and traffic disturbance would likely displace these species from the immediate Project area. Similarly, the alteration of ground cover could potentially remove denning sites for coastal river otters as well as foraging habitat for lynx and other mid-sized carnivores.

In addition to the direct effects on wildlife that are typically associated with the construction of industrial sites, there are multiple indirect effects that have the potential to negatively impact the fitness and reproductive output of wildlife species that occur within the terrestrial component of the Project area, as well as within the adjacent marine environment (Crémaillère Harbour). For example, in northern Alberta, Habib et al. (2007) found that some species of warblers were sensitive to excessive noise and had reduced pairing success and reproductive output in areas where active construction was occurring. Although this study only considered one species group, a similar behavioural response for other passerines that rely on auditory cues for establishing territories and attracting mates is likely. Noise may also interfere with the ability of birds and mammals to detect predators and prey which may have consequences on their individual fitness and survival.

Because of the potential for adverse environmental effects during the construction phase of the Port, a comprehensive EPP is warranted to provide realistic and effective approaches for mitigating deleterious effects to wildlife and other ecosystem components. An integral part of this EPP will include an Avifauna Management Plan (AMP) which will provide a framework for limiting disturbance to both resident and migratory birds that utilize the Project area. The AMP will consist of three levels of protection; 1) general mitigation measures, 2) awareness measures, and 3) directed surveys. General mitigation measures will include specific actions for minimizing the destruction and harm to individuals, nests, and eggs, particularly during the breeding season. Guidelines will be provided for locating nesting birds, establishing protective buffers and minimizing disturbance to these sensitive areas. Other mitigation measures may include protocols for handling and releasing stranded birds, avoiding nesting in stockpiles and buildings, and actively relocating nests from unwanted structures (e.g. Osprey nests atop transmission line towers). Awareness measures will include basic training that will enable employees and contractors to recognize potential wildlife issues and a process for relaying this information to environmental monitors. The third level of protection (directed surveys) will be critically important given the paucity of site-specific information on the distribution and abundance of birds and the inherent variability in the assemblage of birds that occur in an area in any given year. Dedicated surveys by an experienced ornithologist (plus technical support staff) will provide a thorough description of the species that utilize the Project area and will identify active nesting sites to which mitigating measures can be applied. Although all bird species included under the *Migratory Birds Convention Act* will be recorded during field visits, surveys will be tailored to record the occurrence of both federally and provincially listed species at risk (including Ivory Gull, Red Knot, Short-eared Owl, Harlequin Duck, and Gray-cheeked Thrush) as well as for birds of prey (e.g. Bald Eagle (*Haliaeetus leucocephalus*) and Osprey (*Pandion haliaetus*)) that are likely to breed in the general area. Given the range of sensitive species that may potentially utilize the Project area during different times of the year, all available terrestrial, coastal, and marine habitats should be thoroughly surveyed for bird activity. For example, though shorelines will likely support a low diversity and density of species for most of year, this habitat is critically

important for multiple shorebird species (e.g. White-rumped Sandpiper, Dunlin, Red Knot etc.) during the fall migration period. Similarly, Crémailère Harbour may occasionally support high densities of seabirds (e.g. Black-legged Kittiwakes (*Rissa tridactyla*), Common Eider) depending on local prey availability, ice conditions and other environmental factors. An important component of the AMP will be designing and planning the appropriate surveys for key species that utilize the Project Area during different temporal periods. Specific protection measures/best management practices will be developed, in consultation with the Newfoundland and Labrador Wildlife Division, following completion of directed surveys, based on the species and locations identified. These specific protection measures will be incorporated into the Project EPP.

The Project specific EPP will also include best practice measures, including use of sound barriers and work scheduling, as well as scheduled maintenance of equipment and minimizing the amount, and unnecessary idling, of on-site equipment and vehicles, to limit the potential effects of construction noise and emissions on wildlife use of the Project area. Exposure of plants and wildlife to hazardous materials and substances, as well as contamination of habitat will be prevented by appropriate containment and handling practices. The Project site will be equipped with mobile spill response kits at all active construction locations. All waste materials, including recyclable materials, food and beverage waste, camp waste, hazardous waste and scrap construction waste, will be collected in appropriate containers for transport and disposal to off-site disposal/recycling facilities subject to provincial and federal regulatory requirements and guidelines.

Operations and Maintenance

In addition to the loss of wildlife habitat, other direct impacts to wildlife may include collisions with vehicles, overhead wires, windows, and other physical structures. Prolonged exposure to these hazards sources could reduce the occupancy of wildlife species that are susceptible to these sources of mortality (e. g. moose, waterfowl and shorebirds; Rioux et al. 2013).

Elevated levels of artificial lighting may also influence the behavioural patterns of wildlife species; particularly for those that are most active during nocturnal and crepuscular time periods that require darkness for concealment from predators (Rich and Longcore 2006). Artificial lighting is also known to influence local migratory patterns of birds that migrate at night (e.g. Atlantic Puffins (*Fratercula arctica*); Gauthreaux and Belser 2006) and is a major source of avian mortality through collisions with illuminated structures (Gehring et al. 2009). Excessive lighting may also negatively impact the behaviour and ultimate survival of endangered bat species though the occurrence of these species in the Project Area is unknown (see above). Where extended work hours are necessitated by schedules or tides, work lights should be concentrated in the area of construction. Peripheral lights should be reduced as much as possible by barriers, direction and spot lighting. At night, only lights deemed necessary for safety, security and site operations should be turned on.

Because of the potential for activities and facilities associated with the Ports operational requirement to also result in disturbance to resident and migratory birds that utilize the Project area, the AMP developed during the construction phase will be carried forward into the operation and maintenance phase of the development. The AMP will be incorporated into the operational HSEMS and specific protection measures will be included in the SOPs developed in association with Port operations.

Environmental Effects Assessment Summary

The potential effects of project development on wildlife species are summarized in Table 6.7.

Table 6-7 Examples of construction activities, their interaction with key ecosystem components and proposed measures for mitigating adverse effects

Environmental Component	Project Phase / Potential Interaction			Key Considerations and Environmental Mitigation
	Construction	Operations	Issues / Interactions	
Furbearers and avifauna	.	.	• Loss of nesting, denning, and foraging habitat, disruption of migratory routes and foraging patterns, and increased predation • Increased mortality as a result of collisions with vehicles. • Decreased productivity of birds and mammals due to chronic noise disturbance from construction activity. • Habituation of some wildlife to human presence and artificial feeding which may develop 'problem wildlife' • Contamination of wildlife and their habitats by oil and other harmful substances	• Minimizing the Project footprint by confining vegetation clearing and other forms of ground disturbance to the extent possible • Maintain natural buffers around wetlands and riparian areas where feasible • Conduct nest searches in advance of site clearing during the breeding season (15 April to 15 August) to avoid disturbance to nesting landbirds. • Establish protective buffer zones around all active nests. Buffer sizes are species-specific and are based on the perceived susceptibility of each species to anthropogenic disturbance • Incorporate appropriate SARA and ESA listed species protection measures in Project EPP and HSEMS as required; • Avoid wildlife-vehicle collisions by ensuring safe driving practices • Avoid construction during the pre-calving/calving season (early May to late June) if woodland caribou are detected in the Project area • Minimize the use of artificial lighting to reduce disturbance to nocturnal bird and bat species • Prevent harvesting or harassment of wildlife by Project personnel • Avoid intentional feeding of wildlife (e.g. red foxes, black bears, gull species etc.).

Environmental Component	Project Phase / Potential Interaction			Key Considerations and Environmental Mitigation
	Construction	Operations	Issues / Interactions	
				• Ensure that waste and other materials are properly disposed of/managed. Ensure that a comprehensive spill response plan is developed and that it can be effectively implemented.
Vegetation	.	.	• Clearing of vegetation • Possible fuel or chemical spills	• Minimizing the Project footprint by confining vegetation clearing and other forms of ground disturbance to the extent possible • Clearly delineate work areas to prevent excessive clearing. • Limit vehicle and ATV traffic to established roadways. • Minimize contaminants (airborne or run-off) through dust control on roads and containment of stockpiles. • Conduct rare plant assessment in advance of clearing activities; • Incorporate appropriate rare plant protection measures in Project EPP and HSEMS as required; • Compliance with applicable regulations and permits

With the implementation of the environmental mitigation measures outlined here, and detailed in the EPP, the proposed Project is not likely to result in significant adverse environmental effects on wildlife or wildlife habitat.

6.3.2 Vegetation, Streams and Wetlands

Vegetation will be cleared from areas to be developed for infrastructure construction. Possible effects on local streams and wetlands include infilling, sedimentation, de-watering, excess dust, and altered flows. Standard mitigations related to vegetation, stream and wetland protection include minimizing project footprint, avoiding areas of wetlands for infrastructure such as roads, and proper sedimentation and dust control during both construction and operation

Construction

Possible effects of construction of roadways, buildings and laydown areas on local vegetation, streams and wetlands include landscape disturbance, disturbance of rare plant species or habitat, infilling, sedimentation, de-watering, excess dust, and altered flows.

During construction, traversing of the site by equipment and human foot traffic will be limited to clearly delineated roads, paths and laydown areas. The areas to be affected will be determined in the Site Plan based on the principle of smallest necessary footprint. Areas beyond the final footprint of development affected by construction will be revegetated with indigenous plants.

In order to determine the presence of rare plant species in areas that may be disturbed by construction activities, standardized botanical surveys will be conducted by a qualified botanist in all areas to be cleared of vegetation prior to development. As well, beach and cliff areas within the Project area will be surveyed for presence of plant species that may be rare or threatened. The Newfoundland and Labrador Wildlife Division will be consulted regarding the survey methodology to be employed, the findings of the surveys undertaken and appropriate mitigations to be undertaken if surveys confirm the presence of rare plant species. The requirement for botanical surveys prior to clearing, as well as any mitigative measures identified as a result of these surveys, will be incorporated into the Project specific EPP for communication and implementation during Project construction

A primary consideration in engineering of the Project is the proximity of wetlands and natural water courses to construction activities. As is feasible, wetlands, natural riparian buffer zones and areas of indigenous vegetation will be preserved to provide natural drainage and filtration surrounding paved and developed areas. These natural areas will be clearly delineated and all measures taken to ensure they are not affected by disturbances, sedimentation, or contamination during construction.

Responsible engineering and project management, particularly in large scale projects, requires comprehensive drainage and erosion control as an integral part of the initial planning phase for all aspects of the project including construction. A comprehensive program of proven, effective erosion and sediment control measures will be identified in the Project EPP and implemented before earth moving takes place.

The EPP will include an Erosion and Sedimentation Control Plan (ESCP) based on a complete geological and hydrological survey of the entire Project site including an inventory and assessment of water bodies and water courses. The ESCP will detail surface stabilization practices and provide detailed schematic drawings of drainage and sediment control structures.

Best Management Practices (BMPs) for erosion and sediment control appropriate for the Project will be established in the Project EPP and associated ESCP. While erosion control is the primary means of preventing the degradation of downstream aquatic resources, sediment control serves a contingency/back-up plan. The design of temporary and permanent control measures should be viewed as a flexible process, that evolves as new information is obtained throughout construction phases.

The ESCP will be dictated by site conditions and will detail steps necessary to minimize erosion (e.g. limiting the exposed area, limiting exposure time, installing BMPs early, diverting runoff, limiting velocity and protecting concentrated flow areas) and establish sediment control practices that intercept sediment-laden runoff that may escape erosion control measures. Select erosion and sediment control measures are discussed below.

The simplest way to prevent erosion on a construction site is to prevent existing vegetation from being disturbed and limiting the time any disturbed areas are exposed (Coquitlam 2014, Iowa 2013, Moncton 2009, and Transport Alberta 2011). While some site areas will necessarily be graded and some ground exposed, measures will be taken to minimize the effect on the environment during the construction and operation stages of the project. Integrated site planning and coordination of site preparation and construction time lines will delineate and limit the area of exposed soils and the amount of time that soil is exposed. Clearing and excavation onshore will occur only where necessary and will, as much as practicable, be kept within the footprint of the finished structures. Where necessary, wetlands, natural riparian buffer zones and areas of indigenous vegetation will be preserved to provide natural drainage and filtration surrounding paved and developed areas. These natural areas will be clearly delineated and all measures taken to ensure they are not impacted by

disturbances, sedimentation or contamination during construction. Where practical, construction and operation activities will be scheduled to avoid environmental impacts.

Drainage and catchment system design and engineering will mitigate erosion and impact on the natural hydrology. BMPs for on-site water management (e.g. use existing drainage, design drainage channels appropriately, and anticipate and manage groundwater where applicable) will be implemented to ensure there is capacity for handling extreme weather events and projected climate trends. Buffer zones will prevent flushing of runoff catchments into adjacent fresh and saltwater bodies and rivers at peak periods during extreme weather. Exposed areas within and beyond the final footprint of pavements and buildings will be watered and/or covered or stabilized using vegetation and soil stabilization measures that will include, but not limited to, the following:

- *Seeding:* one of the more common methods of stabilizing disturbed ground. Seeding methods include broadcast seeding with a spreader, hydroseeding (seed mixed with mulch and water) and pneumatic seeding (seed mixed with compost). The established vegetation protects the soil from raindrop impact and helps to slow runoff. Typically, seeding is most effective for stabilizing slopes that are 3:1 or flatter (Iowa 2013). Steeper slopes usually require some other form of stabilization (e.g. rolled erosion controlled products)
- *Mulching*: application of organic material (e.g. wood chips) over soil that is bare or immediately over soil that has been seeded. Protects the soil by absorbing the impact of raindrops.
- *Turf Reinforcement Matting*: a three-dimensional product constructed of synthetic, non-degradable materials that provides immediate erosion protection that can permanently reinforce vegetation on steep slopes.
- *Riprap Armoring:* typically used for channel lining in areas where vegetation is not easily established.
- *Rolled Erosion Controlled Products (RECP)*: prefabricated blankets or netting formed from both natural (e.g. jute) and synthetic materials (e.g. glass-fiber or PVC). Typically used as a temporary surface stabilizing measure on steep slopes to aid in the establishment of vegetation.

The selection of methods used to control erosion by diverting runoff, limiting velocity and protecting concentrated flow areas depend on the size of the disturbed area, the type of runoff (concentrated or sheet flow) and the runoff volume. The site assessment for the Project will include a comprehensive study of surface water, groundwater and marine hydrology necessary to establish suitable runoff control methods. In general, the diversion of runoff (sheet or concentrated flow) away from a disturbed area can be achieved using structural measures such as dikes, berms, drainage swales and diversion ditching. Check dams (a vertical barrier constructed across ditch) can also be implemented to reduce the velocity of concentrated runoff and reduce gully erosion until runoff conveyance channels can be stabilized. The application of suitably engineered Low Impact Development (LID) methodologies (e.g. bioretention cells, pervious pavements and grassed swales) will also serve to capture/reduce storm water runoff and facilitate removal of pollutants from runoff.

Where road construction unavoidably nears sensitive or vulnerable areas, GNP Inc. will employ BMPS to manage road runoff and drainage to minimize erosion and sedimentation. Where applicable in wet meadow areas, permeable fill under the road surface along with culvert arrays will maintain subsurface water flow. In areas of rapid drainage such as exposed bedrock adjacent to roads and paved areas, GNP Inc. will implement structural erosion control measures such as constructed lead-out ditches and rock aprons to disperse water-flow energy and reduce erosion.

The Department of Municipal Affairs and Environment's Policy for Development in Shore Water Zones prohibits infilling, drainage, dredging, channelization, or removal of surface or underwater vegetation on or along shore water zones which could aggravate flooding problems, have unmitigable adverse water quality impacts,

have significant impacts on water circulation patterns within the shore water zones or on sediment deposition or accretion or removal rates along the shore water zones. GNP Inc. is proposing the use of a jack-pile dock system that will reduce the sea-bottom footprint, allow ramp access over and above the intertidal zone, and relatively unobstructed movement of water in the basin.

Temporary stockpile control/protection methods, if deemed necessary due to construction scheduling, will be implemented. Stockpiles will be located well away from watercourses and environmentally sensitive areas. Stockpiles scheduled to remain in-place for greater periods of time will be covered as a preventative measure.

The selection of methods taken to remove sediment will depend on site-specific criteria as described in the EPP. Sediment control measures may include, but are not limited, to the following:

- *Check dams:* while their primary purpose is to reduce the velocity of runoff in conveyance channels, check dams constructed from coarse granular material may provide some sediment removal benefits (Iowa 2013).
- *Filter berms:* triangular shaped structures with a filter material (e.g. gravel) that can be used to slow flow velocity and, due to its natural permeability, trap sediment. When installed on a slope, filter berms are typically installed perpendicular to sheet flow.
- *Silt fencing:* temporary sediment barriers of geotextile fabric anchored into the ground and supported by posts on the downstream side of the fabric. Silt fencing does not filter runoff, rather it intercepts and impounds sediment onsite (Coquitlam 2013). This method should only be used when there are small runoff flow rates and volumes (Transport Alberta 2011).
- *Straw bale filter barriers:* in some circumstances, straw bales can control sheet flow and act as temporary sediment barriers. Current BMPs indicate straw bales should not be utilized as the primary sediment control barrier where channelized flows are to be expected (Coquitlam 2013). Straw bales are most effective when used in conjunction with other ESC practices.
- *Sediment traps:* overland flow runoff from disturbed areas can be directed to a small control pond/trap formed either by excavation or by placing an earthen embankment across a low area or drainage swale (Moncton 2009).
- *Sediment basin/ponds:* structures used to detain sediment laden runoff long enough to allow sediment to settle out. Larger than sediment traps and typically used for drainage areas larger than 2 hectares.

In-stream sedimentation control, if deemed necessary, can be achieved using heavy-duty filter fabric weighted at the bottom and attached to a flotation unit at the top. These floating silt curtains are not typically left in place during winter months (Iowa 2006).

Use of explosives in or near water will be avoided wherever possible. Where explosives are required in near rivers, bodies of fresh water, salt water or intertidal zones, impacts to fish and fish habitat (i.e. through sedimentation) will be minimized by adhering to the "Guidelines for the Use of Explosives in or Near Canadian Fisheries Waters" (Wright and Hopky 1998) and mitigation measured provided therein, where applicable.

Exposure of streams and wetlands to hazardous materials and substances will be prevented by appropriate containment and handling practices. The Project site will be equipped with mobile spill response kits at all active construction locations. All waste materials, including recyclable materials, food and beverage waste, camp waste, hazardous waste and scrap construction waste, will be collected in appropriate containers for transport and disposal to off-site disposal/recycling facilities subject to provincial and federal regulatory requirements and guidelines.

During construction, sanitary wastewater will be stored in portable units (either enclosed portable toilets or containerized sanitary wastewater tanks adjoining temporary construction site buildings). These will be cleaned and the wastewater will be transported to an off-site sanitary fill disposal site.

In keeping with surface water management BMPs, clean water will be kept clean as contaminants will not be allowed to overtop or run into natural surface water and will, where necessary, be siphoned into containerized transport to a suitable disposal site.

BMPs will also be implemented to minimizing the potential impact on wetlands and streams of fugitive dust from roadways and laydown areas, use of pressure treated wood, and use of concrete on the Project site.

Preventative measures for on-site roadways and laydown areas may include, but are not limited to, a reduction of vehicle speeds on unpaved areas and the application of dust suppressants. Suppression methods including paving of select areas will be considered, but paving may prove unsuitable for areas used by heavy vehicles. Wherever paving is not practical, high traffic areas may be covered with large aggregates or lower silt material (e.g. gravel) to reduce track-out (MOECC 2017). Implementation of BMPs (TAC 103) will help ensure materials (e.g. calcium chloride) are effectively managed to prevent and reduce any negative impact to water quality.

Guidelines for the use of treated wood in and around aquatic environments and the disposal of treated wood will be implemented. The specification "Treated Wood in Aquatic Environments" (WPC 2012) and the companion document "Specifiers Guide – Best Management Practices for the Use of Preserved Wood in Aquatic and Sensitive Environments" (WWPI 2012) will be followed, where applicable, to guide the selection, installation and management of wood preservation systems in aquatic and wetland environments.

Best practice for using concrete near water, where necessary, may include, but is not limited to, preventing any water that contacts uncured or partly cured concrete (e.g. during rinsing of equipment) from directly or indirectly entering any watercourse or storm water system. The "Environmental Code of Practice for Concrete Batch Plant and Rock Washing Operations" (Department of Environment and Lands 1992) will be adhered to when necessary.

Operations and Maintenance

Operation and maintenance activities can also result in the inputs of sediment and chemicals into local streams and wetlands that can change flow patterns and the chemical characteristics of the water systems.

Runoff from roofs and paved areas will be captured in storm-capacity catchments and grassed ditches to allow natural filtration before entering ground water or natural water systems.

Road deicing chemicals are an environmental concern. Salt run-off from roads and sidewalks then enters the natural environment through bounce and scatter from spreaders, wind, splash and spray from vehicles, snow melt, and runoff. The greatest environmental impact of salt is its effect on fresh water. Salt in solution contaminates surface water and infiltrates groundwater via storm drains. Chloride from dissolved salt is potentially toxic to fish, macro invertebrates, insects and amphibians and remain in solution with no natural means of removal except dilution with more fresh water.

The best practice for minimizing salt impact is applying the least amount of salt necessary. Custodial managers should understand what ice control products to use, when to use them and how much is necessary. Other strategies include matching de-icer application rate to temperature conditions, reducing accumulation of snow and ice on roadways through the use of snow fences or other measures, predicting when to apply de-icers, improving the application and distribution methods, and allowing de-icers sufficient time to work before plowing and reapplication.

To minimize environmental impacts, the EPP will emphasize the importance of using smaller quantities of de-icers, use of snow fences and barriers, and increased efficiency of mechanical ice removal.

Buildings on the Port development will be engineered and constructed to minimize maintenance. Anticipated environmental effects include runoff from roofs and paved areas which will be captured in storm-capacity catchments and grassed ditches to allow natural filtration before entering ground water or natural water systems

Conformance to the requirements of the *Environmental Control Water and Sewage Regulations (2003)* will be achieved by establishing a monitoring program to monitor water quality that ensures wastewater, effluent or runoff leaving the site conforms to the requirements specified. If necessary, runoff from impoundment areas will be directed to an outflow where drainage can be monitored, sampled and tested for conformance.

The Project will have its own sewer infrastructure completely outside and separate from both surface and groundwater sources currently in use by the Towns of St. Anthony and Goose Cove. The septic system for the Port will be confined inside the boundaries of the Port site. GNP Inc. has investigated and will integrate advanced wastewater treatment technologies into the Development Plan for the Port to facilitate conformance with *Environmental Control Water and Sewage Regulations (2003)* and the Department of Municipal Affairs and Environment's Policy for Development in Shore Water Zones (PDSWZ) (prohibiting the placement, deposit or discharge into shore water zones any raw sewage, refuse, municipal and industrial wastes, fuel or fuel containers, pesticides, herbicides or other chemicals or their containers, or any other material which impairs or has the potential to impair the water quality of the shore water zones). The Project EPP will identify opportunities and provide detailed plans for recycling, wastewater treatment and disposal, composting and solid waste disposal. During the operational stage of the project, drains and drainage systems will require cleaning of brush and debris. Where flushing is required, debris will be caught and disposed of appropriately.

Because of the potential for activities and facilities associated with the Ports operational requirement to also result in disturbance to rare plant species that may be present within the Project area, the results of botanical surveys conducted during the construction phase will be carried forward into the operation and maintenance phase of the development. Rare plant protection measures, including botanical surveys of any new development areas, will be incorporated into the operational HSEMS and specific protection measures will be included in the SOPs developed in association with Port operations.

Environmental Effects Assessment Summary

A summary of potential environmental effects and identified mitigation measures for the Project on streams, wetlands and vegetation is provided in Table 6-8.

Table 6-8 Environmental Effects Summary: Vegetation, Streams and Wetlands

Environmental Component	Project Phase/Potential Interaction			Key Considerations and Environmental Mitigation
	Construction	Operations / Maintenance	Issues / Interactions	
Streams and Wetlands	.	.	• Erosion and sedimentation • Runoff from road de-icing • Accidental spills of deleterious substances (e.g. fuel, oil or drilling mud, wastewater / bilge)	• Minimize activity in and around streams and wetlands • Preserve natural riparian buffer zones; • Limit the area of exposed soils and the amount of time that soil is exposed; • Development of a Project specific erosion and sediment control plan; • Development of an on-site water management program; • Implementation of approved storm water and waste water control designs; • Implementation of Regulatory guidelines for use of treated wood and concrete, and for blasting in or near waters.
Vegetation	.	.	• Removal and disturbance • Accidental spills of deleterious substances	• Clearing and excavation will occur only where necessary and kept within the footprint of finished structures, where practicable; • Conduct rare plant assessment in advance of clearing activities; • Incorporate appropriate rare plant protection measures in Project EPP and HSEMS as required; • Develop emergency response procedures and capability to limit the potential for and effect of accidental events.

With the implementation of the environmental mitigation measures outlined here and detailed in the EPP, the proposed Project is not likely to result in significant adverse environmental effects on vegetation, streams and wetlands.

6.3.3 Freshwater and Marine Fish

Fish species in both freshwater and marine ecosystems may be directly affected by developments that disrupt or destroy habitat or by deposition of deleterious substances such as sediments, hydrocarbon or other chemicals that impact the quality of the habitat in which they live. They may also be indirectly affected by developments that create barriers to their movement or that affect the presence of other species that are food sources.

Construction

Construction of roadways, buildings, docks, laydown areas and other infrastructure have the potential to affect both freshwater and marine fish and fish habitat. This will be minimized by limiting work in and around waterbodies where feasible and using environmental protection measures, as specified in the Project EPP to minimize effects where construction in water is required.

Operation and Maintenance

Operations within the Crémaillère Harbour Development will be controlled to ensure that any discharges to freshwater or marine habitat is in compliance with provincial and federal requirements including the *Environmental Control Water and Sewage Regulations* and the *Fisheries Act*, as well as any conditions of permits and approvals received. Accidental or uncontrolled releases will be minimized by secondary containment at all fuel and chemical bulk storage facilities and implementation of SOPs contained in the operational HSEMS for transportation and handling of controlled substances.

Environmental Effects Assessment Summary

Table 6-9 Environmental effects summary for the freshwater and marine environment

Environmental Component	Project Phase/Potential Interaction			Key Considerations and Environmental Mitigation
	Construction	Operations and Maintenance	Issue/ Interactions	
Surface Water	·	·	• Drainage disruption and Sedimentation • Accidental Spills	• No water use is proposed for the construction of the road, water quantity should not be affected; • Work areas will be isolated from running water as much as possible; • When isolation is not possible, silt fencing or another barrier type will be used; • All necessary permits will be acquired and applied throughout the duration of construction and for routine/non-routine maintenance; • A response plan will be developed to address potential accidental releases;
Fish Habitat	·	·	• Stream Alteration • Stream crossings • Drainage disruption and Sedimentation • Accidental Spills of deleterious substances • Additional access to fishing areas	• Whenever possible, machinery will be operated above high water mark; • Machinery fording of watercourse will be avoided as much as possible. If not possible the crossing will be limit to one time-events (to and back); • Culverts will be installed following provincial guidelines; • If stream alterations are necessary, provincial guidelines will be followed; • Silt fencing will be in place to reduce effects of potential increased sedimentation; • Water samples will be collected from key areas

Environmental Component	Project Phase/Potential Interaction			Key Considerations and Environmental Mitigation
	Construction	Operations and Maintenance	Issue/ Interactions	
				throughout the construction period; • Work sites will be isolated from running water, and appropriate barriers will be installed to prevent accidental released of deleterious substances; • A response plan will be developed to address potential accidental releases of deleterious substances; • All necessary permits will be acquired and applied throughout the duration of construction and for routine/non-routine maintenance; • Prohibition of on-site fishing activity by Project construction and operation personnel
Fish	·	·	• Damage to fish and fish habitat destruction • Accidental Spills of deleterious substances	• Compliance with the *Fisheries Act* and in particular completion of the Application for Review process to avoid causing serious harm to fish; • Isolation of worksite by the use of air curtains, cofferdams or aquadams. Removal of fish trapped within the isolated area and release without harm; • Minimize subdivide blasting charge weights. The smaller charges should be detonated at least 25 m apart; • Back-fill blast holes; • Use of blast mats to minimize debris;

Environmental Component	Project Phase/Potential Interaction			Key Considerations and Environmental Mitigation
	Construction	Operations and Maintenance	Issue/ Interactions	
				• Avoidance of ammonium nitrate based explosive due to potential of toxic by-products; • Remove debris and other products from blast areas.
Shoreline	·	·	• Erosion • Habitat destruction • Vegetation disturbance	• Avoid unnecessary clearing of riparian/coastal vegetation; • Minimization of sediment removal below the high water mark; • Conduct rare plant assessment in advance of shoreline disturbance activities; • Incorporate appropriate rare plant protection measures in Project EPP and HSEMS as required; • Stabilization of shoreline/banks to prevent erosion/sedimentation. IF feasible by the use of re-vegetation using native plant species; • Restoration of bank to stable gradient, taking fish migration into account; • Any use of foreign rock material will be clean; • If riparian area is identified as part of critical habitat for species at risk, appropriate guidelines will be followed.

With the implementation of the environmental mitigation measures outlined here and detailed in the EPP, the proposed Project is not likely to result in significant adverse environmental effects on freshwater or marine fish.

6.3.4 Marine Mammals

The marine environment, including marine mammals and their habitat, has the potential to interact with the Project; in particular, the associated increase in vessel traffic is anticipated to have an effect on marine mammals

and their habitat. Vessel traffic and associated noise can be a source of chronic stress for marine mammal populations (Rolland et al 2012). Marine mammals are known to adjust their movement behaviour around ships (Richardson et al 1995), and to modify their vocal patterns (Clark et al 2009). Certain whale species, including fin whales and humpback whales, are at risk of injury or mortality from direct collisions with vessels (Laist et al 2001; Vanderlaan and Taggart 2007; Williams and O'Hara 2010). Although vessel strikes can have serious consequences, these events are rare as avoidance behaviour tends to reduce the risk of collision. Reducing vessel speed has been shown to reduce the number of marine mammal deaths and severe injuries due to collisions (Vanderlaan and Taggart 2007; Vanderlaan et al 2008; van der Hoop et al 2012); lethal strikes are infrequent at vessel speeds less than 25.9 km/h (14 knots) and very rare at less than 18.5 km/h (10 knots) (Laist et al 2001).

Accidental releases of deleterious substances into the marine environment could also have effects on marine mammals and their habitats. Facilities to be constructed at Crémaillère Harbour as part of the Project may include a liquid mud plant and a fuel tank farm. Storage / treatment of fluids at these facilities will be conducted in accordance with all Federal and Provincial regulations to ensure that risk of unplanned or accidental release into the marine environment is minimized.

Mitigation measures will be taken throughout the lifetime of the Project including speed restrictions and limits on marine traffic volumes operating in the harbour. These and additional mitigation measures to reduce effects on marine mammals and their habitat will be detailed in the Project EPP and HSEMS. A harbour pilot and patrol boat will be stationed at the port site during all underwater diving and construction operations to alert and direct marine traffic, and a qualified fisheries observer will be available to observe and implement marine environment impact mitigation measures.

Construction

Relative to the small amount of marine traffic in Crémaillère Harbour currently and historically, a significant increase in marine traffic in the harbour basin and approaches will occur during the construction period. The primary potential interactions with marine mammals as a result of the development of the Project are associated with the increase in underwater noise produced by ships involved with construction. Marine mammals may also be affected by accidental releases of small amounts of deleterious substances such as hydrocarbons into the marine environment, and temporary disturbances associated with other construction activities such as drilling, blasting, pile driving, and excavation operations may also occur.

The EPP will provide best practice guidelines and site measures to mitigate noise effects including (but not limited to) sound barriers, reduction of noise from equipment through use of suppression devices, and work scheduling. These will be followed in all aspects of the Project by all persons and companies engaged in port operations.

All construction activities will be performed in a manner that will ensure no deleterious substances enter, either directly or indirectly, the surrounding marine environment. Deleterious substances can include sediments and excess runoff, fuels and oils and any other substance that can have a negative impact on the marine environment. Standard environmental protection procedures as outlined in the EPP will be in place and adhered to for the duration of this phase of the project.

Operation and Maintenance

During planned operations, the primary potential interactions with marine mammals will be due to increased vessel traffic in the port. Projected volumes of marine traffic, as well as Project-specific and cumulative environmental effects, will be detailed in the EPP. The GNP will operate according to the Practices and Procedures for Public Ports, including regulations pertaining to refueling, ballast water discharge, painting, and other operations with potential environmental impacts. The EPP will also take into account current best practices regarding all aspects of navigation and movement and operation of vessels within the Port's authority. As port manager and authority, GNP Inc. will abide by Transport Canada Marine Acts and Regulations and will include

contingency planning in the EPP to enforce and ensure the noise level and water activities are within the bounds outlined in the legislation.

Environmental Effects Summary and Evaluation

A summary of the potential environmental interactions, mitigations and potential residual environmental effects of the proposed GNP on Maine Mammals and their habitat is presented below in Table 6-9.

Table 6-10 Environmental Effects Summary: Marine Mammals

Environmental Component	Project Phase/Potential Interaction			Key Considerations and Environmental Mitigation
	Construction	Operations / Maintenance	Issues / Interactions	
Marine Mammal Habitat Quality	.	.	• Increased noise due to vessel traffic, construction activities • Accidental spills of deleterious substances (e.g. fuel, oil or drilling mud, wastewater / bilge)	• GNP will adhere to TC marine acts and regulations regarding noise levels and in-water activities; • EPP will provide best practice guidelines and site measures to mitigate noise effects including (but not limited to) sound barriers, reduction of noise from equipment through use of suppression devices, and work scheduling; • All necessary permits will be acquired and adhered to throughout the duration of construction and maintenance; • Storage and treatment of fluids at LMP and Ballast Wastewater / Bilge Disposal facilities will be in accordance with Federal and Provincial regulations protecting marine water quality; • GNP port will be equipped with oil-disposal equipment for environmentally neutral disposal of oil contaminated ballast water, bilge and any other hazardous liquids/solids; • All fuels and oils will be stored in properly designed, regulated and certified storage tanks or containers;

Environmental Component	Project Phase/Potential Interaction			Key Considerations and Environmental Mitigation
	Construction	Operations / Maintenance	Issues / Interactions	
				• Containment, transport and handling of fuels and oils will follow all applicable environmental, and health and safety regulations and best practices; • Containment structures will be constructed or placed around storage tanks to ensure; containment of spills or leakage • A response plan will be developed in the EPP to address potential accidental releases.
Marine Mammal Presence and Health	.	.	• Increased noise due to vessel traffic and construction activities (including drilling, blasting) • Potential for collision with vessels • Accidental spills of deleterious substances	• Project vessels will maintain constant course and speed to the extent practical, and will detour around marine mammals if it is safe to do so; • EPP will provide best practice guidelines and site measures to mitigate noise effects including (but not limited to) sound barriers, reduction of noise from equipment through use of suppression devices, and work scheduling; • In the event of a mammal-vessel strike, GNP will report the incident to DFO (Whale Release and Strandings Newfoundland and Labrador at 1-888-895-3003); • Use of explosives in or near water will be avoided wherever possible; • *Guidelines for the Use of Explosives in or Near Canadian Fisheries Waters* (Wright and Hopky 1998) will be adhered to where

Environmental Component	Project Phase/Potential Interaction			Key Considerations and Environmental Mitigation
	Construction	Operations / Maintenance	Issues / Interactions	
				applicable; • GNP will adhere to TC marine acts and regulations regarding noise levels and in-water activities; • Storage and treatment of fluids at LMP and Ballast Wastewater / Bilge Disposal facilities will be conducted in accordance with all Federal and Provincial regulations protecting marine water quality; • GNP port will be equipped with oil-disposal equipment for environmentally neutral disposal of oil contaminated ballast; • All fuels and oils will be stored in properly designed, regulated and certified storage tanks or containers; • Containment, transport and handling of fuels and oils will follow all applicable environmental, and health and safety regulations and best practices; • Containment structures will be constructed or placed around storage tanks to ensure containment of spills or leakage; • A response plan will be developed in the EPP to address potential accidental releases of deleterious substances; • All necessary permits will be acquired and adhered to throughout the duration of construction and for routine/non-routine

Environmental Component	Project Phase/Potential Interaction			Key Considerations and Environmental Mitigation
	Construction	Operations / Maintenance	Issues / Interactions	
				maintenance.

With the implementation of the environmental mitigation measures outlined here and detailed in the EPP, the proposed Project is not likely to result in significant adverse environmental effects on marine mammals or their habitat.

6.3.5 Historic Resources

Seven registered archaeological sites have been identified in Crémaillère Harbour, Figure 6-5, relating to French migratory fishery activity in the 16th, 17th, 18th, and 19th centuries, however, only two of these are located in areas where Project infrastructure is proposed. Discussions with the PAO has identified that protection of these sites during Project construction and operation can be suitably incorporated into Project design and operational planning by providing buffer zones to separate proposed project infrastructure from the archaeological sites, and incorporating historic resource protection provisions in the Project EPP and HSMS documents.

As well, as is shown by L'Anse aux Meadows and like sites in the Province, archaeological sites can become engines for local and regional economic and social development. In order that the potential value of the historic resources at Crémaillère Harbour are realized GNP Inc., in consultation with a qualified Archaeologist, will develop a Historic Resources Preservation and Management Plan based on the Historic Resources Assessment conducted as part of this environmental preview report that will direct historic site development and historic resource management.

It is further the intent of GNP Inc. to maximize the economic and social benefits of the historic resources of the archaeological sites at Crémaillère Harbour both in terms of artifacts and the interpretive information. Active archaeological sites will be supported and promoted by GNP Inc. to realize economic and social benefits of these historic resources.

Public access to the archaeological sites identified, by way of walking trails, naturally vegetated park lands and interpretive sites, will be integrated into the HRPMP to accommodate traditional usage and encourage visitors. Based on the findings of the historic resource assessment, and in consultation with a qualified interpretive exhibit planner, a public interpretive display will be installed at the Port Authority office and interpretive panels erected at each of the sites included within the Project area. Plans and detailed design of the exhibit and interpretive panels will be integrated into the HRPMP prior to commencement of Phase I construction.

Construction

Planning and engineering of the GNP port project will include incorporation of the recommendations of the Gerald Penney Associates, 2018 Crémaillére Harbour, Great Northern Port Historic Resource Impact Assessment, Stage 1 report. In particular, planning and engineering for the Project will include the following in relation to the archaeological sites identified in Crèmaillére Harbour, Figure 6.5:

- EiAv-03

No clearing, fencing, or other development shall occur within 70 m of the western most positive test pit from Gerald Penney Associates, 2018, in this area. This buffer must also ensure that the North Point Hill daymark identified in Gerald Penny Associates, 2018 is located east of this 70 m buffer.

- EiAv-13

No clearing, fencing, or other development shall occur within 50 m of the cleared area of this cove.

- EiAv-08

No clearing, fencing, or other development shall occur within 50 m of the area of the Thomas Penny land grant.

- EiAv-12

No clearing, fencing, or other development shall occur within 50 m of the shoreline in this area.

- EiAv-11

If the John Murrin land grant is to be included in the development proposal at some future date, it will require field investigation, based on proximate finds and possibility of structural remains.

- EiAv-07

No clearing, fencing, or other development shall occur within 50 m of the area encompassed by Observation Point and Penney's beach including the existing area of clearing surrounding the beach.

- EiAv-10

No clearing, fencing, or other development shall occur within 50 m of the shoreline in this area.

Plans for any geotechnical work to be conducted upon, or in vicinity of, known archaeological sites will be submitted to the PAO for review prior to such works being undertaken and archaeological monitoring will be conducted during implementation of any such works.

Archaeological surveys will be undertaken, to the satisfaction of the PAO, prior to any work that could potentially impact underwater historic resources.

The project specific EPP will include provision for protection of any archaeological artifacts discovered during Project construction, in consultation with the PAO.

Operation and Maintenance

All buffers surrounding known archaeological sites identified and implemented during construction will be maintained during operation and maintenance of the proposed Project. Any proposed changes in project infrastructure or operations in the vicinity of known archaeological sites will be submitted to the PAO for review prior to being undertaken.

The project HSEMS will include provision for protection of any archaeological artifacts discovered during Project operation and maintenance, in consultation with the PAO.

Environmental Effects Summary and Evaluation

A summary of the potential environmental interactions, mitigations and potential residual environmental effects of the proposed GNP on historic resources is presented below in Table 6-10.

Table 6-11 Environmental Effects Summary: Historic Resources

Environmental Component	Project Phase/Potential Interaction			Key Considerations and Environmental Mitigation
	Construction	Operations / Maintenance	Issues / Interactions	
Archaeological Sites	.	.	• Disturbance of known archaeological sites	• No clearing, fencing or other development shall occur within buffer areas around known archaeological sites identified in consultation with the PAO. • Plans for any geotechnical work to be conducted upon, or in vicinity of, known archaeological sites will be submitted to the PAO for review prior to such works being undertaken and archaeological monitoring will be conducted during implementation of any such works. • Archaeological surveys will be undertaken, to the satisfaction of the PAO, prior to any work that could potentially impact underwater historic resources. • Any proposed changes in project infrastructure or operations in the vicinity of known archaeological sites will be submitted to the PAO for review prior to being undertaken.
Archaeological Artifacts	.	.	• Disturbance of archaeological artifacts	• Provision for protection of any archaeological artifacts discovered during Project construction, operation and maintenance will be included in the Project EPP and HSEMS provision.

With the implementation of the environmental mitigation measures outlined here and detailed in the EPP, the proposed Project is not likely to result in significant adverse environmental effects on historic resources at Crémaillère Harbour.

6.3.6 Human Environment

The Project has the potential to intersect with private land, existing transportation routes, a public water supply, mineral exploration interests and scenic viewscapes. These potential issues have been addressed by the proponent through the following mitigation measures:

- The Project will be located on Crown land and not require any private lands that exist near the Project site; Access to private properties near the Project area will not be altered by the Project;
- The Project will be accessed from an existing road off Goose Cove Road;
- The Project will have its own water supply and septic systems;
- The site plan has been redesigned to exclude any of the Goose Cove East Protected Water Supply Area;
- The Project has been approved by the Town of St. Anthony as a Discretionary Use within the Rural Zone.

Construction

Most of the identified issues related to development of the Project have been addressed in the mitigations listed above. An outstanding issue will be potential visibility of the Project. It is anticipated that due to the topography of the land surrounding the Project and distance to various recreation and tourism locations and amenities, that the Project may (depending on the height of the infrastructure) be visible from St. Anthony and some of the identified land-based tourism and recreational activities. This assumption is based on the results of analysis that shows that the top of the hills surrounding Crémaillère Harbour will be visible from identified destinations in St. Anthony and St. Anthony Bight, and a trailhead near Goose Cove East. Project construction activities will likely be visible from the ocean, from tourism-based vessels, depending on the transit route to and from St. Anthony, which has an existing industrial port. St. Anthony hosts a small number of cruise ships annually and passengers on such vessels would likely be accustomed to seeing industrial activities in any ports-of-call in the Province, as such harbours are not exclusively used for tourism. In addition, passengers of the two boat tour operators located in the area (i.e., St. Anthony and St. Anthony Bight) may be able to see the Project when transiting the coastline, especially when on route to the Hare Bay Islands Seabird Ecological Reserve. Throughout Newfoundland and Labrador, and elsewhere, ports are used for a variety of activities including tourism and industrial activities. Thus, the visibility of industrial activities will be a routine part of participating in marine boat tours. All construction activities will be performed in keeping with Federal, Provincial, Municipal regulations including those related to use of marine waters.

The Project area may overlap with mineral exploration licences in the St. Anthony area but the Project will require access to surface rights only. The Proponent is in the process of obtaining access to Crown Lands for the purpose of developing the Project and will work with Department of Natural Resources to obtain all appropriate permits and to resolve conflicts prior to commencement of construction.

Detailed bathymetric surveys will precede site planning and determine actual location and time frames for excavation and construction. Marine coastal surveys will be conducted to further assess the marine fish and fish habitat of the Project Area. Local fisheries conducted within Crémaillère Harbour and in areas adjacent to the harbour will also be documented during such coastal surveys.

Operation and Maintenance

During operations and maintenance activities, Project effects will be limited to the visibility of the Project which will not likely be of concern as the area has existing industrial port activities. In addition, tourism and recreation

boat tour operators and passengers will likely be accustomed to observing industrial port activities as part of their activities.

Although no commercial fishing activity has been identified within Crémaillère Harbour, there is the potential for such operations in adjacent areas. GNP Inc. is committed ongoing consultation with the communities in the area and to working to avoid any disruption of local fishing activity.

Environmental Effects Summary and Evaluation

A summary of the potential environmental interactions, mitigations and potential residual environmental effects of the proposed access road on surrounding freshwater aquatic environment are presented below in Table 6-11.

Table 6-12 Environmental Effects Summary: Human Environment

Environmental Component	Project Phase/Potential Interaction			Key Considerations and Environmental Mitigation
	Construction	Operations and Maintenance	Issue/ Interactions	
Tourism and Recreation	.	.	• Visibility	• The Project will be visible from marine vessels entering and departing from St. Anthony Harbour and St. Anthony Bight. This includes cruise ships and commercial boat tours especially those that travel south to Hare Bay Islands Ecological Reserve. Such vessels normally use ports where industrial facilities are located; • To minimize visual disturbances, all necessary permits will be acquired and adhered too throughout the duration of construction and for routine/non-routine maintenance.
Mineral Resources	.		• The Project may overlap with mineral exploration licences	• Access to areas of mineral licences will be resolved with DNR prior to Project commencement; • To minimize effects on other resources users, all necessary permits will be acquired and adhered too throughout the duration of construction and for routine/non-routine maintenance.

The proposed Project is not likely to result in significant adverse environmental effects on the Human Environment.

6.4 Environmental Protection and Response Planning

Environmental protection and response planning are an important and integral part of GNP Inc.'s Crémaillère Harbour Marine Port Development.

An EPP is an important tool for consolidating environmental information and procedures in a useable format for their timely and effective implementation in the field. An EPP provides clear and concise instructions to all Project personnel and contractors regarding mitigation procedures and techniques to avoid, reduce or respond to environmental issues associated with construction and/or operations activities.

GNP Inc. is committed to developing and implementing an EPP for construction of the Project which incorporates the commitments and controls identified in this EPR. An annotated outline for the proposed EPP is provided in Appendix E. The Project's EPP will continue to be further developed and refined as the EA and permitting processes move forward, so as to fully incorporate the mitigation measures identified through the EA review as well as the eventual terms and conditions of any eventual EA approval and subsequent environmental permits that are required and obtained for the Project.

6.5 Effects of the Environment on the Project

The proposed Project has been planned and designed, and will be implemented, with due consideration of the local environmental conditions in and around the Project site. Once approval in principle is obtained and the framework for environmental and further geotechnical assessment is established, studies and engineering surveys may begin. Detailed topographic terrestrial and bathymetric surveys will precede site planning and determine actual location and time frames for excavation and construction. Marine coastal surveys will be conducted to further assess the marine fish and fish habitat of the Project Area. Local fisheries conducted within Crémaillère Harbour and in areas adjacent to the harbour will also be documented during such coastal surveys. GNP Inc. anticipates a two year time frame for these activities with a possible start up for environmental and geotechnical site work in 2018.

6.6 Environmental Monitoring and Follow-up

Any potential environmental issues which may be associated with the Project can be addressed and mitigated through the use of good construction and operational practices and procedures, as described throughout this EPR. These will be further addressed through the specific environmental permitting requirements and compliance standards and guidelines which will apply to the proposed Project.

The Project will be subject to regular inspections and maintenance as required. The Proponent is committed to obtaining all required authorizations for the proposed Project, and to complying will all applicable regulations (including any associated compliance monitoring and reporting requirements). No other environmental monitoring or follow-up is considered necessary in relation to the proposed Project.

7.0 PROJECT-RELATED DOCUMENTS

In addition to this EPR, GNP Inc.'s project related documents include the EA Registration document Registered with the Department of Municipal Affairs and Environment on November 14, 2017.

8.0 APPROVAL OF THE UNDERTAKING

Following release under the provincial EA Process, GNP Inc. has committed to all attributes contained within the EA registration, and EPR, and will implement the following comprehensive Plans, and assessments during Project planning and implementation:

- Environmental Protection Plan
- Avifauna Management Plan
- Site Monitoring Plan for Migratory Birds
- Historic Resource Preservation and Management Plan
- Marine/Aquatic study to include description of fish, invertebrates and marine mammals that may be present year round
- Habitat Study
- Marine Habitat Protection Pan
- Port Facility Security Plan
- Fire Protection Plan
- Emergency Response/Preparedness Plan
- Occupational Health and Safety Plan
- WHMISS Plan
- Waste Management Plan
- Develop Women in the Workplace Plan in conjunction with:
  - Dept of Advanced Education, Skills and Labour
  - Women's Policy Office
  - Office to Advance Women Apprentice Plan
  - Women in Resource Development

In addition to approval under the provincial EA process, the Project will require a number of environmental permits and other approvals from various provincial, federal and/or municipal authorities in relation to its proposed construction and/or operations and maintenance activities.

A listing of some of the main permits, licences, approvals and other authorizations that may be required for the Project is provided in Appendix D.

9.0 DECOMMISSIONING AND REHABILITATION

Crémaillère Harbour Marine Port operations are projected to begin in 2025, at which point dockage, refuelling, and other port services will be in place. Operations are projected to last into the foreseeable future. As a deep-water, ice-free port, the Crémaillère Harbour Marine Port will satisfy long-term logistical needs for marine shipping requirements in Canada's northern and arctic waters.

In the event of the potential decommissioning of Crémaillère Harbour operations, the land and marine based infrastructure will be removed and areas rehabilitated with application of environmental protection measures as identified in the project construction EPP. Land based infrastructure will be removed and any waste materials generated removed for appropriate disposal in conformance with provincial environmental standards for construction and demolition waste disposal, as well as applicable federal and provincial hazardous waste handling and disposal regulations and standards. Disturbed areas will be sloped to stable grades and available organic materials will be spread over these surfaces to encourage natural revegetation.

10.0 EPR SUMMARY AND CONCLUSION

GNP Inc. is proposing to develop a marine port at Crémaillère Harbour, near St. Anthony on the Great Northern Peninsula. The proposed Project is subject to review and required approval under the Newfoundland and Labrador EA process.

This EPR has been prepared and submitted by the Proponent in relation to the proposed Project, the purpose of which has been to provide further information on the proposed port development, the existing environmental setting and potential environmental interactions, and planned environmental protection (mitigation) measures to avoid or reduce any adverse environmental effects. This information will be subject to governmental and public review and will help inform an eventual EA decision by the Minister.

Pending release from the EA process, and the receipt of formal corporate approval and all other required permits and authorizations, Project construction activity would commence with completion of engineering, and environmental studies to allow for detailed site planning prior to beginning excavation and construction. GNP Inc. anticipates a two year time frame to complete these studies. Actual construction of port facilities are proposed to be undertaken in phases between 2020 and 2030.

The proposed Crémaillère Marine Port will include shore based and marine infrastructure with potential for impact on land based, freshwater and marine environmental components in Crémaillère Harbour. No significant natural environment sensitivities have been identified during the conduct of the environmental preview report and environmental protection measures and mitigations have been identified to minimize the potential for significant adverse environmental effects on wildlife or wildlife habitat, vegetation, streams and wetlands, freshwater and marine fish, and marine mammals resulting from construction, operation and maintenance of the proposed Project. The potential for adverse impacts for the proposed development on the human environment in the area are low and the potential for economic benefits resulting from the Project is high. The proposed Project received positive response during a public information session in the local area and subsequently received letters of support from twenty-six communities located on the Great Northern Peninsula. Seven known archaeological sites have been identified in Crémaillère Harbour and two of these are located in areas associated with the Projects planned infrastructure. Mitigative measures, including buffering zones have been identified around these known archaeological sites, in consultation with the PAO, to protect these sites from disturbance as a result of Project development.

Much of the proposed Project infrastructure is subject to further federal and provincial permitting and approval processes and GNP Inc. is committed to working closely with the government agencies involved to ensure that Project construction and operations satisfy high standards of environmental and social responsibility and protection. Conditions of permits and approvals will also be incorporated into Project construction and operation control documents including a Project specific EPP and HSEMS.

11.0 REFERENCES

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APPENDIX A ENVIRONMENTAL PREVIEW REPORT GUIDELINES - TABLE OF CONCORDANCE

APPENDIX A

Environmental Preview Report Guidelines - Table of Concordance

Great Northern Port Inc. – Crémaillère Harbour Marine Port Development Table of Concordance with Environmental Preview Report (EPR) Guidelines	
EPR Guideline Requirement	**Where / How Addressed in EPR**
NAME OF UNDERTAKING	
The undertaking has been assigned the Name "Crémaillére Harbour Marine Port Development."	Section 1.0
PROPONENT:	
Name the proponent and the corporate body, if any, and state the mailing address.	Section 2.0
Name the chief executive officer if a corporate body, and telephone number, fax number and E-mail address	Section 2.0
Name the principal contact person for purposes of environmental assessment and state the official title, telephone number, fax number and E-mail address.	Section 2.0
THE UNDERTAKING:	
State the nature of the project.	Section 3.1
State the purpose/rationale/need for the project. If the proposal is in response to an established need, this should be clearly stated. Identify needs that are immediate as well as potential future needs.	Section 3.2
Describe the requirement for proximity to the Arctic and Northwest Passage and discuss the reliability of consistent commercial shipping routes in this area.	Sections 3.2 and 5.0
Explain the rationale for this project considering similar port developments and dry dock facilities exist in the province (e.g. Bull Arm, Argentia, Cow Head, Marystown, St. John's, Nain) and at northerly ports, such as Greenland.	Sections 3.2 and 5.0
Explain the rationale for this project considering services are available at the nearby port at St. Anthony (St. Anthony has existing ballast treatment, ore storage capacity, and ability to accommodate larger vessels).	Sections 3.2 and 5.0
DESCRIPTION OF THE UNDERTAKING:	
Provide complete information concerning the preferred choice of location, design, construction standards, maintenance standards, etc.	Section 4.0
Geographical Location/Physical Components/Existing Environment:	
Provide an accurate description of the proposed site, access road, facilities and equipment, including GPS location coordinates. Attach an original base map (1:25,000 scale) and/or recent air photos.	Section 4.1
Provide information regarding ownership and/or zoning of the land upon which the project is to be located and any restrictions imposed by that ownership or zoning, including municipal ownership/zoning, Crown, and private land.	Sections 4.1 and 6.2.3
This project involves Crown land application 151500, the majority of which is in the Rural zone according to the Town of St. Anthony Development	Sections 4.1 and 6.2.2

Great Northern Port Inc. – Crémaillère Harbour Marine Port Development Table of Concordance with Environmental Preview Report (EPR) Guidelines	
EPR Guideline Requirement	**Where / How Addressed in EPR**
Regulations, 2017-2027; "Industrial Uses" may be considered at Council's discretion in the Rural zone, subject to Condition 2 (Discretionary Use Classes) of the Rural Use Zone Table. If Council chooses to consider the proposed discretionary use, then in accordance with subsection 32(3) of the Town's Development Regulations, Council must post a written notice, including a synopsis of the proposed development, on the Town's website at least ten (10) days prior to the date scheduled for Council to consider the application. If the Town does not have a website, then the notice will be circulated, at the expense of the applicant, to all persons whose land is in the immediate vicinity. Council must consider any objections or representations received on the matter advertised. If Council has satisfied the public notification requirements outlined under section 32 of the Town's Development Regulations and is satisfied that the application is not contrary to the Town's Municipal Plan, Development Regulations, scheme, and to the public interest, then it may permit the discretionary use application. The EPR should describe compliance with the approval process.	
A portion of the site is located inside the Goose Cove East Public Water Supply area which does not permit industrial uses. The boundary of the application will require modification to avoid overlap with this area. Indicate if the application has been amended with Crown lands.	Section 6.2.4
Describe the requirement for an ice free harbour when access to and from the harbour may be restricted due to sea ice.	Section 5.0
Construction:	
State the time period in which proposed construction will proceed (if staged, list each stage and its approximate duration) and proposed date of first physical construction-related activity.	Sections 4.1.1 and 4.2.11
Develop a Women's Employment Plan (WEP) in consultation with the Women's Policy Office (WPO) that meets the approval of the Deputy Minister of WPO. The WEP should include commitments and accountability measures (including contractors and sub-contractors) that promote the employment and leadership of women through each phase of the project. Acknowledge support for an annual report and an annual meeting with WPO representatives to discuss any issues with designing and implementing the WEP.	Section 4.2.12
The details, materials, methods, schedule, and location of all planned construction activities must be presented, including:	Section 4.2
• A more detailed description of the Ballast Wastewater/Bilge Disposal Facility construction.	Sections 4.2.5
• A more detailed description of the Graving Dock construction which includes: – the excavation process including blasting operations; – the approximate volumes of excavated materials; – how and where excavated materials will be managed and disposed of,	Section 4.2.8

Great Northern Port Inc. – Crémaillère Harbour Marine Port Development Table of Concordance with Environmental Preview Report (EPR) Guidelines	
EPR Guideline Requirement	**Where / How Addressed in EPR**
– monitoring procedures to ensure that the material is suitable for its destination; – pit dewatering requirements during construction and operation, and monitoring, treatment and disposal methods for this water; and – any plans for coverage or enclosure of the graving dock as a method to shield ships from satellite detection	
• A more detailed description of the Bulk Ore Loading/Offloading/Storage area construction.	Section 4.2.7
• Whether quarry materials (e.g. aggregate, fill, rock, stone, gravel, sand, clay, borrow material, etc.) required for the project will be sourced, either from a site permitted under the Quarry Materials Act, 1998, or from an external source as a by-product of development and for which royalties have been paid under the Quarry Materials Act, 1998, or from within the legal boundary of the project site.	Section 4.2.9
• Commitment to adhere to the Department of Municipal Affairs and Environment's guidelines for the Construction and Maintenance of Wharves, Breakwaters, Slipways and Boathouses.	Section 4.2.6
• The volume of traffic generated by construction and full buildout of the marine port development to inform any requirement for further traffic analysis or mitigating requirements for highway safety. A Traffic Impact Statement may be required.	Section 4.2.1
• Consideration of building envelope design and construction best practices in energy efficiency with respect to the construction of new industrial and commercial buildings.	Section 4.2.2
• Acknowledgement that prior to the start of construction, all building drawings shall be registered with Service NL for Compliance with Fire and Life Safety and Building Accessibility requirements.	Section 4.2.2
• Acknowledgement that for any in-ground sewage disposal, an engineering study may be required to ensure that on-site conditions are acceptable.	Section 4.2.1
• Statement if any activities associated with the marine port require dredging, and if so, a description of how dredged materials are to be managed and whether any disposal at sea (and associated permit) is required.	Section 4.2.9
• Description of how activities associated with this project are in compliance with the Occupational Health and Safety Act and its Regulations. This includes the responsibility for ensuring that contractors hired to perform work also comply with this legislation, as per OHS Act s.10.	Sections 4.2.12 and 4.3
• Description of how project construction considers any future	Section 9.0

Great Northern Port Inc. – Crémaillère Harbour Marine Port Development Table of Concordance with Environmental Preview Report (EPR) Guidelines	
EPR Guideline Requirement	**Where / How Addressed in EPR**
requirement to decommission and rehabilitate the area.	
OPERATION AND MAINTENANCE:	
All aspects of the operation and maintenance of the proposed development should be presented in detail, including:	Section 4.3
• A more detailed description of the Ballast Wastewater / Bilge Disposal Facility operation that identifies: – the treatment processes to be employed; – where and how the treated water is to be released; – how discharges will comply with the Environmental Control Water and Sewage Regulations; – the approximate volumes of water to be treated and released; and – the types of waste that will be captured by the process and the method of disposal.	Section 4.3.7
• A more detailed description of the Bulk Ore Loading/Offloading/Storage facility operation which includes characterization of the ore, potential environmental effects, and mitigating measures associated with this activity	Section 4.3.10
• A more detailed description of the operation of the Graving Dock	Section 4.3.9
• Acknowledgement that prior to the start of construction, a comprehensive Waste Management Plan and a Contingency Plan addressing all activities and potential issues associated with this development will be required. These will require review and approval by the Pollution Prevention Division, Department of Municipal Affairs and Environment.	Sections 4.2.9 and 4.3
• Acknowledgement the requirement to register all petroleum storage tanks with Service NL	Section 4.2.3
• Consideration of the applicability of the following *Canadian Environmental Protection Act R*egulations for substances stored or used on site: *Environmental Emergency Regulations, Interprovincial Movement of Hazardous Waste Regulations,* and *New Substances Notifications Regulations*. In addition, any reporting requirements under the National Pollutant Release Inventory should be identified	Sections 4.3.8 and 4.3.15
• Description of the adequacy of the proposed water source to provide a reliable and safe supply of potable and/or commercial water. The project area is in close proximity to the water supply areas for the towns of St. Anthony and Goose Cove East.	Section 4.2.1
	Section 5.0
ALTERNATIVES	
Alternative means of carrying out the project to meet the stated purpose and rationale must be provided.	Section 5.0

Great Northern Port Inc. – Crémaillère Harbour Marine Port Development Table of Concordance with Environmental Preview Report (EPR) Guidelines	
EPR Guideline Requirement	**Where / How Addressed in EPR**
The EPR must identify and describe alternative means and locations of carrying out the Project that are technically and economically feasible. The following steps for addressing alternative means and locations are recommended: • Identify any alternative means and locations to carry out the Project; • Identify the environmental effects of each alternative means and location; • Identify the **preferred** means and location; • Provide reasons for the rejection of alternative sites.	
• Include information from previous project related studies describing alternate locations that were considered, including the expansion of existing sites, reasons for rejection, and reasons supporting the proposed site as the preferred location.	Section 5.0
• Alternative locations should be clearly outlined on maps of a suitable scale (i.e.1: 50,000, 1: 25,000).	Section 5.0
In particular, the EPR should address:	
• The suitability of using existing facilities and/or existing brownfield harbour sites.	Section 5.0
• The need for year round shipping when some industries in Labrador (e.g. mining) may stockpile and ship seasonally or use land based methods of transport.	Section 5.0
POTENTIAL ENVIRONMENTAL EFFECTS AND MITIGATION	
Potential environmental effects associated with the construction and operation of a marine port development include, but are not limited to, the following:	
• damage or loss to historic resources;	Sections 6.2.1 and 6.3.5.
• impacts to wildlife, including plants, avifauna, fish, and marine mammals and their habitats;	Sections 6.1, 6.3.1, 6.3.2, 6.3.3, and 6.3.4
• erosion and sedimentation of waterbodies resulting from on-land and in-water activities;	Sections 6.1.2 and 6.3.2
• impacts to water quality from materials and techniques used in construction; and	Sections 6.1.2, 6.1.3 6.3.2 and 6.3.3
• alteration of water level viewscapes which may interfere with recreational and commercial activities.	Sections 6.2.5 and 6.3.5
Provide detailed information regarding the potential effects of the project on the environment and the proposed mitigation to be used to avoid adverse environmental effects, including:	Section 6
• Results of a terrestrial and underwater Historic Resources Impact Assessments conducted in consultation with the Provincial Archaeology Office (PAO). It is expected that full remediation of the historic resources will be required if the project is to proceed. This work must begin with the proponent developing a plan for	Sections 6.2.1 and 6.3.5 and Appendix C

Great Northern Port Inc. – Crémaillère Harbour Marine Port Development Table of Concordance with Environmental Preview Report (EPR) Guidelines	
EPR Guideline Requirement	**Where / How Addressed in EPR**
archaeological impact assessment that shall include, but not be limited to a desktop assessment of known and potential historic resources; stage one archaeological assessment, and mitigation strategies for impacted historic resources.	
• Commitment to the development of an overall Environmental Protection Plan (EPP) for this project which includes an Avifauna Management Plan (AMP). The EPR should indicate that prior to any clearing activities, field surveys for species protected under the Canadian Species at Risk Act and the provincial Endangered Species Act will be conducted. This includes surveys for the Short-eared Owl and botanical surveys for rare plants that occur along the beaches and the cliffs. Survey results should inform beneficial practices and mitigating measures utilized in the AMP and EPP.	Section 6.3.1 and Appendix B
• Description of how the AMP will consider the number and distribution of species protected under the Migratory Birds Convention Act; as well as bald eagles, raptors and other species inhabiting the area.	Section 6.3.1
• Description of beneficial practices and mitigating measures that will: – monitor the use of the port by birds; – minimize and prevent destruction and harm to nests, eggs and nesting – birds during the breeding season (April 15th through August 15th for – landbirds and April 1st through August 30th for seabirds) during construction and operations; including descriptions of how nests are to be avoided and details on buffers when nests are found; – prevent birds and their habitat from contamination with oil or other deleterious substances; – prevent nesting in stockpiles and attraction to light; – deal with stranded birds; – facilitate Common Eider breeding and overwintering; – prevent disturbance to Harlequin Ducks, Short-eared Owls, and other – federally and provincially listed avian species at risk; and – ensure recommended practices for working on shorelines are followed.	Section 6.3.1
• Description of methods that will be used to avoid or minimize the impacts of the project on wetlands.	Section 6.3.2
• Description of methods that will be used to prevent erosion and sedimentation from on-land and in-water activities.	Section 6.3.2
• Measures to monitor water quality and ensure that any waste water, effluent, or runoff leaving the site will conform to the requirements of	Section 6.3.2

Great Northern Port Inc. – Crémaillère Harbour Marine Port Development Table of Concordance with Environmental Preview Report (EPR) Guidelines	
EPR Guideline Requirement	**Where / How Addressed in EPR**
the *Environmental Control Water and Sewage Regulations*, 2003.	
• Description of measures that address potential impacts to water quality from the use of dust suppression materials, pressure treated wood, concrete materials, and blasting operations.	Section 6.3.2
• The occurrence and distribution of fish species and fish habitat in the project area. Describe potential impacts of the proposed project on fish and fishhabitat, along with implementation of best practices and mitigation measures to avoid negative effects.	Sections 6.1.3 and 6.3.3
• Completion of the "Application for Review" form located at: www.dfo- mpo.gc.ca/pnw-ppe/reviews-revues/index-eng.html. The *Fisheries Act* requires that projects avoid causing serious harm to fish unless authorized by the Minister of Fisheries and Oceans. A guidance document entitled "Request for Review" will assist you in identification of the necessary information required to complete the application form. If submitting an application please ensure you attach photos/diagrams of the area, fish species in your project area, habitat types (e.g., boulder, cobble, gravels, etc.) and other pertinent information, e.g., if a fishery is located in/near by the project site, etc. The Projects Near Water website, www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html, also provides information on standard measures that can be implemented to assist in achieving compliance with the Fisheries Act (refer to the section entitled "Measures to Avoid Causing Harm to Fish and Fish Habitat") as well as the Species at Risk Act.	Section 6.3.3
• The occurrence and distribution of marine mammals within the project area. Describe potential impacts of the proposed project on these species, including effects of increased vessel traffic, along with any mitigating measures.	Sections 6.1.4 and 6.3.4
• Identify how the project will avoid interference with the rights of other legitimate land owners/user, including:	Section 6.2.3
• Description of mitigating measures to address impacts on viewscapes from water level, commercial boat tour traffic, and non-commercial recreational boating activity during construction and operation.	Section 6.3.6
• Commitment to submit Notice of Works pursuant to the Navigation Protection Act (NPA) for all in water works, falling outside the scope of the Minor Works Orders, proposed to be placed in scheduled waters.	Sections 4.2.8 and 4.2.9

Great Northern Port Inc. – Crémaillère Harbour Marine Port Development Table of Concordance with Environmental Preview Report (EPR) Guidelines	
EPR Guideline Requirement	**Where / How Addressed in EPR**
DECOMMISSIONING and REHABILITATION	
Describe all aspects of the decommissioning and rehabilitation plans for the project, assuming the eventual need to eliminate the entire project footprint from the landscape.	Section 9
PROJECT- RELATED DOCUMENTS:	
Provide a bibliography of all project-related documents already generated by or for the proponent (e.g., feasibility study, engineering reports, etc.).	Section 7
PUBLIC INFORMATION MEETING	
An Open House Public Information Session shall be held at a place adjacent to or in the geographical area of the undertaking, or as the minister may determine, in order to: a) provide information concerning the undertaking to the people whose environment may be affected by the undertaking; b) record and respond to the concerns of the local community regarding the environmental effects of the undertaking; and c) present the information gathered to fulfil the requirements of Section 5 of these guidelines.	Sections 6.2.7 and 6.2.8
Additional consideration should be given to providing: • awareness of the project and consultation on employment opportunities to women's organizations; and • renderings or simulations of the visual impact of the project on water level viewscapes and residential areas.	Sections 4.2.12 and 6.3.6
You are required to notify the Minister and the public of the scheduled meeting not fewer than 7 days before that meeting. Public concerns shall be addressed in a separate section of the EPR.	Sections 6.2.7 and 6.2.8
Protocol for these public sessions will comply with Section 10 of the Environmental Assessment Regulations, 2003. Public notification specifications are outlined in Appendix A.	Sections 6,2,7 and 6,2,8
A ballast water storage and treatment system and/or the bulk ore loading/offloading/storage may require a Certificate of Approval from the Pollution Prevention Division (PPD) of the Department of Municipal Affairs and Environment.	Section 4.2.5, 4.2.7, 4.3.7, 4.3.10 and Appendix D
Depending on their capacity, diesel generators may require a Certificate of Approval from the PPD.	Appendix D

APPENDIX B Environmental Preview Report Deficiencies List Contained in Letter from Minister of Municipal Affairs and Environment February 22, 2019 - Table of Concordance

APPENDIX B

Great Northern Port Inc. – Crémaillère Harbour Marine Port Development Table of Concordance with Environmental Preview Report (EPR) Deficiencies List Contained in Letter from Minister of Municipal Affairs and Environment February 22, 2019	
EPR Deficiencies List Requirement	**Where / How Addressed in Revised EPR**
Item 1:	
Development of a Women's Employment Plan (WEP) in consultation with the Women's Policy Office (WPO) that meets the approval of the Deputy Minister of WPO. The WEP should include commitments and accountability measures (including contractors and sub-contractors) that promote the employment and leadership of women through each phase of the project."	Section 4.2.12 and Appendix C
Item 2:	
Clarification with respect to the Avifauna Management Plan (AMPP Specifically, how the AMP will consider the number and distribution of species detected within the project study area, including short-eared owl. This will include a description of the surveys for avifauna that must be conducted prior to construction. The Wildlife Division must be consulted regarding survey methodology and permits..	Section 6.3.1; Table 6-7; Appendix D and Appendix F
Item 3:	
Corrections to the description of occurrence and status of wildlife species within the project footprint.	Sections 6.1.1 and 6.1.3; Tables 6-1, 6-2 and 6-3
Item 4:	
Acknowledgement in section 6.1.4 of the main document that rare plants occur in the project area. Section 6.3.2 must include description of the standardized botanical surveys for rare plant species to be conducted by qualified botanists in all areas to be cleared prior to construction. The Wildlife Division must be consulted regarding survey methodology, survey permits and appropriate pre- and post-construction management actions..	Sections 6.1.2 and 6.3.2; Table 6-6; Appendix D and Appendix F
Item 5:	
Information on anticipated traffic volumes and types of vehicles expected for this development when in production. Additional detail is required on the upgrades to the Goose Cove Road.	Section 4.2.1
Item 6:	
Information on the distribution and occurrence of fish species and their habitat (e.g. substrate, aquatic vegetation) within the specific project area. Information on commercial, recreational, or indigenous fisheries in the project area as well as a description of any potential interactions/interference with other resource users..	Sections 6.1.3, 6.2.6, 6.3.6 and 6.5; Tables 6.2 and 6.3
Item 7:	
Detailed explanation of the requirement for the following proposed project activities to be located at dockside: a. Liquid Drilling Mud Plant b. Ballast Water Disposal and Treatment Facility C. Fuel Tank Farm.	Sections 3.2, 4.2.3, 4.2.4 and 4.2.5
Item 8:	
• Detailed explanation of the requirement for the ore storage component of the project and a more detailed description of its	Sections 4.2.7 and 4.3.10

Great Northern Port Inc. – Crémaillère Harbour Marine Port Development Table of Concordance with Environmental Preview Report (EPR) Deficiencies List Contained in Letter from Minister of Municipal Affairs and Environment February 22, 2019	
EPR Deficiencies List Requirement	**Where / How Addressed in Revised EPR**
operation.	
Item 9:	
An assessment of the requirement for the graving dock in relation to existing provincial capacity, including the need for this facility to be enclosed.	Sections 4.2.8, 4.3.9 and 5.0
Item 10:	
A detailed comparison of the specific requirements of the proposed project in relation to the location, services and infrastructure currently or potentially provided by the port of St. Anthony or other existing port. This comparison should specify a more precise evaluation of the criteria and market factors considered when selecting the proposed site.	Sections 3.2 and 5.0

APPENDIX C GREAT NORTHERN PORT INC. WOMEN'S EMPLOYMENT PLAN (WEP)

GNP PROJECT
180 Patrick Street St John's NL A1C 5C4 709-770- 8040

Great Northern Port Inc. **Womens Employment Plan**

Submitted to: Office for the Status of Women April 11, 2019

Proposed GNP Women's Employment Plan (WEP)
For Consultation with Women's Policy Office (WPO)

Introduction

Great Northern Port is a proposed deep-water port and marine service and supply base to be located at Crémaillère Harbour on the Northern Peninsula of the island of Newfoundland in the Canadian Province of Newfoundland and Labrador. The Harbour is situated approximately 4.1 kilometres South of the Town of St. Anthony, in the electoral District of St. Barbe/Lanse Aux Meadows. The Proponent, Great Northern Port Inc. (GNP) is a company, registered in the Province, and formed to investigate the feasibility of and generate investment in the proposed port project.

The Crémaillère Harbour Marine Port Development project was registered for Part 10 Environmental Assessment (EA) of the Newfoundland and Labrador Environmental Protection Act in November 2017. In March 2018 the Department of Municipal Affairs and Environment released Guidelines for the preparation of the Environmental Preview Report for this project and more specifically, criteria regarding a Women's Employment Plan (WEP). The request is as follows:

> *"Develop a Women's Employment Plan (WEP) in consultation with the Women's Policy Office (WPO) that meets the approval of the Deputy Minister of WPO. The WEP should include commitments and accountability measures (including contractors and sub-contractors) that promote the employment and leadership of women through each phase of the project. Acknowledge support for an annual report and an annual meeting with WPO representative's to discuss any issues with designing and implementing the WEP."*

The preparation and submission of this document is intended to address the above noted condition of the Environmental Preview Report.

This plan provides an overview of the various commitments and measures that GNP will take to ensure a diverse and inclusive workforce and work environment prevails at Crémaillère Harbour Marine Port.

GNP values gender diversity and more broadly a workplace that promotes equality, equity, acceptance and promotion of both females and males in the work environment. More to this is the acceptance and promotion of a workplace that brings together the collective and diverse talents, perspectives, behaviours and attributes of all individuals. Although much effort has been made to improve the inclusion and advancement of women in construction projects, GNP recognizes the challenges women face in securing stable employment and biased-free work environments where occupational opportunities have traditionally been male-dominated. The approach proposed in this Women's Employment Plan would support a strategic and focused effort on diversity, inclusion and gender equity.

The GNP Women's Employment Plan will progress as various stages or phases of the project comes on stream. For the next two years and after EA approval is received, the work will primarily focus on survey and engineering studies. The Construction Period will include three Phases and a preliminary Construction consultation has estimated that between 75-

100 job opportunities will be created during the Period. The start of Phase 1 Construction is proposed to be in Spring 2020.

Commitment and Accountability

GNP Management is accountable and responsible for both administration and implementation of the Women's Employment Plan. All employees of the Company and contractors hired to support construction activities related to the project have a role to play in implementing the Company's policies and programs, including increasing the overall opportunities for and employment by women.

Senior level support and governance over diversity and inclusion will be established by identifying an executive sponsor, creating a diversity Council (committee), and assigning responsibility for diversity leadership to a member of the management team, such as the HR Manager, for championship of diversity initiatives.

GNP recognizes that one of the major barriers women face is the lack of leadership and commitment from top executives to advance women within organizations. The leaders of GNP will support initiatives that recognize barriers before they become impediments, and will make focused efforts to advance women and to improve women's under-representation in occupational areas and leadership roles.

As majority of the workforce during Construction will be through contractual arrangements, GNP will ensure that contractors follow and implement employment policies and practices that demonstrate a commitment to equity and diversity, and report progress on a regular and frequent basis.

Consultations and Community

GNP commits to review this proposal with the Women's Policy Office (WPO) representatives and will welcome advise on areas for improvement or suggestions for development. The anticipated relationship with the WPO will enable GNP to receive advice and useful best practices based on experiences from other Provincial projects that collaborate with the WPO. The goal will be to have a final WEP that is suitable for this project and meets the expectations of the WPO.

There are many community stakeholder groups that can add value through collaborative and strategic relationships for this project. As the project nears the Contraction Phase GNP Management will hold stakeholder sessions to inform, seek input and open communication channels. Some of these stakeholders may include: Newfoundland and Labrador Organization of Women Entrepreneurs (NLOWE), Women in Resource Development Corporation (WRDC), Office to Advance Women Apprentices (OAWA), College of the North Atlantic (CAN), and Memorial University of Newfoundland (MUN).

Diversity Action Plan for Construction and Operation Phases

The following section of this proposed WEP outlines a Diversity Action Plan with tactical activities that support equitable employment and work environment standards of this project. Timelines for these activities will be defined and developed prior to start of the Construction phase.

(1) Recruitment, hiring and selection

The hiring process that the Company and contractors utilize must ensure that fair and equitable access is provided to all eligible candidates. To support this the Company will implement the following initiatives:

- Develop a Recruitment, Hiring and Selection Policy and define processes designed to attract a diverse group of job applicants and to implement fair and unbiased practices in Human Resource Systems.
- Use advertising methods that promote GNP's vision of a gender diverse workforce, are explicitly gender inclusive and promote a respectful and inclusive workforce.
- Use recruitment methods that draw on the variety of approaches to ensure a diverse applicant pool including outreach to local advocacy organizations (i.e. distribute job advertisements to various women's agencies and organizations).
- Publish job advertisements that clearly outline essential job requirements.
- Ensure job advertisements state that the Company is an equal opportunity employer and will include gender-neutral language.
- Give equal value to qualifications and work experience regardless of gender.
- Conduct recruitment campaigns that are inclusive of women and sensitive to cultural differences and languages.
- Educate hiring managers in recruitment processes to ensure sound practices free of gender bias.
- Interview panels to include diversity so that all candidates feel welcome.
- Interview questions to be carefully reviewed for inherent biases and stereotypes.
- Task interview panels to identify opportunities to hire women in under-represented occupation groups when women candidates meet the minimum requirements of the positions being recruited.
- A standardized process for reference checking which avoids questions that might discriminate on a ground prohibited by Human Rights Legislation.

(2) Training and development

GNP will implement training and development initiatives that support employees to build competencies and influence upward mobility within the Company. The Company recognizes that women do not have significant numbers of qualified individuals in some non-traditional occupations in the construction industry. To help address this reality, the Company will support, where reasonably possible, efforts designed to increase the supply of women who have the skills to support the project. To support the training and development goals, the Company will implement the following initiatives:

- Develop a Training and Development Policy and define processes designed to increase knowledge, skills and motivation and prevent practices that exclude or limit any gender in training and development.
- All employees receive the same training that is relevant to their jobs.

- Create/source and implement gender diversity training for all managers and employees.
- Maintain records of participation by gender at training events.
- Explore training opportunities with key stakeholders relevant to specific job functions (i.e. OAWA, CNA).

(3) Promotion

GNP recognizes that systemic, attitudinal, and situational barrier have stalled the advancement of women in some occupational areas and leadership roles. There may be the lack of role models/mentors, insufficient support for career development, access issues and familial obligations that impact success of advancing women in their careers. To support the advancement of women in the workplace, the Company will implement the following initiatives:

- Develop a Promotion Policy and define processes to support the equal advancement of women and men in the workplace.
- Where applicable, speak with employee representatives and unions on issues concerning promotion and seniority to ensure that women are not unfairly excluded.
- Ensure job opportunities that offer advancement are well advertised through the organization.
- Make information about special assignments for temporary senior positions available to everyone.
- Ensure performance evaluations are based on the same basic criteria for each job category and review evaluations for potential gender bias.
- Promote a culture that supports a positive relationship between men and women.

(4) Retention and termination

GNP supports a premise that retaining men and women in the workplace is not a singular solution. Reasons that both genders provide for leaving the workplace are often different and only through awareness can the Company understand the underlying dynamics that exist in the workplace and external factors that influence retention decisions. GNP is committed to promoting a respectful workplace free of discrimination and bias, and welcoming of productivity and inclusiveness. To support the retention of men and women the Company will implement the following initiatives:

- Develop an Anti-Harassment and Discrimination Policy and processes that support a zero tolerance approach to harassment and discrimination and methods for employees to report concerns.
- Develop a Respect Workplace Policy.
- Conduct confidential exit interviews to clarify exactly why an employee is leaving.
- Implement an employee and family assistance program to address specific concerns of employees and their immediate families.
- Ensure that the compensation system provides for equal pay for equal work.

(5) Workplace Policies and Conditions

- Employees and contractors and subcontractors will be expected to adhere to Respectful Workplace, Anti-discrimination and Harassment Policy and other HR policies and to act in a positive and respectful manner in all they say and do.
- Ensure all employees, contractors and subcontractors are aware of GNP policies and practices related to employment and involvement of under-represented groups.
- All project workers will be provided with an orientation and induction program that includes health and safety, cultural awareness, diversity and inclusion, and environmental awareness training.
- Strict enforcement of Company policies, and a requirement for contractors to have associated policies/standards with respect to equitable employment, respectful workplace, and zero tolerance for harassment.
- All project/site facilities will comply with applicable regulatory requirements including those related to accessibility and gender, as a minimum.
- The use of gender inclusive / neutral language in all written correspondence and verbal communications with employees; ensure that gender equity and workplace diversity is evident in any images used in regular employee communications and notices and external printed material.
- Conduct manager and supervisor training to enable them to address any respectful workplace situations that may arise in a timely, safe and appropriate manner.
- Ensure representation by women on all workplace committees where interest exists.

Reporting and Monitoring

During the Construction Phases of the project, GNP will use a reporting system whereby all companies hired to support the project will report monthly to the Company. This information will include employment reports containing, but not limited to, the following:

- Quantitative data: total number of employees and hours worked by gender and in a breakdown displaying the National Occupational Classification (NOC) categories; number of apprentices and journey persons by NOC and by gender; full/part-time employment numbers by NOC and gender.

- Qualitative date: will include all actions taken within the month promoting diversity and inclusion and supporting GNP's Women's Employment Plan.

GNP will provide quarterly reports to the Minister responsible for the Women's Policy Office including employment data as referenced above and in addition, will report on any progress on the implementation of any policies or programs that align with the WEP. Reporting will begin during the Construction Period. The report parameters and frequency will be determined in consultation with the Women's Policy Office.

APPENDIX D ANNOTATED ENVIRONMENTAL PROTECTION PLAN OUTLINE FOR THE PROPOSED CRÉMAILÈRE HARBOUR PORT DEVELOPMENT

1.0 Introduction

The Introduction is intended to provide the context needed for the reader to understand where the EPP fits into the Project development process, as well as information on the organization, intended purpose, scope, and document control processes that apply to the document.

1.1. Purpose of the Environmental Protection Plan

1.2 Organization of the Environmental Protection Planning

1.3 Roles and Responsibilities

1.4 Environmental Orientation

1.5 Description of Activities

1.6 Policies and Procedures

1.7 Document Management

2.0 Environmental Protection Procedures

2.1 Surveying

Surveying activities may include: vegetation removal, traversing, and establishing targets, benchmarks and transponder stations.

The EPP for the Project will identify specific environmental protection measures that will be applied during surveying activities including, but not limited to, the following applicable protection measures identified in the EPR:

- Limiting equipment and human foot traffic to smallest necessary footprint;
- Beach and cliff areas to be assessed for presence of plant species that may be rare or threatened;
- Implement Avifauna Management Plan (AMP) during survey activities.

2.2 Buffer Zones

The EPR has identified the need for buffer zones for stream and wetland protection as well as at shore zones. Blasting will be controlled according to established guidelines to limit noise impacts and disturbance to fish bearing waters.

No clearing, fencing, or other development shall occur within buffer areas identified in the vicinity of seven known archaeological sites located in Crémaillère Harbour.

Buffer zones may also be identified if the presence of rare or endangered plant or wildlife species is identified through directed surveys to be completed prior to clearing, or other disturbance of areas, to be developed.

2.3 Laydown and Storage Areas

Environmental concerns relating to laydown and storage areas include:

- The danger of spillage of hydrocarbons or other hazardous products during equipment assembly or repair.
- The physical disturbance of the terrestrial environment during vehicle movements or equipment assembly.
- Potential erosion and run-off of sediment into nearby water bodies.

The EPP for the Project will identify specific environmental protection measures that will be applied relating to laydown and storage areas including, but not limited to, the following applicable protection measures identified in the EPR:

- Storage of chemicals and hazardous materials in approved storage and transport containers;

- Development of Emergency Preparedness and Response Plans appropriate for the types and quantities of materials to be handled.
- Limiting areas to be affected on the principle of smallest necessary footprint;
- Use of aggregate material from on-site excavations as much as possible when infilling is required;
- Development and implementation of an Erosion and Sedimentation Control Plan (ESCP) incorporating principles of limiting the exposed area, limiting exposure time, diverting runoff, limiting runoff velocity, and protecting concentrated flow areas.

2.4 Clearing Vegetation

Environmental concerns include loss of habitat, sedimentation of watercourses, and disturbance or destruction of historic resources.

The EPP for the Project will identify specific environmental protection measures that will be applied during clearing activities including, but not limited to, the following applicable protection measures identified in the EPR:

- Limiting equipment and human foot traffic to smallest necessary footprint;
- Conduct standardized botanical surveys in all areas to be cleared of vegetation prior to development The Newfoundland and Labrador Wildlife Division will be consulted regarding the survey methodology to be employed, the findings of the surveys undertaken and appropriate mitigations to be undertaken if surveys confirm the presence of rare plant species.
- Beach and cliff areas will also be assessed for presence of plant species that may be rare or threatened;
- Implement of AMP during survey activities;
- No clearing, fencing, or other development shall occur within buffer areas identified in the vicinity of seven known archaeological sites located in Crémaillère Harbour.

2.5 Grubbing and Disposal of Related Debris

The principal concerns associated with grubbing and disposal of related debris are the potential effects of erosion and sedimentation on marine and freshwater ecosystems and water quality. Potential disturbance to rare species and habitat, and historic or archeological resources must also be taken into consideration.

The EPP for the Project will identify specific environmental protection measures that will be applied during this activity including, but not limited to, the following applicable protection measures identified in the EPR:

- Limiting areas to be affected on the principle of smallest necessary footprint;
- Development and implementation of an Erosion and Sedimentation Control Plan (ESCP) incorporating principles of limiting the exposed area, limiting exposure time, diverting runoff, limiting runoff velocity, and protecting concentrated flow areas
- Implement AMP prior to grubbing activities;
- No clearing, fencing, or other development shall occur within buffer areas identified in the vicinity of seven known archaeological sites located in Crémaillère Harbour.

2.6 Excavation, Embankment, and Grading (including cutting and filling)

The principal environmental concern associated with excavation, backfill and grading is the potential impact on aquatic ecosystems and water quality due to runoff of sediment-laden water. Potential disturbance to rare

species and habitat, and historic or archeological resources must also be taken into consideration, along with the effect on forests, side hills and steep slopes (i.e danger trees or wind falls).

The EPP for the Project will identify specific environmental protection measures that will be applied during these activities including, but not limited to, the following applicable protection measures identified in the EPR:

- Limiting areas to be affected on the principle of smallest necessary footprint;
- Development and implementation of and Erosion and Sedimentation Control Plan (ESCP) incorporating principles of limiting the exposed area, limiting exposure time, diverting runoff, limiting runoff velocity, and protecting concentrated flow areas;
- Beach and cliff areas to be assessed for presence of plant species that may be rare or threatened; Conduct standardized botanical surveys in all areas subject to disturbance prior to development The Newfoundland and Labrador Wildlife Division will be consulted regarding the survey methodology to be employed, the findings of the surveys undertaken and appropriate mitigations to be undertaken if surveys confirm the presence of rare plant species.
- Implement AMP prior to excavation and backfilling activities
- No clearing, fencing, or other development shall occur within buffer areas identified in the vicinity of seven known archaeological sites located in Crémaillère Harbour.

2.7 Erosion Prevention and Sediment Control

Runoff from disturbed terrain can result in the terrain instability and the movement of sediment. Eroded material may alter drainage patterns, increase stream velocities and cause siltation in water bodies and, subsequently, decrease suitable habitat for aquatic and terrestrial animals.

The EPP for the Project will identify specific environmental protection measures that will be applied during in relation to erosion prevention and sediment control, including, but not limited to, the following applicable protection measures identified in the EPR:

- Limiting areas to be affected on the principle of smallest necessary footprint;
- Development and implementation of an Erosion and Sedimentation Control Plan (ESCP) incorporating principles of limiting the exposed area, limiting exposure time, diverting runoff, limiting runoff velocity, and protecting concentrated flow areas.

2.8 Camps and Temporary Facilities

There is the potential for site erosion and the introduction of sediment into local waterbodies. These activities will result in terrestrial habitat alterations and noise disturbances to wildlife in the area.

The EPP for the Project will identify specific environmental protection measures that will be applied in relation to camps and temporary facilities, including, but not limited to, the following applicable protection measures identified in the EPR:

- Limiting areas to be affected on the principle of smallest necessary footprint;
- Development and implementation of and Erosion and Sedimentation Control Plan (ESCP) incorporating principles of limiting the exposed area, limiting exposure time, diverting runoff, limiting runoff velocity, and protecting concentrated flow areas;
- Conduct standardized botanical surveys in all areas to be cleared of vegetation prior to development The Newfoundland and Labrador Wildlife Division will be consulted regarding the survey methodology to be employed, the findings of the surveys undertaken and appropriate mitigations to be undertaken if surveys confirm the presence of rare plant species.

- Implement AMP prior to development of camps and temporary facilities;
- No clearing, fencing, or other development shall occur within buffer areas identified in the vicinity of seven known archaeological sites located in Crémaillère Harbour.
- Sanitary wastewater to be stored in temporary units, either enclosed portable toilets or containerized sanitary wastewater tanks adjoining temporary construction site buildings. These will be cleaned and the wastewater transported to off-site sanitary fill treatment and disposal facilities;
- Tendering of temporary camp requirements to an experienced contractor responsible for ensuring that all permits are acquired and inspection, management and decommissioning of the temporary construction camp are completed with due attention to environmental requirements and sensitivities.

2.9 Watercourse (Stream) Crossings

The environmental concerns associated with fording, culvert installations, bridge construction and maintenance include direct disturbance to, or mortality of, fish, disturbance to waterfowl, and loss of fish habitat caused by sedimentation and removal of substrate, and disturbances to stream bank vegetation.

The EPP for the Project will identify specific environmental protection measures that will be applied in relation to watercourse crossings, including, but not limited to, the following applicable protection measures identified in the EPR:

- Machinery fording of watercourse will be avoided as much as possible. If not possible the crossing will be limit to one time-events (to and back);
- Culverts will be installed following provincial guidelines;
- If stream alterations are necessary, provincial guidelines will be followed;
- Silt fencing will be in place to reduce effects of potential increased sedimentation;
- Water samples will be collected from key areas throughout the construction period;
- Work sites will be isolated from running water, and appropriate barriers will be installed to prevent accidental released of deleterious substances;
- A response plan will be developed to address potential accidental releases of deleterious substances;
- All necessary permits will be acquired and applied throughout the duration of construction and for routine/non-routine maintenance;
- Guidelines and best practices relating to use of treated wood and concrete in and around aquatic environments will be applied;
- Conduct standardized botanical surveys in all areas to be cleared of vegetation prior to development The Newfoundland and Labrador Wildlife Division will be consulted regarding the survey methodology to be employed, the findings of the surveys undertaken and appropriate mitigations to be undertaken if surveys confirm the presence of rare plant species.
- Implement AMP prior to development of watercourse crossings.

2.10 Pumps and Generators

Environmental concerns are associated with any accidental spills or chronic leaks contaminating waterbodies and soil. There may also be concerns with noise, as well as air emissions from generators at the site.

The EPP for the Project will identify specific environmental protection measures that will be applied in relation to the location and operation of pumps and generators, including, but not limited to, the following applicable protection measures identified in the EPR:

- These activities will be planned to limit the potential of environmental effects from accidental events and to

ensure that emergency response procedures and capability are in place in case of accidental events.

- Development and implementation of an Erosion and Sedimentation Control Plan (ESCP) incorporating principles of limiting the exposed area, limiting exposure time, diverting runoff, limiting runoff velocity, and protecting concentrated flow areas;
- Noise and air emissions.

2.11 Dewatering Work Areas and Site Drainage

The major concerns associated with dewatering are sedimentation, direct fish mortality, and/or habitat destruction for freshwater and marine fish species.

The EPP for the Project will identify specific environmental protection measures that will be applied in relation to dewatering activities, including, but not limited to, the following applicable protection measures identified in the EPR:

- Wetland, natural riparian buffer zones and areas of indigenous vegetation to be preserved, where feasible, to provide natural drainage and filtration;
- Development and implementation of an Erosion and Sedimentation Control Plan (ESCP) incorporating principles of limiting the exposed area, limiting exposure time, diverting runoff, limiting runoff velocity, and protecting concentrated flow areas;
- If stream alterations are necessary, provincial and federal guidelines will be followed;
- Silt fencing will be in place to reduce effects of potential increased sedimentation;
- Water samples will be collected from key areas throughout the construction period;
- Work sites will be isolated from running water, and appropriate barriers will be installed to prevent accidental released of deleterious substances;
- A response plan will be developed to address potential accidental releases of deleterious substances;
- All necessary permits will be acquired and applied throughout the duration of construction and for routine/non-routine maintenance.

2.12 Equipment Installation, Use and Maintenance

Noise associated with equipment operation and movement may negatively affect humans and wildlife. Air emissions may have air quality implications. Accidental leaks or spills of fuel or other hazardous materials may affect soils, water, fish, vegetation and wildlife. Tracked equipment has the potential to disturb the ground around/at work fronts.

The EPP for the Project will identify specific environmental protection measures that will be applied in relation to equipment use and maintenance, including, but not limited to, the following applicable protection measures identified in the EPR:

- Limiting areas to be affected on the principle of smallest necessary footprint;
- use of sound barriers and work scheduling, as well as scheduled maintenance of equipment and minimizing the amount, and unnecessary idling, of on-site equipment and vehicles, to limit the potential effects of construction noise and emissions on wildlife use of the Project area;
- Exposure of plants and wildlife to hazardous materials and substances, as well as contamination of habitat will be prevented by appropriate containment and handling practices;
- The Project site will be equipped with mobile spill response kits at all active construction locations;
- All waste materials, including recyclable materials, food and beverage waste, camp waste, hazardous waste and scrap construction waste, will be collected in appropriate containers for transport and disposal to off-site disposal/recycling facilities subject to provincial and federal regulatory requirements and guidelines.

2.13 Storage, Handling and Transfer of Fuel and Other Hazardous Materials

The primary concern regarding the use of fuel and hazardous materials is their uncontrolled release to the environment through spillage, and the subsequent adverse effects on human health and safety, terrestrial, aquatic and marine habitat and species, soil, and groundwater quality.

The EPP for the Project will identify specific environmental protection measures that will be applied in relation to the storage, handling and transportation of fuels and other hazardous materials, including, but not limited to, the following applicable protection measures identified in the EPR:

- Bulk fuel and hazardous liquids will be stored in tanks and containers designed according to the latest applicable standards and guidelines;
- All bulk storage of fuels and hazardous liquids will be deigned with secondary containment systems according to the latest applicable standards and guidelines;
- All petroleum storage tanks will be registered in accordance with Services NL regulations;
- Controlled products will be stored and transferred in appropriate containers as defined in Transportation of Dangerous Goods Regulations and Workplace Hazardous Materials Safety Regulations;
- The Project site will be equipped with mobile spill response kits at all active construction locations;
- All waste materials, including recyclable materials, food and beverage waste, camp waste, hazardous waste and scrap construction waste, will be collected in appropriate containers for transport and disposal to off-site disposal/recycling facilities subject to provincial and federal regulatory requirements and guidelines.

2.14 Waste Disposal

Solid waste if not properly controlled and disposed of, will be unsightly and may cause human safety and health concerns and could result in human-wildlife interactions.

The EPP for the Project will identify specific environmental protection measures that will be applied in relation to waste management and disposal, including, but not limited to, the following applicable protection measures identified in the EPR:

- All waste materials, including recyclable materials, food and beverage waste, camp waste, hazardous waste and scrap construction waste, will be collected in appropriate containers for transport and disposal to off-site disposal/recycling facilities subject to provincial and federal regulatory requirements and guidelines.
- Limiting areas to be affected on the principle of smallest necessary footprint;
- use of sound barriers and work scheduling, as well as scheduled maintenance of equipment and minimizing the amount, and unnecessary idling, of on-site equipment and vehicles, to limit the potential effects of construction noise and emissions on wildlife use of the Project area;

2.15 Sewage Disposal

The release of untreated sewage is a concern to human health, drinking water quality, and freshwater and marine ecosystems.

The EPP for the Project will identify specific environmental protection measures that will be applied in relation to sewage disposal, including, but not limited to, the following applicable protection measures identified in the EPR:

- Sanitary wastewater to be stored in temporary units, either enclosed portable toilets or containerized sanitary wastewater tanks adjoining temporary construction site buildings. These will be cleaned, and the wastewater transported to off-site sanitary fill treatment and disposal facilities;

- Tendering of temporary camp requirements to an experienced contractor responsible for ensuring that all permits are acquired, and inspection, management and decommissioning of the temporary construction camp are completed with due attention to environmental requirements and sensitivities.

2.16 Hazardous Waste Disposal

Hazardous waste can cause contamination of lands and waters as well as being toxic to organisms that may come in contact.

The EPP for the Project will identify specific environmental protection measures that will be applied in relation to hazardous waste handling and disposal, including, but not limited to, the following applicable protection measures identified in the EPR:

- All waste materials, including recyclable materials, food and beverage waste, camp waste, hazardous waste and scrap construction waste, will be collected in appropriate containers for transport and disposal to off-site disposal/recycling facilities subject to provincial and federal regulatory requirements and guidelines.

2.17 Vehicle Traffic and Equipment Movement

Vehicle traffic can result in direct contact with wildlife as well as indirect effects from noise and dust.

The EPP for the Project will identify specific environmental protection measures that will be applied in relation to vehicle traffic, including, but not limited to, the following applicable protection measures identified in the EPR:

- A traffic impact study will be conducted as part of the proposed road upgrade plan and a traffic impact statement may be issued if warranted based on the results. Detailed traffic studies and projections will inform a roads upgrade plan which will set standards and scheduling for upgrading. The features of road improvements; such as paved shoulders, turning lanes etc. will rely on relevant standards for roads with loads and levels and types of traffic anticipated. Standards for road verges, drainage, erosion mitigation, and environmental remediation will be consistent with road construction standards within the project site boundaries including landscaping and replanting of exposed areas;
- Avoid wildlife-vehicle collisions by ensuring safe driving practices;
- Minimize airbourne contaminants through dust control on roads.

2.18 Dust Control

Dust generated from on-site activities can result in disturbance to wildlife habitat and add to sedimentation of watercourses.

The EPP for the Project will identify specific environmental protection measures that will be applied in relation to dust generation, including, but not limited to, the following applicable protection measures identified in the EPR:

- Use of dust control agents on roads, laydown areas and material stockpiles using dust control agents such as water and calcium chloride.

2.19 Noise Control

Construction generated noise can result in wildlife avoidance of habitat in the area.

The EPP for the Project will identify specific environmental protection measures that will be applied in relation to dust generation, including, but not limited to, the following applicable protection measures identified in the EPR:

- Limit ATV traffic to established roadways;
- Establish protective buffer zones around known active nests;
- Use of sound barriers and work scheduling, as well as scheduled maintenance of equipment and minimizing the amount, and unnecessary idling, of on-site equipment and vehicles, to limit the potential effects of construction noise and emissions on wildlife use of the Project area

2.20 Road Maintenance

Road repair and re-painting, and road clearing and ice control measures are considered under potential environmental effects of road maintenance.

The EPP for the Project will identify specific environmental protection measures that will be applied in relation to dust generation, including, but not limited to, the following applicable protection measures identified in the EPR:

- Emphasis will be placed on minimizing the quantity of chemicals used, including salt for de-icing in order to minimize potential runoff of chemicals to wetlands and streams. The EPP will emphasize the importance of using smaller quantities of de-icers, use of snow fences and barriers, and increased efficiency of mechanical ice removal.

2.21 Building Construction

Building construction results in disturbance through site preparation as well as generation of bulk construction waste which, if not appropriately handled can contaminate wildlife and fish habitat.

The EPP for the Project will identify specific environmental protection measures that will be applied in relation to dust generation, including, but not limited to, the following applicable protection measures identified in the EPR:

- Limiting areas to be affected on the principle of smallest necessary footprint;
- All waste materials, including recyclable materials, food and beverage waste, camp waste, hazardous waste and scrap construction waste, will be collected in appropriate containers for transport and disposal to off-site disposal/recycling facilities subject to provincial and federal regulatory requirements and guidelines.

2.22 Drilling and Blasting

The general environmental concerns associated with on-land blasting include:

- Destruction of vegetation outside excavation limits;
- Noise disturbances to humans and wildlife;
- Disturbance of archaeological resources;
- Release of chemicals (i.e. ammonia) to the environment (explosive mixtures and products); and
- Dust generation.

Blasting in or near waterbodies can affect organisms with swim bladders (fish) but may also affect a variety of aquatic animals including shellfish, marine mammals, otters, seabirds and waterfowl. The introduction of sediment into the water column is also a concern for marine/freshwater water quality and related effects on aquatic life.

The EPP for the Project will identify specific environmental protection measures that will be applied in relation to dust generation, including, but not limited to, the following applicable protection measures identified in the EPR:

- Limiting areas to be affected on the principle of smallest necessary footprint;

- Use of explosives in or near water will be avoided wherever possible. Where explosives are required in near rivers, bodies of fresh water, salt water or intertidal zones, impacts to fish and fish habitat (i.e. through sedimentation) will be minimized by adhering to the "Guidelines for the Use of Explosives in or Near Canadian Fisheries Waters" (Wright and Hopky 1998) and mitigation measured provided therein, where applicable.

2.23 Abandonment of Work site

Abandonment of work sites can result generation of disturbed areas that can generated dust and sediment runoff into streams as well as being available for invasion of non-native vegetation.

The EPP for the Project will identify specific environmental protection measures that will be applied in relation to dust generation, including, but not limited to, the following applicable protection measures identified in the EPR:

- Use of dust control agents on roads, laydown areas and material stockpiles using dust control agents such as water and calcium chloride;
- Development and implementation of and Erosion and Sedimentation Control Plan (ESCP) incorporating principles of limiting the exposed area, limiting exposure time, diverting runoff, limiting runoff velocity, and protecting concentrated flow areas;
- Revegetation of the disturbed footprint with native plant species to stabilize the area and promote regeneration of wildlife habitat.

2.24 Vessel Operations

The primary potential interactions of increased vessel traffic during construction is with marine mammals and is associated with the increase in underwater noise produced by ships involved with construction. Marine mammals may also be affected by accidental releases of small amounts of deleterious substances such as hydrocarbons into the marine environment.

The EPP for the Project will identify specific environmental protection measures that will be applied in relation to marine traffic, including, but not limited to, the following applicable protection measures identified in the EPR:

- Aherance to Transport Canada Acts and Regulation regarding noise levels and in-water activities;
- Project vessels will maintain constant course and speed to the extent practical, and will detour around marine mammals if it is safe to do so;
- An emergency response plan will be developed to address potential accidental releases of deleterious substances.

3.0 Contingency Plans

3.1 Fuel and Hazardous Material Spills

3.2 Wildlife Encounters

3.3 Forest Fires

3.4 Discovery of Historic Resources and Management

3.5 Avifauna Management

3.6 Migratory Bird Site Management

4.0 Contacts

APPENDIX E HISTORIC RESOURCES IMPACT ASSESSMENT CRÉMAILLÈRE HARBOUR, NOVEMBER 2018

Crémallière, Great Northern Port
Historic Resource Impact Assessment, Stage 1
Archaeological Investigation Permit #18.31

Penneys Beach and archaeological site Crémallière, Observation Point [EiAv-7]
(GPA image CH 447, 26 August 2018).

Submitted to
Provincial Archaeology Office
Department of Tourism, Culture, Industry and Innovation
Confederation Building, St. John's, NL
A1B 4J6
and
Frank Ricketts
Senior Environmental Advisor
Wood Environment and Infrastructure Solutions
133 Crosbie Road, St. John's, NL
A1B 3Y8

Submitted by
Gerald Penney Associates Limited
P.O. Box 428, St. John's, NL
A1C 5K4

6 November 2018

CONTENTS

Gerald Penney
ASSOCIATES LIMITED

Letter of Transmittal

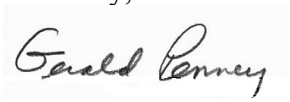
6 November 2018

Martha Drake
Provincial Archaeologist
Provincial Archaeology Office
Department of Tourism, Culture, Industry and Innovation
Confederation Building, St. John's, NL
A1B 4J6

Dear Martha,

Please find enclosed our report: "Crémallière, Great Northern Port, Historic Resource Impact Assessment, Stage 1."

Sincerely,



Gerald Penney
President

/encls

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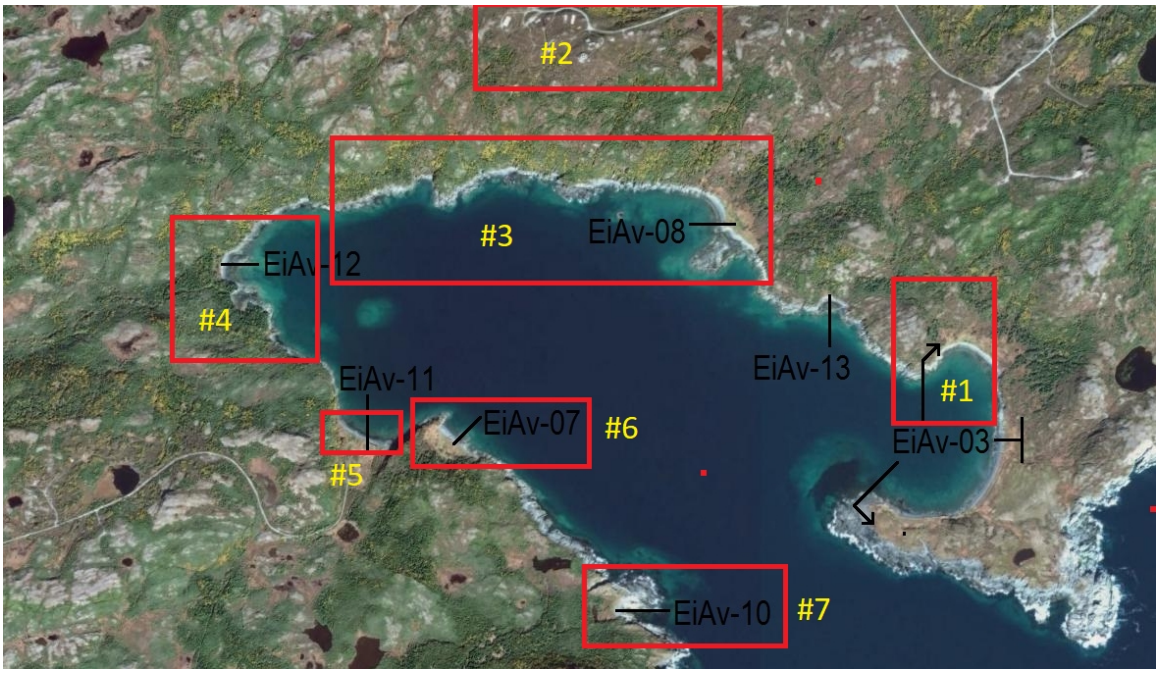


Crémallière Harbour archaeological sites (Google earth, with labels added by GPA).

Executive Summary

Seven areas of interest (AOIs), which Gerald Penney Associates Limited (GPA) had identified through desk-based archaeological assessment (GPA 2018), were assessed in the field on 26-29 August 2018. As a result of field assessment, the Provincial Archaeology Office (PAO) has determined that there are four new archaeological sites in Crémallière Harbour. However, only one of these (AOI#5/EiAv-11) is in an area where project groundworks are proposed.

A mitigation strategy will ultimately be determined by the PAO and transmitted as terms of reference. However, it is a rule-of-thumb that the best strategy is site protection/preservation through avoidance, if possible. GPA suggests establishing a "buffer" around each site, as delineated during test-pitting and surface survey. (See Appendix D pp. 80-83 for preliminary mapping of a 50 m buffer around principal sites.) At a 15 October 2018 consultation meeting with representatives of Wood plc and GPA, Great Northern Port principals expressed general agreement with the buffering approach, with exact dimensions to be determined by the PAO.

Recommendations from fieldwork include the following:

AOI#1 – Grand Rochelle/North Point

-Establish coordinates for EiAv-03 site west boundary. Buffer distance (50m?), request guidance from PAO and adjust chain-link fence accordingly;
-Exclude NP Hill daymark from GNP fenced compound; and
-Buffer based on waypoints 528-534 a partial perimeter of uninhabitable landforms (open to the east). [Hereinafter the abbreviation "wpt" will be used for waypoints.]

AOI#2 – St. Anthony Air Station

-The projected fuel tank farm will take in a 1968 dump/military equipment landfill site. This dump is not of archaeological interest, but its presence may be taken into account by GNP as an environmental factor.

AOI#3 – Northwest Shore

-At Russells Cove, the Thomas Penney land grant/enclave may be sufficient to protect archaeological site EiAv-08, but should be precisely mapped in relation to wpts 506-524–a perimeter of uninhabitable landforms.

AOI#4 – Crémallière Bay

-The establishment of new site EiAv-12 is based on minor findings of ballast flints (stones, typically from English Channel ports, which were brought over as ballast and dumped when loading fish for the return journey), iron, and vegetable garden drills. Buffer 50 m from shoreline? Note that the projected new road around the harbour is +500 m inland.

AOI#5 – Batteau Cove

-New site EiAv-11 was established based on minor findings of ballast flints, ceramics, and iron. Most of these materials were found on the west side of the cove, which is excluded from GNP's Crown land application based on a pre-existing land grant per land grant.
-The projected Port Authority and warehouse building footprints are in a previously-disturbed area, resulting from the burial of fish offal from the St. Anthony fishplant.

AOI#6 – Observation Point/Penneys Beach

-The suggested strategy is avoidance during the construction period and after, a buffer zone to be determined by PAO based on wpts 491-503, a perimeter of uninhabitable landforms.
- The projected Warehouse and Distribution Facility may be too close to archaeological site EiAv-07 and its buffer. Once development plans are finalized the placement of this facility should be reviewed and adjusted if necessary.

AOI#7 – Low Point

-New site EiAv-10 (iron and lead materials 70 m inland, previously unearthed by a metal detectorist) should not be impacted by the proposed development and could be protected by buffering/avoidance.

Our field investigations confirm that AOI #6/EiAv-07 has both the greatest potential and greatest potential disturbance from the proposed development. In consultation with regulator, GNP should commit to a specific mitigation strategy for this site.

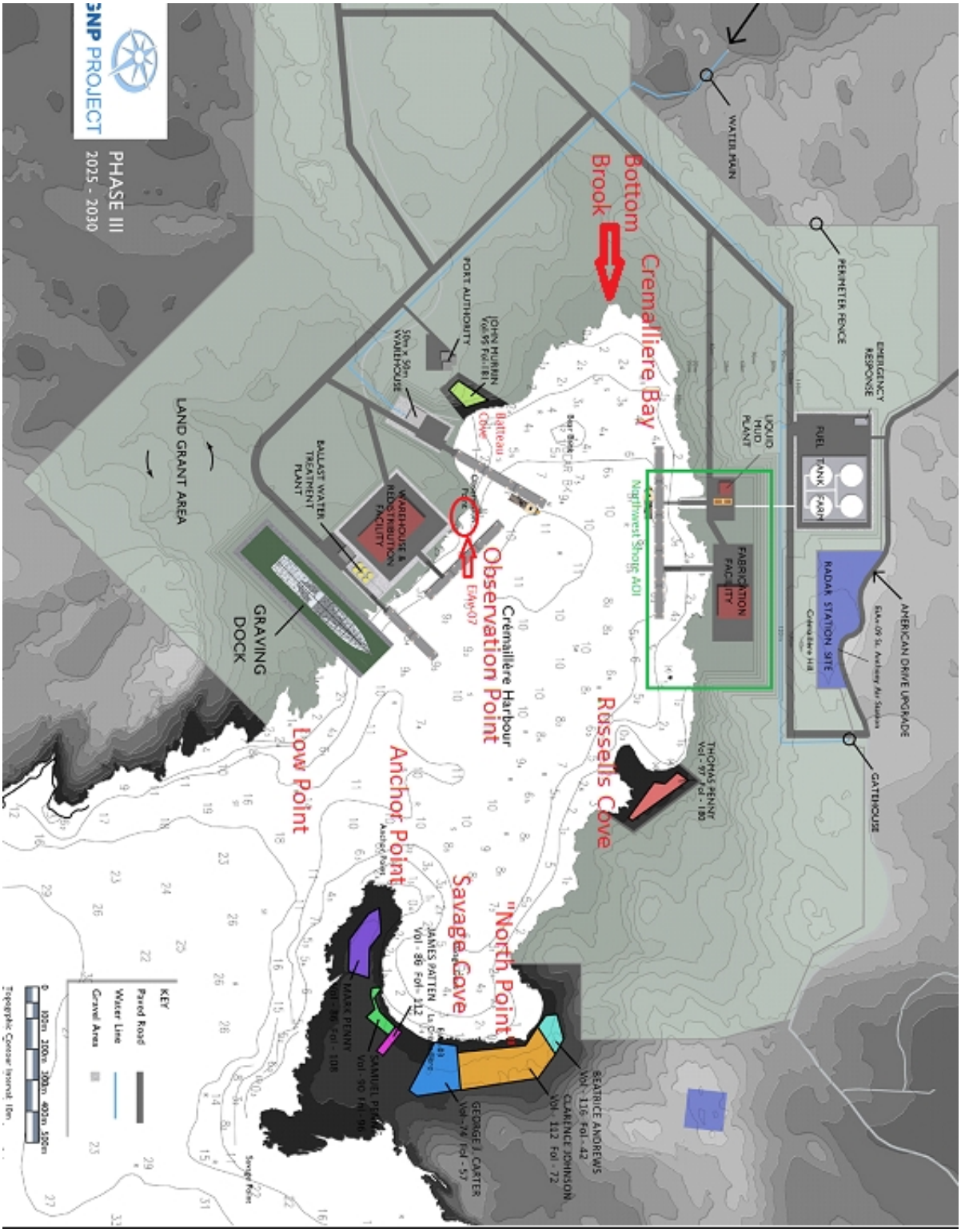
See also “Recommendations” at pp. 58-61.

Participants

Gerald Penney, M.A.	Principal investigator
Blair Temple, M.A.	Field archaeologist, archaeological research
Toby Simpson, B.A.	Drafting, digital mapping
Robert Cuff, M.A.	Field assistance, historical research, report preparation

Looking south across Savage [Big] Cove from Grand Rochelle, towards Anchor Point and Cape Haut-en-Bas (CH.566).

The assistance of Amanda Crompton and Marc Bolli, boat operator Dwayne Cull, John Erwin and Stephen Hull of the PAO, Frank Ricketts of Wood plc, as well as John Simms, Cyril Simmonds and Maude Simmonds of St. Anthony, is greatly appreciated.



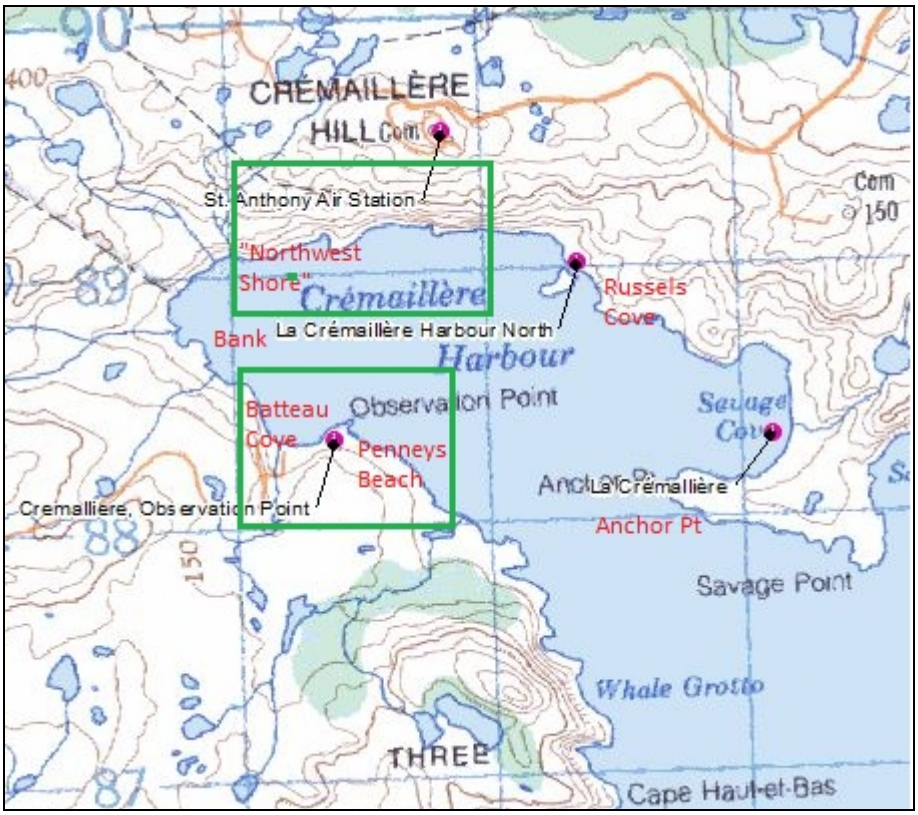
Projected works for the Great Northern Port by Phase III (2030), with field names added by GPA. Added red oval indicates archaeological site EiAv-07 at Observation Point. We use a field name "Northwest Shore" for the area enclosed by a green box at right (Great Northern Port).

Introduction

In July 2018 GPA was contacted by Wood plc requesting a desk-based historic resources assessment for the proposed Great Northern Port project at Crémallière[1] Harbour, near St. Anthony, Newfoundland and Labrador. Great Northern Port (hereinafter GNP) proposes to develop a marine base to service emergent offshore industry in the Labrador Sea. Our report "Great Northern Port (Crémallière) Desk-based Archaeological Assessment" (hereinafter, DBAA) was submitted on 20 August 2018. It proposed a field assessment of seven areas of interest and formed the basis of an Archaeological Investigation Permit application, under which assessment was conducted 26-29 August 2018 – Permit #18.31. This report combines GPA's research from the DBAA with results from field investigation and a meeting held with GNP on 15 October 2018 to discuss possible mitigation strategies.

Crémallière was a summer base for the French migratory fishery in the 16th, 17th, 18th and 19th centuries (Tapper 2014), and was a small inshore fishing settlement from the late 19th century until approximately 1915. There are six known French fishing rooms, which are represented by three registered archaeological sites. Four of these rooms are encompassed by archaeological site La Crémallière (EiAv-03, designated 2007; Pope et al 2007). One La Crémallière room,[2] historically known as *Grand Rochelle*, is very close to GNP's proposed eastern boundary. A fifth room, *Petit Rochelle*, at Russells Cove, archaeological site La Crémallière North (EiAv-08, designated 2013; Tapper and Pope 2014) is roughly equivalent to an enclave or excluded area, not included within GNP's Crown grant application area as it is private property. On the south side, a sixth French room, archaeological site Crémallière Observation Point (EiAv-07, designated 2013; Tapper and Pope 2014), is in an area which encompasses most of the proposed GNP facilities, including two buildings, three piers, a container yard and a graving dock. EiAv-07 is the only archaeological site within the Crown grant application area.

[1] Local pronunciation, roughly, cr-MEAL-ya.
[2] This fishing room was included in archaeological site EiAv-03 based on a brief survey in 2007, but is physically removed from the other three.



Crémallière Harbour, with approximate locations of previously-known archaeological sites as red dots. Field names are added in red. Green boxes indicate two primary work areas: Northwest Shore at top and, below it, Observation Point (PAO, with additions by GPA).

In addition to Observation Point and area the second principal area proposed for development is the northwest side of Crémallière Harbour, where there will be a marginal wharf, possible liquid mud plant, fabrication facility and fuel tank farm. The "Northwest Shore" of Crémallière (see above) is steep-to the salt water and was not used by French fishers or Newfoundland settlers. A proposed fuel tank farm is proximate to a 1953-68 radar station on Crémallière Hill, which is also a registered archaeological site, St. Anthony Air Station (EiAv-09, designated in 2016).

This report reviews previous archaeological investigations in the Crémallière area, and summarizes the results of GPA documentary research and field investiagtions, with a view to developing mitigation strategies in order to identify, protect, and possibly remediate historic resources.

Typical coastline of the "Northwest Shore" of Crémallière Harbour, a small peninsula between MP Cove and FF Cove, off which there will be access to a marginal wharf. Possibly a Liquid Mud Plant will be located at centre (GPA image CH.537).

Study Area/Natural Features

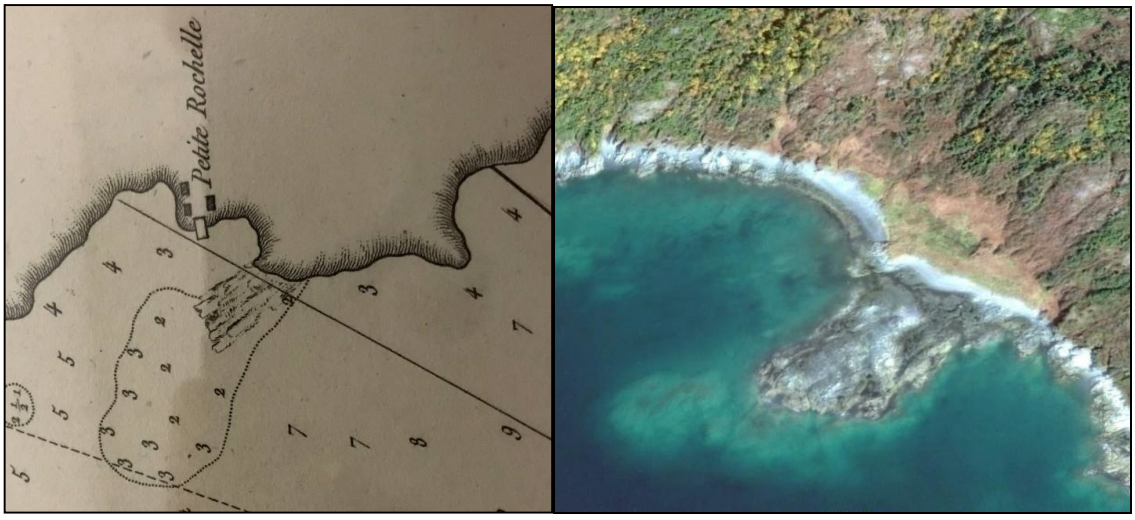
Crémallière Harbour is on the east coast of the Great Northern Peninsula, approximately 2.4 km southwest (SW) of the town of St. Anthony, which is the regional service center for the area. Typical of the eastern or White Bay side of the Peninsula, the land about Crémallière is a hilly barren on the higher ground, punctuated by scrub forest in the hollows, with a rocky coast steep to the shore.

The harbour measures about 2.5 km east and west and 1.2 km north and south and is entered on the southeast through a 550 m-wide passage, of which about 400 m is the navigable ships' channel. Although much of the shoreline is rocky and sheer, there are several cobble and/or coarse sand beaches, the largest and best sheltered being on the east side at Savage Cove (locally, Big Cove[3]). With the best small-boat landings, closest access to fishing grounds, and ample shore space to dry salt fish, Savage Cove was the focus of most fishing activity at Crémallière in the historic era. There were four French fishing rooms here, designated archaeological site La Crémallière (EiAv-03). West of Savage Cove, there are several much smaller coves, the closest of which is about halfway between Savage Cove and Russells Cove, for which GPAs fieldname is "HW Cove."

[3] GPA employs local nomenclature by preference. However, the cartographic record for the name Anse aux Sauvages/Savage Cove is well established historically, was repeatedly employed by other archaeologists, and so is adopted here.

Savage Cove and archaeological site La Crémallière (EiAv-03), with approximate locations of the principle French fishing rooms added in yellow and GPA field names in red, HW Cove at top, left (Google earth).

Going west, the next major landing is "Russells Cove," once a French fishing room, Petit Rochelle. This room is registered as archaeological site La Crémallière North (EiAv-08).



At left, the Petite Rochelle fishing room, from a French chart of 1792. Right, a Google earth image of Russells Cove, its name probably an Anglicization of "Rochelle."

West of Russells Cove, there are several small beaches (field names moving west: PN Cove, FF Cove, MP Cove and CO Cove), which were assessed in the course of a boat survey as being marginal landings, with virtually no level backing ground. One, "PN Cove," was identified by boat operator Dwayne Cull as being a place where he

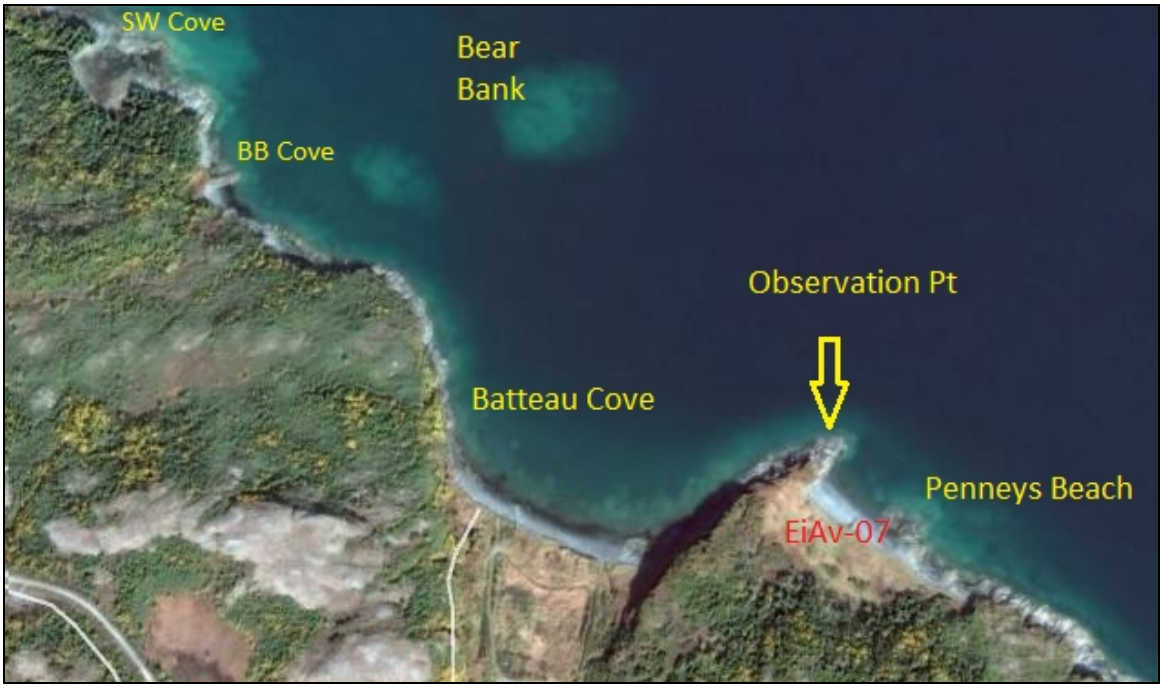
sometimes landed for family picnics, but the beach here was completely boxed-in by surrounding cliffs. The survey team also attempted to visit "CO Cove" overland from Crémallière Bay, but it is blocked by cliffs.

GPA field names around Crémallière Harbour (base map by PAO, additions in red).

The west end of Crémallière Harbour is locally known as Crémallière Bay. Here, a beach approximately 70 m long provides a landing for occasional picnics and mussel-boils, as there is an extensive mussel-bed in adjacent "SW Cove," as well as sources of fresh water at "Bottom Brook" and "Falls Cove." There are also small beaches either side of Crémallière Bay: at Falls Cove to the northeast and "BB Cove" to the southeast.

On the south side of the harbour there are larger beaches either side of Observation Point: an approximately 150 m beach at Batteau Cove on the west, and approximately 140 m at Penneys Beach, just east of the Point. A hydrographic feature of interest is a shallow about 350 m north of Batteau Cove, known as the Bear Bank. The French fishing room at what is now Penneys Beach was known as *Banc á l'Ours* – registered as Crémallière, Observation Point (EiAv-07). It will be most directly affected by GNP's development.

SW Cove mussel beds, looking north. "CO Cove" is right of centre, just left of Mr. Cull's boat (GPA image CH.619).



Field names of natural features on the south side of Crémallière Harbour. The Banc á l'Ours fishing room at Penneys Beach was registered as archaeological site EiAv-07 in 2013 (Google earth image with labels added by GPA).

Aerial view of Observation Point (yellow box), Penneys Beach to its left and Batteau Cove to its right, showing vegetation and topography typical of Crémallière Harbour (after Great Northern Port 2017:24).

This view of the west end of Russells Cove show typical rugged country surrounding the major beaches and their anthropogenic clearings, to 50 m asl within 100 m from the high water mark, as at far left (GPA image CH.548).

A chart of Crémallière harbour, Letourneur [1784]. The Banc á l'Ours *fishing room and Batteau Cove are at bottom, left, with a structure backed by ten* rances[4] *and fronted by two* galets, *judged sufficient for eight boats. The other five fishing rooms in the harbour are judged 12-20 boats' room, for a total capacity of 84 boats.*

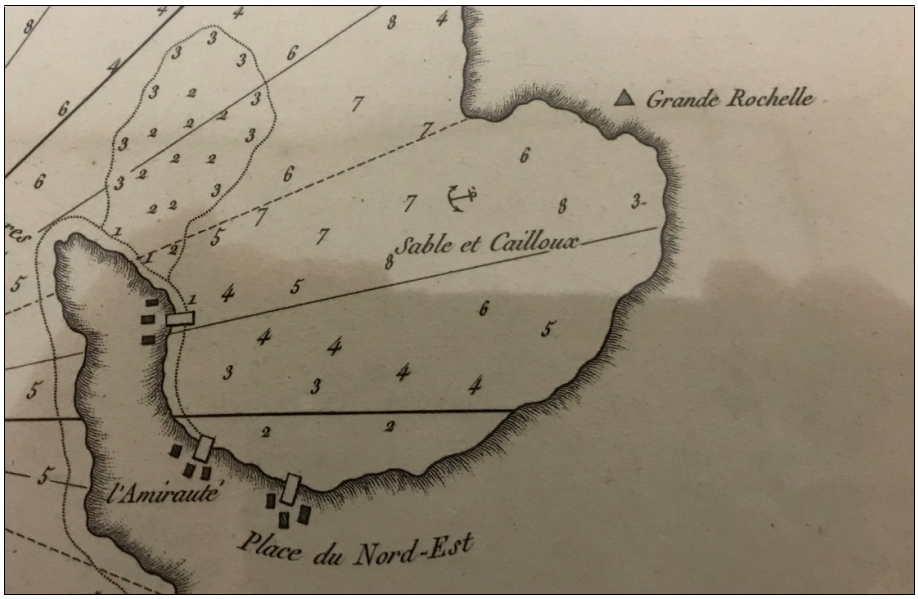
[4] The French distinguished between "galets" and "rances." *Galets* (Breton; sometimes referred to as *graves* by Normans) are artificial or augmented cobble surfaces where fish can be spread for drying directly on the rocks, generally known in Newfoundland English as "bawns." *Rances* (literally, "boughs") may be thought of as low flakes, often with the boughs resting directly on the ground in order to provide for air circulation. A *vigneaux* or *flagues,* is a feature more like a traditional flake. Another term, *cailloux*, refers to pebble, as opposed to cobble (*galet*) beaches.

Looking southwest across Crémallière Harbour in 1857. Anchor Point, with its three French fishing rooms, is at centre and the Three Mountain Summitts at top, right. Above the bill of Anchor Point, a schooner sails by Low Point (by Rev. William Grey, Centre for Newfoundland and Labrador Studies, MUN).

Historic Context

The potential for either pre-contact or historic-era aboriginal use of Crémallière Harbour is discussed below, under "Previous Archaeology." Historic-era European use began in the 1500s, with most scholars suggesting that a French migratory fishery to the Petit Nord began about AD 1510. Certainly fisherman from Brittany, and particularly from the ports of St-Malo and La Rochelle, were established on the tip of the Northern Peninsula by 1534, when Malouin explorer Jacques Cartier visited St. Anthony and Quirpon. Crémallière was likely an established fishing station by 1540, when it was first mapped. It is one of eight French stations at the headlands of Hare Bay, which between them were used by 1500-2000 fishermen each summer. St. Anthoine, Crémallière, Trois Montagnes [locally, Back Cove] and Petite Oie [Goose Cove] are near the north headlands of the Bay. Fischot, Islets Harbour [Zealot], Grandois, and St. Julien are on the south side. In 1640 a Breton petition listed Crémallière's annual capacity as 300 men making it, with Quirpon and Fischot, one of the largest fishing stations on the Petit Nord. In various

surveys of the Petit Nord from 1640 to 1872 its capacity is listed as being from 40 to 94 boats (Tapper 2014:51).



Detail of the Savage Cove rooms from de Combis (1792). At top, right, a triangle indicates that the Grand Rochelle room was formerly inhabited, but had been absolutely destroyed.

By 1678 the French fisheries at the Petit Nord and the Strait of Belle Isle were estimated to employ 300 ships and as many as 20,000 men annually. The mid-to-late 17th century was the most productive period for the French-Newfoundland fishery, which declined 1689-1713 due to a series of wars between France and England. It revived after 1713, but again ceased temporarily 1756-63, during the Seven Years' War. This French hiatus coincided with the initial English "northern fishery," whereby fishers from the West Country of England and northern Newfoundland occupied many of the former French stations. Crémallière was so occupied, but on a small scale, being used by a single English ship, with four boats and 24 men in 1764. By 1766 the French had returned and had 50 boats working out of Crémallière.

Two detailed charts of Crémallière were produced in the late 18th century: Letourneur (1784?[5]) and de Combis (1792, based on observations taken in 1786). There is also a

[5] This collection of roughly-drawn charts was dated by Pope to around 1780 and by Tapper to 1784. Note that Letourner indicated two active fishing rooms which were noted as being "*habitte autrefois… absolument detruit"* in 1786.

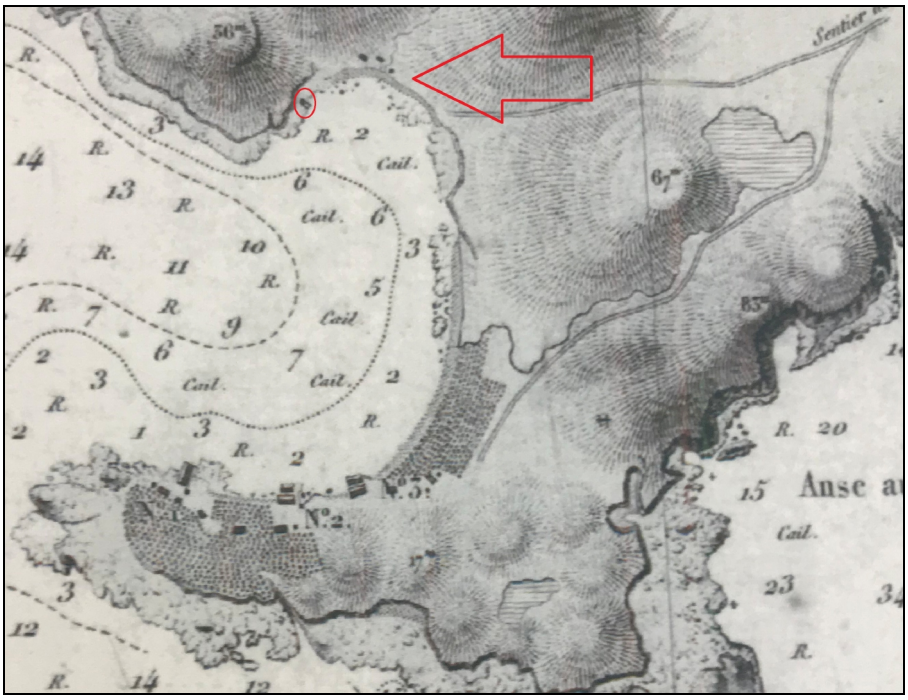
near-contemporary (1785) inventory of shipping, which shows eight vessels of St-Malo fishing out of the port, its ship tonnage was exceeded by only three other harbours of the 32 surveyed: Quirpon, St. Juliens and Crouse.

From 1795 to 1815 French activity was again curtailed by war. Crémallière was noted as being a focus of fishing activity early in the 19th century, and seems to have been visited by three to six French vessels in some years. Noted as being fished in 1821, 1832, 1848 and 1857, by 1872 St. Anthony and Crémallière were the only harbours in the Hare Bay area still frequented by the French. Their use of Crémallière probably continued to about 1880. As the French fishery to the Petit Nord declined, English/Newfoundland year-round settlement became established at many of their fishing stations. Some of the first settlers were families of *gardiens*, Newfoundlanders engaged to protect French fishing establishments during the winter months. They also traded with the French crews in timber, boats, and bait. The *gardien* system was in use by the 1820s, and there were *gardiens* in most principal harbours by 1850.

Crémallière first appears in a Newfoundland *Census* in 1857, with a population of nine, comprising a single family headed by a man over 70 years of age – perhaps an aging *gardien.* This was the same year that English missionary Rev. William Grey visited and sketched its fishing rooms: "mostly large tents, set up for the summer fishing season and taken down when the fishermen return to France in the autumn." In the 1860s a boom in the population of Twillingate and western Notre Dame Bay (where the Tilt Cove copper mine was established in 1864) led to a Newfoundland-based migratory fishery at the former French stations. The Newfoundland-French Shore fishery has been little documented, but it was probably the source of most fishers recorded as living in Crémallière in the late 19th and early 20th centuries. The earliest documented residents were John Patey[6] and family in 1872. In 1874 there were 18 people, three houses and three fishing rooms in use. Other *Census* records 1884-1911 indicate three or four

[6] In 1926, when Thomas Penney was granted the former Petit Rochelle room at Russells Cove, the land adjacent to the north was noted as being occupied or claimed by John Patey (see p. 52). This family name, common at St. Lunaire, St. Carols, and St. Anthony, does not appear in the business directories for Crémallière.

resident families and a population which fluctuated between 12 and 26. From business directories and church records we know who these families were.

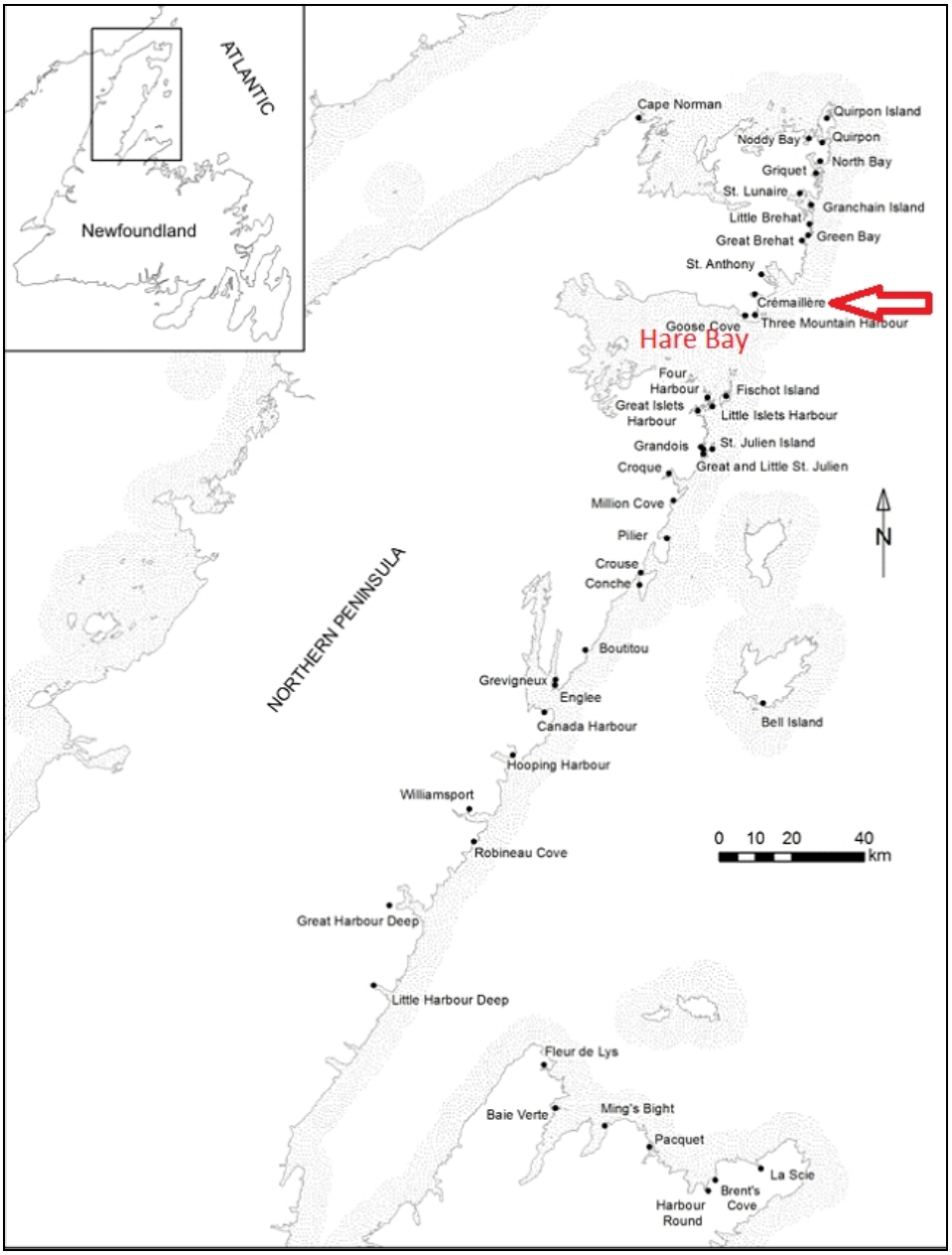


Detail of Savage Cove from Pierre (1860). There are three numbered French rooms on the south side of the cove. Three structures on the north side may represent the homes Newfoundland settlers. They are indicated by an added red arrow, with a red circle showing a wharf or stage, very near where Mr. Cull chose to land the survey team (wpt "Wf pt"). Note the path ("sentier") at top, right, connecting both the French rooms and northside structures to St. Anthony.

George Cadwell (1854-1917) and George Frampton (1845-1932) came from Harbour Grace and Carbonear respectively, marrying women from the French Shore, likely of the Patey or Rose[7] families. Alfred Rice (1849-1912) was born at Twillingate, while the French-born Louis Pasma (1837-1898) had married a Newfoundland woman at St. Anthony about 1867. Crémallière last appears in the *Census* in 1911. By the next *Census* (1921), Pasma, Rice and Cadwell were all dead and Frampton was living at Norris Arm. Alfred Rice's son, John Rice, moved to Back Cove [Three Mountain Harbour] in 1915, this being the last certain record we have of year-round settlement.

[7] The principle family name of Three Mountain Harbour.

Very likely the "abandonment" of Crémallière in 1915 was followed by a new influx of summer fishers. Crown land grants were obtained at Anchor Point 1915-18 by residents of St. Anthony, Freshwater (Carbonear) and Flat Islands, Bonavista Bay, while John Murrin of Goose Cove and Thomas Penney of St. Anthony obtained grants at Batteau Cove (1924) and Russells Cove (1926), respectively. It continued is use as a summer fishing station until about 1935.



French fishing stations of the Petit Nord (from "Newfoundland's Petit Nord: An Historic Maritime Cultural Landscape" / http://niche-canada.org/member-projects/petit-nord/fishing_stations.html).

Previous Archaeology

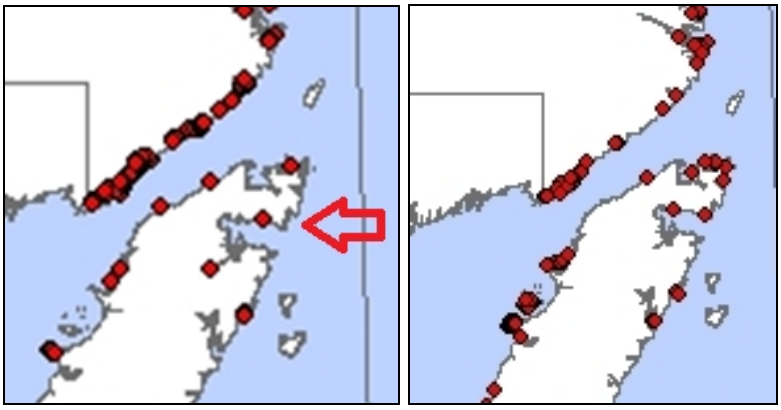
While there is no documented pre-contact or historic aboriginal presence at Crémallière Harbour, the Great Northern Peninsula has a wealth of archaeological sites, including multi-component sites (exhibiting evidence of more than one culture). The best known of these are near Port aux Choix, about 140 km to the SW of Crémallière, designated a National Historic Site. Another concentration of pre-contact sites is in the Cape de Grat-Quirpon area, about 30 km to the north and proximate to another National Historic Site, the Norse settlement at L'anse aux Meadows.

Pre-contact cultures of Newfoundland. The first recorded cultural group on the Island were the Maritime Archaic Indians (MAI), who arrived about 4000 BC, the earliest evidence coming from the Gould site at Port au Choix. This is also the location of the well-known MAI cemetery site excavated in the 1960s after it was accidentally discovered during mechanical excavations for a building foundation. The closest MAI site to Crémallière is at Ireland Bight, about 10 km west of the GNP Project Area.

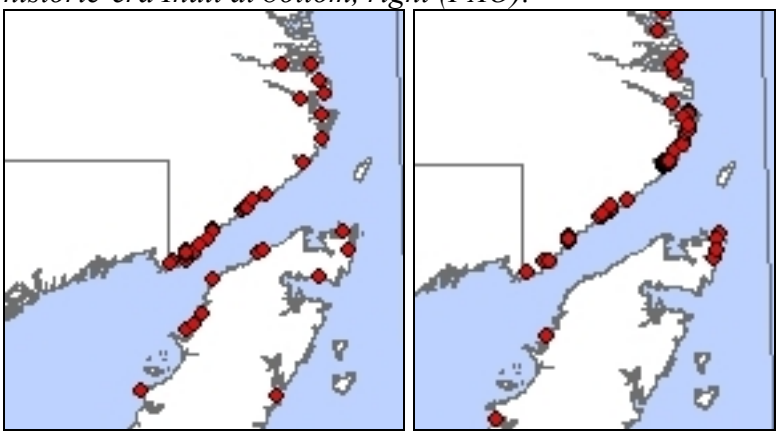
MAI sites have not been found after approximately 3200 BP [1300 BC], and it may be that the Island was not peopled for the next 200-300 years. It was repopulated approximately 2990 BP [about 1000 BC] by Groswater Paleoeskimoes, who also arrived from Labrador, where they had existed for two centuries previous. During the last centuries of Groswater occupation, two additional groups arrived from Labrador: Dorset Paleoeskimo, and the first Recent Indians groups.

Dorset, who first arrived approximately 2000 BP, became the most populous and widely distributed pre-contact group in Newfoundland. They had an even greater marine-oriented subsistence than Groswater, focusing on seals, supplemented by birds and fish. Seal procurement occurred at sites located along the coast, often at highly exposed headlands. The closest Palaeoeskimo sites are at Goose Cove, about 4 km to the SW of Crémallière, while there are many others in the Quirpon-L'anse aux Meadows area.

Meanwhile, a wave of Amerindians – referred to as Recent Indians – arrived approximately 2100 BP. The last pre-contact Recent Indian culture, known as the Little Passage complex, may be thought of as ancestral Beothuk. Little Passage culture had a mixed interior-coastal subsistence pattern. Encounters with Europeans in the 16th century had a gradual effect on their material culture through the adoption of metal. It is these European materials, primarily acquired by pilfering form fishing stations during the winter, which distinguish Beothuk sites from pre-contact. From the 16th century onward, the expansion of the European fishery and eventually settlement resulted in a contraction of the area typically inhabited by the Beothuk. They would become concentrated in the Notre Dame Bay area and eventually forced into the interior. The Recent Indian site closest to the study area is Ireland Bight (EiAw-01), about 10 km west. The only proximate Beothuk site is at Four Harbour, near Fischot and the south headland of Hare Bay, about 20 km SSW of Crémallière.



Distribution of archaeological sites (as of 2015) at the tip of the Great Northern Peninsula: MAI at top, left; Palaeoeskimo at top right; Recent Indian at bottom, left; and historic-era Inuit at bottom, right (PAO).



In the midst of this dual (Dorset and Recent Indian) occupation, the Norse arrived. Their arrival is a significant contact event between North Americans and Europeans, while the 1960s discovery and excavation of L'anse aux Meadows, 30 km NE of the study area, was a landmark in the history of archaeology.

Proximity of the pre-contact (Dorset) sites at Goose Cove (added red arrow) to Crémallière, indicated by a green arrow (PAO).

Very little is known about Beothuk presence on the Northern Peninsula, as it may be that by the time of contact they were already focused on the Exploits River system and western Notre Dame Bay. This concentration increased as the Beothuk withdrew from the areas most frequented by European fishers, including the Petit Nord, which was the part of Newfoundland most frequented by Europeans in the 16th and 17th centuries. There is also evidence that the Petit Nord fishery encouraged visits to the tip of the Great Northern Peninsula by aboriginal groups from Labrador, who engaged in both trade and winter pilfering. Inuit and Innu presence may have further encouraged the Beothuk to go

elsewhere. Inuit were recorded from the late 1500s to late 1700s, while Innu persisted into the late 19th century. There is vague report of a continuing Beothuk presence in Hare Bay in the late 17th and early 18th centuries, with the primary documented instance 1718-20 being based on report of the Innu (Marshall 1996:40, 53, 57), which is not located more specifically than *Baie des Lièvres* [Hare Bay]. Both Inuit and *sauvages rouges* looted rooms at Hare Bay during the winter, and sometimes burned boats to obtain nails.

Pre-contact site potential

Although there has not yet been a focused archaeological investigation of the north side of Hare Bay concentrating on pre-contact and historic presence of native peoples, an inventory of Petit Nord fishing stations indicated a Palaeoeskimo presence at nearby Goose Cove, 4 km SSW of Crémallière. This brief survey of French stations found a Dorset-style end blade and a worked core from shovel test at Goose Cove North (EhAv-02), as well as a possible Dorset rock and sod dwelling foundation at Goose Cove South (EhAv-01). Other than its proximity to known pre-contact sites and a vague documentary reference to Indians in Hare Bay, there are some further indications of pre-contact site advantage at Crémallière, particularly so for the Dorset culture, which favoured headlands and exposed situations on the outer coast. It should also be noted that GNP's proposed development is based on Crémallière Harbour being naturally ice-free, which may be presumed advantageous for hunting marine mammals. Certainly the highest expectation based on pre-contact site advantage is at Anchor Point/Savage Cove, which has the best access to headland marine resources. Further, the place name L'anse aux Sauvages/Savage Cove likely had its origins in some post-contact aboriginal presence. Another headland location of interest is opposite Anchor Point, at a point on the SW side of the entrance, which GPA has given the field name "Low Point." It is about 200 m SE of the footprint of the proposed graving dock.

Archaeology of the Petit Nord

In 2004, to commemorate the 500th and 100th anniversaries of French arrival and departure from the Petit Nord, the Social Sciences and Humanities Research Council of Canada funded a multi-year project headed by Memorial University's Peter Pope to

investigate and document the archaeology and maritime cultural landscapes of the east coast of the Great Northern Peninsula. The purpose of the study was to inventory, and register as archaeological sites, approximately 40 locations where French presence was known from documentary sources.

In 2007 Crémallière was visited at Savage Cove and registered as La Crémallière (EiAv-03), following a brief survey finding "decisive artefactual evidence of French presence and some interesting features" (Pope et al 2008). It was suggested that further archaeology on this site could be productive. The following year Pope's team also visited nearby Goose Cove and Three Mountain Harbour, again briefly (Pope et al 2009). In 2013 a supplementary field survey of French fishing rooms visited other areas indicated by the cartographic evidence assembled for the larger project. This resulted in identification of further evidence of the historic French fishery at Three Mountain Harbour East and at Observation Point and Russells Cove (Tapper and Pope 2014).

The main beach on the east side of Savage Cove as it appeared in 2007, looking north from Anchor Point. At left, an area of outcrop/cliff forms a physical boundary between the principal French rooms and Grand Rochelle (after Pope 2008).

Field Investigation

AOI#1 – Grand Rochelle/North Point (field investigation 28 August 2018).

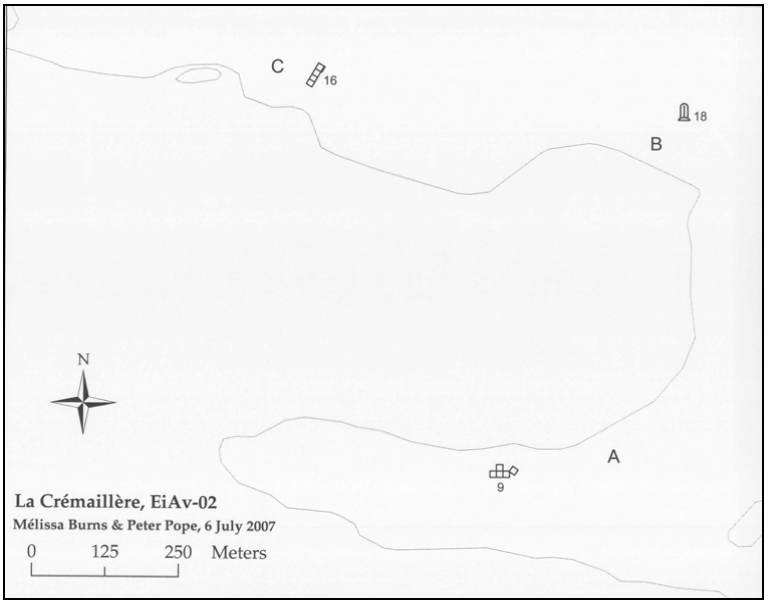
The former Grand Rochelle fishing room is the portion of EiAv-03 adjacent to GNP's Project Area, which is approximately 100 m to the west and north of the west end of Grand Rochelle beach (wpt "Groch"). Although there are no wharves or buildings being proposed here, GNP preliminary sketches anticipate building a chain-link perimeter fence running north from the bill of North Point and running east from "NP Hill." In this light, the headland and hill at North Point were surveyed for pre-contact historic resources and French "daymarks" in proximity to Project Area boundaries, and in light of the fact that minimizing project impact on EiAv-03 is one of GNP's primary commitments. For figures illustrating waypoint and test-pit locations, see Appendix C.

The La Crémallière/Savage Cove/EiAv-03 site includes the entire cove, a curving beach approximately 1200 m long and terraces 100 m and more inland. GPA's field survey concentrated on the northern cove (field name "GR Cove") for two related reasons. Firstly, it was obvious from desktop review that a map included in the 2007 report which resulted in EiAv-03 being designated a site was either erroneous, or the data present in text was not consistent to that depicted on the map (see overleaf).[8] Second, the north portion of Savage Cove borders on the south boundary of the proposed marine base Crown land grant application, so delineating the site was a prime purpose of the field investigation.

Upon landing at the beach at the far NW end, investigation by Mr. Temple began with a surface survey of the beach eastward and southward, to a rocky cliff along the east end of

[8] The 2018 testing and investigations found an error in either the mapping and/or recording of EiAv-03. Pope's map of EiAv-03 (Pope et al 2007, overleaf), illustrates the location of three primary finds (or concentrations of finds): Area A, B, and C. The present issue lies with the depiction of Area C: the limited discussion in the report, and the more detailed discussion in the site's Site Record Form, indicate that this Area is located on the north side of Savage Cove. However, the report map illustrates Area C as further NW, in our "HW Cove." Due to the high and thick vegetation growth during our visit in late August, the features identified by Pope – a linear stone feature, and a possible sod foundation – could not be discerned. The map accompanying the original SRF shows that the site is contained within Savage Cove, and the map in the report erroneous.

the harbour.[9] Ballast flint was identified primarily at the furthest north part of the harbour (wpt "BALL11", "BALL12" and BALLOTS"); a pipe stem fragment (wpt "STEM"; not collected) was identified near the SE end of the survey area; and two sherds of coarse earthenware – one unidentified, and another possible Breton – were collected along the NE shore (wpt "CEW" and CEW2").



Site plan, illustrating some of the features identified at EiAv-03 [not 02] in 2007 (Pope et al 2007:n.p.). Just left of "C" is the small cove given the field name "HW Cove" by GPA.

GR Cove, EiAv-03. The newly-recorded finds-area indicated within the red block. The fenced lot is visible at centre.

[9] This can be viewed as a physical separation between Grand Rochelle and the other French rooms represented by EiAv-03.

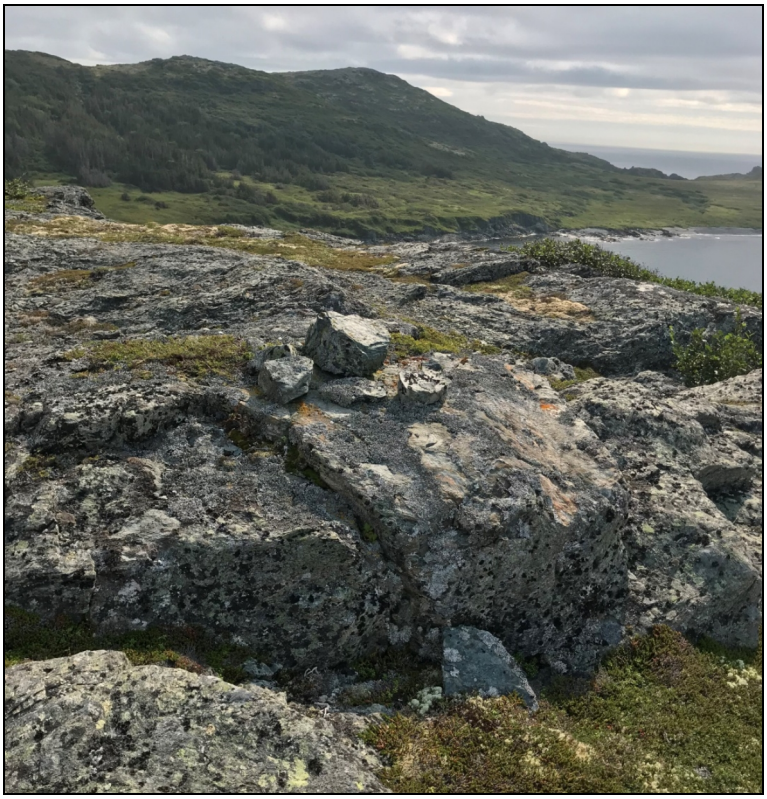
Surface survey specimens (EiAv-03): unidentified coarse earthenware (left); possible brown faience hollowware vessel (right; inset shows opposite side of sherd).

Investigation inland above the beach began at the south end of GR Cove. Here, the area contains two terraces, the upper covered in knee- to waist-high brush. It was well beyond the boundary of the proposed marine base Crown land application, and lay partly within a swath of private land grants, thus no test pitting was conducted along the north and east end of GR Cove. The ground was investigated for surface features to assist in correcting Pope's map, but nothing conclusive was identified. Traces of a potential *galet* (extensive cobble and pebble) were identified underfoot on the lower terrace, for a length of approximately 55 m along the base of the upper terrace (wpt "059" through "067"). Foliage was largely raspberry bushes. During the boat ride to the beach a series of wooden posts were visible on the upper terrace, determined to be a post and rope "fence". They are clearly modern, presumably placed by an individual to mark an existing land grant or claim (marked portion is approximately 20 m × 20 m), perhaps in response to the proposed development (wpt "FENCED", "056", "057" and "058").

Bearing in mind the presumed changes in vegetation overlying any former structures and other features as noted by Crompton and Bolli during prior consultation (and observed at EiAv-07), two anomalies were observed. One is located on the outer edge of the upper terrace (wpt "STR?"), and is a noticeable change in vegetation, approximately 4 m × 6 m

in size, with a depression in its centre. The other is on the lower terrace (wpt “STR2?”), visible as a roughly square patch of cow parsnip, approximately 4 m x 4 m in size.

EiAv-03 (GR Cove), showing vegetation changes and a possible structure or feature on the lower terrace.



Dismantled cairn or daymark, at the crest of NP Hill, wpt “Noprhill” (CH.587).

Mr. Cuff proceeded around our "North Point" toward the proposed GNP boundary. The top of "NP Hill" has a lichen-encrusted and dismantled rock cairn or daymark (wpt "Noprhill"). It was during this investigation that a cleft was identified, heavily used by the local moose, which allowed overland travel between the Petit Rochelle room at Russells Cove and the main French establishments of Savage Cove.

GR Cove is the presumed location of "several rock alignment and sod foundations" identified by Pope (Pope et al 2007:5). The Site Record Form for EiAv-03 states: "Feature 16 is a north-south rock alignment in the meadow of Area C with the associated square sod foundation immediately to the west of it. Feature 17 is 3 or 4 tabular rocks on a promontory above Area C." Due to the height of ground cover and foliage, no such features were identified, though a roughly flat platform-type area was observed and a single test pit excavated (wpt "C80"), with no cultural material identified. A possible ramp was recorded to the immediate east (wpt "RAMP"), likely a cultural modification of a natural cut in the terrace edge.

Testing along the furthest west portion of the lowest terrace at GR Cove, immediately above our landing area at wpt "Wf Pt," proved most productive. Ten test pits were excavated along an approximately 70 m stretch of shoreline immediately above the beach. Two contained cultural material, evidence of French occupation. Test pit C86 contained two nails, a sherd of TGEW, a sherd of REW (possible creamware), and a sherd of possible Breton CEW. Another test pit at "GR 5" approximately 20 m NE, produced two nails and another sherd of possible Breton coarse ware. Test pit C86 is the closest to the proposed GNP boundary/perimeter fence, approximately 75 m away. These finds point to a 19th century (possible 18th century) component, warranting mitigation, possibly in the form of avoidance (discussed below).

Tin-glazed earthenware (left, test C86) and possible Breton coarse earthenware sherds (centre, C86, and right, GR5).

With a view to possible mitigation, a survey of each of the known French fishing rooms included a "perimeter survey," whereby Mr. Cuff made a series of forays inland to points where the "grass-grounds" petered out into scrub and the land was judged unsuitable for habitation, either from slope or wet ground. The west and north perimeter of the GR Cove portion of site are represented by wpts 529-534.

GR Cove, looking southeast from wpt 529, the approximate location of perimeter wpt "532 pic" added (CH.594).

Perimeter photo, the base of an uninhabitable scree slope, wpt "532 pic" (CH.598).

In order to further investigate the possible 2007 recording error, Mr. Temple proceeded to the indicated cove west of "Area C," for which GPA's field name is "HW Cove." Surface survey along the beach identified ballast (wpt "FLINT"); subsurface testing (n=7) recorded nails in two test pits (wpt "CV02" and CV04"). These isolated finds are not especially diagnostic, but the situation of HW Cove halfway between EiAv-03 and EiAv-08 is certainly suggestive of possible traverse. The site has been registered and designated EiAv-13.

HW Cove, barred by a shoal at low tide.

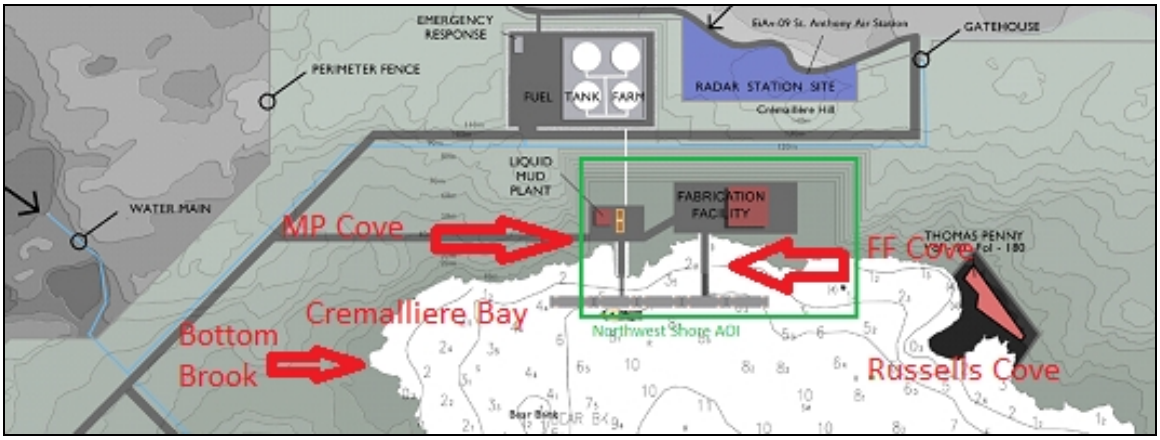
St. Anthony Air Station (1953-68) on Crémallière Hill (after GNP Project 2017).

AOI#2 – St. Anthony Air Station (field investigation 29 August 2018).

The site boundaries of EiAv-09 are based on land granted for a United States Air Force radar station in 1953, and are excluded from the GNP Project Area. Many foundations were readily observed at surface and historic aerial photography assists in delineating this site, which consisted primarily of a radar array to the east of a central peak and barracks and service buildings to the west. We visited the Air Station by road and conducted a walkover in order to assess site condition and facilitate GNP's commitment to additional buffering, if necessary. No test-pitting was conducted.

The ruins are easily accessible by gravel road and much visited for their view of the surrounding area and Crémallière Harbour in particular, with attendant graffiti on remnant concrete walls, while the more accessible areas are polka-dotted with the pot holes of metal detectorists. The Air Station was systematically dismantled, so that what remains are primarily concrete structural foundations, which are being progressively invaded by alders. We also visited a large disturbed area about 300 m west of the Air Station (wpt "Ddump"), where we had been informed a large amount of equipment (reputedly including entire vehicles) had been buried when the base was de-

commissioned. We concluded that this dump site is likely included in an area proposed by GNP for its fuel tank farm. Being post-1960 it is not of archaeological interest, while the main site is confined to a previously identified enclave. It does not seem to be at risk from GNP's project.



Proposed development areas and the excluded grants on the Northwest Shore of Crémallière Harbour (GNP, with labels added by GPA).

From the St. Anthony Air Station, looking southwest towards Crémallière Bay, across the area proposed as a fuel tank farm, at centre and right (CH 710).

Looking southeast from St. Anthony Air Station ruins, towards Savage Cove. Cape Haut-en-Bas at far right, with Goose Island (NTS Notre Dame Island) beyond it. About 3 km south of Savage Cove, Goose Island is a well-known cod-fishing ground (CH.717).

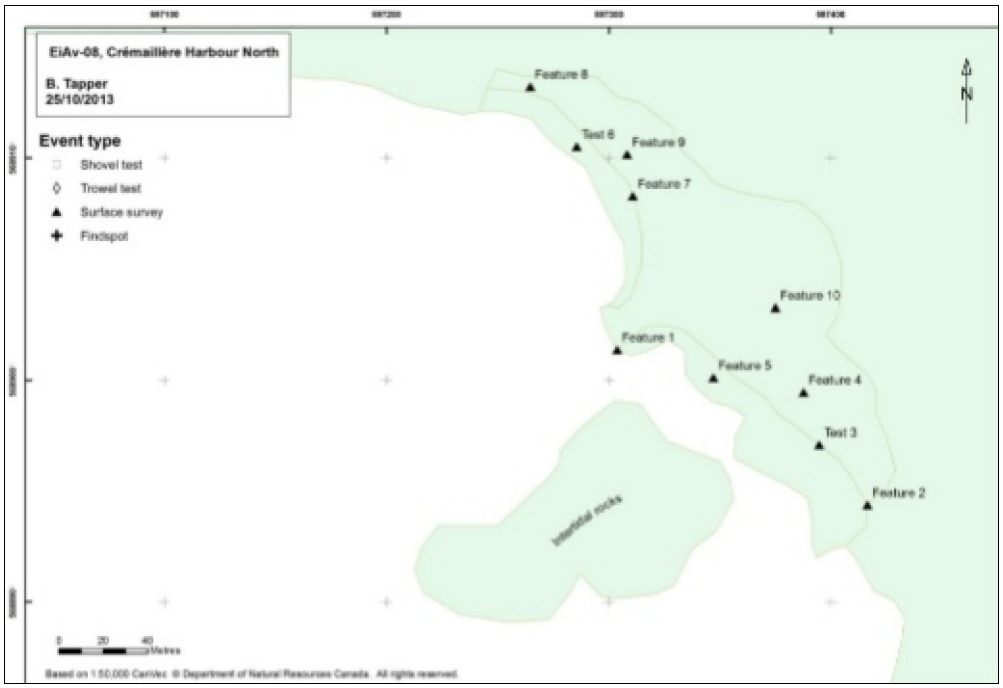
AOI#3 – Northwest Shore (field investigation 28 August 2018).

During our 28 August boat survey, GPA assessed EiAv-08 at Russells Cove, and possible landings at four small coves to the west which were given the field names PN Cove, FF Cove, MP Cove and CO Cove. The two central coves will be impacted by the projected building footprints of the Fabrication Facility ("FF Cove"), the possible Liquid Mud Plant ("MP Cove") and associated wharves.

Russells Cove, looking east from wpt 507 (CH.550).

To the southeast of the Air Station, EiAv-08 at Russells Cove includes the Petit Rochelle fishing room. This site is excluded from Project Area, as granted to Thomas Penney in 1926. The nearest work area is the projected Fabrication Facility, about 350 m to the NW. However, further delineating this small site was undertaken in order to determine whether the allotted buffer is sufficient (approximately 360 m along the shore, and a minimum of 80 m from the beach and shoreline). To this end a "perimeter" was walked around the site, represented by wpts 506-524. Each of these points denotes either an uninhabitable slope or bog, the farthest inland being wpt 510, at about 160 m inland and 26 m asl.

Surface survey commenced at the NW end of the beach (foreground, p. 35). Between this end and the rocky, drying shoal at centre, several ballast flint find spots were recorded over an approximately 80 m length of the inter-tidal zone (wpts "BALL", "BALLL", "BALL2", "BALL3", "BALL4"). Immediately SE of the shoal, ballast flint was again recorded on the beach (wpt "BALL6").



Site plan, illustrating features recorded at EiAv-08 in 2013 (Tapper and Pope 2014:Map 7).

Subsurface testing above the beach was kept to a minimum, due largely to the fact that it is a known French fishing room from previous archaeology and has since been identified by GNP as private property. Limited testing along the periphery at either end of the beach

identified no artifacts, other than a nail and an unidentified iron fragment from a test pit at the far SE end, on a low terrace (wpt "C67").

Petit Rochelle/Russells Cove, looking west from wpt 521. In the foreground, above the shovel blade, Mr. Temple and test C67 (Ch.554).

AOI#4 – Crémallière Bay (field investigation 28 and 29 August 2018).

While there is no indication of French/livyer fishing rooms in the western part of the harbour, locally known as Crémallière Bay, there is a small cove/beach which could have been used for access to the interior, or to winterhouses. "Bottom Brook," which runs out into a shoal- and mussel encrusted cove to the south ("SW Cove") is also a potential indicator of site advantage. The main beach was investigated, as was a small cove to the NE ("Falls Cove"), but we were "cliffed-out" without reaching "CO Cove," further NE. Another small beach, with close access to the Bear Bank shallows ("BB Cove") was also investigated by traverse from Batteau Cove.

Most testing in AOI #4 was conducted on a terrace above the "main beach" at Crémallière Bay, although the beach itself yielded a single locus of ballast flint (wpt "BALCH"). Surface survey of the flat shoreline above determined that much of the area is wet, and it became moreso during our return visit, when it rained most of the morning.

Testing resulted in limited cultural material. A single test pit (wpt "C95") produced two nails and a fragment of unidentified iron. Testing exposed evidence of possible *galet*, but it was concluded that this was likely natural (wpt "C96COBBLE"). Cultural usage of the cove was confirmed however, during a final surface survey of the southern end of the shore, when probable vegetable garden drills were identified underfoot at the far south end of the grassy area, measuring approximately 5 m × 5 m (wpt "CGARDEN"). This cove is registered as EiAv-12.

NE of this main cove, a small cobble beach backed by a falling brook (field name, "Falls Cove") yielded two pieces of ballast flint at surface (wpt "BALL10"), but two test pits yielded no cultural material. The cove does have an ideal fresh water source, so offloading of ballast for taking on water could account for the flint. On the north side of Falls Cove a small cave was observed in the cliff.[10] Three test pits within the cave yielded no cultural material.

Terraces at Batteau Cove, looking west from Observation Point over the outlet of a brook. The fields at left contain numerous large pits (CH.483).

[10] This cave was observed while traversing the beach and rocky shoreline in an unsuccessful attempt to access a small cove visible along the north shore of Crémaillère Harbour, our field name being "CO Cove."

AOI#5 – Batteau Cove (field investigation 29 August 2018).

To the west of Observation Point, Batteau Cove was judged in the DBAA to have site advantage as a small-boat landing and access point to the interior. Although it was not a French fishing room, it was identified in 1792 as a good place for habitation. This area on the west side of the cove was incorporated in a land grant issued to John Murrin of St. Anthony in 1924. Local information is that Mr. Murrin actually lived at Goose Cove, where he died in 1949 and where his descendants may still be found. While the Murrin grant is excluded from GNP's application, much of the remainder of Batteau Cove will be developed for a Port Authority building, warehouse and finger pier. Batteau Cove can be accessed by what is locally known as the "Japanese Road," constructed to access a proposed whaling station that was never built because of the international ban on commercial whaling in 1972. This project caused significant ground disturbance at Batteau Cove, including the pouring of a concrete foundation.

Investigation began with a surface survey of the entire beach, east to west. Ballast flint was observed on the beach at six locations, from end to end. A sherd of unidentified refined ware (possible a stone china cup) was identified (wpt "RSW"), and a small sherd of Normandy stoneware was collected (wpt "CEW3"), both towards the western or "John Murrin" end, proposed in 1792 as a house site.

Test pitting and traverse of the large fields above the beach was truncated by extensive disturbance. Traverse through the waist- to chest-high foliage encountered numerous large pits, apparently excavated by Fishery Products during the 1970s for dumping fish offal from their plant at St. Anthony. These pits are located throughout the entire width of the field (excluding a narrow strip east of the brook), and as far inland/south as the upper gravel road, approximately 145 m from the beach. Limited test pitting did record cultural material (such as nails in test pit "CBC2") though the obvious and extensive signs of disturbance negated any further testing.

The east side of Batteau Cove, south of the beach and east of the brook – is comprised of beach rock for approximately 30-35 m from the beach, a possible *galet*. Above this is

evidence of garbage dumping, including large sections of structural concrete which may be remnant of the abortive whaling station (wpt "CONCC"). Regardless of these disturbances, evidence supports the interpretation of the cove as a former French station. The site is designated EiAv-11.

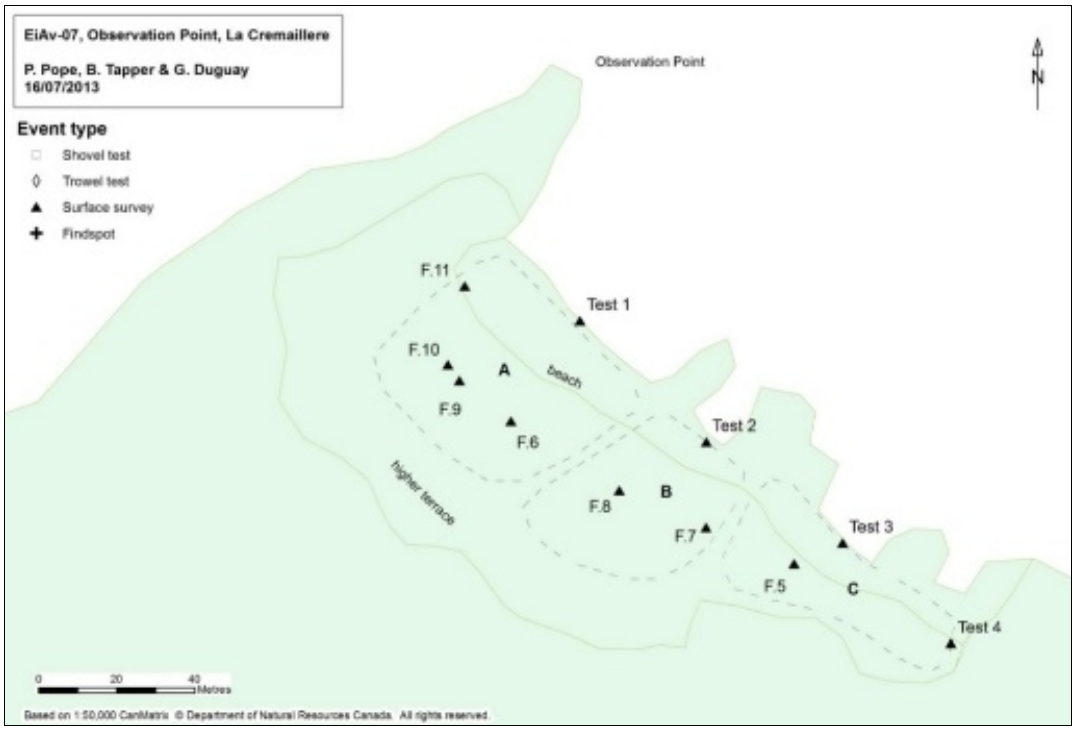
Penneys Beach, Observation Point, and Batteau Cove, looking south from the St. Anthony Air Station. The south side of Hare Bay is visible at horizon (CH.696).

Ceramic fragments and a cut nail resting on rock/galet, directly beneath the sod, at Penneys Beach, wpt "Bop 17," see artifact photo at p. 44 (CH.508).

Positive test "Bop 14" on a seeming "ramp" providing access between Penneys Beach and galets (CH.502).

AOI#6 – Observation Point/Penneys Beach (field investigation 26 and 27 August 2018).

As Observation Point, EiAv-07 and area will be the most impacted by construction activitities, including a warehouse/distribution centre and a marginal wharf which, coupled with the Batteau Cove finger pier, will surround this archaeological site, which was the first priority of the HRIA. GPA proposed a day to survey and test EiAv-07 (in the event, a day and a half), in order to gain a better understanding of the site's preservation and extent, and to recommend appropriate site buffers and a mitigation strategy if warranted. Investigation by Tapper and Pope (2014) and Crompton and Bolli (2016, 2017) had posited EiAv-07 an "undisturbed" French fishing site, dating to the 17th to 19th century. This, coupled with its proximity to proposed development, indicated that disturbance could occur, and site delineation was necessary.



Site plan, illustrating features identified in 2013 (Tapper and Pope 2014:Map 6).

Tapper and Pope's results had bearing on the methodology and focus of GPA's 2018 test pitting. Their investigation identified features such as a stone-lined (?) well (Feature 7), *galets* (Feature 6) and a possible ramp from the lower to upper terrace (Feature 11). Also recorded were surface evidence of two possible structures: one in the centre of the lowest terrace, and another westward on the same terrace. The western feature (Feature 7; wpt "PF7") is described as measuring 5 m × 12 m. Northeastward, Feature 8 (wpt "PF8") measured 5 m × 6 m and "is more obviously enclosed by slight earthwork banks" (Tapper and Pope 2014:13). Crompton and Bolli's aerial (drone) investigation of the site, and subsequent infra-red imagery, identified three possible structural features, two consistent with those recorded by Tapper and Pope, and another further to the NW (ESE of the well). While our testing was intended to cover the entire open space, and primarily, its periphery in order to delineate the site, acquiring evidence of these possible features was an additional goal. "Perimeter" wpts 491-503, generally 75-100 m inland, represent an unihabitable slope. Investigation began with a surface survey of the beach and exposed bank, west to east

(accurately, NW to SE). A concentration of ballast flint was identified at the far NW end, nearest Observation Point (in Tapper and Pope's Area A); no other finds were observed.[11] Test pitting began at the far SE portion (Tapper and Pope's Area C) of the shoreline above the beach, next to a rocky ridge. The first test pit (wpt "C20"), produced two nails and several sherds of Normandy stoneware. Continued testing (n=6) along this narrowest portion of the field encountered no more cultural material. Further NW, the field widens inland, to as much as 50-60 m from the beach; here lies the first of three possible structural foundations. Testing adjacent to "PF7" found cultural material in six test pits (for example, wpt "C311", "C321", and "Bop17"). Finds include window glass, Normandy stoneware and refined ware sherds, but most prominent were iron nails.

Initial test pits along SE end of the site. A test pit circled in red ("C20") contained several fragments of Normandy stoneware (see below).

Normandy stoneware sherds from test pit C20.

[11] In 2007, Pope and crew identified and collected all visible ceramics sherds observed during beach surface survey.

Testing to the NW, proximate to Tapper and Pope's Feature 8 structure (wpt "PF8"), exposed similar finds. For example, sherds of hand-painted whiteware (post 1835) were collected from test pit "C37", and a fragment of red coarse earthenware collected from test pit "C41"; test pit "Bop14" contained several artifacts including refined earthenware, CEW and bone. All positive test pits contained nails.

Ceramics sample from test pit "Bop17": unidentified red coarse earthenware (left) and a rim sherd from a blue printed whiteware jug (right). See p.40 for an in situ *photo.*

Testing proximate to a third possible structure (tentatively identified by Crompton and Bolli), identified cultural materials including a nail, a sherd of REW and an unidentified iron fragment from test pit "C42" and a nail from test pit "Bop24". Test pits around its periphery produced small quantities of artifacts (mainly nails). Similar to results from the other two possible structures, no clear difference in soil conditions was observed between the suspected interior and exterior. In order to truly determine whether these are structural remains or not (particularly the latter, western example), larger excavations must be opened. Initial drone footage collected by Crompton and Bolli illustrated two possible gardens along the upper terrace. These features were not visible via vegetation changes, but with the knowledge that something did exist there, garden drills could be discerned

underfoot. Testing (wpt "C43" and "C44") identified evidence of possible soil mixing (i.e. gardening), but no cultural material.

The upper limits of the second terrace (against the tree line) contained a large *galet*, approximately 12 m x 40 m (wpts "041" to "054"). This is partially visible underfoot, as cobble beneath the foliage. Related, and of future interest, this feature is covered almost exclusively with raspberry and dewberry bushes.[12]

Subsurface testing at EiAv-07 equaled 58 test pits, of which 21 produced cultural material. Finds were spread throughout the site, though concentrations of positive test pits are consistent with the location of three presumed structures or features.

Part of a large patch of Monkshood, an escaped garden plant found about 100 m inland, wpt "Monkshood" (CH.520).

[12] Either the presence of the cobble and stone, or soil conditions below this rock, have affected the growth of these specific plants. A possible *galet* identified at EiAv-03 (Area C) is covered with the same abundance of raspberry brush. Generally, Crémallière had, by a considerable margin, the most and tastiest dewberries [standard name, Hairy Plumboy, *Rubus pubescens*] ever seen by either field investigator.

The bill of Observation Point (left of centre) from wpt "Llo," showing typical vegetation and landforms of the southern side of Crémallière Harbour (CH 493).

Low Point, with GD Pond glimpsed at top, left and Low Point Cove at bottom, right (Google earth).

AOI#7 – Low Point (field investigation 26 August 2018).

The headland at the southwest side of the entrance into Crémallière Harbour (field name "Low Point") was identified as having archaeological potential from close access to marine resources, and from the observable tendency of pre-contact cultures (especially Dorset Palaeoeskimo) to favour such unlikely places. Were Crémallière's relative absence of winter sea ice on the south side of the harbour to extend 3000 years into the past, it is possible to envision Low Point as a sealing station, having access to a polynya –

a stretch of open water which appears from year to year as a result of the interaction of landforms and ocean currents (sometimes referred to in Newfoundland speech as a "rent" in the ice).[13]

Low Point was accessed by walking along the coast from Batteau Cove, about one kilometer southeast as the crow flies. From Penneys Beach to Low Point the coast is rocky and backed by barrens and tuckamore. About halfway there is small pond (about 120 m long) in a hollow which is proposed as the eventual site of a graving dock, our field name "GD Pond." Other than a small cobble beach in a gorge which lies between GD Pond and Low Point the only tenable landing is at a small cove south of the point, field name "Low Point Cove."

Low Point, looking northeast, with Anchor Point at top, left and the cove at far right (CH.458)

This is a small beach/cove located at the far SE end of the Project Area, and as such, could potentially be impacted by groundworks associated with the pending marine base, specifically the proposed graving dock to the immediate NW. Low Point Cove has an approximately 50 m long beach, with a grass and sparse brush covered shoreline ranging between 25 m to approximately 50 m inland. Initial surface survey determined that much of the open area contains short grasses and shrubs growing on a bed of beach rock. While

[13] In context of a discussion of use of Crémallière by residents of St. Anthony, Mr. Cull spoke of the primary winter activity being eider duck hunting from Anchor Point.

testing did not determine whether this platform was natural or man-made, it was posited a possible *galet.* On the shore above the beach, nine test pits were excavated (wpt "C04"-"C12"). In all instances, vegetation lay on a shallow layer of soil, which overlay beach rock of varying size. No artifacts were recovered from any test pit. However, in the approximate centre of the beach, a large length of sawn timber (likely driftwood) lay on the surface, and had an iron spike, a cut nail, and a scrap of melted lead laid on it (not collected), likely from a nearby metal detectorist hole (wpt "Lphole"). Adjacent test pits found no artifacts and no other metal detector holes were identified; the beach material below the surface proved difficult to excavate. The spike and nail may well have been brought into the cove embedded in driftwood, though it warrents mention that no modern nails were identified. This cove was one of three identified by Mr. Cull as used for family boil-ups. The site is designated EiAv-10.

Testing on the rocky ledge north of the beach. The cobble beach is visible at right.

A lump of lead, a spike and a cut nail, likely laid on this driftwood post by a metal detectorist (CH.470).

Anchor Point from the cairn at wpt "Noprhill" (CH.593).

Discussion

Archaeological sites at Crémallière were initially identified based on references in historic documents and from cartography. Their significance and level of preservation was assessed in the field on a preliminary basis in 2007 and 2013. Moving forward, GNP committed to developing a Historic Resources Preservation and Management Plan which will detail "assessment, development, and remediation," as well as site access and public interpretation (GNP 2017:26).[14]

Upon completion of a DBAA, we suggested that a Stage 1 Historic Resources Impact Assessment include field assessment of seven areas of interest, numbered counter-clockwise from Anchor Point.

[14] In particular the three largest French rooms at Savage Cove/Anchor Point warrant further study and, based on proximity to St. Anthony and ease of access, EiAv-03 should be considered eligible for full archaeological investigation. In such event the proponent states that "active archaeological sites will be supported and promoted by GNP to realize economic and social benefits of these historic resources" (GNP 2017:24). At present it seems clear that the best mitigation strategy for EiAv-03 is avoidance.

Recording a rock alignment, and an associated square turf foundation, at Grand Rochelle in 2007. This feature was assessed in the field as probable 19th-century. It may represent the 1857-1915 livyer occupation of Crémallière (after Pope 2008).

Area of Interest [AOI]#1 – Grand Rochelle/North Point

The recording of historic cultural material at the far west end of the cove's north side extends this site's boundaries. This is within approximately 75 m of the development's proposed eastern boundary. A buffer is appropriate to protect this historic resource. Likewise the recording of a new site (EiAv-13) requires mitigation, typically and most suitably, avoidance through the enactment of a buffer zone.

A view of Savage Cove from the St. Anthony Air Station (CH.687).

AOI #2 – St. Anthony Air Station

This archaeological site is not at risk from the proposed GNP development. A proposed fuel tank farm will take in a 1968 dump/military equipment landfill site. Although this is not of archaeological interest, its reputed presence may be taken into account by GNP as an environmental factor.

AOI#3 – Northwest Shore

The registered archaeological site (EiAv-08) at Russells Cove lies on private land, and no impact is expected in this specific area from the proposed development. Given its proximity to EiAv-13 and EiAv-03, to the SE, there is an approximately 950 m length of shoreline containing three archaeological sites.

A number of small coves proved inaccessible by boat, due to poor landing prospects and choppy sea. Visual assessment from the boat suggests that each of CO, MP, FF and PN coves are poor prospects for archaeological sites, encumbered with sunkers, with small beaches and limited dry ground between the high-water mark and steep backing cliffs.

"MP Cove" (at centre, below the communications tower on the horizon) as viewed from the water.

"FF Cove" as observed from boat (CH.538).

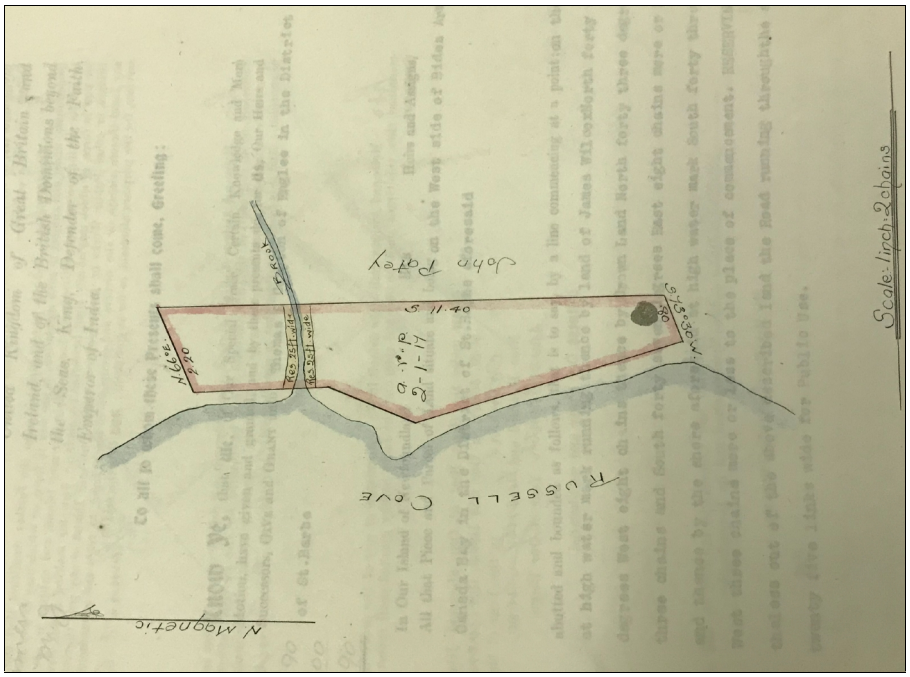


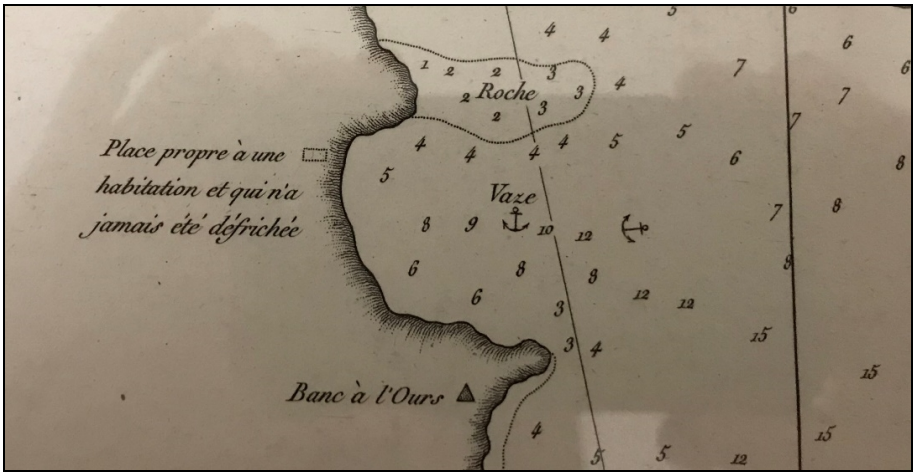
Diagram from the Thomas Penney Crown land grant at Russells Cove (CH.179).

A view of the aspect of the country about the proposed Liquid Mud Plant, looking west from St. Anthony Air Station (CH.711).

Test C96 at Crémallière Bay, showing the bed of cobble immediately below the sod.

AOI#4 – Crémallière Bay

Evidence of cultural use was scant compared to other areas of Crémallière Harbour, however a ballast flint find on the main beach, nails from a test pit, and in particular, a vegetable garden, taken together provide sufficient reason for designation/registration (EiAv-12).

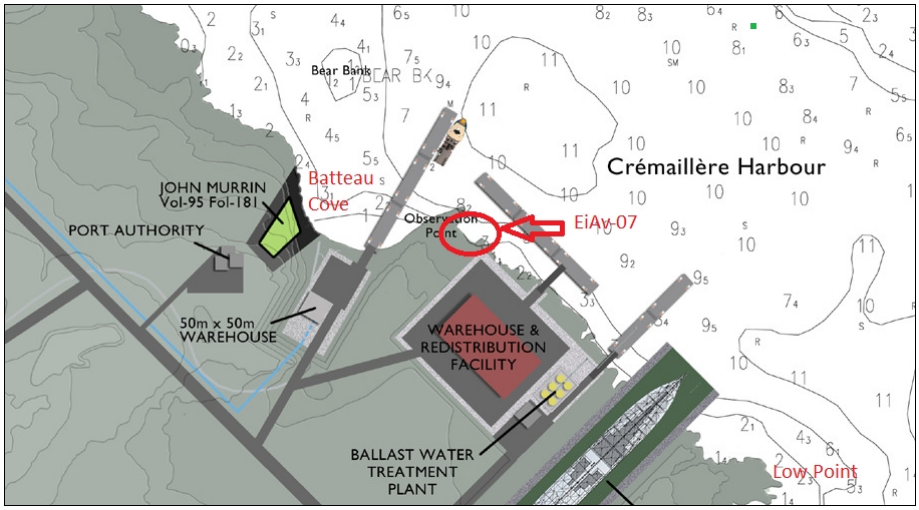


Batteau Cove (centre) and Banc á l'Ours [Penneys Beach] in 1786 (De Combis 1792).

AOI#5 – Batteau Cove

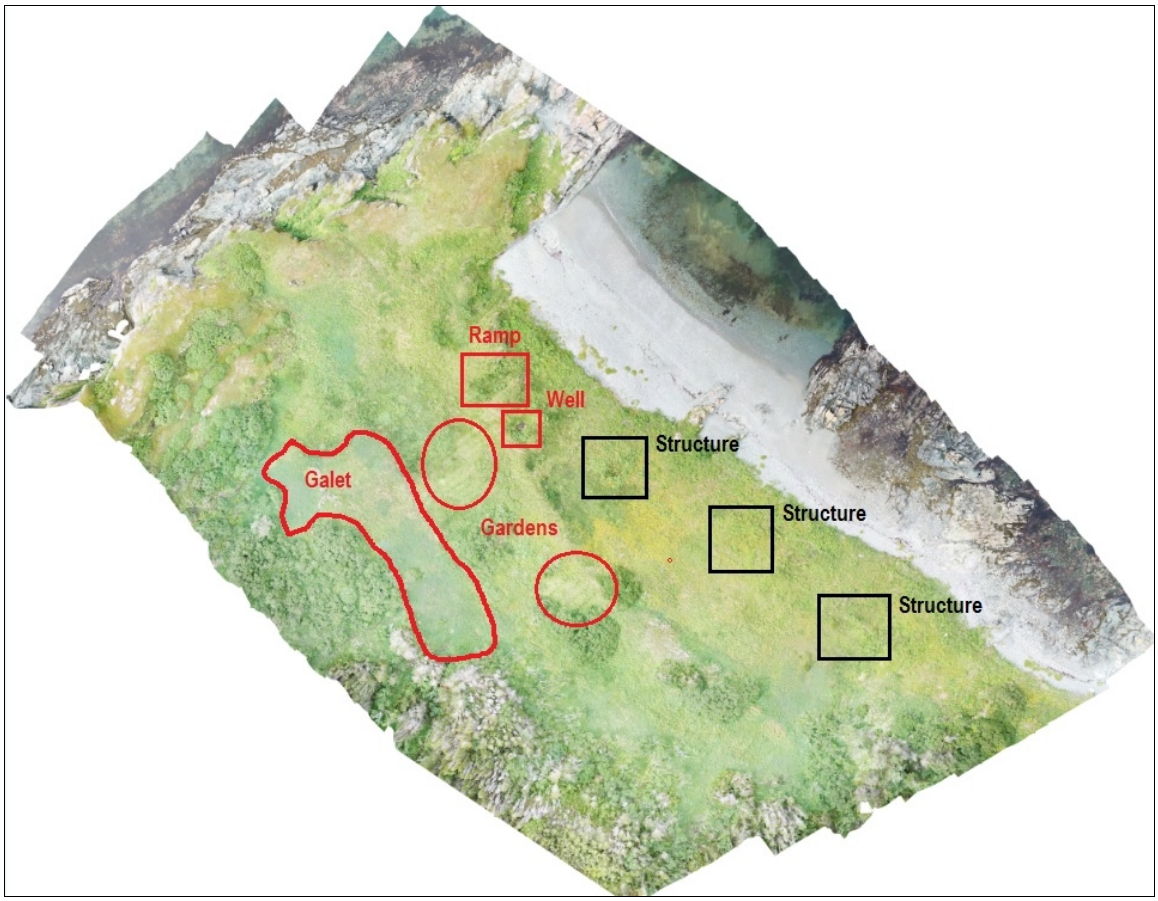
The presence of ballast flint and ceramics on the beach of Batteau Cove, as well as its French name, suggest that the cove was likely used during the 19th century (and possibly earlier) by fishers, perhaps for building and/or mooring of boats. However, we conclude

that most evidence of this, as well as a posited early 20th century livyer occupation, has likely been destroyed. Beach margins in the west and east could contain undisturbed deposits. However, the presence of private property inland of the shoreline/ Crown reserve in the west, and accumulations of concrete debris in the east, suggest that there is little to be learned here in comparison to Savage Cove, Russells Cove, and Penneys Beach.



Projected works on the south side of Crémallière Harbour. A warehouse and finger pier proposed for the east side will be a primary impact of the GNP project on Batteau Cove.

Penneys Beach, with posited structural remains circled.



Drone image of EiAv-03, with cultural features illustrated (base image courtesy Amanda Crompton and Marc Bolli).

AOI#6 – Observation Point/Penneys Beach

Testing EiAv-07 indicated that site boundaries extend to the edge of the entire open and cleared portion(s) of the cove. Findings range from one end to the other, and extend back to the edge of tree growth, for a site dimension of approximately 160 m × approximately 50 m. Field results allow for a couple of observations that are relevant for future investigations. Consistently within positive test pits most material cultural came from the same part of the profile: at the bottom of the upper sod/soils layer, immediately above/on the underlying pebble and cobble layer. There were areas along the eastern half where the cobble stone appears to lie on a buried sod layer, implying that the cobble/pebble is added and cultural (wpt “C251”, “C271”, and immediate vicinity). Related, excavation of test pits proved difficult and cumbersome due to the cobble and pebbles. Future investigation should bear this in mind, and consider the possibility of opening larger (thus fewer) units. EiAv-07 remains a rare example of an undisturbed French fishing site, containing

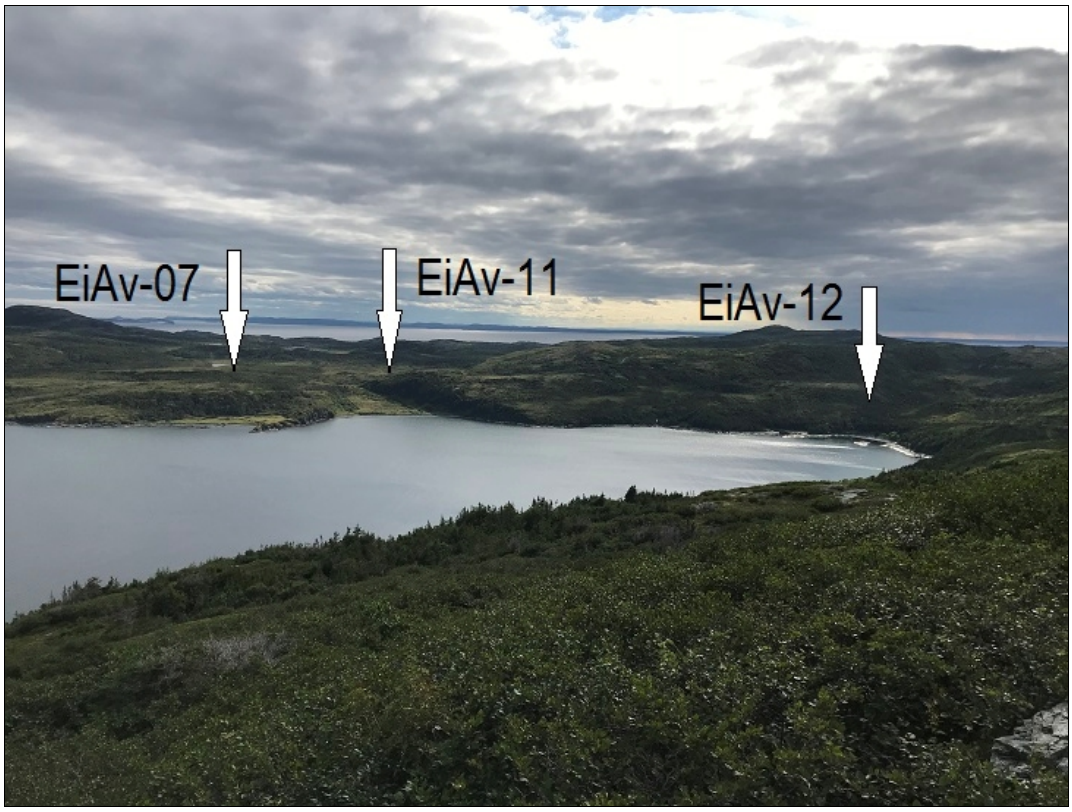
evidence of all hallmark elements: cobble beaches for drying fish, structural evidence, a well, and access ramps (Pope 2008; 2009). Related, confirmation of the proposed structural features as true structures is still wanting; soil difference between the interior and exterior test pits was minimal.

Low Point, as viewed from Grand Rochelle in 1857 (detail of a coloured ink drawing by Rev. William Grey, Centre for Newfoundland and Labrador Studies, MUN).

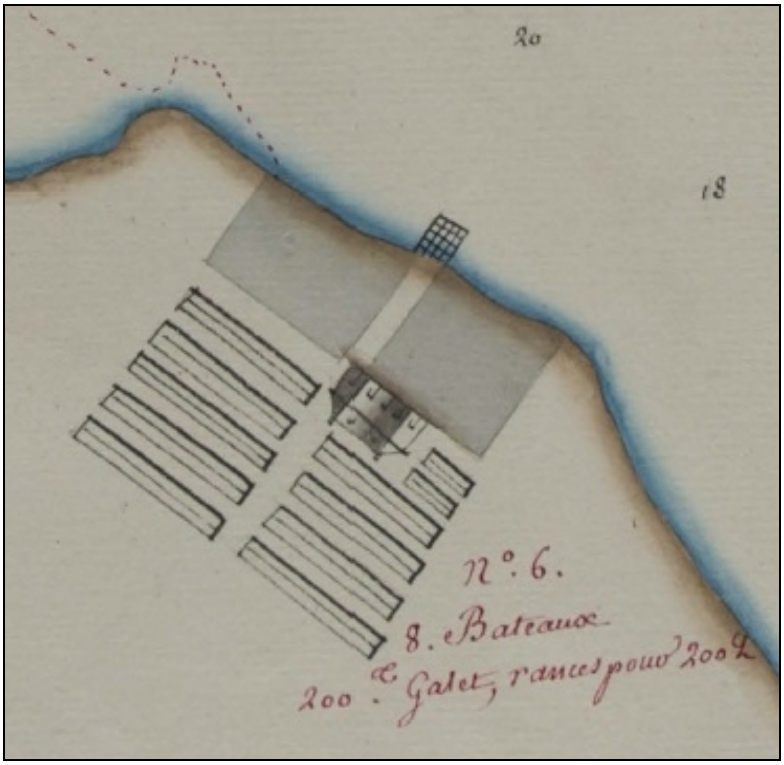
AOI#7 – Low Point

Two iron nails from a metal detector excavation imply cultural presence and usage, although they could have reached this beach embedded in driftwood from the principal French rooms at Savage Cove, about one km to the northeast. This does not, however, explain the presence of lead. No ballast flints were identified on this beach. The beach could have been employed by fishers making and or drying salt fish, or for hunting seals and/or seabirds, thus designation of Low Point as EiAv-10. Future investigation may be warranted.

A spike in a piece of driftwood at Low Point, about 50 m inland (CH.469).



EiAv-07, 11 and 12, from the air station.



Detail of Le Tourneur [1784], showing the Banc á l'Ours fishing room.

Recommendations

GPA suggests that an acceptable and ultimately successful mitigation strategy should include the following:

AOI#1 – Grand Rochelle/North Point

The western-most positive test pit is approximately 50 m east (and 76 m NE) of the proposed GNP boundary. A 50 m buffer thus lies outside the project boundary. While adjustment of the official boundary (for Crown Land application purposes) is not an option at this stage, GNP officials have determined that this boundary could be adjusted for site usage, and an additional site buffer length added. We suggest an additional 20 m buffer.

> -Establish coordinates for EiAv-03 site west boundary. Buffer distance (50-100 m?) request guidance from PAO and adjust chain-link fence accordingly;
> -Exclude NP Hill daymark from GNP fenced compound; and note that
> -Wpts 528-534 are a partial perimeter of uninhabitable landforms (open to the east).

More detailed mapping of project groundworks as construction plans are finalized should be provided by the proponent. Then buffering is an appropriate mitigation strategy, in that the only projected structure is a chain-link fence.

EiAv-03 Boundary	
Coordinates (NAD 1983)	*Location and discussion*
597931E 5688593N	West end of buffer, nearest the shoreline
597931E 5688775N	West end of buffer, inland; north buffer
597889E 5688775N	North buffer; eastward continuation

EiAv-13 – the entire cleared portion of the cove is taken to be the site boundaries. A 50 m buffer zone should suffice.

EiAv-13 Boundary	
Coordinates (NAD 1983)	*Location and discussion*
597562E 5688804N	West end of buffer, nearest the shoreline
597562E 5688888N	West end of buffer, inland
597704E 5688888N	East end of site, inland
597704E 5688813N	East end of site, nearest the shoreline

AOI#2 – St. Anthony Air Station

-Tank farm will take in a 1968 dump/military equipment landfill site, which is not of archaeological interest, but its presence may be taken into account by GNP as an environmental factor.

No mitigation likely required. All historic resources are visible above surface, and can serve as visible markers for avoidance.

AOI#3 – Northwest Shore

-Two coves were not visited as poor landings unlikely for human habitation
-At Russells Cove the Thomas Penney land grant/enclave may be sufficient, otherwise buffering may be suggested by PAO
-Wpts 506-524 a perimeter of uninhabitable landforms at Russells Cove.

More detailed mapping of project groundworks is indicated as construction plans are finalized. Then buffering is an appropriate mitigation strategy. At the GNP/GPA meeting of 15 October there was some discussion of whether "enclaves," such as the Thomas Penney land grant, should be enclosed by fencing, with this issue being left for further discussion.

EiAv-08 Boundary	
Coordinates (NAD 1983)	*Location and discussion*
597190E 5689178N	Northwest buffer, nearest the shoreline
597207E 5689213N	NW buffer; inland
597404E 5689189N	NE buffer; inland
597456E 5689047N	NE buffer, inland
597459E 5688920N	SE buffer, nearest to shore

AOI#4 – Crémallière Bay

-New site EiAv-12, based on minor findings of ballast flints, iron, vegetable garden drills;
-Buffer 50 m from shoreline? Projected new road around harbour is +500 m inland.

EiAv-12 Boundary	
Coordinates (NAD 1983)	*Location and discussion*
595749E 5688779N	South buffer, nearest the shoreline
595677E 5688779N	SW buffer; inland
595677E 5688962N	NW buffer; inland
595758E 5688962N	North buffer, nearest the shoreline

AOI#5 – Batteau Cove

Here a buffer may not be practical, in that finds on the east side of the cove may be within 50 m of the base of a projected finger pier. Further field investigation could well establish that disturbance at EiAv-11 is so profound as to diminish or eliminate concern about this site. GPA suggests that if further field investigations and/or monitoring activities are required at EiAv-07, then this particular issue could be resolved at that time. We consider it unlikely that the PAO will require further fieldwork to resolve this one point.

-New site EiAv-11, based on minor findings of ballast flints, ceramics, iron;
-Most early materials on west side, which is excluded per land grant;
-The projected Port Authority and warehouse building footprints are in a previously-disturbed area (burial of fish offal from St. Anthony plant); note also that
-If the John Murrin land grant is to be included in the development proposal at some future date, it would require field investigation, based on proximate finds and the possibility of structural remains.

AOI#6 – Observation Point/Penneys Beach

GNP needs to indicate clearly whether construction plans and methods require either ground disturbance or traverse of this site.

-Avoidance during construction period and after, a buffer zone to be determined by PAO;
-Any proposed development, or traverse, of this excluded area in the future should be reported to the PAO for a determination of what level of Historic Resources Impact Assessment will be applicable;
-The projected Warehouse and Redistribution building footprint may be too close to EiAv-07 and/or within the projected 50 m buffer;
- This site, described as "pristine" by previous researchers, will be surrounded by GNP development; note also that
-Wpts 491-503 comprise a perimeter of uninhabitable landforms

More detailed mapping of project groundworks will assist in resolving this issue. GNP may consider an "exclusion zone" to protect this site. In consultation with regulator, GNP should develop a specific mitigation strategy for this site and the PAO develop a terms of reference based on their review of this strategy.

EiAv-07 Boundary	
Coordinates (NAD 1983)	*Location and discussion*
596332E 5688330N	NW buffer, inland portion of Observation Point
596510E 5688172N	SW/SE buffer junction; inland
595606E 5688271N	SE buffer, nearest the shoreline

AOI#7 – Low Point

New site EiAv-10 (iron and lead materials 70 m inland, previously unearthed by a metal detectorist) will require no mitigation other than avoidance, unless some further survey of the south side of Crémallière Harbour is indicated by PAO in relation to an AOI #6 mitigation strategy. Only projected structure/groundworks (fence) is 100 m + from site.

EiAv-10 Boundary	
Coordinates (NAD 1983)	*Location and discussion*
596898E 5687887N	North end of west buffer, near the shoreline (at end of gorge)
596898E 5687744N	SW buffer; inland
597117E 5687744N	East end of south buffer, near the shoreline

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GNP Project
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Gerald Penney Associates Limited
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Appendix A: Archaeological Investigation Permit #18.31

Newfoundland Labrador

Government of Newfoundland and Labrador
Department of Tourism, Culture, Industry and Innovation

ARCHAEOLOGICAL INVESTIGATION PERMIT

granted by:
Provincial Archaeology Office
Dept. of Tourism, Culture, Industry and Innovation
P.O. Box 8700
St. John's, NL
A1B 4J6

PERMIT NO. 18.31

NAME Gerald Penney

ADDRESS Suite 104, Caledonia Place, 40 Quidi Vidi Road, St. John's, NL – A1A 1C1

INSTITUTION Gerald Penney Associates Limited

is authorized to conduct archaeological investigations at the location(s) stated below, subject to the terms and conditions of the Application for Permit and the *Historic Resources Act*, RSNL 1990, c. H-4

LOCATION(S) Cremaillere Harbour

All material recovered is the property of the Province.

VALID FOR THE PERIOD August 26, 2018 – September 1, 2018

NOTE: All material recovered during excavation is to be recorded using three dimensional provenience unless permission to do otherwise has been granted from the Provincial Archaeology Office

Minister of Tourism, Culture, Industry and Innovation

Date: August 24, 2018 per:

ARCHAEOLOGICAL INVESTIGATION PERMIT HOLDER DEADLINE CHECKLIST

According to Newfoundland Regulation 143/91 "Archaeological Investigation Permit Regulations under The Historic Resources Act (O.C. 574-91)" *the following deadlines should be adhered to. Any requests for extensions should be cleared with the Provincial Archaeologist in the Provincial Archaeology Office*

PERMIT NUMBER: 18.31

PROJECT AND/OR LOCATION: Cremalliere Harbour

START DATE: August 26, 2018 EXPIRES: September 1, 2018

PERMIT HOLDER: Mr. Gerald Penney

ADDRESS: Suite 104, Caledonia Place, 40 Quidi Vidi Road PHONE: 739-7227

St. Johns, NL - A1A 1C1 Email: Gerald@geraldpenneyassociates.com

INSTITUTION OR COMPANY: Gerald Penney Associates Ltd.

ITEMS DUE 30 DAYS AFTER PERMIT EXPIRES:

Item	Date Due	Date Received
1) Completed Site Record Form(s) (including one for each revisited site)	October 1, 2018	
2) 1:50,000 scale map(s) noting the site location, areas surveyed and methodology (ie. areas test pitted, surface walked, etc.)	October 1, 2018	

ITEMS DUE 180 DAYS AFTER PERMIT EXPIRES:

Item	Date Due	Date Received
1) Archaeological Record Forms from Field Work	March 1, 2019	
2) Site Plans, sectional drawings	March 1, 2019	
3) A Sample of Photographs	March 1, 2019	
4) Interim report	March 1, 2019	

ITEMS DUE 1 YEAR AFTER PERMIT EXPIRES:

Item	Date Due	Date Received
1) Site Report following the requirements outlined in the Regulations *if project is more than one season long then the final report is due 2 YEARS after the final permit expires, however an interim report is still required 180 days after each permit expires	September 1, 2019	

ITEMS DUE 2 YEARS AFTER PERMIT EXPIRES:

Item	Date Due	Date Received
1) Artifact Catalogue sheets, complete with measurements	September 1, 2020	
2) Artifact Treatment sheets	September 1, 2020	
3) Artifacts, catalogued and treated according to the regulations	September 1, 2020	

Appendix D: Preliminary mapping of suggested buffer zones

EiAv-03 – showing approximate location of Crown lands application boundary.

EiAv-03 – showing 20 m buffer/ "extension."

EiAv-07.

EiAv-08.

EiAv-10.

EiAv-12.

EiAv-13.

APPENDIX F LIST OF POTENTIALLY APPLICABLE PERMITS AND AUTHORIZATIONS

List of Potentially Applicable Permits and Authorizations (Provincial, Federal, Municipal)

Approval Potentially Required	Legislation / Regulation	Project Component / Activity Requiring Approval or Compliance	Department or Agency	Requirements
Government of Newfoundland and Labrador				
License to Occupy Crown Land	*Lands Act*	Any development on Crown Lands	Crown Lands Administration, Department of Fisheries and Land Resources	Approval is required for Project activities and infrastructure on Crown Land. Applications No. 151500 (Grant) and 151508 (Lease) have been filed with The Department of Forest Resources and Lands and approvals are pending.
Commercial Cutting Permit Operating Permit	*Forestry Act* and *Cutting of Timber Regulations*	Clearing land areas for the access road and drill site	Forestry and Agrifoods Division, Department of Fisheries and Land Resources	A permit is required for the commercial cutting of timber on Crown Land.
Permit to Burn	*Forestry Act* and *Forest Fire Regulations*	Any burning required during Project clearing	Forestry and Agrifoods Division, Department of Fisheries and Land Resources	A permit is required to light fires outdoors between April and December. Permits are not issued during forest fire season.
Certificate of Approval for any Alteration to a Body of Water	*Water Resources Act*	Any activities which may alter a water body	Water Resources Management Division, Department of Municipal Affairs and Environment	Approval is required before starting construction activities within 15 metres of any water body. Construction activities include all stream crossings, drainage works and any other work such as landscaping, clearing or cutting of any natural vegetation within 15 metres of a body of water.
Compliance Standard	*Water Resources Act, Environmental Control Water and Sewage Regulation*	Any waters discharged from the Project site	Water Resources Management Division, Department of Municipal Affairs and Environment	A person discharging materials into a body of water must comply with the standards, conditions and provisions prescribed in these regulations for the constituents, contents

Approval Potentially Required	Legislation / Regulation	Project Component / Activity Requiring Approval or Compliance	Department or Agency	Requirements
				or description of the discharged materials. This Permit, if granted, will contain specific terms and conditions to prevent water quality degradation during construction and for the life of the project and may include requirements for water quality monitoring and reporting.
Policy Directives	*Water Resources Act*	Project activities	Water Resources Management Division, Department of Municipal Affairs and Environment	The Department has a number of potentially applicable policy directives in place for specific types of work and/or work in sensitive areas.
Water Use Authorization	*Water Resources Act*	Water withdrawal for use during construction and operation activities (if required)	Water Resources Management Division, Department of Municipal Affairs and Environment	Water use authorization is required for all beneficial uses of water.
Application for Water Well Drilling License Non-Domestic Drilled Well Permit	*Water Resources Act*	Drilling activity for a water well (if required)	Water Resources Management Division, Department of Municipal Affairs and Environment	A license is required for water well drilling in Newfoundland and Labrador.
Access to Highway Permit	*Urban and Rural Planning Act, Protected Road Zoning Regulations*	Construction of access road from TCH	Department of Transportation and Works and/or Service NL	The construction of an access to a highway that is classified as a Protected Road requires approval.
Preliminary Application to Develop Land	*Urban and Rural Planning Act, Protected Road Zoning Regulations*	Construction activity	Department of Transportation and Works and/or Service NL	Construction within the planning area boundaries of a highway that is classified as a Protected Road requires the prior approval of the Department of Transportation and Works and/or Service NL

Approval Potentially Required	Legislation / Regulation	Project Component / Activity Requiring Approval or Compliance	Department or Agency	Requirements
Authority To Drill a Well Drilling Program Approval	*Petroleum and Natural Gas Act* and *Petroleum Drilling Regulations*	Drilling activity	Mineral Lands Division, Department of Natural Resources	Operator holding a subsisting licence, permit or lease issued pursuant to the *Petroleum Regulations* must apply for approval to conduct a drilling program, with information on the drilling rig and equipment and procedures to be used
Compliance Standard	*Environmental Protection Act, Air Pollution Control Regulations*	On-site generators	Pollution Prevention Division, Department of Municipal Affairs and Environment	The Regulations outline specific ambient air quality standards and emission standards, as well as relevant engineering design (e.g., stack height) requirements and other provisions
Certificate of Approval for an Industrial Emission Source	*Environmental Protection Act*	Bulk ore loading/offloading/storage facility	Pollution Prevention Division, Department of Municipal Affairs and Environment	Industrial facilities with air emissions and/or emission discharge may be required to obtain a Certificate of Approval.
Certificate of Approval for an Industrial Emission Source	*Environmental Protection Act*	Ballast water storage and treatment system	Pollution Prevention Division, Department of Municipal Affairs and Environment	Industrial facilities with air emissions and/or emission discharge may be required to obtain a Certificate of Approval.
Terrestrial and Marine Historic Resource Impact Assessment	*Historic Resources Act*	Sites subject to disturbance	Provincial Archaeology Office, Department of Tourism, Culture, Industry and Innovation	Completion of Historic Resources Impact Assessment in consultation with the Provincial Archaeology Office
Quarry Permit	*Quarry Materials Act* and *Regulations*	Extracting borrow material (if required)	Mineral Lands Division, Department of Natural Resources	A permit is required to dig for, excavate, remove and dispose of any Crown quarry material.

Approval Potentially Required	Legislation / Regulation	Project Component / Activity Requiring Approval or Compliance	Department or Agency	Requirements
Fuel Tank Registration - Storing and Handling Gasoline and Associated Products	*Environmental Protection Act,* and *Storage and Handling of Gasoline and Associated Products Regulations*	Storing and handling gasoline and associated products	Engineering Services Division, Service NL	Fuel Tank Registration required for storing and handling gasoline and associated products.
Mobile Fuel Storage Tank Relocation Request Form	*Environmental Protection Act* and *Environmental Guidelines for Fuel Cache Operations*	Temporary fuel storage	Engineering Services Division, Service NL	A permit is required for any temporary fuel storage in a remote location.
Permit for Storage, Handling, Use or Sale of Flammable and Combustible Liquids	*Fire Prevention Act,* and *Fire Prevention Flammable and Combustible Liquids Regulations*	Storing and handling flammable liquids	Engineering Services Division, Service NL	This permit is issued on behalf of the Office of the Fire Commissioner. Approval is based on information provided for the Certificate of Approval for Storing and Handling Gasoline and Associated Products.
Permit for Conducting Surveys for listed species under the *Endangered Species Act*	*Endangered Species Act* and *Endangered Species Regulations*	Clearing and land or shoreline development	Wildlife Division	A permit may be required to undertake surveys or research relating to the presence of species listed under the *Endangered Species Act*
Permit for conducting surveys to identify presence of rare species.	*Wild Life Regulations*	Clearing and land or shoreline development	Wildlife Division	A permit may be required to undertake surveys or research relating to the presence of rare species not presently listed under the *Endangered Species Act*.
Compliance Standard	National Fire, Building and Life Safety Codes	Buildings and structures on site	Services NL	Compliance with codes
Compliance Standard	Codes and Standards	Building accessibility	Services NL	Compliance with codes
Compliance Standard	Codes and Standards	Boilers and pressure vessels	Services NL	Registration

Approval Potentially Required	Legislation / Regulation	Project Component / Activity Requiring Approval or Compliance	Department or Agency	Requirements
Compliance Standard	Codes and Standards	Pressure piping systems	Services NL	Certification
Compliance Standard	Codes and Standards	Certification of welders and blazers	Services NL	Certification
Compliance Standard	Codes and Standards	Certification of propane system installers	Services NL	Certification
Compliance Standard	*Occupational Health and Safety Regulations*	Compliance with Regulations and standards	Occupational Health and Safety Division, Services NL	Compliance
Compliance Standard	*Dangerous Goods Transportation Act* and *Regulations*	Storing, handling and transporting fuel, oil and lubricants	Department of Transportation and Works	If the materials are transported, handled and stored fully in compliance with the regulations, a permit is not required. A Permit of Equivalent Level of Safety is required if a variance from the regulations is necessary. Transporting goods considered dangerous to public safety must comply with regulations.
Compliance Standard	*Health and Community Services Act, Sanitation Regulations*	Sewage and waste disposal	Department of Health and Community Services, or Services NL	Outlines standards for sewage and waste disposal.
Compliance Standard	*Occupational Health and Safety Act* and *Regulations*	Project-related occupations	Service NL	Outlines minimum requirements for workplace health and safety. Workers have the right to refuse dangerous work. Proponents must notify Minister of start of construction for any project greater than 30 days in duration.
Compliance Standard	*Occupational Health and Safety Act, Workplace Hazardous Materials*	Handling and storage of hazardous materials	Operations Division, Service NL	Outlines procedures for handling hazardous materials and provides details on various hazardous materials.

Approval Potentially Required	Legislation / Regulation	Project Component / Activity Requiring Approval or Compliance	Department or Agency	Requirements
	Information System Regulations			
Government of Canada				
Letter of Advice for Works or Undertakings Affecting Fish Habitat	*Fisheries Act*	Construction of watercourse crossing or any other activities in or near water that may support a fishery	Fisheries and Oceans Canada	If Project construction is able to adhere to planning guidance found in DFO Operational Statements there is no DFO review required. Instead, DFO requests that an Operational Statement Notification Form be submitted to them. If the Project construction can not adhere to guidance found in the relevant Operational Statements, a Request for Project Review application is required to be submitted to DFO. DFO will make a determination on the level of risk associated with the project activity. If it is determined to be a low risk then a Letter of Advice would be issued. If it is determined to be a higher level of risk an Authorization may be required.
Work Approval for Construction Within Navigable Waters	*Navigable Waters Protection Act* and Regulations	Construction of watercourse crossing, docks, and any other in-water work.	Transport Canada	A permit is required for certain works or construction activity located below the high water mark, either over, under, through or across any navigable waters. Any in-water works will be reviewed against the Minor Works and Waters Order pursuant to Section 13 of the *Navigable Waters Protection Act* to

Approval Potentially Required	Legislation / Regulation	Project Component / Activity Requiring Approval or Compliance	Department or Agency	Requirements
				determine if they meet the criteria of a "minor" work or water, and if further review and approval is required.
Radiocommunication Permit	*Radiocommunication Act* and *Regulations*	Establishment and use of radio equipment and associated towers	Industry Canada	Approval may be required for sites on which radio apparatus, including antenna systems, may be located and the erection of masts, towers and other such structures.
Compliance Standard	*Fisheries Act*, Section 36(3), Deleterious Substances	Any run-off from the Project site being discharged to receiving waters	Environment Canada	Environment Canada is responsible for Section 36(3) of the *Fisheries Act*. Discharge must not be deleterious and must be acutely non-lethal.
Compliance Standard	*Migratory Birds Convention Act* and *Regulations*	Any activities which could result in the mortality of migratory birds and endangered species and any species under federal authority	Canadian Wildlife Service, Environment Canada	Prohibits disturbing, destroying or taking a nest, egg, nest shelter, eider duck shelter or duck box of a migratory bird, and possessing a live migratory bird, carcass, skin, nest or egg.
Compliance Standard	*Canadian Environmental Protection Act*	Any activities that may result in environmental emissions	Environment Canada	The Act enables protection of the environment, and human life and health, through the establishment of environmental quality objectives, guidelines and codes of practice, and the regulation of toxic substances, emissions and discharges from federal facilities, international air pollution, and disposal at sea.
Policy	Federal Policy on Wetland Conservation	Any disruption of wetland habitat	Environment Canada	The goals of this policy should be considered where a project could affect wetland habitat.

Approval Potentially Required	Legislation / Regulation	Project Component / Activity Requiring Approval or Compliance	Department or Agency	Requirements
Compliance standards; permits may be required.	National Fire Code	On-site structures (temporary or permanent)	Service NL	Approval is required for fire prevention systems in all approved buildings.
Compliance standards; permits may be required.	National Building Code	On-site structures (temporary or permanent)	Service NL	Approval is required for all building plans.
Compliance standard		Port facilities and operation	Transport Canada	Implementation of Port Facility Security Plan
Compliance standard		Port facilities and operations	Customs Canada	Vetting international ships
Municipalities				
Approval for Waste Disposal	*Urban and Rural Planning Act, 2000,* and Relevant Municipal Plan and Development Regulations	Waste disposal	Town of St. Anthony	The use of a community waste disposal site in Newfoundland and Labrador by proponents/contractors to dispose of waste requires municipal approval. Restrictions may be in place as to what items can be disposed of a municipal disposal site.
Compliance standard	*Urban and Rural Planning Act, 2000,* and Relevant Municipal Plan and Development Regulations	Industrial Development Plan	Town of St. Anthony	Industrial Development Plan