St. Lawrence Fluorspar Marine Shipping Terminal Project

PROJECT SUMMARY

PROJECT DESCRIPTION

PURSUANT TO
THE CANADIAN ENVIRONMENTAL ASSESSMENT ACT, 2012

PROJECT REGISTRATION

PURSUANT TO
THE NEWFOUNDLAND AND LABRADOR
ENVIRONMENTAL PROTECTION ACT

Submitted to:

The Canadian Environmental Assessment Agency

and

NL Department of Municipal Affairs and Environment, Environmental Assessment Division

Submitted by:

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TABLE OF CONTENTS

TABLE OF CONTENTS ..... **II**

1.0 INTRODUCTION **1**

1.1 Project Overview 1

1.2 The Need for the Undertaking 3

1.3 Scope and Objectives 4

1.4 Consultation with Regulatory and Public Stakeholders 4

1.5 Approval of the Undertaking – Regulatory Framework 5

1.6 Project Schedule 6

1.7 Existing Environment & Issues Scoping 7

1.8 Environmental & Social Management Plans 7

2.0 PROJECT DESCRIPTION **9**

2.1 Project Location 9

2.2 Project Components 10

2.3 Construction Activities 12

2.4 Operation Activities 13

2.5 Rehabilitation and Closure 14

2.6 Occupations 14

2.7 Emissions, Discharge and Waste Management 14

2.8 Accidents, Malfunctions and Emergency Response Planning 15

2.9 Potential Resource Conflict 16

3.0 PROJECT RATIONALE AND ALTERNATIVES ASSESSMENT **17**

4.0 ENVIRONMENTAL EFFECTS ANALYSIS METHODOLOGY **18**

4.1 Approach and Methodology 18

4.2 Valued Components (VCs) 18

4.3 Existing Environment 19

4.4 Identification of Project-Environment Interactions 19

4.5 Temporal and Spatial Boundaries 20

4.6 Project Effects Analysis 20

4.7 Cumulative Effects Analysis 20

5.0 PUBLIC CONSULTATION AND ISSUES SCOPING **22**

5.1 Consultation Approach and Activities 22

5.2 Public Information Session 22
5.3 Proponent Engagement and Consultation with Indigenous Groups 25
6.0 EXISTING ENVIRONMENT 26
6.1 Physical Environment 26
6.1.1 Met-Ocean Climate 26
6.1.2 Soil and Bedrock Geology 29
6.1.3 Mine Waste Geochemistry 29
6.1.4 Surface Water & Hydrogeology 29
6.1.5 Air Quality 30
6.2 Terrestrial and Freshwater Biological Environment 30
6.2.1 Vegetation and Vegetation Species at Risk 30
6.2.2 Wetlands 30
6.2.3 Freshwater Fish and Fish Habitat 31
6.2.4 Wildlife & Wildlife Species At Risk 31
6.3 Marine Biological Environment 31
6.3.1 Marine Fish and Fish Habitat 32
6.3.2 Marine Birds, Marine Mammals and Sea Turtles 33
6.4 Socio-Economic Existing Environment 34
7.0 ENVIRONMENTAL EFFECTS ANALYSIS 36
7.1 Physical Environment 36
7.2 Atmospheric Environment 37
7.3 Water Resources 39
7.4 Terrestrial Environment 40
7.5 Wildlife 42
7.6 Marine Environment 43
7.7 Socio-Economic 45
7.8 Accidents and Malfunctions 47
7.9 Cumulative Effects Analysis 47
8.0 FUNDING AND FEDERAL INVOLVEMENT 49

PROPONENT INFORMATION

NAME OF THE DESIGNATED PROJECT

St. Lawrence Fluorspar Marine Shipping Terminal Project

NAME AND ADDRESS OF THE PROPONENT

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1.0 INTRODUCTION

This document represents a stand alone PROJECT SUMMARY as per CEA Agency's "*Guide to Preparing a Description of a Designated Project under the Canadian Environmental Assessment Act, 2012*". It provides a summary of the PROJECT DESCRIPTION submitted to the Canadian Environmental Assessment Agency.

1.1 Project Overview

Canada Fluorspar (NL) Inc. (CFI), the Proponent, plans to build and operate a dedicated Marine Shipping Terminal (the Project) to export the acid-grade fluorspar concentrate and construction aggregate from its St. Lawrence Fluorspar Mine. The new proposed location of the shipping wharf is near Mine Cove in Little Lawn Harbour, along the western border of the Town of St. Lawrence, in the province of Newfoundland and Labrador (Figure 1-1). A dedicated marine shipping facility near the current mine/mill operation is vital to CFI's St. Lawrence Fluorspar Mine operation and sustainability.

CFI carried out two environmental assessments in recent years; the first in 2010 to reactivate two old underground mines; and the second in 2015, focused on the AGS vein mine & mill. In both EA's the proposed location of the marine terminal was at Blue Beach Cove, in the Great St. Lawrence Harbour, on the eastern side of the St. Lawrence peninsula (referred to as the east shipping facility, Figure 1-2).

The AGS Mine is located close to Mine Cove within Little Lawn Harbour (the west shipping facility, as shown in Figure 1-2). The proposed new location of the marine terminal is therefore much closer to the operating mine (and its waste rock storage). Since the AGS Mine operation began last August 2018, fluorspar concentrate has been trucked about 45 km to Mortier Bay (Marystown) for export. This temporary measure was implemented for CFI to evaluate other more viable export options for its products.

The Project (the Undertaking) includes construction, operation, rehabilitation and closure of the St. Lawrence Fluorspar Marine Shipping Terminal near Mine Cove. This undertaking represents an **alternative location** to Blue Beach Cove, which was approved and released from environmental assessment in October 2010 (*i.e., St. Lawrence Fluorspar Mine Reactivation, Registration #1418*) and in November 2015 (*St. Lawrence AGS Vein Fluorspar Mine (2015 EA), Registration # 1794*).

The Project includes the following primary components:

- Waste rock crushing plant, radial arm stockpiling system, and aggregate stockpiles;
- Concentrate storage building;
- Access and haul roads;
- Conveyor (fluorspar concentrate and aggregate transfer system);
- Wharf and Ship-Loader;
- Rock-filled breakwater (approximately 350 m long).

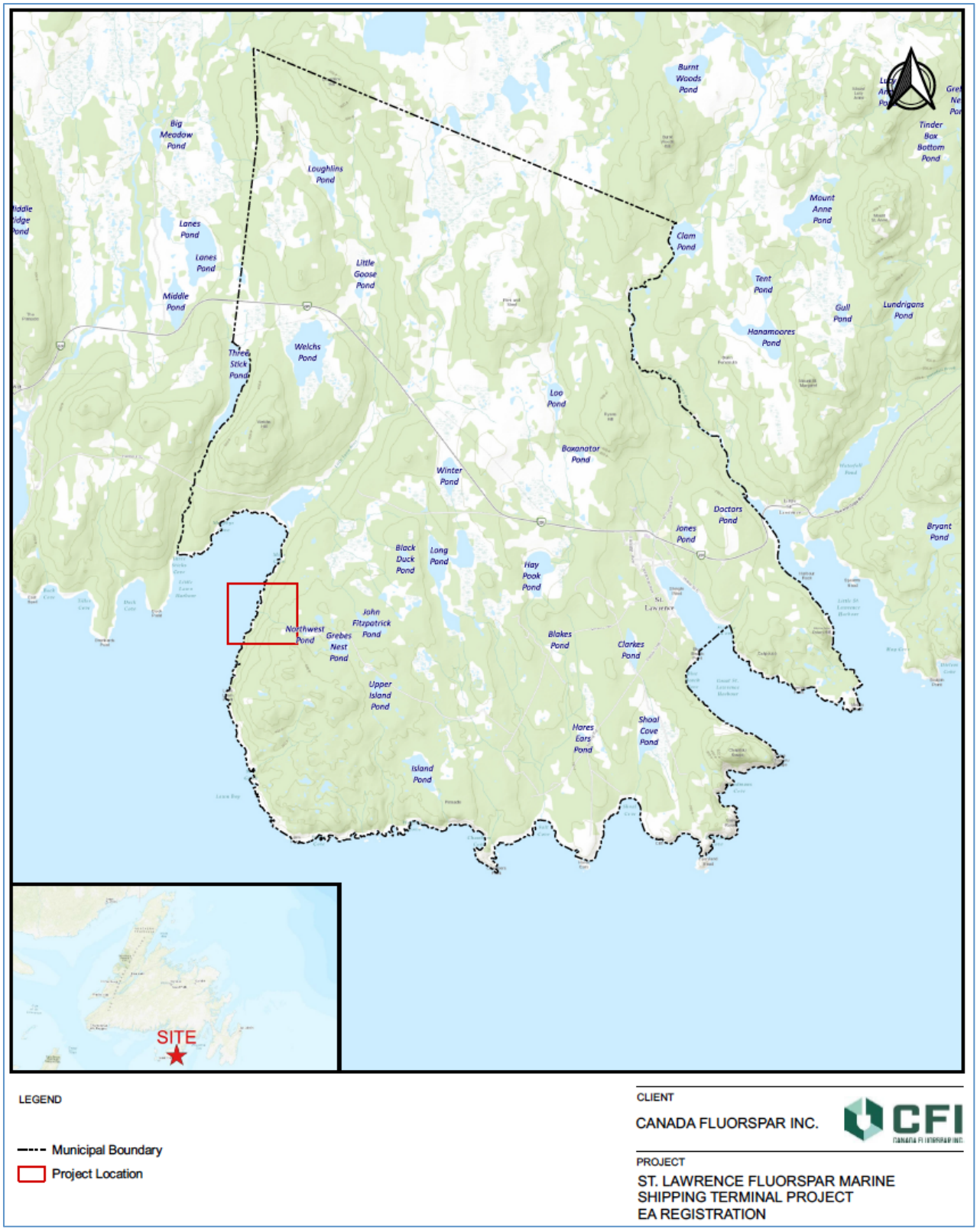


Figure 1-1: General Site Location Map & Project Area

The marine shipping terminal design capacity will be as follows:

- Fluorspar Concentrate: 200,000 tonnes/annum;
- Construction Aggregate: 2,000,000 tonnes/annum;
- Berthing vessels up to 72,000 Deadweight Tonnage (DWT), i.e., post-Panamax bulk carriers;
- Required water depth at the face of the wharf: 16 m; and
- Breakwater constructed from ~1.4 million tonnes of rock (approximately 350 m long).

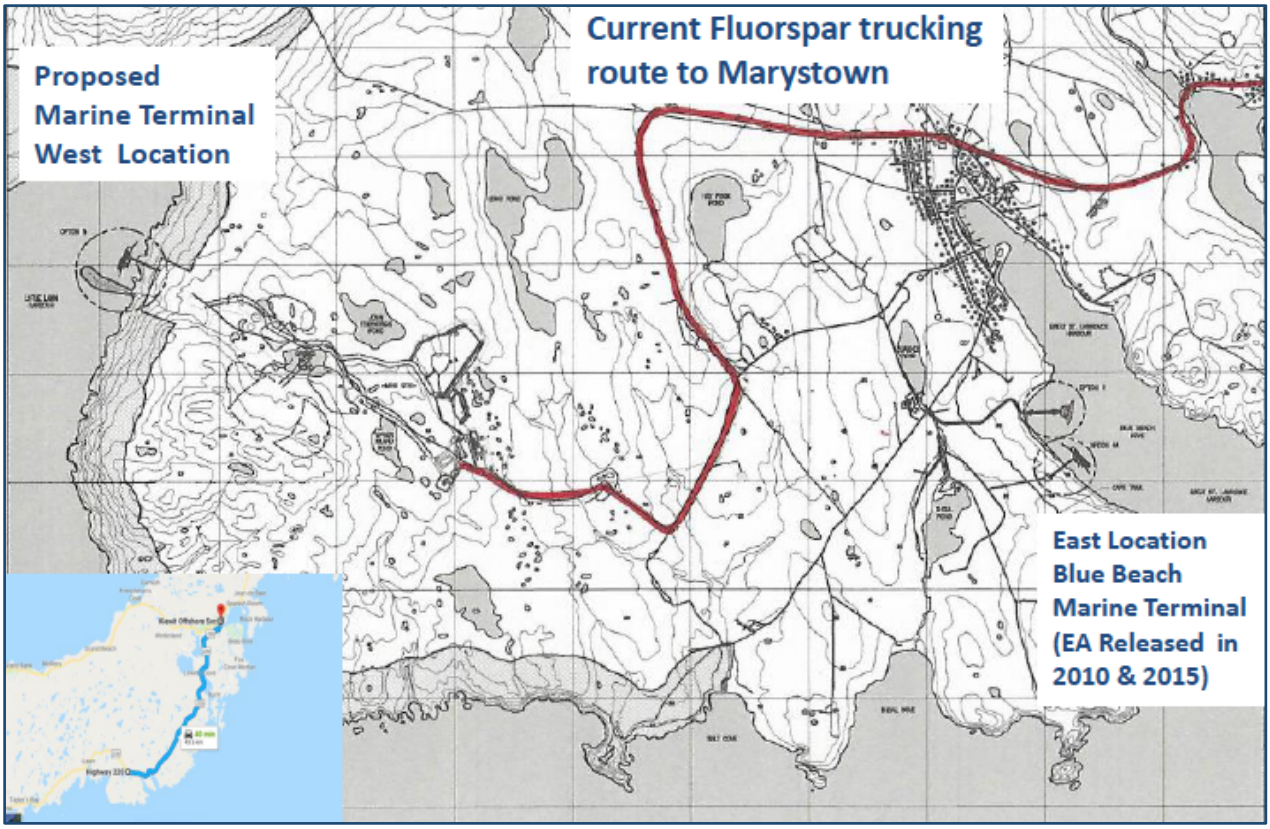


Figure 1-2: Proposed Alternative Locations of the Marine Terminal and the Existing AGS Mine and Mill Footprint

1.2 The Need for the Undertaking

CFI has carried out a feasibility study for evaluating the export of its concentrate to foreign markets and larger quantities of high quality construction aggregate to North American markets. The previously approved 'east option' of the marine terminal at Blue Beach Cove is an uneconomical one for the AGS Mine if both products are to be exported. Accordingly, the interim solution was to allow CFI to truck only fluorspar concentrate (in small batches) to Marystown and use the existing facilities there until a permanent solution could be found. There are economic and environmental costs associated with trucking product to Marystown, in addition to scarcity of storage and ship size limitations at the Mortier Bay wharf. There are also public safety considerations due to the large number of trucks on the highway and town roads (approximately one 25-tonne truck each hour, every day of the year), as well as the significant carbon footprint of this operation.

Therefore, the proposed option near Mine Cove solves this logistics issue: it significantly reduces trucking emissions (significant reduction of carbon footprint), improves public safety, puts global markets within reach (e.g., enables use of larger vessels), and expands product offerings (aggregate as well as concentrate), prolonging the CFI Mine operations a further ten years or more, thus extending employment for the workforce and adding to the local and the region's economic viability.

1.3 Scope and Objectives

The Project's on-land footprint is located entirely within the municipal boundaries of the Town of St. Lawrence, to the west of the community and in close proximity to the AGS Mine. There are compelling arguments in favour of the proposed Project with respect to its location, environmental sustainability and economic benefits, including the following:

- Given the economic challenges faced by the AGS Mine associated with exporting its concentrate, CFI has been evaluating the feasibility of processing the mine's waste rock (~70% metasediment and ~30% rhyolite) into aggregate for sale along North America's eastern seaboard. Not only would this enhance the mine's economic outlook, but also recycling this waste rock into a high-quality construction aggregate and selling it abroad would reduce the size of the waste rock dumps when mining ceases (around 35 million tonnes generated during the AGS Mine life).

- The project provides a number of synergies with the current mine and fluorspar operations, including consumption of waste rock, hauling/loading cost reductions, sharing of mine infrastructure and equipment, and sharing of management, administration and supervision.

- The current transport of concentrate 45 km to Marystown generates more greenhouse gases (GHG) than the quantity that would be produced when hauling to a wharf near Mine Cove. In addition, the use of much larger marine vessels (20,000 to 72,000 DWT) would reduce GHG emissions per tonne of fluorspar delivered.

- In addition to GHG, air emissions (from vehicle exhaust and gravel road dust) related to hauling the products to Marystown or Blue Beach Cove would be greater than those associated with a wharf near Mine Cove.

CFI is currently conducting an engineering study and other baseline studies to evaluate the commercial feasibility of exporting aggregate (including engineering design of the marine terminal), and biophysical and socio-economic baseline conditions.

1.4 Consultation with Regulatory and Public Stakeholders

CFI has carried out an extensive public consultations with those who may be affected and/or interested stakeholders from several groups including the Town of St. Lawrence and adjacent municipalities, regulatory agencies (both provincial and federal), economic development agencies, education and training institutes, environmental & recreation associations, Non-Governmental Organizations and special interest groups, and most importantly local residents and communities in the Project area. A public information session was held on April 25, 2019. Details of public consultation and issues raised by the public and government departments (issue scoping) are presented in Section 5.

There are no designated Indigenous lands in the St. Lawrence / Burin Peninsula region, and Project activities are not likely to affect the Indigenous groups within the province. However, five Indigenous groups with fishing licences that enable access to Placentia Bay have been contacted about the Project and were invited to review the information provided and reminded of the opportunity to comment during the public review period for the Project EA Registration/Project Description. Most have indicated that they

will review the information, even if their actual activity in Placentia Bay or Little Lawn Harbour is unlikely. CFI is in the process of ascertaining with DFO if any Indigenous groups on the east coast outside of Newfoundland and Labrador who may have licences that enable them an access to NAFO Area 3PSc.

The Project is not located on federal lands, and there are no archaeological sites within the Project footprint area itself; however, the nearest, Little Lawn Old Mine (CfAu-08) at 46° 55' 10.3" Latitude, 55° 28' 55.8" Longitude, will be clearly marked with a 20 m buffer zone established, in accordance with the Provincial Archaeology Office (PAO) procedures.

1.5 Approval of the Undertaking – Regulatory Framework

CFI will require approvals and permits from federal, provincial, and municipal governments for all stages of the proposed Project, as applicable. The anticipated regulatory framework for the EA process is described in the following sections. Following EA release, specific permits and approvals will be obtained from federal, provincial and municipal governments, as appropriate.

FEDERAL PROCESS & APPROVAL

Federal EAs are regulated under the *Canadian Environmental Assessment Act (CEAA 2012)*. Submission of a Project Description to the CEA Agency is required for all projects designated in the *Regulations Designating Physical Activities*. This Marine Terminal Project is considered a "designated physical activity" under Section 24(C) of the regulations, and therefore will be subject to the CEAA process.

Federal approvals and authorizations that may be required are outlined in Table 1-1.

Table 1-1: Potentially Applicable Federal Permits, Approvals and Authorizations

Agency	Permit, Authorization, Approval	Act/Regulation
Transport Canada	Transportation of Dangerous Goods – Explosives	*Canada Transportation Act*
	Approval for the Marine Terminal	*Navigation Protection Act*
Natural Resources Canada	Magazine Licence Application	*Explosives Act (obtained as part of the AGS mine project)*
	Application for Permit to Transport using a Flatbed Trailer	*Explosives Act (obtained as part of the AGS Mine project)*
	Application for Authorization of Explosives	*Explosives Act (obtained as part of the AGS Mine project)*
Fisheries and Oceans Canada	Request for Project Review	*Fisheries Act*
	Application for Authorization	*Fisheries Act*
	Compliance with *Species at Risk Act*	*Species at Risk Act, 2002* (*SARA*)
Environment and Climate Change Canada	Compliance with *Canadian Environmental Protection Act*	*Canadian Environmental Protection Act*
	Compliance with the *Wastewater Systems Effluent Regulations*	*Fisheries Act*
	Compliance with *Species at Risk Act*	*Species at Risk Act*, 2002
	Compliance with Migratory Birds Convention Act, 1994	*Migratory Birds Convention Act, 1994*
	Scientific Bird Handling Permit	*Migratory Birds Convention Act, 1994*
Industry Canada	Communications Licence	*Radio Communication Act (obtained as part of the AGS Mine project)*
	Radio Station Licence	
Health Canada	Uranium/Radon in mine waste rock potential aggregate use in the construction of homes & institutions, etc.	*N/A*

PROVINCIAL PROCESS & APPROVAL

In accordance with the NL *Environmental Assessment Regulations*, *2003* the Project must be registered pursuant to the *NL Environmental Protection Act*. The EA process for the Project is initiated via submission of this EA Registration to the Environmental Assessment Division of the NL Department of Municipal Affairs and Environment (DMAE). While CFI has several provincial approvals, permits, authorizations and certifications in place for mining the AGS vein, most of these approvals do not apply to the proposed marine terminal Project. Specific permits, approvals, and authorizations will need to be acquired, and management plans approved following EA release of the Project.

MUNICIPAL (TOWN OF ST. LAWRENCE)

The Project is located within the municipal boundaries of the Town of St. Lawrence and as such will abide by all the bylaws and regulations of the town. The Project site is within land use zones reserved for mining, as outlined in the Town of St. Lawrence Municipal Plan (Town of St. Lawrence 2012). CFI will comply with the municipal and any other applicable bylaws and regulations. This also applies to the Environmental Protection-Management Unit (EP-MU), under the Municipal Habitat Stewardship Agreement between the Town and the Department of Fisheries and Land Resources, Wildlife Division.

A number of environmental studies/assessments have been undertaken in the Designated Project region/area, these are listed in Table 1-2.

Table 1-2: List of Previous Environmental Assessments

Project	Regulatory Body	EA Process	Dates
AGS Mine	DOEC	Provincial Environmental Preview	2015
Reactivation of the St. Lawrence Fluorspar Mine – Water Diversion Structure, Clarkes Pond, St Lawrence	CEA Agency	Screening (amendment to the 2009–2010 federal EA)	2011–2012
Reactivation of the St. Lawrence Fluorspar Mine	DOEC & CEA Agency	Provincial Environmental Preview Report and federal Screening	2009–2010
St. Lawrence Tailings Management Facility	DOEC	Environmental Preview Report	1995–1996
DOEC = Department of Environment and Conservation, CEA = Canadian Environmental Assessment			

1.6 Project Schedule

CFI intends to start the construction phase of the Project immediately after the receipt of all required approvals, permits, and authorizations. The Project will be undertaken in four specific phases: Phase 1 - Pre-construction (currently on going); Phase 2 - Construction an estimated 14 months; Phase 3 - Operations (estimated Project life of 18 years) to 2039; and Phase 4 - Rehabilitation and Closure (estimated 1-2 years).

The pre-construction phase is currently ongoing and includes various activities such as baseline investigations/studies, engineering and feasibility studies, Project Registration, EA process and regulatory permitting. CFI anticipates initiating on-shore construction activities in the spring of year 2020.

Figure 1-3 provides an anticipated high-level project schedule of the construction, operation and rehabilitation and closure of the proposed Marine Terminal.

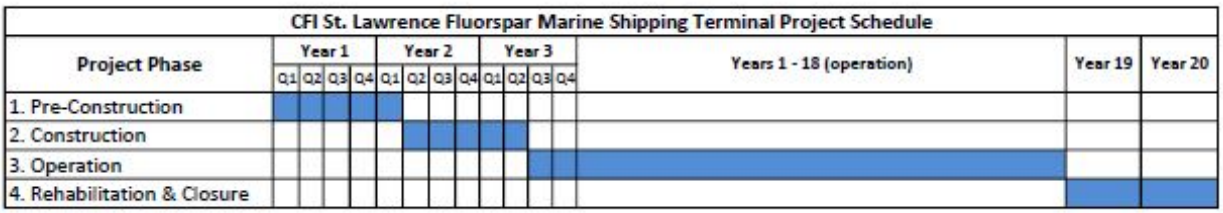


Figure 1-3 Project Schedule

1.7 Existing Environment & Issues Scoping

The existing environmental setting of the Project is summarized in Section 6.0, which includes the environmental or socio-economic elements that were considered when determining likely effects that could occur as a result of the Project. The environmental baseline, describing the existing environment and socio-economic elements considered in the previous AGS Mine registration and provincial Environmental Preview Report (EPR) (CFI, 2015) were updated, and new additional studies and site-specific field investigations have been completed and/or currently underway (e.g., detailed bathymetric survey, freshwater and marine and fish/fish habitat surveys, met-ocean investigation, and engineering and design optimization). This information is used as the basis for determining potential environmental and socio-economic effects associated with the Project (see Section 7.0).

A scoping exercise confirmed an appropriate list of Valued Components (VCs), upon which to focus the environmental and socio-economic assessment. VCs were established based on government guidance, consultation with stakeholders, and understanding of the proposed Project. Following this process, the following VCs were considered for analysis:

- Physical Environment (met-ocean, climate change, soil and geology);
- Atmospheric Environment (Climate, Air and Noise);
- Water Resources (Surface Water and Groundwater);
- Terrestrial Environment (Freshwater Fish and Fish Habitat, Vegetation Communities and Habitat Types, Avifauna, Wetlands and Species at Risk);
- Wildlife (Terrestrial Mammals, Birds [Coastal and Marine], and Species at Risk);
- Marine Environment (Fish and Fish Habitat, Marine Mammals and Species at Risk); and
- Socio-economic Environment (Health &Safety; Economy, Employment, Business; Community Services and Infrastructure; and Commercial, Recreational and Indigenous Fisheries).

1.8 Environmental & Social Management Plans

Safety and Environmental stewardship are priorities for CFI. CFI has developed a robust **Environmental, Health and Safety Management System** (EHSMS) for its current St. Lawrence Fluorspar AGS Mine & Mill operations, which is in compliance with regulatory requirements and best practise. In addition, CFI is implementing an environmental monitoring program (on going) for its mine and mill operations (e.g., water quality - surface & underground, air emission-air quality monitoring, waste rocks geochemistry sampling, etc.).

Several Environmental and Social Management Plans are already in place, which will be updated to include the proposed Marine Shipping Terminal, these are:

- Environmental Protection Plan (EPP)
- Environmental Effects Monitoring Plan (EEMP)
- Waste Management Plan (WMP)
- Water Management Plan (WtMP)
- Avifauna Management Plan
- Rehabilitation and Closure Plan
- Occupation Health and Safety Plan (OHSP)
- Best Management Practices Plan for the Control of Fugitive Dust
- Emergency Preparedness and Response Plan
- Best Available Control Technologies Plan
- Gender Equity and Diversity Plan (October 2018)
- **Benefits Agreement** between CFI and the Government of Newfoundland and Labrador (September 2018). The Agreement includes local benefits, full and fair opportunity for employment, education and training, research and development, human resources plan, and Gender Equity and Diversity Plan (Article 14. & Schedule B).

2.0 PROJECT DESCRIPTION

2.1 Project Location

The proposed Project is located near Mine Cove in Little Lawn Harbour on the western boundary of CFI's mining lease and in close proximity to the AGS fluorspar vein that is currently being mined. The geographic coordinates are approximately 46°55' N 55° 29' W. The on-land Project footprint is located entirely within the municipal boundaries of the Town of St. Lawrence. Figure 2-1 shows the site location of the marine terminal and the AGS mine/mill general project area. The Project is approximately 350 km by road from St. John's, Newfoundland, 45 km from Marystown, and next to the community of St. Lawrence. The Project marine facility is in Little Lawn Harbour, which is ice-free year-round; the coastline in the study area is rugged, consists of a number of bold headlands, bordering open coves. The Project is located in an area designated for mining as per the 2013 Development Regulations for St Lawrence. The marine infrastructure, however, is adjacent to but outside the municipal boundaries of the Town of St Lawrence.

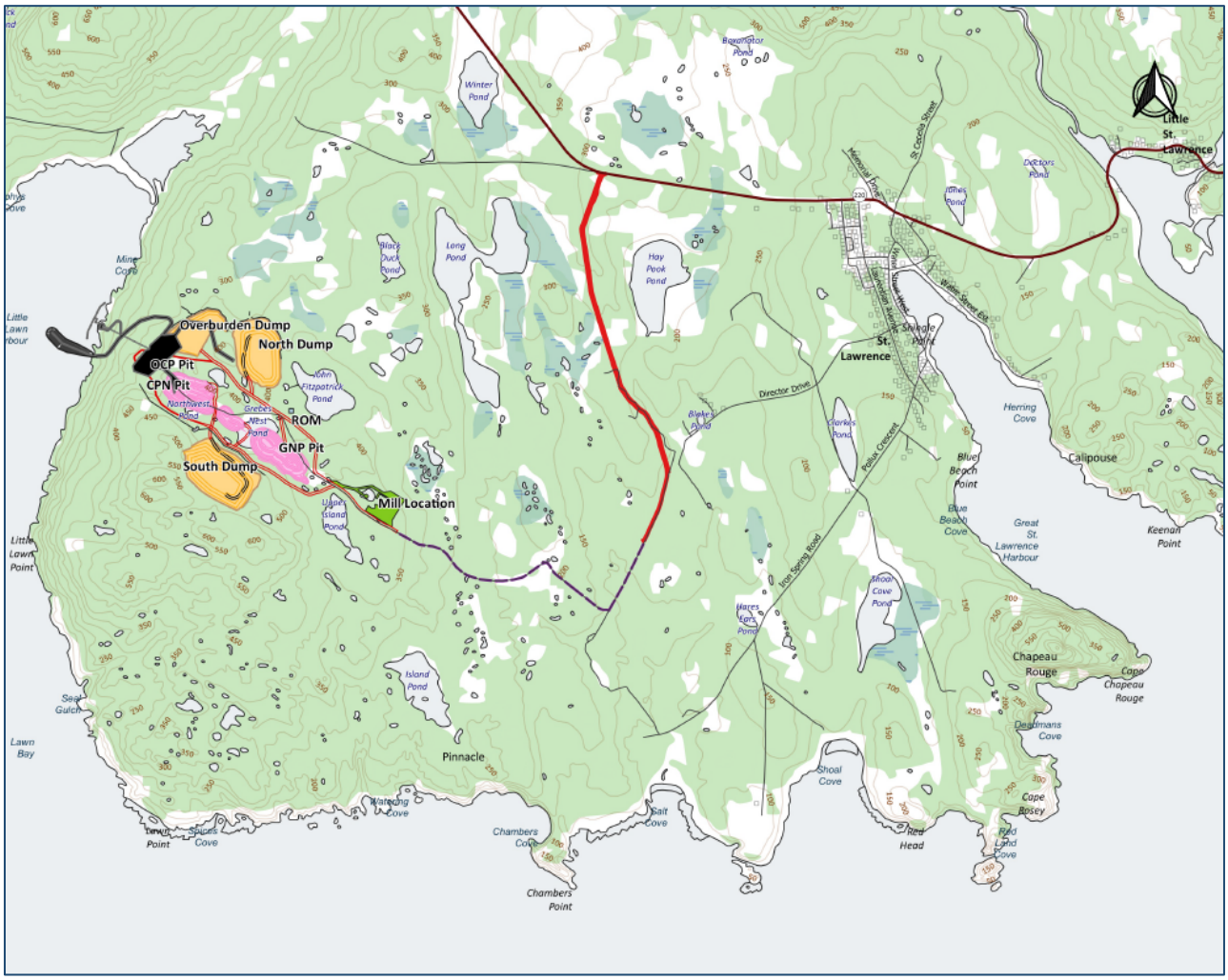


Figure 2-1: Project Site Location and AGS Mine and Mill project area, St. Lawrence, Newfoundland and Labrador

2.2 Project Components

Several alternatives and layout options for the proposed Marine Terminal have been considered as part of the feasibility study carried out by CFI, and the most technically and economically viable, environmentally responsible, and socially and economically sustainable option has been selected.

The main physical features proposed for the Project are shown on Figure 2-2. These Project components are listed below, and described in the following subsections:

- Concentrate storage building;
- Aggregate processing, stockpiling, and handling area;
- Access and haul roads;
- Water management and general site drainage;
- Concentrate/Aggregate conveyor transfer system;
- The Shipping Wharf and Breakwater.

Concentrate Storage Building: A concentrate storage building will be located at the aggregate processing and stockpiling area. Alternative locations in the general area were considered and the proposed design was selected to minimize interference with other mining activities and enhance logistics of material handling/ship loading.

Aggregate Processing (Crushing and Stockpiling): Processing aggregate requires the operation of a variety of equipment including primary and secondary crushers, screens, conveyors, waterlines and pumps, and other mobile mining equipment including excavators, loaders and haul trucks. The plant will be designed to facilitate incremental expansion as productions ramps up to the design capacity of 2 million tonnes per annum. The processed rock will be stockpiled via portable radial stackers into separate piles based on product dimensions. The reclaim operation will involve front-end loaders feeding aggregate material to the infeed hopper for the overland conveyor.

Water Management and Drainage: Water management will focus on stormwater runoff in the Project area, water used by the Project for processing aggregate, conveyor belt washing, and wastewater generated at the concentrate building to dewater the slurry (should the pipeline option be selected).

Concentrate and Aggregate Transfer System (Covered Conveyor): An overland pile-supported conveyor system will transport both the fluorspar concentrate and aggregate materials from their respective storage/stockpiles to the ship loader. The conveyor will be elevated and sloped to follow the nature ground slope. Each tower support will consist of concrete foundations anchored to the underlying bedrock with grouted anchors. The conveyor belt cleaning (washing) will be required between product switching from fluorspar concentrate to aggregate.

MARINE TERMINAL – BERTH & BREAKWATER

Based on engineering activities carried out to date, the preferred configuration of the marine berth (wharf) will consist of a steel pile-supported structure in combination with a rubble stone breakwater (Figure 2-2). The breakwater will extend approximately 350 m from shore and will provide protection to the berth from predominately west-south-west waves. The marine infrastructure is designed to withstand severe weather and sea state conditions (1-in-100 year return period design criteria). The design will be resilient to

climate change and climate variability (i.e. sea level rise and storm surges, climate vulnerability risk assessment).

The major components of the shipping terminal marine infrastructure are:

- The shipping wharf - eight (8) breasting/mooring dolphins;
- Two (2) mooring dolphins;
- Shiploader support structure;
- Access Trestle and walkways between dolphins;
- Radial shiploader; and
- Rubble mound breakwater lined with both filterstone and armorstone.

The berth will be located in approximately 16 m of water to accommodate Panamax bulk carriers up to 72,0000 DWT. Smaller vessels (20,000 DWT) will be utilized for the export of fluorspar concentrate. The radial shiploader will be designed to reach three (3) hatches on the Panamax class vessel and therefore warping of the vessel will be required to load all hatches. Loading rates will vary up to 2,500 tonnes per hour. The fluorspar concentrate and construction aggregate will be shipped from the wharf, with approximately one vessel per week ranging in frequency and size, with approximately 10-20 ships for fluorspar concentrate and 30 Panamax ships for aggregate on an annual basis at the wharf.

The berth will be equipped with a variety of hardware and equipment such as:

- Navigation lights as required by Transport Canada/DFO regulations;
- High energy absorbing fenders;
- Bollards and quick release hooks;
- Berth lighting (downward directed for night operations);
- Safety ladders;
- Power supply;
- Fire protection; and
- Environmental emergency response equipment.

MARINE TERMINAL FOOTPRINT AREA

The Project's (infrastructure) footprint area was calculated as follows:

Landside (up to the high water mark): the direct area affected included the footprint of the waste rock pile, aggregate processing plant and stockpiles, concentrate storage building, conveyor gallery and power line routes, access and hauling roads, and temporary layout area, etc. The estimated area is approximately 200,000 m^2 (20 ha).

Marine Side: based on the current design, the footprint of the marine infrastructure (breakwater, wharf, dolphins, trestle, walkways, etc.) is approximately 38,000 m^2 (3.8 ha)

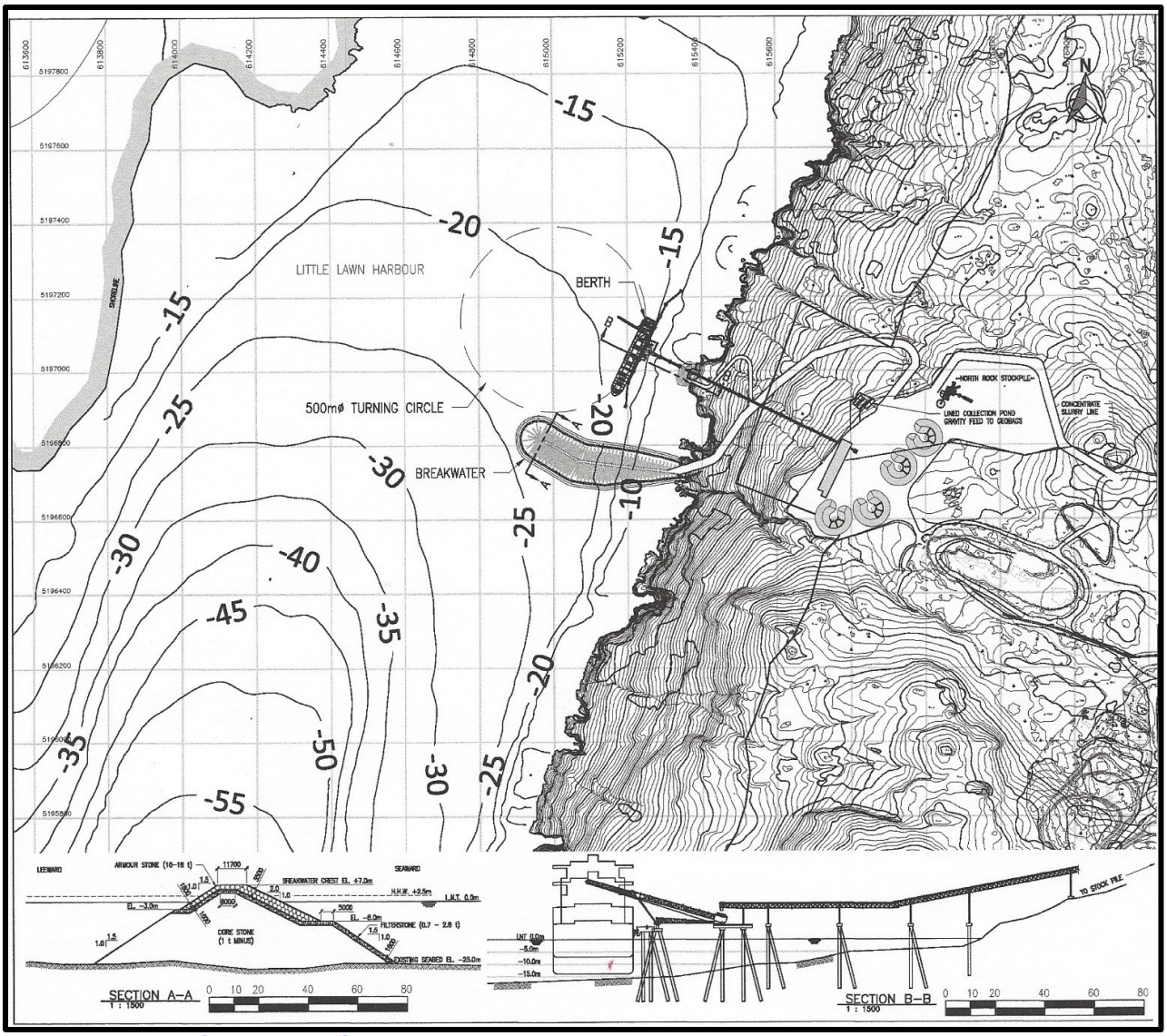


Figure 2-2: Project Components / Site Layout

2.3 Construction Activities

The Construction phase is expected to begin in early 2020 and to be completed by mid 2021. The main activities to be completed during this phase include: site preparation and site access roads; construction of infrastructure (storage building, aggregate crushing plant and overland conveyor); Installation of utilities; restoration of temporary work areas; and commissioning. CFI will execute the proposed works in an environmentally responsible and safe manner and will obtain all necessary regulatory approvals and permits prior to initiating construction.

The construction (as well as operations and rehabilitation and closure) activities will be carried out in accordance with CFI's Occupation Health and Safety Plan, Environmental Protection Plan (EPP) and all applicable permits, authorizations and certifications.

SITE PREPARATION

Site preparation activities include vegetation clearing, grubbing, topsoil salvage, site grading and excavation. The general areas requiring site preparation will be the aggregate processing/stockpiling area, fluorspar concentrate storage building, overland conveyor, and access road to the berth and breakwater. This work will be completed with all necessary sedimentation and erosion control measures, in accordance with the Project EPP. Excavation and blasting related to site development, access roads, and site preparation for the marine terminal will be carried out over approximately 4 months. Standard earthmoving procedures will be employed at the site. During the construction phase, blasting operations are only required during the site preparation work, as stipulated in relevant legislation, CFI Occupational Health and Safety standards, and in compliance with the construction permits. No blasting will take place in the marine environment.

CONSTRUCTION OF THE BREAKWATER AND WHARF

The preferred construction technique for the breakwater will consist of end dumping core rock along the breakwater alignment. Once the breakwater reaches a sufficient height above the water level trucks will travel along its length and continue the end dumping exercise. As the breakwater progresses from shore the core rock will be protected by a layer of filterstone and topped with a suitable size armorstone. Both the filterstone and armorstone will be transported to the breakwater site by trucks (or barges) and placed using excavators or cranes depending on the filterstone/armorstone weight. Silt curtains will be used, if required.

The piling associated with the wharf's mooring, breasting and shiploader supports will be installed from a conventional marine plant consisting of two barges. One barge will be used as a platform for the crane and other equipment while the second barge will be used to store piling materials. The piles will be installed using pile driving hammers and churn drills and will be anchored to the underlying bedrock. Silt curtains will be used, if necessary. After installation of the piling the concrete pile caps will be formed and poured in place. Where practical pre-cast pile caps may be used to improve constructability and schedule.

POWER

Electrical power for local operations and the Town of St. Lawrence is obtained from the Newfoundland Power electrical grid. A Newfoundland Power substation is situated on the north side of the study area. The substation and metering station built in recent years at the mill site will be the connecting point for the Project's new electrical transmission line.

2.4 Operation Activities

The operation phase is anticipated to last approximately 18 years based on current estimates of waste rock generated by the AGS Mine. Various activities are associated with aggregate processing, stockpiling, and transfer to ship loading facility. It also includes the transfer of concentrate to ships. Marine operations including ship loading and shipping activities will be in accordance with applicable Acts and Regulations.

CFI will protect the environment by addressing waste management and water management at all phases of the Project. Environmental monitoring will be concurrent with Project activities to foster continuous environmental protection and control. The Marine Terminal will be supplied with domestic water from the Mill Site. This water will not be used for drinking purposes but will be treated for use in showers, water closets and lavatories. The drinking water requirements will likely be served by bottled water brought on

site. At this stage in the Project's conceptual development, the firewater supply has not been identified, however it will most likely be a sump pump located at the marine terminal utilizing saltwater.

Power to the marine terminal site will be supplied by transmission line from the mill site, which is currently connected to the existing grid. A substation will supply power from the main line to supply electrical power to the entire marine terminal site. Emergency power will be needed for critical equipment at the port site, such as shiploader and lighting, as well as communications/controls and life safety systems. In the event of power failure, emergency power will be supplied by diesel generators, which will be tied-in to the system via automatic transfer switches.

2.5 Rehabilitation and Closure

Once the operation phase of the port has ended, the facilities will be properly closed, and rehabilitative measures will be taken to ensure that the site and surrounding areas are returned to an environmentally appropriate condition and in accordance with the Project Rehabilitation and Closure Plan. The mine's Rehabilitation and Closure Plan will be updated and submitted to the Government of NL for approval under the *Newfoundland and Labrador Mining Act*. Decommissioning, closure and rehabilitation work is anticipated to take up to 2 years followed by post-closure monitoring activities.

The exact length of the monitoring period will be determined at decommissioning following assessment of the site conditions and in consultation with the appropriate regulatory authorities. It is anticipated that the breakwater will remain in place (will not be part of the rehabilitation). At the time of closure, the marine habitat established on or surrounding the breakwater will be well developed and its removal activity will have potentially more harmful effects on marine life already established within the breakwater limits than those associated with the removal of the breakwater.

2.6 Occupations

CFI is committed to maximizing local benefits during all phases of the Project, which will generate employment and associated socio-economic benefits. CFI is committed to local employment, to maximizing local benefits, both through direct employment, training and by giving assistance and preference to local suppliers.

Construction Employment: the construction of the Project will result in a total workforce of 152 persons.

Operation Employment: Employment during the 18-year aggregate operation will result in the creation of approximately 24 full-time positions. These positions are anticipated to be direct employees of CFI that will likely work full-time on the Project, although some positions might be hourly while others will be salaried.

2.7 Emissions, Discharge and Waste Management

Information on the main mitigation measures to be implemented to minimize discharges and emissions in the environment is summarized below. CFI will update its Environmental Management System (EMS) to guide Project activities and reduce adverse environmental effects. These include the following activities:

ATMOSPHERIC EMISSIONS

Potential sources of air emissions will be identified and controlled through various means (e.g., engineered systems, operational and maintenance controls, and industry best practices that will form the Project's Environmental Management System (EMS). Mitigation measures will be identified during various

Project phases. CFI is committed to reducing its emissions of greenhouse gases. Preliminary design is underway and opportunities to reduce these emissions are being explored.

GREENHOUSE GAS (GHG)

During the Project's construction and operation phases the estimated GHG emission totals for one year are as follows:

- Construction: 4.954 kt CO2e
- Operations: 8.764 kt CO2e

The estimate includes primary and indirect sources, the latter related to electricity consumption. Operations sources include marine vessel emissions while loading at the wharf, but not other off-site emissions. These estimates have been calculated conservatively.

WASTE MANAGEMENT

CFI's existing Waste Management Plan (WMP) will also be updated as part of the EMS and will include procedures to manage the various waste streams generated during all phases of the Project. This plan will be developed prior to the start of construction. The key waste streams include waste rock, sewage, solid waste and hazardous waste. Solid waste will be generated during all phases of the Project. Waste management practices will be established in compliance with all applicable regulatory requirements. During all Project phases, waste management options will be considered to minimize the waste generated by Project activities, and to reuse and/or recycle wastes when feasible. Hazardous waste generated through Project activities will be managed in compliance with all applicable legislation. Hazardous waste sources and quantities will be identified during detailed design, construction and operation phases and in accordance with CFI's Waste Management Plan.

2.8 Accidents, Malfunctions and Emergency Response Planning

The effects of potential accidents and malfunctions on workers, the public, and environmental, socio-economic and cultural resources are considered in this EA Registration. Accidents and malfunctions could occur during all Project activities. The Project has been designed and will be constructed and operated following applicable standards, industry best management practices, Project-specific mitigation measures identified in this document, and CFI's EPP and ERP. These measures are expected to reduce the risk of an accident or malfunction during Project construction, operation, and rehabilitation/closure.

CFI has a goal of zero accidents; accident prevention is high priority within CFI's Environmental Health and Safety Management System (EHSMS). Anticipating potential accidents and malfunctions, and implementing proactive measures aimed at preventing such incidents are the guiding principle in CFI's EHSMS. In addition, this system will require that a high level of response capability be maintained throughout all phases of the Project.

Accidental events can be generally categorized as either spills or releases to the environment (e.g., fuel and hazardous materials, concentrate or wastewater), or failure of engineered systems resulting in material spills or releases to the environment. The following list of accidents and malfunctions cover all phase of the Project:

- Marine terminal failure (e.g., processes and equipment);
- Conveyor system and pipeline failure;

- Stockpile slope failure;
- Vehicle and vessel collisions;
- Spills or leaks of hazardous substances (terrestrial and marine); and
- Fires and explosions.

2.9 Potential Resource Conflict

Potential interactions between the Project and the environment (both adverse and positive) during construction and operation may include those associated with:

- Fish and Fish Habitat (freshwater and marine);
- Resource Harvesting (fisheries, berry picking);
- Birds and Wildlife;
- Species at Risk (if present in the general area of construction); and
- Socio-Economic Environment.

Potential resource conflicts arising from these interactions are being identified through stakeholder consultations during all Projects' planning stages, including the EA process. An analysis of these Project-environment interactions and potential resource conflicts and proposed mitigation measures is provided in Section 7.0.

3.0 PROJECT RATIONALE AND ALTERNATIVES ASSESSMENT

As discussed in previous sections, three alternative locations for the transportation of the mine and mill products have been considered and evaluated, these are

1. Present situation – trucking and shipping fluorspar concentrate to Mortier Bay, Marystown, Cow Head marine facilities;
2. Blue Beach Cove, Great St. Lawrence Harbour (two locations); and
3. Western option near Mine Cove, Little Lawn Harbour.

As discussed in previous sections, option 3 was the preferred location for the proposed marine shipping terminal.

In addition, a number of alternative locations and design configuration/layout of the wharf and breakwater and associated land-based infrastructure have been considered and assessed in the recent CFI feasibility study, which is also based on the site-specific investigations (bathymetry, fish/fish habitat surveys, terrestrial and marine environmental studies, socio-economic analysis and public consultations). The final design of the breakwater (location, length, width, crest height, and orientation) will be optimized based on the results of the Met-Ocean Investigations using the most comprehensive wind and wave database and the use of state-of-the-art advanced numerical models of hydrodynamic and wave prediction.

All these factors have been considered in the selection of the preferred design option for the proposed Marine Terminal near Mine Cove.

4.0 ENVIRONMENTAL EFFECTS ANALYSIS METHODOLOGY

4.1 Approach and Methodology

The approach and methodology used in this document are based on accepted environmental assessment practice and federal and provincial guidelines, focusing on environmental and socio-economic issues of greatest concern. It is generally acknowledged that an EA is a planning tool and should focus on those components of the environment that are valued by society and/or serve as indicators for environmental change. These components are known VCs and include physical, environmental and socio-economic components. In general, the analysis involved the following steps:

- Determining the Valued Components (VCs) that may interact with Project activities;
- Describing and studying the existing environmental setting in which the Project will be constructed and operated;
- Conducting a preliminary identification of likely Project-environment interactions;
- Establishing the temporal and spatial boundaries of the Project-VCs interactions;
- Assessing Project-specific effects, including the likelihood of Project effects & recommended mitigation measures; and
- Describing the likely cumulative effects for the Project in combination with other physical activities that have been or will be carried out in the Project region.

The scope of this document was determined by the Proponent and its consultants, and is based on the Project components and activities, professional judgment and expert knowledge of the consultant team, consultation with the public and regulatory authorities, and the results of field studies conducted in support of this study.

4.2 Valued Components (VCs)

This analysis evaluates the likely environmental effects of the proposed Project components and activities, throughout all Project phases, with regard to each VC. By analyzing the likely effects on a given VC within the study boundaries, a meaningful evaluation of project effects on relevant environmental aspects can be achieved. The following VCs were identified and assessed based on government guidance, consultation with stakeholders, and understanding of the Project interaction with the environment:

1. Physical Environment (Soil and Geology);
2. Atmospheric Environment (Climate, Air and Noise);
3. Water Resources (Groundwater, Surface Water);
4. Terrestrial Environment (Freshwater Fish and Fish Habitat, Vegetation Communities, Habitat Types, Wetlands and Species at Risk);
5. Wildlife (Birds [Terrestrial and Marine] and Species at Risk);
6. Marine Environment (Fish and Fish Habitat, Marine Mammals, Sea Turtles and Species at Risk);
7. Socio-economic Environment (Health and Safety, Economy, Employment and Business, Community Services and Infrastructure, Historic Resources, Navigation, Commercial, Recreational and Indigenous Fisheries).

4.3 Existing Environment

The existing environmental setting includes physical and biological environmental and socio-economic elements that were considered when determining likely effects that could occur as a result of the Project. The environmental baseline studies, describing the existing environment and socio-economic elements, are the basis for determining potential changes and likely environmental and socio-economic effects associated with the Project. The analytical methods and existing environmental and socio-economic setting in which the Project will be constructed and operated are described in Section 6.0 (Existing Environment). All elements referred to as VCs in this analysis are also described in that section; however, only those identified as having possible interactions with the Project were scoped into the analysis and discussed in Section 7.0 (Environment Effects Analysis).

4.4 Identification of Project-Environment Interactions

A preliminary identification of likely Project-Environment interactions was undertaken to focus the analysis on the issues of key importance. All relevant Project works or activities were analyzed individually to determine if a plausible mechanism exists for an effect on each VC during normal Project conditions. The results are summarized in a matrix illustrating when the Project may interact with each VC and when adverse effects are likely or possible (Table 4-1).

Table 4-1: Preliminary Project Interactions with Valued Environmental Components

Valued Environmental Components (VCs)		Project Phase		
		Construction	Operation and Maintenance	Decommissioning and Rehabilitation
Physical Environment	Soil	•	•	•
	Geology	—	—	—
Atmospheric Environment	Climate	—	—	—
	Air Quality	•	•	•
	Noise	•	•	•
Water Resources	Groundwater	•	•	•
	Surface Water	•	•	•
	Freshwater Fish and Fish Habitat	•	•	•
Terrestrial Environment	Vegetation Communities and Habitat Types	•	•	•
	Wetlands	•	•	•
	Species at Risk	•	—	—
Wildlife	Birds [Terrestrial and Marine]	•	•	•
	Species at Risk	•	•	•
Marine Environment	Fish and Fish Habitat	•	•	•
	Marine Mammals	•	•	•
	Sea Turtles	•	•	•
	Species at Risk	•	•	•
Socio-Economic Environment	Health and Safety	•	•	•
	Economy, Employment and Business	•	•	•
	Community Services and Infrastructure	•	•	•
	Historic Resources	•	•	•
	Commercial, Recreational and Indigenous Fisheries	•	•	•

• = A likely Project-environment interaction could result in an environmental or socio-economic effect.
— = No plausible interactions were identified.

4.5 Temporal and Spatial Boundaries

Temporal and spatial boundaries encompass those periods and areas within which the VCs are likely to interact with, or be influenced by, the Project. Temporal boundaries are generally limited to the duration of, and for a period of time after the Project activities, which in this case include the entire lifetime of the Project including decommissioning and rehabilitation activities (18–20 years). Temporal boundaries also address other temporal issues such as seasonal sensitivities (e.g., fish spawning and bird breeding).

Spatial boundaries are generally limited to the immediate Project area, unless otherwise noted. For the purpose of this assessment, the Project area (i.e., Project physical boundary, including the infrastructure footprint and other areas that may be affected by Project activities) was assumed to cover 200 ha, which is conservative assumption considering the Project infrastructure footprint area is 23.8 ha. The Project larger area of influence may include the AGS Mine & Mill and associated infrastructures, the Town of St. Lawrence and the surrounding environment. Some spatial boundaries may extend beyond the Project area (e.g., Water Resources, Terrestrial, Wildlife and Socio-Economic Environment).

4.6 Project Effects Analysis

The Project-specific effects analysis evaluates the environmental and socio-economic effects of the construction, operation and maintenance, and decommissioning and rehabilitation phases of the Project. The methodology included the following steps: identifying likely environmental and socio-economic effects; assessing these effects and developing technically and economically feasible mitigation.

The effects analysis considers the possible interactions between the Project infrastructure components and activities, and the VCs, within the identified spatial and temporal boundaries. Project interactions may be direct (e.g., Project infrastructure component or activity affecting a VC), or indirect (i.e., as a result of a change to one VC affecting another VC). Likely effects of the Project on VCs are determined by comparing the baseline conditions to those that are expected to result from the introduction of the Project. Project activities that have been considered in this analysis have been described in previous sections.

Development of mitigation measures to reduce or avoid likely effects on VCs begins with the engineering design phase, and continues throughout the Project planning, EA, public consultation, etc. Refinements are made as specifics are identified and the Project and cumulative effects analysis is conducted. Mitigation is outlined in the effects analysis (Section 7.0) with reference to the Project Environmental Protection Plan, Health and Safety Plan, industry standard practices, and regulatory requirements.

4.7 Cumulative Effects Analysis

In addition to the analysis of environmental or socio-economic effects of the Project by itself, the analysis also considers the environmental effects of the Project in combination with those from other projects and activities that have been, or will be, carried out in the foreseeable future, and which may interact with the Project activities. The cumulative effects analysis aims to determine the interaction of these individual developments to determine how a given project will influence not only the project site or area, but also the cumulative effects study area.

Consideration of other physical facilities or activities that have been or will be carried out within the defined spatial and temporal boundaries must, at a minimum, include the following: existing projects and activities; and those physical facilities or activities for which formal plans or applications have been made and are likely to occur. If Project effects on a VC were predicted, the VC was carried forward into the cumulative effects analysis. For a VC where no Project effects were predicted, the VC was not carried

forward for further analysis. Typically, the likely effects of malfunctions and accidents are not included in the cumulative effects assessment because these events are hypothetical and have a low probability of occurrence.

5.0 PUBLIC CONSULTATION AND ISSUES SCOPING

CFI is committed to a program of engagement with all stakeholders at all stages of the Project and will monitor the effectiveness of the various media used for Project communication.

Public consultation is an important part of environmental assessment. And while the public had been engaged in the previous assessments of CFI's AGS Mine operation, an alternate location of the shipping facility is a new aspect. CFI believes it warrants further consultation with stakeholders, as new information and interests should be considered, in particular those of the marine community. The focus of this Project and associated consultation addresses only the changes from the 2015 AGS project – the movement of fluorspar concentrate by conveyor to ships at a site different than Blue Beach Cove; the crushing and movement of aggregate to ships by conveyor; a breakwater to shelter the terminal which consists of the closed conveyor system and radial ship loader on the wharf which is supported by a series of piles founded within the sea floor; and mooring and berthing dolphins for a vessel (see Section 2.0 for details).

The initial round of consultation activities by CFI has been completed and the feedback received from the community is generally highly supportive of the Project.

Likewise, discussions with regulatory agencies have also been positive with clear direction as to the information they require. The proposed Project will build on previous relevant environmental studies: earlier studies are being updated and new studies relative to the marine environment in Little Lawn Harbour have been started and /or completed.

Meaningful and respectful consultation remains important to CFI in building productive relationships with community members and interested stakeholders, and to improve the Project design based on their input. CFI has worked to establish open and transparent communication with all interested or affected individuals, organizations, communities, and regulatory agencies.

5.1 Consultation Approach and Activities

CFI has taken a similar approach to the effective consultation carried out for the AGS Mine assessment in 2015, identifying stakeholders and regulatory agencies that would have clear interests and/or permitting roles and ensuring there is an effective communication process, with opportunities for information sharing.

CFI's representatives and/or EA team met with several regulatory agencies regarding specific approvals or processes as well as with municipal representatives in the immediate area of ongoing operations (St. Lawrence, Lawn, Burin, Marystown). FFAW-Unifor were asked for assistance to identify fish harvesters potentially affected by a terminal near Mine Cove and arranged an introductory meeting for the CFI EA team with fisher harvesters from Lawn and Lord's Cove.

There are no Indigenous communities within the Project area or within the Burin Peninsula. CFI is not aware of any Indigenous fishing activities in the approaches to or within the Little Lawn Harbour. However, CFI has reached out to the Indigenous Communities in the Province and elsewhere to inform them of the Project and seek their input.

5.2 Public Information Session

The Public Information Session held in St. Lawrence on April 25th, 2019 was an important source of information for CFI to aid their understanding of residents' interests, questions and reaction to the proposed alternate location of the marine shipping terminal, especially what they see as advantages and disadvantages over the previous location at Blue Beach Cove closer to the community centre, as well as

the current trucking activities to transfer the fluorspar concentrate to Marystown. The signup sheet had 76 people's signature. While close to half of those who attended were from St. Lawrence, there were people from as far away as St. John's and Clarenville, and a good number from nearby communities. 62 surveys were submitted. Summary of the responses to selected survey questions are summarized below.

A question related to the community in which the participant resides (Question 2) - a graphical representation of the responses to this question is shown in Figure 5-1. The majority of participants reside in St. Lawrence (55.7%). While Marystown was well represented (almost 10%), over 21% of participants indicated they live 'other ', naming communities mainly on the Burin Peninsula.

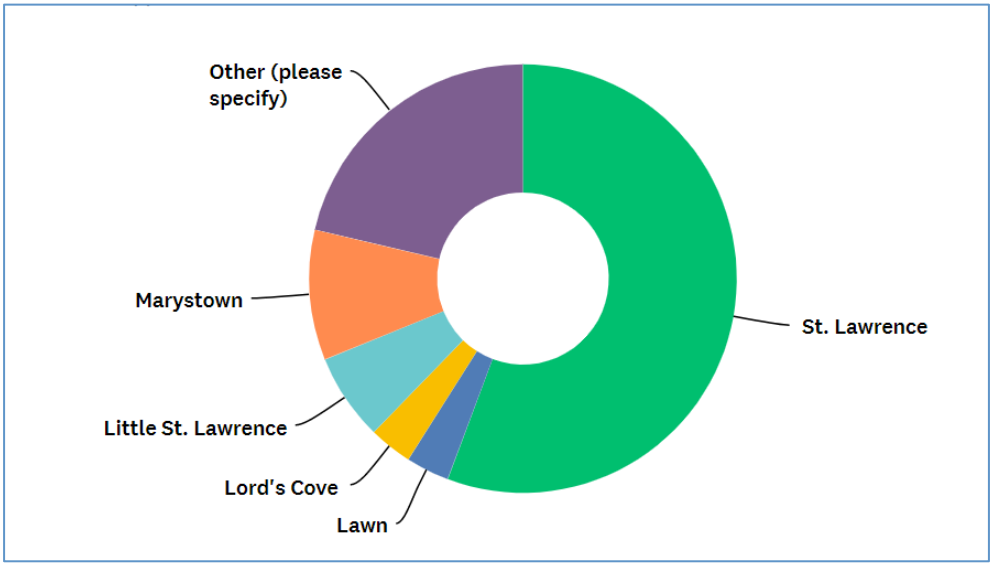


Figure 5-1: Responses to Question: "Which Community Do You Reside In?"

Question 8 is direct – Do you support the Proposed Marine Shipping Terminal on the west side of the mine? The response is clear: 96.4% are in support (Figure 5-2).

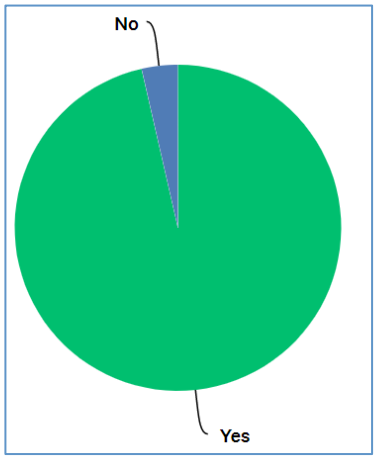


Figure 5-2: Response to "Do You Support The Proposed Marine Shipping Terminal At The Proposed Location?"

Question 9 seeks to understand what area residents believe is the most important aspect of the Project: they are asked to rank five different aspects: Health and safety; jobs/employment; environment; local benefits; and other (Figure 5-3). The overwhelming interest is in health and safety, which was ranked as number one priority and almost twice as important to participants as employment. There were only three who selected other as a response, and they indicated economic benefits for the community, infrastructure and education.

Figure 5-3: Response to Question on "Most Important Aspect of The Project to Participants"

In question 10, the survey asks respondents what they see as the advantages or disadvantages of the proposed new western location for the marine shipping terminal. Responses mainly identified advantages (38 of 48 responses), in particular reduced trucking/traffic on community and public roads. Other advantages mentioned include the possibility of additional opportunities (e.g., exporting aggregate); the benefit to the environment of reduced air emissions with decrease in trucking; and the shorter distance to move the material as an economic benefit. A couple of respondents identified the challenges of maintaining a breakwater in heavy sea conditions. Four comments mentioned the introduction of large vessels in the area used by small fishing boats and one expressed concern for effects on the lobster fishery in Little Lawn Harbour.

Question 11 was open ended, asking respondents to provide any additional comments or questions. Several supportive comments were added, e.g., '...*a very positive project development for the community'* and '*great project for town and region'*, '*good project for long-term viability*. The caution raised by some of the fish harvesters regarding the wave and wind forces and breakwater design was reiterated and there was encouragement to continue to work with the area fish harvesters regarding potential for displacement from fishing areas.

In summary, there is clear support for the Project. Issues scoping through public consultation has identified areas of high interest to participants, these are:

1. Health and Safety;
2. Commercial Fishing;
3. Employment; and
4. Environment

5.3 Proponent Engagement and Consultation with Indigenous Groups

Previous research for the 2015 AGS Mine EA has found that there are no designated Indigenous lands in the St. Lawrence Project region (CFI 2015) and CFI is not aware of any Indigenous fishing activities in the approaches to or within the Project area in Little Lawn Harbour. However, several Indigenous Communities hold licences from DFO that could allow fishing in Placentia Bay: while none has occurred to date, CFI has contacted each of the identified Indigenous communities about the Project and the environmental assessment and requested their input.

The Indigenous groups, which have been consulted, are: Miawpukek First Nation (MFN), Qalipu Mi'kmaq First Nation Band, NunatuKavut Community Council, Labrador Innu (Innu Nation) and the Labrador Inuit (Nunatsiavut).

CFI sent an introductory letter to the DFO-identified contact for each of the five Indigenous groups listed above. The letter introduced the Project and invited input into the environmental assessment. The letter also indicated the planned timeframe for initiating the assessment and requested confirmation of the appropriate contact for further communication regarding the Project. CFI's socioeconomic EA consultant followed up on the letter in telephone conversation(s) and with further information if requested. At the time of writing, CFI has been assured by two of the Labrador based communities that they do not plan to fish in the Project area and three of the five, including both Island based groups, have offered to review the Project information provided and the Project Description/Registration as well. MFN indicated they would review the information provided and Project Description/Registration from the point of view of vessel related traffic, noise, pollution, potential accidents as well as the Salmon River entering Little Lawn Harbour. CFI has initiated contact with DFO to ascertain if any Indigenous groups on the east coast but outside this province may have licences that could bring them into Placentia Bay or Lawn Bay: if so, CFI will contact them regarding the Project.

CFI is committed to a program of engagement with all stakeholders at all stages of the Project and will monitor the effectiveness of the various media used for Project communication.

There are no Indigenous Communities in the Project Area and there is no record of current or historical use of Project Lands for traditional purposes. As well, there is no record of structures or sites within the Project area that are of historical, archaeological, paleontological or architectural significance to communities within the study area. Therefore there is no change to the environment as a result of the Project that would affect the Indigenous groups in the Newfoundland and Labrador or other Atlantic Provinces.

6.0 EXISTING ENVIRONMENT

The Project area's physical, biological and socio-economic environments are briefly described in this Project Summary. The following sections provide a summary of selected environmental settings of the Project area.

6.1 Physical Environment

This section includes an overview of the marine environment (met-ocean), soil/geochemistry, surface water, and air quality.

6.1.1 Met-Ocean Climate

The database used in this study for the offshore and nearshore wind/wave climate is recognized as the best available and most comprehensive dataset for the study region. The offshore data was derived from the MSC50 wind/wave model (1954-2015) and the nearshore site-specific wave data was obtained from the state of the art spectral wave model (MIKE21). This wind and wave climate data have been used for the design of the Marine Terminal's wharf and the breakwater, and in determining the operating conditions at the berth (wind speed and wave height thresholds and associated downtime).

WIND CLIMATE

Wind rose and wind speed exceedance curve (Figure 6-1) illustrate the prevailing west-south-westerly wind in the study area; the offshore wind speed exceeds 25 knots (12.85 m/s, 46.3 km/hr) 12% of the time on average. The highest offshore winds occur in winter (Mean 11.1 m/s; Max 27.2 m/s and the dominant direction is from west-southwest (WSW); the extreme 100 year return period wind speed is 31.5 m/s (61.3 knots).

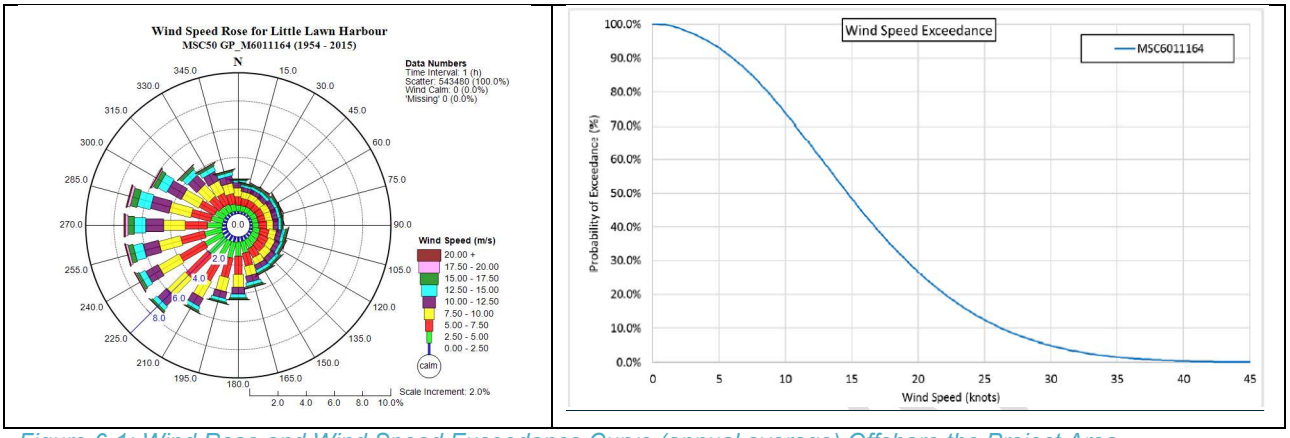


Figure 6-1: Wind Rose and Wind Speed Exceedance Curve (annual average) Offshore the Project Area

WAVE CLIMATE (OFFSHORE)

Figure 6-2 present wave roses and wave height exceedance curves for combined sea & swell waves for offshore & onshore waves. The offshore seas are associated with winds, and approach Lawn Bay from the SW to W directions. The swells are associated with storms occurring at more distance in the North Atlantic Ocean, and approach Lawn Bay from SSE to SSW. Wave severity varies significantly by season, with highest in winter and much lower sea states in summer; the offshore mean monthly significant wave height varies from 1.5 m (July) to 3.0 m (December). The maximum monthly significant wave height

varies from 7.3 m (summer) to 12 m (winter). The 100-year return period offshore wave height is 13.1 m (annual).

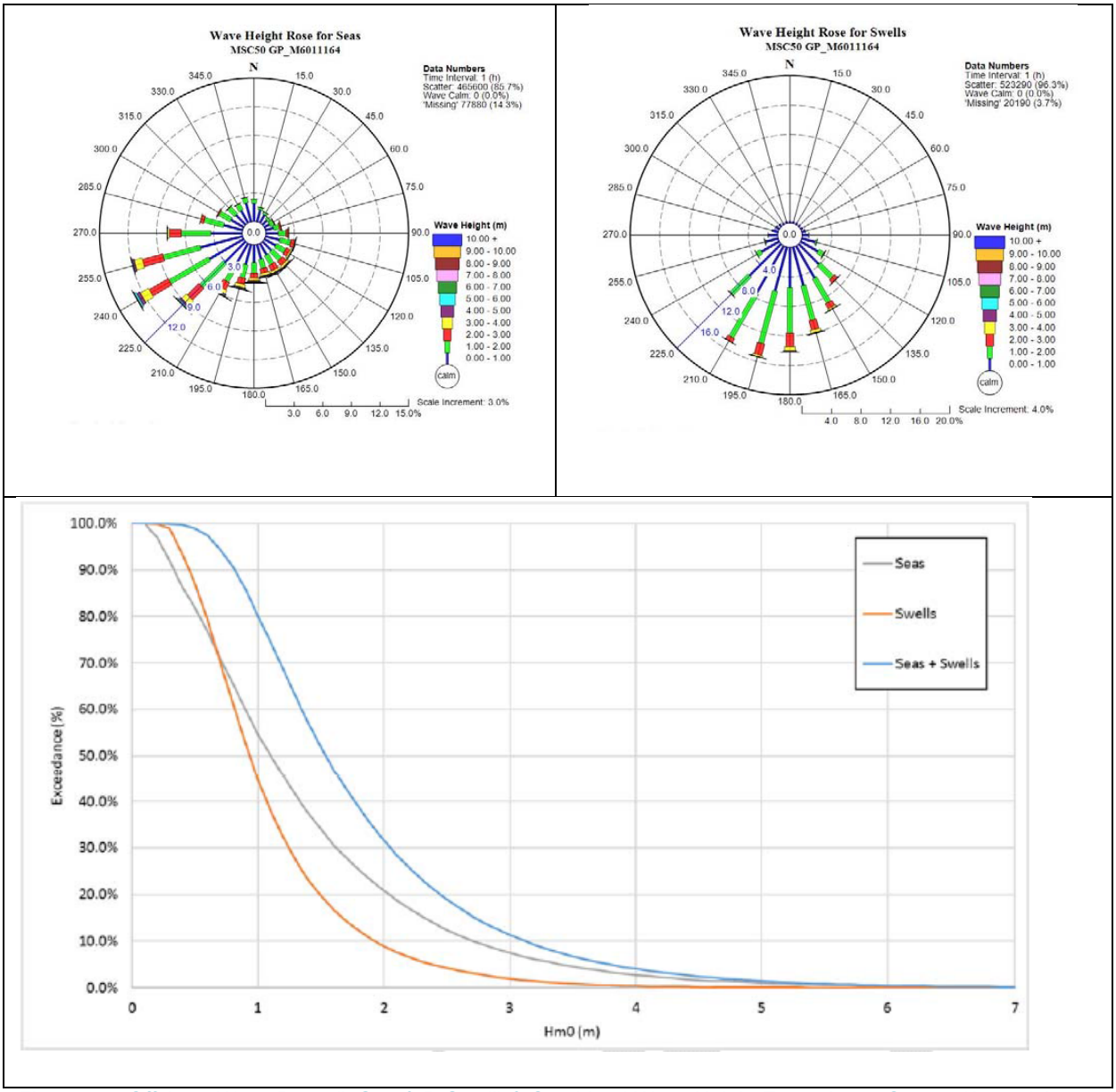
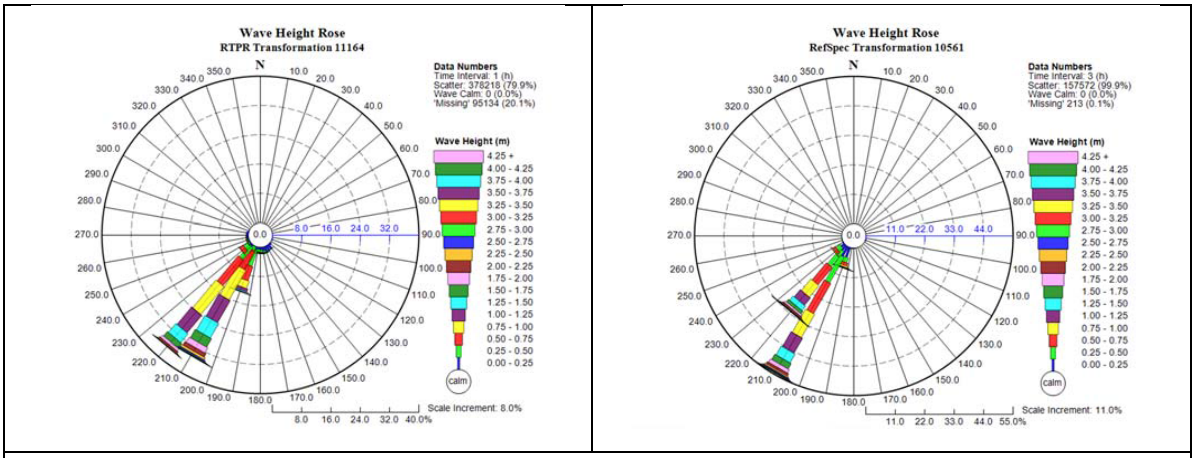


Figure 6-2: Offshore Wave Rose (L-Sea & R-Swell) & Combined Wave Height Exceedance Curves (Annual Average)

WAVE CLIMATE (NEARSHORE)

Figure 6-3 presents the nearshore wave roses and wave height exceedance curves at the proposed location of the berth. As shown, significant transformation of the offshore wave conditions occurs as waves propagate into the Project site. It indicates that the predominant wave direction is SSW-SW. Extreme Value Analysis of wave height for 10, 20, 50, and 100-year return periods were determined (Table 6-1). As shown the preliminary estimate of 100-year return period significant wave height at the end of the breakwater (i.e., design wave height) is ~5.5 m and associated peak wave period of 13 seconds. The design breakwater crest elevation = +7.0 m (above Chart Datum).



Nearshore Wave Roses (L – Spectral Transformation, R - Parametric Transformation,)

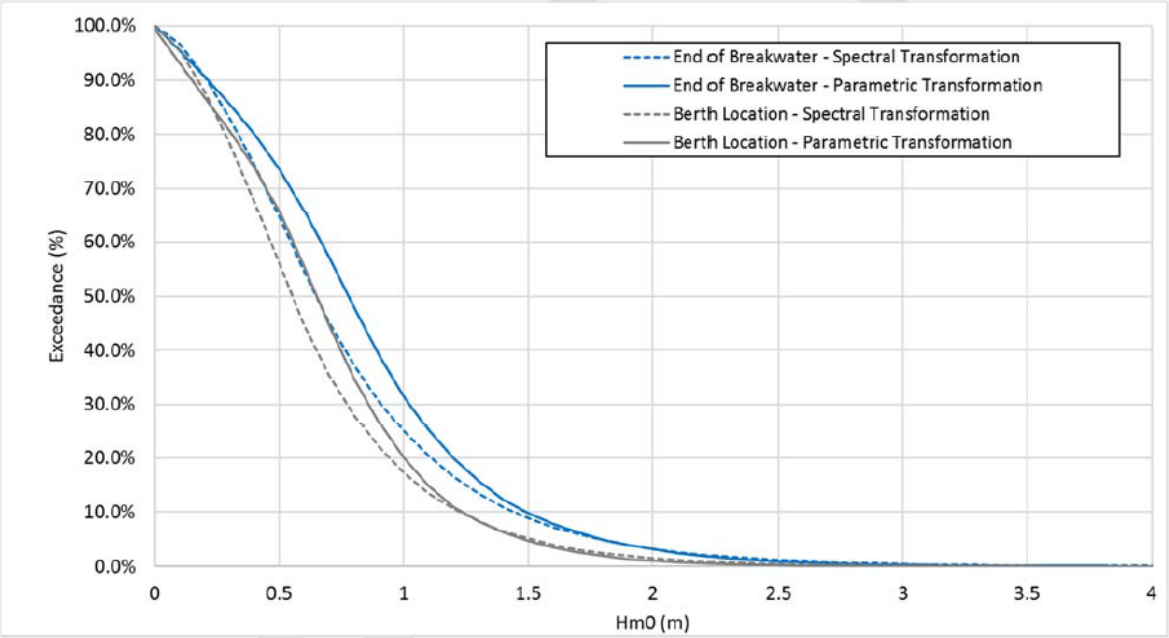


Figure 6-3: Nearshore Spectral Wave Rose and Significant Wave Height Exceedance Curves

Table 6-1: Extreme Wave Heights at End of Proposed Breakwater for Various Return Periods

Return Period (yr)	Significant Wave Height (m)	90% Confidence Limits (m)	Associated Wave Period (Tp, s)
10	4.7	4.5 – 4.9	12 – 15
20	5.0	4.7 – 5.2	13 -15
50	5.2	4.9 – 5.5	13 – 15
100	5.4	5.1 – 5.8	13 - 15

6.1.2 Soil and Bedrock Geology

Soils over much of the study area generally consist of a relatively thin (1.5 m) to thick (15 m) layer of glacial till comprised of silty sand and gravel with varying percentages of cobbles and boulders. The Project area is underlain by the Late Devonian St. Lawrence Granite and associated porphyritic rocks of similar composition, both of which intrude older host rocks. The porphyritic rocks are locally referred to as rhyolites.

Exposed along Little Lawn Harbour's shoreline is bedrock belonging to the Bay View Formation: one of the three formations that comprise the Inlet Group. The rocks of this formation, which are generally highly cleaved and schistose, consist of mudstones, shales, limestones, and siltstones.

6.1.3 Mine Waste Geochemistry

Acid Generating – Metal Leaching Potential

Baseline geochemical characterization of AGS Mine wastes (including waste rock and DMS Floats) has been ongoing since 2015 to characterize the acid generating and metal leaching potentials of these materials. Based on this extensive sampling program, there appears to be sufficient evidence that the waste rock is considered non-Potentially Acid Generating (non-PAG).

Based on results of kinetic testing carried out over 57 weeks on two waste rock samples conducted by CFI, most of the key parameters identified in the baseline report are leaching at concentrations below guideline levels (*Canadian Water Quality Guidelines for the Protection of Freshwater Aquatic Life, Canadian Environmental Quality Guidelines* [CCME 2019]).

Radon

A Health Canada survey initiated in 2017 found elevated radon levels in some older buildings in the Town of St Lawrence. Certain buildings were constructed in the past using waste rock from the old underground mines, and Health Canada suspected there may be a connection between the waste rock and these anomalous radon levels.

Radioisotopes of radon ultimately derive from radioactive decay of uranium. Therefore, a test for total uranium in waste rock provides a useful proxy for evaluating the potential for generating elevated radon levels in basements and substructures, should aggregate processed from waste rock be used for such applications. Health Canada suggests that total uranium concentrations in waste rock below 23 mg/kg (preferably <10 mg/kg) would be acceptable, should aggregate be used for building construction.

Whole rock analysis of CFI's mine waste (i.e. waste rock and DMS Floats) samples have reported uranium concentrations all below the Canadian Soil Quality Guidelines for Residential/Parkland land uses (i.e. < 23 mg/kg). Based on testing of over 60 representative samples of CFI's mine waste, results indicate that uranium concentrations in aggregate meet Health Canada's acceptance.

6.1.4 Surface Water & Hydrogeology

Stream flows in the general Project area follow a bimodal pattern with a primary peak occurring in April (snowmelt) and a secondary peak in December (due to rainstorms). The lowest flows occur in the summer months of July and August. Average monthly runoff depths range from 58.8 mm (August) to 191.3 mm (April), with an annual total of 1401 mm. In the vicinity of the Project footprint, there are two watersheds: Mine Cove watershed and Northwest Pond watershed.

Surface water and groundwater quality sampling and analyses have been conducted by CFI over the past five years. Sampling and testing has focused on the watersheds within the mining lease area, to establish baseline conditions in the region, including the Project area. Regular water quality analyses have taken place since before the AGS Mine began operations in August 2018 as part of the mine's regulatory requirements and environmental effects monitoring program.

Based on fieldwork, groundwater levels in monitoring wells in the vicinity of the AGS Vein were confirmed to be near ground surface. It was also assumed that shallow bedrock flow directions are the same as surface water flows. It was determined that the shallow aquifer system is largely controlled by surface runoff and local recharge, which makes groundwater levels sensitive to dry periods.

6.1.5 Air Quality

Atmospheric emissions associated with CFI's AGS Mine project are monitored by an Ambient Air Monitoring Station (AAMS) that was commissioned in December 2016 during the mine's construction phase. Since then, the station has been monitoring emissions resulting from fugitive releases of particulate matter (material handling & processing, and road dust) and diesel engine exhaust.

Since CFI's AAMS installation, there have been no concerns raised by DMAE with respect to the monitoring. This suggests air quality associated with current AGS Mine operations is both acceptable and compliant with the *Air Pollution Control Regulations, 2004.* This monitoring also helps establish "baseline" air quality with respect to the proposed western marine shipping terminal Project.

6.2 Terrestrial and Freshwater Biological Environment

This section summarizes the terrestrial and freshwater biological environment, including vegetation, wetlands, freshwater fish and wildlife located in the Project area, including species at risk.

6.2.1 Vegetation and Vegetation Species at Risk

The proposed Project area occurs within the Eastern Hyper-Oceanic Barrens Ecoregion of Newfoundland and Labrador. Vegetation communities and habitat types were previously identified via Ecological Land Classification (ELC). An area of approximately 10,400 ha was selected for the ELC Study Area, with coverage extending between Little Lawn Harbour and Little St Lawrence Harbour. For this Project, a subset of the 2015 ELC product was used to assess land cover east of Little Lawn Harbour. This confined terrestrial area of focus (98 ha) represents the maximum extent for the proposed Project footprint and contains all of ecological land classes as identified in the ELC area, with the exception of: Broadleaf Dense; Mixed wood Dense; Mixed wood Sparse; Reef; and Wetlands.

In 2015, during habitat assessments for wetlands, avifauna and wildlife at risk, it was noted that the upper plateau of the Project area was predominately covered with stunted (tuckamore) balsam fir interspersed with low-lying woody vegetation. The west-facing slope extending down to Little Lawn Harbour is steep and comprised of a mixture of coniferous forest, barren tracts, and exposed bedrock. Overall, coniferous canopy coverage is sparse, being most dense mid-slope and in areas that provide natural windbreaks.

There is no species at risk vegetation in the Marine Terminal Project Area.

6.2.2 Wetlands

The ELC confirmed that no wetlands (greater than 100 m^2) are located in the proposed marine terminal Project area of focus (98 ha), and it is not anticipated that any Project activities will conflict with upland wetlands.

6.2.3 Freshwater Fish and Fish Habitat

Streams and drainage channels within the proposed marine terminal footprint have been surveyed for fish and fish habitat. These have been confirmed to not contain resident fish populations and are judged to be incapable of sustaining such populations.

6.2.4 Wildlife & Wildlife Species At Risk

TERRESTRIAL MAMMALS

Terrestrial mammals that may occur in the Project area includes moose, black bear, coyote, red fox, ermine, lynx, and snowshoe hare, none of which are species at risk. Wildlife sightings by CFI personnel at site have been restricted to distant viewing of moose and no confirmed reports of wildlife close to buildings or direct wildlife-human interaction have been made.

BIRDS

Based on bird surveys conducted in the past number of years, there are 132 bird species reported in the St. Lawrence area: 50 migratory breeder species of which 8 are marine/coastal; 34 migratory species of which 16 are marine/coastal; 33 resident species of which 2 are marine/coastal; and 15 vagrant species (typically individual birds that are found well outside of their normal range, e.g. migration fallout after storm events), all of which would be rare in the area). Additional bird surveys were conducted prior to, and during, construction of the AGS Mine project as part of CFI's dedicated avifauna management plan.

Overall, terrestrial bird species diversity in the greater St. Lawrence area is low but includes a variety of boreal and heathland (subarctic) species. For marine birds, refer to Section 6.3.2 of this Summary.

WILDLIFE SPECIES AT RISK

For the purposes of this Project, species at risk include only those designated species that are known to occur, or to have occurred, in the vicinity of the Project area. Of the 16 federally and/or provincially listed bird species, 9 have a known range that includes the Project area or have potential to occur: red crossbill, chimney swift (*Chaetura pelagica*), peregrine falcon, rusty blackbird, short-eared owl, olive-sided flycatcher (*Contopus cooperi*), grey-cheeked thrush (*Catharus minimus*), barn swallow (*Hirundo rustica*), and harlequin duck (*Histrionicus histrionicus*).

In the past decade, only a single sighting of short-eared owl has been reported for the St. Lawrence area. Harlequin duck is the only marine bird species at risk with potential to occur in the vicinity of the Project area. However, the probability is low as there are no known wintering locations on the Burin Peninsula.

None of the federally and/or provincially listed terrestrial mammal species at risk have a known range or are expected to occur in the Project area.

6.3 Marine Biological Environment

Information on the existing environment pertaining to marine fish and fish habitat, marine birds, marine mammals, sea turtles and species at risk is summarized in this section.

6.3.1 Marine Fish and Fish Habitat

The fish and fish habitat in the marine portion of the Project Area was surveyed with drop camera during 25-26 May 2019. The survey was conducted in an area with water depths ranging from intertidal to about 30 m.

The surficial substrate in the survey area is predominantly hard, consisting of varying proportions of bedrock, boulder, rubble, cobble and gravel. The substrate of the portion of the survey area closest to shore (i.e., ≤10 m depth) is generally characterized by bedrock, boulder and rubble with patches of cobble and gravel. The surficial substrate of the remainder of the survey area is generally characterized by cobble and gravel with patches of rubble and occasional boulders.

The flora and fauna observed are typical of inshore marine areas in Newfoundland characterized by hard substrate. Flora observed during the fish and fish habitat survey included brown kelp (e.g., *Laminaria digitata*, *Alaria esculenta, Agarum* sp.), filamentous brown algae (*Desmarestia* sp.), Irish moss (*Chondrus crispus)*, and coralline algae. Fauna observed during the survey were dominated by sea urchins (*Strongylocentrotus droebachiensis*). Other observed fauna include sea anemones, sea stars, jellyfish, ctenophores, toad crab (*Hyas* sp.), various gastropods, brittle stars, mussels, Atlantic wolfish (*Anarhichas lupus*), flatfish (most likely winter flounder *Pseudopleuronectes americanus*), and cunner (*Tautogolabrus adspersus*). No lobster were observed during the survey which isn't surprising given that they are primarily nocturnal and the survey was conducted during daylight hours.

The data collected during the marine fish and fish habitat survey will be presented to DFO in the Request for Review during CFI's application for *Fisheries Act* paragraph 35(2)(b) Authorization to proceed with the work.

Sensitive Habitat

Sensitive habitats that either overlap or occur proximate to the Project area are shown in Figure 6-4.

The Project area is located within the Placentia Bay Ecologically and Biologically Significant Area (EBSA). The proposed marine terminal is located along the Coastline Environmental Protection Management Unit (EP-MU Zone), aka SAMNL. This MU features balsam fir tuckamore, open barrens, and bogs, and hosts a high abundance of shorebirds, waterfowl, and seabirds from nesting colonies at the nearby Government of NL Lawn Islands Archipelago Ecological Reserve and Middle Lawn Island Important Bird Area (IBA) of Canada, in western Lawn Bay.

Critical habitat for at-risk leatherback sea turtles has recently been proposed in Placentia Bay. The southern portion of the proposed habitat is ~20 km south of the proposed marine terminal location. This proposed critical habitat features high abundance and quality of the leatherback turtle's gelatinous prey species (e.g., jellyfish), supporting the population's survival.

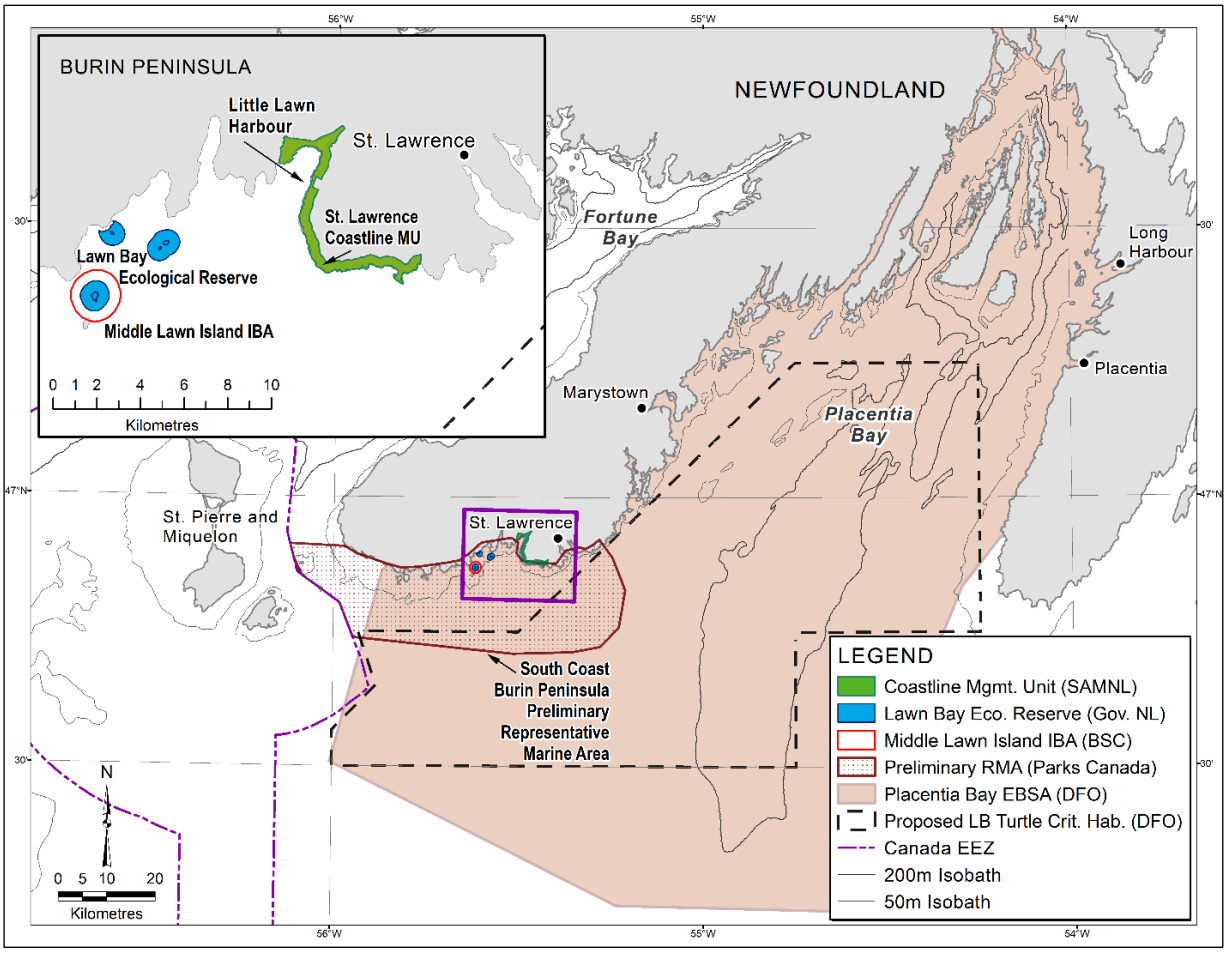


Figure 6-4: Sensitive Habitats that Overlap or are Near the Project Area

6.3.2 Marine Birds, Marine Mammals and Sea Turtles

MARINE BIRDS

Marine birds are those species that spend time associated with the coastal and/or pelagic environment. Most species have either a coastal or pelagic distribution (i.e., spend most of their lives at sea) but some species, such as large gulls, spend time in both habitats. Seabird breeding colonies are numerous on headlands and islands along the entire perimeter of the Placentia Bay area, three of which rank as Important Bird Areas (IBA) off the southern Burin Peninsula, including Green Island, Middle Lawn Island and Corbin Island. The coastal area of St Lawrence experiences high to moderate wave energy and bounds the western mouth of the Placentia Bay area, an area rich in marine bird life. In summer, colonies of gannets, cormorants, alcids, gulls and terns nest along cliffs and on numerous islands, archipelagos and adjacent headlands of St. Lawrence area. Sea ducks, especially common eiders (Somateria moillisima) occur in winter, and seabirds such as Manx shearwaters (Puffinus puffinus) and Leach's storm petrel (Oceanodroma leucorhoa) breed nearby on offshore islands with designated protection (e.g. Middle Lawn Island IBA; provincial Lawn Bay Ecological Reserve).

Overall, the Project area supports sparse marine bird population and species diversity is relatively low. In general, use appears to be seasonal either as spring or fall migrants. Shorebird use within the Project

area is anticipated to be minimal given the predominance of exposed bedrock in the intertidal zone; the inner reaches of the harbour north of Mine Cove would be preferential habitat.

MARINE MAMMALS AND SEA TURTLES

Marine mammal species that typically occur near the Project area include the following: fin whale; sei whale; killer whale; humpback whale; minke whale, long-finned pilot whale; harbour porpoise; Atlantic white-sided dolphin; common dolphin; white-beaked dolphin; otter; harbour seal; grey seal; and Leatherback sea turtles.

The Placentia Bay region is an important feeding area for marine mammals and sea turtles. Numerous sea turtles and marine mammals, including female cetaceans with their young, aggregate in the Placentia Bay region during spring to fall months to feed. Some mammals feeding in the area year-round, including harbour seals, otters and some other cetaceans. Harbour seals haul out and pup in the vicinity of Point May on the southwestern Burin Peninsula, and otters are known to reproduce in the Placentia Bay. The Placentia Bay region is also thought to be part of the migratory route of leatherback sea turtles.

Marine mammal and sea turtle species at risk that potentially occur in the vicinity of the Project area include three marine mammals and two sea turtle species. CFI acknowledges that the at-risk status designations of species/groups may change during the life of the Project, and it will monitor and adaptively manage SARA-related issues as they arise. CFI will abide by relevant regulations as per the SARA and species-specific Recovery Strategies, Action Plans and Management Plans, and minimize potential impacts on at-risk species during all Project phases.

6.4 Socio-Economic Existing Environment

The Project is located in St. Lawrence on the Burin Peninsula. St. Lawrence has a long history of mining, dating back to the early 1930's. St. Lawrence is also a busy harbour, designated as core fishery harbour by Small Craft Harbours and DFO, with a major seasonal fish plant. St. Lawrence has a population of approximately 1,400 people. The communities closest to St. Lawrence are Lawn (population 779), Burin (population 2,315), and Marystown (population 5,316).

Current CFI operations provide more than 200 jobs, support local businesses and provide support to community groups and initiatives. CFI's AGS Mine & Mill project construction started in 2016 and production started in August 2018. Fluorspar production at the mine is anticipated for about 8-10 years. However with the marine shipping terminal at the proposed alternate location, there is the possibility to also export aggregate and extend operations for an additional 10 for a total of 18 - 20 years of operation. Like many rural areas in the province, the population of the Burin Peninsula has been declining over the last 15 years due to a lack of employment. Employment opportunities for such a long period of time may well help residents to stay and/or return to the Burin Peninsula.

There is basic business capacity on the Peninsula, augmented by a cluster of heavy industry service and support businesses about 2 hours away by highway. While the commercial fishery continues to be an important part of the economy, the local and regional economy is diversifying with a new aquaculture industry starting in Marystown and processing planned for the fish plant in St. Lawrence; tourism initiatives; a cannabis growing facility; and a potential marine fabrication and service centre as well as mineral exploration.

The community services and infrastructure on the Burin Peninsula (education, health, policing, transportation, fire protection, recreation, housing and regional services for fire protection and waste

management) were mainly developed for a larger population base. If more residents are able to remain and/or return, there will be increased financial support for the existing services and infrastructure.

The Project has health and safety benefits. The Project will have the immediate benefit of removing much of the heavy truck traffic from the public and community roads: at present there is a truck each hour travelling the 45 minutes from St. Lawrence to past Marystown to deliver fluorspar concentrate to the wharf. The export of aggregate will extend the use of the open pit mining, a safer operation than underground mining. And while the introduction of large bulk carriers is not new to the area (e.g., Placentia Bay shipping traffic of very large crude oil tankers), but new to the Little Lawn Harbour, talks are underway with the fishers who have traditionally fished in Little Lawn Harbour and the approaches to ensure operational safety is effectively addressed.

Commercial fisheries typically conducted in Little Lawn Harbour and its immediate vicinity include those targeting lobster, Atlantic cod and snow crab. While lobster and cod are fished within Little Lawn Harbour, snow crab harvesting occurs in offshore deeper waters south of Little Lawn Harbour. Recreational fisheries for cod and Atlantic salmon also occur in Little Lawn Harbour area.

7.0 ENVIRONMENTAL EFFECTS ANALYSIS

The methodology for the analysis is described in Section 4.0. A description of likely environmental effects is provided for each VC at each Project phase: construction, operation, and rehabilitation and closure. Mitigation measures and monitoring procedures that are designed to result in the avoidance or reduction of likely adverse environmental effects are outlined. The effects analysis also considered the implications of accidental and malfunction events, and cumulative effects.

7.1 Physical Environment

Based on the preliminary identification of likely Project-environment interactions, it is likely that the Project will affect the Physical Environment VC during all phases of the Project. The majority of the effects are associated with Project construction (i.e., stripping and removal of vegetation, excavation and blasting), where the majority of soil disturbance will occur within the Project footprint. A summary of the likely environmental effects and proposed mitigation for the Physical Environment VC is provided in Table 7-1.

Table 7-1: Environmental Effects & Mitigation Measures for Physical Environment VC

Project Phase	Activity	Likely Environmental Effects	Proposed Mitigation Measure
Construction	Stripping, excavation and blasting, construction activities and equipment mobilization	Temporary and permanent soil disturbance.	Minimize the Project footprint to that required for efficient and safe construction.
			Implement best practices to prevent soil erosion and sediment control.
			Strip topsoil appropriately to avoid admixing with subsoil.
			Minimize the need for borrow pits, by using granular material from the waste rock to the extent possible.
	Excavation and blasting, construction activities and equipment mobilization, transportation, waste management staging and storage of construction related equipment and material	Potential metal contamination of soil surface due to dust fallout.	Implement best practices to prevent soil erosion and sediment control.
			See mitigation measures specific to dust emissions reduction in Section 7.2 Atmospheric Environment.
	Staging and storage of construction-related equipment and materials	Possible contamination of soil due to contaminated runoff water.	Wherever possible, make use of previously disturbed areas for staging and stockpiling.
Operations and Maintenance	Waste rock processing and aggregate stockpiling	Temporary and permanent soil disturbance.	Minimize the Project footprint to that required for efficient and safe operation.
			Implement best practices to prevent soil erosion and sediment control.
			Minimize the need for borrow pits, by using granular material from the waste rock to the extent possible.
	Aggregate and concentrate transportation	Potential metal contamination of soil surface due to air dust fallout	See mitigation measures specific to dust emissions reduction in Section 7.2 Atmospheric Environment.
Rehabilitation and Closure	Rehabilitation and Closure	Potential contamination of soil surface due to air dust fallout	See mitigation measures specific to dust emissions reduction in Section 7.2 Atmospheric Environment.

In summary, the expected residual environmental effect of the Project on the physical environment is minor or negligible, when mitigations measures listed above are considered.

7.2 Atmospheric Environment

The Atmospheric Environment VC includes consideration of air quality and noise. Several sources of atmospheric emissions will result from the proposed Project including noise and air emissions, including greenhouse gases (GHG), from fuel burning vehicles and equipment, and emissions (dust) generated from waste rock (aggregate) processing, material handling, and transportation. Based on the preliminary identification of likely Project-environment interactions (Table 4-1), it is likely that the Project will affect the Atmospheric Environment VC during all phases of the Project.

A summary of the likely environmental effects and proposed mitigation for the Atmospheric Environment VC is provided in Table 7-2.

Table 7-2: Environmental Effects & Mitigation Measures for Atmospheric Environment VC

Project Phase	Activity	Potential Environmental Effect	Proposed Mitigation Measure
Construction	Stripping	Increase in fugitive dust in the atmosphere	Prevent wind erosion during stripping and grading activities by applying water to exposed soils as needed (e.g., during high winds).
			Regular and adequate maintenance of the unpaved roads.
	Excavation and blasting		Application of water or other dust suppressants on unpaved roads, as needed.
			Reduce drop heights during material transfers.
	Construction activities and equipment mobilization		Size trucks appropriately to reduce the number of vehicle trips.
			Proper design of haul and access roads, to minimize distance travelled.
	Transportation		Stabilize exposed surfaces and stockpiles with filter fabric, rock or mulch as appropriate to minimize wind erosion.
			Consider the use of fogging systems and wind barriers to reduce wind erosion.
	Staging and storage of construction related equipment and material		Implement a speed limit on the access and haul roads.
			Implement progressive rehabilitation during all Project phases to minimize dust generated from wind erosion.
	Blasting	Potential risk during blasting activities of formation of carbon monoxide, nitrogen dioxide (NO_2) or methane	Implement Project OH&S Plan and emergency response procedures.
	Energy Consumption	Emissions of air contaminants and GHGs in the atmosphere	Regular and adequate maintenance of the unpaved roads.
			Implement a no-idling policy to reduce combustion emissions.
			Promote the use of block heaters during winter months as part of the no-idling policy.
			Implement an awareness program to promote fuel consumption reduction.

Project Phase	Activity	Potential Environmental Effect	Proposed Mitigation Measure
	Stripping	Noise level increase in the surroundings of the working areas	When possible, construction activities will be limited to daytime especially in work areas that are closest to the sensitive receptors.
	Excavation and blasting		Consider evaluating the use of newer technologies associated with back-up alarms to reduce to amount of noise from equipment operation.
	Construction activities and equipment mobilization		Reduce vehicle traffic during night-time.
	Transportation		Maintain vehicles and equipment regularly and adequately.
	Staging and storage of construction related equipment and material		In the event that applicable noise levels would be exceeded, implement additional engineering mitigation and control measures.
			Perform blasting during daytime only at a regular scheduled time.
			Implement a Complaints Response Plan to establish a mechanism to record, address and resolve complaints related to Project activities and phases.
Operations	Material handling	Dust emission increase in ambient air	Same as construction phase.
	Waste rock /aggregate processing		Operate and maintain a dust suppression system in accordance with the manufacturer operation manual.
	Transportation		Maximize indoor storage of fine AG concentrate and undertake periodic moistening of concentrate.
			Consider implementing engineering controls at the Marine Terminal such as enclosures for transfer points.
			Implement Project OH&S Plan and emergency response procedures.
	Waste rock/aggregate processing	Emissions of air contaminants and GHGs in the atmosphere	Same as for construction phase.
	Waste rock/aggregate processing, handling, transportation	Noise level increase in the surroundings of the working areas	Same as for construction phase.
Rehabilitation and Closure	Rehabilitation and Closure	Dust, noise, and GHG emissions	Same as for construction phase.

In summary, the expected residual environmental effect of the Project on the Atmospheric Environment VC is minor or negligible, when mitigations measures listed above are considered.

7.3 Water Resources

The Water Resources VC includes water quantity and quality, as well as (freshwater) fish and fish habitat that could potentially be affected by the Project. The interactions between this VC and Project activities, the likely effects of these activities on the Water Resources VC, and the mitigation measures to minimize these effects are described below. Based on the preliminary identification of likely Project-environment interactions (Table 4-1), it is likely that the Project will interact with the water resources during all phases of the Project. Most of the effects on water resources are associated with waste rock / aggregate processing and transportation. It should be noted that CFI's principle and priority in developing the proposed marine terminal was to limit the majority of Project footprint to one watershed area (the Mine Cove Watershed, approx. 163 ha), which will limit the impact to this area.

Freshwater Fish and Fish Habitat

Given the lack of fish and fish habitat in the Project Area, and the standard mitigations for site preparation and construction of access roads and other infrastructures, there will be no interaction with freshwater fish and fish habitat during the construction, operation or rehabilitation and closure phases and therefore no residual effects or serious harm to the fish or fish habitat in the Project area.

A summary of the likely environmental effects and proposed mitigation for the Water Resources VC is provided in Table 7-3.

Table 7-3: Environmental Effects and Mitigation Measures for Water Resources VC

Project Phase	Activity	Likely Environmental Effect	Proposed Mitigation Measure
Construction	Stripping, construction activities and equipment mobilization, transportation, staging and storage of construction-related equipment and materials	Changes in water quality due to generation of dust and increase potential for erosion and sedimentation Changes in fish habitat due to increased siltation of ponds and watercourses Alteration of fish habitat and water quality due to watercourse crossing installations	Minimize the Project footprint to that required for efficient and safe construction (limit to one watershed)
			Design and implement a Site Grading and Drainage Plan.
			Implement measures to control dust as per Section 7.2.
			Design and implement Water Management Plan in consultation with NL DMAE.
			Obtain and comply with Alteration of a Body of Water permits for bridge and/or culvert installation
			Implementation of a Fisheries Offsetting Plan pursuant to the *Fisheries Act* Section 35(2)(b) –N/A
			Comply with DFO's guidance on measures to avoid causing serious harm to fish and fish habitat (DFO 2013c). – N/A
			Implement progressive rehabilitation measures.
	Excavation and blasting	Changes in water quality due to generation and deposition of dust and subsequent surface runoff Change in water quantity due to re-direction of surface and groundwater flow Harm of fish and fish eggs	Implement measures to control dust as per Section 7.2.
			Blasting to comply with DFO guidelines for blasting in or near water.
			N/A No fish/fish habitat in the Project Area

Project Phase	Activity	Likely Environmental Effect	Proposed Mitigation Measure
	Water Management	Altering natural water flows in streams	Obtain and comply with Alteration of a Body of Water permits for water withdrawal
			Design and implement Water Management Plan in consultation with NL DMAE.
			Implementation of a Fisheries Offsetting Plan pursuant to the *Fisheries Act*. – N/A
Operation	Waste Rock processing and Aggregate Stockpiling	Change in water quality due to use of water for ore processing Change in water quantity due to use of clean surface or groundwater for processing and discharging to TMF	Effluent treatment in compliance with all applicable legislation prior to release into the environment, if needed.
			Design and implement Water Management Plan in consultation with NL DMAE.
	Water Management	Loss of water quantity due to ongoing dewatering of the pit	Design and implement Water Management Plan in consultation with NL DMAE.
			Obtain and comply with Alteration of a Body of Water permits for water withdrawal
Rehabilitation and Closure	Rehabilitation and closure.	Similar to those to those experienced during construction	Implement Rehabilitation and Closure plan prepared and approved by NL DNR
			Design and implement Water Management Plan in consultation with NL DMAE.

In summary, the expected residual environmental effect of the Project on the Water Resources Environment (including Fish and Fish Habitat) is minor or negligible, when mitigations measures listed above are considered.

7.4 Terrestrial Environment

The Terrestrial Environment VC includes wetlands, vegetation communities, and provincially and federally listed vegetation species under the NL *Endangered Species Act, Species at Risk Act (*SARA) or Committee on the Status of Endangered Wildlife in Canada (COSEWIC). The extent of the Project area used to identify likely effects of the Project on the Terrestrial Environment VC was defined by the area of potential physical land disturbance (i.e. the 98 ha terrestrial area of focus) and extends to include the potential zone of influence resulting from either potential interactions with infrastructure or activities during each Project phase. Based on preliminary design of the Marine Terminal, it is estimated that up to 20 ha of terrestrial habitat will be directly affected by the Project (i.e., the Project infrastructure footprint). The adverse effects for this VC mainly relate to the alteration or loss in productivity of vegetated habitat during the construction and operation phases.

An Ecological Land Classification (ELC) product and desktop review was used to identify unique land classes and their potential presence of listed plant species. Only species at risk, which are known to occur in the vicinity of the Project area, were considered in this effects analysis. The ELC product was used to calculate the surface area of each land cover class identified within the ELC Study Area and the area affected or altered by the Project activities. The result of this analysis indicated that the area affected by the Project activities would be ~ 1 % of the total ELC study area; therefore the Project effect on

vegetation (plant species) is negligible. No vegetation species at risk are known to occur within the Project footprint or were identified within the desktop review. A species of particular interest to the region is the boreal felt lichen (*Erioderma pedicellatum*), which is typically found on mature balsam fir trees within intact forest stands associated with adjacent *Sphagnum-rich* wetlands. Therefore it is unlikely that Boreal Felt Lichen occurs within the Burin Peninsula, and it is not expected in the Project area.

A summary of the likely environmental effects and proposed mitigation for the Terrestrial Environment VC is provided in Table 7-4 below.

Table 7-4: Environmental Effects and Mitigation Measures for Terrestrial Environment VC

Project Phase	Activity	Likely Environmental Effect	Proposed Mitigation Measure
Construction	Stripping	Alteration of vegetation communities	Minimize the Project footprint to that required for efficient and safe construction
			Avoid any off-site equipment and vehicle movement
			Bird surveys prior to cutting/grubbing activities to mitigate loss of nesting habitat
	Staging and storage of construction-related equipment and material		Wherever practical, make use of previously disturbed areas for staging and stockpiling
			Implement soil erosion and sediment control measures
			Implement progressive rehabilitation measures
			Use existing access to the extent practical
	Stripping	Alteration or loss of habitat due to changes in soil conditions	Implement best practices to prevent soil erosion and sediment control
			Use existing access to the extent practical
	Excavation and blasting		Implement dust control measures as described in Section 7.2
			Stockpile topsoil and keep separate from subsoils to limit admixing, and stabilize against wind and water erosion for future use during reclamation
	Transportation		Implement progressive rehabilitation measures
	Stripping	Alteration or loss in productivity of vegetation communities due to dust deposition	Implement dust control measures as described in Section 7.2
	Excavation and blasting		
	Transportation		
	Staging and storage of construction-related equipment and material		
	Staging and storage of construction-related equipment and material	Alteration or loss in habitat conditions due to compaction of soil	Minimize the Project footprint to that required for efficient and safe construction
	Transportation	Alteration or loss in productivity of vegetation communities	Minimize the Project footprint to that required for efficient and safe construction
Operation	Aggregate crushing and stockpiling	Alteration or loss of vegetation communities	Implement progressive rehabilitation measures
	Transportation	Alteration or loss in productivity of vegetation communities	Implement dust control measures as described in Section 7.2
Rehabilitation and Closure	Rehabilitation and Closure	Reestablishment of vegetation communities	Implement Rehabilitation and Closure Plan as approved by NL DFLR

Project Phase	Activity	Likely Environmental Effect	Proposed Mitigation Measure
The above activities will be conducted in full compliance with all relevant Acts and Regulations, including, but not limited to the *Migratory Birds Convention Act,* 1994 and the *Species at Risk Act,* 2002 and in accordance with the Project's EPP and other management plans.			

In summary, the expected residual environmental effect of the Project on Terrestrial Environment VC is negligible, when mitigations measures listed above are considered.

7.5 Wildlife

The Wildlife VC considers birds, both terrestrial and marine, and terrestrial wildlife species at risk. The Project-related interactions and likely effects on the Wildlife VC, along with the mitigation measures to minimize or avoid these effects, are described below. It is noted that birds and wildlife, in general, exhibit similar interactions and likely effects with the Project as birds and wildlife species considered to be at risk or of conservation concern. Based on the preliminary identification of potential Project-environment interactions (Table 4-1), it is likely that the Project will affect wildlife during all phases of the Project.

Based on the results of the ELC study presented in Section 7.4, the Project footprint will result in the alteration or loss of ~1% of the total area encompassed in the ELC Study area and no habitat type will be completely lost. Wildlife species will have the opportunity to relocate to other similar habitat types in the region.

A summary of the likely environmental effects and proposed mitigation for the Wildlife VC is provided in Table 7-5 below.

Table 7-5: Environmental Effects Summary and Proposed Mitigation Measures for Wildlife VC

Project Phase	Activity	Likely Environmental Effect	Proposed Mitigation Measure
Construction	Pre-stripping, excavation and blasting, construction activities and equipment mobilization, transportation, staging and storage of construction-related equipment and materials	Reduction of wildlife habitat	▪ Refer to Section 7.2 Atmospheric and Section 7.6 Terrestrial and Marine Environment; ▪ Minimize construction area; ▪ Minimize duration of construction; ▪ Avoid clearing during the breeding bird season , where possible; ▪ If clearing during the breeding bird season, follow the CFI Avifauna Management Plan and consult with CWS for contingency plan(s), as necessary; ▪ Discourage ground- and burrow-nesting species from nesting on denuded soil (e.g., by covering unattended soil piles); ▪ If a nest is identified on the site, establish a species-specific buffer around the nest, halt potentially disruptive activities within the buffer area and protect nests until chicks have fledged; ▪ If a nest is identified on the site, consult with CWS for further advise; ▪ Implement 1 km buffer from breeding seabird colonies recommended by CWS for high-disturbance activities; ▪ Maintain proper housekeeping practices and activities that may attract wildlife. ▪ Compliance with the *Migratory Birds Convention Act,* 1994 and the *Species at Risk*
		Fragmentation of wildlife habitat	
		Mortality of wildlife	
		Disturbance and behavioural changes of wildlife	
		Destruction of active migratory bird nests	

Project Phase	Activity	Likely Environmental Effect	Proposed Mitigation Measure
			Act, 2002
Operation	Aggregate production, transportation, water & waste management,	Reduction of wildlife habitat Mortality of wildlife Disturbance and behavioral changes of wildlife Destruction of active migratory bird nests	▪ Refer to construction mitigation above and Section 7.3 Water Resources and Section 7.8 Accidents and Malfunctions; ▪ Implement 300 m buffer between ships and breeding seabird colonies as recommended by Environment Canada; ▪ Minimize use of pilot warning and obstruction avoidance lighting on tall structures; ▪ White lights would be preferred for use on towers or high structures at night; ▪ Solid red or flashing red lights will be avoided; ▪ High intensity lights, including floodlights, will be turned off at night outside of working hours, if possible, especially during the spring and fall migration period; ▪ Lighting for the safety of the employees should be shielded to shine down and only to where it is needed, without compromising safety; ▪ Use existing shipping lanes where possible; ▪ Should seabirds or other species become stranded on vessels or on land, adhere to relevant protocols; and ▪ Annually complete a permit application form prior to handling birds. ▪ Compliance with the *Migratory Birds Convention Act,* 1994 and the *Species at Risk Act,* 2002
Rehabilitation and Closure	Similar to those used during construction with the exception of blasting	Similar to those to those experienced during construction	▪ Refer to construction.
The above activities will be conducted in full compliance with all relevant Acts and regulations, including, but not limited to the *Migratory Birds Convention Act,* 1994 and the *Species at Risk Act,* 2002 and in accordance with the Project's EPP and other management plans.			

In summary, the Project will affect wildlife during all phases (i.e., construction, operation, rehabilitation and closure). However, with mitigations in place, the residual effect of the Project on the Wildlife VC, which includes migratory birds and species at risk, is predicted to be not significant. Please note: stakeholders raised no issues related to wildlife during our public consultations with local residents.

7.6 Marine Environment

The Marine Environment VC includes marine fish and fish habitat, marine mammals, sea turtles and marine species at risk that could potentially be affected by the Project. The Project-related interactions and likely effects on the Marine Environment VC, along with the mitigation to reduce or avoid these effects, are described below. The potential effects of the proposed project on marine birds are considered in Section 7.5. Accidents and malfunctions are considered in Section 7.8. Based on the preliminary identification of likely Project-environment interactions (Table 4-1), the Project will interact with the marine environment during all phases of the Project. Most of the potential effects on the marine environment are associated with the construction of the wharf and breakwater. The design of the breakwater includes the installation of various sized stone (e.g., armour stone, filter stone) to protect against wave damage. The armour stone and filter stone will create marine habitat that is suitable for colonization by a variety of

marine invertebrates, such as lobster. It is anticipated that the installation of the various stone types will provide offset for the marine habitat that is altered or lost as a result of the breakwater footprint.

A summary of the likely environmental effects and proposed mitigation for the Marine Environment VC is provided in Table 7-6.

Table 7-6: Environmental Effects Summary and Proposed Mitigation Measures for Marine Environment VC

Project Phase	Activity	Likely Environmental Effect	Proposed Mitigation Measure
Construction	Stripping, excavation and blasting, construction activities and equipment mobilization, transportation, staging and storage of construction-related equipment and materials	Increased suspended sediments in runoff into marine environment	Refer to stripping and mitigation measures indicated in Section 7.2 Atmospheric Environment and Section 7.3 Water Resources.
			Implement standard erosion and sediment control measures on land-based construction areas.
			Consider use of silt curtain or other measures in marine construction areas.
			Monitor discharge of settling ponds for suspended sediments.
	Excavation and blasting, pile driving, other construction activities and equipment mobilization	Alteration or loss of marine fish habitat Disturbance and behavioural changes of marine species Loss of benthic communities within the footprint of the wharf (piles) and breakwater	Minimize the Project footprint to that required for efficient and safe construction.
			Minimize duration of construction. minimize underwater noise.
			Comply with DFO guidance related to blasting near and in the marine environment. There will be no blasting in marine area, only pile deriving.
			Use of bubble curtains or other similar methods in the marine environment to limit the potential effects of noise, as appropriate.
			Maintain 150 m setback from coast for blasts larger than 100 kg per hole.
			Maintain constant course and vessel speed under 14 knots while operating in Little Lawn Harbour and vicinity
			Implement Marine Fisheries Offsetting Plan pursuant to the *Fisheries Act* Section 35(2)(b).
Operation	Transportation - shipping	Alteration of marine habitat	Maintain constant course and vessel speed under 14 knots while operating in Little Lawn Harbour and shipping lane approach; Install proper navigation aids; Minimize underwater noise; minimize engine noise while in Little Lawn Harbour;
		Disturbance and behavioural changes of marine species	
Rehabilitation and Closure	Rehabilitation and closure.	Similar to those associated with construction	Refer to construction.

The above activities will be conducted in full compliance with all relevant Acts and regulations, including, *Species at Risk Act,* 2002, and in accordance with the Project's EPP and other management plans.

In summary, the Project will cause unavoidable serious harm to marine fish and fish habitat as a result of construction of a breakwater and wharf. However, with the implementation of mitigation measures, the

residual effect of construction on marine fish and fish habitat is predicted to be not significant. Similarly, with mitigations in place, the residual effect of the Project on the Marine Environment VC, which also includes marine mammals, sea turtles and species at risk, is predicted to be not significant. Stakeholders raised no issues related to the marine environment during consultation activities (except the fishers, which is addressed in Section 7.7).

7.7 Socio-Economic

This section presents an analysis of the most likely key Project effects on the Socio-Economic VC and proposed mitigation measures to reduce or avoid adverse effects during construction and operations, and to enhance positive effects.

The Project has the potential to extend the life of open pit mining at the AGS site for an additional ten to eighteen years, which added to the current anticipated 10 years (life of the mine), enables anticipation of an ongoing need for a 200-person workforce or more for more than 20 years. The prospect of continuity of employment provides opportunities for residents who wish to remain on the Burin Peninsula or return from living and/or working away and may well help address the decline in population.

Construction has been part of activities at the AGS site since 2016 as the site was prepared for production, employing close to 375 direct hire workers, mostly from the local area; a similar situation is anticipated for the much smaller work force (approximately 150) for the construction of the proposed marine terminal Project.

There is the necessary business capacity in the region to serve the Project, especially in combination with companies supporting heavy industry and fabrication located in the Avalon Isthmus area, about a two-hour drive away. As well, there is an increase in business diversity in communities in the immediate area with the start of Grieg NL's salmon aquaculture project. Through the Benefits Agreement, CFI has committed to efforts to use local suppliers and contractors.

The Burin Peninsula has a wide range of community services and infrastructure, much of it put in place to serve a larger population. The services and infrastructure were able to accommodate the construction workforce required to refurbish the CFI site for production: the Project construction workforce is much smaller. The increased employment over the longer time period anticipated with the Project will increase the tax basis to support community infrastructure.

CFI has had initial discussions with the commercial fishers who typically use Little Lawn Harbour for lobster fishing (and some cod) and the deep-water areas outside the harbour for crab and cod. The harvesters are concerned about possible Project effects on lobster habitat and loss of area to set gear. The Project will also result in large bulk carriers travelling to and from Little Lawn Harbour, an area used by relatively small, open fishing boats. The need for a designated vessel traffic lane will be investigated with fishers and relevant regulatory agencies. There will be follow-up discussions between CFI and the harvesters as to how best to minimize or avoid Project effects during construction and operation.

Breakwaters can provide new fish and shellfish habitat. DFO has published guidance re breakwater design to meet habitat needs of lobster of varying age/size. The harvesters have had a lobster research program ongoing for some time in Little Lawn Harbour, and CFI is working with FFAW and DFO to access this information. CFI is currently conducting a marine fish and fish habitat survey in Little Lawn Harbour and will be able to provide specific information on the existing seabed conditions and habitat.

A summary of the likely environmental effects and proposed mitigation for the Socio-Economic VC is provided in Table 7-7.

Table 7-7: Environmental Effects Summary and Proposed Mitigation Measures for Socio-Economic VC

Project Phase	Activity	Potential Environmental Interaction	Proposed Mitigation Measure
Construction	All Project activities	Potential nuisance effects (dust, noise, odor) which could affect commercial and recreational fisheries in the immediate area	Prepare and implement a Complaints Response Plan during construction phase
			Implement an EPP, waste management plan, OH&S Plan to reduce potential effects of dust, odor and noise on the quality of life of its workers
			Implement mitigation measures identified in Section 7.2 Atmospheric Environment to address likely adverse effects associated with dust and noise
		Job creation (positive)	Provide on-the-job training
			Prioritize hiring of qualified local workers
		Development of local economy (positive)	Engage with local suppliers to share information on their requirements for equipment and services
	Stripping, excavation, blasting and construction activities	Potential alteration or loss of historic resources	Incorporate measures to address unexpected discovery of historic resources in the Project EPP
			In the event of discovery of such resources, construction activities in the affected area will cease immediately and the discovery will be reported to the Provincial Archaeology Office
	Construction of Marine Terminal	Necessity for vessels to modify their trajectories in the Little Lawn Harbour to avoid the marine terminal construction area. Fisheries in the immediate area of the marine construction will likely be affected temporarily.	- CFI will transmit the exact geographical coordinates of the Marine Terminal construction area to the Canadian Coast Guard to help them manage marine traffic in the Harbour; - Ongoing communication with harvesters; - Set up safety zone within the wharf & breakwater construction area
Operation	All Project activities	Potential nuisance effects (dust, noise, odour)	Continue implementation of the Complaints Response Plan during operation phase
			Implement an EPP, waste management plan, OH&S Plan to reduce potential effects of dust, odour and noise on the quality of life of its workers
			Implement mitigation measures identified in Section 7.2 Atmospheric Environment to address likely adverse effects associated with dust and noise
	Shipping Activities	Displacement of fishers from traditional gear deployment locations Potential collision of Project vessels with fishing gear	Set up safety zone within the wharf & breakwater and turning basin
			Maintain constant course and vessel speed under 14 knots while operating in Little Lawn Harbour and vicinity
			Implement Fish/Fish Habitat Offsetting Plan
			Minimize disruption to the lobster fishery
			Implement agreed fishers program
			Establish Communications procedures with Fishers for operational safety.
	All Project activities	Job creation (positive)	Provide on-the-job training

Project Phase	Activity	Potential Environmental Interaction	Proposed Mitigation Measure
			Prioritize hiring of qualified local workers
	All Project activities	Development of local economy (positive)	Continue to inform local suppliers of Project goods and services requirements

The overall effects of the Project will be to provide steady employment for a work force approximately 10% greater than at present and for a longer time period, as much as eighteen years more, as well as short-term employment of over 150 people during the Construction phase of the Project. CFI's commitments in the Benefits Plan toward employment, training and suppliers during the Operations phase will have positive effects on the local and regional economy. The residual socio-economic effects of the Project will be positive.

There are no Indigenous Communities in the Project Area and there is no record of current or historical use of Project Lands for traditional purposes. As well, there is no record of structures or sites within the Project area that are of historical, archaeological, paleontological or architectural significance to communities within the study area. Therefore there is no change to the environment as a result of the Project that would affect the Indigenous communities in the Newfoundland and Labrador or other Atlantic Provinces. More specifically, the Project will not have effect on the health and socio-economic conditions, physical and cultural heritage, and current use of lands for traditional purposes of the Indigenous communities in the region.

7.8 Accidents and Malfunctions

Accidents and malfunctions could occur during Project activities, particularly construction, operation. Potential accidents and malfunctions associated with the Project include: marine terminal failure; stockpile slope failure; vehicle and vessel accidents/collisions; small terrestrial or marine spills of deleterious substances (e.g., fuels, lubricants); large marine spills (fluorspar concentrate, oil spill); and fires or explosions.

The Project has been designed, and will be constructed and operated following applicable high industry standards, industry best management practices, precautionary approach, and effective mitigation measures, emergency preparedness and response. These measures are expected to limit the potential for occurrence of an accident or malfunction during Project implementation phases.

As part of CFI's EHSMS, an Emergency Response Plan (ERP) is in place for the current mine & mill operations, which will be updated to include the Marine Terminal Project-specific activities, and will be implemented during all phases of the Project. The ERP will provide an appropriate and consistent response to emergency situations that may occur over the life of the Project.

7.9 Cumulative Effects Analysis

Cumulative effects can be defined as changes to the environment resulting from an action, project or activity in combination with other existing or future projects or activities. The cumulative effects analysis considers likely environmental effects associated with the Project, after consideration of mitigation measures. Likely environmental effects that are considered in this analysis are associated with the following VCs:

- Marine environment;
- Atmospheric environment (air quality and noise); and

- Socio-economic environment (community services and infrastructure; employment, economy and business).

Existing and/or future projects located in the Burin Peninsula and north-western Avalon Peninsula are listed below:

1. The existing St. Lawrence Fluorspar AGS Mine Project. As the proposed Marine Shipping Terminal Project is part of the AGS Mine project, cumulative impact of the marine terminal Project has been considered as a combined effect of the two operations).
2. St. Lawrence Wind Power Project. This project effects do not overlap or interact with the effects of the CFI Project
3. Grieg Salmon Hatchery and Aquaculture Farms (under construction). Hatchery and farm management in Marystown: farms at locations in Placentia Bay. No overlap expected.
4. Ocean Choice International, St. Lawrence (in operation). No overlap expected as different skills required. No cumulative physical environmental effect (in different bay from the Great St. Lawrence Harbour)
5. Marystown Industrial Park Development (in operation). Project effects do not overlap or interact with the effects of the CFI Marine Terminal Project.
6. Whiffen Head Oil Transhipment Facility, Placentia Bay. With the exception of tanker traffic along the main shipping lane, this project does not overlap or interact with the effects of the CFI Marine Terminal Project.
7. Come By Chance Oil Refinery, head of Placentia Bay (in operation). With the exception of tanker traffic along the main shipping lane, this project does not overlap or interact with the effects of the CFI Marine Terminal Project.
8. Vale Inco's Long Harbour Commercial Nickel Processing Plant, Long Harbour. Project effects do not overlap or interact with the effects of the CFI Project
9. Marbase, Marystown (in development). Maybe some temporary overlap in relevant trades but will also encourage retention and return of residents. No cumulative physical environmental effects.
10. Cannabis Grow facility, Burin (under construction). No overlap expected as different skills required. Also no cumulative environmental impact.

Most of these projects are located between 40 km and 300 km from the proposed Project, and therefore, no cumulative biophysical effects, other than cumulative effects on the atmospheric environment, may be anticipated.

8.0 FUNDING AND FEDERAL INVOLVEMENT

The Project will be mainly funded through private financing by CFI. The primary funders of the Project are investment funds affiliated with Golden Gate Capital. Financial assistance from the NL Government has been secured through a Government Loan Agreement for the development of the Marine Terminal.

There is no proposed or anticipated federal financial support from federal authorities to support the carrying out of the Project.

The proposed marine terminal footprint is not located on or near any federal lands and no federal lands will be used for the purpose of carrying out the Project.

<Original signed by>

May 31, 2019

Date *Bill Dobbs, President and CEO*