

SAGUENAY PORT AUTHORITY

MARINE TERMINAL ON THE NORTH SHORE OF THE SAGUENAY

SUMMARY – PROJECT DESCRIPTION



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Saguenay Port Authority

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SUMMARY

1 GENERAL INFORMATION

The Saguenay Port Authority (hereinafter referred to as Port of Saguenay) wishes to expand its activities with a new marine terminal project, serving the north shore¹ of the Saguenay River. The marine terminal facilities will include the following main elements: wharf, ship loader, silos and concentrate handling systems, as well as an access road to the wharf for operational and maintenance purposes. Furthermore, as the Ariane Phosphate mining company has already expressed its intention to use this wharf on the north shore of the Saguenay River to move the produced phosphate concentrate toward external markets, Port of Saguenay will take charge of all handling, from unloading the trucks into the storage silos to the loading of the ships.

Proponent information

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In the immediate area of the project, various environmental studies have been carried out, been started then stopped or are currently underway. These studies will be used, especially, for the assessment of the cumulative effects of the project. Below is a non-exhaustive list:

Authorized projects

- Certificate of authorization 7610-02-01-0700802 400464894 for the construction of the 60 000 t/year Jonquière Complex pilot plant within the territory of the City of Saguenay.
- Decree 473-2006 regarding the issue of a certificate of authorization for Alcan Primary Metal Group – Alcan Division Inc. for the construction project of a spent potlining treatment plant within the territory of the City of Saguenay.
- Decree 915-2008 regarding the issue of a certificate of authorization to Rio Tinto Alcan Inc. for the optimization project of the Shipshaw power station.

¹ To facilitate understanding, in this document we will use the term “ north shore” to refer to the left bank and the term “south shore” to refer to the right bank.

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- Decree 976-2009 regarding the amendment of decree number 1930-89 of December 13 1989 relating to the issue of a certificate of authorization for the development of a rail construction project for the Laterrière, Chicoutimi alumina smelter.
- Decree 946-2011 regarding the issue of a certificate of authorization to Rio Tinto Alcan Inc. for the AP60 plant construction project of the Jonquière Complex within the territory of the City of Saguenay.

Projects subjected to public hearings at Québec's Bureau d'audiences publiques sur l'environnement (BAPE)

- Improvement project of route 172, from km 38 to km 40 in the MRC of Fjord-du-Saguenay (Saguenay Fjord MRC).
- Biodiversity reserve projects for nine territories and one aquatic reserve for a territory in the administrative area of Saguenay–Lac-Saint-Jean.
- Rail connection project for the Saguenay Grande-Anse marine terminal.
- The Rivière-du-Moulin wind farm project in the MRC of Fjord-du-Saguenay and Charlevoix.
- Turbine addition project at the Shipshaw power station.
- Implantation project of a spent potliner treatment plant.
- The AP60 Jonquière Complex plant construction project within the territory of the City of Saguenay.

Projects presented to the CEEA: The Canadian Environmental Assessment Registry

- The Saint-Honoré Niobec mine expansion project; Registry reference number 80011 (Status : ongoing)
- Installation of a gas terminal in Saguenay « Grande-Anse Project »: Registry reference number 05-03-16553 (Status : environmental assessment terminated).
North Shore Extension / Saguenay – Sept Îles Gas Pipeline; Registry reference number 80016 (Status : environmental assessment terminated)

Basic regional information

Several documents with a regional focus will be consulted during the environmental assessments in order to describe the environment and to allow the identification of the potential impacts of the project. Below is a non-exhaustive list:

- Documents from the Commission sur les ressources naturelles et le territoire (CRRNT) Regional Natural Resource and Land Use Management Board.

The CRRNT's mission is to set up and implement the regional community's vision of its development based on the promotion and the conservation of its natural resources and its land, defined using territorial issues and expressed in terms of orientation, objectives, priorities and actions.

- Commission régionale sur les ressources naturelles et le territoire du Saguenay–Lac-Saint-Jean (Saguenay–Lac-Saint-Jean Regional Natural Resource and Land Use Management Board). 2011. *Portrait du territoire du Saguenay–Lac-Saint-Jean (Portrait of the Territory of Saguenay-Lac-Saint-Jean)*. Prepared by Groupe Conseil Nutshimit inc. 322 pages and an appendix.
- Commission régionale sur les ressources naturelles et le territoire (Saguenay–Lac-Saint-Jean Regional Natural Resource and Land Use Management Board). 2011. *Portrait de la ressource eau du Saguenay–Lac-Saint-Jean (Portrait of the Saguenay-Lac-Saint-Jean water resource)*. Prepared by the Organisme de bassin versant du Saguenay (The Saguenay watershed organization). Saguenay. 101 pages and appendices.
- Commission régionale sur les ressources naturelles et le territoire Saguenay–Lac-Saint-Jean Regional Natural Resource and Land Use Management Board). 2011. *Portrait de la ressource minérale du*

Saguenay–Lac-Saint-Jean (Portrait of the Saguenay-Lac-Saint-Jean mineral resource). 144 pages and appendices.

- Commission régionale sur les ressources naturelles et le territoire du Saguenay–Lac-Saint-Jean (Saguenay–Lac-Saint-Jean Regional Natural Resource and Land Use Management Board). 2011. *Portrait de la ressource forêt du Saguenay–Lac-Saint-Jean (Portrait of Saguenay-Lac-Saint-Jean lumber)*. Prepared by the Groupe Optivert. 218 pages and appendices.
 - Commission régionale sur les ressources naturelles et le territoire du Saguenay–Lac-Saint-Jean (Saguenay–Lac-Saint-Jean Regional Natural Resource and Land Use Management Board). 2011. *Portrait de la ressource faune du Saguenay–Lac-Saint-Jean (Portrait of the wildlife resource of Saguenay-Lac-Saint-Jean)*. 242 pages.
 - Commission régionale sur les ressources naturelles et le territoire du Saguenay–Lac-Saint-Jean (Saguenay–Lac-Saint-Jean Regional Natural Resource and Land Use Management Board). 2011. *Plan régional de développement intégré des ressources et du territoire du Saguenay–Lac-Saint-Jean (PRDIRT) (Saguenay-Lac-Saint-Jean Integrated Regional Resources and Territory Development Plan)*. 76 pages.
- *Inventaire des biomasses lignocellulosiques aux fins de combustion au Saguenay–Lac-Saint-Jean (The Saguenay-Lac-Saint-Jean Lignocellulosic biomass inventory for combustion)*. A report prepared for the Regional conference of elected officers of Saguenay-Lac-Saint-Jean (RCE). 43 pages.
- *Land use and development plans for the City of Saguenay and the MRC of the Fjord-du-Saguenay*.

2 PROJECT INFORMATION

The main goals of Port of Saguenay are to foster the expansion of Canada's international trade and commerce and to develop the Canadian hinterland especially that of the Saguenay-Lac-Saint-Jean-Chibougamau-Chapais region.

In particular, the objectives of this project are:

- Provide Ariane Phosphate with a deep water port access allowing for cost effective and efficient transport of its product;
- Provide all other companies wishing to develop exploitation resources projects for the north-central Québec area, the possibility to transport using full-sized vessels from the north shore;
- Provide local businesses with north shore port access for the import/export of material, equipment and products.

In accordance with paragraph c) of section 24 of the annex to the *Regulations designating physical activities under the Canadian Environmental Assessment Act (2012)* (CEAA 2012), the project is subject to a federal environmental assessment.

As a first step, Port of Saguenay will build the infrastructures needed to accommodate the Ariane Phosphate² project (around 3Mt/y), which has already expressed its need to use marine facilities on the north shore of the Saguenay River. In addition to the basic infrastructures, i.e., the wharf, the ship loader, the silos, the truck unloading and phosphate concentrate handling system, on this site there will also be a wharf access road, the electric substation as well as the water management infrastructures (consumption, runoff and wastewater). The area required for the whole project is around 20 ha. The Port of Saguenay will be responsible for handling the phosphate concentrate from Ariane Phosphate. Thus, from the end

² Ariane Phosphate has tabled an impact study for its phosphate mine project which also includes the transportation of its end product (phosphate concentrate) to a site to the south of route 172 at Sainte-Rose-du-Nord, on the north shore of the Saguenay River.

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of the non-standard road to be built by Arienne Phosphate to the south of road 172, the Port of Saguenay will install various items of equipment to unload the phosphate concentrate held in the trucks, move it towards the storage silos and then on towards the ship loading process, towards a transport system linked with the ship loading transfer tower located near the wharf. The concept of moving the phosphate concentrate is under review in order to give optimal results and thus the equipment outlined below could therefore be different once the detailed engineering has been completed, while still respecting the intended basic usage.

Truck unloading machinery

The truck unloading installations include two hydraulic tipper equipped bays especially designed to secure and unload 120 tons payload made-to-measure tractor trailers.

Storage silos

The terminal site has two storage silos with an approximate storage capacity of 200,000 t. The silos and their machinery can function independently allowing operations to carry on during maintenance stops. The main infrastructures are to be built on a plateau of around 2 ha.

Conveyor toward the wharf

The closed type conveyor moving toward the loading dock will use the favourable slope of the terrain to transfer the concentrate toward the wharf. The conveyor connecting the ship loading equipment at the wharf will allow for the transport of around 2,700 t/h of phosphate concentrate. The anticipated conveyor length is around 500 to 600 meters.

The transfer tower going toward the ship loader

A transfer mechanism erected at the end of the conveyor will feed the concentrate onto the ship loader. This piece of equipment will have a capacity of 2,700 t/h of phosphate concentrate.

Ship loader

The ship loader will allow for a wide variety of loading positions in the ship holds. It will have a capacity of 2,700 t/h of phosphate concentrate.

Wharf

The wharf will be designed for multiuser use and with the possibility for expansion for future clients. Bulk carriers of 50,000 dwt. and more will be able to berth at the wharf.

Wharf access road

The wharf access road will allow delivery of and removal of material, equipment or products shipped by boat and may be used by maintenance trucks, snow removal truck or, in emergencies, to provide assistance to the bulk carrier crew. It will be about 1 to 1.5 km long with a 10 m road surface.

Other infrastructures

Utility and administrative buildings as well as an electric substation will be erected at a primary use area. A network of ditches and culverts will collect and direct surface water to the sedimentation basins. A service road will link various infrastructures on the site. The fresh water supply to the installations will possibly come from (a) drilled well(s) on the site and will feed into a network. This supply will flow toward

a stand-alone water treatment system. The wells will also feed into the add-on tank to be used in case of fire.

Three activities are associated with the project but not part of the Port of Saguenay project and will be carried out by other proponents (concrete activities related to the project). These activities are the construction of an electric line to supply the marine terminal, the construction of a non-standard road south of route 172 and the cargo transport by ocean-going vessels.

Electric supply

The proposed marine terminal will use electricity from the Hydro-Québec grid for the operation of its various infrastructures. The required power is estimated at 4.7 MW. This construction is a project-related project, and will be built by Hydro-Québec. The corridor used by Hydro-Québec to transport the energy to the terminal site will potentially be the same corridor as the road to the south of route 172 and will be 6.8 km long.

The road to the south of route 172

As part of its phosphate mine project, Ariane Phosphate will transport the produced concentrate from its Lac à Paul plant, as far as the truck loading site. A new road will be built by Ariane Phosphate to the south of route 172, over a distance of approximately 6.8 km and represents a related activity. It goes without saying that Ariane Phosphate's project is subject to the building of the marine terminal by the Port of Saguenay.

Cargo transport by ocean-going vessels

The transport of phosphate concentrate or any other product passing through the Port of Saguenay marine terminal represents an activity related to the project. Various shipping companies will be responsible for the transport, and will use the Saguenay River and then the Saint Lawrence River. For now, with the Ariane Phosphate project, around 60 round trips (120 single trips) per year are planned, i.e. the equivalent of 1.15 trips per week.

For the project as a whole, Table 1 presents the potential sources of atmospheric emission, according to the different phases. All atmospheric emissions will be verified starting with the use of equipment in good working order and in accordance with existing standards.

Table 1 Potential sources of atmospheric emissions during the different phases of the project

PHASE	ATMOSPHERIC EMISSION
Construction	<ul style="list-style-type: none"> • Greenhouse type gases coming from the use of machinery and explosives • Particulate matter coming from machinery traffic
Operational	<ul style="list-style-type: none"> • Greenhouse type gases coming from vehicular traffic • Particulate matter coming from handling activities and from vehicular traffic
Closing	<ul style="list-style-type: none"> • Greenhouse type gases coming from machinery use • Particulate matter coming from machinery traffic

Table 2 presents the potential sources of liquid discharge, according to the different phases of the project. All liquid discharges will be treated in accordance with existing standards.

Table 2 Potential sources of liquid discharges during the different phases of the project

PHASE	LIQUID WASTE
Construction	<ul style="list-style-type: none"> • Rain/runoff water • Waste water from sanitation facilities
Operational	<ul style="list-style-type: none"> • Rain/runoff water • Waste water from sanitation facilities
Closing	<ul style="list-style-type: none"> • Rain/runoff water

Table 3 is a summary of the various dangerous and non-dangerous residual materials which may be generated during the construction, the operation and the closing of the marine terminal on the north shore of Saguenay River. All inert material will be deposited in areas created for this purpose. All other materials will be sent to appropriate sites which comply with recycling and disposal standards. Suitable practical work will be carried out to avoid accidental discharge of dangerous material, and if such a thing happens, contaminated soil will be dealt with in accordance with existing regulations.

Table 3 Residual matter generated during the different phases of the project

PHASE	RESIDUAL MATTER	
	Non-dangerous	Dangerous
Construction	<ul style="list-style-type: none"> • Rock, earth, sand, wood residue • Crushed rock, concrete • Metals • Wood and packaging materials • Household waste 	<ul style="list-style-type: none"> • Paint, solvents, thinners and other liquid waste • Waste oils and grease • Waste oil filters • Pressurized containers and contaminated empty containers • Contaminated absorbents and rags
Operational	<ul style="list-style-type: none"> • Wood and packaging materials • Domestic waste • International waste derived from ships 	<ul style="list-style-type: none"> • Paint, solvents, thinners and other liquid waste • Waste oils and grease • Waste oil filters • Pressurized containers and contaminated empty containers • Contaminated absorbents and rags • Cells, batteries, electronic equipment, fluorescent tubes • Industrial waste
Closing	<ul style="list-style-type: none"> • Demolition debris (concrete, metal, wood, etc.) • Equipment and structures to be dismantled 	<ul style="list-style-type: none"> • Paint, solvents, thinners and other dangerous liquid waste • Potentially dangerous solid residual matter (pressurized containers and contaminated empty containers, industrial waste) • Waste oil and grease

Table 4 presents the project realization preliminary timeline.

Table 4 Project realization preliminary timeline

PROJECT PHASE	REALIZATION PERIOD
Submission the project description	April 2015
Submission the environmental impact study	Fall 2015
Federal Environmental Assessment	Spring 2015 – Fall 2016
Environmental authorizations (decree, certificates, permits)	Fall 2016
Plans and project estimates	Spring 2016 – Spring 2017
Site preparation	Fall 2016
Construction	Winter 2017 – Summer 2018
Beginning of operations	Summer 2018
Operations	2018 – 2044 Minimally over several decades. 26 years life expectancy forecast according to the latest Arianne Phosphate mining estimates.
Decommissioning and closing	2044 – 2045 (Still to be specified depending on the selected components)

3 PROJECT LOCATION

The project is located in the Saguenay-Lac-Saint-Jean region, within the confines of the Saguenay Fjord MRC, on the territory of the Municipality of Sainte-Rose-du-Nord on the Saguenay River north shore. The site in question is situated close to the Municipality of Saint-Fulgence boundary, and at around 14 km from its urban core. As for the Sainte-Rose-du-Nord urban core, it is situated at around 10 km from the site.

At some 8 km upstream of the new intended terminal, the Grande-Anse port facilities on the south shore can be found. Other port facilities, belonging to Rio Tinto Alcan, are located in the Bay Ha! Ha! at 13 km from the chosen site, as the crow flies (on the south shore).

Site access is possible from route 172 by passing close by the old “Produits forestiers Résolu” site via an access road still to be built as part of the Arianne Phosphate mine project. The approximate project coordinates are:

- Longitude : 70° 43' 23" W
- Latitude : 48° 24' 04" N

Figure 1 presents the location of the planned marine terminal and the local study area. Figure 2 gives an overall view of the planned installation areas. Photos 1 and 2 show the natural site along the north shore of the Saguenay River intended for the construction of the port terminal. The designated project site lies within Nitassinan of Essipit.

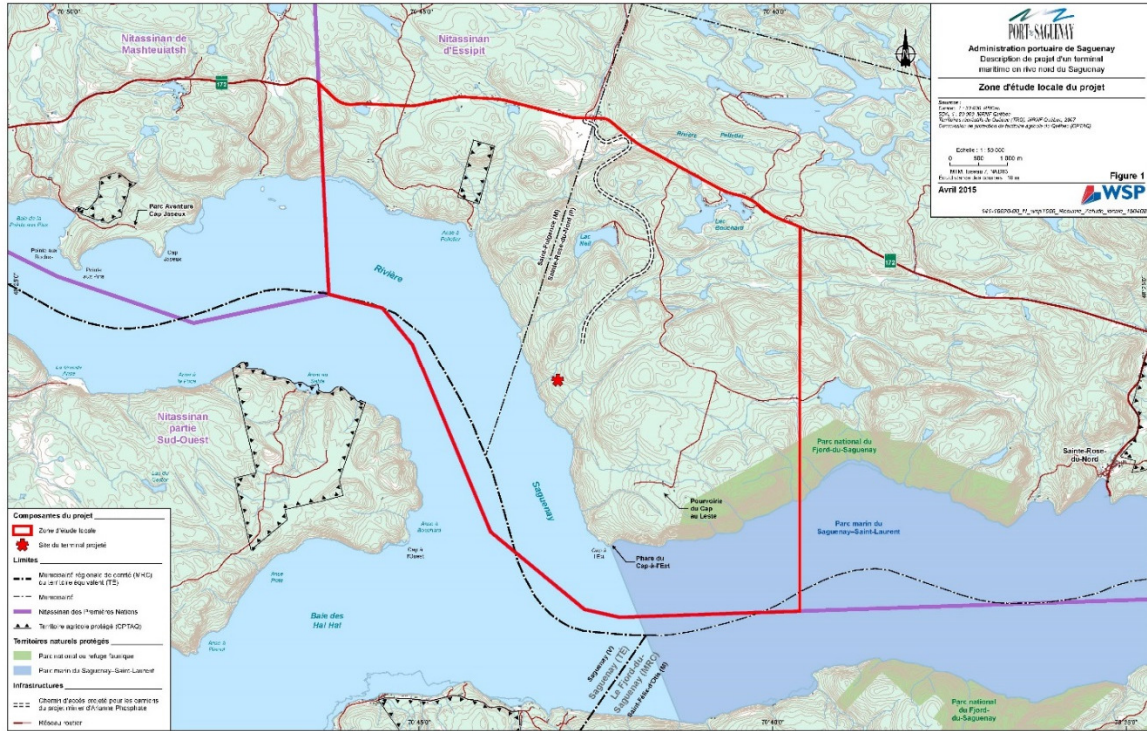


Figure 1 Project Localization

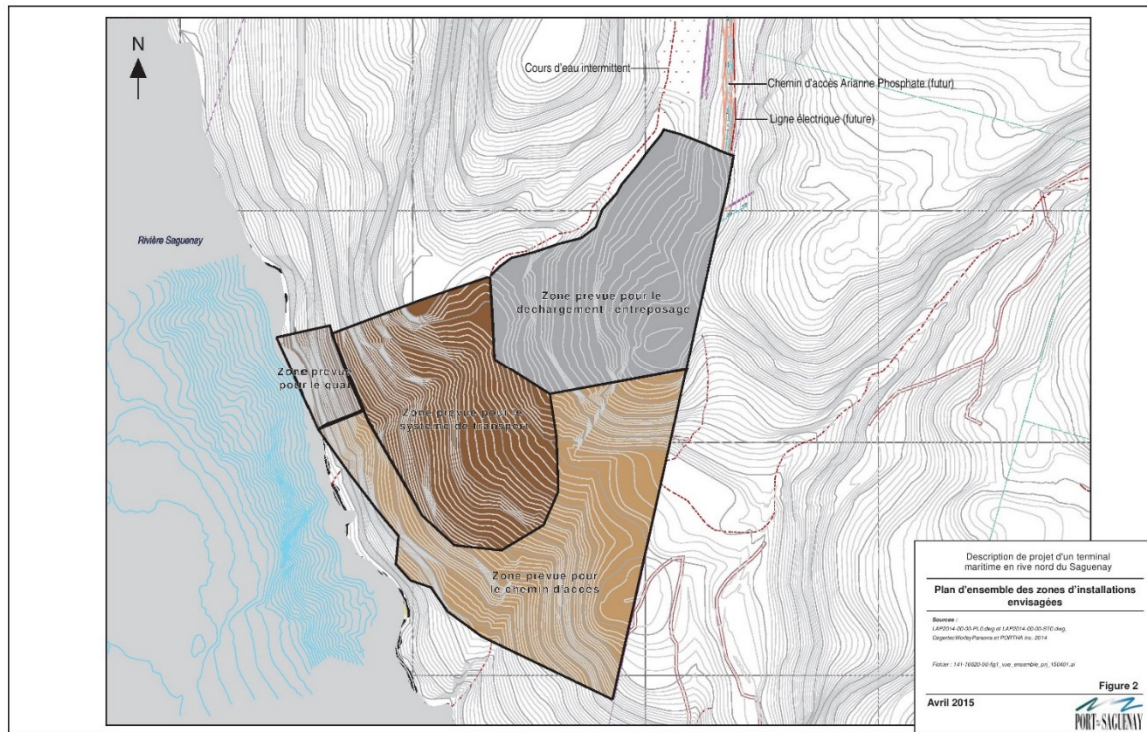


Figure 2 Overall view of the planned installation areas



Photo 1 Planned site for the marine terminal



Photo 2 Planned site for the marine terminal, looking north-west

All the terminal infrastructures are located on a private lot (municipal matrix register number : 8862-69-7023) for which Ariane Phosphate already holds an option to purchase and has taken various options for an access road south of route 172. This option to purchase will eventually be transferred to Port of Saguenay and the land will become the property of The Saguenay Port Authority.

The closest housing are located at Lake Brock, at about 1.3 km from the marine terminal site. These are seasonal cottages. The closest permanent residences three in number and are to be found at Lake Neil, at about 2 km from the marine terminal; the other dwelling places numbering 13 are seasonal residences around this lake.

The site of the planned project is inside Nitassinan of Essipit, but according to the preliminary investigations started, this site is not used by the Innus of Essipit.

There are no crown lands in this area. The lands mentioned for this terminal, which are private lots, are currently under option and will be the property of The Saguenay Port Authority during the terminal construction and operation.

4 FEDERAL GOVERNMENT PARTICIPATION

The Port of Saguenay could request federal government funding for the terminal infrastructures which have been earmarked for use by more than one user. However, no formal request to this end has been made at the time of submission the present project description.

Under CEEA 2012, an environmental assessment is focusing on the potential negative environmental effects which come under federal government jurisdiction, including fish and their habitat, other aquatic species and migrating birds. Upon completion of an environmental assessment, the Minister of the Environment will determine if the project is likely to cause significant negative environmental effects, in view of the mitigation measures identified during the environmental assessment.

Fisheries and Oceans Canada (DFO) may first issue an authorization pursuant to clause 35(2) of the *Fisheries Act*, (R.S.C (1985), c. F-14) considering the possible impact of the realization of the project on the fish habitat.

Transport Canada (TC) may issue an authorization under article 5(1) of the Navigation Protection Act (R.S.C., 1985, c. N-22) for the construction of a wharf on the shore of the Saguenay River.

Natural Resources Canada (NRCan) may issue a permit under clause 7(1) of the Explosives Act (R.S.C., 1985, c. E-17), considering that explosives may very well be used during construction and thus, stored.

5 ENVIRONMENTAL EFFECTS

5.1 DESCRIPTION OF THE HOST ENVIRONMENT

5.1.1 ELEMENTS OF THE PHYSICAL ENVIRONMENT

Geology and Geomorphology

At the planned marine terminal site, surface deposits are made up of thin, discontinuous tills and large areas of rocky outcrops may be observed (Fulton 1995). Close to Cap à l'Est the rocks are made up of orthopyroxene granitoids (charnockite, mangerite, jotunite and hypersthene syenite), while, further north moving towards L'Anse-à-Pelletier, they contain more migmatite (MRN 2002).

Hydrography

The Saguenay River has an extensive hydrographic network covering an area of 85,000 km² and includes 46 sub-watersheds. The biggest rivers feeding into it are the Péribonka, Mistassini, Mistassibi and Ashuapmushuan, which flow into the head of Lake Saint-Jean. This lake is the main water source of the

Saguenay River. Several other rivers flow directly into the Saguenay River (1,460 m³/s) or its estuary. These include the Sainte-Marguerite (133 m³/s), Chicoutimi (79 m³/s) and Shipshaw (57 m³/s) rivers (Fortin and Pelletier 1995).

Climatic conditions

According to the Litynski classification of world's climates, the Saguenay region has a mild subpolar type climate which is subhumid with no dry season and with a vegetation growing season of between 180 to 209 days (Gérardin and McKenney 2001). The annual mean temperature at Bagotville station is 2.8°C and total annual precipitation is on average 930.6 mm, 663.8 mm of which is in liquid form (rain) and 321.7 mm in solid form (snow), i.e. the approximately 3 m of snow per year.

Ice regime

Ice thickness on the Saguenay River varies from one place to another all along the river. According to measurements taken over a period of 27 years by the Canadian Ice Service in Ha! Ha! Bay, the thickness of the ice close to La Baie is on average 75 cm toward the end of winter and may vary between 60 and 102 cm. Within the River Saguenay ice forms in the more western sectors toward the end of November or beginning of December. It generally spreads as far as the Saint Lawrence River during the third week of December. It solidifies in the upstream zone one or two weeks later and persists all winter. However, a navigable channel is maintained, and this, as far up as the port facilities of Port-Alfred and Grande-Anse. Ice concentrations on the lower Saguenay River decrease due to the mechanical influences which tides and currents have. (Musée du Fjord 2002c).

5.1.2 COMPONENTS OF THE BIOLOGICAL ENVIRONMENT

Vegetation

The study area is situated in the northern temperate zone (mixed forest sub-area) and falls within the eastern balsam fir-yellow birch bioclimatic domain (MRN 2013). It is to be found at the junction of the ecological regions of the Hautes Collines de Charlevoix et de la rivière Saguenay (High Hills of Charlevoix and Saguenay River) (4d) and the Lake Saint-Jean and Saguenay Plain (4e) (Blouin and Berger 2003).

Riparian and inter-tidal vegetation

253 plant species can be identified along the coast of the mid to lower Saguenay River (The 1998 Saguenay ZIP Committee quoted in Ville de Saguenay 2005). The local and wider study areas are influenced by the tides. The site shore is especially steep and not likely to develop wetland. The presence of tidal flats in certain areas fosters the development of freshwater and brackish tidal wetlands. Taking into consideration the exposure of the site and the dominance of rock on the banks, sand and blocks on the foreshore, the amount of intertidal vegetation is generally low and dominated by clusters of bulrushes and spartina grass.

The distribution of marine algae in the Saguenay River depends on the water temperature, salinity, depth, bedrock, period of exposure, degree of wave exposure, currents, ice, light, mineral salts, grazing and on interspecific and intraspecific competition. Therefore, it varies on the vertical axis, but also according to the position in relation to the mouth of the River Saguenay and consequently, to the freshwater input (Mousseau and Armellin 1995). Few studies mention benthic algae distribution in the waters of the Saguenay fjord.

Invertebrate fauna

Benthic invertebrates play an important role in the aquatic food chains and thus make up a significant part of the feeding of numerous vertebrates like fish and ducks. Due to the special brackish water conditions in the study area, the diversity of the benthic invertebrates colonizing this environment is likely to be low (Mousseau and Armellin 1995). However, we might expect to find various species of hydroids, shrimp,

polychaetes, gastropods, anemones, tunicates and sponges. Furthermore, barnacles, whelks, tubeworms, the *Henrica* starfish, coralline algae, lucernariopsis as well as soft coral have been documented in the Grande-Anse area, suggesting their presence slightly more downstream of the Saguenay River (GENIVAR 2011). Finally, data published by the Aquatic Biodiversity Monitoring Network (ABMN) confirm the presence of 25 species in the Sainte-Rose-du-Nord area.

Fish communities

That part of the Saguenay River flowing within the fjord holds more than 60 freshwater species as well as other marine species. According to Drainville (1970) in Mousseau and Armellin (1995), freshwater fish make up 16% of the fish community therein, whereas marine fish make up the majority, with 62%. Migrating anadromous and catadromous species, make up 22% of the entire range of species.

The species regarded as typically freshwater are generally found in the first 20 meters below surface, whereas the marine fish are more deep water users (Mousseau and Armellin 1995).

Special interest species

Of the around sixty species which may potentially found in the Saguenay River, certain special status or sport interest species deserve special attention. Certain of these species show how the biophysical characteristics of the Saguenay fjord are so unique. These are identified as:

- Brook trout
- Striped bass
- *Greenland shark*
- *Atlantic sturgeon*
- *American eel*
- *Rainbow smelt*
- *Atlantic salmon*
- *Atlantic redfish*

Marine mammals

The Saguenay fjord is used mainly by only three species. In fact, only the beluga whale (*Delphinapterus leucas*), the minke whale (*Balaenoptera acutorostrata*) and the common seal (*Phoca vitulina*) use the fjord regularly. While the beluga whale as well as the common seal are resident species, the minke whale, is only rarely seen with its young (Musée du Fjord 2002).

On the Saguenay River, the Beluga whale uses two spots, i.e. the mouth of the River Saguenay and Saint-Marguerite Bay. Therefore, the presence of the beluga whale is less likely within the local study area.

The haul-out sites used occasionally or regularly by the common seal are sporadically scattered along the two shores of the Saguenay fjord. In the Saguenay River, two haul-out sites have been identified, i.e. upstream of Cap Éternité on the south shore and close to Cap Fraternité on the north shore (H. Royer, Saguenay Provincial Park, comm. pers. in ROMM, 2004). These sites are situated at more than 35 km from the marine terminal being studied.

Avifauna

The Saguenay River and the surrounding land is home to a rather diversified avian fauna, i.e. approximately 289 species including wildfowl, shore birds, colonial species, forest birds and birds of prey (Mousseau and Armellin 1995; appendix A). The sectors of La Baie and of Saint-Fulgence are the sites where the bird population is the most varied in the region of Saguenay. Waterfowl gathering areas (WGA) are to be found at the two sites, i.e. Grande Baie (02-02-0172-1990) and l'Anse aux Foins (02-02-0041-1993). An important bird area (IBA) is also located at Saint-Fulgence: la ZICO du Marais-de-Saint-Fulgence (Marais-de-Saint-Fulgence IBA) (14 km to the west (upstream) of the site identified for the marine terminal).

Herbetofauna

Little information is available about the diversity and abundance of amphibians and reptiles in the study area. However, according to the information available from within the fjord, two amphibian groups, more particularly the urodela (salamander and newt) as well as the anurans (frogs and toads) would be more likely to use the banks of the Saguenay River and its fjord. Moreover, 5 grass snake species and one turtle species are also likely to be present.

Semi-aquatic mammals

The semi-aquatic mammals likely to be present in the study area are the muskrat, beaver, American mink, and the river otter (Mousseau and Armellin 1995).

Endangered species

According to Mousseau and Armellin (1995), four plant species still likely to be declared as threatened or vulnerable, according to *The Act Respecting Threatened or Vulnerable Species* (ATVS) in Quebec are present in areas surrounding the Saguenay fjord, i.e. the Striped Coralroot (*Corallorhiza striata* var. *striata*), the Showy Lady's Slipper (*Cypripedium reginae*), Sand Heather (*Hudsonia tomentosa*) and Tckerman's Quillwort (*Isoetes tuckermanii*).

During Arianne Phosphate's impact study, as for the non-standard road to the south of route 172 leading to the planned marine terminal, no presence of a plant designated as endangered has been catalogued in this area; this does not however exclude the possibility of this happening.

With respect to wildlife, some fish and bird species are theoretically likely to enter into the study zone or its surrounding areas.

The beluga whale status has recently been revised (November 2014) by COSEWIC, passing from threatened status to verge of extinction status. For the time being, this status has neither been modified in the Species at Risk Act (SARA) nor in the Act Respecting Threatened or Vulnerable Species (ATVS).

Special interest habitats

The wider study zone holds at least five wildlife habitats of interest, i.e.:

- The Saguenay- St. Lawrence Marine Park (SSLMP);
- The Saguenay National Park;
- The Important Bird Area (IBA) of Marais-de-Saint-Fulgence;
- five waterfowl gathering areas (WGA);
- a heronry located in Bay Ha! Ha!.

5.2 DESCRIPTION OF ALL THE CHANGES THAT COULD HAPPEN

The study of the project shows that planning a new marine terminal on the Saguenay fjord is likely to impact the physical environment. The main anticipated impacts, established using current knowledge, especially concern potential sediment contamination as well as surface water contamination due to the resuspension of contaminated sediments and the potential hydrocarbon spills during construction work and by contaminants introduced into the environment due to maritime traffic, related to ships of foreign origin.

Concerning the biological environment, the potential environmental impact study of the project on the habitats and the evolving wildlife of the area show, in particular, the vulnerability or sensitivity of the fish habitat, and its communities, avifauna and endangered species.

It is important to note that the impacts on environment quality during the construction and operational phase will be mitigated with good planning and project optimization while considering public opinion and concerns, this will help in making for a more socially acceptable project.

It is worth mentioning that the construction work as well as the presence of this new infrastructure would have a positive impact on local and regional employment and the economy.

Finally, the planned project of a new marine terminal in the Saguenay fjord is likely to have several short and medium term priorities and issues, may contribute to some cumulative effects, one of which is the maritime traffic-related under-water noise nuisance.

In short, several elements will be taken into consideration during the construction phase planning, as well as operation activities management in order to optimize the project and mitigate, as much as possible, the potential negative impacts on the sensitive environmental components.

Physical environment

The construction and operational activities of the marine terminal facilities are likely to cause an increase in contaminating sources in :

Water quality

Construction and operation activities of the marine terminal are likely to cause an increase in water contaminant sources due to the risk of accidental discharge, from a possible reworking of Saguenay riverbed sediments as well as from the emission of fine particles into the water. Studies will be done in order to characterize the current water quality in the study area and steps shall be taken during the construction and operation phases in order to limit the impacts related to the project (using appropriate mitigation measures).

Sediment quality

The Saguenay fjord sediments are recognized as being relatively contaminated due to the presence of several upstream industries in the fjord and to the importance of maritime traffic passing through. Consequently, all activity likely to cause reworking of the sediment may result in contaminant resuspension. Furthermore, any accidental contaminant discharge would likely degrade the environment. Studies will therefore be carried out in order to characterize the sediments present and the steps taken to limit the project related impacts (mitigating measures).

Air quality

Construction work is likely to lead to an increase in air-borne dust and emissions of pollutants due to equipment and machinery operation, machinery traffic and material transport. Taking the proximity of

cottages into consideration, setting up mitigating measures will be done to limit the inconveniences that this could cause. The air quality characterization and modeling can be done as the need arises during the subsequent phases of the project, if this issue proves to be significant enough, in the opinion of the specialists in this field. During the operational phase, only shiploading and the ensuing maritime traffic are likely to have a potential effect on the air quality. This should, however, be relatively minor, considering the installations (dust-collectors, vents, etc.) as well as the mitigating measures to be put forward.

Biological environment

The construction and operational activities of the marine terminal facilities are likely to favour disruption in environments, such as:

Aquatic plants

Aquatic plants make up habitats for fish, invertebrates as well as for the avian fauna of the environment. Their degradation or destruction is therefore likely to have impacts on wildlife use of the site. It is thus desirable for the marine terminal project to have a minimum footprint and to alter as less as possible the sediment dynamics so as to maintain the right conditions for the establishment, expansion and densification of aquatic plants. The choice of the terminal installation site as well as the wharf construction methods and design are potentially significant factors on the quality of the grass beds and of their general state after installing the marine terminal. During the environmental assessment of the marine terminal, aquatic grass inventories will be made beside the wharf.

Destruction, degradation and fish habitat loss in a subtidal environment

The installation of the wharf and its operation could lead to losses or disturb the fish habitat in a subtidal environment. In fact, installing the wharf piles will inevitably cause encroachment on the riverbed, even if it is minimal. Given that the means of construction will be clearer only during a more detailed engineering phase, the more precise impacts will be determined during the environmental assessment. In any case, the losses caused may have to be compensated under the *Fisheries Act*, and this, depending on the impacted scope and the affected species.

Aquatic wildlife

The issues faced by the aquatic wildlife are the losses or disturbances in the fish habitat areas. The wharf should affect the fish habitat, the extent of which is still to be determined by the inventories to be carried out during the environmental assessment. This will be the same for rivers and streams present on the projected site. If need be, the water crossing structures will guarantee free passage for the fish in accordance with the guidelines proposed in the government guides prepared for this purpose.

Finally, the wharf installation construction work, could provoke vibrations likely to disturb fish. The fish will move toward other similar nearby habitats in order to avoid disturbed areas. Suitable mitigation measures will be set up in order to limit potential impacts. The description of the suitable mitigation measures will be presented during the environmental assessment. Beforehand, a land inventory to be carried out in 2015 will ensure an adequate assessment, when appropriate, of the potential impacts of the intended new installations on the fish habitat.

Marine mammals

The local study area is not recognized as being regularly used by marine mammals, nevertheless, it does belong to the theoretical beluga whale distribution area, a species on the verge on distinction (according to COSEWIC). Maritime traffic and sub-marine noise pollution are likely to affect it. Indeed, the beluga whale is a gregarious species and therefore is extremely dependent on interactions between group or population members. Beluga whales use sounds to identify each other, to coordinate predation activities, for social cohesion, detection, positioning, prey and obstacle characterization by echolocation. In order to

do this, they use whistles, short bursts of cry-like sounds, grunts and barking noises (MPO 2012b). Consequently, noise emissions related to port operation or boats moving around, along with environmental noise, are likely to interfere with beluga whale communication and increase stress levels of those individuals found in the neighbouring environment.

The physical presence of ships moving around the Saguenay River constitutes an added disturbance. Though beluga whales are relatively small, agile and rapid mammals, the presence of additional ships requires a certain alertness on their part in order to avoid collisions. The predictability of a ship's arrival, the kind of approach made, the duration and frequency of the disturbances, as well as the degree of activity and the beluga whales' behaviour during the disturbance, may influence their degree of reaction. (MPO 2012b) Blane and Jackson (1994 In MPO 2012b) observed that the beluga avoidance behaviour translated into longer surface breathing intervals, increased swimming speed and regrouping of individuals. This avoidance behaviour is likely to have a long term effect on the population because of the decrease of the beluga's ability to store energy reserves which are essential to ensure success in reproduction and survival during periods of low food supplies.

Avian fauna

During the construction phase, noise emission, as well as all of the planning and construction activities are likely to disturb the local avian fauna, as well as migrating species (waterfowl, shoreline birds, birds of prey). Furthermore, the habitat, in particular aquatic grass, may be degraded or partly destroyed, impacting on the biological activity of the birdlife. Forest clearing is also likely to effect the habitat of various species. Ultimately, the sum of all impacts could result in the modification of the use of the environment, i.e. bird groupings moving away to rest and feed.

Construction activities and infrastructure construction will potentially disturb nesting couples and the loss of habitats related to clearing of the area. Depending on the chosen site for the project installations, the impacts due to the clearing on the avian fauna, including migratory birds, will be clearly evaluated during the environmental assessment.

During the operational phase, the activities taking place at the marine terminal, such as heavy vehicle traffic and the arrival of cargo ships, will be likely to cause disturbance in the birds found in the immediate surroundings.

Endangered species

Endangered species is an issue during any project. These species, being particularly vulnerable to disturbances, it is all the more important to minimize the impacts a project could have on them. Thus for each of the documented components, particular attention has to be brought to endangered species in order to optimize the project and to set up mitigating measures reducing to the minimum, the scope of the impacts, during construction and operation.

Land vegetation

As far as land vegetation is concerned, the construction activities could potentially cause the loss of wetland sites and areas of land habitats. The impacts mainly concern the loss of areas colonized by plant communities.

The land inventory to be done in 2015 will allow for the proper evaluation, if need be, of the potential impact of the new intended installations on the vegetation and wetland sites. Suitable measures of mitigation will be presented during the project environmental assessment.

Land mammals

When it comes to land mammals, construction activities and infrastructure installation will cause losses or fragmentation of habitat areas, related to necessary forest clearing. This work is likely to disturb fauna close to the sites to be developed. Certain less mobile specimens could however be affected by construction work, in particular by clearing and site preparation.

During the operational phase, the activities taking place near the marine terminal, such as heavy vehicle traffic, will likely disturb locally present mammals.

Human environment

Social acceptability is based on a multitude of factors, as much environmental as social, which are likely to engage the public. As part of the marine terminal development, the following environmental priorities and issues have been considered important concerning the social acceptability of the project. It must be noted that other issues may be identified during the public consultation of the project and from documented environmental components.

- Land use
- Quality of life
- Visual impact
- Local and regional economy
- Archaeology

5.3 DESCRIPTION OF ALL ENVIRONMENTAL CHANGES ON FEDERAL LANDS, IN ANOTHER PROVINCE OR OUTSIDE CANADA

No impact from the project is foreseen on federal lands, outside the province or outside Canada.

5.4 DESCRIPTION OF THE EFFECTS ON THE ABORIGINAL PEOPLES

Land use by the Aboriginal people

The marine terminal site is located in Nitassinan of Essipit. This covers an area of 8,403 km² stretching from the Portneuf River in the north to the Saguenay River in the south; the limit of the Sainte-Marguerite River watershed, tributary to the Saguenay River, makes up Nitassinan's west boundary. Aboriginal rights to Nitassinan are however restricted. Royalties have been foreseen as part of the Treaty dealing with the exploitation of natural resources on Nitassinan (AADN 2010).

According to our present knowledge, no Aboriginal activity is taking place on the site where the marine terminal infrastructures are to be installed. However, this site may well have been used in the past. A study of potential archeology has been carried out on the site (Subarctique 2014), but no marine terminal associated infrastructure will affect them nor unduly get close to them.

Impacts on Aboriginal peoples

At the moment, according to available information, the project will not have any effects on the Essipit community. Out of concern for transparency and respect of property rights, the Essipit community will be approached by the Port of Saguenay right at the very first phases of the development and authorization process of the project, and on a continuous basis.

Archaeology

Though no archaeological site will be affected by the infrastructures to be installed for the proposed marine terminal (Subarctique 2014), in order to limit the risk of any archeological loss, a study of archaeological potential has been initiated. If a site with archaeological potential were to be discovered in the area, the recommendations would be:

- To optimize the project by firstly considering the options that would have the least impact on the identified potential zones, taking all areas that could be negatively impacted into account (access roads, cut and fill areas, material sampling areas, etc.)
- To conduct archaeological research by doing field inventories using sampling if the potential archaeological areas are located inside land acquired for the construction work. If archaeological sites were to be discovered, a systematic dig should follow.
- To immediately inform the archeologist if archaeological remains were to be found outside, already identified sites of potential. If the need arises, a plan of action will be developed according to the importance of the discoveries.

6 ABORIGINAL GROUP PARTICIPATION AND CONSULTATION ACTIVITIES

The Quebec Innu refer to their territory using the term Nitassinan, meaning « our land ». Nitassinan is currently the object of Comprehensive Land Claim Negotiations. It is also the territory covered by the Agreement in Principle of a General Nature (AGGN), a treaty ratified in 2004 by the First Nations of Mamuitun (Mashteuiatsh, Essipit and Pessamit) and Nutashkuan and by the governments of Quebec and Canada.

The Essipit community is located at around 100 km from the planned marine terminal, near the village of Les Escoumins, on the North Shore. In 2014, the registered population of the Essipit community stood at around 680, of which 200 were living on the reserve (AADNC 2014). As part of its phosphate mine project, Ariane Phosphate had initiated various meetings with Aboriginal groups. The marine terminal was not the subject of any formal discussions, but this aspect was nevertheless addressed.

The Port of Saguenay will meet with representatives of the Essipit community in April 2015 in order to present the specific marine terminal project and to listen to Aboriginal concerns.

At this phase in the consultation process, the only thing worrying the Essipit Innu about the marine terminal site was their concern about potential Innu archaeological sites.

During the environmental assessment process to take place, the Port of Saguenay will undertake various meetings with the Essipit Innu and establish constant communication and discussions with them. The ancient or current use of the land and its resources for traditional purposes will be studied and the concerns raised will also be addressed as part of the environmental assessment.

7 CONSULTATION WITH THE PUBLIC AND OTHER STAKEHOLDERS

Before the Port of Saguenay began formal negotiations, Ariane Phosphate had initiated and participated in various consultations where the marine terminal had been discussed. For its own part the Port of Saguenay started a series of consultations in the form of individual interviews with the stakeholders. The Port of Saguenay has not yet held public consultations on the marine terminal.

Through direct or social media communication, certain groups have transmitted their comments and concerns about the construction of a marine terminal of the north shore of the Saguenay River.

Throughout the duration of the project, the stakeholders and the general public will be consulted via the CEA process.

8 REFERENCES

PORT OF SAGUENAY. 2015. Terminal maritime en rive nord du Saguenay – Description de projet. 60 pages + annexe. (Marine terminal on the Saguenay north shore – Project description. 60 pages + appendix)