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	<p>PURE FONTE LTÉE PIG IRON PRODUCTION PLANT – FEASIBILITY STUDY CUSTOMER N°: 1821</p>
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	<p>TENOVA TECHINT ENGINEERING & CONSTRUCTION</p>
	<p>FEASIBILITY STUDY SECTION 4 SITE CLIMATE AND ACCESSIBILITY</p>

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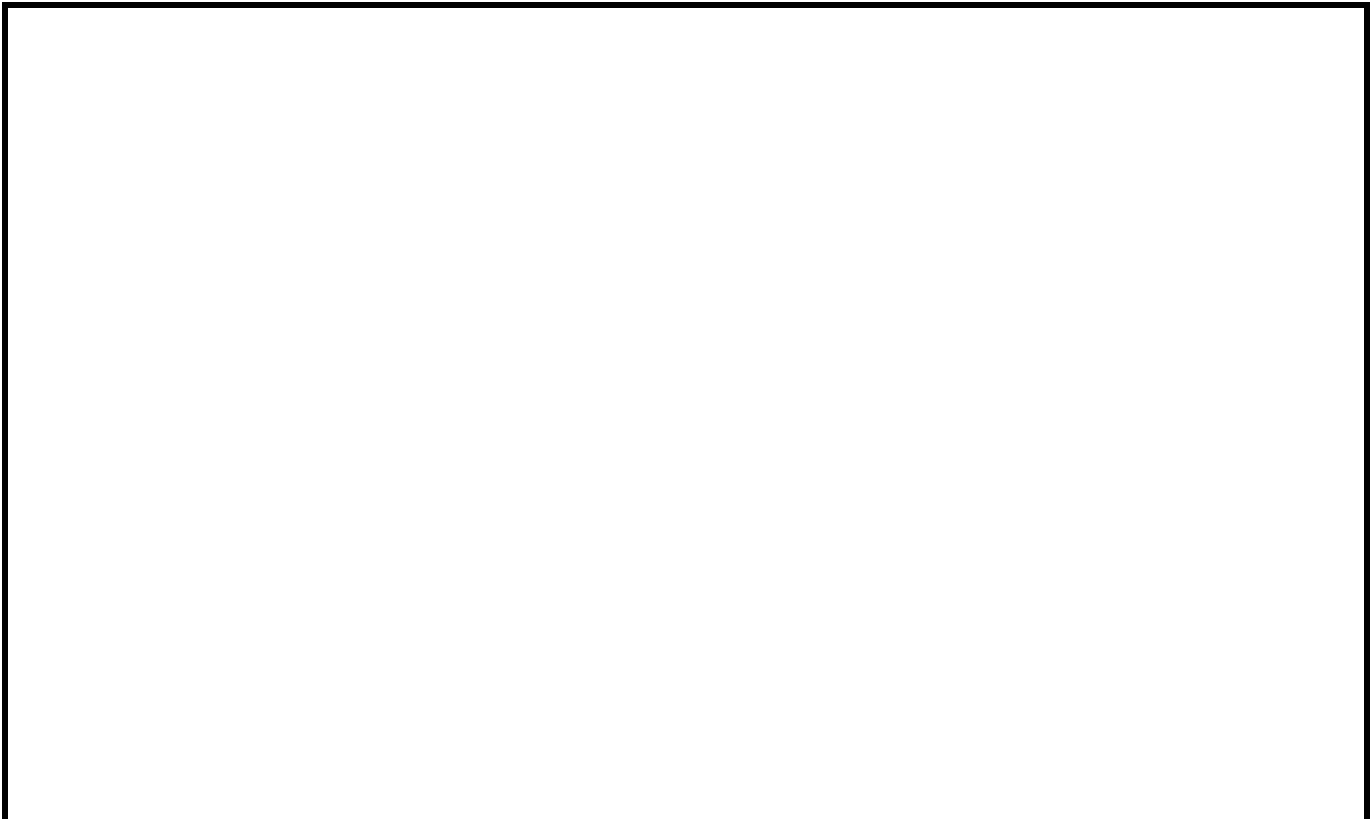
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PURE FONTE LTÉE
PIG IRON PRODUCTION PLANT – FEASIBILITY STUDY
CUSTOMER N°: 1821



TENOVA
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SECTION 4 – SITE CLIMATE AND
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CHAPTER 4.1

SITE CLIMATE CONDITIONS

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4.1 Site Climate Conditions

4.1.1 General

This document provides the basic site conditions to be used by all disciplines for the design of all facilities associated with the project.

However special data for specific calculation can be modified and/or added for each discipline in order to ensure the most restrictive data in each case. These data shall be shown in the corresponding Design Criteria document.

4.1.2 Project Location

The purpose of this document is to describe the Site Conditions for North Atlantic Iron Corporation (PURE FONTE LTÉE) who is planning on building a Greenfield DRI based iron-making pre-feasibility study for the production of pig iron from iron oxide in Port Saguenay, Québec.

The facility utilizes a Direct Reduction Reactor to reduce the iron ore pellets into DRI which then are melted in an Electric Arc Furnace for the production of 425,000 tons per year of saleable pig iron, with the plan to have a possible expansion of the production in the future to 850,000 tons per year.

4.1.3 Site Conditions

The Iron Ore and coal will travel by boat on the Saguenay River – Rivière Saguenay for delivery to the dock of Port Saguenay, about 10 miles east of the town of Saguenay, QC. The port is about fifty-four nautical miles from the junction of the Saguenay and the St.-Lawrence Rivers. Lat.: 48°24,1 - N Long.: 70°49,9 O.

Grande-Anse Marine Terminal was originally built as a forest product terminal. The recent diversification program has transformed it into a general-cargo terminal. Its isolation from the urban area makes it a logical site for the location of major industries.

The site condition shown below are based on the meteorological data at Port Saguenay



LOCATION

Geo-reference	PORT SAGUENAY: N: 48° 24,1 W: 70° 49,9
Elevation (m) above sea level (masl)	140 m

ENVIRONMENTAL AND WEATHER CHARACTERISTICS

Ambient Temperature	PG Max: 30.3°C	PG Min: -30°C
	PG Average: min -13°C/ max 21°C	
Barometric Pressure	Average: 100,8 kPa	
Relative Humidity	Max: 100%	Min: 40%
	Average: 88%	
Annual Average:	Snow: 175,5 cm	Rainfall: 663,8 mm

OTHERS

	Average Velocity	16.6 km/h
Wind	Max Velocity:	74 km/h
	Predominant direction:	WNW (18,3% annual)

SEISMIC LOAD (Note 1)

Importance Category	High
Peak Ground Acceleration (PGA)	PGA= 0.31

Table 4.1-1.: Site Conditions

Note 1:

According to NBCC 2010, Volume 2, Division B, Part 4, Section 4.1.8 and Appendix C, Table 2-C. For more details refer to Civil and Structure Design Criteria.

4.1.4 Site Temperatures

The average temperatures during the last 30 years go from a low value of -16.1°C in January to a high value of 18.1°C in July.

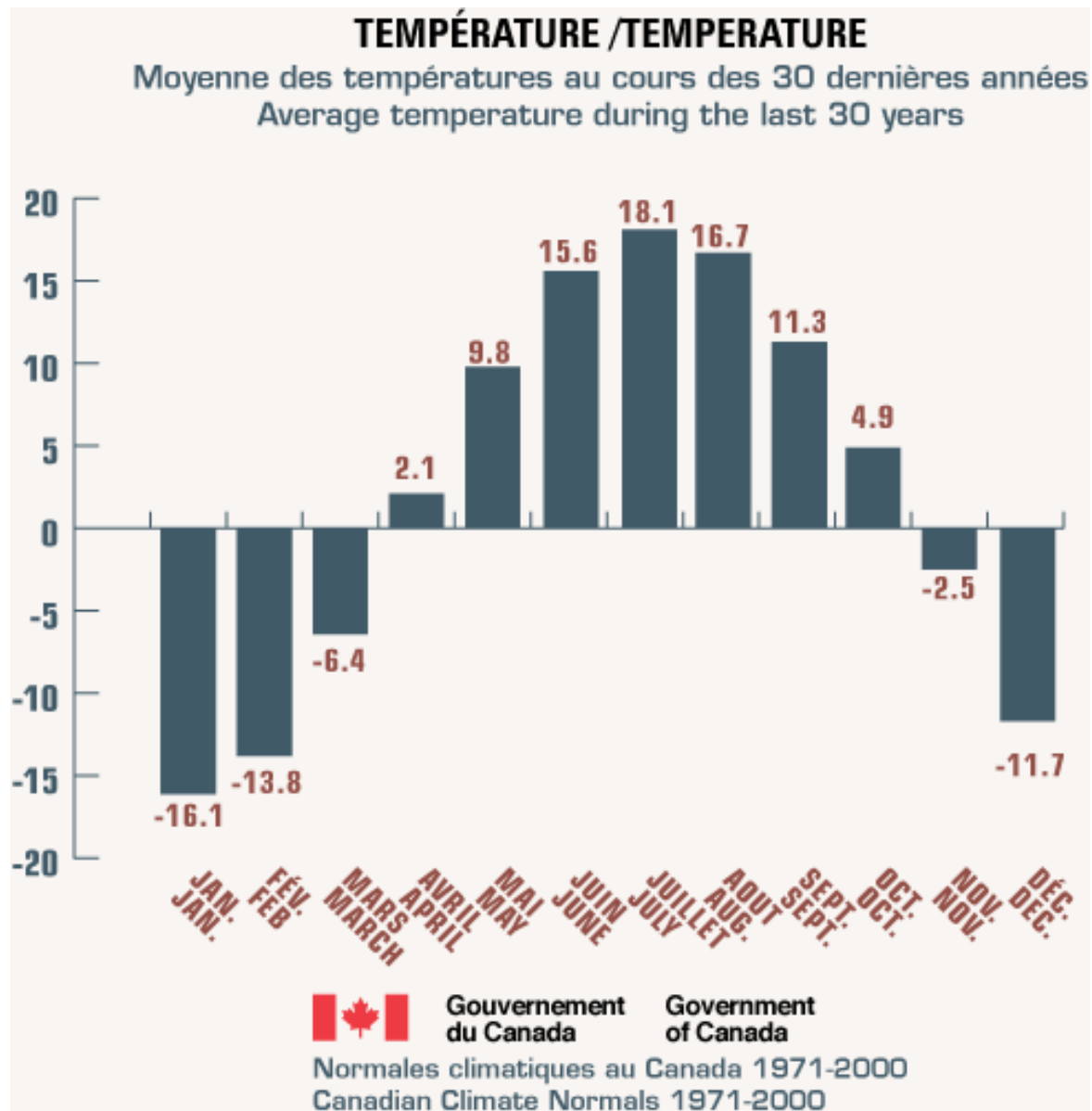


Figure 4.1-1.: Average Temperature during the last 30 years

The temperature excursion during the day can be quite significant and detailed data has been gathered from official data of the PETIT SAGUENAY (QC) weather station, Latitude 48.18, Longitude -70.05, Elevation 122m, Climate Identifier #7046010

In summary, since 1963:

- The Mean Max Temp (°C) has been 26.5 degrees in July 1995
- The Mean Min Temp (°C) has been -27.6 degrees in January 1976
- The Extreme Max Temp (°C) has been 35 degrees registered four times: in July 1995 in May 1972, in August 1975, in July 1983 and July 1991

(See Appendix VI for detailed report values from <http://climate.weather.gc.ca/>)

4.1.5 Site Precipitations

The average precipitations during the last 30 years go from a low value of 50.6 mm in February to a high value of 122.8 mm in July.

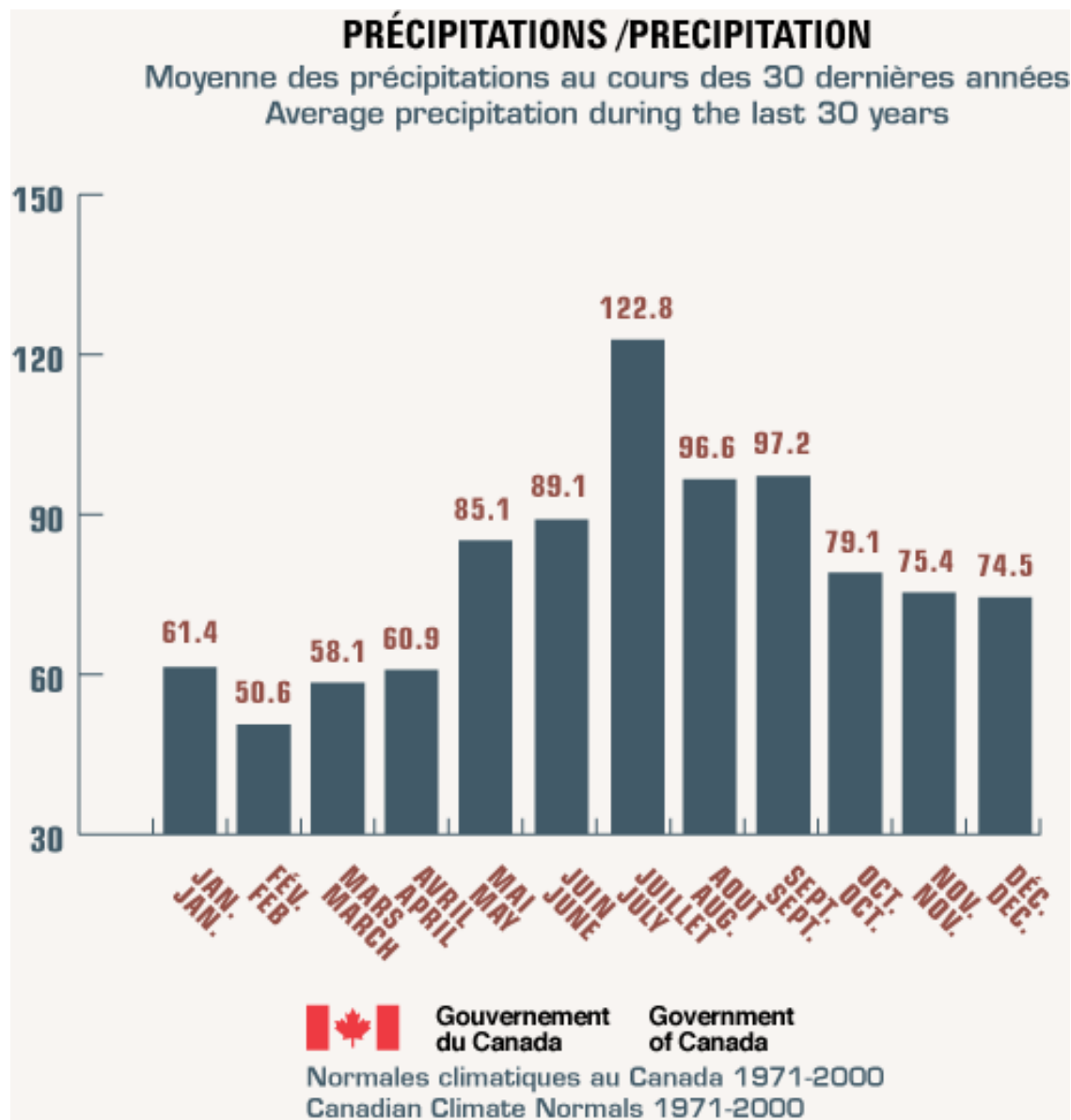


Figure 4.1-2.: Average Precipitation during the last 30 years

4.1.6 Site Winds

The average wind speeds during the last 30 years go from a low value of 10.9 km/h in August to a high value of 16.5 km/h in March/April.

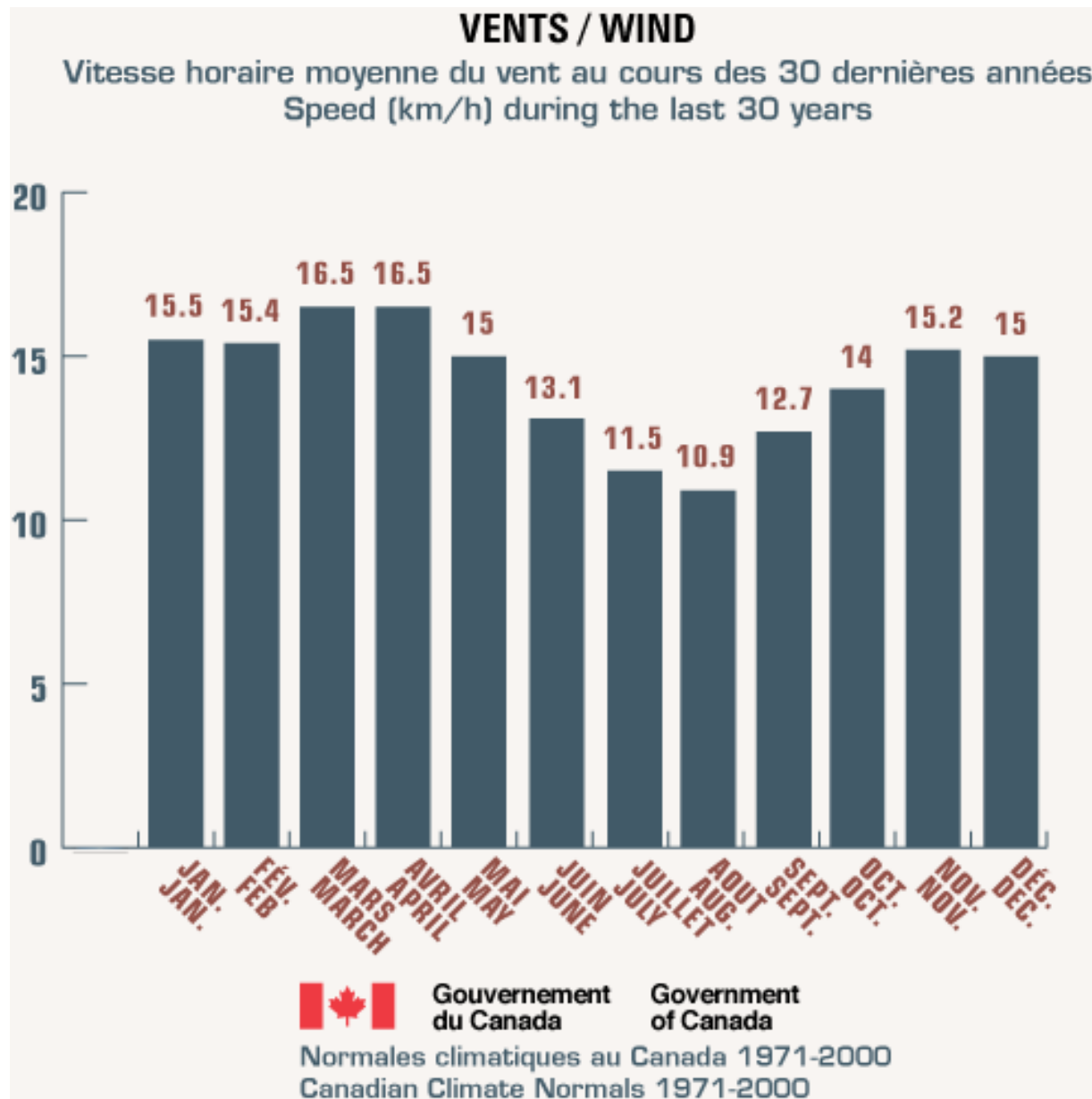


Figure 4.1-3.: Average Wind Speed during the last 30 years

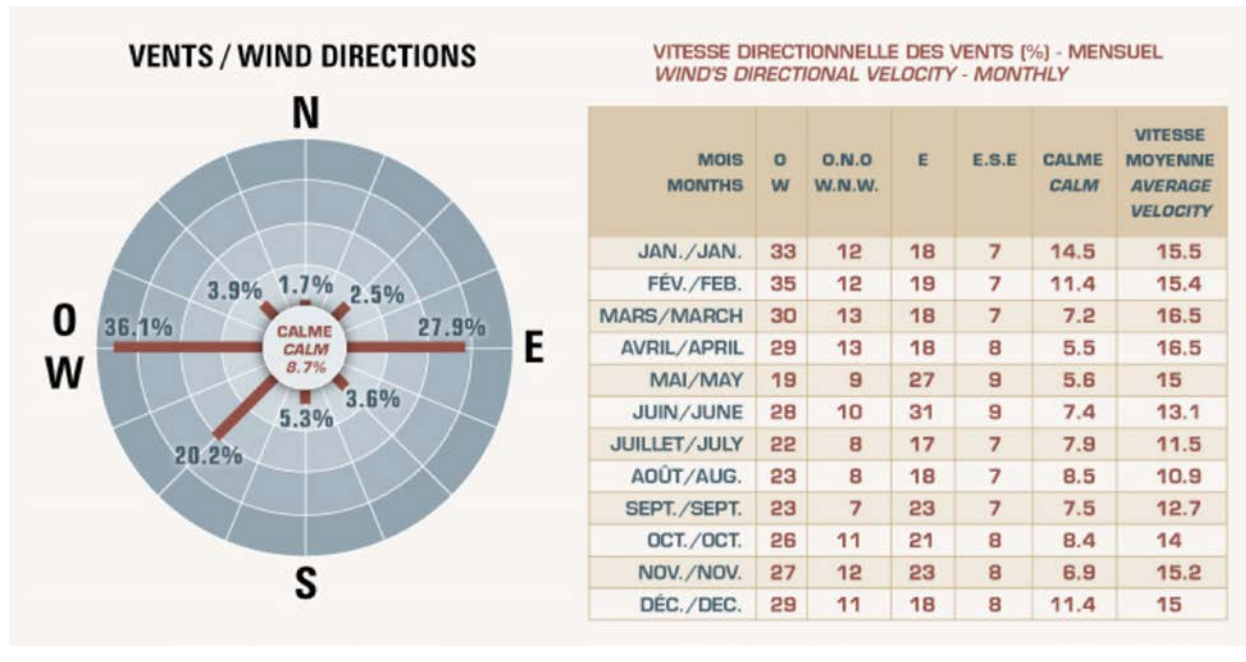
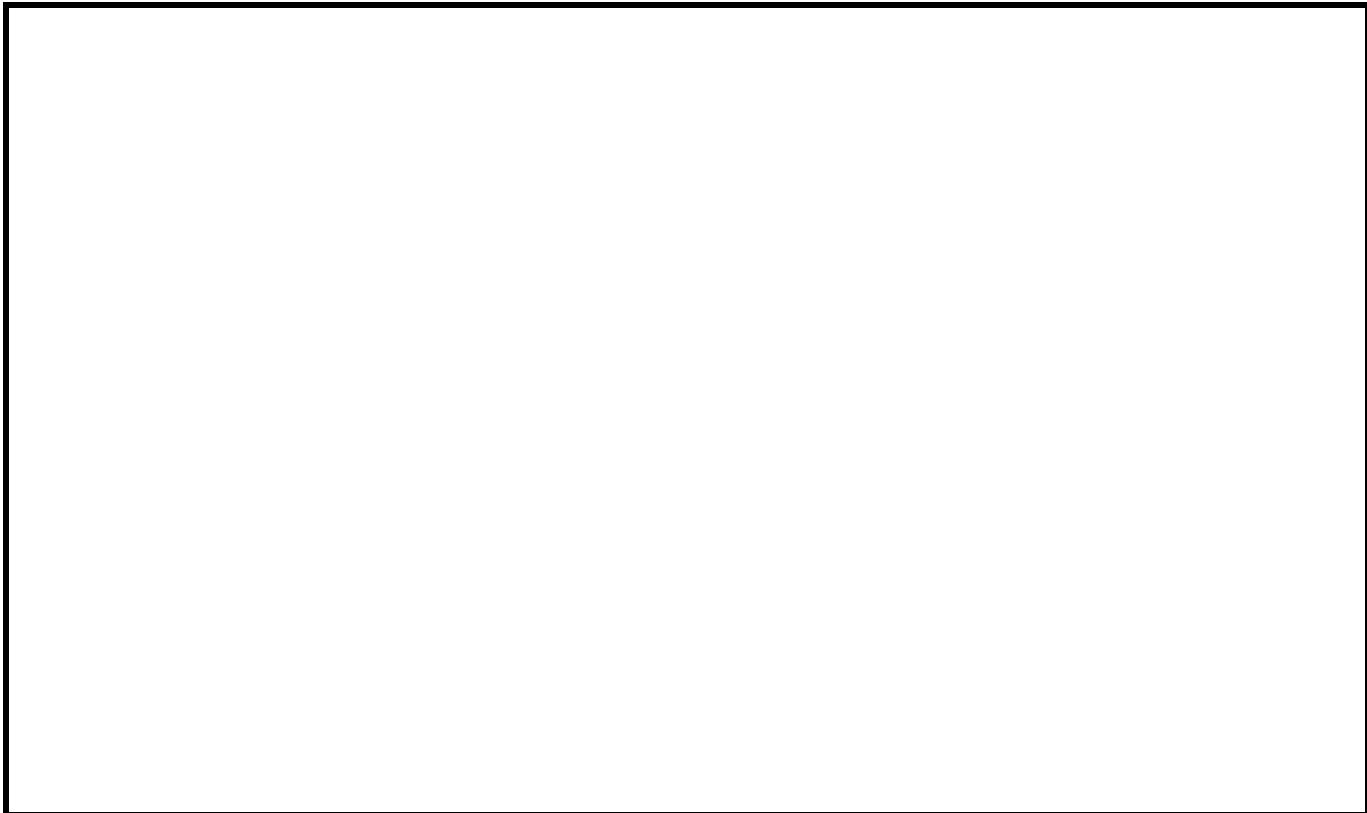




Figure 4.1-4.: Vents/ Wind Directions



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[1] Tenova Core Inc., "elaboration of Google Maps," 2016.

[2] Grande-Anse Terminal Map, "Album photo," 2005. [Online]. Available: <http://portsaguenay.ca/index.php?page=27&lang=eng>. [Accessed 8 September 2016].

[3] Port Facilities Road Links , "Album photo," 2005. [Online]. Available: <http://portsaguenay.ca/index.php?page=42&lang=eng>. [Accessed 8 September 2016].

4.2 Site Accessibility

This chapter describes provides in detail the PURE FONTE LTÉE site accessibility. The following areas are involved:

1. Transport of Material to Site
2. Port Accessibility
3. Road Accessibility

4.2.1 Transport of Material to Site

The raw materials for PURE FONTE LTÉE will arrive at the Port of Saguenay. The materials include the following:

- Iron ore pellets (Blast Furnace grade or DRI grade)
- Lime, dolomitic lime and bauxite
- Mold spray coating

Other main consumables used in the plant

- Electrodes
- Refractory

The main raw material by volume and cost is the iron ore pellets and the following paragraphs outline the main method of transportation to plant site, divided in two steps:

- a. Transportation of the iron ore pellets from supplier's site to Port Saguenay's wharf
- b. Transfer of the iron ore pellets to Port Saguenay's wharf to plant site

4.2.1.1 Maritime Services for Iron Ore Pellets

PURE FONTE LTÉE can use a variety of iron ore pellets produced worldwide; however, proximity to Canadian iron ore pellets from Arcelor Mittal Canada (AMC) and Iron Ore Canada (IOC) will provide a cost advantage and allow the project to be a Canadian consumer of Canadian raw materials.

Both of these suppliers have the ability to ship vessels of 35,000 tons via the St. Lawrence River to the Saguenay River and ultimately Port Saguenay. This is the size of vessel that is required to fill the storage dome at PURE FONTE LTÉE site. With only 20 shipments, one every 2 weeks, PURE FONTE LTÉE will receive all the material needed to produce the projected quantity of MPI in a year.

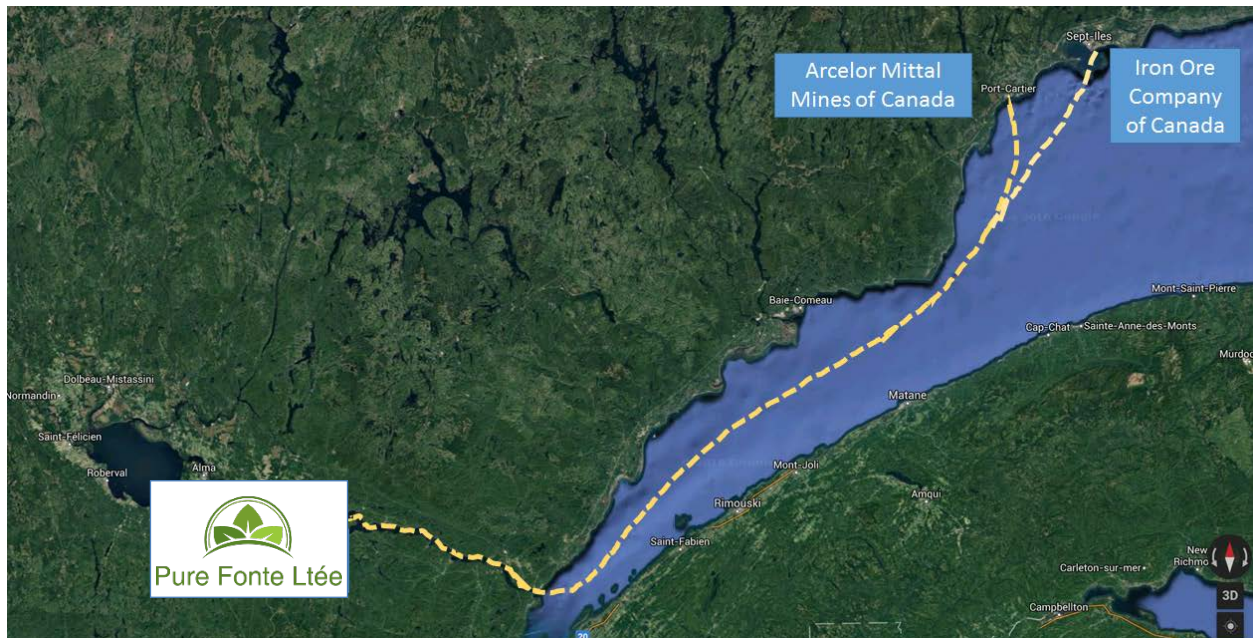


Figure 4.2-1.: Both Arcelor Mittal Mines of Canada, located in Port Cartier, QC and Iron Ore Company of Canada, located in Sept-Îles, QC are less than 24 hours of navigation from North Atlantic Corporation, located in Port Saguenay, up the fjord of the Saguenay River [1]

4.2.1.2 Truck Services from Wharf of Port Saguenay to PURE FONTE LTÉE Site

The iron ore pellets will be delivered by the self-unloading vessels onto the wharf of Port Saguenay, as per agreement between PURE FONTE LTÉE and the Port Authority. The transportation of the pellets from the wharf to the site will initially be realized by trucks. There are several trucking companies in the area (Groupe Goyette inc., Les Entreprises de transport PAG inc., Guylain Marquis, Logistique Saint Laurent), and the operation of transferring the IO to PURE FONTE LTÉE site will be coordinated by Quebec Stevedoring Company Ltd. (QSL), which will be discussed in this FS.

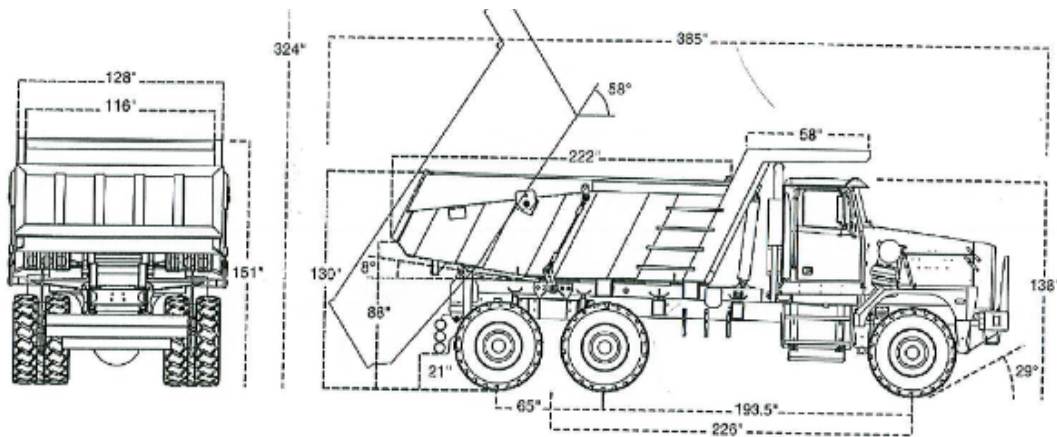


Figure 4.2-2.: Body dimensions of a truck able to transport 50 ton per load by Logistique Saint Laurent



Figure 4.2-3.: The distance between the wharf and PURE FONTE LTÉE site is 2.5 km of paved road [1]

4.2.2 Port Accessibility

4.2.2.1 Grande-Anse Marine Terminal

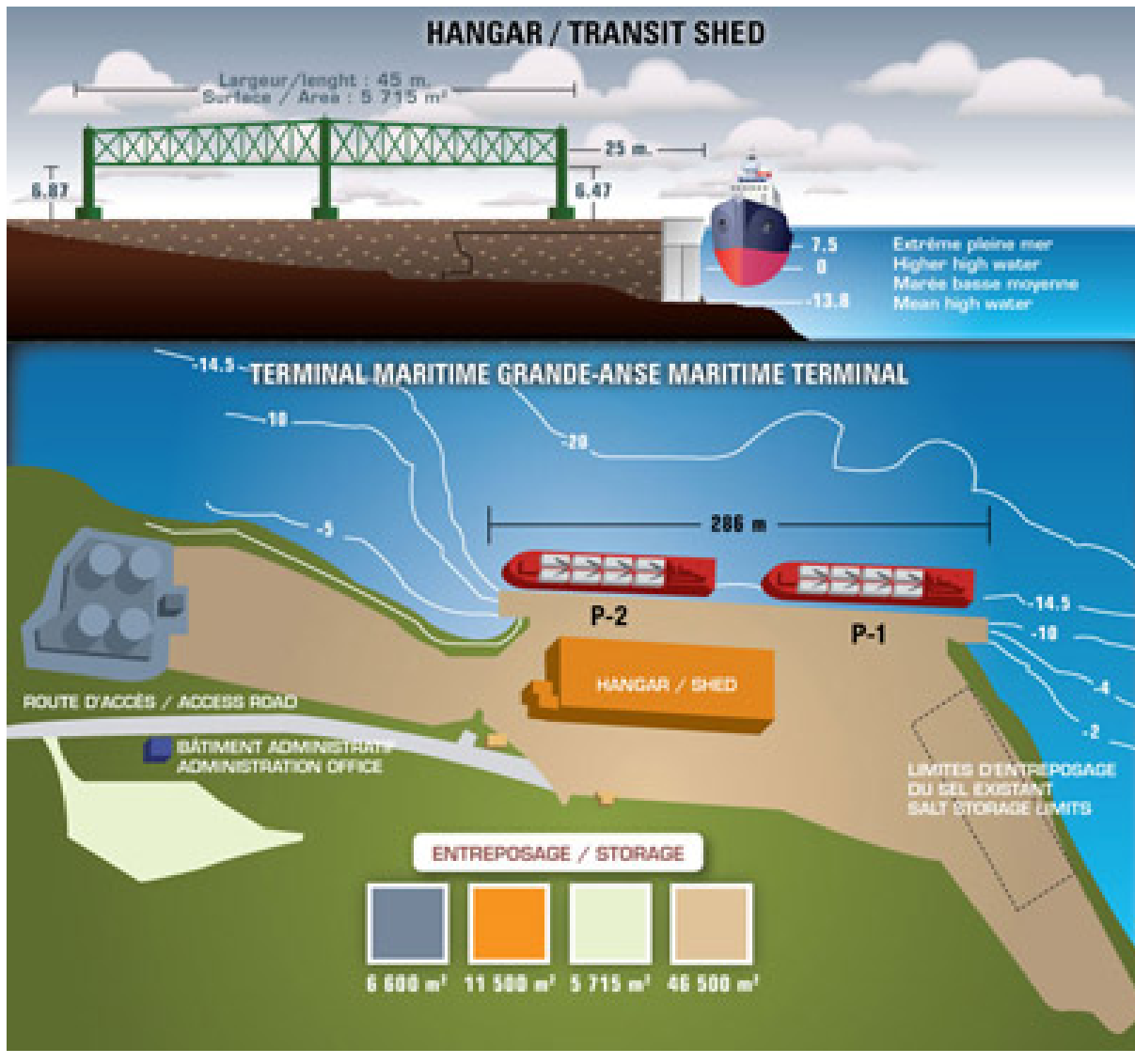


Figure 4.2-4.: General Plan of Grande- Anse Marine Terminal [2]

History

Located at La Baie, Grande-Anse Marine Terminal was originally built as a forest product terminal. The recent diversification program has transformed it into a general-cargo terminal. The tonnage handled consists primarily of wood pulp, paper, de-icing salt, caustic soda, liquid tar and general cargo. Its isolation from the urban area makes it a popular site for the location of major industries. Construction of this facility began on May 1, 1984, the first vessel tied up on November 25, 1985 and the facilities were officially opened in October 1986. The wharf was officially named the Quai-Marcel-Dionne at the naming ceremony held on August 27, 2004 to honour the memory of Marcel Dionne.

On June 30, 2004, the Grande-Anse Marine Terminal received a statement of compliance for a port facility under the International Ship and Port Facility (ISPS) Code, which allows the Terminal to receive vessels coming from abroad.

Location

On the Saguenay River, about fifty-four nautical miles from the junction of the Saguenay and the St.-Lawrence Rivers.

Latitude:48°24,1N

Longitud : 70°49,9 O

Technical Description

General Cargo Terminal

- Wharf length: 286 m. (939 f.) two berths available
- Depth: 13,8 m. (45 f. 2 i.) at mean low water tide
- Berthing capacity: Vessels of more than 100 000 deadweight tons
- Navigation period: year-round

Storage

- Shed I:
 - Length: 127 m. (416 f.)
 - Width: 45 m. (148 f.)
 - Area: 5 715 m.² (61 568 f.²)
- Shed II :
 - Length: 110 m. (361 f.)
 - Width: 67 m. (220 f.)
 - Area: 7 382 m.² (79 434 f.²)
- Open storage: 685 ha
- Storage tanks: 17 019 m.³ / 5 units (Servitank's and Fonbrai's property)

Navigation Conditions

Currents

Currents near the wharf are moderate and vary with the state of the tide.

Ice

An icebreaker is available to escort vessels upstream and downstream when ice conditions are unfavorable for commercial navigation.

Hydrography

The Saguenay is approximately 2 000 m. wide from the face of the wharf to the opposite shoreline. This space allows for the movement of large ships of large.

Anchorage

There is an anchorage spot on the river's north side, upstream of the wharf.

Winds

The particular topography of the site offers good protection against prevailing winds originating from the west, south and east.

4.2.3 Road Accessibility

From Côte-Nord

The following road link access the site from Côte-Nord

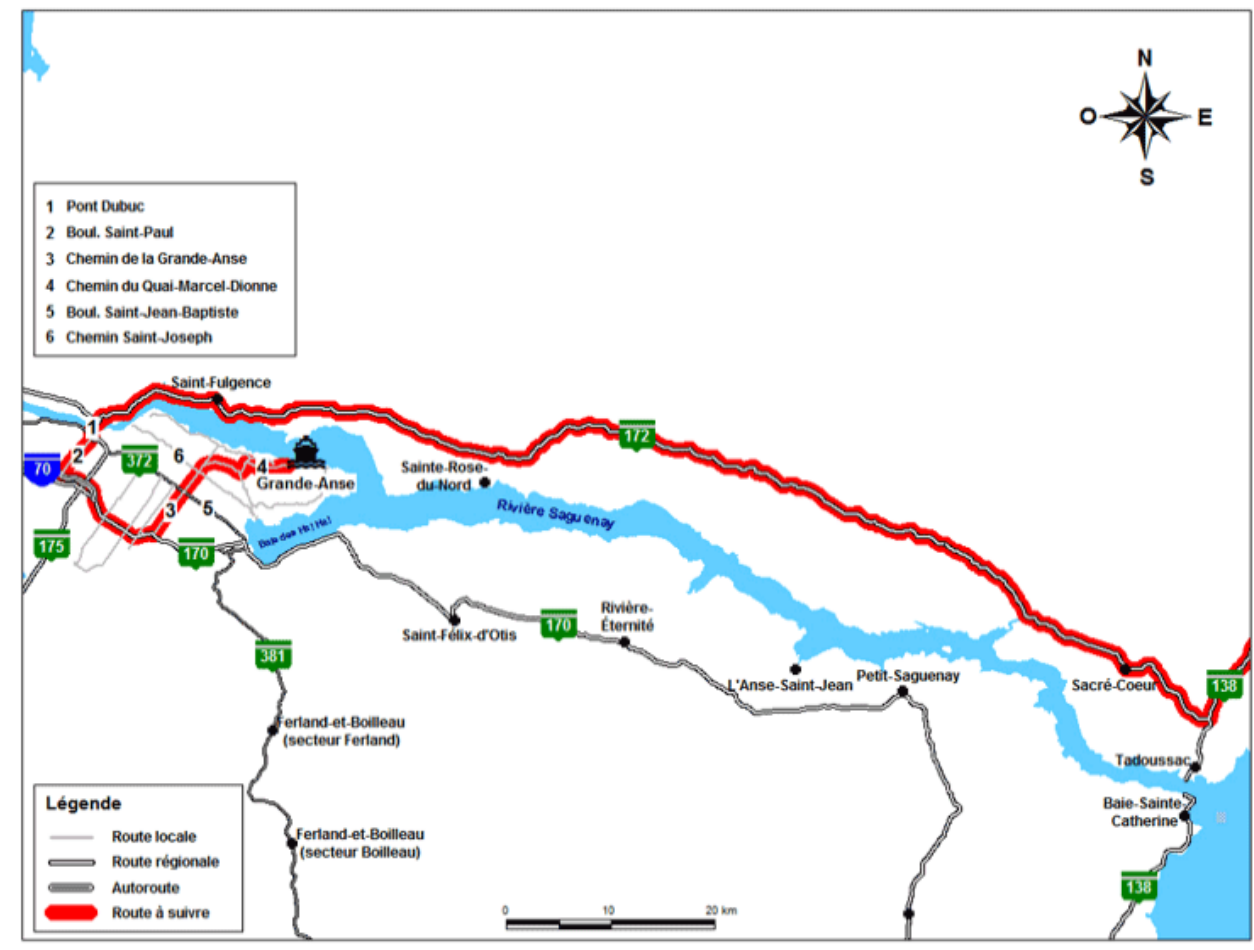


Figure 4.2-5.: Access to site from Côte-Nord [3]

From Dolbeau-Mistassini

The following road link access the site from Dolbeau-Mistassini

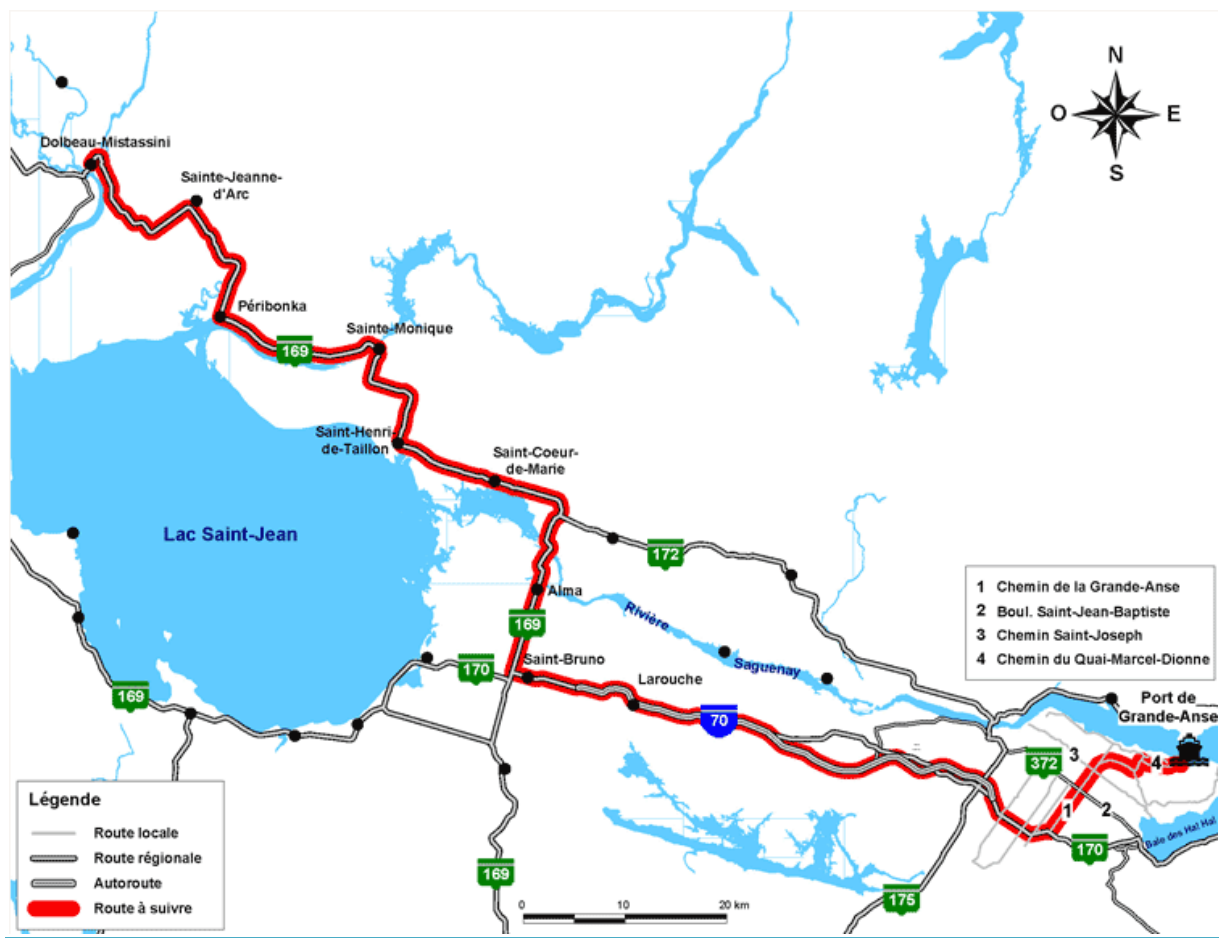


Figure 4.2-6.: Access to site from Dolbeau-Mistassini [3]

From Quebec

The following road link access the site from Quebec

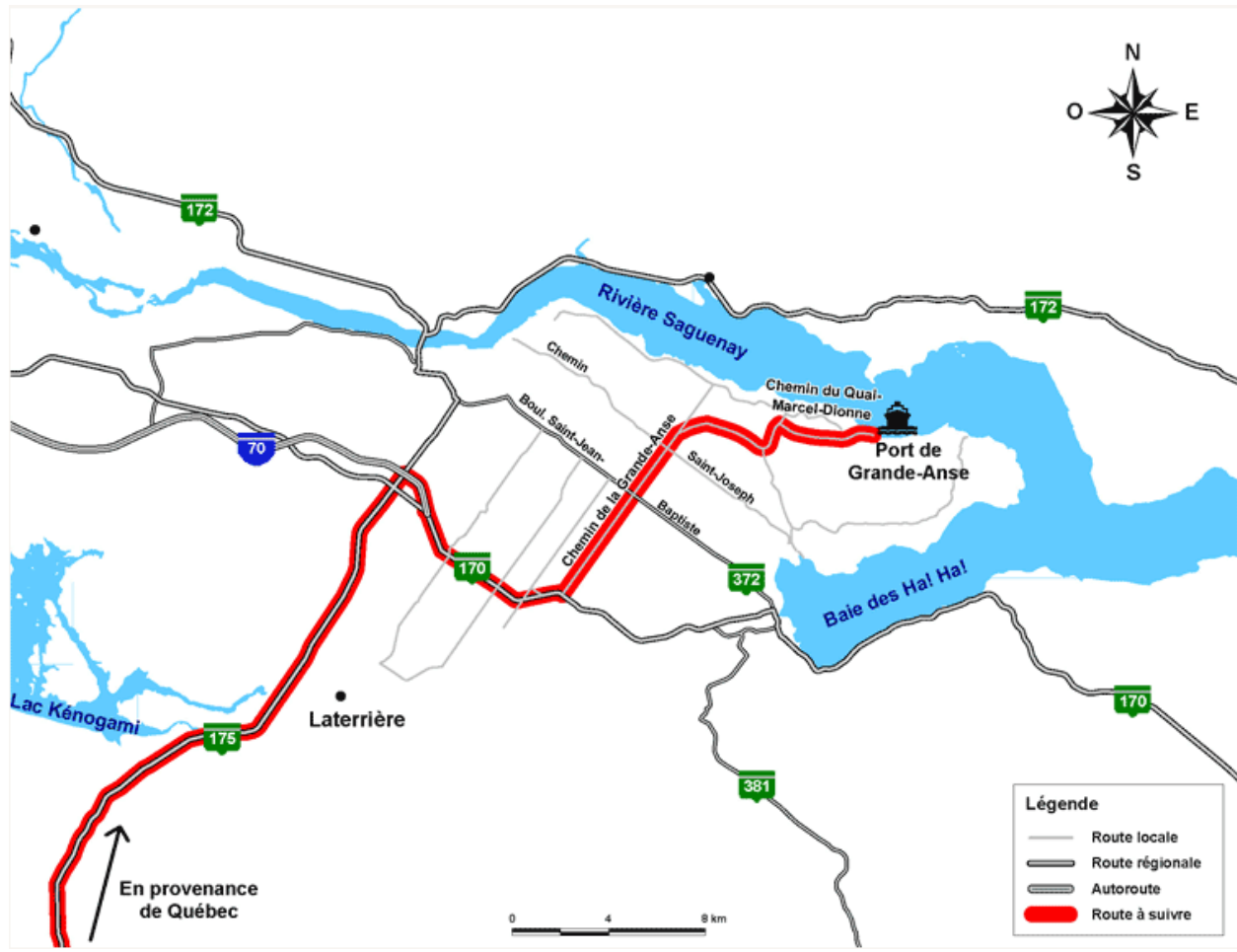


Figure 4.2-7.: Access to site from Dolbeau-Mistassini [3]

From Saint-Felicien

The following road link access the site from Saint-Felicien

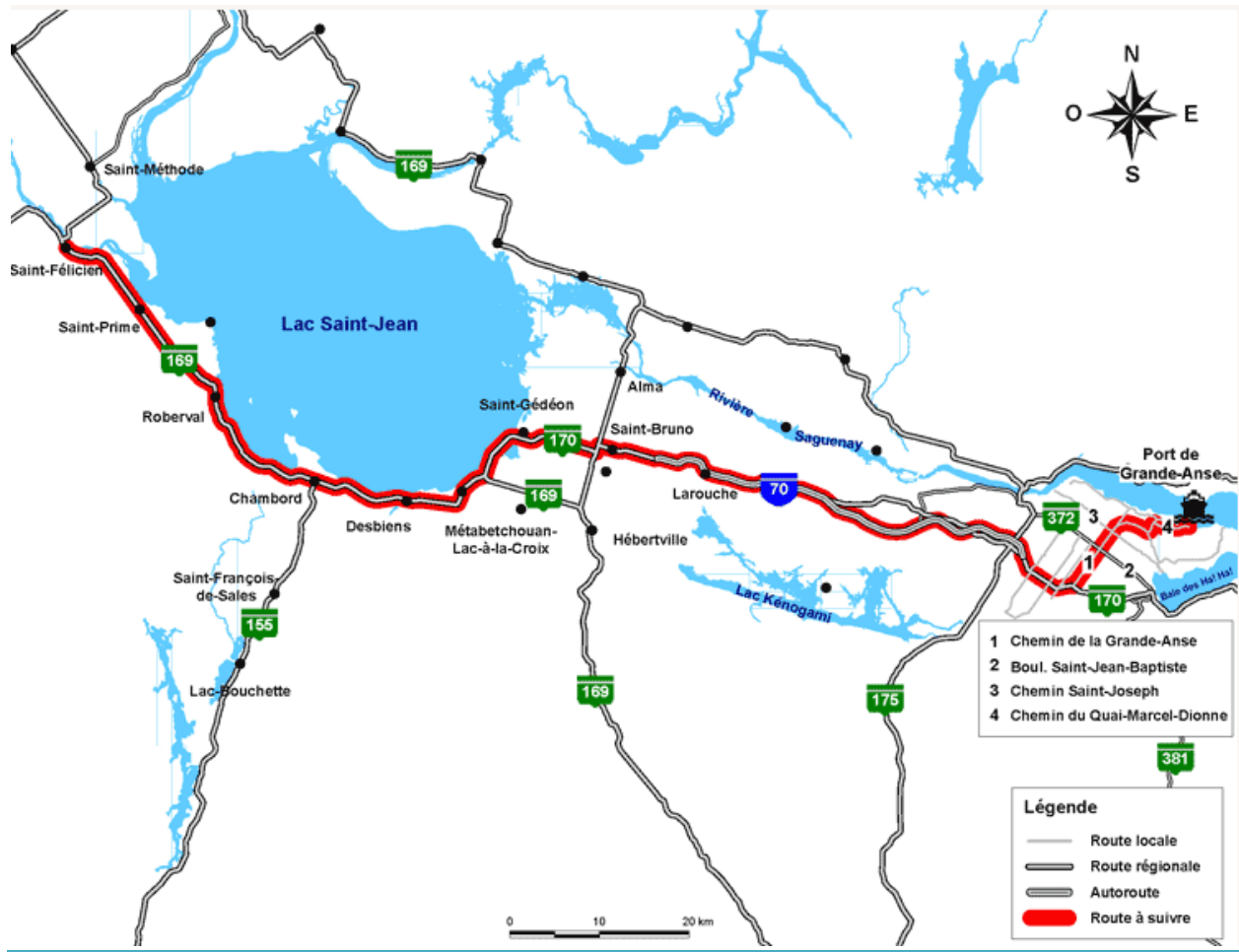


Figure 4.2-8.: Access to site from Saint-Felicien [3]