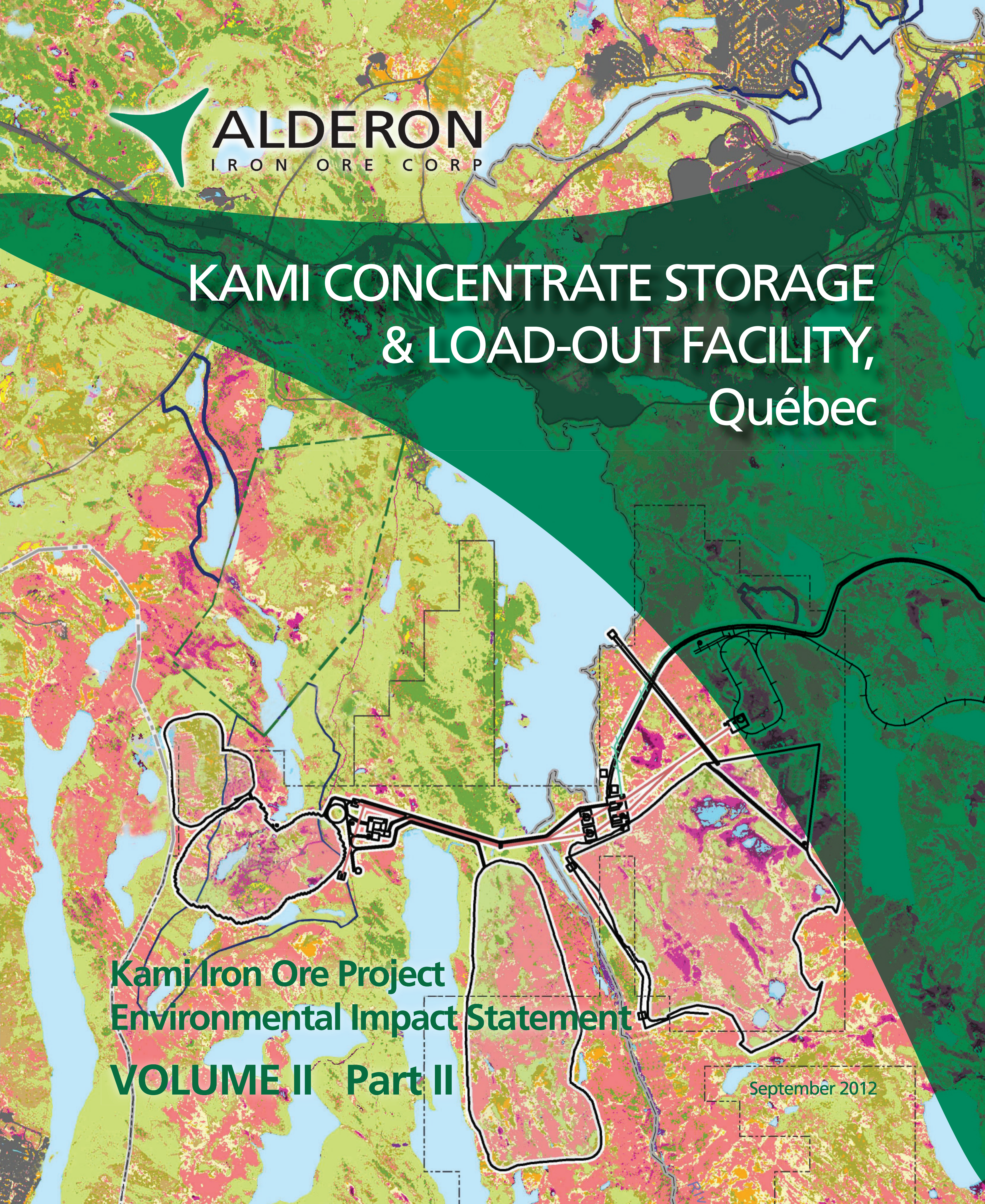
ALDERON
IRON ORE CORP

KAMI CONCENTRATE STORAGE & LOAD-OUT FACILITY, Québec



Kami Iron Ore Project Environmental Impact Statement

VOLUME II Part II

September 2012

ENVIRONMENTAL IMPACT STATEMENT DOCUMENT ORGANIZATION

VOLUME I : KAMI IRON ORE MINE AND RAIL INFRASTRUCTURE, LABRADOR

Plain Language Summary

Executive Summary

PART I

PART II

Appendices

Printed on EarthChoice ® (Rainforest Alliance Certified and FSC Certified) Paper

VOLUME II : KAMI CONCENTRATE STORAGE AND LOAD-OUT FACILITY, QUÉBEC

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Foreword

In the preparation of the Environmental Impact Statement for the Kami Iron Ore Project, Alderon has strived to produce a focused assessment which provides useful information in a readable format. It is our objective to allow the reader to quickly gain an overall understanding of the Project and its predicted effects and then to move on the specific areas of interest.

We have designed the Environmental Impact Statement and supporting documentation to achieve this objective. The information is presented in two separate volumes; one for the Project components located in Labrador (Volume One), and one for the Project components in the province of Québec (Volume Two).

Each Volume is divided into two parts: Part I of each Volume presents the overall findings of the assessment with sufficient detail to allow the reader to understand the issues, Project effects and the proposed mitigation measures; Part II of each Volume presents the details of the assessment on a Valued Ecosystem Component basis. Supporting baseline studies are attached as appendices.

Although this format may be a deviation from a more typical presentation, we have ensured that we have addressed the Guideline requirements in their entirety. The table of concordance presented at the beginning of each Volume is provided to help the reader in navigating through the document.

The preparation of the Environmental Impact Statement is the result of many dedicated scientists, engineers and environmental assessment practitioners. Alderon would like to thank Stantec, Amec, BBA Engineering, Golder Associates, Strategic Concepts Norton Rose Canada, and Osler, Hoskin & Harcourt LLP for their professional contributions to this effort.

We would also like to acknowledge the cooperation of the federal and provincial regulatory agencies and public stakeholders and Aboriginal groups who have contributed to our understanding of their expectations, issues and information requirements.

Finally, I would like to thank the Alderon project team for their diligence and support during the preparation of this documentation and, in particular, a special acknowledgment to Elisabeth Poirier-Garneau, Alderon's Manager of Environmental Assessment for her patience, understanding and fortitude.

Alderon looks forward to advancing to the next steps of the Environmental Assessment process.

Original Signed By

Todd Burlingame
Executive Vice President Environment and Aboriginal Affairs
Alderon Iron Ore Corp.

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14.0 ATMOSPHERIC ENVIRONMENT

The purpose of this chapter is to predict the environmental effects of Kami Terminal on the Atmospheric Environment VEC. This VEC is defined as ambient air quality, the acoustic environment (noise), vibrations and ambient light quality within the vicinity of Kami Terminal.

14.1 VEC Definition and Rationale for Selection

This VEC has been selected as a VEC based on:

- Protection of human health and safety, as well as ecological health and aesthetics;
- Potentially sensitive human and wildlife receptors;
- Provisions of the *Canadian Environmental Protection Act* (CEPA) (1999), and the *Clean Air Regulation* under Québec's *Environment Quality Act (1978);* and,
- The potential for greenhouse gas (GHG) emissions.

GHGs and air pollutants emissions from the Kami Terminal, such as particulate matters (TPM, PM_{10} and $PM_{2.5}$), nitrogen oxides (NO_X) and sulphur dioxide (SO_2) could cause adverse environmental effects on the Atmospheric Environment. The information used to determine related GHG and air pollutant emissions were obtained from engineering calculations, published literature and, where available, site-specific scientific studies related to other comparable facilities.

Ground borne vibration effects due to rail line traffic and port activity have been selected for assessment because of its importance to stakeholders as well as seasonal or permanent residential users near the rail lines. The assessment identifies and quantifies the vibration effects due to rail construction and operation of the line, describes the assessment approach and evaluates the Kami Terminal's compliance with applicable regulatory limits and guidelines.

The vibration effects (i.e. ground borne vibration and ground borne noise) associated with the construction and operation of the Kami Terminal is discussed in this section. The effects are assessed in conjunction with the three main aspects:

- The vibration receptors ;
- Existing vibration effects (ambient vibration); and,
- Future effects due to the Kami Terminal (construction and operation).

For the purpose of this effects assessment vibration receptors are defined as any permanently or seasonally occupied residence with the exception of an employee or worker residence, dormitory, or construction camp. Other seasonal dwellings such as trailer parks, campgrounds, and traditional use cabins may also qualify as a vibration receptor. Receptor locations that have been considered are those nearest the rail corridor as it enters the LSA due north of Sept-Îles through the terminus at the port. The closest of all potential vibration receptors is a residential area located approximately 700 metres and more away from the line.

Light is an emission originating from a Kami Terminal's luminaires, or lighting units. Luminaires comprise all lamps and their associated parts for distributing and positioning the light. Proper lighting during all phases of the Kami Terminal is necessary for a safe and productive rail and utility corridor. However, improperly designed lighting can result in adverse effects ranging from a minor social nuisance to environmental disruption. Lighting impacts can be classified as being of three distinct types, i.e., light trespass or light spill, sky glow and glare.

The Kami Terminal has the potential to affect the environment in each of these three ways. Nearby urban areas are insulated from lighting effects by distance. Some rural dwellings are likely to be susceptible to effects from lighting due to their proximity to the Kami Terminal and their intended use as respite from urban areas.

14.1.1 Approach to Assessment of Effects

A detailed description of the Air Quality Dispersion Modelling Study (Stantec, 2012a) used to establish baseline conditions for air quality and GHG emissions can be consulted in the baseline report provided in Appendix G. An assessment of the baseline conditions for the acoustic environment and ambient light was also carried out for this EIS. The methodologies used are described in this section. No analysis of baseline conditions for vibrations was conducted.

14.1.1.1 Measurement of Sound Pressure Levels

Baseline sound pressure levels (L_{eq}) were measured using both Larson and Davis Type I Sound Pressure Level meters, model SoundTrack LxT1. These meters are laboratory calibrated and calibration checks are made in the field before and after sampling. The meters were positioned on tripods approximately 1.5 meters above grade when monitoring. The meters were also equipped with a wind screen to reduce extraneous noise due to the wind. A signal from the sound level meters was connected directly to a digital audio recorder so that the recordings could be reviewed afterward and any abnormalities in the data could later be checked. The meter was set up to log one minute L_{eq} values and one hour L_{eq}, L_{min}, L_{max}, L_{10} and L_{90} values for a period of twenty-four consecutive hours.

L_{eq} is a noise measure that is an energy average of sound level during a specified period. L_{10} and L_{90} refer to the level that is exceeded 10 percent and 90 percent of the time, respectively. L_{10} may be interpreted as the sounds of traffic and other intermittent events, and L_{90} may be considered to be the background level, but these interpretations are only rough rules-of-thumb. This report focuses on the more widely used L_{eq} values, the other values were retained for quality assurance / quality control purposes.

14.1.1.2 Baseline Light Monitoring

Nearby urban areas Sept-Îles and Val Sainte-Marguerite are primarily residential areas, with most sources of employment located outside of the urban areas. As a result, the sky is an aesthetic resource with inherent value, and existing light pollution is expected to be low.

To confirm night time sky glow levels, baseline light monitoring was conducted at the Kami Terminal, the closest residence near Val Sainte-Marguerite, and due north from the Kami Terminal site at baie des Sept-Îles on the evening of June 7, 2012. A Unihedron Sky Quality Meter was used to monitor ambient sky glow at each location. Site names, coordinates, measurement times, and sky glow levels recorded during the baseline light monitoring study are provided in Table 14.1. The measurement levels of sky glow employ an uncommon unit— the mag/arcsec^2 —and so a descriptive reference table is provided in Table 14.2.

Table 14.1 Sky Glow Readings

Site	Easting (m)	Northing (m)	Time	Intensity (mag/arcsec2)	Temperature (°C)
Kami Terminal Site	680017	5558792	9:56	19	13
			9:57	19.09	12
			9:59	19.11	12
Marguerite Cabin	675193	5558725	10:10	20.11	14
			10:11	20.08	14
			10:12	20.09	14
			10:13	20.08	14
Baie des Sept-Îles	686485	5564572	22:48	18.56	18
			22:49	18.67	17
			22:50	18.65	16
			22:51	18.58	16
			22:52	18.54	15

Table 14.2 Reference Levels of Sky Glow

Sky Glow (mag/arcsec2)	Corresponding Appearance of the Sky
21.7 (Rural)	The sky is crowded with stars that appear large and close. In the absence of haze the milky way can be seen to the horizon. The clouds appear as black silhouettes against the sky.
21.6	The above with a glow in the direction of one or more cities is seen on the horizon. Clouds are bright near the city glow.
21.1	The milky way is brilliant overhead but cannot be seen near the horizon. Clouds have a greyish glow at the zenith and appear bright in the direction of one or more prominent city glows.
20.4	The contrast of the milky way is reduced and the detail is lost. Clouds are bright against the zenith sky. Stars no longer appear large and near.
19.5	Milky way is marginally visible, only near the zenith. Sky is bright and discoloured near the horizon in the direction of cities. The sky looks dull grey.
18.5 (Urban)	Stars are weak and washed out and reduced to a few hundred. The sky is bright and discoloured everywhere.
Source: Berry (1976)	

14.1.2 Issues

The following issues were raised by the public and other stakeholders:.

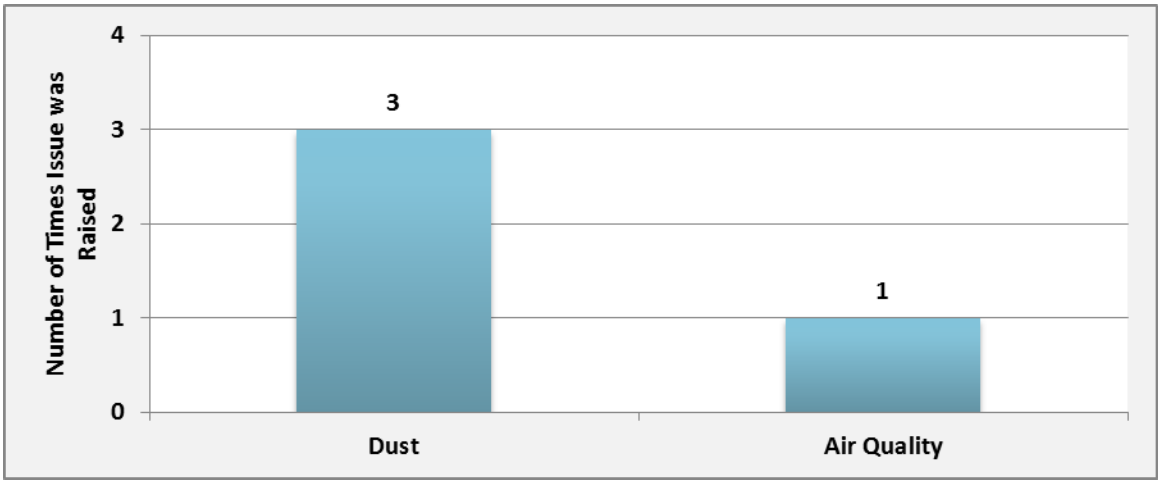
- Dust; and,
- Air quality.

Accordingly, these issues are included in the assessment of the VEC. Details on the issues raised by stakeholders are provided in Table 14.3. The number of times each issue was raised is shown in Figure 14.1.

Table 14.3 Issues Raised by Stakeholders

Issue	Community / Organization	Summary of Comments Raised During Consultation and Engagement Activities	Response / Location in the EIS
Dust	Sept-Îles	Two residents enquired about dust emissions associated with rail car dumpers	Rail cars will be emptied inside a building, and emissions will be treated by a dust collector. More information is available in **Section 14.6**.
	Sept-Îles	One resident enquired about dust emissions associated with rock cutting	Effects of dust emissions associated with the construction will be short-term and activities will be carried out according to construction standards and industry best practices. More information is available in **Section 14.6**.
	Sept-Îles	Two residents enquired about dust emissions associated with the loading of boats	Product loading of ships will be managed by the Port, which will comply with all applicable laws and regulations.
	Sept-Îles	Two residents asked what mitigation measures were planned to control fugitive dust from the concentrate stockpile	Measures to control fugitive dust at the concentrate stockpile include adjusting the height of the stacker-reclaimer, and use of water as and when needed. Additional information is provided in **Section 14.6**.
Cumulative impacts of multiple industries on air quality	Sept-Îles	One resident indicated its concern about cumulative effects, due to the presence of other industries. A reference to an air quality committee was made, by indicating that it has yet to decide where to install its air quality monitors. Another resident asked if Alderon is installing air quality monitors in Sept-Îles.	Alderon will participate to the air quality monitoring effort initiated in Sept-Îles. Additional details are available in **Section 14.6**.

Figure 14.1 Frequency of Issue Raised Related to the Atmospheric Environment



14.2 Environmental Assessment Boundaries

14.2.1 Spatial Boundaries

The spatial boundaries for the environmental effects assessment of the Atmospheric Environment are defined below. Base maps showing the LSA and RSA are provided in Figures 14.2 and 14.3.

Local Study Area

The LSA is the maximum area within which environmental effects can be predicted or measured with a reasonable degree of accuracy and confidence. The LSA includes the PDA and any adjacent areas where environmental effects may reasonably be expected to occur.

For the air quality, GHG emissions, light and vibration assessments, the LSA is defined as an area that is 30 km (east-west) by 30 km (north-south) extending from the center of the proposed undertaking.

For the acoustic modelling of the operation of the Kami Terminal, the LSA is defined as an area that is 14 km (east-west) by 6 km (north-south) extending from the center of the Kami Terminal related activities.

Regional Study Area

The RSA is the area within which cumulative effects for the Atmospheric Environment may occur, depending on physical and biological conditions and the type and location of other past, present, and reasonably foreseeable projects. The RSA is the area within which the significance of Kami Terminal effects is predicted.

Figure 14.2 Local and Regional Study Area for Air quality and Noise Monitoring

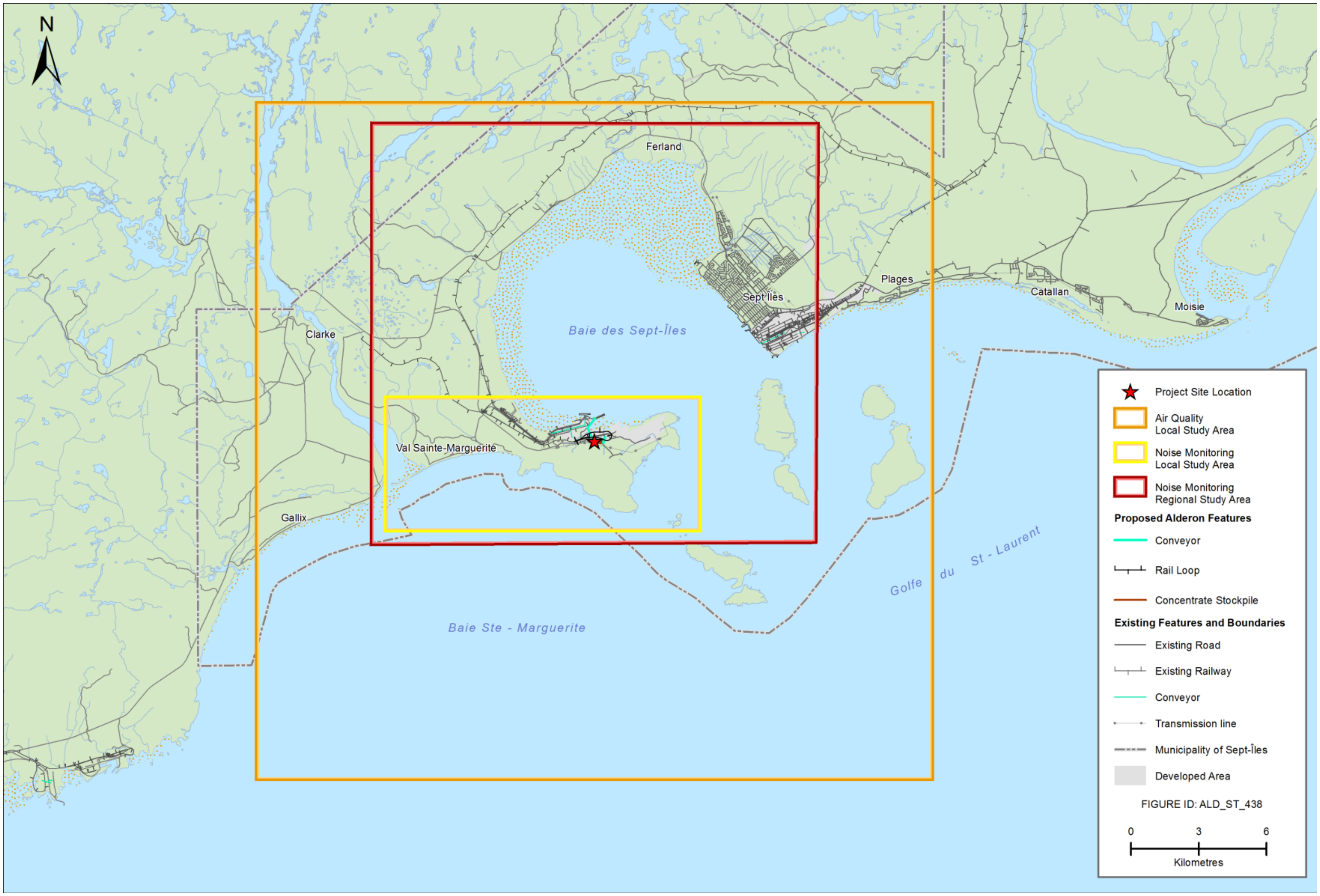


Figure 14.3 Regional Study Area for Greenhouse Gas Emissions

With respect to conventional pollutants, the RSA is deemed equivalent to the above-described LSA. For a change in GHG emissions, since the environmental effect of GHG on the environment is a global concern, the spatial boundary is provincial, national and ultimately global in geographic extent. It was defined as being the territory of the province of Québec, for the purpose of this study.

The RSA includes an area that incorporates the other current and proposed projects, given potential overlapping sound, light, and vibration emissions.

14.2.2 Temporal Boundaries

The temporal boundaries for the assessment of the potential environmental effects of the Kami Terminal on Atmospheric Environment include the periods of construction (approximately two years), operation and maintenance (approximately 17 years), and decommissioning and reclamation (approximately one year).

14.2.3 Administrative Boundaries

Air Quality

The protection and management of air quality are under both provincial and federal jurisdiction. Ambient air quality standards or objectives were developed by both provincial and federal environmental authorities, for several air contaminants. Ambient air quality objectives and standards are routinely used as a basis of comparison for air quality assessments and are generally chosen by regulators to be protective of human and environmental health. As such, published objectives and standards where available, will be used for comparison with measured or predicted values and in characterizing environmental effects.

Provincial standards are in place for all air contaminants considered in this study except for particulate matter with less than 10 microns (PM_{10}). *National Ambient Air Quality Objectives* (NAAQO) or *Canada-wide Standards* (CWS) are also available except for PM_{10}.

Provincial Air Quality Regulation

With the adoption of the Québec *Clean Air Regulation* (QCAR) R.S.Q., c. Q-2, r. 4.1, the Québec government modernized its regulatory framework related to air quality in June 2011.The CAR replaces the former *Regulation Respecting the Quality of the Atmosphere* R.R.Q., c. Q-2, r.38.

With respect to material handling, such as concentrate, the QCAR contains the following limits aimed at minimizing dust emissions:

- **Section 10:** The emission limit of 30 mg/Rm^3 applies to any particle collection system designed to prevent fugitive particle emissions during the transfer, fall or handling of the materials referred to in Section 12.

- **Section 12:** Particle emissions from the transfer, fall or handling of materials including aggregates, ashes, grains, fertilizers, sawdust, wood chips, mine tailings, ore, ore concentrate, ore slag, coal, coke or iron concentrate pellets must not be visible more than 2 meters from the emission point.
- **Section 14:** Particles recovered with a dry dust collector must be handled, transported, stored and disposed of so no particle emission is visible more than 2 meters from the emission point.

The QCAR also contains ambient air standards for some pollutants, including criteria air contaminants (CACs). A proponent needs to demonstrate that its project will not result in exceedances of these standards outside of industrial sectors, before proceeding. Background levels must also be taken into account when a dispersion modelling study is performed and when no site-specific data is available to estimate the initial background levels.

Table 14.4 presents the Québec air quality regulation criteria and default initial levels for CACs.

Table 14.4 Québec Air Quality Regulations and Default Initial Levels for Criteria Air Contaminants

Criteria	Period	Pollutant concentration (µg/m³)					
		SO_2	CO	NO_X	TPM	PM_{10}	$PM_{2.5}$
Québec Clean Air Regulation	4 min.	1 050 [(1)]	-	-	-	-	-
	1 hour	-	34 000	414	-	-	-
	8 hours	-	12 700	-	-	-	-
	24 hours	288	-	207	120	-	30
	1 year	52	-	103	-	-	-
Initial level (default baseline)	4 min.	150	-	-	-	-	-
	1 hour	-	2 650	150	-	-	-
	8 hours	-	1 750	-	-	-	-
	24 hours	50	-	100	90	-	20
	1 year	20	-	30	-	-	-

(1) This value can be exceeded up to 0.5% of time, on an annual basis, without exceeding 1310 µg/ m³.

Federal Air Quality Objectives and Standards

The pertinent federal air quality standards for the assessment are the NAAQO and the CWS. The NAAQO were established by the federal government in the early 1970s to protect human health and the environment by setting objectives for the following common air pollutants: carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), sulphur dioxide (SO_2) and total suspended particulates (TSP). The objectives are denoted as “Desirable”, “Acceptable” and “Tolerable”. The Federal Objectives are defined as follows:

- The **maximum desirable level** is the long-term goal for air quality and provides a basis for anti-degradation policy for unpolluted parts of the country, and for the continuing development of control technology;
- The **maximum acceptable level** is intended to provide adequate protection against effects on soil, water, vegetation, materials, animals, visibility, personal comfort and well-being; and,
- The **maximum tolerable level** denotes time-based concentrations of air contaminants beyond which, due to a diminishing margin of safety, appropriate action is required to protect the health of the general population.

The CWS are based on intergovernmental agreements developed under the Canadian Council of Ministers of the Environment (CCME) *Canada-wide Environmental Standards Sub-Agreement*, which operates under the broader CCME *Canada-wide Accord on Environmental Harmonization*. The CWS flow from the federal, provincial and territorial Ministers desire to address key environmental protection and health risk issues that require concerted action across Canada. They represent cooperation toward a common goal, but involve no delegation of authority by any federal, provincial or territorial government. The standards may include qualitative or quantitative standards, guidelines or objectives for protecting the environment and human health. A number of these exist to protect air quality, including ambient air quality objectives for $PM_{2.5}$.

Overall, the NAAQO “acceptable” levels and the Québec ambient air quality standards are very similar. There is no NAAQO for $PM_{2.5}$, but CCME adopted in 2000 a CWS for that substance. The CWS for $PM_{2.5}$ is similar to the Québec ambient air quality standard. There is no NAAQO or CWS standard for PM_{10}. The National Ambient Air Quality Objectives and CCME Canada Wide Standards are presented in Table 14.5.

Table 14.5 National Ambient Air Quality Objectives for Criteria Air Contaminants

Criteria	Period	Pollutant concentration (µg/m^3)					
		SO_2	CO	NO_X	TPM	PM_{10}	$PM_{2.5}$
National Ambient Air Quality Objectives (acceptable level) (1)	1 hour	900	35	400	-	-	-
	8 hours	-	15	-	-	-	-
	24 hours	300	-	-	120	-	-
	1 year geometric	-	-	-	70	-	-
	1 year arithmetic	60	-	100	-	-	-
CCME Canada Wide Standard (2)	24 hours (3)	-	-	-	-	-	30

(1) Environment Canada (2010), NAAQO, maximum acceptable levels.
(2) CCME (2000), Canada-wide Standards for Particulate Matter and Ozone.
(3) Achievement to be based on the 98th percentile ambient measurement annually, averaged over 3 consecutive years.

Greenhouse Gas Emissions

GHG emissions are regulated at the provincial and federal levels. Reporting thresholds for GHG emissions at the provincial level are addressed in the Québec *Regulation Respecting Mandatory Reporting of Certain Emissions of Contaminants into the Atmosphere* under the QEQA. At the federal level, GHG emissions, thresholds for reporting are published annually under Article 46(1) of CEPA.

Acoustic Environment

For sound emissions, Health Canada has published *Health Canada's Suggested Information Needs for Consideration of Human Health in Environmental Assessments* (Health Canada, 2009), which is now incorporated into *Useful Information for Environmental Assessments* (Health Canada, 2010). These documents provide objectives for noise levels based on day-night average sound levels and percent annoyance. The concept of annoyance is based on work by the United States Environmental Protection Agency (US EPA) investigating community responses to perceived noise issues. Health Canada policy is that annoyance is a community health impact, therefore within their mandate. Although Health Canada do not publish regulations with respect to noise, and do not have noise guidelines, their publications provide guidance on the assessment methods for noise impact, with emphasis on the annoyance methods from the US EPA (1974). Annoyance is calculated as percent highly annoyed (HA), by a response function from a full day noise level, Ldn. Ldn is computed from the daytime and weighted night time sound levels. In short, the 15 daytime hours and 9 night time hours, exactly from 07:00 to 22:00 and 22:00 to 07:00 respectively, are energy averaged, with a bias of +10 dB applied to the night time before averaging. This bias reflects the greater sensitivity or responsiveness of the community to noise impacts during this part of the day.

The methods for computing percent HA are to be found in Canadian Standards Association in *Acoustics – Description, measurement and assessment of environmental noise* (International Organisation for Standardization, 2005). For the operations phase of the Kami Terminal, the percent HA should also be calculated using the same procedure for the baseline and project conditions. If, after mitigation has been applied, the percent HA increases by 6.5 percent or more, the potential environmental effect may be substantial.

A summary of Health Canada's (2010) guidance to noise assessments is provided in Table 14.6.

Table 14.6 Summary of Health Canada's Guidance to Assessing Noise

Phase	Criterion	Limit	Rationale
Construction <2 months Temporary	Community consultation is advised	-	-
Short Term Construction (< 1 year)	Mitigation is advised if levels are predicted to result in widespread complaints	-	Mitigation required if resulting levels are predicted to result in widespread complaints or strong community reaction

Phase	Criterion	Limit	Rationale
Construction > 1 year or operation with noise levels between 45-75 dB	% HA	Change in percent HA between project and baseline <6.5 percent	Annoyance is deemed to be a community health impact and mitigation is required if the percent HA between baseline and project exceeds 6.5 percent
Construction (> 1 year) or operation with noise levels (45-75 dB)	Noise Levels	75 dBA	> 75 dB mitigation required

In addition to these limits, Health Canada also advises proponents to adhere to a number of other guidelines that include World Health Organization guidelines (WHO 1999) dealing with sleep disturbances and community noise. WHO has established a guideline of 30 dBA inside a dwelling to avoid sleep disturbance.

The province of Québec also has provincial guidelines in place which are applicable to ambient noise levels in addition to the Health Canada guidelines. The guidelines are applicable for all receptors surrounding the Kami Terminal. The guidelines provide separate 1-hour maximum noise level limits for each of 4 different zoning types as presented in Table 14.7 below. The maximum 1-hour noise level limit for a site is considered the greater of either the baseline residual noise levels of a site or the levels listed within the table for the applicable zone. For purposes of the guidelines, day is defined as being the period from 7:00 AM to 7:00 PM and night as the period from 7:00 PM to 7:00 AM.

Table 14.7 Day and Night Maximum 1-hour Noise Levels for each Zoning Type

Zoning	Night (dBA) (1900h - 0700h)	Day (dBA) (0700h - 1900h)	Definition
I	40	45	Single-family dwellings (detached or attached), healthcare and educational institutions, and existing dwellings within agricultural zones
II	45	50	Houses in multiple dwelling units, mobile home parks, institutions, or campsites.
III*	50	55	Commercial use or recreational parks.
IV**	70	70	Industrial or agricultural purposes

*The noise level expected for the night period only applies at the point of reception for residential properties located within or neighbouring the zone. In other cases, the maximum noise level expected for the day (55 dBA) also applies at night.

**The criteria is 50 dBA at night and 55 dBA during the day for existing houses in an industrial zone and established in accordance with the laws in force at the time of its construction.

Based on these zoning type definitions, for the purposes of this assessment, the Kami Terminal site on Pointe-Noire is classified as Zone IV, in the area of the City of Sept-Îles is classified as

Zone III, and Val Sainte-Marguerite and other rural residential areas fall under the Zone I or Zone II classifications.

The province of Québec also provides separate guidelines for noise levels originated from a construction site applicable during the construction phase of the Kami Terminal. For daytime (7:00 AM to 7:00 PM), all reasonable measures must be taken to ensure that the maximum 12-hour noise level from a site does not exceed the greater of the following at any residential or equivalent receptor point:

- 55 dBA at any residential or equivalent receptor point; and,
- The initial baseline ambient noise level, if greater than 55 dBA.

For evening periods (7:00 PM to 10:00 PM) and night (10:00PM to 7:00 AM), all reasonable measures must be taken to ensure that the maximum 1-hour noise level from a site does not exceed the greater of the following at any residential or equivalent receptor point:

- 45 dBA at any residential or equivalent receptor point; and,
- The initial baseline ambient noise level, if greater than 45 dBA.

It is recognized within the guidelines however, that there are situations where the constraints are such that construction cannot take place within these limits. In these situations, the site supervisor shall be required to do the following:

- Predict as far in advance as possible these situations, identify and define;
- Specify the nature of work and sources of noise in question;
- Justify the construction methods used in relation to alternative possibilities;
- Demonstrate that all reasonable measures are taken to minimize the magnitude and duration of exceedance;
- Estimate the magnitude and duration of expected exceedances; and,
- Follow-up action plan to assess the real impact of these situations and take necessary corrective action.

Note that this exception can only be applied during the day (7:00 AM to 7:00 PM) and to a maximum of 55 dBA during the evening (7:00 PM to 10:00 PM). No exceptions are permitted during the night period.

Vibration

Vibration is an oscillatory motion and can be described in terms of the displacement, velocity and acceleration. The peak particle velocity (PPV) is defined as the maximum instantaneous positive or negative peak of the vibration signal. PPV is often used to monitor blasting and vibrations related to structural damages. However, human response to vibration is assessed for an average vibration as opposed to peak particle velocity. The parameter used is root mean square (RMS) amplitude.

Both PPV and RMS vibration are described in m/second (inch per second in the USA); also they are described in decibel notation. When described in decibel the reference velocity of $5x10^{-8}$ m/second is typically used ($1x10^{-6}$ inches/second in the USA). Rumbling sound caused by the vibration of room surfaces is called ground-borne noise.

Table 14.8 provides the assessment criteria that can be applied to rail vibration and ground-borne noise.

Table 14.8 Characterization of Vibration Criteria

Description	Ground-borne Vibration		Ground-borne Noise
	V (dB re 10^{-6} inch/sec)	V (dB re $5x10^{-8}$ m/sec)	dBA (re $20x10^{-6}$ Pascals)
Residences and cabins where people can normally sleep (frequent use of tracks also assumed)	72	66	35
Federal Transit Administration (FTA), 2006; Transit Corporative Research Program (TCRP), 2009			

Increasing perceptible vibration may cause annoyance. Annoyance cannot be measured directly, but meeting guidelines / limits provided in standards (such as the criteria in Federal Transit Administration) minimizes the potential for annoyance.

Light

There are currently no regulations, guidelines, or policies in place within the province of Québec that regulate the amount of obtrusive light being emitted from facilities. However, the *Commission Internationale de L'Éclairage* (CIE), also known as the International Commission on Illumination, has developed sets of maximum values for both light trespass and glare that should not be exceeded. These guidelines have been adopted in Great Britain and form the basis of a number of recommendations in the Leadership in Energy and Environmental Design (LEED) Green Building Council Certification Program of Canada (LEED, 2004). These values are based on environmental zones (see Table 14.9) and time of day.

The CIE has established four environmental zones as a basis for outdoor lighting regulations (CIE, 2003). These four zones are summarized in Table 14.9. The location of the Kami Terminal and surrounding areas / would be considered to fall in an E2/E3 (rural / suburban) category.

Table 14.9 *Commission Internationale de L'Éclairage* Environment Zones

Zone	Surrounding	Lighting Environment
E1	Natural	Intrinsically Dark
E2	Rural	Low District Brightness
E3	Suburban	Medium District Brightness
E4	Urban	High District Brightness

Lighting impacts can be classified as being of three distinct types:

- **Light trespass or light spill** is the light that is emitted by a facility and received at a property where it may disturb sleep by shining in windows, cause harsh and objectionable outdoor illumination, and potentially compromise security by imposing a light distribution that may negatively affect visibility. This type of impact is best avoided by using full cut-off fixtures that create directed light toward work areas as required. The full cut-off fixture will avoid the transmission of light outside of the property.
- **Sky glow** is the result of illumination that is directed upward, typically as a result of the use of lighting that has significant upward directivity, or is omnidirectional, such as "bare bulbs". The sky glow reduces the aesthetic quality of the night sky, making it impossible under serious situations to observe any stars or features of the night sky. This upward lighting is also thought to affect the navigational ability of birds. Sky glow is greatly reduced through the use of full horizontal cut-off fixtures, and other design and operational measures to minimize the use of excessive lighting.
- **Glare** is the familiar problem that results from exposed and poorly directed lights such as the bright headlights in oncoming traffic. Paradoxically, glare, an excess of light, impairs vision in those impacted, with consequent impairment of safety and security, in addition to the degradation of aesthetics. Again, glare is reduced by the use of appropriate lighting fixtures, an efficient site lighting design, and operational measures that reduce excessive and energy-wasteful illumination.

The maximum values recommended by CIE for light trespass (illumination) on properties by environmental zone and time of day are presented in Table 14.10.

Table 14.10 *Commission Internationale de L'Éclairage* Maximum Values of Light Trespass (Illumination) on Properties

Time of Day[1]	CIE Maximum Values of Light Trespass on Properties by Environmental Zone (in lux)			
	E1	E2	E3	E4
Pre-Curfew (19:00 – 23:00)	2	5	10	25
Post-Curfew (23:00 – 6:00)	0	1	2	5

Notes:
[1] Terminology, environmental zones and values defined by CIE (2003)

The maximum values recommended by CIE for glare (intensity of luminaires) offsite by environmental zone and time of day are presented in Table 14.11.

Table 14.11 *Commission Internationale de L'Éclairage* Maximum Values for Glare (Intensity of Luminaires) Offsite

Time of Day[(1)]	*Commission Internationale de L'Éclairage* Maximum Values for Glare in Designated Directions by Environmental Zone (in cd)			
	E1	E2	E3	E4
Pre-Curfew (19:00 – 23:00)	2,500	7,500	10,000	25,000
Post-Curfew (23:00 – 6:00)	0*	500	1,000	2,500

NOTES:
(1) Terminology, environmental zones and values defined by CIE (2003)
* If for public lighting value may be up to 500 cd

All types of excessive lighting tend to be reflected in the amount of light radiating to space, and that which is reflected back, known as sky glow. Reference levels of sky glow are presented in Table 14.12. The higher the number, the more the sky is dominated by the natural background; the lower the number, the greater the degree of sky glow that is caused by reflection from the atmosphere of anthropogenic lighting. The numbers are in an inverse order because of the astronomical basis of the definition of "magnitudes"; in basic terms, high is good, low is bad.

Table 14.12 Reference Levels of Sky Glow

Sky Glow (mag/arcsec^2)	Corresponding Appearance of the Sky
21.7 (Rural)	The sky is crowded with stars that appear large and close. In the absence of haze the milky way can be seen to the horizon. The clouds appear as black silhouettes against the sky.
21.6	The above with a glow in the direction of one or more cities is seen on the horizon. Clouds are bright near the city glow.
21.1	The milky way is brilliant overhead but cannot be seen near the horizon. Clouds have a greyish glow at the zenith and appear bright in the direction of one or more prominent city glows.
20.4	The contrast of the milky way is reduced and the detail is lost. Clouds are bright against the zenith sky. Stars no longer appear large and near.
19.5	Milky way is marginally visible, only near the zenith. Sky is bright and discoloured near the horizon in the direction of cities. The sky looks dull grey.
18.5 (Urban)	Stars are weak and washed out and reduced to a few hundred. The sky is bright and discoloured everywhere.

Source: Berry (1976)

14.3 Establishing Standards or Thresholds for Determining the Significance of Environmental Effects

The following terms will be used to characterize residual environmental effects for Atmospheric Resources, direction, magnitude, geographical extent, frequency, duration, reversibility and ecological context. The definitions of these terms are presented below.

- **Direction:**
  - Adverse: condition of the atmospheric resources is worsening in comparison to baseline conditions and trends;
  - Positive: condition of the atmospheric resources is improving in comparison to baseline conditions and trends; or,
  - Neutral: no change in the condition of the atmospheric resources compared to baseline conditions and trends.
- **Magnitude:**
  - Negligible: no measurable adverse effect anticipated;
  - Low: effect occurs that is detectable but is within normal variability of baseline conditions;
  - Moderate: effect occurs that would cause an increase with regard to baseline but is within regulatory limits and objectives; or,
  - High: effect occurs that would singly or as a substantial contribution in combination with other sources cause exceedances of objectives or standards beyond the Project boundaries.
- **Geographical Extent:**
  - Site-specific: effect restricted to the Project footprint within the LSA;
  - Local: effect restricted to the LSA;
  - Regional: effect restricted to the RSA; or,
  - Global: Provincial, National or Global scale (GHG Emissions only).
- **Frequency:**
  - Once: effect occurs once;
  - Sporadic: effect occurs at sporadic intervals;
  - Rarely: effect occurs on a regular basis and at regular intervals; or,
  - Frequently: effect occurs continuously throughout the Project life.
- **Duration:**
  - Short-term: effect occurs for less than three years;
  - Medium-term: effect occurs for between 3 and 15 years; or,
  - Long-term: effect persists beyond 15 years.
- **Reversibility:**
  - Reversible: effect ceases when Project operations cease; or,
  - Irreversible: effect continues after Project operations cease.

- ***Ecological or Socio-Economic Context:***
  - Undisturbed: effect takes place within an area that is relatively or not adversely affected by human activity; or,
  - Disturbed: effect takes place within an area with human activity. Area has been substantially previously disturbed by human development or human development is still present.

A significant adverse residual environmental effect on the air quality is defined as an environmental effect that results in emissions that may be emitted in quantities that may result in ambient concentrations of concern to the regulatory agencies or the public.

With respect to GHGs, considering the magnitude, intensity and duration of Kami Terminal emissions as directed by the CEA Agency guidance (CEA Agency 2003), three categories are described: low, medium and high. In this EIS these are attributed to numerical values (on a tonnes CO_2eq per annum basis) of less than 10^5, greater than 10^5 and less than 10^6, and greater than 10^6, for low, medium and high categories, respectively.

For a change in the acoustic environment a significant adverse residual environmental effect is defined as an environmental effect that results in sound pressure levels at the nearest residential receptors or sensitive receptors (i.e. daycares, schools, hospitals, places of worship, First Nation Reserves) that cause a change in calculated percent HA from baseline greater than 6.5 percent.

For a change in vibration a significant adverse residual environmental effect would be associated with intermittent levels that are high in magnitude, or persistent vibrations with medium-term duration that occur at sensitive receptor buildings. Such vibrations would result in an exceedance of the vibration criteria presented in Table 14.8.

For a change in ambient lighting quality, a significant adverse residual environmental effect is defined as an increase in Kami Terminal related light emissions such that the guidelines for light trespass and glare are exceeded and where the Kami Terminal related sky glow would be typical of an urban environment.

14.4 Potential Project-VEC Interactions

The environmental assessment of the Atmospheric Environment is focused on the following environmental effects:

- Change in air quality;
- Change in GHG emissions;
- Change in acoustic environment;
- Change in vibrations; and,
- Change in ambient light quality.

A list of all known Kami Terminal activities and physical works associated with each phase and each of the identified potential environmental effect associated with the Atmospheric Environment VEC is shown in Table 14.13. The interactions were ranked as a 0, no interaction occurs, 1, interaction occurs however the resulting effect can be managed through proven mitigation and codified practice, or as a 2, an interaction occurs and has the potential to exceed regulatory standards and therefore requires further assessment.

Table 14.13 Potential Environmental Effects of Kami Terminal to Atmospheric Environment

Kami Terminal Activities and Physical Works	Potential Environmental Effects				
	Change in Air Quality	Change in GHG Emissions	Change in Acoustic Environment	Change in Vibration	Change in Light Emissions
Construction					
Site Preparation (incl. clearing, excavation, blasting, material haulage, grading, removal of overburden and stockpiling)	2	1	1	1	1
Construction of Unloading, Stacking, Storage and Reclaiming Facilities (rail dumper building, rail car dumper and hopper, train positioner transfer houses, conveyors, dust collector, maintenance building, substation, sanitation system)	1	1	1	1	1
Construction of Railway Loop	2	1	1	1	1
Construction of Stream Diversion	1	1	1	1	1
Access Roads and Waterline Realignment	1	1	1	1	1
Onsite Vehicle / Equipment Operation	1	1	1	1	1
Waste Management	0	1	1	0	0
Transportation of Personnel and Goods to Site	1	1	1	0	1
Expenditures	0	0	0	0	0
Employment	0	0	0	0	0
Operation and Maintenance					
Rail Transport	2	2	2	2	1
Concentrate Handling and Stockpiling	2	1	2	1	1
Water Collection, Treatment and Discharge	0	0	1	0	1
Onsite Vehicle / Equipment Operation and Maintenance	1	1	1	0	1
Waste Management	0	0	0	0	0
Transportation of Personnel and Goods to Site	1	1	1	0	1
Expenditures	0	0	0	0	0

Kami Terminal Activities and Physical Works	Potential Environmental Effects				
	Change in Air Quality	Change in GHG Emissions	Change in Acoustic Environment	Change in Vibration	Change in Light Emissions
Employment	0	0	0	0	0
Decommissioning and Reclamation					
Site clean-up	1	1	1	0	1
Accidents and Malfunctions					
Train Derailment	1	0	2	1	1
Forest Fire	2	2	1	0	1
Stormwater Retention Pond Breach	0	0	0	0	0

KEY
0 No interaction
1 Interaction occurs; however, based on past experience, the resulting effect can be managed to acceptable levels through standard operating practices and/or through the application of best management or codified practices. No further assessment is warranted.
2 Interaction occurs, and resulting effect may exceed acceptable levels without implementation of specified mitigation. Further assessment is warranted.

Air Quality

During the construction phase, the site preparation activities (including blasting) were ranked 2, as they will generate dust and gaseous pollutants emissions with the potential of off-site impacts. The construction of the railway loop was also ranked 2, as it will involve the crushing of rock to build the subgrade.

During the operation phase, the handling and storage of iron concentrate was ranked 2, in relation to the emission of particulate matters. Rail transportation of the concentrate from the mine to the Kami Terminal will involve the use of diesel-powered locomotives, and emissions warrants an additional assessment.

The emissions occurring during decommissioning and reclamation activities are expected to be small and of short duration, compared to those occurring during operations. Interactions ranked 1 in Table 14.13 could emit measurable but small quantities of air pollutants (e.g., exhaust gases or dust), but these pollutants are not expected to exceed ambient regulatory standards. Activities associated with vehicle and machinery may result in local air contaminant emissions. Some of these air pollutant emissions will occur from gasoline and diesel fuel combustion and fugitive dust (e.g., CO, NO_X, SO_2, CO, PM). These emissions are expected to occur only for short durations, will be local and will be low in magnitude.

Accidents and malfunctions identified in Table 14.13 (stormwater retention pond breach and train derailment) were ranked 0 or 1. If a forest fire occurs on the Marconi Peninsula, it is likely to be relatively easy to control, in comparison to forest fires that occur in vast uninhabited areas. The two other potential accidents (breach of the stormwater retention pond and train derailment) are more likely to affect the aquatic environment than the atmospheric environment.

Greenhouse Gas Emissions

During the construction phase, as well as during the decommissioning and reclamation phases, no significant GHG emissions are expected, and each planned activity was ranked as 0 or 1. The vehicles and equipment used during the construction phase will require the consumption of fossil fuels, such as diesel, but the amounts will not be significant.

During the operation phase, rail transportation of the concentrate from the mine to the Kami Terminal will involve the use of diesel-powered locomotives, and emissions will be sufficient to warrant an additional assessment. The consumption of fuel associated with other activities occurring during the operation phase will not be significant, especially due to the fact that electricity received from the public grid is primarily hydro-electricity.

Accidents and malfunctions identified in Table 14.13 (stormwater retention pond breach and train derailment) were ranked 0 or 1. Forest fires may involve GHG emissions (mainly biomass-related emissions).

Acoustic Environment

The Kami Terminal interactions on each environmental effect are ranked as 0, 1 and 2 for a Change in the Acoustic Environment based on anticipated quantities of emissions, and project experience.

There are no significant noise emissions resulting from activities associated with expenditures, employment, waste management, or a breach in the stormwater retention pond. Those activities have therefore been ranked as 0 for a change in the acoustic environment.

Activities associated with the construction and decommissioning of facilities, rail lines, access roads, as well as on-site vehicle use during construction and during operation and maintenance have the potential to result in noise emissions. However, all of these activities are temporary in nature, and can be easily mitigated by incorporating industry best practices. They are therefore ranked as 1 for a change in the acoustic environment, and are not further assessed.

A forest fire could result in potential noise emissions. Noise emissions would be minimal due to the limited possible extent of a forest fire initiated by Kami Terminal operations, and are therefore ranked as 1. A train derailment could also potentially result in increased noise emissions.

Rail transportation and concentrate handling have the potential to significantly affect the acoustic environment without mitigation, and were thus ranked as 2 and are further assessed below.

Vibration Environment

The following construction and site decommissioning and reclamation related activities are ranked “0” as there are no known significant vibrations expected to be originated from those activities:

- Waste management;
- Transportation of personnel and goods to the site;
- Expenditures;
- Employment; and,
- Site clean-up.

Similarly, the following operation related activities are also ranked “0” as there are no known significant vibrations expected from those activities:

- Water collection, treatment and discharge
- On-site vehicle / equipment operation and maintenance;
- Waste management;
- Transportation of personnel and goods to the site;
- Expenditures; and,
- Employment.

The following construction and operation related activities are ranked “1” as there are known interactions because of the usage of motor powered equipment / movable equipment; however, based on past experience, the resulting effect will only occur very near the site, and can be managed to acceptable levels through standard practices and/or through the application of best management or codified practices.

- Site preparation;
- Construction of unloading, stacking, storage and reclaiming facilities;
- Construction of railway loop;
- Construction of stream diversion
- Access roads and waterline realignment;
- Onsite vehicle / equipment operation; and,
- Concentrate handling and stockpiling.

As discussed the significance of vibration effects related to activities ranked “0” and “1” are not expected to be significant in magnitude, and are local or near field in geographical extent, temporary, limited to daytime during the construction period. The effects are generally reversible once the source ceases to exist. Thus, in consideration of the nature of the interactions and the planned implementation of known and proven mitigation, the potential environmental effects of all Kami Terminal activities and physical works that were ranked as 0 or 1 in Table 14.13 on the Atmospheric Environment during any phase of the Kami Terminal are rated not significant, and are not considered further in the assessment.

Light Environment

The following activities, and accidents or malfunctions are not sources of light emissions, and were ranked "0":

- Waste management;
- Expenditures;
- Employment;
- Site clean-up; and,
- Stormwater retention pond breach.

All other activities or accidents and malfunctions are known to emit light at levels which could interact with the environment. However, through past experience, the light emissions are expected to be not significant due to their intermittent nature, localized geographic extent, low magnitude, and reversibility once activities cease. Therefore, those events have been ranked as a 1.

The measurable parameters used for the assessment of the environmental effects presented above and the rationale for their selection will be provided in Table 14.14.

Table 14.14 Measurable Parameters for Atmospheric Environment

Environmental Effect	Measurable Parameter	Rationale for Selection of the Measurable Parameter
Change in Air Quality	Emissions and ambient concentrations of CAC and non-criteria air contaminants (Non-CAC) (µg/m^3)	• Air quality is characterized by chemical and physical properties of the atmosphere, as affected by the release of combustion gases and particulate matter into the atmosphere (e.g., NO_X, CO, PM, and SO_2) • QCAR regulation contains ambient air standards for some pollutants, including CACs. A proponent needs to demonstrate that its project will not result in the exceedance of these standards, before proceeding. The criteria are applicable outside of industrial sectors.
Change in GHG Emissions	GHG emission rates of CO_2, N_2O and CH_4 resulting from the Project	• The inventory and analysis of GHG emissions are widely recognized when assessing related environmental effects on climate (CEA Agency 2003)
Change in Acoustic Environment	Changes in ambient sound levels as measured in A-weighted sound pressure levels in decibels and percent annoyance	• Health Canada has published *Guidance on Noise Assessment* for projects requiring assessment under CEAA. This includes consideration of daytime and night time noise exposure of sensitive receptors and percent annoyance. Québec also has noise guidelines that are applied in this assessment.
Change in Vibration	Root square mean velocity (rms)	• Used to determine perceptibility of vibration levels from construction / operation of an equipment

Environmental Effect	Measurable Parameter	Rationale for Selection of the Measurable Parameter
Change in Light Emissions	Light Spill - Light output from the Project perimeter on vertical surface of receptors	• Light received beyond the Kami Terminal perimeter is spill or trespass lighting
	Glare - Horizontal contrast between Project lighting and background lighting	• Increased glare is a safety issue and an aesthetic issue
	Sky Glow - Ratio of upward directed lighting to total lighting	• Sky glow is a result of wasted light shining upwards, and from excessive lighting reflected upwards

14.5 Existing Environment

14.5.1 Air Quality

Climate

The Sept-Îles climate is subarctic, marked by long and cold winters and short and mild summers. The presence of the Saint-Lawrence Gulf brings its maritime influence, with increased humidity, fog and colder weather, especially in summer when winds are coming from the south.

There are two meteorological stations located in Sept-Îles, one at the airport which also measure upper air (soundings) data twice a day, and one at Pointe-Noire and closer to the Kami Terminal but which measure a limited number of parameters.

The climate normal for Sept-Îles are presented in Table 14.15 for the 1971 through 2000 period, as measured at the Sept-Îles Airport and compiled by the Canadian Meteorological Center. The average annual temperature is 0.8°C. The warmest month of the year is July, with an average daily temperature of 15.3°C" The month of January is the coldest, with an average daily temperature of -15.3°C. The extreme maximum temperature recorded at the Sept-Îles Airport is 32.2°C and was recorded in June 1947 and the minimum is -43.3°C, recorded in January 1950.

The average annual precipitation is 757 millimeters and account for total amount of rain and snow (melted equivalent) precipitations. September is the month that contributes the most to the annual total, with an average rainfall of 113 mm. The month of February has the lowest precipitations, with an average of 67.2 mm. The maximum snowfall occurs in December with an average of 97 cm while the average maximum accumulation of snow occurs in February, with an average snow depth of 68 cm.

Figure 14.4 presents the wind rose and wind class frequency distribution for the Sept-Îles Airport and was prepared with hourly wind data as measured from 2005 through 2011. The average measured wind speed is 14.7 km/h and the most frequent wind direction is from the east while the second most frequent wind direction is from the North. The maximum gust speed was measured in December 1960, with a speed of 161 km/h in January 1960.

Figure 14.4 Wind Rose and Wind Class Frequency Distribution, Sept-Îles Airport, 2005 through 2011

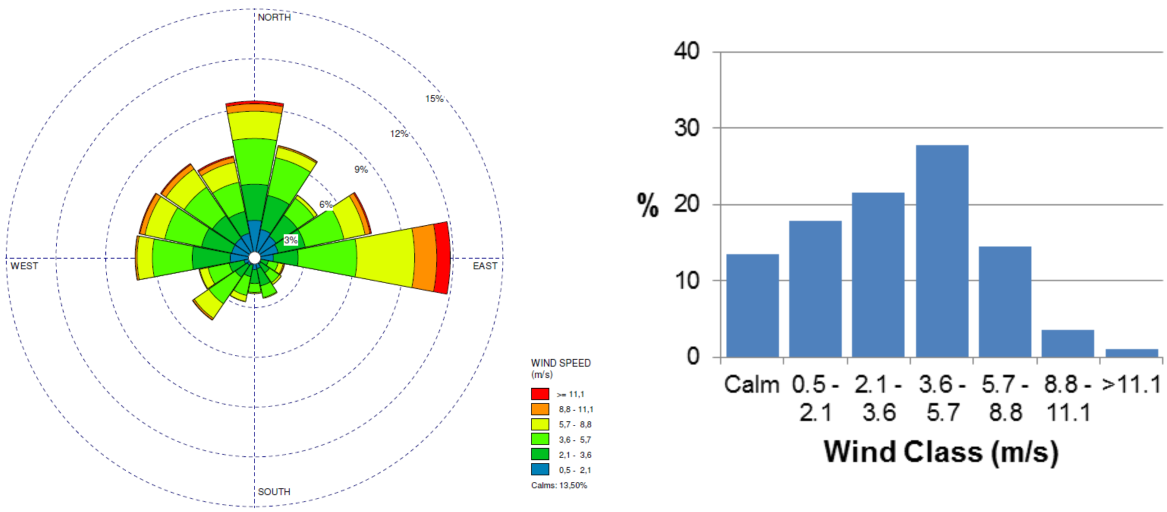


Figure 14.5 presents the wind rose and wind frequency distribution for Pointe-Noire from 2005 through 2011 and was prepared with hourly wind data. The most frequent wind direction is from the west and the second most frequent wind direction is from the west-northwest. It is noted that on average, wind velocity is slightly lower at Pointe-Noire (12.7 km/h at Pointe-Noire vs 13.9 km/h at the Sept-Îles airport).

Figure 14.5 Wind Rose and Wind Class Frequency Distribution, Pointe-Noire, 2005 Through 2011

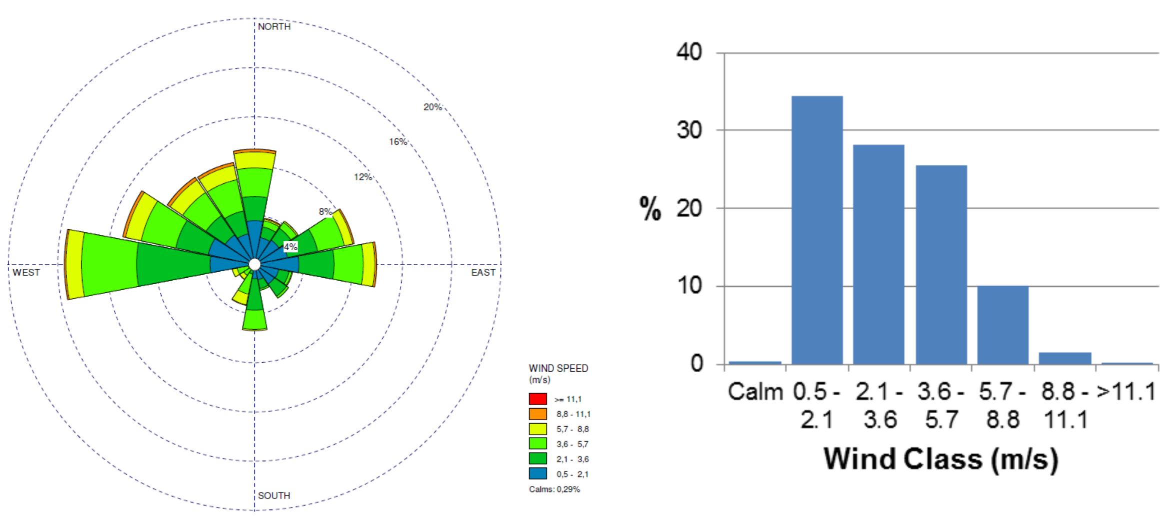


Table 14.15 Climate Normal, Sept-Îles Airport, 1971 Through 2000

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Temperature													
Daily Average (°C)	-15.3	-13.4	-7.1	0	5.9	11.7	15.3	14.2	9.3	3.4	-3.1	-11.3	0.8
Daily Maximum (°C)	-9.8	-7.8	-2.1	3.8	10.3	16.4	19.6	18.8	13.6	7.4	0.7	-6.5	5.4
Daily Minimum (°C)	-20.9	-19	-12.1	-3.8	1.5	7	10.9	9.6	4.8	-0.6	-7	-16.1	-3.8
Extreme Maximum (°C)	22.2	10.6	11.8	19.2	28.3	32.2	32.2	31.1	29.4	22.2	16.9	9.4	
Extreme Minimum (°C)	-43.3	-38.3	-31.7	-26.4	-11.7	-2.8	1.7	-0.6	-6.5	-12.8	-28.9	-36.5	
Precipitation													
Rainfall (mm)	9.3	10.9	26	61	83.1	99.3	99.8	91.1	113.2	97.5	48.3	18	757.4
Snowfall (cm)	87.3	59.7	64.7	37.5	9.1	0	0	0	0	7.9	49	96.9	412
Precipitation (mm)	87.4	67.2	88.8	102.8	94	99.3	99.8	91.1	113.2	106.5	97.7	108.1	1156
Average Snow Depth (cm)	56	68	66	40	5	0	0	0	0	0	5	32	23
Extreme Daily Snowfall (cm)	52	49.4	50.8	44.6	29.2	0.5	0	0	0.6	28.2	45.4	55.8	
Extreme Daily Precipitation (mm)	52	94	50.8	74.9	69.6	68.1	84.8	76.5	98.6	67	114.6	69.8	
Days with Precipitation (rainfall or snowfall)													
>= 0.2 mm	16.2	12.4	13.5	12.8	13.9	14	15.9	14	14.3	15.2	14.1	16.4	172.8
>= 5 mm	5.5	3.7	5.3	5.5	5.9	6	6.2	5.6	6.9	6.3	6.1	6.1	68.8
>= 10 mm	2.7	1.8	3	3.6	3.3	3.1	3.1	2.9	3.9	3.8	3.5	3.3	37.9
>= 25 mm	0.31	0.59	0.66	1.1	0.57	0.86	0.75	0.67	0.93	0.77	0.67	0.86	8.8
Wind													
Speed (km/h)	16	15.4	17	16.7	14.9	13.9	12.4	12	13.2	14.1	15.2	15.8	14.7
Most Frequent Direction	N	N	N	E	E	E	E	E	E	E	N	N	E
Maximum Hourly Speed (km/h)	97	90	80	93	83	89	64	68	80	80	89	101	
Maximum Gust Speed (km/h)	161	161	121	124	121	129	103	113	154	122	130	159	

Ambient Air Quality

There is no public air quality monitoring station located in Sept-Îles or within a distance of 100 km from Sept-Lies, as part of the National Air Pollution Surveillance (NAPS) network and/or as part of the Québec provincial monitoring network.

The closest monitoring station is located in Murdochvile, at approximately 150 kilometers south of Sept-Îles on the other side of the Saint-Lawrence Gulf. Along the north shore of the Gulf, there is one station in Mingan (162 km east) and one near Forestville (239 km southwest). The parameters measured for theses 3 stations are total particulate smatter (TPM), particulate matter with a diameter less than or equal to 10 micrometers (PM_{10}) and ozone (O_3). Given the distance, the results for theses station were considered non representative for the Sept-Îles area and are not presented in this study.

Between 1975 and 1995, there was up to 4 monitoring station located in Sept-Îles measuring TPM. Given that these results are over 17 years old and up to 37 years old, they must be taken as historical data and only for informative purpose and should not serve as a reference to establish current ambient levels.

The most relevant and recent air quality data available comes from a monitoring campaign performed in Sept-Îles in June 2009 and carried out by the Québec's *ministère du Développement durable, de l'Environnement et des Parcs* (MDDEP). A report on this study was published in June 2010[1]. The targeted pollutants were TPM, $PM_{2.5}$, SO_2, NO_X, NH_3, fluoride, PAH, VOCs and metals but only TMP, PM_{10} and $PM_{2.5}$ results will be reviewed here as they are the main pollutants expected to be emitted by the Kami Terminal.

A series of 15 minutes measurements were taken in 8 different residential areas near the center of Sept-Îles from June 16 through June 19, 2009. A series of 24 hours TPM measurements was also completed between June 16 and September 3, 2009, in 3 different locations in Sept-Îles.

The average concentrations measured at each site during this 2009 monitoring campaign are presented in Table 14.16. The highest concentrations were measured at the Retty (Cartier-Dequen) location with an average concentration of 198 ug/m^3 for TPM and 13.6 for $PM_{2.5}$. The lowest results were measured at the 925 Arnaud location for TPM, with a concentration of 31 µg/m^3 and at the Parc Ferland for $PM_{2.5}$, with a concentration of 8 µg/m^3.

The data summarized in Table 14.16 support the use of the background concentrations suggested by the MDDEP in QCAR, i.e., 20 µg/m^3 for $PM_{2.5}$ and 90 µg/m^3 for TPM. Measured concentrations were generally lower than these values, with the notable exception of the Retty sector for TPM.

[1] MDDEP, Évaluation de la qualité de l'air à Sept-Îles, Analyse globale de la situation à partir de données historiques et d'une campagne de mesures effectuée en 2009, Juin 2010

Table 14.16 Summary of Monitoring Results in 2009 at Selected Sept-Îles Locations [1]

Location	Average measured concentration (µg/m^3)			
	TPM (June –September)	TPM (June only)	PM10-June	PM2.5 - June
Laure – Des Montagnais		60	18,6	9,6
Comeau – Régneault		97	26,6	9,4
MDDEP		59	22,6	11
925 Arnaud	36	31	18,6	10,2
Parc Ferland		34	16,5	8
Retty – McManus	58	116	33	12,6
Retty (Cartier-Dequen)		198	50	13,6
Retty –Franquelin	41			

(1) Source : MDDEP, 2010.

Existing Air Pollution Sources

The Sept-Îles ambient air quality is characterized by the presence of industrial activities including the Aluminerie Alouette aluminum smelter, the Wabush Mines / Cliffs iron pellet plant, the IOC-Rio Tinto shipping Terminal and the Imperial Oil petroleum products tank farm. Another important iron pellet plant, operated by ArcelorMittal, is located in Port-Cartier, but has less local influence due to its distance from Sept-Îles (30 km). Ambient air quality is also affected by typical urban pollution sources such as road traffic and wood heating.

Table 14.17 lists the main potential sources or air contamination. This table is an adaptation of a similar table presented by the MDDEP in the above-mentioned 2010 report on air quality.

Table 14.17 Main Potential Sources of Air Contamination [1]

Existing potential source	Distance from Sept-Îles downtown (km)	Direction from Sept-Îles downtown	Potential contaminants
Road traffic	0	N/A	TPM, PM_{10}, $PM_{2.5}$, SO2, NO_x, CO, VOCs.
Wood heating	0	N/A	TPM, PM_{10}, $PM_{2.5}$, SO2, NOx, CO, VOCs, PAH
Imperial Oil	0.5	S	VOCS and odors
IOC	0.5	S	TPM, PM_{10}, $PM_{2.5}$, SO2, NO_x, CO, Metals
IOC former tailing impoundment area	3.6	E	TPM, PM_{10}, $PM_{2.5}$
Sandpit	7	NNE	TPM, PM_{10}, $PM_{2.5}$,
Aluminerie Alouette	6.5	SSW	TPM, PM_{10}, $PM_{2.5}$, SO2, NOx, PAH, NH_3, Fluorides

Existing potential source	Distance from Sept-Îles downtown (km)	Direction from Sept-Îles downtown	Potential contaminants
Cliffs (Wabush Mines)	8	SW	TPM, PM_{10}, $PM_{2.5}$, SO2, NOx, CO, Metals
ArcelorMittal	30	SW	TPM, PM_{10}, $PM_{2.5}$, SO2, NOx, CO, Metals
(1) Adapted from : Évaluation de la qualité de l'air à Sept-Îles, MDDEP, June 2010.			

Publicly available data from the National Pollutant Release Inventory (NPRI) (Environment Canada 2012b) were used to quantify existing annual pollutants emissions in the area and are presented in Table 14.18.

Table 14.18 Annual Emissions Reported by Industrial Sources Located in Sept-Îles

Facility	Reported annual emissions under NPRI (2010) (t/a)						
	VOCs	SO_2	CO	NO_2	TPM	PM_{10}	$PM_{2.5}$
Mines Wabush - Sept-Îles	8	2 188	2 483	1 714	770	404	137
Aluminerie Alouette Inc. - Sept-Îles	310	10 713	81 254	123	1 025	720	310
ArcelorMittal Mines Canada – Port-Cartier	17	4 288	12 970	6 329	1 049	461	237
IOC - Sept-Îles	-	-	-	-	755	317	49
Imperial Oil - Sept-Îles Terminal	54	-	-	-	-	2,1	1,4

It should be noted that this inventory does not include all industrial and/or commercial emissions sources that may be present in the region as well as the emissions associated with road traffic and wood burning.

Greenhouse Gas Emissions

Environment Canada maintains a national inventory of GHG emissions for all sectors of activity. The latest update of the national inventory was published in 2012, and described 2010 emissions. The Québec government also published its own GHG emissions inventory, and the latest update available is for year 2009. Table 14.19 summarizes the key GHG emissions for 2012, as these will be used to evaluate the relative importance of the Kami Terminal.

Table 14.19 National and Québec Greenhouse Gas inventory (1)

	Greenhouse Gas Emissions (CO_2e – kt/yr)	
	Canada	Québec
Total Emissions	692 000	81 800
Sub-total Transportation	195 000	27 100
(1) Source: Environment Canada, 2012; MDDEP, 2009		

Although GHG emissions associated with the Kami Terminal will be assessed by comparing to the provincial and national totals, it is also useful to highlight how they compare with the other regional sources of emissions. The following facilities reported their GHG emissions to Environment Canada, under the national reporting program mandatory for sources emitting more than 50 kt/yr of CO_2e:

- Aluminerie Alouette, Sept-Îles: 1 044 416 kt of CO_2e;
- ArcelorMittal Mines Canada, Port-Cartier: 956 654 kt of CO_2e;
- Cliffs – Wabush Mines, Sept-Îles: 395 952 kt of CO_2e.

The above-mentioned totals do not take into account the GHG emissions associated with the operation of the railroad lines by ArcelorMittal, Cliffs / Chemin de Fer Arnaud and IOC / QNS&L, as transportation activities are not subject to the reporting obligation under the national GHG reporting program.

14.5.2 Acoustic Environment

The proposed unloading, stacking, storage and reclaiming facilities, and associated rail loop will be located south of the baie des Sept-Îles, in the vicinity of the Cliffs and Iron Ore Company of Canada (IOCC) port facilities at Pointe-Noire Terminal in Sept-Îles, Québec with similar noise emission levels. Surrounding areas are best described as rural or coastal, where the acoustic environment is likely dominated by:

- The sound of wind in the trees and vegetation;
- The sound of running water from stream and rivers, or waves along the shoreline; and,
- Animal sounds and bird calls.

There are also nearby towns which typically experience sounds from:

- Traffic;
- Construction;
- Service stations or workshops; and,
- Recreational sounds from sports or other outdoor activities.

Baseline monitoring was conducted in May of 2012 near the proposed site of the concentrate unloading, stacking, storage and reclaiming facility (labeled Pointe-Noire), and also at the closest dwelling near Plage-Sainte-Marguerite. Both locations are identified in Figure 14.6. Data were collected over a 16-hour period at the site and a 24-hour period at Plage-Sainte-Marguerite on May 21-22, 2012. Hourly results for both sites can be found in Table 14.20.

Figure 14.6 Location of Noise Baseline Monitoring Stations

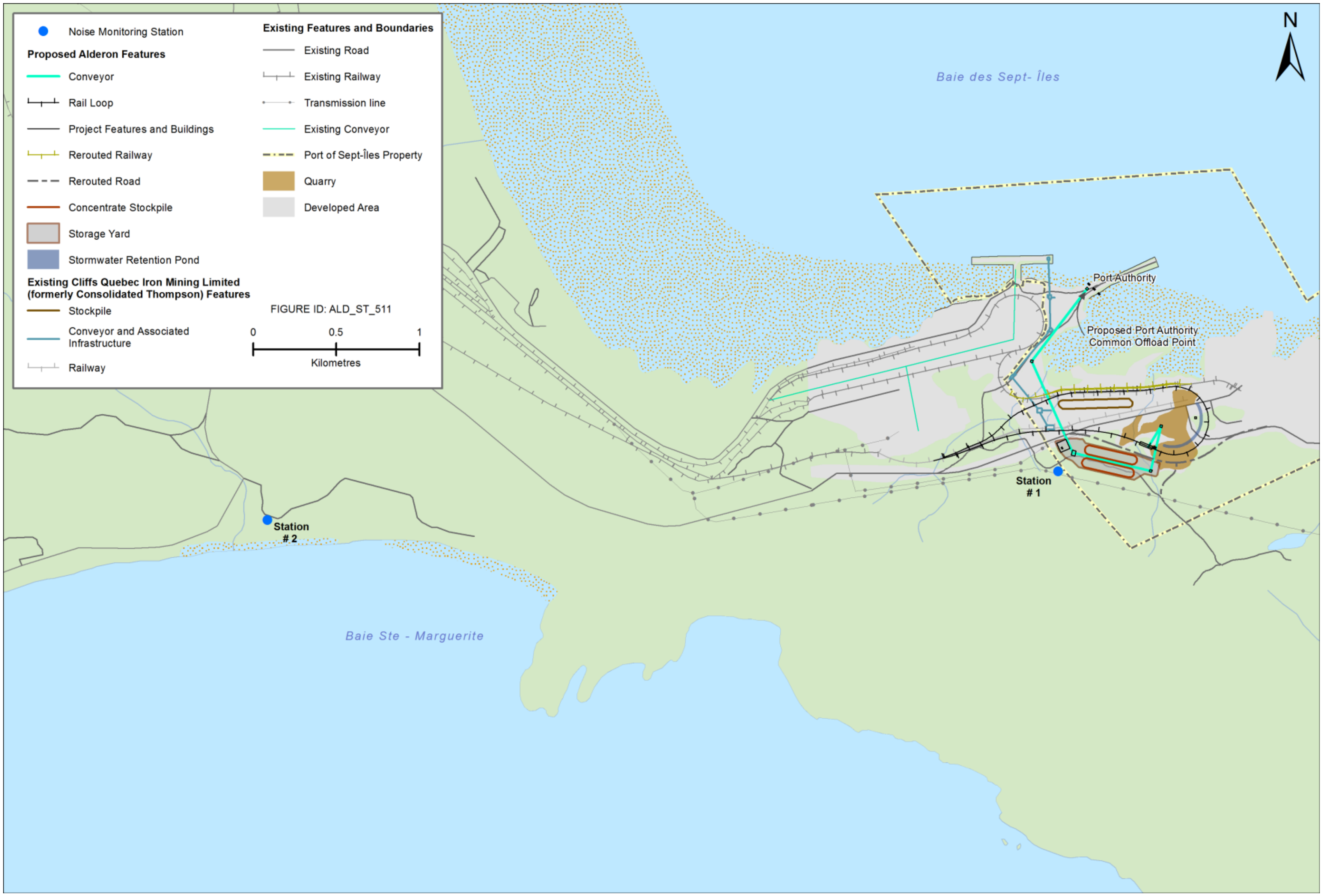


Table 14.20 Hourly Sound Pressure Level at Monitoring Stations near Sept-Îles

Time of Day	Station 1 – Pointe-Noire (dBA)	Station 2 – Plage-Sainte-Marguerite (dBA)
17:00	47	-
18:00	48	39
19:00	47	35
20:00	46	34
21:00	52	43
22:00	52	34
23:00	52	32
0:00	51	35
1:00	52	31
2:00	52	32
3:00	53	41
4:00	53	37
5:00	51	39
6:00	52	39
7:00	51	38
8:00	53	43
9:00	-	37
10:00	-	38
11:00	-	36
12:00	-	37
13:00	-	36
14:00	-	38
15:00	-	40
16:00	-	40
17:00	-	38
18:00	-	36

The daytime and night time average sound levels are expressed as Leq in Table 14.21. Average daily noise value L_{dn} is computed based on daytime and night time readings and converted to a percent HA value. Both L_{dn} and percent HA are calculated for both sites in Table 14.21.

Table 14.21 Average Day, Night, and Day-Night Sound Power Levels, and Percent Highly Annoyed at Site Monitoring Stations.

Average Sound Level	Site 1 – Pointe-Noire (dBA)	Site 2 – Plage-Sainte-Marguerite (dBA)
Ld	50	39
Ln	52	37
Ldn	44	53
Percent HA	6.2	1.0

14.5.3 Vibration Environment

There are no known vibration generation sources identified near the rail line, other than traffic for other purposes. The existing vibration is expected to be generally from nature with some minor influence form distance industrial activities. Because of the separation distances (>700 m), it is expected that no human perception of vibration occurs at those receptors at present.

14.5.4 Light Environment

Nearby urban areas Sept-Îles and Val Sainte-Marguerite are primarily residential areas, with most sources of employment located outside of the urban areas. As a result, the sky is an aesthetic resource with inherent value.

Baseline light readings presented in Table 14.1 are typical of an E3 CIE environmental zone, and the night time sky shows modest impact of the urban area, and little impact of industry or commercial areas that affect many cities.

14.6 Assessment of Project-related Environmental Effects

Each effect (change in air quality; change in GHG emissions; change in acoustic environment) was assessed for each Kami Terminal phase. This section summarizes notably the analytical methods used to assess the Vibration effects on the environment. The assessment was undertaken in consideration of all Kami Terminal activities; however, details on decommissioning are not discussed in detail because the effects will be similar to those occurring during the construction phase. Thus the effects environment was analyzed for the construction and operation scenarios. Specific focus is given to the rail line because of public interest and despite the fact that it is well away from seasonal or permanent residential receptors.

14.6.1 Construction

14.6.1.1 Change in Air Quality

The emissions occurring during construction are expected to be small and of short duration, compared to those occurring during operation.

Site preparation (incl. clearing, excavation, blasting, material haulage, grading, removal of overburden and stockpiling) was ranked 2 in Table 14.13, implying that there is a potential to exceed air quality standards. More specifically, two activities are identified as having the potential to emit more air contaminants:

- Blasting of 535 000 metric tons of rock, mainly to build the concentrate storage pad, by assuming that gelatine dynamite will be used; and,
- Crushing of 275 000 metric tons of rock, which will be used to construct the railway loop subgrade, by using a crusher with a capacity of 300 tons per hour.

Kami Terminal Emissions

Emission rates of air contaminants associated with these two activities were established by using calculation methodologies published by the US EPA (*AP-42 guidelines - AP-42, Compilation of Air Pollutant Emission Factors*), by considering typical processing rates and uncontrolled emissions.

With respect to blasting, some assumptions were made to predict worst-case conditions, by assuming a frequency of 1 blast per hour during day time, in order to capture for worst case meteorological conditions that might occur during any given day. The result of this assumption must be taken into account when reviewing modeling results, especially for averaging period longer than an hour.

Dispersion Modeling Results

The US EPA CALPUFF modeling system was used to predict maximum ground-level concentrations due to emissions associated with the construction phase. The core of this system consists of a meteorological model CALMET, and a transport and dispersion model CALPUFF. The modelling was done with five years of meteorological data, from 2006 through 2010.

Some special or sensitive receptors were identified and are presented on Figure 14.7. There receptors are mainly private residences, located near the railroad track, near the site in Plage-Sainte-Marguerite and Gallix, or in Sept-Îles.

Table 14.22 summarizes the maximum predicted hourly and 24-hr ground-level concentrations (GLCs) throughout the five year-period for the two selected activities (blasting and rock crushing) at those special receptors, in comparison to the ambient air-criteria.

Figure 14.7 Location of Special Receptors for the Atmospheric Dispersion Study

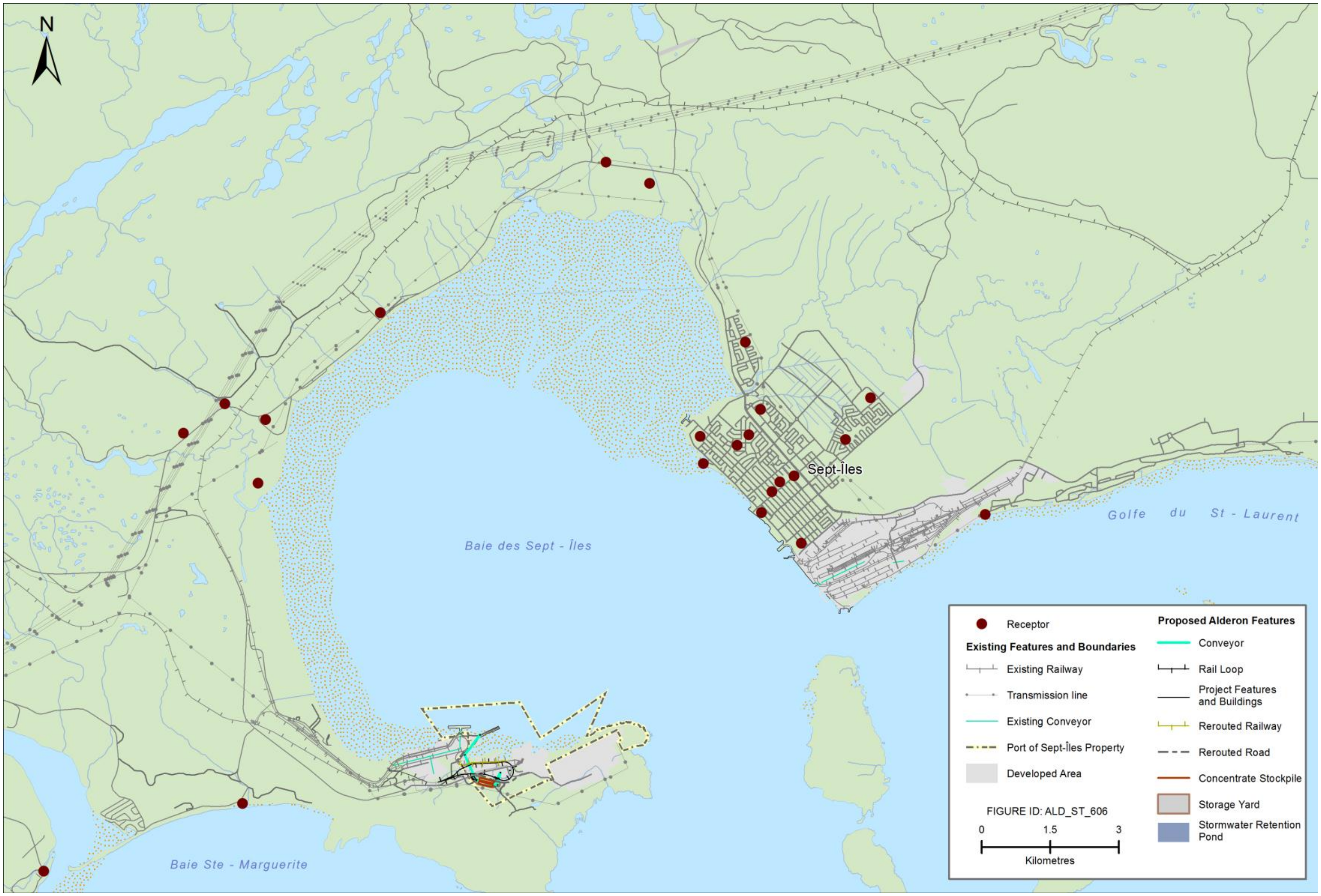


Table 14.22 Summary of Ground Level Concentrations (GLCs) at the Special Receptors During Site Preparation and Construction

Contaminant	Averaging Period	Maximum GLC ($\mu g/m^3$)	Background Concentration ($\mu g/m^3$)	Cumulative Max GLC ($\mu g/m^3$)	Applicable Criteria ($\mu g/m^3$)	Percent (%) of Criteria
TSP	1 - Hour	71	-	-	-	-
	24 - Hours	8	90	98	120	82%
PM_{10}	24 - Hours	6	-	-	-	-
$PM_{2.5}$	1 - Hour	3	-	-	-	-
	24 - Hours	0.4	20	20.4	30	68%
SO_2	4 – Minutes	0	150	150	1050	14%
	24 - Hours	0	50	50	288	17%
NO_2	1 - Hour	82	150	232	414	56%
	24 - Hours	9	100	109	207	53%
CO	1 - Hour	165	2 650	2 815	34000	8%
	8 - Hours	39	1 750	1 789	12700	14%

GLCs for all contaminants and averaging periods are predicted to be below the applicable criteria at the special receptors. This is also true when considering the prescribed background concentration, from the provincial regulation, and the results are presented in the column presenting cumulative maximum GLCs. TSP is the contaminant that is predicted to be the closest to the criteria, reaching 82% of the 24-hrs criteria. However, this is mostly associated with the use of the prescribed background (90 $\mu g/m^3$) which is 10 times higher than the maximum predicted GLC resulting from construction activities. It is a similar situation for $PM_{2.5}$, as it reaches 68% of the 24-hr criteria, but the prescribed background is 50 times higher than the maximum predicted GLC resulting from construction activities.

Interactions ranked 1 in Table 14.13 may emit small quantities of air pollutants (e.g., exhaust gases or dust). Activities associated with vehicle and machinery may result in local air contaminant emissions. These emissions are expected to occur only for short durations, will be local and will be low in magnitude. Based on experience with other projects, and in consideration of the significance criteria for air quality (Section 14.3), these interactions are not expected to cause adverse environmental effects and were not further assessed through the use of a dispersion model.

Mitigation of Potential Environmental Effects

Mitigation measures that can be implemented during the construction phase include the following:

- Use of an approved dust suppressant or road watering as needed, to limit dust emissions associated with truck traffic over unpaved areas, as per industry best practices. This will also reduce safety risks that may arise from the reduced visibility resulting from the presence of dust;
- The speed of truck will be limited, in order to minimize the dust emissions (same reason);
- Use of drilling machinery equipped with dust collector of water dust suppression, when making blasting holes in the rock, as required by the provincial regulation for pits and quarries; and,
- Use of CO monitors during blasting activities at nearby receptors, to ensure that ambient concentrations remain at acceptable level following blasting events.
- As needed, the surface involved with each blast may be adjusted accordingly.

14.6.1.2 Change in Greenhouse Gas Emissions

During construction, the fuel consumption of heavy equipment during upgrading and constructing site access roads, site preparation and construction of site buildings and vehicular traffic on site are expected to produce some GHG emissions. However, such emissions will occur only during construction and are not expected to be substantive. These interactions are therefore ranked 1 and were not quantified.

Mitigation of Potential Environmental Effects

No mitigation measure is deemed necessary for GHG emissions during the construction phase.

14.6.1.3 Change in Acoustic Environment

A variety of machinery will be employed for the site preparation and construction of the concentrate unloading, stacking, storage and reclaiming facility and associated rail infrastructure. Clearing, grading, and cut and fill activities will involve graders, dozers and haul trucks. Construction of facilities will generate noise emissions from activities such as welding, infrastructure erection, and transportation of materials on-site.

The footprint of the construction phase of the port infrastructure will be limited to the operational area of the Kami Terminal, and is expected to last no longer than 2 years. Noise emissions will be intermittent in nature. The nearest dwelling to the site is over 1 km away, and is unlikely to experience significant affects to the acoustic environment due to construction activities. Higher noise emissions more continuous in frequency and larger in extent are expected during the operational phase. Quantitative analyses of noise emissions during the operational phase were therefore considered to adequately represent any adverse effects due to construction activities.

Mitigation of Potential Environmental Effects

Mitigating of noise emissions from construction machinery can be achieved through proper muffler installation and regular maintenance. Enforceable low-speed standards on-site can also significantly reduce construction noise.

14.6.1.4 Change in Vibrations

Construction activity associated with the Kami Terminal would include two different construction phases:

1. Off-site – includes activities associated with access road, power line and rail line.
2. Onsite- includes activities associated site clearing and construction and control / planned blasting.

All of these construction activities will utilize typical machinery such as excavators, loaders, and graders, as are commonly used in other civil works.

Blasting may be required during the construction of the Kami Terminal facilities at the port, specifically for grading the site. However, blasting is not expected to be periodic, (rather sporadic) in nature and will involve a blast design and will be implemented under controlled environment, including monitoring. Due to the extensive separation distances of about 10 km to Sept-Îles and 5 km to Plage-Sainte-Marguerite, the blasting will be barely perceptible, if at all.

As all phases of other construction activities are not expected to occur simultaneously, and the typical vibration from construction equipment is expected to diminish below perceptible level within a few 10s of metres of the site, no significant effect is predicted from construction.

14.6.1.5 Change in Ambient Light Quality

During construction, portable lighting units may be used in the concentrate storage area for preparation of the site, and at the fixed facilities to enable the construction. Portable lights are often used to illuminate an area lateral to the unit, and bright powerful lights that will unavoidably cause some glare and vertically directed illumination.

Mitigation of Potential Environmental Effects

The construction lighting will be limited to only as much lighting as is necessary.

14.6.2 Operation and Maintenance

14.6.2.1 Change in Air Quality

Interactions ranked 1 in Table 14.13 could emit measurable but small quantities of air pollutants (e.g., exhaust gases or dust), but these pollutants are not expected to lead to the exceedance of ambient air quality criteria.

Activities associated with vehicle and equipment operation, transportation of personnel and goods to site as well as fuel storage and dispensing may result in local air contaminant emissions. Some of these air pollutant emissions will occur from gasoline and diesel fuel combustion and fugitive dust (e.g., NO_X, SO_2, CO, PM). These emissions are expected to be local and low in magnitude. The concentrate received by rail cars will be handled by a system of conveyors and stacker-reclaimer, and will therefore not involve the use of trucks to move it around. Electricity will be the primary source of energy associated with the handling of the concentrate.

The operation and maintenance activities listed in Table 14.13 with interactions ranked as 2 have a potential environmental effect on air quality. Following an initial source screening on sources related to the normal operation expected to occur on the Kami Terminal site, the following sources were identified in the inventory and included in the modelling study (Appendix G, Stantec, 2012a,):

- Movement of rail cars from and to the site;
- Concentrate Handling and Stockpiling :
- Wind erosion from the concentrate pile;
- Transfer of concentrate from rail cars to the storage pile;
- Emissions from the rail car dumping buildings; and,
- Handling of concentrate by the conveyor system.

Kami Terminal Emissions

Annual emissions were calculated for each source based on preliminary design data, expected level of activities, material properties and meteorological data. The basic and general information that will have an impact on the level of emissions expected to arise are as follows:

- Up to 16 million tonnes of concentrate will be carried from the mine to Sept-Îles by railroad, by two transportation companies, after the completion of the two phases;
- It is expected that two trains containing 240 cars will arrive on the Kami Terminal site each day (one train per day during the first phase);
- The concentrate unloaded from the trains will be stored on two storage piles, carried by an enclosed conveying system and put on the pile by a stacker; and,

- The stored concentrate will then be transferred on a conveyor by a reclaimer and sent to the ship for loading. The ship loading activity itself is not included in the scope of the study, because it is under the control of the Port Authority.

The transportation of the concentrate from the Kami mine site to the Sept-Îles shipping Terminal will be done by two transportation service providers, i.e. QNS&L railroad line operated by IOCC, from the Newfoundland operation to the Arnaud Junction located near Sept-Îles, and then the CFA operated by Wabush Mines, from Arnaud Junction to the Sept-Îles Terminal.

The most substantive emissions during operation are due to concentrate handling and storage (fugitive dust emission). The emission sources can be categorized into three groups:

- Emissions from the diesel locomotive used for transporting the concentrate (mobile source);
- Emissions from the unloading operations at the car dumper (point source); and,
- Emissions due to pilling of concentrate on the storage pile (fugitive dust).

Emission rates of air contaminants associated with these activities were established by using calculation methodologies published by the US EPA (*AP-42 guidelines - AP-42, Compilation of Air Pollutant Emission Factors*), by considering typical processing rates, project-specific information and site-specific meteorological conditions (Pointe-Noire meteorological station).

Table 14.23 gives a summary of estimated Kami Terminal's annual emissions. Considering the absence of a description of the concentrate's behavior in the AP-42 methodology, in relation to the potential for wind erosion at the storage pile, two modelling scenarios were considered. The lower end of the range is associated with the estimate made by assuming that the concentrate behaves like coal, and the higher end of the range is associated with the estimate made by assuming that the concentrate behave like sand.

The Kami Terminal's annual emissions can be compared with the NPRI data from other industrial sites. TPM annual emissions of the Kami Terminal are estimated at less than 26 tonnes per year as compared to a total of 2,550 tonnes per year reported in the 2010 NPRI by the nearby industrial sources (Aluminerie Alouette, IOCC and Cliffs-Wabush Mines), which account for less than 1% of existing nearby emissions sources. The recent Consolidated Thompson shipping Terminal has not reported its emissions for 2010, as it was then being started, but it can only be assumed that future emissions will be in the same range of Alderon's emissions once both projects reach their full operating capacity, considering the similarity of the operations.

Table 14.23 Estimated Kami Terminal's Annual Emissions

Source	Category	Pollutants Emitted (t/a)					
		TPM	PM_{10}	$PM_{2.5}$	SO_2	NO_x	CO
Railroad (1)	Mobile	< 0.1	< 0.1	< 0.1	2,8	0.4	< 0.1
Car dumper	Fixed	6.7	4.8	3.5	-	-	-
Stacker (2)	Fugitive	11.8	5.6	1.8	-	-	-
Concentrate storage pile (3)	Fugitive	0.1 to 7.8	< 0.1 to 3.9	< 0.1 to 0.6	-	-	-
	Total	**18.6 to 26.4**	**10.5 to 14.4**	**5.3 to 5.9**	**2.8**	**0.4**	**<0.1**

(1) Estimated only for the Arnaud railroad segment (approx. 40km)
(2) The transfer points for the conveyor system are considered as negligible, because the conveyors will be covered and the transfer points will be equipped with dust collectors.
(3) The reason for the range of fugitive emissions from the concentrate storage pile is associated with the uncertainty surrounding its precise behavior, and susceptibility for wind erosion.

Dispersion Modeling Results

For more details on this study, please refer to Air Quality Dispersion Modeling Study (Stantec 2012a) in Appendix G. With respect to the transportation of concentrate by rail, a summary of the dispersion modelling results at selected sensitive receptors, i.e., mainly private residences located near the railroad track, as identified in Figure 14.7, is presented in Table 14.24.

Table 14.24 Summary of Ground Level Concentrations for Rail Emissions at the Special Receptors

Contaminant	Averaging Period	Maximum Ground Level Concentrations (µg/m^3)	Background Concentration (µg/m^3)	Cumulative Max Ground Level Concentrations (µg/m^3)	Applicable Criteria (µg/m^3)	Percent of Criteria
TSP	24 - Hour	1.5	90	92	120	76%
	Annual	0.3	-	-	-	-
PM_{10}	24 - Hour	1.5	-	-	-	-
$PM_{2.5}$	1 - Hour	6.1	-	-	-	-
	24 - Hour	1.5	20	22	30	72%
	Annual	0.3	-	-	-	-
SO_2	4 – Minute	1.6	150	151.6	1050	14%
	24 - Hour	0.2	50	50	288	17%
	Annual	0.0	20	20	52	39%
NO_2	1 - Hour	241.1	150	391	414	94%

Contaminant	Averaging Period	Maximum Ground Level Concentrations (µg/m³)	Background Concentration (µg/m³)	Cumulative Max Ground Level Concentrations (µg/m³)	Applicable Criteria (µg/m³)	Percent of Criteria
	24 - Hour	58.8	100	159	207	77%
	Annual	9.8	30	40	103	39%
CO	1 - Hour	33.8	2650	2684	34000	8%
	8 - Hour	9.2	1750	1759	12700	14%

Cumulative ground level concentrations for all contaminants and averaging periods are predicted to be below the applicable criteria at the special receptors.

With respect to the concentrate handling and storage of concentrate, a summary of the dispersion modelling results is presented in Table 14.25, for the two scenarios considered regarding fugitive emissions from the concentrate storage pile.

Table 14.25 Summary of Ground Level Concentrations for the Concentrate Storage and Handling Activities

Contaminant	Averaging Period	Maximum Ground Level Concentrations (µg/m³)		Background Concentration (µg/m³)	Cumulative Max Ground Level Concentrations (µg/m³)		Applicable Criteria (µg/m³)	Percent of Criteria	
		Scen. 1	Scen. 2		Scen. 1	Scen. 2		Scen. 1	Scen. 2
TSP	1 – hour	934	1 533	-	-		-	-	
	24 – hours	46	267	90	136	357	120	114%	298%
	Annual	7	39	-	-	-	-	-	-
PM_{10}	24 – hours	25	142	-	-	-	-	-	-
$PM_{2.5}$	1 – hour	235	236	-	-	-	-	-	-
	24 – hours	8	44	20	28	64	30	95%	213%
	Annual	2	9						

The results of the dispersion modelling show that there may be potential exceedances of regulatory standards at locations near the property line during adverse meteorological conditions for the $PM_{2.5}$ and TSP 24 hour criteria, with the background included, involving higher fugitive emissions from the storage pile.

However, for Scenario #1, these higher values are limited to within about 100 m of the property line and it is unlikely that prolonged human exposure to air contaminant concentrations at these levels will occur.

For Scenario #2, these higher values are located primarily over sea, or on high points of the Marconi Peninsula, i.e. on uninhabited areas zoned for industrial uses. It is important to remember that the dispersion modeling results presented for Scenario #2 were obtained by using a constant and worst case emission rate for each hour during 5 years while in reality, the frequency of pile disturbance are limited and occur only when several meteorological conditions occur simultaneously. In addition to these conditions, wind direction also needs to be considered because modeled exceedances occurred over the south-west property limits and would be mainly the result of wind blowing from north-east and north north-east with sufficient speed to create some wind erosion (less than 1% of time at Pointe-Noire).

Therefore, as the predicted exceedances represent worst-case meteorological conditions are limited in spatial extent, seasonal, and are short-term in duration, no substantive changes in air quality are expected.

Total Particulate Matters (TPM)

Figure 14.8 presents the maximum GLCs for TPM over the whole modelling grid for scenario #2, prior to the addition of the background. Because scenario #2 represents the worst-case conditions in terms of wind erosion, the consideration of this figure is sufficient to understand the localized nature of higher predicted concentrations, which may occur over the high points of the Marconi Peninsula.

PM_{10}

Figure 14.9 presents the maximum GLCs for PM_{10} over the whole modelling grid for scenario #2, prior to the addition of the background, and again for scenario #2 representing the worst-case conditions in terms of wind erosion.

$PM_{2.5}$

Figure 14.10 presents the maximum GLCs for $PM_{2.5}$ over the whole modelling grid for scenario #2, prior to the addition of the background, and again for scenario #2 representing the worst-case conditions in terms of wind erosion.

Figure 14.8 Maximum 24-hour TPM Concentration (μg/m³)

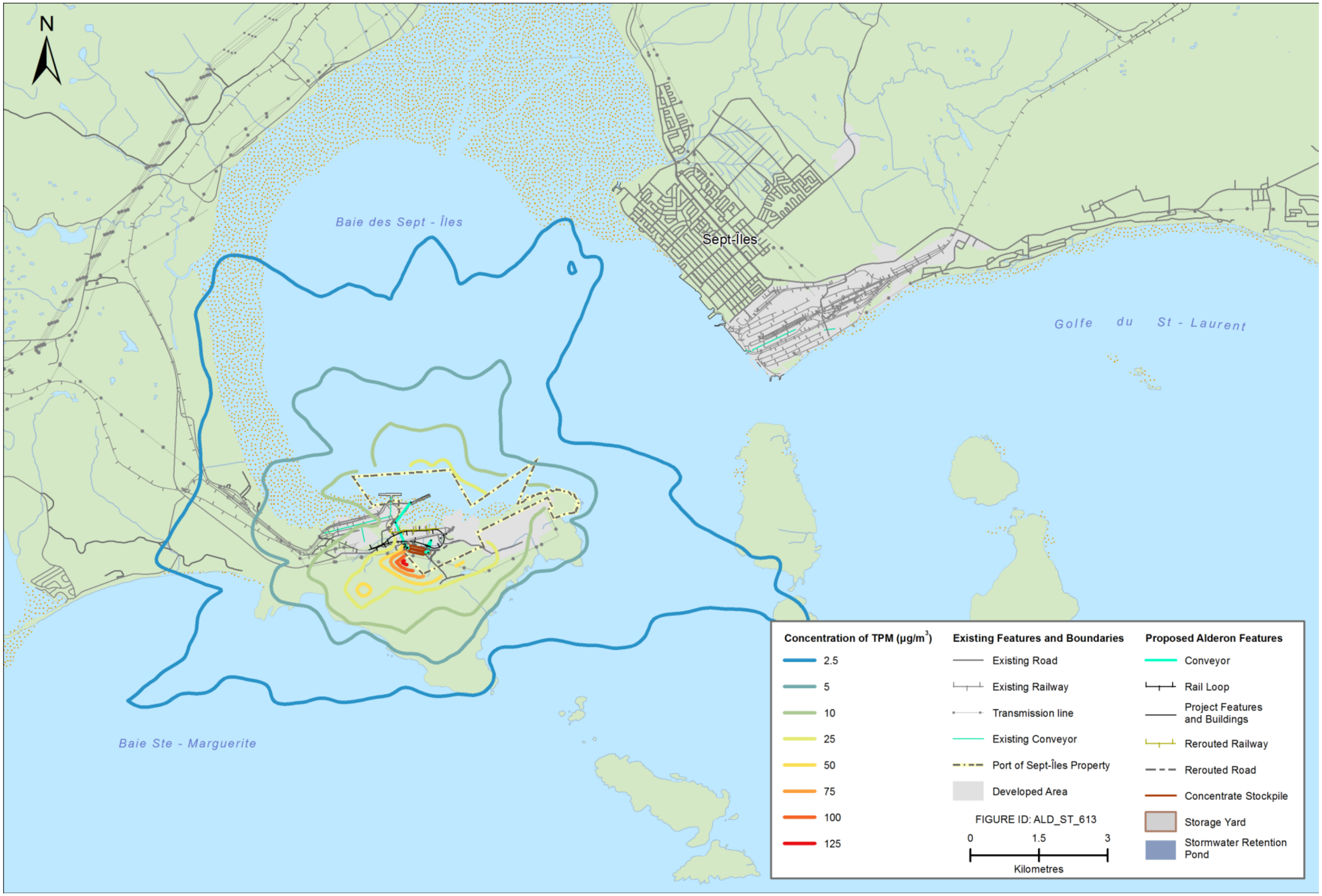


Figure 14.9 Maximum 24-hour PM_{10} Concentration (µg/m³)

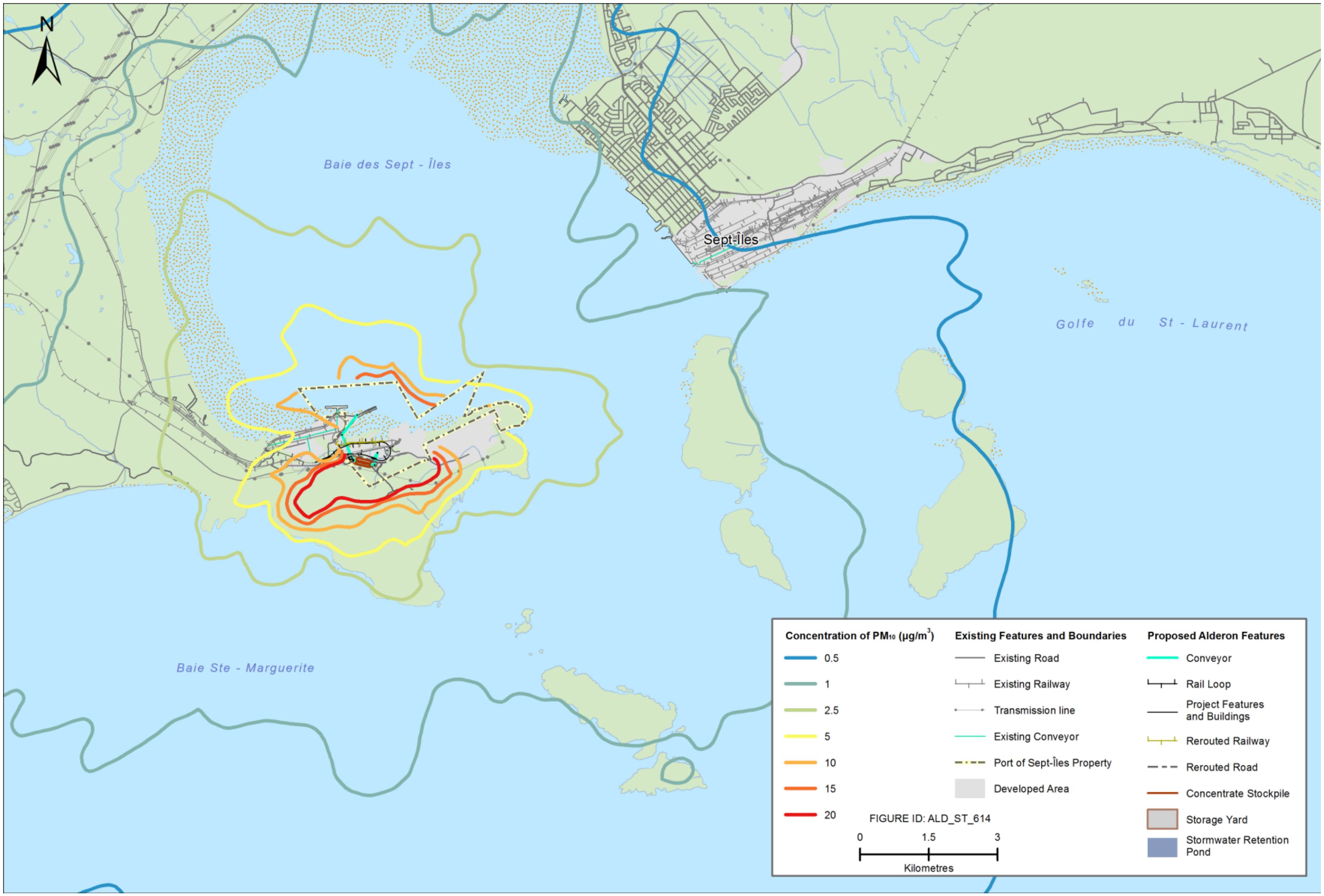
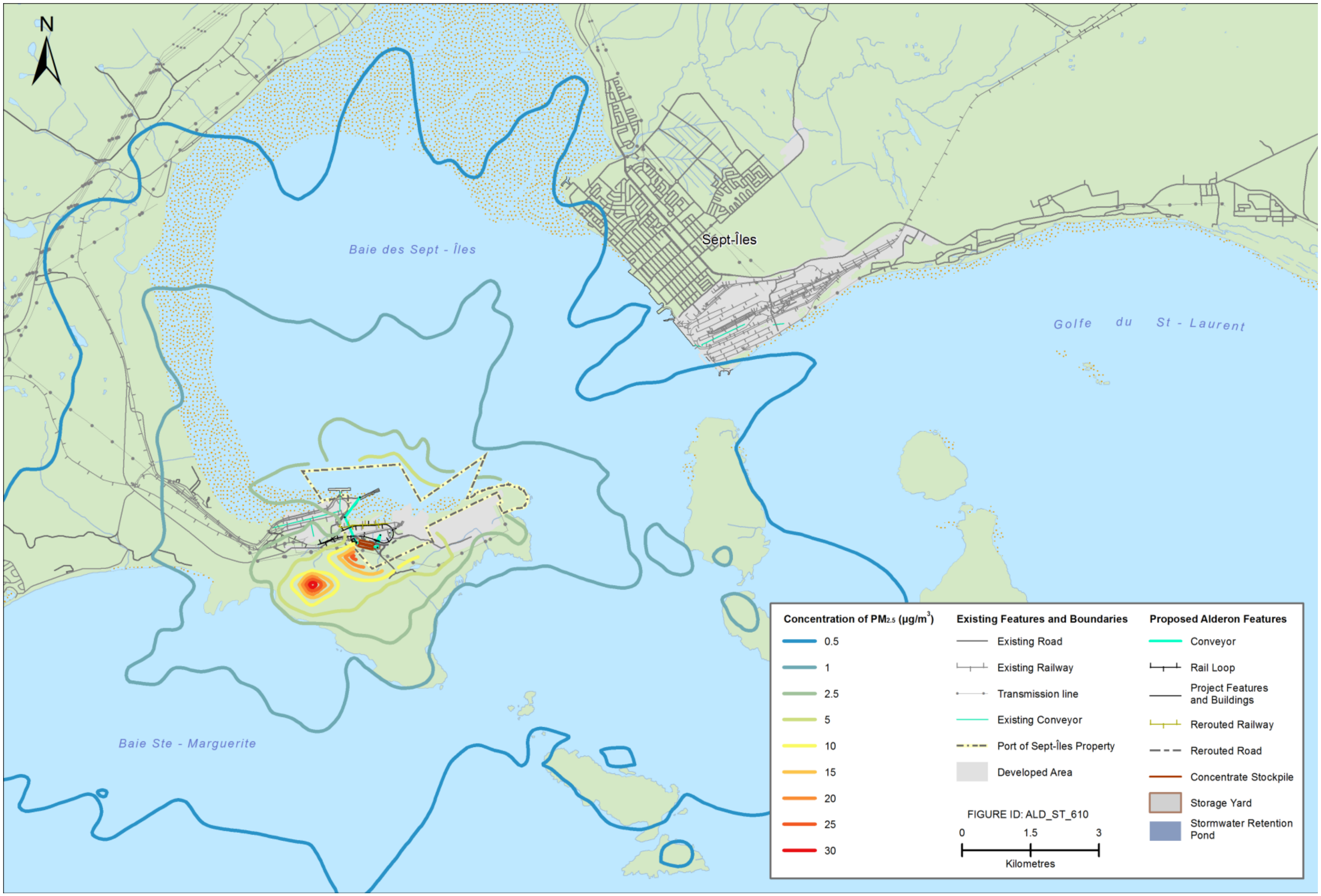


Figure 14.10 Maximum $PM_{2.5}$ 24-hour Concentration ($\mu g/m^3$)

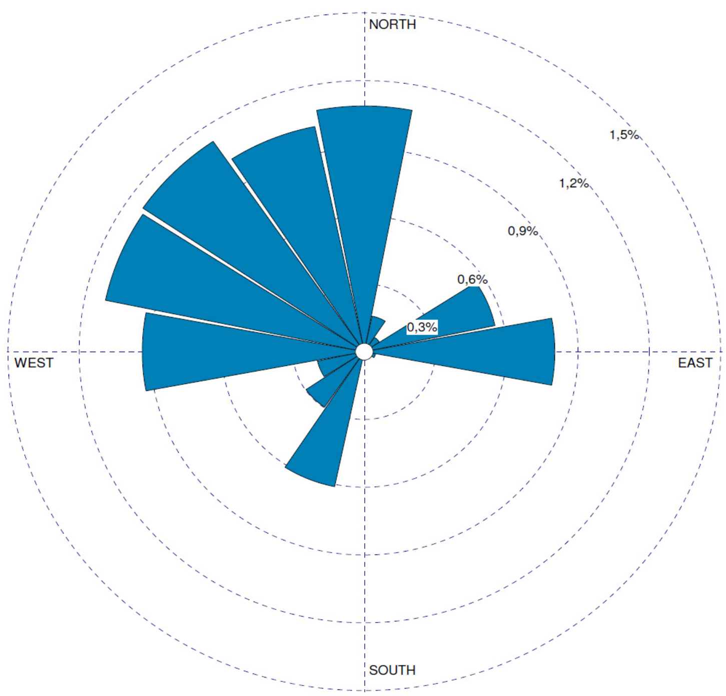


Emissions from the diesel locomotive used for transporting the concentrate to Sept-Îles are not expected to cause substantive changes in air quality as such emissions will be intermittent (two round trips per day) and short-term in duration.

Although fugitive dust emissions will occur due to material handling (scenario #1), the majority of the fugitive dust will remain in the lowest 1 to 2 meters above ground level and settle within a few hundred meters. As such, while some dusting may occur under certain meteorological conditions, they will be localized in extent and short-term in duration.

With respect to the worst-case conditions in terms of wind erosion (scenario #2), the potential exceedances will be limited to uninhabited or industrial properties, and the frequency of meteorological conditions (i.e wind speed above 22.4 km/h) that may lead to such emissions in the south-west direction is very low (see Figure 14.11)

Figure 14.11 Wind Rose for Wind Speeds Above 22.4 km/h, Pointe-Noire, 2005 Through 2010



Therefore, on an overall basis, the modelling results show the local and regional changes in air quality due to emissions, including background, are not expected to be substantive.

Mitigation of Potential Environmental Effects

The following mitigation measures were already included in the design of the Kami Terminal, in order to minimize its emissions:

- The car dumping will occur in a closed building, equipped with a dust collector to control emissions to permitted concentrations;
- The conveyor system will be enclosed and transfer points will be equipped with dust collectors;
- The stacker will have an adjustable height, to minimize the height of free fall for the material and therefore reduce fugitive emissions;
- Routine inspections of the dust collectors at the dumper building and on the conveyor system, to ensure that they remain in good operating conditions.

In addition, if the concentrate storage pile generates fugitive emissions that represent a concern, additional mitigation measures may be considered, such as the spraying of water over the surface to minimize wind erosion. Such mitigation measures are not clearly justified when considering the modelling results.

14.6.2.2 Change in Greenhouse Gas Emissions

The potential for GHG emissions associated with the Kami Terminal is mainly associated with the transportation of the concentrate from the Kami Mine site to the shipping Terminal. Locomotives used by the two transportation service providers (QNS&L and CFA) are powered with diesel.

Emissions were estimated by using the average fuel efficiency of 5.5 litres/thousand metric ton/km published by the Railway Association of Canada for 2009. This number is considered to be conservative, compared to what can be expected for the two local railroads, considering that they are dealing with long convoys, with infrequent stops and that the loaded railcars are moving in the direction for which there is a downward slope (from Labrador, towards Sept-Îles). For these reasons, the real fuel efficiency is expected to be lower than the National average.

Table 14.26 summarizes the GHG emissions estimated for the distance travelled by the trains within the Québec territory.

Table 14.26 Greenhouse Gas Emissions Associated with the Kami Terminal – Transportation of Concentrate

Parameter	From Québec Border to Arnaud Junction	From Arnaud Junction to Pointe-Noire	Total	Source of Information
Distance (km)	235	38	273	QNS&L
Fuel Efficiency (litres/km/1000 tons)	5.5	5.5	5.5	Railway Association of Canada
Tonnage (million metric tons/yr)	16	16	16	Alderon – after phase 2
GHG Emission Factor (kg CO_2e/litre)	3.01	3.01	3.01	Québec regulation – Mandatory reporting of air contaminants
Annual GHG Emissions (t CO2e/yr)	62 257	10 065	72 323	Calculation

When considering the Provincial and National total GHG emissions for 2010, as presented in Table 14.19, it is concluded that the Kami Terminal will represent respectively less than 0.01 percent of the Provincial total GHG emissions, and less than 0.001 percent of the National total GHG emissions.

Mitigation of Potential Environmental Effects

Because transportation will be done by transportation service providers, Alderon will not have the ability to mitigate emissions. However both CFA and QNS&L have financial incentives to reduce their fuel consumption, so they may consider fuel efficiency measures in the future, to further improve the current GHG intensity (on a per-ton basis).

The electricity used at the shipping Terminal, for the concentrate handling and conveying system will be powered with the electricity supplied by the Hydro-Québec grid, which is dominated by the production of low-CO_2 hydro-electricity.

14.6.2.3 Change in Acoustic Environment

Noise emissions during the operational phase of the Kami Terminal will occur from rail traffic, concentrate transfer from railcars, the storage facility, or onto ships, and conveyors. At maximum operation, 240-car trains will arrive twice daily to the port site.

Trains will travel by the community of Ferland, around the baie des Sept-Îles, and arrive at the port site near Plage-Sainte-Marguerite. As the trains approach the port site, they are detached from their locomotives, guided onto a train positioner. The trains are positioned onto a rail car dumper, where concentrate is either loaded directly onto an awaiting ship via conveyors and transfer houses, or is delivered to the storage facility and arranged by the stacker-reclaimer. Trains are therefore expected to be stationary or travelling at very low speeds near the port site.

Emissions will occur during each transfer point of concentrate, through the operation of conveyors, railway traffic at the rail loop on-site, and rail traffic leading up to the port site. Quantitative modeling of the on-site activities (excluding rail traffic) was used to assess the impact of noise emissions on nearby sensitive receptors using Computer Aided Noise Abatement (CadnaA) version 4.2.140. CadnaA is operated under the ISO 9613-1 and 9613-2 algorithm framework accepted by Health Canada in assessing effects on the acoustic environment (Ref Tech. Data Report). Rail traffic was modeled using the Sound from Trains Environmental Analysis Method (STEAM) developed by the Ontario Ministry of Environment, and incorporated with the results from CadnaA to determine the total noise emissions from the operations. Table 14.27 summarizes the expected sound power levels of the railway, the conveyor, and material transition points at the port site.

Table 14.27 Sound Power Level for Noise Emitters in Model

Source	Sound Power Level (dBA)
Existing Railway	69
Rail Loop	66
Conveyors	94
Concentrate Transfer	100
Note: Rail and conveyors are modeled by a sound power level per metre length	

Several receptors of concern near existing rail leading to the site or in proximity to the port site itself were included in the model. Their coordinates and distances from the closest noise emission source are summarized in Table 14.28. The sites include a reference for on-site noise levels, the closest dwelling to the Kami Terminal, and several locations representing clusters of residences or recreational areas.

Table 14.28 Significant Receptors Near the Railway and Port Site

Receptor	Coordinates		Distance to Closest Emitter (km)
	Easting (m)	Northing (m)	
Sept-Îles	686492	5564657	7.94
Marguerite Cabin	676674	5558307	1.11
Plage-Sainte-Marguerite	673794	5558179	2.96
Val Sainte-Marguerite	672578	5557955	4.03
Baie des Sept-Îles	676845	5567850	0.84
Cran-De-Fer	682083	5572640	0.7
Ferland	683363	5572085	1.52
On-Site	680067	5558740	0.1

Table 14.29 summarizes the results of the cumulative sound levels resulting from the Kami Terminal and from background sources. In order to determine a change in percent HA for the receptors, baseline data retrieved from Plage-Sainte-Marguerite were assumed to be representative of all receptors.

Table 14.29 Background, Predicted and Cumulative Sound Pressure Levels for Model Receptors

Receptor	Background Sound Pressure Level (dB(A))		Predicted Operation Sound Pressure Level (dB(A))		Cumulative Sound Pressure Level (dB(A))	
	Day	Night	Day	Night	Day	Night
Sept-Îles	39	37	10	10	39	37
Marguerite Cabin	39	37	38	38	41	40
Plage-Sainte-Marguerite	39	37	24	24	39	37
Val Sainte-Marguerite	39	37	19	19	39	37
Baie des Sept-Îles	39	37	41	41	43	42
Cran-De-Fer	39	37	42	42	44	43
Ferland	39	37	34	34	40	39
On-Site	50	52	65	65	65	65

The operation of the port site and increased traffic of the railway increase noise levels from baseline levels (Table 14.30). Increases in percent HA do not, however, exceed the 6.5 percent threshold established by Health Canada for any dwellings.

Table 14.30 Baseline and Cumulative Predicted Acoustic Effects for Model Receptors

Receptor	Background Sound Levels		Cumulative Sound Levels		Change in Percent HA	Health Canada Criterion Met
	Ldn (db(A))	Percent HA	Ldn (dB(A))	Percent HA		
Sept-Îles	44	1.0	44	1.0	0.0	Yes
Marguerite Cabin	44	1.0	47	1.4	0.5	Yes
Plage-Sainte-Marguerite	44	1.0	44	1.0	0.0	Yes
Val Sainte-Marguerite	44	1.0	44	1.0	0.0	Yes
Baie des Sept-Îles	44	1.0	49	1.8	0.9	Yes
Cran-De-Fer	44	1.0	50	2.2	1.2	Yes
Ferland	44	1.0	45	1.2	0.2	Yes
On-Site	58	6.2	72	27.9	21.7	

Figure 14.12 presents the noise modelling results for the activities associated with the operations and maintenance phase, along the rail corridor and around the shipping Terminal.

Mitigation of Potential Environmental

Mitigation of noise emissions during operation and maintenance include, but are not limited to:

- Enclosing conveyors and conveyor transfer points; and,

- Vegetation buffers by minimizing the disturbed area.

14.6.2.4 Change in Vibrations

The Kami Terminal, including the rail line, is expected to be in operation for many years and therefore the rail line. The operation scenario describes the environment after the construction of the Kami Terminal is completed. The Kami Terminal is in the early stage of the design. The client and designers indicated the types of rail activities on the line. The number of trains and corresponding rail line usage (i.e., number of cars and number of trips) data were also provided.

Table 14.31 Planned Rail Traffic Data

	No. of Trains per Time Period	Time Period (hours)	No. of Locomotives per Train	No. of Cars per Train	Train Speed (km/hr)
Empty Freight Daytime	2.0	15	3	240	50
Empty Freight Night time	2.0	9	3	240	50
Full Freight Daytime	1.0	15	3	240	50
Full Freight Night time	1.0	9	3	240	50

Vibrations from rail line to a receptor depend on rail type (freight trains); speed, vehicle parameters, track conditions, receiver conditions etc. In the analysis, he following assumptions was made:

- Rail type – diesel powered locomotives;
- Speed – 50 km/hour or less;
- Wheels – worn or flat wheels will not be used and will be reasonably well maintained;
- Tracks - will be installed on ballast as typical of such applications;
- Rock layer – no continuous rock layer greater than 15 – 20 m found between rail track and receptor; and,
- Receivers - cabins are made of light weight structural elements which could amplify vibration.

Based on the above noted assumptions the following table provides the estimated vibration and ground-borne noise as calculated for a hypothetical receiver at 80 m from the track, and the results are shown in Table 14.32.

Figure 14.12 Noise Modeling Results for the Operations and Maintenance Phase

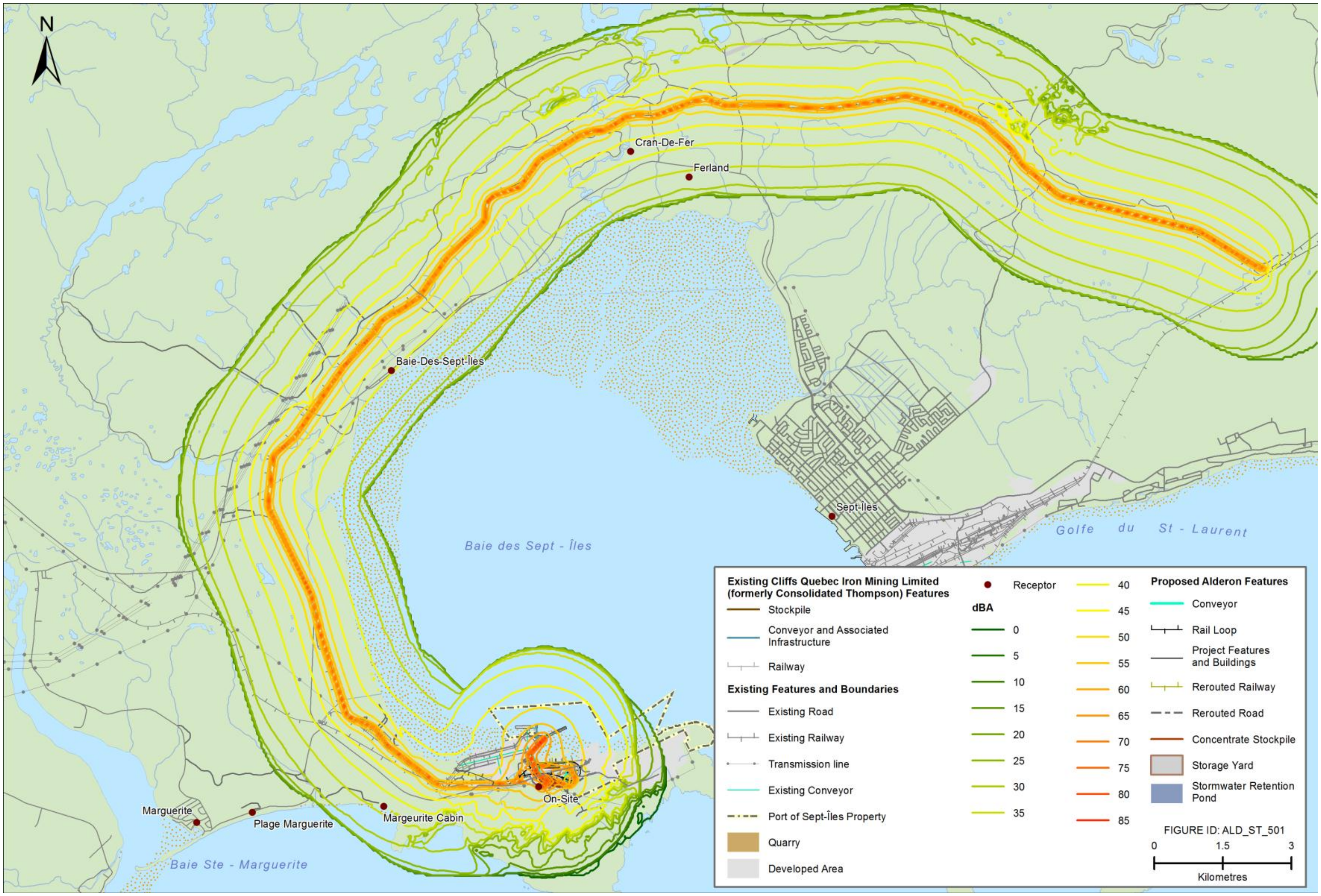


Table 14.32 Predicted Vibration and Ground-borne Noise

Receiver ID	Vibration (VdB) (ref 10-6 in /sec)	Vibration (VdB) (ref 5x10-8 m /sec)	Ground-borne Noise (ref 1x10-6 Pascals)
Typical	70.1	64.1	33.1

This result demonstrates that the estimated vibration and ground-borne noise will meet the criteria outlined in Table 14.8 at a distance of about 80 m. As the nearest receptors are of the order of 700 m, it is concluded that no perceptible effect is likely at that distance, or from 80 m further, and the impact of rail induced vibration will not be significant.

14.6.2.5 Change in Ambient Light Quality

The permanent lighting fixtures for the Kami Terminal will be of the full horizontal cut-off type, and the impact of the site lighting, given the use of these fixtures, distance, and topographic shielding, should be minimal. Lighting from trains in the Project is less easy to control, as safety and efficient operation will require effective lighting.

Mitigation of Potential Environmental Effects

The use of full horizontal cut-off fixtures will be important. Any fixtures that must illuminate laterally should be located on the south side of the Kami Terminal and pointed away from the baie des Sept-Îles.

Rail traffic will generally be shielded by vegetation and topography. Tree cover will be left in place where practicable to reduce the line-of-sight from nearby rural dwellings.

14.6.3 Decommissioning and Reclamation

14.6.3.1 Change in Air Quality

The emissions occurring during decommissioning and reclamation activities are expected to be small and of short duration, compared to those occurring during operation. Interactions ranked 1 in Table 14.13 could emit measurable but small quantities of air pollutants (e.g., exhaust gases or dust), but these pollutants should not exceed ambient regulatory standards. Activities associated with vehicle and machinery may result in local air contaminant emissions. Some of these air pollutant emissions will occur from gasoline and diesel fuel combustion and fugitive dust (e.g., CO, NO_X, SO_2, PM). These emissions are expected to occur only for short durations, will be local and will be low in magnitude.

Mitigation of Potential Environmental Effects

The mitigation measures that may be considered during the decommissioning and reclamation phase are the same as those mentioned for the construction phase with respect to road traffic:

- Use of an approved dust suppressant or road watering as needed, to limit dust emissions associated with truck traffic over unpaved areas; and,
- The speed of truck will be limited, in order to minimize the dust emissions.

14.6.3.2 Change in Greenhouse Gas Emissions

The decommissioning and reclamation activities listed in Table 14.13 are not likely to involve significant GHG emissions, with interactions ranked as 1.

Mitigation of Potential Environmental Effects

No mitigation measure is deemed necessary for GHG emissions.

14.6.3.3 Change in Acoustic Environment

Changes to the acoustic environment from decommissioning and reclamation of the Kami Terminal are expected to be similar in nature, magnitude and duration to the construction phase. The decommissioning and reclamation is therefore not expected to interact with the acoustic environment significantly.

Mitigation of Potential Environmental Effects

Mitigation of the decommissioning and reclamation for the port site are expected to be similar to procedures outlined in the construction phase. Mufflers, regular maintenance of vehicles or machinery will reduce noise emissions.

14.6.3.4 Change in Vibration Environment

Due to the relative isolation of the Kami Terminal, vibration effects due to decommissioning and reclamation are assumed to be similar to those of construction, and are therefore considered to be not significant.

14.6.3.5 Change in Ambient Light Quality

Lighting used in decommissioning is expected to be very similar to that used in construction.

Mitigation of Potential Environmental Effects

Similar guidelines with respect to portable lighting will be employed during decommissioning to reduce potential impacts. Activities will be temporary in nature, distant, and mostly shielded.

14.6.4 Summary of Residual Environmental Effects

Table 14.33 summarizes the residual environmental effects in relation to the atmospheric environment.

Table 14.33 Summary of Residual Environmental Effects of Kami Terminal: Atmospheric Environment

Kami Terminal Phase	Mitigation / Compensation Measures	Residual Environmental Effects Characteristics									Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental or Socio-Economic Context	Significance	Prediction Confidence	
Change in Air Quality											
Construction	• Use approved dust suppressant or road watering as needed. • Enforceable low speed standards on-site. • Use drilling machinery equipped with dust collector or water dust suppression. • Use CO monitors during blasting activities at nearby receptors. • Adjust blast surface as needed. • Enclose car-dumping in building equipped with dust collector. • Enclosed conveyors. • Equip transfer points with dust collectors. • Design stacker to include adjustable height. • Routine inspections of dust collectors. • Spraying water over ground surface to minimize wind erosion as needed.	A	M	L	ST	S	R	D	N	H	• Monitor CO emissions from blasting near Kami Terminal site with portable monitors. • Participate in air quality monitoring program initiated in Sept-Îles.
Operation and Maintenance		A	M	L	LT	R	R	D	N	H	
Decommissioning and Reclamation		A	L	S	ST	S	R	D	N	H	

Kami Terminal Phase	Mitigation / Compensation Measures	Residual Environmental Effects Characteristics									Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental or Socio-Economic Context	Significance	Prediction Confidence	
Change in Greenhouse Gas Emissions											
Construction	• Use low CO2 hydroelectricity for infrastructure operation	A	L	R	ST	S	R	D	L	H	• None
Operation and Maintenance		A	M	R	LT	R	R	D	M	H	
Decommissioning and Reclamation		A	L	R	ST	S	R	D	L	H	
Change in Acoustic Environment											
Construction	• Enclosing conveyors and conveyor transfer points; • Proper muffler installation. • Comprehensive and regular maintenance of vehicles. • Vegetation buffers by minimizing the disturbed area.	A	L	L	ST	R	R	D	N	H	• Noise monitoring
Operation and Maintenance		A	L	L	LT	C	R	D	N	H	
Decommissioning and Reclamation		A	L	L	ST	R	R	D	N	H	

Kami Terminal Phase	Mitigation / Compensation Measures	Residual Environmental Effects Characteristics: Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental or Socio-Economic Context	Significance	Prediction Confidence	Recommended Follow-up and Monitoring
Change in Vibrations											
Construction	• None recommended	A	L	S	ST	S	R	D	N	H	• None recommended
Operation and Maintenance		A	L	S	LT	S	R	D	N	H	
Decommissioning and Reclamation		A	L	S	ST	S	R	D	N	H	
Change in Ambient Light Quality											
Construction	• Use only as much lighting as is necessary • Use of full horizontal cut off light fixtures. • Locate lateral lighting fixtures on south side of facility. • Direct lateral lighting away from the baie des Sept-Îles. • Retain tree cover.	A	L	S	ST	S	R	D	N	H	• None recommended
Operation and Maintenance		A	L	L	LT	R	R	D	N	H	
Decommissioning and Reclamation		A	L	S	ST	S	R	D	N	H	

Kami Terminal Phase	Mitigation / Compensation Measures	Residual Environmental Effects Characteristics									Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental or Socio-Economic Context	Significance	Prediction Confidence	

KEY

Direction:
P Positive.
A Adverse.
N Neutral.

Magnitude:
N Negligible: no measurable adverse effect anticipated;
L Low: effect occurs that is detectable but is within normal variability of baseline conditions;
M Moderate: effect occurs that would cause an increase with regard to baseline but is within regulatory limits and objectives;
H High: effect occurs that would singly or as a substantial contribution in combination with other sources cause exceedances of objectives or standards beyond the Project boundaries.

Geographic Extent:
S Site-specific: effect restricted to the Project footprint within the LSA.
L Local: within the LSA.
R Regional: within the RSA.
G Global*: Provincial, National or Global scale (GHG Emissions only).*

Duration:
Author to use quantitative measure; or
ST Short term: effect occurs for less than three years
MT Medium term: effect occurs for between 3 and 15 years;
LT Long term: effect persists beyond 15 years.

Frequency:
Author to use quantitative measure; or
O Once: effect occurs once;
S Sporadic: effect occurs at sporadic intervals;
R Rarely: effect occurs on a regular basis and at regular intervals; or,
F Frequently: effect occurs continuously throughout the Project life.

Reversibility:
R Reversible.
I Irreversible.

Environmental or Socio-economic Context:
U Undisturbed: Area relatively or not adversely affected by human activity.
D Developed: Area has been substantially previously disturbed by human development or human development is still present.
N/A Not Applicable.

Significance:
S Significant.
N Not Significant.

Significance (GHG only):
L less than 10^5 t CO_2eq per annum.
M between 10^5 t and 10^6 CO_2eq per annum .
H greater than 10^6 t CO_2eq per annum.

Prediction Confidence:
Based on scientific information and statistical analysis, and effectiveness of mitigation or effects management measure.
L Low level of confidence.
M Moderate level of confidence.
H High level of confidence.

14.7 Assessment of Cumulative Effects

14.7.1 Air Quality

The Kami Terminal will take place in an area that is already designated for similar industrial or boat loading activities. The immediate neighbors include Cliffs / Wabush Mines' pellet plant, the Alouette aluminum smelter and the Cliffs / Bloom Lake iron concentrate ship loading facilities. Other industrial activities in the sector include the IOCC shipping and receiving Terminal located near residential areas on the east side of Sept-Îles, as well as the Port-Cartier iron pellet plant operated by ArcelorMittal.

Although the Kami Terminal will generate some dust, the nature of the activities as well as the integration of mitigation measures in the facility's design implies that the estimated annual emission will be significantly lower than those already occurring in the region (at most 1 percent of total particulate matters emissions from the two immediate neighbors, and even less when considering other industrial activities conducted by ArcelorMittal and IOCC, as well as non-industrial activities such as wood heating).

A quantitative assessment of the cumulative effects was not done as part of this study, but the small share of Alderon in overall regional emissions indicates that the impact of additional emissions will be close to neutrality. Also, the analysis of the modelling results was done by considering the background that is prescribed in QCAR, which is a way to consider the cumulative effects of a project. For TPM and $PM_{2.5}$, the background of 90 $\mu g/m^3$ and 20 $\mu g/m^3$ represent respectively 75 percent and 67 percent of the 24-hour criteria, which implies that the regulation asks any developer to consider that the current ambient air quality is already affected significantly by other contributions. The data presented in Table 14.16 regarding the air quality in Sept-Îles tends to support the fact that the prescribed background for $PM_{2.5}$ is conservative. For TPM, with the exception of monitoring stations located at the east end of the city, the prescribed background is also conservative.

Figures 14.13 and 14.14 present the cumulative effects associated with the Kami Terminal on the TPM and $PM_{2.5}$ 24-hr criteria, when adding the prescribed background, and by using the worst-case scenario in terms of fugitive emissions from the concentrate stockpile.

With respect to the transportation of the concentrate by rail, the additional traffic associated with the Kami Terminal will not increase ambient air concentrations, but instead increase the frequency to the short-term emissions resulting from the passages of trains.

Figure 14.13 Maximum TPM 24-hour Concentration and 90 µg/m³ Background (µg/m3)

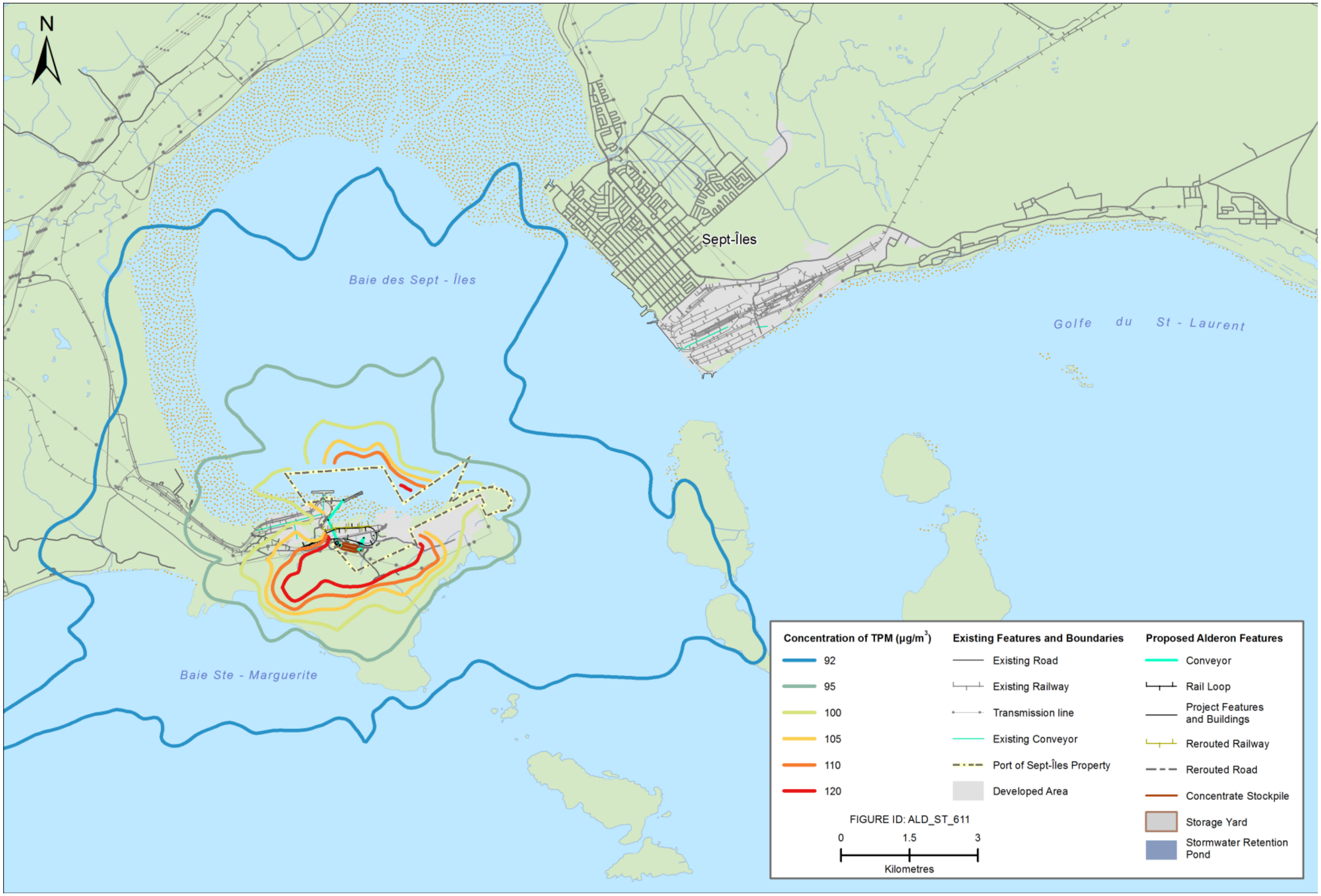
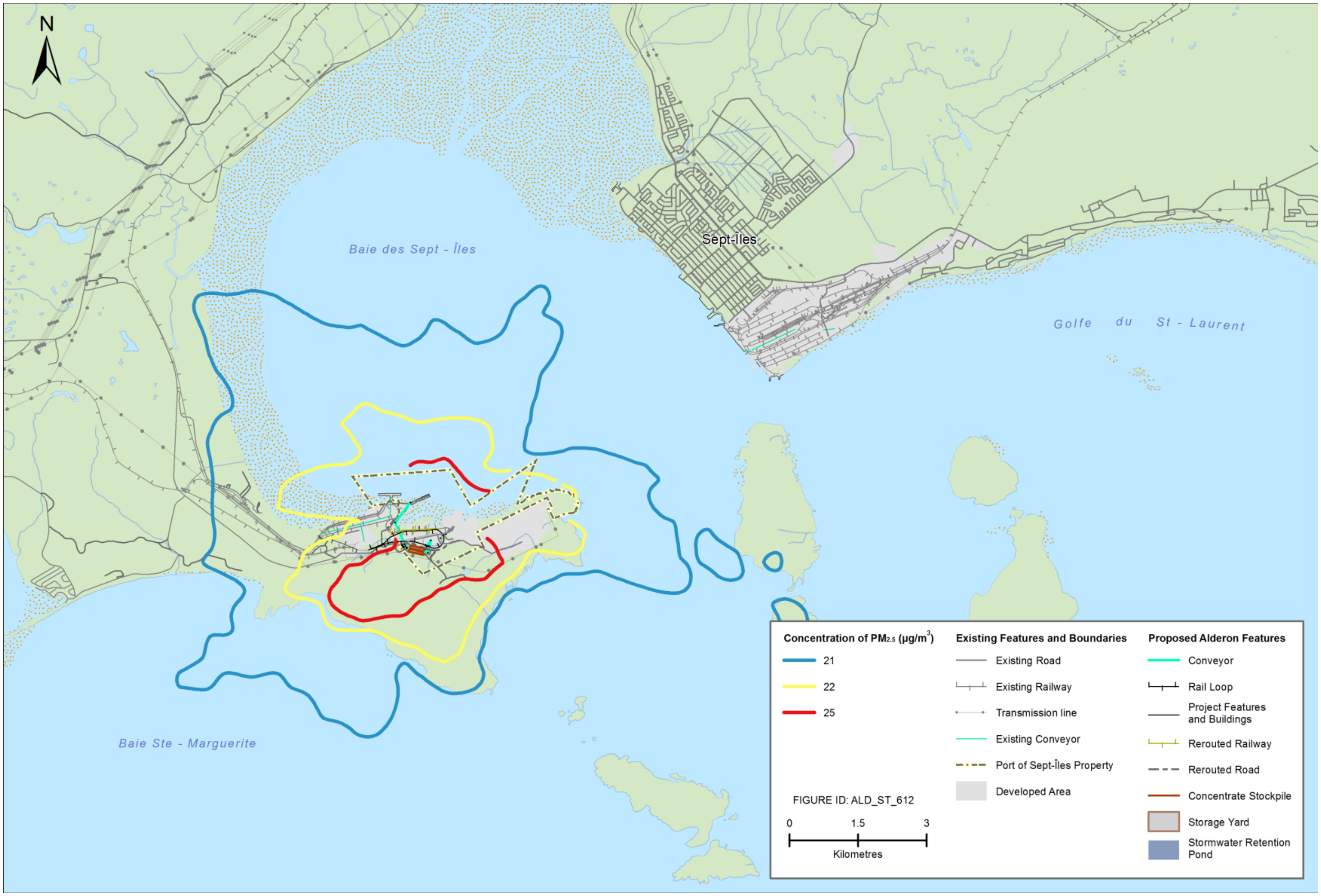


Figure 14.14 Maximum $PM_{2.5}$ 24-hour Concentration and 20 $\mu g/m^3$ Background ($\mu g/m3$)



14.7.2 Greenhouse Gas Emissions

The cumulative effects of the Kami Terminal on GHG emissions are mainly associated with the consumption of diesel for the locomotives. Because GHG emissions are related to climate change and part of a global issue, the cumulative effects should be looked at in the context of overall provincial and national emissions. When considering the provincial and national total GHG emissions for 2010, as presented in Table 14.19, it is concluded that the Kami Terminal will represent respectively less than 0.01 percent of the provincial total GHG emissions, and less than 0.001 percent of the national total GHG emissions.

In addition, a cap-and-trade program is being implemented in Québec, and will include transportation in 2015. The consumption of diesel in the locomotives will become subject to the tax imposed by the distributors, to fulfill their obligation towards the cap-and-trade program.

14.7.3 Acoustic Environment

The cumulative effects on the acoustic environment of dwellings and other sensitive receptors -- such as hospitals, schools, or places of worship--include noise emissions from the Kami Terminal and all other currently operational and/or proposed activities. The incremental addition of projects in an area can alter the original desired acoustic environment beyond what would be detected on a project-by-project analysis.

The concentrate unloading, stacking, storage and reclaiming facilities and associated rail infrastructure at the Kami Terminal site is adjacent to an existing dock facilities operated by Cliffs and IOCC, and in the vicinity of Sept-Îles and Val Sainte-Marguerite. Several rural dwellings are located near the port site. The existing railway from the QNS&L junction to the port site also passes by several suburban areas.

The existing port site operated by IOCC and Cliffs and their associated rail traffic could potentially interact acoustically with the Kami Terminal site. No data exist which indicate the sound levels before the development of the ports, however, baseline studies inherently incorporate the sound levels from all nearby sources experienced by sensitive receptors. Baseline monitoring conducted for urban areas and cabin dwellings near the port site indicated daytime and night time sound pressure levels ranging from 39-52 and 37-50 dB(A), respectively. Noise modeling results indicated the residual impact on the acoustic environment by the port site and railway expansion indicated a negligible increase in sound pressure for all sites.

In all cases, the Health Canada criteria and Québec noise guidelines were not exceeded. Therefore, the cumulative impacts of noise emissions from the Kami Iron Ore Mine site on the acoustic environment are found to be not significant.

14.7.4 Vibrations

Ground borne vibration propagating from the site can cause annoyance by through building displacement or low-frequency noise, or cause structural damage in extreme cases. Vibrations from construction activities at the port site are expected to be rare in frequency, short in duration, and local in extent, and are therefore deemed to be not significant, and unlikely to interact with vibration sources from the Cliffs or IOCC port sites significantly.

Vibrations effects from the railway were shown to be insignificant in Section 14.6.2. Adverse vibration effects rapidly decrease with distance, and are negligible beyond 75 m. The closest dwelling to the port site is over 700 m away, and is therefore not expected to experience any vibration emissions from any of the three port sites. Therefore, the cumulative effects of vibrations are deemed not significant.

14.7.5 Light

Poorly designed lighting can lead to circumstances of obtrusive or hazardous light emissions, and can substantially increase the presence of light in the night sky. The night sky and unobtrusive lighting which does not impair the safety of nearby residence or sensitive receptors are to be achieved from the Kami Terminal and all surrounding projects.

Sept-Îles would be considered an E4 setting, with many sources of light disturbing the night sky. Rural dwellings on the other side of the bay are better classified as an E2. Existing light emissions from the Cliffs and IOCC port sites will act cumulatively with the Kami port site.

Glare and light trespass emissions are extremely localized, and are unlikely to interact with other developments in the surrounding environment due to topographic and vegetative shielding. Careful positioning of lamps, work lighting, and building lights which avoid roadways or other pathways, and using topography and vegetation strategically will mitigate adverse light emissions.

Sky glow is the most likely interaction between the three ports. Use directional lightings to limit light spill are effective measures to preserve the night sky inherent to rural dwellings.

The localized nature of glare and trespass combined with available mitigation indicate that their cumulative effects with other active or proposed projects will not be significant. When incorporating effective technology to mitigate the cumulative effects of the Kami Terminal on sky glow, the effects are found to be not significant.

A summary of cumulative effects is presented in Table 14.34.

Table 14.34 Summary of Potential Cumulative Effects on the Atmospheric Environment

VEC Existing Condition (Past & On-Going Activities)	• The Kami Terminal will take place in an area that is already characterized by ship loading activities or industrial activities, and dust emissions already occur. • Light levels in surrounding areas are typical of urban areas (CIE E4 designation), ranging from 14.87 – 19.21 mag/arcsec^2. • Vibrations from existing development and rail traffic minor and extremely localized. • Sound pressure levels typical of urban environments for nearby receptors, and range from 37 – 50 dB.		
Kami Terminal Residual Environmental Effects	• Air emissions from the Kami Terminal, mainly dust, will affect air quality in the immediate vicinity of the site, and occasionally, exceedances of the air quality criteria may occur over sea, or over uninhabited area, or within the Pointe-Noire industrial sector. Mitigation measures are integrated in the design to minimize emissions. • Kami Terminal infrastructure will be a potential source of sky glow, and also a source of noise at the port and along the Arnaud railway. Vibrations are not expected to be significant. • Mitigation of noise emissions include enforceable low speed standards on-site, coverings for conveyors on site, and regular maintenance on all port and rail infrastructure. Mitigation of sky glow can be achieved with directional lighting fixtures.		
Other Projects / Activities	**Likely Effect Interaction (Y/N)**	**Rationale**	**Cumulative Effects**
Pointe-Noire Port Expansion (Port of Sept-Îles)	Y	• The Kami Terminal will be made possible by the expansion of the Port of Sept-Îles. • Direct overlap of noise and sky glow emissions.	• The loading of ships may generate some dust emissions. The loading of ships is intermittent and modern loading facilities normally incorporate mitigation measures to minimize emissions. • Baseline measurements capture current light and noise emissions from Pointe-Noire. • With mitigation, light emissions will amount to a negligible increase in cumulative emissions at Pointe-Noire. • Noise emissions will be negligible from Kami port site to nearby receptors, falling below current baseline measurements.

CFA and QNS&L	Y	• The railroad lines already exist, and will be used to move the concentrate from the Kami Terminal. • Potential overlap of noise emissions on railway.	• The magnitude of the effects will not increase, but the frequency will do so, as a result of the more frequent passages of train. • Baseline measurements capture current noise emissions from current Arnaud rail operations. • Noise emissions will be negligible from railway traffic associated with Kami mine to nearby receptors, falling below current baseline measurements
Alouette Aluminum Smelter (Aluminerie Alouette)	Y	• The aluminum smelter is considering an expansion (project announced in the fall of 2011). • Direct overlap of noise and sky glow emissions.	• The smelter emits air contaminants, including particles (see Table 14.17) and GHG emissions. Potential emissions from the Kami Terminal are significantly lower. • Baseline measurements capture current light and noise emissions from Alouette. • With mitigation, light emissions will amount to a negligible increase in cumulative emissions. • Noise emissions will be negligible from Kami port site to nearby receptors, falling below current baseline measurements.
Second Port-Cartier Pellet Plant (ArcelorMittal)	N	• Despite the fact that ArcelorMittal is considering an expansion of its Port-Cartier pellet plant, the distance with the Kami Terminal (30 km) reduces the potential for interaction.	• No cumulative effect expected with Kami for VEC.
Bloom Pointe-Noire Terminal (Cliffs Resources)	Y	• Cliffs operates a shipping Terminal similar to the one envisioned by Alderon and is currently in the process of doubling its size. • No interaction to Port-Cartier due to distance for noise, light and vibations.	• The activities at the Lake Bloom / Cliffs Terminal are similar to the Kami Terminal, and may involve dust and GHG emissions (no published report exists) in the same order of magnitude, i.e. lower than other major industrial activities. • Baseline measurements capture current noise emissions from current Arnaud rail operations. • Noise emissions will be negligible from railway traffic associated with Kami mine to nearby receptors, falling below current baseline measurements.

<table>
<tr><td rowspan="1">Arnaud Apatite-Magnetite Mine (Mine Arnaud)</td><td>Y</td><td colspan="3">Yara International and Investissement Québec are proposing the establishment of an apatite mine, a product that is used as a fertilizer. The project is at the planning stage, and would be located between the access to the Marconi Peninsula and the city of Sept-Îles.
Potential overlap of noise emissions on railway.</td><td colspan="4">The Arnaud mine would be generating atmospheric emissions, including TPM, PM10 and PM2.5 and GHG emissions. Potential emissions from the proposed Arnaud mine would be significantly more important than those associated with the Kami Terminal.
Baseline measurements capture current noise emissions to nearby receptors.
Noise emissions will be negligible from railway traffic and port activities associated with Kami mine to nearby receptors, falling below current baseline measurements.</td></tr>
<tr><td rowspan="2">Cumulative Effects Summary (Kami Terminal+ All Relevant Projects / Effects)</td><td>Direction</td><td>Magnitude</td><td>Geographic Extent</td><td>Duration</td><td>Frequency</td><td>Reversibility</td><td>Significance</td><td>Confidence</td></tr>
<tr><td>A</td><td>M</td><td>L</td><td>ST</td><td>S</td><td>R</td><td>D</td><td>H</td></tr>
<tr><td colspan="9">The Kami Terminal will take place in an area that is already subject to industrial activities, generating a variety of air contaminants, including dust (TPM, PM_{10} and $PM_{2.5}$), and contributing to ambient noise, light, and vibration levels. New or expanded activities are foreseen in the future. Atmospheric emissions associated with the Kami Terminal are small compared to the other local sources. With respect to air quality, the cumulative effects were taken into account by considering the background prescribed in the provincial Clean Air Regulation. New emission limits introduced in the Clean Air regulation may lead to some improvements for the existing industrial activities in the coming years.
Note: Environmental effects descriptors and their definitions are as used in the assessment of environmental effects (See Table 14.33).</td></tr>
</table>

14.8 Assessment of Accidents and Malfunctions

Accidents and malfunctions are unplanned events during any phase of the Kami Terminal incurring adverse effects on the atmospheric environment through increased air contaminants, noise, vibration or light emissions. Accidents and malfunctions can result even with the best planning, mitigation, and operational procedures in place. A full assessment of the atmospheric environment must therefore include an evaluation of worst-case scenarios of plausible malfunctions and accidents for the Sept-Îles port expansion and storage facility.

The following possible accidents and malfunctions include:

- Forest fire; and,
- Train derailment.

No interactions were identified between a stormwater retention pond breach and the atmospheric environment (interaction raked as 0 in Table 14.13).

Forest Fire

The Kami Pointe-Noire Terminal is located next to a forest area. Although unlikely, Kami Terminal activities involving the use of heat or flame could result in a fire. The extent and duration of a resulting fire would be dependent on response efforts and meteorological conditions. However, generally speaking it is likely to be relatively easy to control given the shape of the peninsula and short response time owing to continuous human presence at the port. Emergency response measures in case of a fire will be integrated into the existing Port of Sept-Îles, the City of Sept-Îles and the *Société de protection des forêts contre le feu* (Sopfeu) Emergency Response Plans.

No significant interactions were identified with acoustic, vibration and light environments.

Train Derailment

It should be pointed out that Alderon will not operate the railroad lines, but obtain the service from two service providers, QNS&L and CFA, so it relies on these two companies to ensure that the risks of train derailments are minimized.

Derailments could involve trains which are either empty or containing iron ore concentrate from the Kami Mine site. At maximum output, two 240-car trains carrying up to 26,000 tonnes of ore concentrate each will be transported daily. A train derailment could result in the depositing of iron ore concentrate on the ground. Based on experience with other train derailments on the QNS&L railroad, the reasonable worst-case is the loss of 75 cars in a derailment, or approximately 8,125 tonnes of iron ore concentrate.

A train derailment would involve a sudden and large increase in noise emissions during the actual derailment. Subsequent noise emissions would originate from heavy machinery used in the clean-up. Noise emissions and the potential for fugitive dust emissions would last until completion of the clean-up. GHG emissions would result from the use of equipment powered with fossil fuels, such as diesel.

Noise emissions can be mitigated through regular maintenance of clean-up machinery. Enforcing reduced operating speeds and reducing the frequency of machinery activating back-up alarms through efficient site planning will also reduce noise emissions from a derailment.

No interactions were identified with vibration and light environments.

The results of the assessment of potential environmental effects of accidents and malfunctions are summarized in Table 14.35.

14.9 Determination of Significance of Residual Adverse Environmental Effects

The significance of each effect will be determined for each phase.

14.9.1 Determination of Significance of Project Effects

Air Quality

Construction activities will generate some air contaminants, but the impacts will be limited to the LSA. The inclusion of mitigation measures will reduce the potential for concerns outside of the property. The effects to air quality are therefore expected to not be significant.

During the operation phase, some emissions will be associated with the transportation of concentrate by rail, and to handling and storage at the site. The dispersion model indicates that the sector likely to be affected by the Kami Terminal's emissions is close to the site, in industrialized or uninhabited lands zoned for industrial uses. The frequency of occurrence for higher concentrations is low. Mitigation measures were integrated to the design of the Kami Terminal. The effects to air quality are therefore expected to not be significant.

Decommissioning and reclamation activities are expected to be similar in all respects to the construction phase, and are also unlikely to be significant for the air quality.

Table 14.35 Summary of Residual Environmental Effects for Atmospheric Environment – Accidents and Malfunctions

Accident / Malfunction	Mitigation / Compensation Measures	Residual Environmental Effects Characteristics									Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental or Socio-Economic Context	Significance	Prediction Confidence	
Change in Air Quality											
Forest Fire	n/a	N	N	S	ST	S	R	D	N	H	
Train Derailment	• Regular Vehicle Maintenance • Efficient Route Planning	A	M	S	ST	S	R	D	N	H	
Change in Greenhouse Gas Emissions											
Forest Fire	• Emergency Protection Plan	A	L	R	ST	S	R	D	N	H	
Train Derailment	• Regular Vehicle Maintenance • Efficient Route Planning	A	L	R	ST	S	R	D	L	H	
Change in Acoustic Environment											
Train Derailment	• Regular Vehicle Maintenance • Efficient Route Planning	A	L	L	ST	S	R	D	N	H	

Accident / Malfunction	Mitigation / Compensation Measures	Residual Environmental Effects Characteristics									Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental or Socio-Economic Context	Significance	Prediction Confidence	

KEY

Direction:
- P Positive.
- A Adverse.
- N Neutral.

Magnitude:
- N Negligible: no measurable adverse effect anticipated;
- L Low: effect occurs that is detectable but is within normal variability of baseline conditions;
- M Moderate: effect occurs that would cause an increase with regard to baseline but is within regulatory limits and objectives;
- H High: effect occurs that would singly or as a substantial contribution in combination with other sources cause exceedances of objectives or standards beyond the Project boundaries.

Geographic Extent:
- S Site-specific: effect restricted to the Project footprint within the LSA.
- L Local: within the LSA.
- R Regional: within the RSA.
- G Global*: Provincial, National or Global scale (GHG Emissions only).*

Duration:
Author to use quantitative measure; or
- ST Short term: effect occurs for less than three years;
- MT Medium term: effect occurs for between 3 and 15 years;
- LT Long term: effect persists beyond 15 years.

Frequency:
Author to use quantitative measure; or
- O Once: effect occurs once;
- S Sporadic: effect occurs at sporadic intervals; intervals;
- R Rarely: effect occurs on a regular basis and at regular intervals; or,
- F Frequently: effect occurs continuously throughout the Project life.

Reversibility:
- R Reversible.
- I Irreversible.

Environmental or Socio-economic Context:
- U Undisturbed: Area relatively or not adversely affected by human activity.
- D Developed: Area has been substantially previously disturbed by human development or human development is still present.
- N/A Not Applicable.

Significance:
- S Significant.
- N Not Significant.

Significance (GHG only):
- L less than 10^5 t CO_2eq per annum.
- M between 10^5 t and 10^6 CO_2eq per annum.
- H greater than 10^6 t CO_2eq per annum.

Prediction Confidence:
Based on scientific information and statistical analysis and effectiveness of mitigation or effects management measure.
- L Low level of confidence.
- M Moderate level of confidence.
- H High level of confidence.

Greenhouse Gas Emissions

Construction activities will generate some GHG emissions, but the quantities will be small and typical of any construction activity. The effects are therefore expected to not be significant.

During the operation phase, the majority of the GHG emissions will be associated with the transportation of the iron concentrate from the mine to the Kami Terminal. The significance of GHG emissions, when using the criteria provided in CEAA guidance is medium, because they will be between 10^5 and 10^6 metric tons per year.

GHG emissions will be governed by the Québec cap-and-trade program, which will include transportation starting in 2015. In terms of GHG emissions, rail is the most efficient mean of transportation over land.

When considering Québec's cap-and-trade program, which aims at a global reduction of Québec's GHG emissions, the effects on GHG emissions are expected to not be significant.

Acoustic Environment

Construction activities are expected to be short in duration, limited to the LSA, and rare in frequency. The effects to the acoustic environment are therefore expected to not be significant.

Kami Terminal operations and maintenance were modeled to assess the potential effects on the acoustic environment during the lifetime of the project. While measureable increases in sound pressure level occur for some nearby sensitive receptors, the increases do not exceed Health Canada percent HA criteria, and are therefore expected to be not significant for the acoustic environment.

Decommissioning and reclamation activities are expected to be similar in all respects to the construction phase, and are also unlikely to be significant for the acoustic environment.

Vibration Environment

Construction activities are expected to be short in duration, limited to the LSA, and rare in frequency. The effects to the vibration environment are therefore expected to not be significant.

Vibration modeling carried out at the Kami Terminal site showed no significant increase in vibrations for nearby dwellings during the operational phase. The effects of the Kami Terminal on the vibration environment during the operational and maintenance phase are therefore expected to be not significant.

Decommissioning and reclamation activities are expected to be similar in all respects to the construction phase, and are also unlikely to be significant for the vibration environment.

Light Environment

Construction activities are expected to be short in duration, limited to the LSA, and rare in frequency. The effects to the light environment are therefore expected to not be significant.

Sky glow was identified as a potential effect of the light environment during the operational and maintenance phase. Proposed mitigation will reduce light spill, glare, and sky glow to negligible levels within the LSA. The effect of the Kami Terminal on the light environment during the operational and maintenance phase is therefore expected to be not significant.

Decommissioning and reclamation activities are expected to be similar in all respects to the construction phase, and are also unlikely to be significant for the light environment.

14.9.2 Determination of Significance of Cumulative Effects

Air Quality

The Kami Terminal will take place in an area that is already subject to industrial activities, generating a variety of air contaminants, including dust (TPM, PM_{10} and $PM_{2.5}$). Some new or expanded activities are foreseen in the future. Atmospheric emissions associated with the Kami Terminal are very small compared to the other local sources of air contaminants. With respect to air quality, the cumulative effects were taken into account by considering the background prescribed in QCAR. New emission limits introduced in QCAR may lead to some improvements for the existing industrial activities in the coming years. The effects are therefore expected to not be significant.

Greenhouse Gas Emissions

GHG emissions are considered to be a global issue, and this needs to be assessed by considering the provincial or national picture. In Québec, a cap-and-trade program was launched in 2011, and will be gradually implemented over the next few years. Significant sources, i.e. emitting more than 25 000 t per year of CO_2e will have to reduce their emissions, or compensate them through the purchase of credits originating from jurisdictions participating to the Western Climate Initiative (WCI) program (Québec and California, for the time being).

GHG emissions associated with the on-going activities or proposed projects in the region of Sept-Îles are vary from low (less than 10^5 t CO_2eq per annum) to high (greater than 10^6 t CO_2eq per annum). Again, by considering this cap-and-trade program, which aims at a global reduction of Québec's GHG emissions, the cumulative effects associated with the other projects in the Sept-Îles area are therefore expected to not be significant.

Acoustic Environment

Ambient noise levels were assessed, and inherently incorporate existing noise levels and their effect on nearby dwellings and sensitive receptors. Noise emissions do overlap with existing infrastructure, but the increase in noise is not significant. Future developments would also result in a negligible increase in noise due to the separation distances involved.

The residual cumulative effect of the Kami Terminal on the noise environment is therefore expected to be not significant.

Vibration Environment

Vibrations from existing projects do overlap with the proposed Kami Terminal site. Vibrations from the Kami Terminal are not expected to be significant. Due to the extremely localized nature of vibration effects, the cumulative effects on existing or proposed developments are expected to be not significant.

Light Environment

Proposed mitigation for the Kami Terminal site will result in negligible changes in light spill, light glare, or sky glow within the LSA. The cumulative effects of the Kami Terminal and other proposed or existing projects on the light environment are therefore expected to be not significant.

14.9.3 Determination of Significance of Accidents and Malfunctions

Air Quality

Emissions of air contaminants associated with accidents and malfunctions will be small and localized, and for short durations. The effects are therefore expected to not be significant.

Greenhouse Gas Emissions

GHG emissions associated with accidents and malfunctions will be small. The effects are therefore expected to not be significant.

Acoustic Environment

Noise emissions from clean-up will be of similar magnitude as those during construction. Emissions will be temporary, short-term in duration, local in geographic extent, and will cease at the conclusion of the clean-up.

14.9.4 Overall Residual Effects Conclusion

In summary, given the planned mitigation, and the analyses presented in this assessment, the effects of the change in air quality, change in greenhouse gas emissions, change in the acoustic environment, change in vibration and change in lighting on the Atmospheric Environment as a result of the construction, operation and decommissioning of the Kami Terminal, including cumulative effects, are not likely to be significant. The effects of accidents and malfunctions are not likely to be significant.

14.10 Follow-Up and Monitoring

Air Quality

During the construction phase, it is recommended to monitor the impact of blasting on air quality near the Kami Terminal's site, in relation to carbon monoxide (CO), by using portable monitors.

During the operations, Alderon will participate in the air quality monitoring program initiated in Sept-Îles.

Greenhouse Gas Emissions

No follow-up or monitoring is recommended. The majority of the GHG emissions resulting from the Kami Terminal are associated with the transportation of the iron concentrate by rail. Because transportation will be done by third parties (CFA and QNS&L), Alderon will not directly control this activity.

Acoustic Environment

Noise monitoring plans will be developed in consultation with regulatory authorities prior to the start of construction as part of the EMP.

Vibration Environment

No follow-up or monitoring is recommended.

Light Environment

No follow-up or monitoring is recommended.

14.11 Next Steps

No data collection is justified for the Atmospheric Environment prior to the construction.

14.12 Summary

Given the planned mitigation, and the analyses presented in this assessment, the potential change in Atmospheric Environment as a result of the Kami Terminal during all phases, including cumulative effects, are rated not significant.

15.0 LANDFORMS, SOILS, SNOW AND ICE

Landforms, Soils and Snow, and Ice is listed as a VEC in the EIS guidelines. The rational for inclusion is the potential for interactions between landforms, soils, snow and Ice with Kami Terminal activities. Sensitive landforms and landforms that serve as wildlife habitat, terrain stability, soil quality and quantity, Kami Terminal effects on snow and ice as well as acid rock drainage and metal leaching (ARD/ML) are indicated as discussion points for the assessment.

Guideline items that are related to Landforms, Soils, Snow, and Ice are presented in Table 15.1 along with the location of the required information in the EIS as applicable to activities at the Kami Terminal.

Table 15.1 Guideline Items for Kami Terminal Related to Landforms, Soils, Snow, and Ice

Requirements from the Guidelines on Landforms, Soils, Snow, and Ice	Location of Information in the EIS and Comments
Potential Project-VEC interactions include ARD/ML arising from Project activities.	This information is presented in **Section 16.6** as part of the VEC on water resources.
Potential Project-VEC interactions include impacts to the quality and quantity of soils.	Surficial deposits within the PDA have been perturbed in the past because of industrial activity. Natural soils undisturbed soils are virtually absent from the Kami Terminal area apart from the hillside where part of the unloading, stacking, storage and reclaiming facility will be located.
Potential Project-VEC interactions include effects on snow and ice.	Early ice breakup is not considered to be an issue since there are no natural lakes that could freeze-up within the PDA or within a reasonable distance from the PDA that could also be affected by dust particles becoming airborne because of Kami Terminal activities.
Potential Project-VEC interactions include impacts of landform and soils on the Project.	There are no sensitive landforms within the PDA. Information on surficial materials are described below in **Section 15.1**.
The description of the existing environment in the EIS shall include existing unique or valuable landforms (e.g., eskers, fragile landscapes, wetlands), including details regarding their ecological function and distribution in the LSA.	There are no sensitive or valuable landforms within the PDA.
The description of the existing environment in the EIS shall include geomorphology and topography at areas proposed for construction of major Project components, including the type, thickness and distribution of soils.	See information in **Section 15.1.**
The description of the existing environment in the EIS shall include bedrock lithology, morphology, geomorphology and soils where earthworks are proposed.	See information in **Section 15.1.**

Requirements from the Guidelines on Landforms, Soils, Snow, and Ice	Location of Information in the EIS and Comments
The description of the existing environment in the EIS shall include potential for ground and rock instability (e.g., slumping, landslides and potential slippage) at areas planned for Project facilities and infrastructure.	See information below in **Section 15.1.**
The description of the existing environment in the EIS shall include suitability of topsoil and overburden for use in the re-vegetation of surface-disturbed areas.	Alderon has indicated that it intends to transfer its infrastructure to the Sept-Îles Port Authority or to a third party after having cleaned-up the site. In the specific case of the Kami Terminal infrastructure, reuse of soil (including humus layers and organic soils) is not anticipated.
The description of the existing environment in the EIS shall include sites of paleontological or paleobotanical significance.	The area does not contain any sites with paleobotanical or paleontological significance.
If there is a potential ARD/ML to occur as a result of the Project, the EIS should include an investigation of the associated potential from overburden, mine waste rock, ore, and tailings. This investigation should include population assessments for each lithological / alteration / waste management unit. Assessments should account for vertical and horizontal distribution, as well as sampling biases, to proper characterization over the unit's range of variability.	See information in **Section 16.6.**
If there is a potential for ARD/ML to occur as a result of the Project, the EIS should include an investigation of the associated potential from overburden, mine waste rock, ore, and tailings. This investigation should include a chronology of ARD/ML investigations and the design of an ARD/ML characterization program, including all static and kinetic test work conducted to date. The rationale, advantages and disadvantages of, detailed description, sample selections and methodology for all test work.	See information in **Section 16.6.**
If there is a potential for ARD/ML to occur as a result of the Project, the EIS should include an investigation of the associated potential from overburden, mine waste rock, ore, and tailings. This investigation should include predictions of the ARD/ML potential of all materials (bedrock and surficial) to be disturbed or created during all phases (construction, operation, decommissioning, reclamation and post-closure) of the proposed Project. This must include estimation of risk for the onset of ARD for each lithological / alteration / waste management unit and mine component, metal leaching and the predicted drainage chemistry for each mine component, including the types and concentrations of major trace elements.	See information in **Section 16.6.**

Requirements from the Guidelines on Landforms, Soils, Snow, and Ice	Location of Information in the EIS and Comments
If there is a potential for ARD/ML to occur as a result of the Project, the EIS should include an investigation of the associated potential from overburden, mine waste rock, ore, and tailings. This investigation should include clear, concise cross-sections which relate the ARD/ML assessment (static / kinetic sample locations and results), geology and development plans.	See information in **Section 16.6.**
In conducting the analysis, the EIS shall consider pertinent acts, policies, guidelines and directives. The EIS shall provide a description of measures to mitigate effects and list potential residual effects and their significance. The discussion should include a list of rehabilitation measures for borrow sources.	The hillside where the existing road and future unloading, stacking, storage and reclaiming facility will be located will need to be levelled. This implies cut and fill of the existing terrain via the use of specialised blasting techniques. Material generating from blasting will be crushed and used for construction purposes. Excess material will be stored within the rail loop and will be available for use for other projects, if needed.
In conducting the analysis, the EIS shall consider pertinent acts, policies, guidelines and directives. The EIS shall provide a description of measures to mitigate effects and list potential residual effects and their significance. The discussion should include a list of an erosion and sediment control plan.	The Kami Terminal EPP will list measures to control erosion. Surficial materials in the PDA are not erosion prone (see below **Section 15.1**).
In conducting the analysis, the EIS shall consider pertinent acts, policies, guidelines and directives. The EIS shall provide a description of measures to mitigate effects and list potential residual effects and their significance. The discussion should include a list of measures to mitigate changes to local drainage patterns.	This information is available in **Chapter 16**.
Specifically, the EIS shall discuss the general impact on landform as a result of Project development, borrow resource extraction, with a focus on sensitive landforms, and those serving as wildlife habitat.	The hillside where the existing road and future unloading, stacking, storage and reclaiming facility will be located will need to be levelled. This implies cut and fill of the existing terrain via the use of specialised blasting techniques. Material generating from blasting will be crushed and used for construction purposes. Excess material will be stored within the rail loop and will available for use for other projects, if needed. There are no sensitive landforms serving as wildlife habitats.
Specifically, the EIS shall discuss the implications to the Project planning and design of baseline information related to terrain conditions.	See information below in **Section 15.1**
Specifically, the EIS shall discuss the potential impacts on the stability of terrain in the vicinity of the Project facilities and infrastructure. Discussion should focus on the potential impacts arising from surface disturbance due to construction (e.g., overburden stripping, cuts / fills), and any associated implications for Project design and management of Project components, including railway embankments, access roads, watercourse crossings, ore / waste rock piles, etc.).	See information in **Section 15.1.**

Requirements from the Guidelines on Landforms, Soils, Snow, and Ice	Location of Information in the EIS and Comments
Specifically, the EIS shall discuss the potential for occurrence, frequency and distribution of terrain hazards, including snow drifts and snow banks, as a result of construction activities (e.g., cut / fill, extraction).	See information in **Section 15.1.**
Specifically, the EIS shall discuss the potential for soil erosion, including stream bank erosion, resulting from surface disturbances associated with the construction, operation and maintenance of Project components.	See information in **Section 15.1.**
Specifically, the EIS shall discuss the proposed commitments to preserve, store and reuse soil (including humus layers and organic soils), as applicable for site rehabilitation.	Alderon has indicated that at the decommissioning phase, it intends on transferring its facilities to the Sept-Îles Port Authority or to a third party after having cleaned-up the site. In the specific case of Kami Terminal infrastructure, reuse of soil (including humus layers and organic soils) is not anticipated.
Specifically, the EIS shall discuss the following potential contamination of soils due to the deposition of air emissions and airborne fugitive dust-fall from the Project.	This information is provided in **Chapter 14.**
Specifically, the EIS shall discuss the potential contamination of snow (e.g., due to runoff from tailings, emissions or other sources).	This information is provided in **Chapter 16.**
Specifically, the EIS shall discuss the following potential for the Project to impact ice on local lakes including Lake Daviault (e.g., potential for blasting to cause cracking).	Early ice breakup is not considered to be an issue since there are no natural lakes that could freeze up within the PDA or within a reasonable distance from the PDA and that could be affected by Kami Terminal activities.
The ARD/ML prediction information and historical site databases and experience will be used to assess the potential leachate risks and determine mitigation requirements for the Project. Additional information should be provided for the feasibility of successfully segregating Potentially Acid Generating (PAG) and Non-Potentially Acid Generating (NPAG) waste materials during operations, proposed geochemical segregation criteria, and identification of operational methods that will be required to achieve geochemical characterization during operations (i.e., geochemical surrogates, on site lab, procedures needed etc.).	This information is provided in **Section 16.6.**
The ARD/ML prediction information and historical site databases and experience will be used to assess the potential leachate risks and determine mitigation requirements for the Project. Additional information should be provided for sensitivity analysis to assess the effects of imperfect segregation of waste rock.	This information is provided in **Section 16.6.**

Requirements from the Guidelines on Landforms, Soils, Snow, and Ice	Location of Information in the EIS and Comments
The ARD/ML prediction information and historical site databases and experience will be used to assess the potential leachate risks and determine mitigation requirements for the Project. Additional information should be provided for estimates of potential lag time to ARD/ML onset for PAG materials (including various waste rock, tailings, ore) and ability to fully saturate appropriate PAG materials during operation and post-closure based on regional experience, if any.	This information is provided in **Section 16.6.**
The ARD/ML prediction information and historical site databases and experience will be used to assess the potential leachate risks and determine mitigation requirements for the Project. Additional information should be provided for pit water chemistry (existing, during operation, post-closure) and pit closure management measures (e.g., flooding). This should include geochemical modeling of pit water quality in the post-closure period.	This information is provided in **Section 16.6**.
The ARD/ML prediction information and historical site databases and experience will be used to assess the potential leachate risks and determine mitigation requirements for the Project. Additional information should be provided for surface and seepage water quality from the mine waste rock stockpiles, other stockpiles and other infrastructure during operation and post-closure.	This information is provided in **Section 16.6.**
The ARD/ML prediction information and historical site databases and experience will be used to assess the potential leachate risks and determine mitigation requirements for the Project. Additional information should be provided for ARD/ML prevention / management strategies under a temporary or early closure scenario, including ore.	This information is provided in **Section 16.6.**

In the Project Development Area of the Kami Terminal, there are no sensitive landforms and most of the soils have been perturbed by industrial activity. Natural undisturbed soils are virtually absent from the PDA apart from the hillside where part of the Kami Terminal will be built. Early ice breakup is not considered to be an issue since there are no lakes that freeze-up within the PDA or within a reasonable distance from the PDA that could be affected by dust particles becoming airborne from Kami Terminal activities.

As per EA guidelines, the following information relates to the description of the physical environment in relation to the issue of potential soil erosion at the terminal as a result of construction activities (see analysis in Section 15.1.4).

15.1 Description of the Physical Environment

15.1.1 Hydrology

The Kami Terminal is located on Pointe-Noire of the Marconi Peninsula, which extends eastward out into the Gulf of St. Lawrence from the Lower North Shore region of the Province of Québec. The peninsula is bound to the north by baie des Sept-Îles, by the Gulf of St. Lawrence to the east, and by baie Sainte-Marguerite to the south. The peninsula covers an area of approximately 14.8 km^2. The peninsula is part of the Atlantic Ocean, St. Lawrence Drainage sub-basin, and the rivière Moisie sub-sub basin (NRCan 2010).

Drainage on the peninsula appears to either flow north, towards baie des Sept-Îles or south towards baie Sainte-Marguerite, with the eastern extremity of the peninsula draining eastward into the Gulf of St. Lawrence. The drainage divide appears to be centrally located along the peninsula's east-west axis with a parallel drainage pattern clearly visible on the south side of the peninsula. The topographic map of the peninsula (1:20,000) illustrates one lake on the peninsula, lac Brochu, situated to the southeast of the Kami Terminal. Lac Brochu drains southeastward, to Petit Havre des Innus on the peninsula's east shore along the Gulf of St. Lawrence. The ruisseau à la Baleine, an intermittent watercourse, crosses the Kami Terminal. This watercourse is fed by runoff waters from the upstream surrounding areas and flows northward into baie des Sept-Îles near anse à la Baleine. The stream, near the shoreline, has been channeled and flows in a series of underground culverts. Another small intermittent watercourse with minor upstream branches is present on the western side of the Kami Terminal. This watercourse also drains northward into baie des Sept-Îles, south of anse à Brochu.

15.1.2 Geology and Surficial Deposits

The Marconi Peninsula is an extension of the Canadian Shield into the Gulf of St. Lawrence. Aerial photographs and topographic maps show that the peninsula is generally forested, with rock outcrops generally at the centre and towards the south side of the peninsula. Aerial imagery shows the bedrock surface that has been scarred by glacial retreat and aeolian weathering. The bedrock consists of gabbro, anorthosite and hypersthenes monozite with pitted, polished or striated surfaces (Dredge 1983).

According to the ecoforesty map available for the Pointe-Noire area (MRNF 2005), surficial deposits on Marconi Peninsula consist mainly of exposed bedrock or of a thin sand cover or till deposited over bedrock. Sand with some gravel is also identified on the map (Figure 15.1). Based on the map consulted, soils within the Kami Terminal boundary consist of a thin layer of sand with some gravel having an overburden thickness ranging between 0.25 m to 1 metre.

15.1.3 Topography

The general topography of the Marconi Peninsula is hilly, with pronounced "V" shaped valleys on the south side of the peninsula. The north side of the peninsula exhibits a more gentle topography, nevertheless hilly, and sloped towards the baie des Sept-Îles shoreline. The maximum elevation of the peninsula is 226 m above mean seal level (amsl). This peak is located nearly central on the peninsula, to the southwest of lac Brochu.

The topography of the general area slopes gently down towards the shore of baie des Sept-Îles to the north. The maximum elevation in the area is approximately 100 m amsl. This elevation is at the south side of the Kami Terminal, located just south of the high-voltage transmission lines that deliver power to the eastern sector of the peninsula. At the south end of the existing quarry, land elevation is 60 m amsl. The land elevation descends to approximately 30 m amsl at the south-most tangent of the proposed rail loop. Based on the topographic map of the Kami Terminal area, the proposed rail loop will be built on gently sloping terrain, with elevations descending from approximately 25 m amsl along the south rails to approximately 15 m amsl along the north rails. The elevation rises to approximately 55 m amsl to the west of the rail loop, just west of the intermittent watercourse and tributaries.

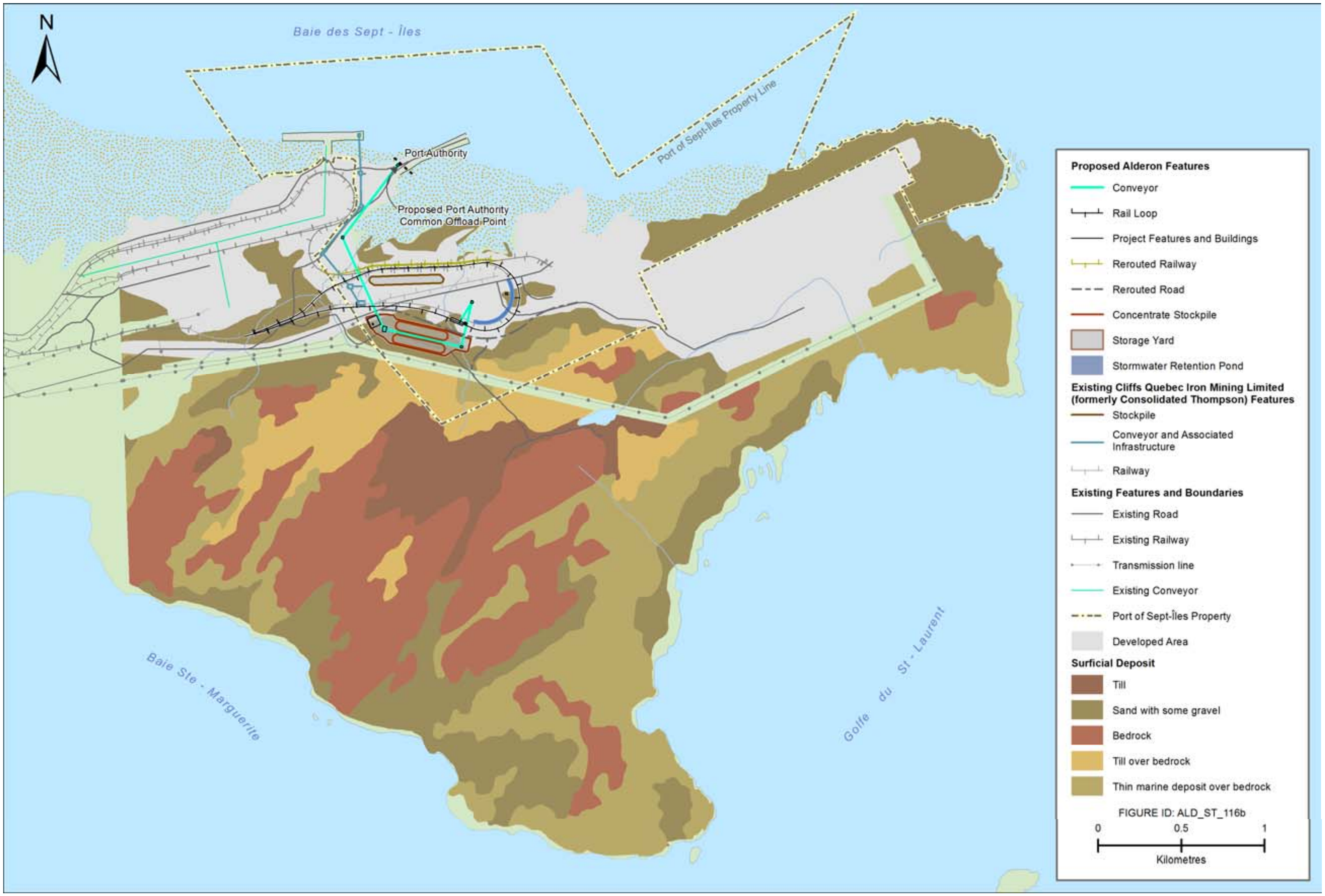
15.1.4 Terrain Stability and Implications for Planning

The results of photo-interpretation of the PDA indicate generally stable terrain. There is evidence of limited erosion (shallow ravines) on the course of the two existing streams and some wave related erosion directly on the coast. The PDA is characterized by generally stable terrain conditions associated with the predominance of rock lying either at ground surface or under shallow sandy till. From a planning standpoint, local conditions only warrant normal erosion control measures on site and at stream crossings. Terrain stability in the PDA is, therefore, not an issue. Normal erosion control measures to be implemented during construction will be outlined in the Environmental Protection Plan (EPP).

15.2 Conclusion

Assessment requirements for LSSI as outlined in the EIS guidelines are presented as per Table 15.1 in chapters 14 and 16 of the EIS. The assessments conducted for red water, acid rock drainage, metal leaching and dust emissions show that the Kami Terminal is not likely to result in significant adverse residual effects on Landforms, Soils, Snow and Ice under normal operating conditions.

Figure 15.1 Surficial Deposits



16.0 WATER RESOURCES

16.1 VEC Definition and Rationale for Selection

Water resources include the quality and quantity of groundwater and surface water resources in the vicinity of the Kami Terminal. It has been selected as a VEC because of:

- Its importance to ecosystem function and human use (including potable water supplies; recreational use and protection of aquatic life);
- Concerns regarding potential for release of hazardous materials on-site and potential contamination associated with water management; and,
- Effects on surface water / groundwater interactions.

Surface water includes all water running or in storage above the ground surface.

Groundwater is the water held beneath the earth's surface in the pores, fractures, crevasses and seams of bedrock and overlying surficial materials. Groundwater originates from the percolation of rain, snowmelt, or surface water into the ground, thence flowing from areas of high elevation (recharge areas) to areas of low elevation (discharge areas), where it exits the sub-surface as springs, streams, lakes and wetlands. This infiltrating water fills voids between individual grains in unconsolidated materials and fills fractures developed in consolidated materials such as bedrock. The upper surface of the saturated zone is called the water table. The water table intersects the surface environment at springs, lakes, streams and wetlands where interaction between the groundwater and the surface water environment can occur. An aquifer is a saturated formation or group of formations that can store or yield useable volumes of groundwater to wells or springs. Natural groundwater quality is directly influenced by the geochemical composition of the geological materials through which it passes, and the time the water resides within that material.

Groundwater resources refer specifically to the value and function of groundwater in maintaining stream flow for ecological habitat, and in supplying fresh water for human and light industrial or commercial uses. Groundwater availability for ecological and human uses and its susceptibility to chemical degradation or depletion by human activities is determined by the hydrogeological and hydrochemical properties of the surficial and bedrock geology in which it is found.

16.1.1 Issues

The following issues were raised by the public and other stakeholders:

- Potential contamination of water bodies;
- Water quality;
- Water management; and,

- Cumulative effects on water resources.

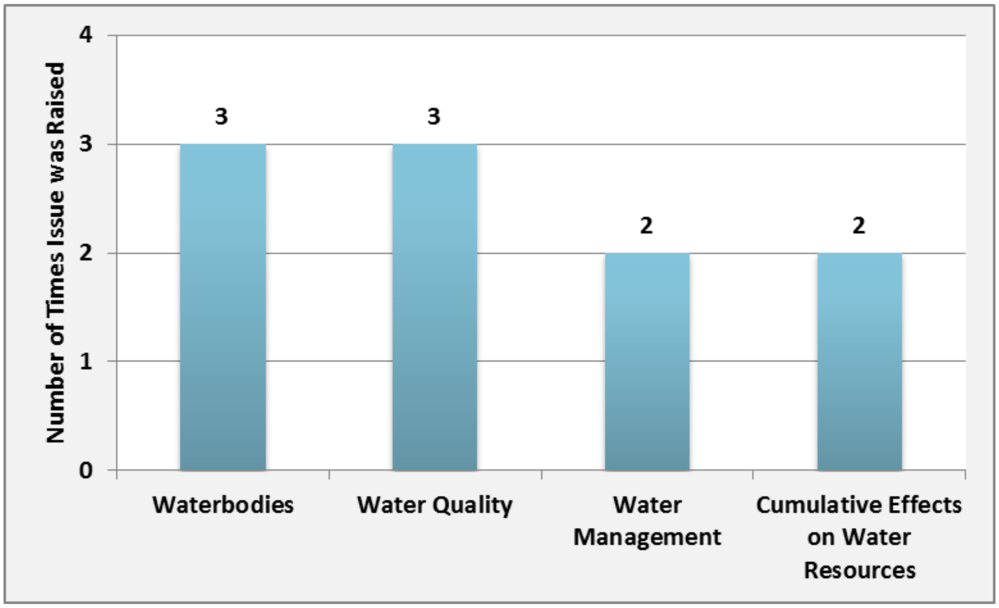
Accordingly, these issues are included in the assessment of this VEC. Details on the issues raised by stakeholders are provided in Table 16.1. The number of times each issue was raised is shown in Figure 16.1.

Table 16.1 Issues Raised by Stakeholders

Issue	Community / Organization	Summary of Comments Raised During Consultation and Engagement Activities	Response / Location in the EIS
Potential contamination of water bodies	Sept-Îles	Many companies have discharged directly into the bay. Want to ensure that this project will not carry out the same practice. What measures would be used to avoid contamination of Sept-Îles Bay by red water?	In order to prevent water contamination, the concentrate storage area, will be sealed with a liner. Water runoff within the concentrate storage area will be directed toward a stormwater retention pond (with liner) where it will be treated before release to the environment. Final effluent treatment will meet or surpass Directive 019 criteria and will ensure that receiving water within the effluent mixing zone will not exceed the applicable CCME *Canadian Water Quality Guidelines for the Protection of Aquatic Life*. More information can be found in **Section 16.6.**
Water quality	Sept-Îles	Resident inquired whether Alderon had tested the quality of water in Sept-Îles Bay. Asked if Alderon will treat water in order to meet standards and regulations or to maintain water quality at its present level.	Water quality in baie des Sept-Îles (anse à Brochu) was analysed for several parameters. More information can be found in **Section 16.5**. Final effluent treatment will meet or surpass Directive 019 criteria and will ensure that receiving water within the effluent mixing zone will not exceed the applicable CCEM *Canadian Water Quality Guidelines for the Protection of Aquatic Life*. More information can be found in **Section 16.6.**
	CRE	Potential effects on water quality in the baie of Sept-Îles	
Cumulative effects on water resources		There is a lot of pressure around the Bay, concerned about cumulative effects. It would be great if elements of the Kami Project could be located further to the shore.	Alderon assessed several alternatives when choosing a site for the Terminal. The selected site was the most economically and technically feasible. More information regarding site selection can be found in **Section 2.8**.

Issue	Community / Organization	Summary of Comments Raised During Consultation and Engagement Activities	Response / Location in the EIS
			Alderon will minimize its influence on the baie des Sept-Îles including treatment of final effluent. The effluent will meet or surpass standards. More information can be found in **Section 16.6.**

Figure 16.1 Frequency of Issue Raised Related to the Water Resources



16.2 Environmental Assessment Boundaries

16.2.1 Spatial Boundaries

Local Study Area

The LSA is the maximum area within which Kami Terminal environmental effects can be predicted or measured with a reasonable degree of accuracy and confidence. The LSA includes the PDA and any adjacent areas where environmental effects may reasonably be expected to occur, which are defined as the anse à Brochu and anse à la Baleine sub-watersheds (Figure 16.2).

Regional Study Area

The RSA is the area within which cumulative effects for the Water Resources may occur, depending on physical and biological conditions and the type and location of other past, present, and reasonably foreseeable projects. The RSA takes into account the area of influence limited to the baie des Sept-Îles (Figure 16.3).

Figure 16.2 Local Study Area

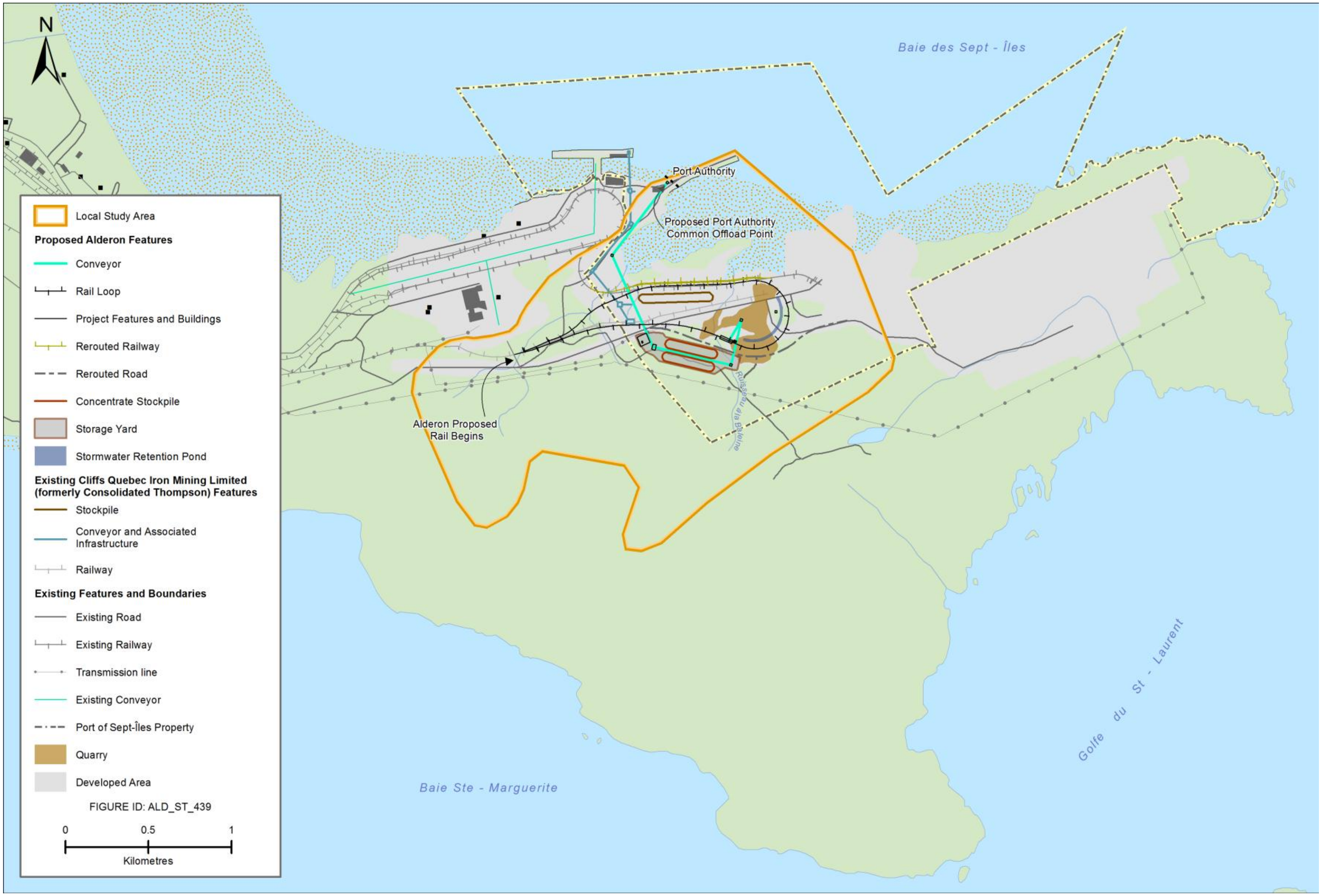
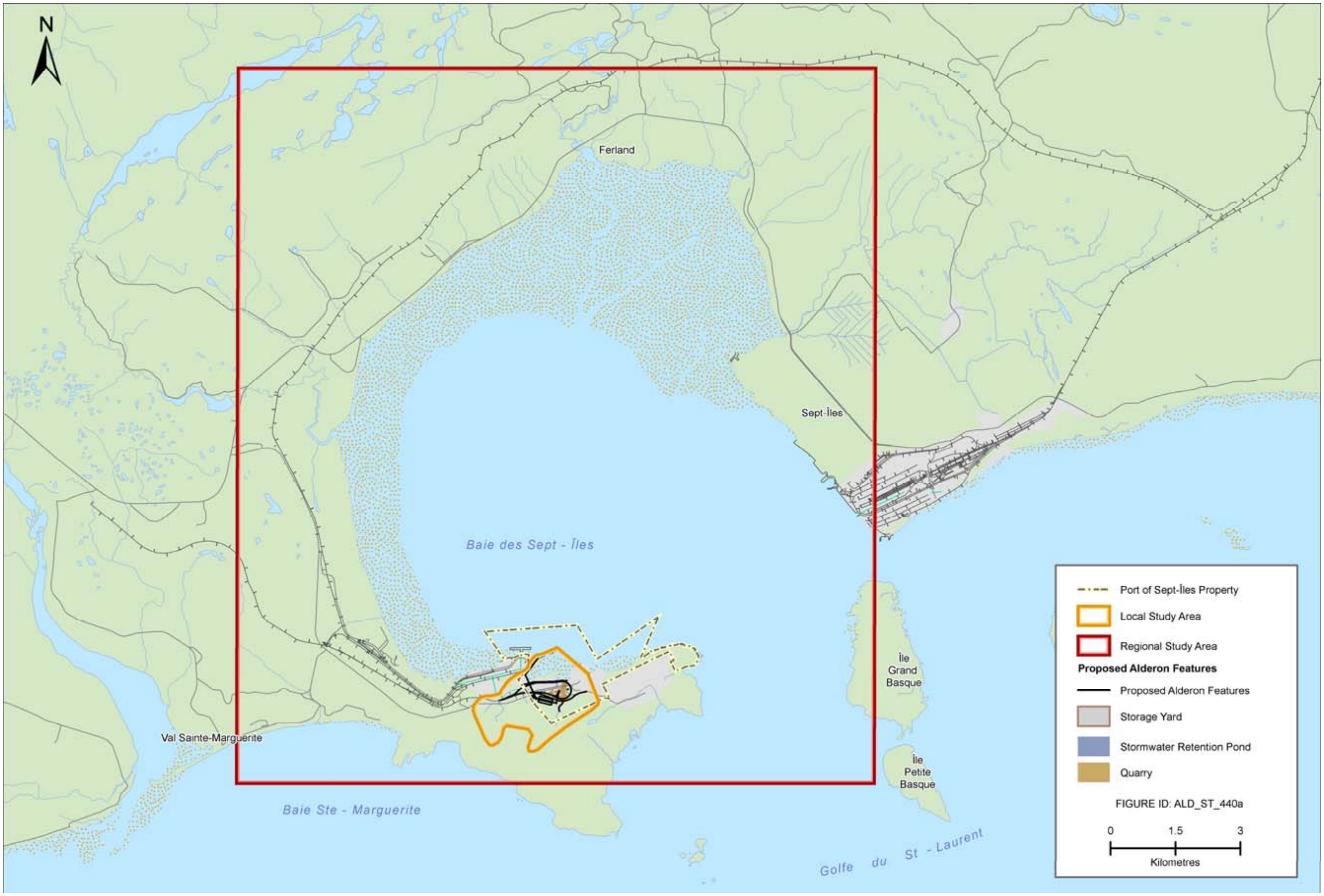


Figure 16.3 Regional Study Area



16.2.2 Temporal Boundaries

The temporal boundaries for the assessment of potential environmental effects of the Kami Terminal on Water Resources include the phases of construction (approximately two years), operation and maintenance (approximately 17 years), and decommissioning and reclamation (approximately one year).

16.2.3 Administrative Boundaries

The Québec MDDEP *Directive 019 for the mining industry* (Directive 019) sets guidelines for the issuance or renewal of certificates of authorization required under the Québec *Environment Quality Act* (MDDEP 2012a). Representatives from the Port Authority of Sept-Îles advised that needs to be respected by Alderon. This directive is not a regulatory document but rather a guide that specify the MDDEP expectations on the main mining activities. The directive sets requirements notably for final effluents.

The Canadian Council of Ministers of the Environment (CCME) has published Canadian recommendations for water and sediment quality with the aim of protecting aquatic life (CCME, 1999). The CCME has determined two reference values described in the *Canadian Water Quality Guidelines for the Protection of Aquatic Life.* Reference values have been prepared for more than 145 substances in freshwater and marine environment: short-term exposure and long-term exposure.

The CCME has also determined two reference values for some thirty substances in freshwater and marine sediments: a threshold effect level (TEL) and a probable effect level (PEL) (CCME 1999). Environment Canada and the MDDEP have jointly established sediment quality assessment criteria for the St. Lawrence (Environment Canada & MDDEP 2007). These criteria constitute a screening tool for assessing the chemical contamination of sediments. They are based on the approach of the CCME.

The MDDEP has established a list of criteria for surface water, including the quality criteria for protection of aquatic life (chronic and acute effect). The purpose of these criteria is to protect aquatic life against water body contamination on the short and long terms (MDDEP 2012b). The chronic effect criterion is the higher concentration at which an aquatic organism (and its offspring) can be exposed daily all his life to a substance without being adversely affected. The acute effect criterion is the maximum concentration at which an aquatic organism can be exposed for a short period without being severely affected (lethal concentration for 50 percent of the individuals exposed).

16.3 Establishing Standards or Thresholds for Determining the Significance of Environmental Effects

The likely effects of the Kami Terminal on Water Resources are described using the following attributes, which are based on standard environmental assessment practice and the EIS Guidelines.

- **Direction:**
  - Adverse: condition of Water Resources is worsening in comparison to baseline conditions and trends;
  - Positive: condition of the Water Resources is improving in comparison to baseline conditions and trends; or,
  - Neutral: no change in the condition of the Water Resources compared to baseline conditions and trends.
- **Magnitude:**
  - Negligible: no measurable adverse effect anticipated;
  - Low: effect occurs that is detectable but is within normal variability of baseline conditions;
  - Moderate: effect occurs that would cause an increase with regard to baseline but is within regulatory limits and objectives; or,
  - High: effect occurs that would singly or as a substantial contribution in combination with other sources cause exceedances of objectives or standards.
- **Geographic Extent:**
  - Site-specific: effect restricted to the Project footprint within the LSA;
  - Local: effect restricted to the LSA; or,
  - Regional: effect within the RSA.
- **Frequency:**
  - Once: effect occurs once;
  - Sporadic: effect occurs at sporadic intervals;
  - Rarely: effect occurs on a regular basis and at regular intervals; or,
  - Frequently: effect occurs continuously throughout the Project life.
- **Duration:**
  - Short-term: effect occurs for less than three years;
  - Medium-term: effect occurs for between three and 20 years; or,
  - Long-term: effect persists beyond 20 years.
- **Reversibility:**
  - Reversible: effect ceases when Project operations cease; or,
  - Irreversible: effect continues after Project operations cease.
- **Ecological or Socio-Economic Context:**
  - Undisturbed: effect takes place within an area that is relatively or not adversely affected by human activity; or,

- Disturbed: effect takes place within an area with human activity. Area has been substantially previously disturbed by human development or human development is still present.

A significant adverse residual environmental effect on the Water Resources is defined as an environmental effect that results in*:*

- Changes in water quality such that effluent quality exceeds Directive 019 criteria, water quality in effluent mixing zone exceed MDDEP acute toxicity criteria, water quality at the boundary of effluent mixing zone exceed MDDEP chronic effect criteria or exceed baseline or *Canadian Water Quality Guidelines for the Protection of Aquatic Life*, the assimilative capacity of effluent receiving waters is exceeded;
- Sediment quality is degraded below baseline quality or the *Canadian Sediment Quality Guidelines*; or,
- The aquifer is physically or chemically altered to the extent that interaction with local surface water results in stream flow or surface water chemistry changes that adversely affect aquatic life.

16.4 Potential Project-VEC Interactions

Potential Kami Terminal-VEC interactions identified in the EIS guidelines include:

- Effects related to mine water management as well as effects on water quality from effluent discharges and seepage;
- Potential ammonia contamination from incomplete combustion of exploded materials (e.g. directly to surface waters, or to groundwater via bedrock fractures);
- Effects on water quantity and hydrology/hydrogeology;
- Effects related to mine water use (demand);
- Effects of accidents and malfunctions; and,
- Erosion and sedimentation, including dust deposition.

These interactions were regrouped in four potential environmental effects: change in surface water quantity, change in surface water quality, change in surface water drainage patterns as well as change in groundwater levels and quality.

Change to surface and groundwater quality can result from the Kami Terminal activities. Runoff and dust deposition following construction activities that disturb the existing ground cover may adversely affect water resources in local drainage areas. Blasting activities can also generate ammonia contamination from incomplete combustion of exploded materials. The concentrate handling and stockpiling has also the potential to generate water laden with particles, including iron (red water) affecting water quality in local drainage areas. Dust generated from concentrate handling and stockpiling may also deposit itself within the local drainage area and affect water quality.

Alterations to the land surface resulting from Kami Terminal facilities can also change local surface water drainage patterns.

Changes to surface water quantity and groundwater levels (from guidelines: mine water use (demand) and effects on water quantity) relate only to the Kami Mine (see Volume 1). The proposed buildings to be built as part of the Kami Terminal will be hooked up to the municipal aqueduct and sewer network. Kami Terminal activities will not require use of local groundwater or surface water.

This section provides a list of Kami Terminal activities and physical works (Table 16.2) and whether or not an interaction is expected to occur with each identified potential environmental effect on the Water Resources. The interactions will be ranked either as a "0", no interaction occurs, "1", interaction occurs however the resulting effect can be managed through proven mitigation and codified practice, or as a "2" an interaction occurs and has the potential to exceed regulatory standards and therefore requires further assessment.

Table 16.2 Potential Environmental Effects of Kami Terminal to the Water Resources

Kami Terminal Activities and Physical Works	Potential Environmental Effects		
	Change in Surface Water Quality	Change in Surface Water Drainage Patterns	Change in Groundwater Quality
Construction			
Site Preparation (incl. clearing, excavation, blasting, material haulage, grading, removal of overburden and stockpiling)	2	1	1
Construction of Unloading, Stacking, Storage and Reclaiming Facilities (rail dumper building, rail car dumper and hopper, train positioner transfer houses, conveyors, dust collector, maintenance building, substation, sanitation system)	1	1	1
Construction of Railway Loop	2	1	1
Construction of Stream Diversion and Stream Crossings	2	2	0
Access Roads and Waterline Realignment	2	1	1
Onsite Vehicle / Equipment Operation	1	0	1
Waste Management	1	0	1
Transportation of Personnel and Goods to Site	0	0	0
Expenditures	0	0	0
Employment	0	0	0

Kami Terminal Activities and Physical Works	Potential Environmental Effects		
	Change in Surface Water Quality	Change in Surface Water Drainage Patterns	Change in Groundwater Quality
Operation and Maintenance			
Rail Transport	0	0	0
Concentrate Handling and Stockpiling	2	2	2
Water Collection, Treatment and Discharge	2	0	2
Onsite Vehicle / Equipment Operation and Maintenance	1	0	1
Waste Management	1	0	1
Transportation of Personnel and Goods to Site	0	0	0
Expenditures	0	0	0
Employment	0	0	0
Decommissioning and Reclamation			
Site Clean-up	1	0	1
Accidents and Malfunctions			
Forest Fire	2	2	2
Stormwater Retention Pond Breach	2	0	2
Train Derailment	2	0	2

KEY

0 = No interaction

1 = Interaction occurs; however, based on past experience, the resulting effect can be managed to acceptable levels through standard operating practices and/or through the application of best management or codified practices. No further assessment is warranted.

2 = Interaction occurs, and resulting effect may exceed acceptable levels without implementation of specified mitigation. Further assessment is warranted.

Construction

During the construction phase no interactions are anticipated between surface water and groundwater resources and the following activities: transportation of personnel and goods to site, expenditures and personnel, and employment (interactions ranked as '0').

Interactions with respect to construction of access roads, site buildings, the railway and unloading, stacking, storage and reclaiming facilities, onsite vehicle / equipment operation, and waste management were assigned a rating of '1' due to the fact that interactions are indirect and can be mitigated to acceptable levels through standard mitigation measures. The indirect interactions with water resources result from potential introductions of deleterious substances and/or dust borne particulates that may alter surface and groundwater quality and sediment chemistry and increase turbidity. These interactions can be fully mitigated through adherence to guidelines or operational statements, implementation of activity specific plans (spill prevention, surface water management, materials handling, erosion and sediment control) and inclusion of aspects within the port operations plan (dust suppression, etc.). Standard, proven measures to reduce the environmental effect and control the potential occurrence of dust, turbidity and sedimentation will be included in the EPP.

The use of explosives may result in the chemical alteration of surface and groundwater. The use of blasting agents can generate the production of toxic by-products (ammonia) and cause an increase in ammonia and nitrate concentrations in nearby groundwater and surface water. Ammonia is a toxic compound that can adversely affect fish health (Wright & Hopky 1998). This interaction can be fully mitigated by respecting DFO *Guidelines for the Use of Explosives In or Near Canadian Fisheries Waters* (Wright & Hopky 1998), which prohibit the use of ammonium nitrate-fuel oil mixtures in or near water (interaction ranked as '1').

The construction of stream diversion and stream crossings can potentially affect surface water resources and modify the drainage pattern (interactions ranked as '2').

The exposure of sulfides, if present in blasted and excavated rocks, has the potential for acid rock drainage and metal leaching (ARD / ML). In this case, leachate could enter the groundwater or be discharged to the surface environment and alter water quality and sediment chemistry. Therefore, activities associated with exposure or production of these materials were rated as '2'.

Operation and Maintenance

During the operations and maintenance, no interactions are anticipated between surface and groundwater resources and the following activities: rail transport, transportation of personnel and goods to site, expenditures and personnel, and employment (interactions ranked as '0').

Onsite vehicle / equipment operation and waste management can interact indirectly with water resources from potential introductions of deleterious substances and dust borne particulates that may alter water quality and sediment chemistry and increase turbidity. These interactions can be fully mitigated through adherence to guidelines or operational statements, implementation of activity specific plans (spill prevention, surface water management, materials handling, erosion and sediment control) and inclusion of aspects within the port operations plan (dust suppression, etc.) (interactions ranked as '1'). Standard, proven measures to reduce the environmental effect and control the potential occurrence of dust, turbidity and sedimentation will be included in the EPP.

The exposure of sulfides, if present in iron ore concentrate, has the potential for ARD / ML. Also, concentrate handling and stockpiling has the potential to generate water laden with particles, including iron (red water) affecting surface water quality in local drainage areas and groundwater quality. Dust generated from concentrate handling and stockpiling may also deposit itself within the local drainage area and affect water quality. Therefore, the concentrate handling and stockpiling activities as well as water management were given a rating of '2'.

Decommissioning and Reclamation

Clean-up activities can indirectly affect surface and groundwater quality as a result of potential introductions of deleterious substances and dust borne particulates. These were assigned a rating of '1' due to the fact the interactions are indirect and can be mitigated to acceptable levels through adherence to guidelines or operational statements, implementation of activity specific plans (spill prevention, surface water management, materials handling, erosion and sediment control).

The measurable parameters used for the assessment of the environmental effects presented above and the rationale for their selection are provided in Table 16.3.

Table 16.3 Measurable Parameters for Water Resources

Environmental Effect	Measurable Parameter	Rationale for Selection of the Measurable Parameter
Change in Surface Water Quality	Total suspended solids (TSS), pH and colour in receiving water bodies	The Kami Terminal has the potential to alter receiving water quality through discharge of red water.
	Neutralization Potential Ratio (NPR) =NP/AP, where NP is Neutralization Potential and AP is Acid-Generating Potential.	If NPR is below 4, there is potential for formation of ARD, which could affect surface water quality.
Change in Surface Water Drainage Patterns	Watercourse alteration / realignment	Kami Terminal facilities and infrastructure will interfere with the existing upstream catchment area and alignment of some watercourses, potentially affecting stream flows and drainage patterns
Change in Groundwater Quality	Total suspended solids (TSS), pH and colour in groundwater	The Kami Terminal has the potential to alter receiving groundwater quality through discharge of red water.
	Neutralization Potential Ratio (NPR) =NP/AP, where NP is Neutralization Potential and AP is Acid-Generating Potential	If NPR is below 4, there is potential for formation of ARD, which could affect groundwater quality.

16.5 Existing Environment

Surface water

Hydrology

The Kami Terminal is located on Pointe-Noire of the Marconi Peninsula, which extends eastward out into the Gulf of St. Lawrence, the world's largest river estuary. The peninsula is bound to the north by baie des Sept-Îles, to the east by the Gulf of St. Lawrence, and to the south by baie Sainte-Marguerite. The peninsula covers an area of approximately 14.8 km^2. The peninsula is part of the Atlantic Ocean, St. Lawrence drainage sub-basin, and the rivière Moisie sub-sub basin (NRCan 2010).

Drainage on the peninsula appears to either flow north, towards baie des Sept-Îles or south towards baie Sainte-Marguerite, with the eastern extremity of the peninsula drains eastward into the Gulf of St. Lawrence. The drainage divide appears to be centrally located along the peninsula's east-west axis with a parallel drainage pattern clearly visible on the south side of the peninsula. The topographic map of the peninsula (1:20,000) shows one lake on the peninsula, lac Brochu, situated to the southeast of the Kami Terminal. Lac Brochu drains southeastward, to Petit Havre des Innus on the peninsula's east shore, along the Gulf of St. Lawrence.

Ruisseau à la Baleine, a second order intermittent stream, crosses the Kami Terminal. This watercourse is fed by runoff waters from the upstream surrounding areas and flows northward into baie des Sept-Îles near anse à la Baleine. Near the shoreline, ruisseau à la Baleine has been channeled and flows through a series of underground culverts. A small third order intermittent stream (unnamed stream) is also present on the western side of the Kami Terminal area. This watercourse also drains northward into baie des Sept-Îles, south of anse à Brochu.

Water Quality

In June 2012, Stantec conducted a Water Resources Baseline Study (Appendix F, Stantec 2012b) in the LSA. Surface water samples were collected from ruisseau à la Baleine (3 samples), the unnamed stream (3 samples), as well as from the baie des Sept-Îles (2 samples). The locations of the sampling stations are indicated on Figure 16.4. The samples were analyzed for the following parameters: pH, total dissolved solid (TDS), total suspended solids (TSS), color, turbidity, hardness, extractible metals (Al, Ag, As, Ba, Cd, Co, Cr, Cr IV, Cu, Fe, Hg, Se, Sb, Mn, Mo, Na, Ni, Pb, Zn), total alkalinity, acidity, total cyanide, total phosphorus (P), ammoniacal nitrogen ($N\text{-}NH_3$), and petroleum hydrocarbons C_{10}-C_{50} (PH C_{10}-C_{50}).

The results were compared to the provincial criteria contained in the Directive 019 (Directive 019 Criteria), as well as the available CCME and Québec surface water criteria.

Analytical results for freshwater samples are presented in Table 16.4. Surface water samples were collected from first order streams that are located near the headwaters of both the ruisseau à la Baleine (SW12-01) and the unnamed stream (SW12-09). Remaining surface water samples were collected from the downstream second and/or third order segments into which the first order streams flow into.

Both samples collected from upstream first order segments of the ruisseau à la Baleine (SW12-01) and the unnamed stream (SW12-09) are characterized by a low pH (5.07 and 5.82, respectively) that are outside the acceptable ranges contained in the CCME *Canadian Water Quality Guidelines for the Protection of Aquatic Life*, the Québec *Surface Water Criteria for the Protection of Aquatic Life* (chronic exposure) and *Directive 019*. These samples are also characterized by low hardness (5 and 9 mg) and low total alkalinity (<1 and 3 mg/L as $CaCO_3$), and high color (180 and 120 UCV). Both samples are acidic with acidities of 52 mg/L as $CaCO_3$ (SW12-01) and 12 mg/L as $CaCO_3$.

Figure 16.4 Surface Water Sampling Stations

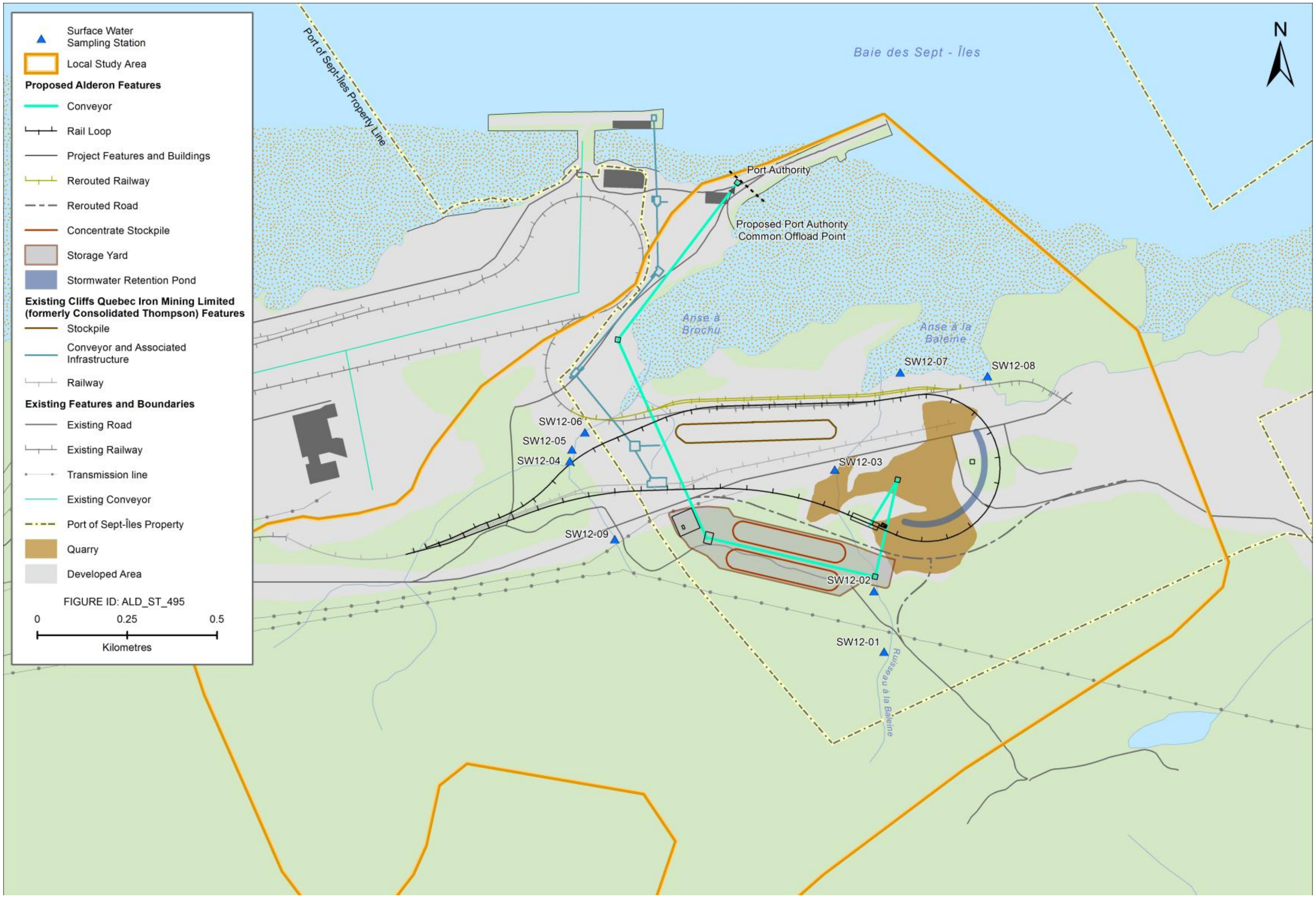


Table 16.4 Analytical Results for Surface Water (Freshwater) in the Kami Terminal Area

Parameters	Units	MDDEP Directive 019[1] Final Effluent		CWQG[2] Protection of Aquatic Life	MDDEP Surface Water Quality [3] Protection of Aquatic Life		Analytical Results					
							Ruisseau à la Baleine			Unnamed Stream		
Sample ID		Monthly Mean Acceptable Concentration	Maximum Acceptable Concentration	Long term	Chronic effect	Acute effect	SW12-01	SW12-02	SW12-03	SW12-04	SW12-06	SW12-09
Sampling Date							2012-06-11	2012-06-11	2012-06-11	2012-06-12	2012-06-12	2012-06-12
Conventional parameters												
pH	pH	6 to 9.5		**6.5 to 9.0**	6.5 to 9.0	**5.0 to 9.0**	**5.07**	6.93	7.14	7.52	7.54	**5.82**
Total dissolved solids	ppm	nc	nc	**nc**	nc	**nc**	83	70	160	160	170	150
Total suspended solids	mg/L	*15*	30	**narrative**	narrative[4]	**narrative[4]**	19	<2	6	23	20	2
Color	UCV	nc	nc	**narrative[5]**	nc	**nc**	180	57	58	66	68	120
Turbidity	NTU	nc	nc	**narrative[6]**	narrative[6]	**narrative[6]**	0.3	0.3	5.2	27	17	0.6
Hardness	mg/L	nc	nc	**nc**	nc	**nc**	5	55	54	98	89	9
Petroleum hydrocarbons												
PH C_{10}-C_{50}	mg/L	nc	2	**nc**	nc	**nc**	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Metals												
Aluminium (Al)	mg/L	nc	nc	**0.005 mg/L. pH <6.5; 0.1 mg/L. pH ≥6.5**	0.087 [7]	**0.75 [7]**	**0.72**	**0.23**	**0.39**	**0.38**	**0.3**	**0.76**
Antimony (Sb)	mg/L	nc	nc	**nc**	0.24	**1.1**	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006
Arsenic (As)	mg/L	*0.2*	0.4	**0.005**	0.15	**0.34**	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
Barium (Ba)	mg/L	nc	nc	**nc**	0.16 / 0.28 [8]	**0.45 / 0.79 [8]**	<0.03	<0.03	<0.03	0.03	<0.03	<0.03
Cadmium (Cd)	mg/L	nc	nc	**0.0001 / 0.0002 [7]**	0.0001 / 0.0002 [8]	**0.0008 / 0.0014 [8]**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium (Cr VI)	mg/L	nc	nc	**0.001**	0.011	**0.016**	<0.008	<0.008	<0.008	<0.008	<0.008	<0.008
Chromium, total (Cr)	mg/L	nc	nc	**nc**	nc	**nc**	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Cobalt (Co)	mg/L	nc	nc	**nc**	0.1	**0.37**	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Copper (Cu)	mg/L	0.3	0.6	**0.001 [8]**	0.004 / 0.006 [8]	**0.006 / 0.009 [8]**	**0.12**	<0.003	<0.003	<0.003	<0.003	<0.003
Iron (Fe)	mg/L	*3*	6	**0.3**	1.3	**3.4**	**0.9**	0.2	**1.4**	**0.8**	**0.8**	**0.8**
Lead (Pb)	mg/L	*0.2*	0.4	**0.001 [8]**	0.001 / 0.002 [8]	**0.024 / 0.046 [8]**	<0.001	<0.001	<0.001	0.004	0.003	<0.001
Manganese (Mn)	mg/L	nc	nc	**nc**	0.8 / 1.3 [8]	**1.8 / 2.8 [8]**	0.60	0.059	0.25	0.63	0.7	0.55
Mercury (Hg)	mg/L	nc	nc	**0.000026**	0.00091	**0.0016**	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Molybdenum (Mo)	mg/L	nc	nc	**0.073**	3.2	**29**	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03
Phosphorus, total (P)	mg/L	nc	nc	**narrative[9]**	0.03	**nc**	<0.01	0.03	0.03	<0.01	0.02	0.02
Nickel (Ni)	mg/L	*0.5*	1	**0.06 [8]**	0.02 / 0.04 [8]	**0.21 / 0.32 [8]**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Selenium (Se)	mg/L	nc	nc	**0.001**	0.005	**0.062**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Silver (Ag)	mg/L	nc	nc	**0.0001**	0.0001	**0.0004 / 0.001 [7]**	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003	<0.0003
Sodium (Na)	mg/L	nc	nc	**nc**	nc	**nc**	4.0	5.2	19	26	27	4.5
Zinc (Zn)	mg/L	*0.5*	1	**0.03**	0.053 / 0.083 [8]	**0.053 / 0.083 [8]**	0.013	0.009	<0.005	0.015	0.014	0.01
Anions												
Alkalinity, total	mg/L	nc	nc	**nc**	narrative[9]	**nc**	<1	44	50	63	62	3
Acidity	mg/L	nc	nc	**nc**	nc	**nc**	52	<10	<10	<10	<10	12
Cyanide, total	mg/L	*1*	2	**0.005 (as free CN)**	0.005 (as free CN)	**0.022 (as free CN)**	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003
Phosphorus	mg/L	nc	nc	**narrative[10]**	0.03	**nc**	<0.01	0.03	0.03	<0.01	0.02	0.02
Nitrogen ammonia (N-NH3)	mg/L	nc	nc	**nc**	1.9 [11]	**26 / 21 [11]**	<0.02	<0.02	0.09	0.03	0.03	<0.02

Notes:
1 Directive 019 sur l'industrie minière – mars 2012, ministère du Développement durable, de l'Environnement et des Parcs 1989, rev. 2012
2 Canadian Council of Ministers of the Environment, Canadian Environmental Quality Guidelines 1987, 1999
3 Critères de qualité de l'eau de surface du Québec, ministère du Développement durable, de l'Environnement et des Parcs 2009, rev. 2012.
4 In clear water (low suspended solids concentrations (<25 mg/L)): maximum increase of 5 mg/L from background levels (chronic effect) and maximum increase of 25 mg/L from background levels (acute effect).
5 True Colour: The mean absorbance of filtered water samples at 456 nm shall not be significantly higher than the seasonally adjusted expected value for the system under consideration.
Apparent Colour: The mean percent transmission of white light per metre shall not be significantly less than the seasonally adjusted expected value for the system under consideration.
6 Clear flow: Maximum increase of 8 NTUs from background levels (acute effect). Maximum average increase of 2 NTUs from background levels (chronic effect/long term).
7 Aluminium: the chronic effect criteria should be used only for waters with hardness < 10 mg/L and pH around 6.5. The acute effect criteria should be used for water with pH <6.5 or > 9.0.
8 This parameter increases with hardness. The value mentioned in the table corresponds to a mean hardness of 38 mg/L (CaCO3) for ruisseau à la Baleine and 65 mg/L (CaCO3) for the unnamed stream respectively.
9 Ultra-oligotrophic <4 µg/L; Oligotrophic 4-10 µg/L; Mesotrophic 10-20 µg/L; Meso-eutrophic 20-35 µg/L; Eutrophic 35-100 µg/L; Hyper-eutrophic >100 µg/L
10 Sensitivity to acidification varies with alkalinity: High sensitivity <10 mg/L; Average sensitivity: 10 – 20 mg/L; Low sensitivity: >20 mg/L
11 This parameter varies with pH and temperature. The value mentioned in the table corresponds to a pH of 6.5 and a temperature of 9°C for ruisseau à la Baleine and a pH of 7.0 and a temperature of 9°C for the unnamed stream.

The downstream samples (SW12-02 and SW12-03) collected from ruisseau à la Baleine exhibited a normal pH (6.93 and 7.14), higher hardness (55 and 54 mg/L), higher total alkalinity (44 and 50 mg/L as $CaCO_3$), lower acidity (<10 mg/L as $CaCO_3$) and lower color (57 and 58 UCV) relative to the upstream samples. The results for the downstream samples (SW12-04 and SW12-06) collected from the unnamed stream were similar with the pH (7.52 and 7.54), hardness (98 and 89 mg/L) and total alkalinity (63 and 62 mg/L as $CaCO_3$) being slightly higher than those measured in the ruisseau à la Baleine.

The total dissolved solids range between 70 to 160 ppm in the surface water samples collected from ruisseau à la Baleine; whereas, the results for the samples collected from the unnamed stream were slightly less variable (150 to 170 ppm). The total suspended solids (<2 to 23 mg/L) and turbidity (0.3 to 27 NTU) measurements were highly variable in both streams. The TSS concentrations of the upstream sample collected from ruisseau à la Baleine as well as the two downstream samples collected from the unnamed stream exceeded the *Directive 019* Criterion (Acceptable Monthly Mean) for wastewater discharges to the environment.

All six surface water samples collected from the two streams exhibited PH C_{10}-C_{50}, antimony, arsenic, cadmium, hexavalent chromium, total chromium, cobalt, mercury, molybdenum, nickel, selenium, silver and total cyanide concentrations that were below the applicable laboratory detect limit. It should be noted that the laboratory detection for several metals (e.g., cobalt) were higher than one or more of the potentially applicable CCME and/or *Québec Surface Water Quality Criteria*. These samples also exhibited barium (<0.03 to 0.03 mg/L), lead (<0.001 to 0.004 mg/L), manganese (0.059 to 0.7 mg/L), total phosphorous (<0.01 to 0.3 mg/L, zinc (<0.005 to 0.015 mg/L), and ammonia nitrogen (<0.02 to 0.09 mg/L) concentrations that were all below the potentially applicable CCME and Québec surface water criteria. The sodium concentrations of the samples ranged from 4 to 27 mg/L.

With the exception of pH and TSS (see above), none of the surface water samples exceeded the available *Directive 019* criteria. However, the following exceedances of CCME *Canadian Water Quality Guidelines for the Protection of Aquatic Life* and/or the Québec *Surface Water Criteria* were detected:

- All six surface water samples exhibited aluminum concentrations (0.23 to 0.76 mg/L) that exceeded the CCME *Aquatic Life Guideline* and one (SW12-01) exceeded the Québec *Surface Water Quality Criterion* for the Protection of Aquatic Life (chronic effect). The upstream surface water sample (SW12-09) collected from the unnamed stream also exceeded the Québec acute effect criterion.
- The upstream surface water sample (SW12-01) collected from ruisseau à la Baleine exhibited a copper concentration (0.12 mg/L) that exceeded the applicable CCME *Aquatic Life Guideline and the Québec Surface Water Criterion for the Protection of Aquatic Life* (chronic and acute effects). The rest of the samples exhibited copper concentrations that were beneath the laboratory detection limit (<0.003 mg/l).
- Five of the six surface water samples exhibited iron concentrations (0.8 to 1.4 mg/L) that exceeded the CCME *Aquatic Life Guideline*. One of the downstream samples (SW12-03)

also exceeded the Québec *Surface Water Criterion for the Protection of Aquatic Life* (chronic effect).

The differences between the chemical compositions of the surface samples collected from the upstream first order segments of both ruisseau à la Baleine and the unnamed stream when compared to the downstream second or third order segments are attributed to the lower buffering capacity of the rock and/or soil within the drainage area of the first order stream. It may also be a reflection of the forest makeup (i.e. larger percentage of coniferous trees). The low pH of the first order segments is likely responsible for the elevated concentrations of aluminum and other metals that were measured in the upstream surface water samples relative to the downstream ones.

Analytical results for estuarine samples are presented in Table 16.5. The two samples of water collected from baie des Sept-Îles exhibited a normal pH (7.96 and 7.75), high total alkalinity (95 and 86 mg/L as $CaCO_3$), low acidity (12 mg/L as $CaCO_3$) and low color (10 and 8 UCV). The TSS concentrations exceeded the Directive 019 Criterion (Acceptable Monthly Mean for both samples and Maximum Acceptable Concentration for one sample) for wastewater discharges to the environment. None of the surface water samples exceeded the available *Directive 019* criteria, CCME *Aquatic Life Guidelines and the Québec Surface Water Criteria*.

Groundwater

Considering that the ore concentrate storage area and the stormwater retention pond will be lined and that Kami Terminal runoff will be contained and treated before release to the environment, gathering groundwater was deemed unnecessary for assessment purposes.

Water Supply

The City of Sept-Îles has an extensive water and wastewater infrastructure. The water supply depends on several sources. The municipal water intake is located in Lac des Rapides (MDDEP, 2011), which is located at approximately 16 kilometers from the site. Groundwater is also the source of water for some 699 people. There are no private wells within or near the LSA. The closest is approximately 5 kilometers away based on information provided by the City of Sept-Îles (Gingras, 2012, personal communication).

Sediments

Stantec conducted sediment sampling in anse à la Baleine in 2012. At the time of writing this chapter of the report, results were not available. This information will be used to characterize baseline conditions.

Table 16.5 Analytical Results for Surface Water (Marine) in the Kami Terminal Area

Parameters	Units	MDDEP Directive 019[1] Final Effluent		CWQG[2] Protection of Aquatic Life Marine Environment	MDDEP Surface Water Quality [3] Protection of Aquatic Life Marine Environment		Analytical Results	
Sample ID		Monthly Mean Acceptable Concentration	Maximum Acceptable Concentration	Long term	Chronic effect	Acute effect	SW12-07	SW12-08
Sampling Date							2012-06-11	2012-06-12
Conventional Parameters								
pH	pH	6 to 9.5		7.0 to 8.7	7.0 to 8.7	5.0 to 9.0	7.96	7.75
Total dissolved solids	ppm	nc	nc	nc	nc	nc	27000	27000
Total suspended solids	mg/L	*15*	30	nc	narrative[4]	narrative[4]	24	34
Color	UCV	nc	nc	narrative[5]	nc	nc	10	8
Turbidity	NTU	nc	nc	narrative[6]	narrative[6]	narrative[6]	1.7	0.5
Hardness	mg/L	nc	nc	nc	nc	nc	4600	4500
Petroleum hydrocarbons								
PH C_{10}-C_{50}	mg/L	nc	2	nc	nc	nc	<0.1	<0.1
Metals								
Aluminium (Al)	mg/L	nc	nc	nc	nc	nc	0.06	0.05
Antimony (Sb)	mg/L	nc	nc	nc	0.5	1.5	<0.006	<0.006
Arsenic (As)	mg/L	*0.2*	0.4	0.0125	0.036	0.069	<0.002	<0.002
Barium (Ba)	mg/L	nc	nc	nc	nc	nc	<0.03	<0.03
Cadmium (Cd)	mg/L	nc	nc	0.00012	0.0093	0.043	<0.001	<0.001
Chromium (Cr VI)	mg/L	nc	nc	0.0015	0.05	1.1	<0.008	<0.008
Chromium, total (Cr)	mg/L	nc	nc	nc	nc	nc	<0.03	<0.03
Cobalt (Co)	mg/L	nc	nc	nc	nc	nc	<0.03	<0.03
Copper (Cu)	mg/L	0.3	0.6	nc	0.0037	0.0058	<0.003	<0.003
Iron (Fe)	mg/L	*3*	6	nc	nc	nc	0.2	<0.1
Lead (Pb)	mg/L	*0.2*	0.4	nc	0.0085	0.22	<0.001	<0.001
Manganese (Mn)	mg/L	nc	nc	nc	nc	nc	0.032	0.018
Mercury (Hg)	mg/L	nc	nc	0.000016	0.0011	0.0021	<0.0001	<0.0001
Molybdenum (Mo)	mg/L	nc	nc	nc	nc	nc	<0.03	<0.03
Phosphorus, total (P)	mg/L	nc	nc	nc	nc	nc	0.05	0.04
Nickel (Ni)	mg/L	*0.5*	1	nc	0.0083	0.075	<0.01	<0.01
Selenium (Se)	mg/L	nc	nc	nc	0.071	0.3	<0.001	<0.001
Silver (Ag)	mg/L	nc	nc	nc	nc	0.00115	<0.0003	<0.0003
Sodium (Na)	mg/L	nc	nc	nc	nc	nc	5200	4900
Zinc (Zn)	mg/L	*0.5*	1	nc	0.086	0.095	<0.005	<0.005
Anions								
Alkalinity, total	mg/L	nc	nc	nc	nc	nc	95	86
Acidity	mg/L	nc	nc	nc	nc	nc	12	12
Cyanide, total	mg/L	*1*	2	nc	1 (as free CN)	1 (as free CN)	<0.003	<0.003
Nitrogen ammonia (N-NH3)	mg/L	nc	nc	nc	nc	nc	<0.02	<0.02

Notes
1 Directive 019 sur l'industrie minière (Directive 019 on the mining industry), ministère du Développement durable, de l'Environnement et des Parcs, 1989, rev. 2012
2 Canadian Council of Ministers of the Environment, Canadian Environmental Quality Guidelines, 1987, 1999
3 Critères de qualité de l'eau de surface du Québec (Québec Surface Water Quality Criteria), ministère du Développement durable, de l'Environnement et des Parcs, 2009, rev. 2012.
4 In clear water (low suspended solids concentrations (<25 mg/L)): maximum increase of 5 mg/L from background levels (chronic effect) and maximum increase of 25 mg/L from background levels (acute effect).
5 True Colour: The mean absorbance of filtered water samples at 456 nm shall not be significantly higher than the seasonally adjusted expected value for the system under consideration.
Apparent Colour: The mean percent transmission of white light per metre shall not be significantly less than the seasonally adjusted expected value for the system under consideration.
6 Clear flow: Maximum increase of 8 NTUs from background levels (acute effect). Maximum average increase of 2 NTUs from background levels (chronic effect/long term).

Geology

The Kami Terminal is part of the Sept-Îles igneous complex, which is located in the Grenville geological province. The complex is the result of an intrusion that has been dated, using the Rb-Sr method, at 544 Ma by Higgins and Doig (1977). The intrusion is believed to be linked to the opening of the Lapetus Ocean.

The rocks of the site are part of the upper transitional structure and of the superior structure (Cimon 1997). The upper transitional structure is described as olivine bearing gabbro and troctolite. The superior structure is recognized by the apparition of potassic feldspar and quartz. However, some pockets of gabbro have been found in the superior structure. Finally, dykes of micro-gabbro and micro-granite are known to cut through both structures.

Field investigation carried out by Stantec in 2012 indicates that rock formation at the existing quarry is olivine bearing gabbro, which has only traces visible of sulfides and carbonates. Two subvertical dykes of micro-gabbro and micro-granite were exposed by the walls of the quarry. In open fractures of micro-gabbro dykes, sulfide blebs up to 1 cm across were observed. No visible carbonates were found in the dykes.

16.6 Assessment of Project-related Environmental Effects

Each effect will be assessed for each Kami Terminal phase.

16.6.1 Construction

The construction activities will include stream diversion and installing watercourse crossings. Stream diversion includes rerouting ruisseau à la Baleine around the future concentrate storage area. The rerouting will change locally the drainage pattern over a short distance. No significant environmental effect is anticipated.

The rail loop will cross two watercourses, ruisseau à la Baleine and an unnamed stream. Precast culvert box structures will be installed at the crossings of these streams on each side of the loop. These activities are likely to generate an increase in suspended materials in the water column. The typical effects associated with this source of disturbances are a temporary increase in turbidity in the water column, resulting in deterioration of water quality.

Potential for Acid Rock Drainage and Metal Leaching

The construction activities will involve the blasting and cut of rocks. The extracted materials will be crushed and serve as subgrade fill on the north and west portions of the rail loop and for the concentrate storage area. Sulphide minerals, if present in the crushed rock, could generate acid drainage which in turn could increase leaching of other contaminants from the waste rock when exposed to precipitation and oxygen. The potential for acid rock drainage and metal leaching (ARD/ML) usually occurs through reaction of oxygen and water with metal sulphides, which naturally occur at elevated concentrations in many types of rock. However, ARD does not occur if geologic materials contain enough carbonate minerals to neutralize the acid as it is generated.

ARD/ML testing of geologic materials from the Kami Terminal was carried out by Stantec. The approach used for this investigation is based on the Prediction Manual for the Drainage Chemistry from Sulfidic Geological Materials (MEND 2009). ARD potential was determined by Acid Base Accounting (ABA), which includes tests for paste pH, Neutralization Potential (NP), total S, total C, carbonate, acid leachable sulfate. Samples' representing different lithology's including altered and weathered rock types were sent to a certified laboratory. The ABA results were used for the calculation of Acid-Generating Potential (AP), Net Neutralization Potential (NNP=NP-AP) and Neutralization Potential Ratio (NPR=NP/AP), which are used as criteria for the ARD classification of mine wastes.

The results indicate that the Neutralization Potential of these materials greatly exceeded the Acid Potential. The NP/AP ratio, or Neutralization Potential Ratio, is used as a criterion in the recommended guidelines for the prediction of ARD potential in geologic materials (Price 2009). Materials with NPR greater than four are considered to be potentially non-acid generating. The samples had NPR values range from 8 to 57, which indicated that the materials would not generate ARD. In addition, water sampled in the quarry was alkaline, with the pH of 8.38 and 9.46. The conclusion is that ARD will not likely arise from the expansion of the quarry or use of materials from the site.

Metal leaching potential was also assessed through analysis of two water samples taken from pools in the existing quarry located on the Kami Terminal site. The samples were sent to a certified laboratory to be analyzed for pH, sulfate, alkalinity and total metals, and dissolved metals.

Metal concentrations in quarry pools were all significantly below the Directive 019 guidelines. Concentrations of aluminum, copper and cadmium exceeded the CCME guidelines. Aluminum concentrations (0.06 mg/L) observed in the quarry pools were significantly lower than concentration measured in the surrounding water bodies (Tables 16.4 and 16.5). The highest copper concentrations (0.005 and 0.008 mg/L) also exceeded the CCME guideline (0.001 mg/L). A sample from the baseline dataset taken upstream of the quarry presents the higher concentration of copper (0.12 mg/L). Cadmium (0.00015 mg/L) marginally exceeds the CCME guideline (0.00014 mg/L) in one sample. In general, it could be concluded that the concentrations of the elements exceeding the CCME guidelines were within the range of baseline concentrations. Therefore, metal leaching from the rock will not likely cause any significant change in the concentrations of these elements in surface water and sediments.

Mitigation of Project Environmental Effects

During the construction phase, the following mitigation measures will be implemented:

- Apply standard and best practices and general environmental protection measures;
- Use of silt fencing downstream of the work area and at the limits of the work zone to reduce the carriage of silt and fines in any water runoff from the area;
- Avoid unnecessary encroachments in the riparian habitat on either side of streams;

- No debris will be disposed in the aquatic environment and any debris introduced will be remove as soon as possible;
- No earth-moving or excavation work will be carried out near streams during high water periods or heavy rains;
- Use machinery that is in proper operating condition in order to avoid any oil or fuel leaks;
- Clean, maintain and store work site machinery and vehicles on a site designated for this purpose at a distance of over 30 metres from streams and ensure an on-site supply of absorbent materials in case of accidental spills as well as properly identified sealed recipients for collecting petroleum products and waste materials; and,
- Stabilize slopes as soon as possible using recognized bioengineering techniques that take into account instability, sensitivity to erosion, slope and height of the embankment.

16.6.2 Operations and Maintenance

Potential for Acid Rock Drainage and Metal Leaching

In Volume 1 of the EIS, the ARD and ML potential of the different lithologies and materials exposed during the Project was assessed for the overburden stockpile, the waste rock dumps, the open pit, the tailings and the stockpiles of ore concentrate. The only exposed materials from the Project that will be present at Kami Terminal are the concentrate.

As presented in Volume 1, the concentrate will be non-acid generating. A phased ARD/ML testing of geologic materials from the mine site was undertaken. Eighty samples were selected from drill cores including representatives of overburden, open pit walls, waste rock and ore. The samples were submitted to a certified laboratory for Acid Base Accounting (ABA) to measure the potential for ARD, and Shake Flask Extraction (SFE) to measure the potential for ML. The ARD/ML potential was also measured in twelve samples of concentrate and tailings that had been generated from the Rose Lake deposit during metallurgical testing. Process water from the metallurgical testing was analyzed for routine parameters and metals.

Static tests of concentrate and tailings samples indicated that the Neutralization Potential of these materials greatly exceeded the Acid Potential. The samples of Kami concentrate and tailings had Neutralization Potential Ratio values ranging from 7.3 to 233, which indicated that tailings and concentrate would not generate ARD. As mentioned previously, materials with NPR greater than four are considered to be potentially non-acid generating. In addition, process water and SFE leachates were alkaline, with the pH ranging from 8.1 to 9.1. The conclusion is that the concentrate and tailings will be non-acid generating.

Metal concentrations in the process water and SFE leachates from tailings and concentrates were significantly below parameters prescribed by the Metal Mining Effluent Regulation (MMER 2002) and most parameters regulated under Environment Canada's *Guidelines for the Protection of Freshwater Aquatic Life*. Exceedances of the CCME guidelines were observed for copper, iron, aluminum, and cadmium. Elevated copper (~0.006 mg/L) was observed only in the process water but was likely related to contamination from copper pipes rather than from the materials, because no exceedances were observed in the leachates extracted with deionized water from tailings and concentrates. Therefore, copper exceedances were not related to the leaching. Iron and aluminum were generally present in the suspended or colloidal fraction passing 0.45 µ filter and were unrelated to metal leaching by acid. Exceedances for total cadmium in the process water was likely related to high concentrations of Total Suspended Solids (TSS). Concentrations of iron, aluminum and cadmium would therefore likely be lowered by the removal of most suspended solids prior to discharge.

Potential Generation of Red Water

The outdoor (uncovered) storage of iron ore concentrate can potentially generate “red water” when exposed to precipitations. Red water is the term used for water which contains fine precipitated iron oxide/hydroxide.

Ferrous iron (Fe2+) is generally strongly soluble at low and ambient pH values, with a minimum solubility at a pH of approximately 11 or greater, precipitating as ferric hydroxide $Fe(OH)_2$. However, Fe2+ is easily oxidized to ferric iron (Fe3+), which is less soluble at ambient pH values, precipitating as ferric hydroxide $Fe(OH)_3$, red iron oxide (Fe_2O_3), and other compounds, at pH values of 4 and above. The oxidation of Fe2+ to Fe3+ occurs rapidly, and between pH 4 and pH 8, oxidation rates increase with increasing values of pH, temperature and oxygen concentration. Oxidation may be biological where sufficient carbon is present, involving bacteria such as *Gallionella* and *Leptothrix*; or it may be abiotic, involving simply aeration. Without proper mitigation, the red water from the concentrate ore strockpile could infiltrate in the ground or drain in nearby waterbodies downstream, affecting the surface and groundwater quality as well as sediment quality.

Mitigation of Project Environmental Effects

As part of the Kami Terminal design, the concentrate storage yard will contain a liner in conformance with Port requirements. Runoff water in the concentrate storage area will be collected below the surface in buried piping and will flow by gravity to a stormwater retention pond with liner for treatment. Separation of the precipitated ferric iron particles from the water may be accomplished by simple gravity sedimentation, by enhanced coagulation and settling, by filtration, and by other more sophisticated separation techniques. The final selection of the appropriate treatment technique depends on the treatability characteristics of the concentrate transfer area drainage, and will be determined during the detailed engineering design phase of the Kami Terminal.

Treatment concept under consideration at this stage is mechanical treatment. Water treatment will be designed to meet MDDEP Directive 019 effluent discharge limits and to ensure that receiving water within the effluent mixing zone will not exceed the CCME water quality guideline for the protection of aquatic life and the Québec surface water quality criteria for the protection of aquatic life. This treatment concept would include the following major components:

- Retention / sedimentation pond, as outlined above, with a total storage volume capacity of approximately 25,000 m^3;

- Decant pumping station to transfer the pond's effluent to an enhanced treatment system; with a firm pumping capacity of 8,300 m^3/d (5.8 m^3/min);
- An enhanced coagulation / settling treatment system, designed for a flow rate of 8,300 m3/d (5.8 m^3/min), which would activate with partial or complete filling of the retention pond. The system will include: pH adjustment, feed of sand as a ballasted settling substrate, and polymer, as well as an inclined plate settling chamber, ongoing removal of settled sludge, and cyclone separation of sludge to recover sand. Achievable settling rates are estimated at approximately 20 times the rate of simple gravity settling systems such as standard sedimentation ponds;
- Gravity pipe discharge to an outfall point in ruisseau à la Baleine;
- Small building to shelter the treatment chemical storage and control components; and,
- Lined landfill for final disposal of removed treatment sludge.

16.6.3 Decommissioning and Reclamation

No significant interactions (ranked of '2') were identified for the decommissioning and reclamation.

16.6.4 Summary of Project Residual Effects

The residual environmental effects of the Kami Terminal on Water Resources are summarized in Table 16.6. The residual environmental effects on Water Resources for construction and operation of the Kami Terminal are characterized by the following descriptors: direction; magnitude; geographic extent; duration and frequency; reversibility; ecological/socio-economic context, significance, and prediction confidence.

Table 16.6 Summary of Residual Environmental Effects of Kami Terminal: Water Resources

Kami Terminal Phase	Mitigation / Compensation Measures	Residual Environmental Effects Characteristics									Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental or Socio-Economic Context	Significance	Prediction Confidence	
Change in Surface Water Quality											
Construction	• Apply standard and best practices and general environmental protection measures. • Use of silt fencing downstream of the work area and at the limits of the work zone to reduce the carriage of silt and fines in any water runoff from the area. • Avoid unnecessary encroachments in the riparian habitat on either side of streams. • No debris will be disposed in the aquatic environment and any debris introduced will be removed as soon as possible. • No earth-moving or excavation work will be carried out near streams during high water periods or heavy rains. • Use machinery that is in proper operating condition in order to avoid any oil or fuel leaks. • Clean, maintain and store work site machinery and vehicles on a site designated for this purpose at a distance of over 30 m from streams and ensure an on-site supply of absorbent	A	N	S	ST	S	R	D/U	N	H	Monitoring of water quality of the stormwater retention pond discharge to ensure compliance with the MDDEP Directive 019 guidelines, CCME water quality requirements for the protection of aquatic life and Québec surface water criteria for the protection of aquatic life.
Operation and Maintenance		A	L	L	MT	R	R	D/U	N	H	

Kami Terminal Phase	Mitigation / Compensation Measures	Residual Environmental Effects Characteristics									Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental or Socio-Economic Context	Significance	Prediction Confidence	
Decommissioning and Reclamation	materials in case of accidental spills as well as properly identified sealed recipients for collecting petroleum products and waste materials. • Stabilize slopes as soon as possible using recognized bioengineering techniques that take into account instability, sensitivity to erosion, slope and height of the embankment. • Concentrate storage area will contain a liner in conformance with Port requirements. • Stormwater collection in the concentrate storage area and drainage directed toward a retention pond with liner. • Water treatment before release to the environment to respect Directive 019 and ensure that receiving water will not exceed the CCME water quality guideline for the protection of aquatic life.	A	N	S	ST	S	R	D/U	N	H	
Change in Surface Water Drainage Patterns											
Construction	None recommended	A	L	L	MT	R	R	D/U	N	H	No monitoring required
Operation and Maintenance		A	N	S	ST	S	R	D/U	N	H	
Decommissioning and Reclamation		A	N	S	ST	S	R	D/U	N	H	

Kami Terminal Phase	Mitigation / Compensation Measures	Residual Environmental Effects Characteristics									Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental or Socio-Economic Context	Significance	Prediction Confidence	
Change in Groundwater Quality											
Construction	• Apply standard and best practices and general environmental protection measures. • Use machinery that is in proper operating condition in order to avoid any oil or fuel leaks. • Clean, maintain and store work site machinery and vehicles on a site designated for this purpose at a distance of over 30 m from streams and ensure an on-site supply of absorbent materials in case of accidental spills as well as properly identified sealed recipients for collecting petroleum products and waste materials. • Concentrate storage area will contain a liner in conformance with Port requirements. • Stormwater collection in the concentrate storage area and drainage directed toward a retention pond with liner.	A	N	S	ST	S	R	D/U	N	H	No monitoring required
Operation and Maintenance		A	L	L	MT	R	R	D/U	N	H	
Decommissioning and Reclamation		A	N	S	ST	S	R	D/U	N	H	

Kami Terminal Phase	Mitigation / Compensation Measures	Residual Environmental Effects Characteristics									Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental or Socio-Economic Context	Significance	Prediction Confidence	

KEY

Direction:
- P Positive: condition of the Water Resources is improving in comparison to baseline conditions and trends.
- N Neutral: no change in the condition of the Water Resources compared to baseline conditions and trends.
- A Adverse: condition of Water Resources is worsening in comparison to baseline conditions and trends.

Magnitude:
- N Negligible: no measurable adverse effect anticipated.
- L Low: effect occurs that is detectable but is within normal variability of baseline conditions.
- M Moderate: effect occurs that would cause an increase with regard to baseline but is within regulatory limits and objectives.
- H High: effect occurs that would singly or as a substantial contribution in combination with other sources cause exceedances of objectives or standards.

Geographic Extent:
- S Site: effect restricted to the Project footprint within the LSA;
- L Local: effect restricted to the LSA; or,
- R Regional: effect within the RSA.

Duration:
- ST Short term: effect occurs for less than three years;
- MT Medium term: effect occurs for between three and 20 years;
- LT Long term: effect persists beyond 20 years.

Frequency:
- O Once: effect occurs once;
- S Sporadic: effect occurs at sporadic intervals;
- R Rarely: effect occurs on a regular basis and at regular intervals;
- C Frequently: effect occurs continuously throughout the Project life.

Reversibility:
- R Reversible: effect ceases when Project operations cease.
- I Irreversible: effect continues after Project operations cease.

Environmental or Socio-economic Context:
- U Undisturbed: effect takes place within an area that is relatively or not adversely affected by human activity; or,
- D Developed: effect takes place within an area with human activity. Area has been substantially previously disturbed by human development or human development is still present.

Significance:
- S Significant.
- N Not Significant.

Prediction Confidence:

Based on scientific information and statistical analysis and effectiveness of mitigation or effects management measure.
- L Low level of confidence.
- M Moderate level of confidence.
- H High level of confidence.

16.7 Assessment of Cumulative Effects

In association with the Kami Terminal environmental effects discussed above, an assessment of the potential cumulative effects has been conducted for other projects and activities that have potential to interact with the Kami Terminal. The potential for overlap between Kami Terminal activities and cumulative effects of other projects is identified in Table 16.7 and explained below.

As described above, the Kami Terminal could lead to a change to surface quality as a result of ground disturbance at proximity to watercourses. Surface and water quality could also be affected by the release of suspended particles and iron laden water (red water) in the environment during the operation phase. With the application of mitigation measures, including the collection and treatment of water in contact with the ore concentrate, these effects are likely to be not significant.

Two watercourses are located within the LSA: ruisseau à la Baleine and an unnamed stream located further west. They flow into small coves (anse à Brochu and anse à la Baleine) of baie des Sept-Îles. Both streams are partially channelled through culverts at road and railway crossings.

Aluminerie Alouette is located in the RSA. It does not presently discharge industrial effluent in the environment; all process water is recirculated or evaporated. Runoff is channelled to a settling basin before being discharged into the Gulf of St. Lawrence. Domestic sewage is channelled to a wastewater treatment plant (aerated ponds) built by the City of Sept-Îles for the aluminum works (Environment Canada 1998). Their effluent discharge criteria are defined by the industrial depollution attestation issued by the MDDEP. Although no technical details are available on the plant new expansion phase, it is assumed that Aluminerie Alouette will continue to recycle its process water after expansion.

In the case of the expansion of the Port of Sept-Îles, a multi-user deep water dock with two ship loaders and two conveyer lines will be built. Construction activities in baie des Sept-Îles will follow requirements from DFO for the protection of fish, fish habitat and therefore water resources.

No information presently exists on railway changes that will need to be made on the CFA and QNS&L railways to accommodate new users. It is expected that new lines will be constructed and that numerous crossing may have to be built. No overlapping is expected within the Kami Terminal activities.

Cliffs Naturals Resources is planning to improve its railway and port infrastructure at the Pointe-Noire Terminal in Sept-Îles. It is expected that the infrastructure to be built for this project would be similar to the Kami Terminal infrastructure and that Cliffs Natural Resources will have to implement erosion control measures and also meet regulatory standards for red water runoff from its own iron concentrate storage area.

The second pellet plant in Port-Cartier proposed by ArcelorMittal Mines Canada is not located within the RSA.

Table 16.7 Potential Cumulative Effects to Water Resources

VEC Existing Condition (Past & On-Going Activities)	Two watercourses are located within the local study area: ruisseau à la Baleine and an unnamed stream located further west. Both streams are partially channelled (culverts) at road and railway crossings. They flow into small coves (anse à Brochu and anse à la Baleine) of baie des Sept-Îles. Water sampled in these streams exhibited the presence of aluminium, copper, iron, lead and manganese. Most of these metals were detected upstream and downstream of the developed area.		
Kami Terminal Residual Environmental Effects	• Effect 1- Change to surface water quality: Alderon will collect and treat all waters in contact with the iron ore concentrate. Applicable discharge standards will be respected. The Kami Terminal will not have significant adverse residual environmental effects on Water Resources given effects management by Alderon. • Effect 2: Change in surface drainage pattern • Effect 3: Change to groundwater quality: the concentrate storage area will be lined to avoid infiltration of potentially contaminated water in groundwater. Residual adverse environmental effects on groundwater resources are considered to be of not significance.		
Other Projects / Activities	**Likely Effect Interaction (Y/N)**	**Rationale**	**Cumulative Effects**
Pointe-Noire Port Expansion (Port of Sept-Îles)	Y	This project is located in close proximity to the Kami Terminal. Construction will involve work near or in baie des Sept-Îles.	• Kami Terminal construction schedule will overlap with the port Expansion construction. Both projects can potentially generate erosion and sedimentation. • Considering the implementation of standard mitigation measures and EPP, no significant adverse cumulative effect is anticipated
CFA and QNS&L	N	No construction work in known to occur near the Kami Terminal in a near future.	• None anticipated.
Alouette Aluminum Smelter (Aluminerie Alouette)	N	Aluminerie Alouette recycles its process water and does not discharge industrial effluent in the environment.	• None anticipated.
Second Port-Cartier Pellet Plant (ArcelorMittal)	N	This project is located outside the regional study area and therefore does not overlap with the RSA	• None anticipated.

Bloom Pointe-Noire Terminal (Cliffs Resources)	Y	This project should be similar to the Kami Terminal and will have to mitigate issues such as red water and slope stability near stream crossings.			• Bloom Lake Mine is also shipping iron ore at the Pointe-Noire Terminal. The main source of effect on water resources will be the generation of red water. • Representatives from the Port Authority of Sept-Îles advised that Directive 019 needed to be respected by Alderon. As Cliffs Resources' project will also be located within Port of Sept-Îles, it is expected that the same requirements will apply.			
Arnaud Apatite-Magnetite mine (Mine Arnaud)	Y	The Arnaud Mine will discharge its treated mining effluent in ruisseau Clet, which flows into baie des Sept-Îles.			• The effluent quality will have to comply with Directive 019 and MMER discharge standards, as well as effluent discharge objectives that will be defined at the permit stage. No significant adverse environmental effect is anticipated.			
Cumulative Effects Summary (Kami Terminal + All Relevant Projects / Effects)	**Direction**	**Magnitude**	**Geographic Extent**	**Duration**	**Frequency**	**Reversibility**	**Significance**	**Confidence**
	N	**L**	**R**	**MT**	**R**	**R**	**N**	**H**
Note: Environmental effects descriptors and their definitions are as used in the assessment of Kami Terminal environmental effects (See Table 16.6),								

Mine Arnaud proposes the development of an apatite and magnetite mine with a production capacity of 23,000 tonnes per day. It will be located approximately 15 km west of Sept-Îles, Québec near the baie des Sept-Îles. Wastewater management will include the discharge of treated effluent in ruisseau Clet. This stream flows into the western section of baie des Sept-Îles. According to the environmental impact study carried out for the apatite mine, pH of the effluent is anticipated to be more alkaline than background levels in ruisseau Clet (pH between 5 and 5.2). Aluminum levels are also expected to be higher than background but the effluent will have to respect environmental standards before being discharge. The applicable discharged standards are defined by the MDDEP Directive 019 and Metal Mining Effluent Regulations (MMER). Effluent discharge objectives (EDO) applicable to mining effluent will also be defined as part of the project approvals (certificate of authorization). EDOs are normally based on the provincial surface water criteria (MDDEP), which are usually more stringent than the Directive 019 standards.

As a result of the above factors, any cumulative effects on this VEC as a result of the Kami Terminal and other projects and activities are not likely to be significant.

16.8 Assessment of Accidents and Malfunctions

Accidents and malfunctions that could interact with Water Resources are listed in Table 16.2. Concerns in these cases are associated with the accidental release of hazardous material onsite and potential water contamination during activities at the port.

Forest Fire

The Kami Terminal is located next to a forest area. Although unlikely, Kami Terminal activities involving the use of heat or flame could result in a fire. The burning of the forest cover and scorching of the forest floor would remove the interception capacity of trees. Therefore a forest fire would affect the water balance by increasing overland flows. The deposition of volatile organic compounds, ash and other burning residuals could affect local water quality. Runoff from a burn would carry burn residual material to receiving waters and would degrade surface water quality. Natural regrowth or planned reforestation would reverse the water quantity and quality effects. The extent and duration of a resulting fire would be dependent on response efforts and meteorological conditions. Emergency response measures in case of a fire will be integrated into the existing emergency response plans for the Port of Sept-Îles, the City of Sept-Îles and the Sopfeu.

Stormwater Retention Pond Breach

A stormwater retention pond will be created in order to collect and treat red water generated from precipitation water runoff from the iron ore stockpiles. The pond is being designed to accommodate the 100-year storm. However, in the unlikely event of a breach or overflow at the stormwater retention pond, red water could be released to the downstream environment. In such an event, it is expected that TSS levels would exceed regulated release criteria. It is anticipated that baie des Sept-Îles could rapidly recover.

The results of the assessment of potential residual environmental effects of accidents and malfunctions are summarized in Table 16.8.

Train Derailment

Ore concentrate will be transported from the Kami Mine site in Labrador to the Kami Terminal. Daily, a train will carry between 24,000 and 26,000 tonnes of ore concentrate in 240 railcars. A train derailment could result in the depositing of iron ore concentrate on the ground or in water at stream crossings. Based on experience with other train derailments on the QNS&L, the reasonable worst-case is the loss of 60 to 75 cars in derailment. Fuel spill would be limited to the amount of fuel contained in the locomotive.

Measures to prevent derailment include manual inspection of all railway components, electronic wayside inspections during transport, and both manual and electronic track inspections. The implementation of Emergency Response and Contingency plans will minimize adverse effects impacts and enable rapid rehabilitation and effective recovery.

Table 16.8 Summary of Residual Environmental Effects for Water Resources – Accidents and Malfunctions

Accident / Malfunction	Mitigation / Compensation Measures	Residual Environmental Effects Characteristics									Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental or Socio-Economic Context	Significance	Prediction Confidence	
Forest Fire	Forest fire emergency response plan	A	L	R	T	O	R	D/U	N	M	None recommended
Stormwater Retention Pond Breach	Pond designed to accommodate a 100-year storm.	A	M	R	L	O	R	D/U	N	M	Monitor success of remediation
Train Derailment	Spill containment/ cleanup/ reclamation Manual/electronic/track inspections	A	M	R	L	O	R	D/U	N	L	Monitor success of remediation

Accident / Malfunction	Mitigation / Compensation Measures	Residual Environmental Effects Characteristics									Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental or Socio-Economic Context	Significance	Prediction Confidence	

KEY

Direction:
- P Positive: condition of the Water Resources is improving in comparison to baseline conditions and trends.
- N Neutral: no change in the condition of the Water Resources compared to baseline conditions and trends.
- A Adverse: condition of Water Resources is worsening in comparison to baseline conditions and trends.

Magnitude:
- N Negligible: no measurable adverse effect anticipated.
- L Low: effect occurs that is detectable but is within normal variability of baseline conditions.
- M Moderate: effect occurs that would cause an increase with regard to baseline but is within regulatory limits and objectives.
- H High: effect occurs that would singly or as a substantial contribution in combination with other sources cause exceedances of objectives or standards beyond the Project boundaries.

Geographic Extent:
- S Site – within PDA.
- L Local: within the LSA.
- R Regional: within the RSA.

Duration:
- ST Short term: effect occurs for less than three years.
- MT Medium term: effect occurs for between three and 20 years.
- LT Long term: effect persists beyond 20 years.

Frequency:
- O Once: effect occurs once.
- S Sporadic: effect occurs at sporadic intervals.
- R Rarely: effect occurs on a regular basis and at regular intervals.
- C Frequently: effect occurs continuously throughout the Project life Continuous.

Reversibility:
- R Reversible: effect ceases when Project operations cease.
- I Irreversible: effect continues after Project operations cease.

Environmental or Socio-economic Context:
- U Undisturbed: Area relatively or not adversely affected by human activity.
- D Developed: Area has been substantially previously disturbed by human development or human development is still present.

Significance:
- S Significant.
- N Not Significant.

Prediction Confidence:
Based on scientific information and statistical analysis effectiveness of mitigation or effects management measure.
- L Low level of confidence.
- M Moderate level of confidence.
- H High level of confidence.

16.9 Determination of Significance of Residual Adverse Environmental Effects

16.9.1 Determination of Significance of Project Effects

Construction activities can potentially generate erosion and sedimentation in nearby waterbodies and introduce deleterious substances affecting surface and groundwater quality. With the application of best management practices and mitigations measures, the effects to water resources are expected to be not significant.

No issues with ARD / ML are anticipated with the use of blasted or cut rocks on-site and the storage of concentrate ore. Both materials show neutralization potential greatly exceeding acid potential.

During operation activities, the concentrate handling and stockpiling has the potential to generate water laden with particles, including iron (red water) affecting surface water quality in local drainage areas and groundwater quality. With the application of mitigation measures, the residual environmental effects on water resources are expected to be not significant.

Decommissioning and reclamation activities are expected to be similar in all respects to the construction phase, and are also unlikely to be significant for the water resources.

There is a high level of confidence in the assessment of environmental effects and significance prediction because of the localized effects on groundwater and surface water and the use of efficient mitigation measures.

16.9.2 Determination of Significance of Cumulative Effects

Similarly to the Kami Terminal, other mining projects identified in the RSA will also discharge water/effluent in baie des Sept-Îles. They will be required to treat red water (Cliffs Natural Resources) or effluent (Mine Arnaud) prior their discharge in the environment as per the applicable regulations or conditions imposed by regulators.

Kami Terminal construction schedule will overlap with the port expansion construction. Both projects can potentially generate erosion and sedimentation that will be mitigated with the implementation of standard mitigation measures and EPP.

As a result of the above factors, any cumulative effects on this VEC as a result of the Kami Terminal and other projects and activities are not expected to be significant.

16.9.3 Determination of Significance of Effects Resulting from Accidents and Malfunctions

A forest fire, a train derailment or a stormwater retention pond breach could affect surface and groundwater quality. The application of prevention measures and the implementation of an emergency response plan will minimize adverse effects and enable rapid rehabilitation and effective recovery.

16.9.4 Overall Residual Effects Conclusion

In summary, given the planned mitigation, and the analyses presented in this assessment, the change in surface and groundwater quality and change in surface water drainage patterns on the Water Resources as a result of the construction, operation and decommissioning of the Kami Terminal, including cumulative effects, are not likely to be significant. The effects of accidents and malfunctions are likely to be not significant.

16.10 Follow-Up and Monitoring

Water quality of the stormwater retention pond discharge will be monitored to ensure compliance with the MDDEP Directive 019 guidelines, CCME water quality requirements for the protection of aquatic life and Québec surface water criteria for the protection of aquatic life. The monitoring will be conducted on a monthly basis for at least the first year of operations. Afterwards, the frequency of monitoring will be adjusted depending on the effluent quality. Parameters that will be monitored include flow, pH, temperature, metals (aluminum, arsenic, copper, iron, lead, nickel and zinc), total suspended solids, alkalinity and petroleum hydrocarbons C_{10}-C_{50}.

16.11 Next Steps

No data collection is needed for water resources prior to construction.

16.12 Summary

Given the planned mitigation, and the analyses presented in this assessment, the potential change in Water Resources as a result of the Kami Terminal during all phases, including cumulative effects, are rated not significant.

17.0 WETLANDS

17.1 VEC Definition and Rationale for Selection

Wetlands are identified in the EIS Guidelines in recognition of the potential for interactions between Kami Terminal activities and the wetland environments and the relationship of those wetlands with wildlife and other biological and physical environments, as well as in recognition of the federal and provincial policies regarding wetlands.

Wetlands cover a sizable proportion of the natural landscape of Québec and are a major constituent of the undisturbed boreal ecosystem, where they provide a number of ecological (physical, chemical, and biological) and socio-economic functions that are of value to regulatory agencies, the public, and ecosystems.

17.1.1 Issues

Only one issue was raised by the public and other stakeholders related to wetlands in the Pointe-Noire area. Details on the issues raised by stakeholders are provided in Table 17.1.

Table 17.1 Issues Raised by Stakeholders

Issue	Community / Organization	Summary of Comments Raised During Consultation and Engagement Activities	Response / Location in the EIS
Wetlands	Sept-Îles	There is a protected wetland in the Pointe-Noire area	Review of aerial maps and field work revealed no wetlands were identified within the PDA at the Pointe-Noire Terminal and for that reason is not further assessed.

18.0 FRESHWATER FISH, FISH HABITAT, AND FISHERIES

18.1 VEC Definition and Rationale for Selection

The EIS guidelines state that Freshwater Fish, Fish Habitat and Fisheries must be considered as a VEC. Freshwater fish and fish habitat means freshwater fish species and the habitat upon which they depend. In accordance with Section 2 (1) of the revised *Fisheries Act*, fish habitat is defined as "spawning grounds and any other areas, including nursery, rearing, food supply and migration areas, on which fish depend directly or indirectly in order to carry out their life processes".

Two freshwater streams are located in the LSA: ruisseau à la Baleine and an unnamed stream located west flowing in anse à Brochu. Neither of these streams provides habitat that supports freshwater fish populations. Both streams have barriers to upstream fish passage (i.e., aggregate at the mouth of the stream and the steep topography of upstream sections), and the upstream reaches of both watercourses are steep and intermittent.

Fish community sampling was conducted in June 2012 (Appendix I, Stantec 2012c). No fish were collected or observed in ruisseau à la Baleine. A total of four individual threespine sticklebacks (*Gasterosteus aculeatus*) were captured in the un-named stream upstream from the culvert. Threespine stickleback can be found in both freshwater and marine environments and are not strictly freshwater fish. It is likely that the four individuals recorded in the un-named stream have been isolated because of the existing barrier at the mouth of the stream.

Based on the existing conditions described above, Freshwater Fish, Fish Habitat and Fisheries do not occur in the LSA.

18.1.1 Issues

The following issues were raised by the public and other stakeholders:

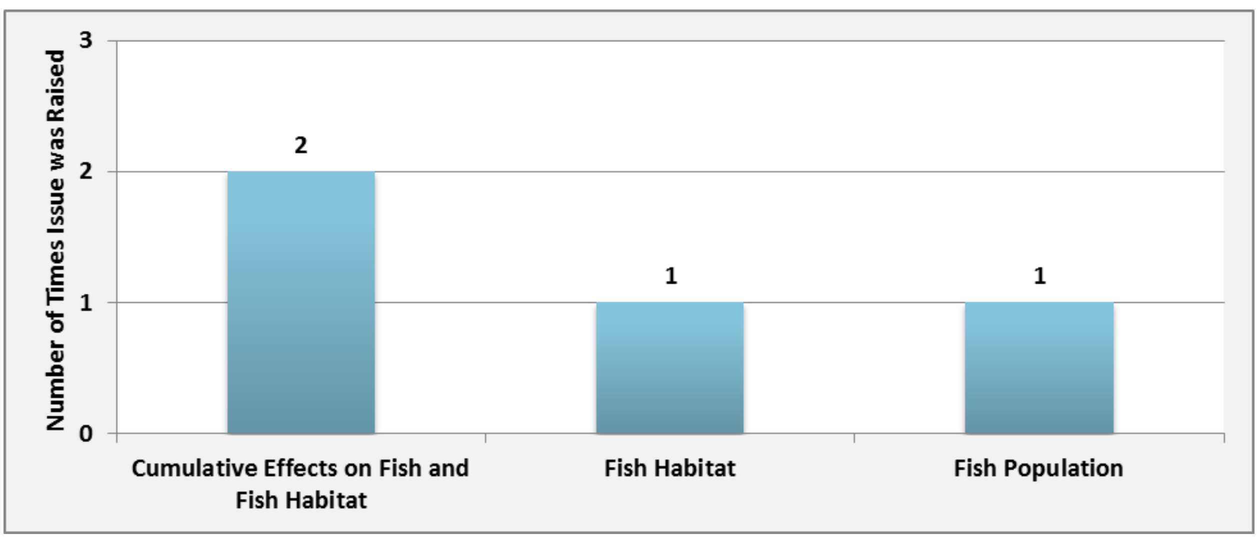
- Cumulative effects on fish and fish habitat;
- Fish population; and,
- Fish habitat.

Details on the issues raised by stakeholders are provided in Table 18.1. The number of times each issue was raised is shown in Figure 18.1.

Table 18.1 Issues Raised by Stakeholders

Issue	Community / Organization	Summary of Comments Raised During Consultation and Engagement Activities	Response / Location in the EIS
Cumulative Effects on Fish and Fish Habitat	CRE/CPESI	There is a lot of pressure around the bay, concerned about cumulative effects. It would be great if elements of the Kami Terminal could be located further to the shore.	Alderon assessed several alternatives when choosing a site for the Terminal. The selected site was the most economically and technically feasible. More information regarding site selection can be found in **Section 2.8.** Alderon will minimize its influence on the baie of Sept-Îles including treatment of final effluent treatment will meet or surpass standards. More information can be found in **Section 16.6.**
Fish Population	Sept-Îles	Resident asked about the potential effects of the Kami Terminal on fish in ruisseau a la Baleine.	In response to concerns raised regarding the presence of fish at the Terminal site, Alderon conducted a fish and fish habitat survey. The findings of this survey are provided in **Chapter 18**.
Fish Habitat	Sept-Îles	Resident voiced concern about impact of increasing rail traffic on the rivière Nipississ, particularly its effect on salmon spawning grounds. Discussed how the vibrations from the rail traffic would destroy salmon spawning.	Rail operations in the vicinity of the Nipississ River are beyond the scope of the Kami Terminal. This activity is the mandate of the QNS&L Railway and all operations are required to comply with all applicable provincial and federal regulations regarding fish and fish habitat.

Figure 18.1 Frequency of Issue Raised Related to Freshwater Fish, Fish Habitat, and Fisheries



19.0 BIRDS, OTHER WILDLIFE AND THEIR HABITATS, AND PROTECTED AREAS

19.1 VEC Definition and Rationale for Selection

Birds, Other Wildlife and their Habitats refer to animal species that are potentially feeding, breeding, or migrating throughout the Kami Terminal area. It includes both migratory and non-migratory birds (i.e., waterfowl, raptors, shorebirds, marsh birds, and other land birds), amphibians, small mammals, ungulates (e.g., moose) and furbearers (e.g., black bear, red fox, beaver and otter). It also includes their habitats and protected areas (e.g., provincial waterfowl gathering areas, and migratory bird sanctuaries). Though there is some overlap of subject matter, species at risk and species of conservation concern are addressed in Chapter 20.

The Protected Areas portion of this VEC has been selected because of the need to protect ecosystems, species diversity, important habitats and ecosystems. In consideration of the existing disturbances at the Port of Sept-Îles, and the limited direct disturbance to habitats within the PDA, the Kami Terminal is unlikely to result in significant environmental effects on wildlife and their habitat, with proper design and following standard and proven mitigation.

19.1.1 Approach to Assessment of Effects

Information used to determine the known or likely presence of birds and other wildlife in or near the PDA was derived from reviews of both historical records and baseline data sources, including:

- Government and non-government sources, including the *ministère des Ressources naturelles et de la Faune* (MRNF) database on protected wildlife habitats, the *Centre de données sur le patrimoine naturel du Québec* (CDPNQ), *Atlas des amphibiens et reptiles du Québec* (AARQ), and the Québec Breeding Bird Atlas (QBBA);
- Published and unpublished literature by the Study Team and others, including peer-reviewed academic journals, research project reports, government publications;
- Recent aerial photographs, satellite imagery from Google Earth, and topographical maps that could indicate the presence of bird or other wildlife species or habitats; and
- Field studies of herpetofauna and birds conducted in May and June, 2011.

19.1.1.1 Birds Baseline

Field / Sampling Methods

Dedicated field surveys for avifauna were conducted on June 28 and June 29, 2011. The survey team consisted of a lead ornithologist and a field technician who completed point counts, linear transects and a walking survey, as well as nocturnal survey (call-back recordings).

Point Count Surveys

Visual and auditory signs of the presence of birds were noted over a 10 minute period of time at 3 sampling points located in the vicinity of the proposed layout of the Kami Terminal. The field personnel travelled from one sampling point to another by foot. All birds identified by sight or sound were recorded as being within 50 m, between 50 and 100 m, or greater than 100 m away from the observer. Individuals heard at separate locations and distances were designated as such. The following parameters were recorded: point count location (point count identification, UTM coordinates), surveyor, survey date, start and finish time of data collection, weather information (temperature, wind speed (Beaufort scale), cloud, precipitation), observed species, number of individuals, subspecies, colour phase (if applicable), habitat, and breeding code.

Linear Transects

The survey included four linear transects. Two transects were established to study the dominant habitats at either end of the storage yard area while accessing the point counts. Two other transects of between 300 and 400 m of length were surveyed in the surrounding area to establish a comparison with the storage site. Visual and auditory signs of the presence of birds were noted while walking along the transect path.

Walking Surveys

Walking surveys (also known as atlassing) along access roads within the study area were carried out to obtain more information on species using the area. The area surveyed included the south side of the main access road to the site, the transmission line corridor, the access road to the communication tower located south of the Kami Terminal and to lac Brochu. Visual and auditory signs of the presence of birds were noted, as well as breeding behaviours, while walking to and within these areas.

Nocturnal Surveys

A night survey using call-back recordings was undertaken on June 28 to determine the occurrence of nightjars and owls. Following a short period of listening, each call-back sound was played at locations along the access road to the communication tower, based on available habitat in the area.

Data Analysis

The QBBA database was used to establish a list of species potentially present in the study area. The 10 km by 10 km reference square covering the study area (19FR85) is from region 29 (MRC de Sept-Rivières). The North American Breeding Bird Survey (BBS) database was also consulted as BBS Route 86, is nearby but is no longer active. A request for information on the presence of threatened and vulnerable species or species at risk in the Kami Terminal area was addressed to the CDPNQ.

Data were compiled in a spreadsheet by bird species. The list of species present in the study area during the field survey was compared with the provincial and federal lists of bird species with special protection status under the federal *Species at Risk Act* (SARA) and the Québec *Act respecting threatened or vulnerable species* and Regulations (QARTVS). Species considered to be at risk in Canada by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC, 2011) and the general status of species in Canada published by the Canadian Endangered Species Conservation Council (CESCC, 2011) were also considered.

The following sources of information were also consulted:

- *Ministère des Ressources naturelles et de la Faune* (MRNF) map of wildlife habitat protected under QACDW (MRNF, 2011);
- Map of Migratory Bird Sanctuaries published by Natural Resources Canada (NRCan, 2006); and,
- Seabird Colonies (Environment Canada, 2011).

19.1.1.2 Herpetofauna Baseline

Field / Sampling Methods

Surveys were conducted in the Kami Terminal study area between May 25 and May 27, 2011 to confirm the presence of amphibians and reptiles and their use of habitat. The team consisted of a field lead and a field technician who completed untimed directed searching during the day and call surveys during at night.

The study area was covered on foot in order to localize reproduction sites, ponds and wetlands. Visual searches for amphibians were more prolonged along the watercourses. The shallow water zone, the waterline and the shore zone was investigated on foot. A long handled net was used to disturb vegetation and flush frogs out of dense vegetation.

The search of terrestrial habitats consisted of lifting logs, rocks, trunks and woody debris from the ground. The time dedicated to the search of amphibians varied according to the level of difficulty in sampling the habitat.

Listening stations were positioned in locations favourable to amphibians that were identified during the day. The monitoring events took place during favourable conditions in the evening, from half an hour after sunset until midnight. Waterbodies were also examined with headlamps at night to locate adults.

Data Analysis

A request of information on the recorded herpetofauna species was addressed to the AARQ to establish a list the species potentially present in the study area. The AARQ provided a list of species recorded within an area of 20 km by 20 km centered on the study area. A request for information on the presence of threatened and vulnerable species or species at risk in the study area was addressed to the CDPNQ.

The list of potential species in the study area during the field survey was compared with the provincial and federal lists of herpetofauna species with special protection status under the federal SARA and the QARTVS.

19.1.1.3 Mammals Baseline

Data Analysis

Desktop regional information was compiled from the theoretical distribution of Québec mammals and the description of their habitat (Prescott and Richard, 2004). The list of potential species in the study area (based on theoretical distribution) was compared with the provincial and federal lists of mammal species with special protection status under the SARA and the QARTVS.

19.1.2 Issues

The following issues were raised by the public and other stakeholders:

- Wildlife species;
- Waterfowl; and,
- Parks and protected areas.

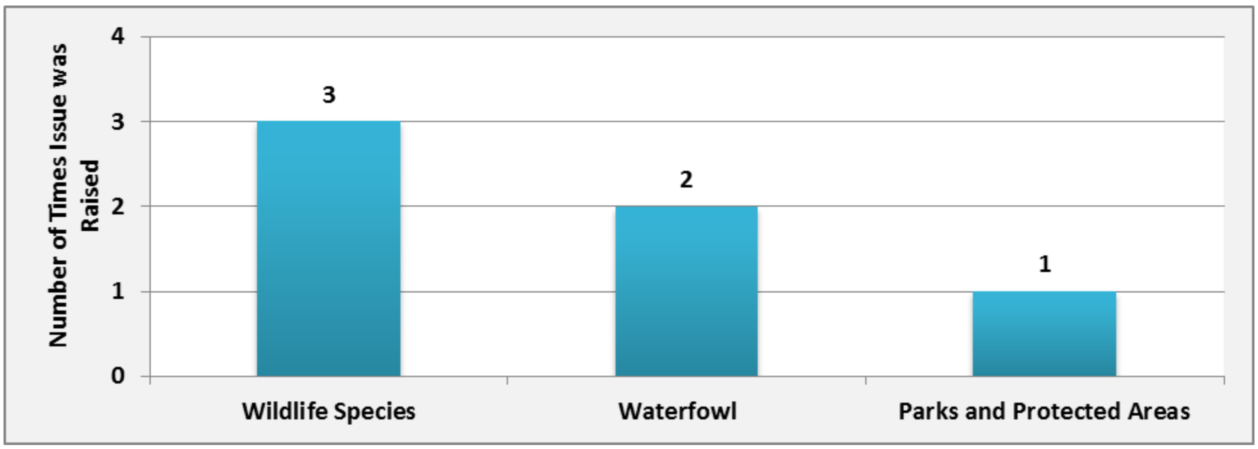
Accordingly, these issues are included in the assessment of this VEC. Details on the issues raised by stakeholders are provided in Table 19.1. The number of times each issue was raised is shown in Figure 19.1.

Table 19.1 Issues Raised by Stakeholders

Issue	Community / Organization	Summary of Comments Raised During Consultation and Engagement Activities	Response / Location in EIS
Parks and protected areas	Sept-Îles	There is a protected wetland in the area.	The Kami Terminal does not overlap with any protected or designated areas. The assessment of the Kami Terminal on protected areas is provided in **Section 19.6**.
Potential effects on wildlife species	CRE	The baie des Sept-Îles is an important conservation zone for migratory birds and concerned about the potential effects of the dust generated from the project on the bay.	Alderon conducted dispersion modelling for the Kami Terminal, the results of which indicate that no substantive changes in air quality are expected on local or regional scales due to emissions from the Kami Terminal. The modelling results are presented in **Section 19.2**.

Issue	Community / Organization	Summary of Comments Raised During Consultation and Engagement Activities	Response / Location in EIS
	Sept-Îles	Resident raised issue of migratory birds and bird species at risk	As part of the EIS, field surveys were conducted to identify habitat and species potentially affected by the Kami Terminal. These surveys did not identify any rare or unique habitats that will be affected by the Kami Terminal. Additional information on bird species, including migratory birds, is provided in **Section 19.5**.

Figure 19.1 Frequency of Issue Raised Related to Birds, Other Wildlife and Their Habitats and Protected Areas



19.2 Environmental Assessment Boundaries

19.2.1 Spatial Boundaries

Local Study Area

The Local Study Area is the maximum area within which environmental effects can be predicted or measured with a reasonable degree of accuracy and confidence. For the environmental assessment of Birds, Other Wildlife and their Habitats, and Protected Areas, the LSA includes the PDA in its entirety and adjacent areas where environmental effects due to noise and dust may reasonably be expected to occur. For the purposes of the assessment, the LSA is restricted to wildlife habitats within 500 m of the PDA (Figure 19.2).

Regional Study Area

The Regional Study Area includes wildlife habitats on the Marconi Peninsula, in baie des Sept-Îles, and extends west to rivière Sainte-Marguerite (Figure 19.3). The RSA is the area within which cumulative effects on Birds, Other Wildlife and their Habitats, and Protected Areas may occur, depending on physical and biological conditions and the type and location of other past, present, and reasonably foreseeable projects. The RSA is the area within which the significance of Kami Terminal effects is predicted.

19.2.2 Temporal Boundaries

The temporal boundaries are the Kami Terminal phases of construction (approximately 2 years), operation and maintenance (approximately 17 years), and decommissioning / reclamation (approximately one year).

While some birds and other wildlife reside in the Kami Terminal area throughout the year, others are present only seasonally, either during the breeding season or in passing during spring and fall migration.

Figure 19.2 Local Study Area

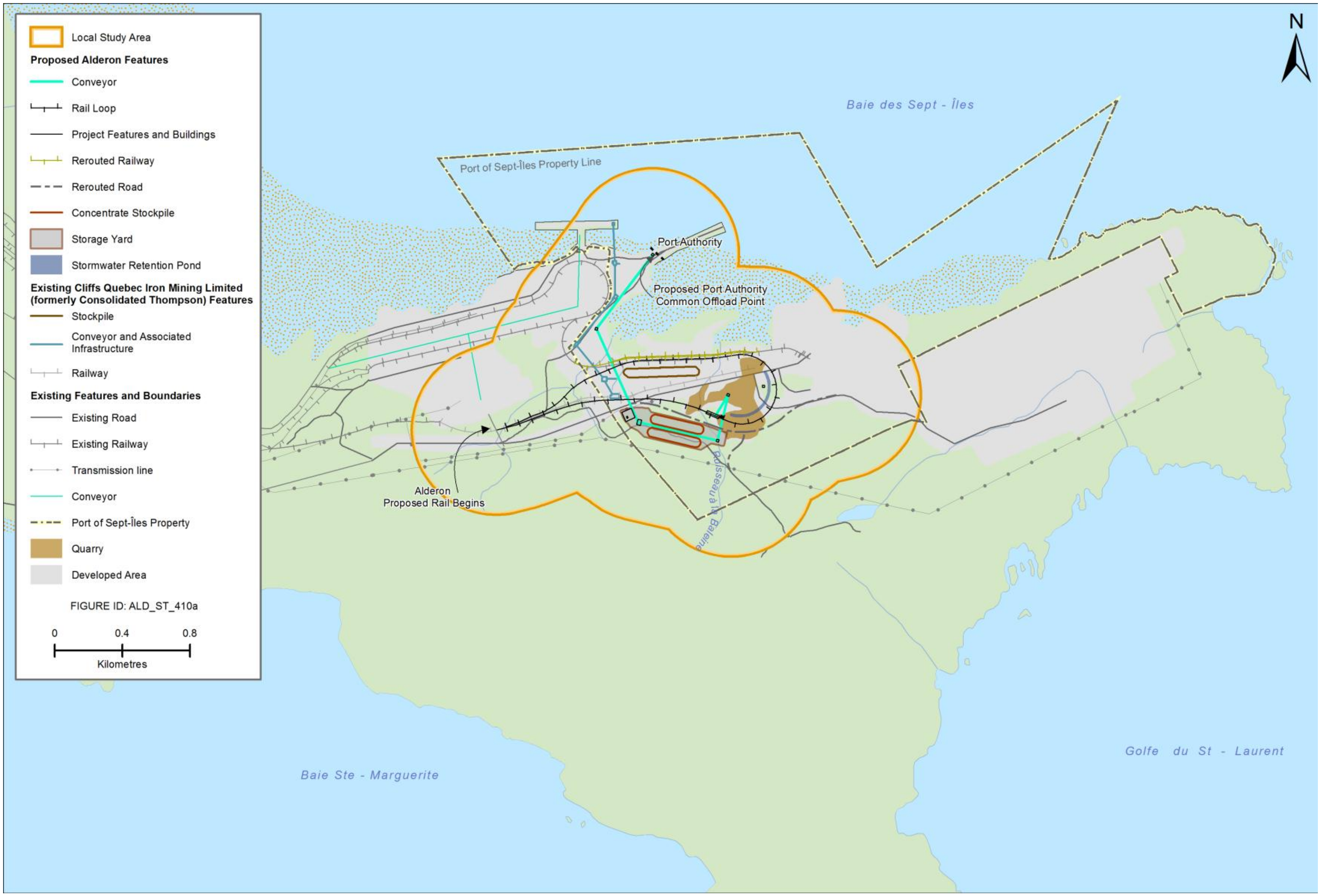
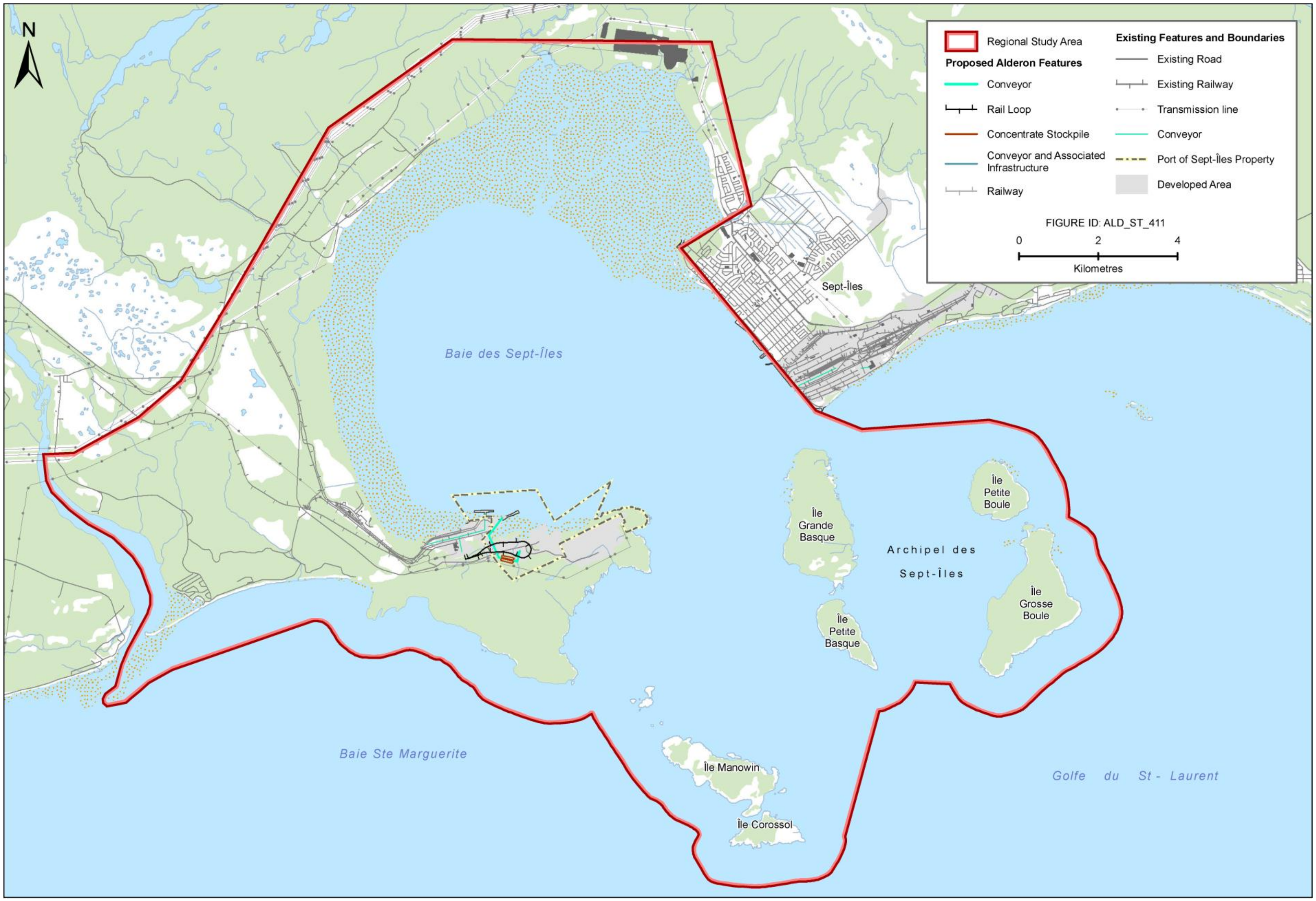


Figure 19.3 Regional Study Area



19.2.3 Administrative Boundaries

Birds, Other Wildlife and their Habitats, and Protected Areas are subject to federal and provincial legislation, regulations, policies, and guidelines published by the governments of Québec and Canada. A thorough assessment of effects on Birds, other Wildlife and their Habitats, and Protected Areas and their significance is required under the CEAA (1992). This VEC will be developed in accordance with applicable provincial and federal acts and associated regulations including:

- Québec's *Act Respecting the Conservation and Development of Wildlife* (QARCDW) (2002); and,
- Canada's *Migratory Birds Convention Act* (MBCA) (1994).

19.2.3.1 Québec Act Respecting the Conservation and Development of Wildlife (QARCDW) (2002)

In Québec, wildlife habitats are protected at the provincial level under the QARCDW (2002) (and the *Regulation Respecting Wildlife Habitats* (2002). According to article 128.6 of the Act, one cannot perform an activity that is likely to modify a biological, physical or chemical aspect of a wildlife habitat unless an authorization is first obtained or unless the activity is performed in a way that is in conformity with applicable norms and conditions.

The QARCDW (2002) specifically addresses wildlife habitat protection and applies to public lands. Wildlife habitats designated by this Act include waterfowl gathering area, white-tailed deer yard, cliff inhabited by a colony of birds, island or peninsula inhabited by a colony of birds, and heronry, among others, with specific definitions as defined in the Regulation respecting wildlife habitats.

19.2.3.2 Migratory Birds Convention Act

The purpose of the MBCA (1994) is to protect and conserve migratory bird populations and individuals and their nests (Section 4; Government of Canada 1994a). Migratory birds covered under the MBCA in Canada include:

- Waterfowl (e.g., ducks and geese);
- Cranes (e.g., sandhill cranes);
- Shorebirds (e.g., plovers and sandpipers); and,
- Songbirds (e.g., robins).

Birds that do not fall under federal jurisdiction within Canada include grouse, quail, pheasants, ptarmigan, hawks, owls, eagles, falcons, cormorants, pelicans, crows, jays and kingfishers. Most birds not included in this list are protected under provincial laws.

The possession, purchasing, selling, exchanging, or giving of migratory birds or nests are prohibited without authorization, as stated in Section 5 of the MBCA. *Bill C-15* (2005) “expands the purpose of the Act to include conserving migratory birds […], specifies that the birds are to be protected and conserved as populations and as individual birds […] and incorporates habitat and ecosystem concepts, along with concern for the protection of individuals”. The MBCA is the enabling statute for the *Migratory Birds Regulations* (1994).

Section 6 of the *Migratory Birds Regulations* prohibits the disturbance, destruction, or removal of a nest, egg, nest shelter, eider duck shelter, or duck box of a migratory bird without the authorization of a permit. In addition, Section 35 (1) has been repealed and replaced with Section 5 (1) of the MBCA, which prohibits the deposition of substances harmful to migratory birds in waters or areas frequented by migratory birds or in a place from which the substance may enter such waters or such an area. Note: this may not be applicable to all projects.

19.3 Establishing Standards or Thresholds for Determining the Significance of Environmental Effects

The likely effects of the Kami Terminal on Birds, Other Wildlife and their Habitats, and Protected Areas are described using the following attributes, which are based on standard environmental assessment practice and the EIS Guidelines.

- **Direction:**
  - Positive: beneficial or desirable change in the environment;
  - Neutral: no detectable or measureable change in the environment; or
  - Adverse: worsening or is undesirable change in the environment.
- **Magnitude:**
  - Low: the residual Project effects to Birds, Other Wildlife and their Habitats, and Protected Areas (alteration / loss) are not expected to exceed five percent of the known population in the RSA. No measurable effect;
  - Moderate: the residual Project effects to Birds, Other Wildlife and their Habitats, and Protected Areas (alteration / loss) are expected to be greater than five percent and not exceed 25 percent of the known populations in the RSA. Effect can be measured; or
  - High: the residual Project effects to Birds, Other Wildlife and their Habitats, and Protected Areas (alteration / loss) are expected to exceed 25 percent of the known population in the RSA. Effect can be easily observed, measured and described, and may be widespread.
- **Geographic:**
  - Site-specific: effect confined to the Project footprint for all Project components (i.e., PDA). Effects would be limited to directly affected environmental components;

- Local: effect extend beyond the Project footprint into the surrounding areas within the LSA;
- Regional: effect extends beyond the LSA into RSA. Area where indirect or cumulative effects may occur; or
- Beyond Regional (provincial, national, and/or international areas): effect extends beyond the RSA. Area where indirect or cumulative effects may occur.

- **Frequency:**
  - Once: effect occurs occasionally, or once during the life of the Project (e.g., clearing);
  - Sporadic: effect occurs sporadically, at irregular intervals, without any predictable pattern during the life of the Project (e.g., hydrocarbon spills);
  - Regular: effect occurs on a regular basis and at regular intervals during the life of the Project; or
  - Continuous: effect occurs continuously.
- **Duration:**
  - Short term: effect occurs during the site-preparation or construction phase of the Project (i.e., 1 to 2 years);
  - Medium term: effect extends throughout the construction and operation phases of the Project (up to 15 years);
  - Long term: effect is greater than 15 years; or
  - Permanent: effect persists.
- **Reversibility:**
  - Reversible: effect is reversible during the life of the Project; or
  - Irreversible: a long-term effect that is permanent (i.e., remains indefinitely as a residual effect).
- **Ecological Context:**
  - Undisturbed: area relatively or not adversely affected by human activity; or
  - Disturbed or Developed: area has been substantially previously disturbed by human development or human development is still present.

Significant adverse residual environmental effects on Birds, Other Wildlife and their Habitats, and Protected Areas are defined for fauna species and protected areas.

For fauna species, a significant adverse residual environmental effect is one that results in the degradation, alteration, or loss (e.g., through physical loss, noise, light and other stimuli) of critical or important habitat within the LSA, either physically, chemically, or biologically, in quality or extent, in such a way as to cause a change or decline in the distribution or abundance of birds or other wildlife that are dependent upon that habitat, such that the likelihood of the long-term viability or survival of the populations within the RSA is reduced as a result.

For protected areas, a significant adverse residual environmental effect is one that results in the degradation, alteration or loss (e.g., through physical loss, noise, light and other stimuli) in the quantity and quality of protected areas, either physically, chemically, or biologically; in quality or extent, in such a way as to cause a change or decline in the effectiveness of that protected status, such that the likelihood of the long-term viability or designated function of the Protected Areas within the RSA is substantially reduced.

19.4 Potential Project-VEC Interactions and Environmental Effects

The environmental assessment of the Birds, Other Wildlife and their Habitat, and Protected Areas VEC is focused on the following environmental effects:

- Change in habitat;
- Change in distribution and movement;
- Change in mortality risk;
- Change in health; and,
- Change in protected areas.

Activities associated with Kami Terminal construction, operation and maintenance, decommissioning and reclamation have the potential to affect Birds, Other Wildlife and their Habitats, and Protected Areas in the LSA. Potential Kami Terminal interactions with Birds, Other Wildlife and their Habitats, and Protected Areas are summarized in Table 19.2. This table lists each activity and physical work for the Kami Terminal, and ranks each potential interaction as 0, 1, or 2 based on the following principles:

0 = Kami Terminal activity that will not interact with Birds, Other Wildlife and their Habitats, and Protected Areas.

1 = Kami Terminal activity that may interact with Birds, Other Wildlife and their Habitats, and Protected Areas; however, based on past experience the interaction would not result in a residual environmental effect or is effectively mitigated through standard environmental protection practices.

2 = Kami Terminal activity that will interact with Birds, Other Wildlife and their Habitats, and Protected Areas and may have residual environmental effects that exceed acceptable levels without implementation of specific mitigation.

Those interactions that have been ranked as 0 or 1 will be further assessed within this section and those that are ranked as 2 will be further assessed and described in Section 19.6 or, in the case of accidents and malfunctions, in Section 19.8. The accompanying text will describe the nature and extent of the interaction as well as provide the rationale for activities that are determined to not result in an interaction with Birds, Other Wildlife and their Habitats, and Protected Areas. The analysis provides a first order assessment of environmental effects of each phase or Kami Terminal activity on the Birds, Other Wildlife and their Habitats, and Protected Areas VEC and will serve to focus the remainder of the environmental effects assessment on those issues that may result in substantive interactions or have potential for significant residual environmental effects. All potential residual environmental effects that are ranked as 0 or 1 are considered to be not significant.

Table 19.2 Potential Environmental Effects of Kami Terminal to Birds, Other Wildlife and Their Habitats, and Protected Areas

Kami Terminal Activities and Physical Works	Potential Environmental Effects				
	Change in Habitat	Change in Distribution and Movement	Change in Mortality Risk	Change in Health	Change in Protected Areas
Construction					
Site Preparation (incl. clearing, excavation, blasting, material haulage, grading, removal of overburden and stockpiling)	2	2	2	2	1
Construction of Concentrate Unloading, Stacking, Storage and Reclaiming Facilities (rail dumper building, rail car dumper and hopper, train positioner transfer houses, conveyors, dust collector, maintenance building, substation, sanitation system)	1	2	1	1	1
Construction of Railway Loop	1	2	1	1	1
Construction of Stream Diversion	1	2	1	1	1
Access Roads and Waterline Realignment	1	2	1	2	1
Onsite Vehicle / Equipment Operation	1	2	1	1	1
Waste Management	1	1	1	1	0
Transportation of Personnel and Goods to Site	1	1	1	1	0
Expenditures	0	0	0	0	0
Employment	0	0	0	0	0
Operation and Maintenance					
Rail Transport	1	1	1	1	1
Concentrate Handling and Stockpiling	1	1	1	1	1
Water Collection, Treatment and Discharge	1	1	1	1	1
Onsite Vehicle / Equipment Operation and Maintenance	1	1	1	1	1
Waste Management	1	1	1	1	0
Transportation of Personnel and Goods to Site	1	1	1	1	0
Expenditures	0	0	0	0	0

Kami Terminal Activities and Physical Works	Potential Environmental Effects				
	Change in Habitat	Change in Distribution and Movement	Change in Mortality Risk	Change in Health	Change in Protected Areas
Employment	0	0	0	0	0
Decommissioning and Reclamation					
Site Clean-up	1	1	1	1	1
Accidents and Malfunction					
Forest Fire	2	2	2	2	0
Stormwater Retention Pond Breach	0	0	0	0	0
Train Derailment	1	0	1	0	0

KEY

0 No interaction.

1 Interaction occurs; however, based on past experience, the resulting effect can be managed to acceptable levels through standard operating practices and/or through the application of best management or codified practices. No further assessment is warranted.

2 Interaction occurs, and resulting effect may exceed acceptable levels without implementation of specified mitigation. Further assessment is warranted.

As shown in Table 19.2, there are a number of potential interactions that are not expected to occur (0). Other potential interactions might occur, but are considered to not warrant further assessment because the resulting effect can be limited to acceptable levels through standard approaches (1). Kami Terminal activities ranked as 1 may have effects on Birds, Other Wildlife and their Habitats, and Protected Areas (e.g., introduction of dust or invasive species). However, based on past experience, the interaction will result in residual environmental effects that are effectively mitigated through standard environmental protection practices, and limited to acceptable levels.

Environmental protection measures designed to manage these effects associated with all Kami Terminal phases will be detailed in a separate EPP, prepared in support of the EIS and compiled at a later date. The overall goal of the EPP is to ensure the fulfillment of Alderon's environmental commitments and responsibilities. The EPP describes the specific environmental protection and mitigation measures that will be applied throughout the life of the Kami Terminal to avoid or minimize potential effects on environmental resources as a result of the Kami Terminal. EPPs are considered 'living' documents, and it will be designed and managed in consultation and collaboration with the Government of Québec, Environment Canada, and stakeholders. Through the development of the EPP and other management plans (e.g., emergency response, spill response, contingency plans), many of these generalized commitments will be developed into site-specific instructions to contractors and employees. Others will simply be incorporated into the final design.

Change in Habitat

No change in habitat for flora or fauna is expected as a result of expenditures or employment, during construction or operation and maintenance.

With the exception of site preparation, most construction activities will have interactions resulting in changes in habitat for flora or fauna that can be easily limited to acceptable levels. Construction activities occurring after site preparation (i.e., construction of concentrate unloading, stacking, storage and reclaiming facilities, construction of railway loop, construction of stream diversion, access roads and waterline realignment, on-site vehicle / equipment operation, waste management, and transportation of personnel and goods to the site) are expected to be within areas that have already been cleared (i.e., no additional clearing required), and therefore any change in habitat will have already occurred from site preparation.

During the operation and maintenance phase, all Kami Terminal activities will also occur within areas where habitat will have already been disturbed.

Decommissioning and reclamation activities are unlikely to result in changes in habitat. When the Kami Terminal is decommissioned, Alderon will perform site clean-up, and then transfer equipment to the Port or a third party. Site rehabilitation is not planned.

Change in Distribution and Movement

No change in distribution and movement is expected as a result of expenditures or employment, during construction or operation and maintenance.

During the construction and operation and maintenance phases, waste management may result in changes in the distribution and movement, as some wastes may attract some wildlife. However, standard practices to manage waste should minimize this risk. Waste management will follow applicable laws, regulations, and standards for the safe use, handling storage and disposal will be followed, and will use existing facilities as feasible. An integrated Waste Management Plan (WMP) will be developed and implemented with the goal to minimize adverse effects on the environment. Given the industrial nature of the site the nature of the waste expected to be generated by activities, and the implementation of standard practices, interactions will be easily mitigated with a low likelihood of residual environmental effects.

Transportation of personnel and goods to site during construction, and operation and maintenance will occur on established roads and highways. Thus, any influence on the distribution and movement of fauna and flora will be minimal compared to current conditions under existing traffic.

Sound quality monitoring indicates that the port is relatively noisy compared to the surrounding natural landscape and that the noise effects extend beyond the disturbed areas of the port. As indicated in the Atmospheric Environment VEC (Chapter 14), incremental noise levels from the Kami Terminal are not likely to increase substantively above background more than several hundred metres beyond the PDA. Thus, the extent of the change in distribution and movement of wildlife will be limited. Environmental effects on the distribution and movement of wildlife resulting from operational activities (i.e., rail transport, concentrate handling and stockpiling, on-site vehicle / equipment operation and maintenance, waste management, and transportation of personnel and goods to site) are expected to remain within an acceptable range, given the location of these activities relative to the current port facilities.

The effects that decommissioning and reclamation activities will have on change in the distribution and movement of wildlife will be similar to those tied to operation and maintenance activities. Alderon will perform site clean-up as required, and then transfer equipment to the Port or a third party. Site rehabilitation is not planned. At the time of decommissioning, no further direct effects would likely occur, and with the cessation of operation, indirect effects, if any, would no longer be attributable to the Kami Terminal.

Change in Mortality Risk

No change in mortality risk is expected as a result of expenditures or employment, during construction or operation and maintenance. Changes in mortality risk would mostly be linked to direct mortality from collision with construction vehicles (i.e., on-site vehicle / equipment operation). However, this activity will mostly occur in disturbed areas within the active port site. Furthermore, vehicles will be relatively slow-moving. The resulting sensory disturbance – though considered an adverse effect with regard to distribution and movement – would serve as a benefit by reducing the number of wildlife on-site and therefore the potential for mortality risk. The resulting environmental effects on change of mortality risk would therefore be expected to be low for most construction activities. While disturbed habitats are the preferred habitat for certain species (e.g., killdeer), such species were not detected during bird surveys conducted in support of the EA. Environmental monitoring of the site during construction would also serve to provide mitigation to reduce the potential for such environmental effects.

Though sensory disturbance from construction activities may reduce mortality in some cases, it may also lead indirectly to increased mortality risk by causing the abandonment of dens or nests, and mortality of young. This type of mortality is likely to be low in extent, occurring in areas closest to construction. Initial abandonment is most likely during the initial disturbance from site preparation, likely limiting the subsequent denning or nesting of fauna close to the Kami Terminal in subsequent construction activities.

During construction and operation and maintenance, waste management may have an interaction with change in mortality risk. Some wastes may attract some wildlife leading to mortality from human interaction. Standard practices to manage waste should minimize this risk. Waste management will follow applicable laws, regulations, and standards for the safe use, handling storage and disposal will be followed, and will use existing facilities as feasible. An integrated WMP will be developed and implemented, with the goal to minimize adverse effects on the environment. Given the industrial nature of the site, and the expected nature of the waste being generated during construction and operation and maintenance, and the implementation of standard practices, interactions will be minimal or easily mitigated, with a low likelihood of residual environmental effects.

During operation and maintenance, rail transport, and on-site vehicle / equipment operation and maintenance, may result in an increase in mortality, since all these activities have potential to cause mortality through collisions or other direct impacts. However, low speed limits in place at the port reduce the likelihood of a collision due to excessive speed. Furthermore, few birds or other wildlife are expected to be present in proximity to these activities due to previous displacement and ongoing sensory disturbance. The potential for change in mortality risk is higher for transportation of personnel and goods to the site during construction, and operation and maintenance than onsite vehicle operation due to the higher travelling speeds. However, given the expected small incremental increase in traffic above background levels during this phase, the relative mortality risk is expected to be low.

The effects that decommissioning and reclamation activities will have on mortality risk will be similar to those of operation and maintenance activities. Alderon will perform site clean-up as required and then transfer equipment to the Port or a third party. Site rehabilitation is not planned. At the time of decommissioning, no further direct effects are likely to occur, and with the cessation of operation, indirect effects, if any, would no longer be attributable to the Kami Terminal.

Change in Health

No change in health is expected as a result of expenditures or employment, during construction or operation and maintenance. Changes in health (and in part changes in mortality risk) are anticipated to be largely related to dust generation. However, construction activities including construction of concentrate unloading, stacking, storage and reclaiming facilities, construction of railway loop, construction of stream diversion, on-site vehicle / equipment operation, waste management, and transportation of personnel and goods to the site are expected to be local and short-term as well as generating relatively little dust. As a result, their impact on the health of birds and other wildlife is expected to be managed to acceptable levels.

During the 2-year construction phase, transportation of workers to the site will result in increased traffic on established roads and highways, which may result in a change in health and mortality risk for birds and other wildlife. Transportation of goods and personnel during the operations and maintenance phase will lead to a small increase in traffic over baseline levels. Thus, changes in health and mortality compared to existing conditions are expected to be minimal.

Noise associated with construction activities can cause increased stress levels, leading to behavioral changes, and ultimately, disease. Noise can also mask important auditory signals such as mating and distress calls, and prey sounds. Breeding and hunting success may be decreased as a result. However, noises associated with the Kami Terminal are expected to be short in duration. Also, high levels of sustained noise are likely to cause the displacement of animals, thereby reducing significant adverse environmental effects on their health.

During the operation and maintenance phase, rail transport, concentrate handling and stockpiling, onsite vehicle / equipment operation and maintenance, and waste management all have the potential to interact with change in health through the generation of dust and other emissions to varying degrees. The Air Quality Dispersion Modelling Study (Appendix G, Stantec, 2012a) carried out in support of the Kami Terminal indicates that the estimated annual emissions of total particulate matter (TPM) during operation are approximately one percent of the National Pollutant Release Inventory (NPRI) data from the two most significant nearby industrial sources (Aluminerie Alouette aluminum smelter and the Cliffs Resources iron pellet plant). Potential dust sources including the car dumper and conveyor system will be covered, reducing the emissions. The stacker-reclaimer system, which will transport concentrate to the storage pile, is expected to result in the highest hourly and annual emissions of TPM. Wind erosion from the concentrate pile is expected to be rare, with small emissions occurring during infrequent events. Wind erosion was therefore excluded from dispersion modelling. Dispersion modelling indicates that the cumulative concentrations at all overland locations will fall under the TPM regulatory standards. Potential exceedances of regulatory standards at locations near the property line during adverse meteorological conditions for TPM and for 24 hours criteria will be limited to within about 100 m of the property line. It is unlikely that prolonged (human) exposure to air contaminant concentrations at these levels will occur. These predicted exceedances represent worst-case meteorological conditions and are seasonal, short-term and limited in spatial extent. Considering these factors, no substantive changes in air quality are expected on the local or regional scales due to emissions from the Kami Terminal. Furthermore, though fugitive dust emissions will result from material handling, the majority of these emissions will remain in the lowest 1 to 2 metres above ground level and settle within a few hundred meters. As such, while some dusting of vegetation may occur under certain meteorological conditions, effects will be localized in extent and short-term in duration. Considering the current dust levels from activities in the port and the proposed dust mitigation measures presented in Chapter 14, the potential effect on change in health is not expected to be substantive.

The effect that decommissioning and reclamation activities will have on change in health will be less than operation and maintenance. Alderon is likely to perform necessary clean-up of the site as required, and then transfer equipment to the Port or a third party. Site rehabilitation is not planned. At the time of decommissioning, no further direct effects will be likely to occur, and with the cessation of operation, indirect effects, if any, would no longer be attributable to the Kami Terminal.

Change in Protected Area

The only protected area in the vicinity of the Kami Terminal is a waterfowl gathering area in baie des Sept-Îles. Construction activities may result in some effects on the protected area. No changes to protected areas are expected as a result of expenditures or employment. Site preparation and some other construction activities will not have a direct effect on the gathering area since no construction is required in the waterfowl gathering area. Activities related to the construction of the rail loop will occur closest to the gathering area. However, there is potential for indirect effects on the suitability of the habitat as a gathering area for waterfowl during migration or wintering because of noise and dust generation. Other noise sources closer to the waterfowl gathering area (port/industrial activities) are likely to have a greater influence on ambient noise, dust levels – and by extension the quality of the waterfowl gathering area —than construction activities, and the impact of the quality of the area to harbour gathering waterfowl.

Waste management and the transportation of personnel and goods to the site are unlikely to cause changes to the aforementioned protected area as these activities will not overlap it.

Decommissioning and reclamation activities are not expected to result in changes in protected areas. At the time of decommissioning, Alderon will perform site clean-up as required and then transfer equipment to the Port Authority or a third party. Site rehabilitation is not planned. No direct effects on the Birds, Other Wildlife and their Habitats, and Protected Areas are anticipated. Furthermore, with the cessation of operation, any indirect effects would no longer be attributable to the Kami Terminal.

In consideration of the nature of the interactions and the planned implementation of known and proven mitigation, the potential environmental effects of all activities and physical works on Birds, Other Wildlife and their Habitat, and Protected Areas that were ranked as 0 or 1 in Table 19.2 are rated not significant, and are not considered further in the assessment.

The measurable parameters used for the assessment of the environmental effects presented above and the rationale for their selection is provided in Table 19.3.

Table 19.3 Measurable Parameters for Birds, Other Wildlife and their Habitats, and Protected Areas

Environmental Effect	Measurable Parameter	Rationale for Selection of the Measurable Parameter
Change in Habitat	Primary or other sensitive or limiting habitat (ha) (physical change)	• Habitat loss or alteration can lead to changes in wildlife abundance, behaviour and/or species mortality and breeding success. The *MBCA*, *Species At Risk Act* (SARA) (2002) and QARCDW afford protection to habitat for species of migratory birds and/or other wildlife, including species at risk. Loss or altered habitat is characterized as a proportion of habitat (ha) in the RSA. Critical habitat as identified in a recovery plan could also apply in this situation
Change in Distribution and Movement	Density and distribution of individuals on the landscape	• Numbers and where they are located. • Movement corridors (if any) would also be considered here.
	Sound pressure levels (dBA) (sensory disturbance) Dust levels	• Sensory disturbance to wildlife behaviour can result in potential change of behaviour including feeding, breeding, migration and movement, with respect to: • Physical hazards and attractants for wildlife (e.g., roads, pits, and other structural features); • Chemical hazards and attractants for wildlife (e.g., identified contaminants of potential concern); and, • Sensory disturbance causing wildlife attraction or deterrence (e.g., noise, light, and human presence.

Environmental Effect	Measurable Parameter	Rationale for Selection of the Measurable Parameter
Change in Mortality Risk	Number (or proportion of population) of mortalities attributable to the Kami Terminal Volume of air emissions	• Direct mortality: collision with by train or construction vehicles; • Indirect mortality: increase in predation, hunting and/or poaching because of improved access or other; • Number of fatalities as a proportion of the population present in the RSA will be forecast. The risk of mortality can be increased as a result of human-wildlife interactions (e.g., vehicular collisions). Various species are afforded legal protection through the *MBCA*,. Loss of individuals is characterized as a proportion of the population in the RSA; and, • A change in mortality risk may occur as a result of contamination from emissions.
Change in Health	Reproductive output and success	• Physiological effects from contamination could cause lowered fitness amongst animals breeding in the LSA.
Change in Protected Area	Amount (km²) of designated Protected Area function lost or altered	• Examines the spatial and other sensory emissions (such as visual, noise or air) that overlap protected areas in a manner that compromises the effectiveness of the protection status.

19.5 Existing Environment

A literature review and background information gathering was performed to determine the likelihood of presence for bird and other wildlife species and the presence of wildlife habitat within the LSA and RSA. As part of this review, wildlife species with potential to occur in the vicinity of the proposed Kami Terminal development were compiled by means of available literature, and MNRF, AARQ, and QBBA databases. Field studies were conducted in 2011 for terrestrial birds and herpetofauna within the LSA.

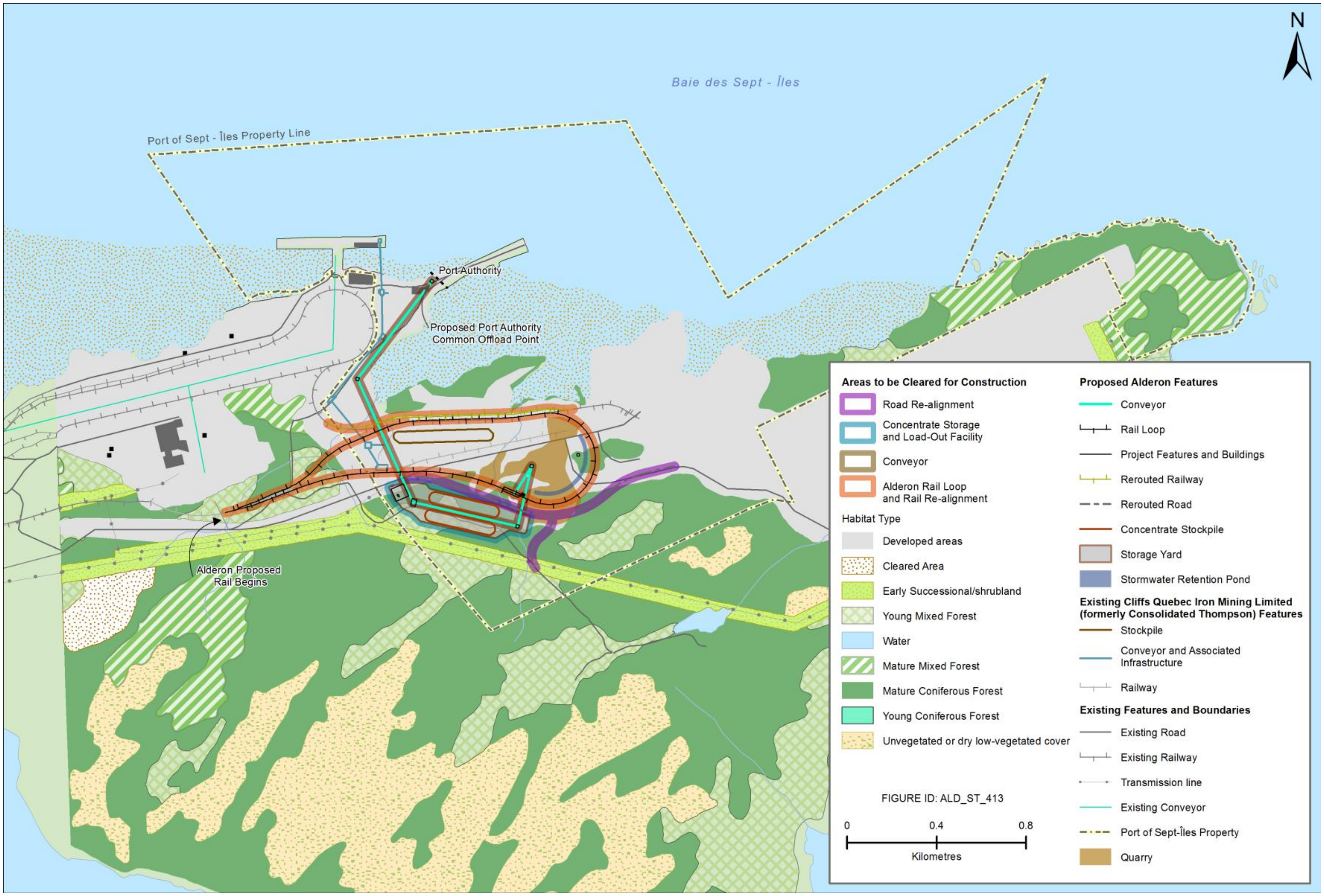
Wildlife species at risk and species of conservation concern are addressed in Chapter 20.

19.5.1 Habitat

The proposed Kami Terminal is located largely within the Pointe-Noire industrial area, situated on the northern part of the Marconi Peninsula (Figure 19.4). The planned concentrate concentrate unloading, stacking, storage and reclaiming facilities are located along chemin de la Pointe-Noire. An access road to a communication tower passes through the Port of Sept-Îles property and crosses the Kami Terminal facilities. An existing quarry is located in the northeast sector of the planned facilities and a transmission line runs along its southern limit.

Most of the northern part of the Marconi Peninsula has been cleared of vegetation as a result of past and on-going industrial activity, such as forest harvesting or excavation for roads. Existing vegetation on the peninsula as a whole is boreal coniferous and boreal mixed forest. Due to successive forest clearing events, existing forest varies in ages of growth, ranging from very young to relatively older growth areas. Hills of approximately 200 meters in elevation are located south of the PDA. Because of port activities, the levels of noise on the northern part of the peninsula can be quite high most of the day and night.

Figure 19.4 Habitat Map



Habitats available within the bird survey study area consist of patches of young mixed forest stands and mature coniferous stands. These habitats are small and present in patches both within the PDA and south of it. Table 19.4 provides the areas and proportions of habitats within the RSA. The developed areas make up 24 percent of the Marconi Peninsula, while mature coniferous forest — the dominant habitat — represents 39 percent of the total area of the Marconi Peninsula.

Table 19.4 Areas and Proportions of Habitats within a Portion of the RSA (Marconi Peninsula)

Habitat type	Area (ha)	Proportion of Marconi Peninsula (portion of RSA)
Developed areas	325.0	24.1%
Cleared Area	9.0	0.7%
Early Successional / Shrubland	44.8	3.3%
Young Mixed Forest	177.5	13.1%
Water	1.8	0.1%
Mature Mixed Forest	58.7	4.3%
Mature Coniferous Forest	524.7	38.8%
Young Coniferous Forest	3.2	0.2%
Unvegetated or dry low-vegetated cover	206.5	15.3%
Total for Marconi Peninsula	**1351.1**	**100%**

19.5.2 Migratory Birds

The field surveys for migratory and non-migratory birds identified 122 migratory birds representing 30 migratory species were recorded during the bird surveys (Table 19.5). Of the migratory birds observed, 114 birds of 27 species were breeding birds. Three migratory species were in flight, namely herring and Great black-backed gulls, and great blue heron. Emberizidae (warblers, redstart) was the most diverse family with seven species followed by the Fringillidae (grosbeak, finch, siskin, goldfinch) and Muscicapidae (kinglet, robin, thrush) with four species each. No nightjars were recorded during these surveys.

Table 19.5 Migratory Birds Found in the Study Area During the June 2011 Survey

Species		Number of records	Highest Breeding Evidence	Highest Breeding Status
English Name	Scientific Name			
Tennessee Warbler *****	*Vermivora peregrina*	21	S	PO
White-throated Sparrow *****	*Zonotrichia albicollis*	11	S	PO
Swainson’s Thrush *****	*Catharus ustulatus*	7	S	PO
Magnolia Warbler *****	*Dendroica magnolia*	7	S	PO
Winter Wren *****	*Troglodytes hiemalis*	7	S	PO
Alder Flycatcher *****	*Empidonax alnorum*	7	A	PR

Species		Number of records	Highest Breeding Evidence	Highest Breeding Status
English Name	**Scientific Name**			
American Robin	*Turdus migratorius*	6	S	PO
Ruby-Crowned Kinglet *	*Regulus calendula*	5	S	PO
Herring Gull § *	*Larus argentatus*	5	X	OB
Yellow-rumped Warbler *	*Setophaga coronata*	4	P	PR
Golden-Crowned Kinglet *	*Regulus satrapa*	4	S	PO
Fox Sparrow	*Passerella iliaca*	4	S	PO
Pine Grosbeak ‡ *	*Pinicola enucleator*	4	FY	CO
Red-Eyed Vireo *	*Vireo olivaceus*	3	S	PO
American Redstart *	*Setophaga ruticilla*	3	S	PO
Purple Finch *	*Carpodacus purpureus*	3	S	PO
Boreal Chickadee	*Poecile hudsonicus*	2	P	PR
Black-Capped Chickadee *	*Poecile atricapillus*	2	S	PO
Great Blue Heron § *	*Ardea Herodias*	2	X	OB
Yellow-Bellied Flycatcher	*Empidonax flaviventris*	2	S	PO
Nashville Warbler	*Oreothlypis ruficapilla*	2	S	PO
Pine Siskin *	*Spinus pinus*	2	H	PO
American Goldfinch *	*Spinus tristis*	2	P	PR
Red-Breasted Nuthatch *	*Sitta Canadensis*	1	S	PO
Cape May Warbler *	*Setophaga tigrina*	1	S	PO
Mourning Warbler ‡ *	*Geothlypis philadelphia*	1	S	PO
American Black Duck	*Anas rubripes*	1	FY	CO
Great Black-backed Gull	*Larus marinus*	1	X	OB
American Woodcock	*Scolopax minor*	1	H	PO
Woodpecker sp	*Picoides* sp.	1	markings on trees	

Legend:
*: Species found in the proposed storage yard area
§: Colonial species
‡: Regionally rare

Breeding Status
OB: Observed
PO: Possible breeder
PR: Probable breeder
CO: Confirmed breeder

Breeding Evidence
A: agitated birds
H: Species in proper habitat
FY: Fledged young
P: Pair in breeding habitat
S: Call or Song
X: Species seen in a habitat inappropriate for breeding

Of the 27 potentially breeding migratory bird species, 21 were recorded as potentially breeding within the PDA. The most commonly occurring bird was Tennessee warbler with many territories likely within and around the proposed storage yard. There is also ample habitat for the second most common species, the white-throated sparrow. Other common birds were found quite regularly, including Swainson's thrush, magnolia warbler, and alder flycatcher. In fact, all the birds except pine grosbeak and mourning warbler are considered regionally common by the QBBA. While considered regionally rare for the purposes of the QBBA, these species are considered Secure in Québec (CESCC 2011).

Pine grosbeak may nest in the area, but as the young had fledged, they could have come from some distance away. There is a record of pine grosbeak in the current (2010-2014) QBBA from the Sept-Îles atlas square.

It is not known if the single observation of a mourning warbler found was nesting, as it was a singing male, and no other of that species was located nearby, but suitable habitat was noted along the access road to the communication tower. This species was not listed on the checklist for this region by the QBBA, but two nearby squares in the region have reported it for future inclusion in the Atlas.

19.5.3 Other Wildlife

19.5.3.1 Non-Migratory Birds

Non-migratory birds (e.g., game birds, cormorants, raptors, kingfishers, corvids, and blackbirds) were recorded concurrently with migratory birds during the bird survey conducted in June 2011. Only three non-migratory birds were recorded, including the double-crested cormorant, which was only observed flying overhead. No raptors or owls were noted during any field visits to the site.

Table 19.6 Non-Migratory Birds Found in the Study Area During the June 2011 Survey

Species		Number of records	Highest Breeding Evidence	Highest Breeding Status
English Name	Scientific Name			
Common Raven *	*Corvus corax*	6	FY	CO
American Crow *	*Corvus brachyrhynchos*	2	H	PO
Double-Crested Cormorant §	*Phalacrocorax auritus*	1	X	OB

Legend:

*: Species found in the proposed storage yard area
§: Colonial species
‡: Regionally rare

Breeding Status
OB: Observed
PO: Possible breeder
PR: Probable breeder
CO: Confirmed breeder

Breeding Evidence
A: agitated birds
H: Species in proper habitat
FY: Fledged young
P: Pair in breeding habitat
S: Call or Song
X: Species seen in a habitat inappropriate for breeding

19.5.3.2 Herpetofauna

In addition to the common garter snake, the only reptile potentially present in the Sept-Îles region, a total of nine amphibian species were recorded within an area covering 400 km² centered on the study area, according to the AARQ database (Table 19.7). Surveys conducted in the Pointe-Noire Terminal area May 25 through May 27, 2011 identified four species: one salamander (blue-spotted salamander), and three anurans (American toad, northern spring peeper and wood frog). All were reported outside the PDA, at lac Brochu (Table 19.8), located approximately 700 m from the PDA. The habitats that will potentially be affected by the Kami Terminal are considered as marginal habitat for breeding. The ruisseau à la Baleine crosses the proposed concentrate storage yard and various ephemeral pools observed on site, notably along the access road to a communication tower, were investigated. No signs of amphibians were noted in these habitats during the survey. All recorded species are considered common and widespread in the province of Québec.

Table 19.7 List of Herpetofauna Species Potentially Present in the Study Area

Group	English Name	Scientific Name
Salamanders	**Blue-spotted salamander**	*Ambystoma laterale*
	Northern two-lined salamander	*Eurycea bislineata*
	Eastern newt	*Notophthalmus viridescens*
Anurans	**American toad**	*Anaxyrus (Bufo) americanus*
	Northern spring peeper	*Pseudacris crucifer*
	Green frog	*Lithobates (Rana) clamitans*
	Mink frog	*Lithobates (Rana) septentrionalis*
	Wood frog	*Lithobates (Rana) sylvaticus*
Snakes	Common garter snake	*Thamnophis sirtalis*

Source: AARQ. 2011. Atlas des amphibiens et reptiles du Québec: active database since 1988 fed by volunteers and wildlife specialists. Société d'histoire naturelle de la vallée du Saint-Laurent et ministère des Ressources naturelles et de la Faune du Québec. Data extracted for an area of 400 km2 centered on the study area.
Bolded species are those found during the herpetofauna survey carried out by Stantec in May 2011.

Table 19.8 Herpetofauna Species Observed During the Spring Survey

Location	Date	Species	Number of individuals	Observations
Lac Brochu	May 27, 2011	Blue-spotted Salamander	2	1 individual seen swimming, 1 adult male netted in the lake
		American toad	-	More than 10 callings heard sporadically along the shorelines
		Spring peeper	-	Choruses
		Wood frog	-	Choruses

19.5.3.3 Mammals, Including Ungulates, Furbearers and Small Mammals

A variety of furbearing animals associated with the boreal forest occur in the Sept-Îles region (Table 19.9).

Table 19.9 List of Mammal Species Likely to be Found in the Sept-Îles Region

Family	English name	Scientific name
Soricidae	Masked shrew	*Sorex cinereus*
	Arctic shrew	*Sorex arcticus*
	Northern water shrew	*Sorex palustris*
	Pygmy shrew	*Sorex (Microsorex) hoyi*
Talpidae	Star-nosed mole	*Condylura cristata*
Vespertilionidae	Little brown bat	*Myotis lucifugus*
	Northern long-eared bat	*Myotis septentrionalis*
Leporidae	Snowshoe hare	*Lepus americanus*
Sciuridae	Eastern chipmunk	*Tamias striatus*
	Woodchuck	*Marmota monax*
	Red squirrel	*Tamiasciurus hudsonicus*
	Northern flying squirrel	*Glaucomys sabrinus*
Castoridae	Canadian beaver	*Castor canadensis*
Cricetidea	Deer mouse	*Peromyscus maniculatus*
	Southern red-backed vole	*Clethrionomys gapperi*
	Heather vole	*Phenacomys intermedius*
	Meadow vole	*Microtus pennsylvanicus*
	Rock vole	*Microtus chrotorrhinus*
	Muskrat	*Ondatra zibethicus*
	Southern bog lemming	*Synaptomys cooperi*
	Northern bog lemming	*Synaptomys borealis*
Muridae	Norway rat	*Rattus norvegicus*
	House mouse	*Mus musculus*
Dipodidae	Meadow jumping mouse	*Zapus hudsonicus*
	Woodland jumping mouse	*Napaeozapus insignis*
Erethizodontidae	American porcupine	*Erethizon dorsatum*
Canidae	Gray wolf	*Canis lupus*
	Red fox	*Vulpes vulpes*
Ursidae	American black bear	*Ursus americanus*
Mustelidae	American marten	*Martes americana*
	Fisher	*Martes pennanti*
	Ermine	*Mustela ermina*
	Least weasel	*Mustela nivalis*
	Mink	*Mustela vison*
	Striped skunk	*Mephitis mephitis*
	River otter	*Lutra canadensis*
Felidae	Canada Lynx	*Felis lynx*
Cervidae	Moose	*Alces alces*
	Woodland caribou	*Rangifer tarandus caribou*

Ungulates

The latest aerial survey for moose in the Côte-Nord region (hunting zone 19) occurred in 1988. The population density was estimated at 0.44 moose per 10 km^2. The productivity was considered low (42 fawns / 100 females) but normal for its northern location (Lamontagne and Lefort, 2004). The density of moose in this area is relatively stable since the last decade with a population of around 5,700 moose in the winter.

Two ecotypes of woodland caribou are present in the Côte-Nord region. The forest-dwelling caribou is sedentary and inhabits homogeneous habitats with a preference for mature black spruce forest, peatlands, and balsam fir forests. It tends to avoid disturbed habitats such as harvested areas, and recent burns (Courtois *et al.* 2003; Crête *et al.* 2004). It can also be found in open or semi-open habitat such as alpine tundra, upper subalpine, peatlands, islands, and shorelines where nutritious plants such as forbs and sedges are available (COSEWIC, 2002). There is little overlap with preferred habitats of other large ungulates, likely to reduce the risk of predation (*Équipe de rétablissement du caribou forestier du Québec*, 2008). The population density in the western sector of the Côte-Nord region is estimated at 1 caribou per 10 km^2 and even lower in the eastern sector of the region (FAPAQ, 2001).

The forest-dwelling caribou populations have been in decline since the mid-20th century, likely due to excessive hunting, loss of habitat and wolf and bear predation. In 2003, woodland caribou dwelling in the boreal forest was attributed the status of threatened species by the Government of Canada. Since 2005, the forest-dwelling caribou is also considered as a vulnerable species at the provincial level (FAPAQ, 2001).

Conversely, the migratory woodland caribous are abundant in northern Québec. The migratory ecotype lives in large groups and makes long seasonal movements between forested and tundra habitats. The Leaf River and George River herds in Québec and Labrador are the largest of these herds. Its breeding range is located in the taiga and tundra while its wintering range is located in the boreal forest. In the Côte-Nord region, the abundance of caribou varies according to the availability of food in northern habitats. Under unfavorable conditions, the caribou migrates further south (FAPAQ, 2001).

The presence of moose or woodland caribou on the Marconi Peninsula is unlikely due to unfavorable habitat conditions including the types of vegetation and the importance of human activity.

Black Bear

Black bear occur in a variety of habitats with a preference for heavily wooded areas and dense bush land but can also be found in burns and scrub growth. Males tend to range over much larger areas than females; both overwinter in dens from December through March-April (Prescott and Richard, 2004).

Black bear within the province of Québec are estimated at 70,000 individuals (Lamontagne *et al.*, 2006). Average density is approximately 2 bears per 10 km^2 (Lamontagne *et al.* 2006;

Kolenosky, 2007). The Côte-Nord region (hunting area 19 south) has the lowest estimated density in the province at 0.3 bear per 10 km^2 (Lamontagne *et al.*, 2006).

Considering the low level of bears in the region, the presence of industrial activities at the port and the habitat fragmentation, the presence of black bear on the peninsula is unlikely.

Furbearers

Furbearers are terrestrial mammals that are commercially exploited following trapping activities. Among the 23 species exploited in the province, fifteen are present in the Côte-Nord region. The most popular game species includes marten, beaver, weasel, muskrat, mink, and red squirrel. Canada lynx, wolf and river otter are also prized by trappers but are captured in a lesser extent.

Seven members of the weasel family (Mustelidae) are present in the Côte-Nord. The marten is a small predator that prefers old growth coniferous or mixed woods forest, although it may seek food in open areas. It preys mainly on small mammals such as red squirrels, mice, voles, shrews and hares (Prescott and Richard, 2004). Fisher prefers dense forest while least weasel and ermine inhabit open areas. They all exploit a wide variety of food sources. Mink and river otter, aquatic members of the weasel family, are distributed along rivers, lakes and the coast. They feed on fish, insects, molluscs, crustaceans, small mammals and waterfowl (Prescott and Richard, 2004).

Red squirrels are a common and widespread mammal in North America that is associated with coniferous and mixed forest. In the boreal forest, the red squirrel feeds mainly on cones of conifer but also on eggs and chicks and insect larvae. It is preyed upon by many animals such as marten, mink, weasel, hawks, owls, fox, coyote, and lynx (Prescott and Richard, 2004).

Beaver occupy rivers, streams, marshes, lakes and ponds. Most common in forested areas, beaver also expand into non-forested habitats, where there are water-courses bordered by deciduous trees or shrubs. Beaver has localized effects on riparian ecosystems by damming small streams and building canals and lodges. This rodent feeds mainly on bark and twigs, but will also eat leaves, grasses, herbs, berries and aquatic plants. The species is most often found in association with riparian and wetland habitat types (Trottier, 1989). Muskrat also inhabit marshes, pond and lake edges and streams, feeding primarily on the roots and stems of aquatic vegetation and sometimes on clams, frogs and fish.

Canada lynx favour old growth boreal forest with a dense undercover of thickets and windfalls. Lynx have dramatic fluctuations in population, following snowshoe hare populations to a peak, and then crashing (Keith, 1992).

Wolf can be found in a variety of habitats, from mixed forest in southern Québec to arctic tundra in the north. Size of territories vary greatly and are dependent on the kind and abundance of available prey (Pimlott, 1993).

Habitat conditions on the Marconi Peninsula are not conducive to the presence of the wolf or lynx mostly because of habitat conditions and scarcity of prey.

Small Mammals

Small mammals refer to a variety rodents, insectivores, bats, and hares. Snowshoe hare are a widely distributed herbivore found where young conifers young coniferous twigs are present (e.g. regrowth, shrublands, open areas, wetlands). In spring and summer, snowshoe hare feeds primarily in open areas on grasses and herbaceous plants. In winter, it strips bark from young trees or the new growth of woody plants. The population is cyclic, typically peaking every 9 to 10 years over most of its range (Prescott and Richard, 2004).

Incidental Observations

Surveys specifically targeting mammals have not been conducted within the LSA; however incidental observations were noted during other field work conducted in support of the Kami Terminal. Habitats in the Marconi Peninsula are fragmented as the result of industrial activity at the Port (port operations, aluminum plant, railroads, access roads and transmission lines) and wood harvesting activities that occurred some 30 years ago. Habitat conditions reflect encroachments and high noise levels associated with industrial activities. Available habitats consist mainly of patches of mature coniferous forest stands and young mixed forest stands. Such conditions are not favorable to large mammals as they normally required large vital ranges. These habitats are more likely to be used by small mammals.

Species observed during field work in the Kami Terminal area include: beaver, snowshoe hare, red squirrel, American porcupine and southern red-backed vole.

19.5.4 Protected Areas

Terrestrial mammal habitats that are protected under the *Regulation Respecting Wildlife Habitats* (c. C-61.1, r. 18) include white-tailed deer yards, muskrat habitat, salt licks and other areas specific to threatened or vulnerable species, areas frequented by caribou, and caribou calving areas. According to the MRNF database on protected wildlife habitats, none of these habitats are present in proximity of the Kami Terminal area (MRNF 2011b).

Seabird colonies are located at approximately 6 km from the Kami Terminal area, on the Île du Corossol (88 ha) and Archipel des Sept-Îles (1,141 ha) (Environment Canada 2012b; MRNF 2011). Île du Corossol is also a migratory bird sanctuary (413 ha) as is Île de la Grosse Boule (1,712 ha) (NRCan 2006). Heron colonies are located on Île Manowin (247 ha) and Île du Corossol (88 ha) (MRNF, 2011).

A heronry (i.e., *héronnière*) is defined in the provincial regulation as:

- a site where at least 5 nests have been used by great blue herons, black-crowned night herons and American egrets during at least one of the past 5 nesting seasons, including a strip of surrounding land 500 m wide or, where the layout of the land makes it impossible to extend the strip to 500 m, a smaller surrounding strip;

Waterfowl gathering areas are also present along the shores of Marconi Peninsula (MRNF, 2011), however not in the vicinity of the western section of the port facility at Pointe-Noire

(Figure 19.5). A portion of a 423 ha waterfowl gathering area is close to a portion of the rail loop. Given the location of the small cove in close proximity to an active port, the area is not likely ideal habitat for gathering waterfowl.

A waterfowl gathering area (i.e., *aire de concentration d'oiseaux aquatiques*) is defined in the *Regulation Respecting Wildlife Habitats* as:

- the site of a swamp, a floodplain delimited by the mean high-water level for a 2-year period, and intertidal zone, a water plant community or a band of water measuring no more than 1 km wide as measured from the low-water mark and no less than 25 ha in area, that is frequented by geese or ducks during nesting or migration seasons and where there are at least 50 birds of those species per kilometre of shoreline measured along a straight line drawn between the two most distant points on the shoreline or 1.5 birds per hectare; where the limits of a floodplain cannot be established as indicated, they shall correspond to the natural high-water mark

No other protected areas have been identified within the LSA.

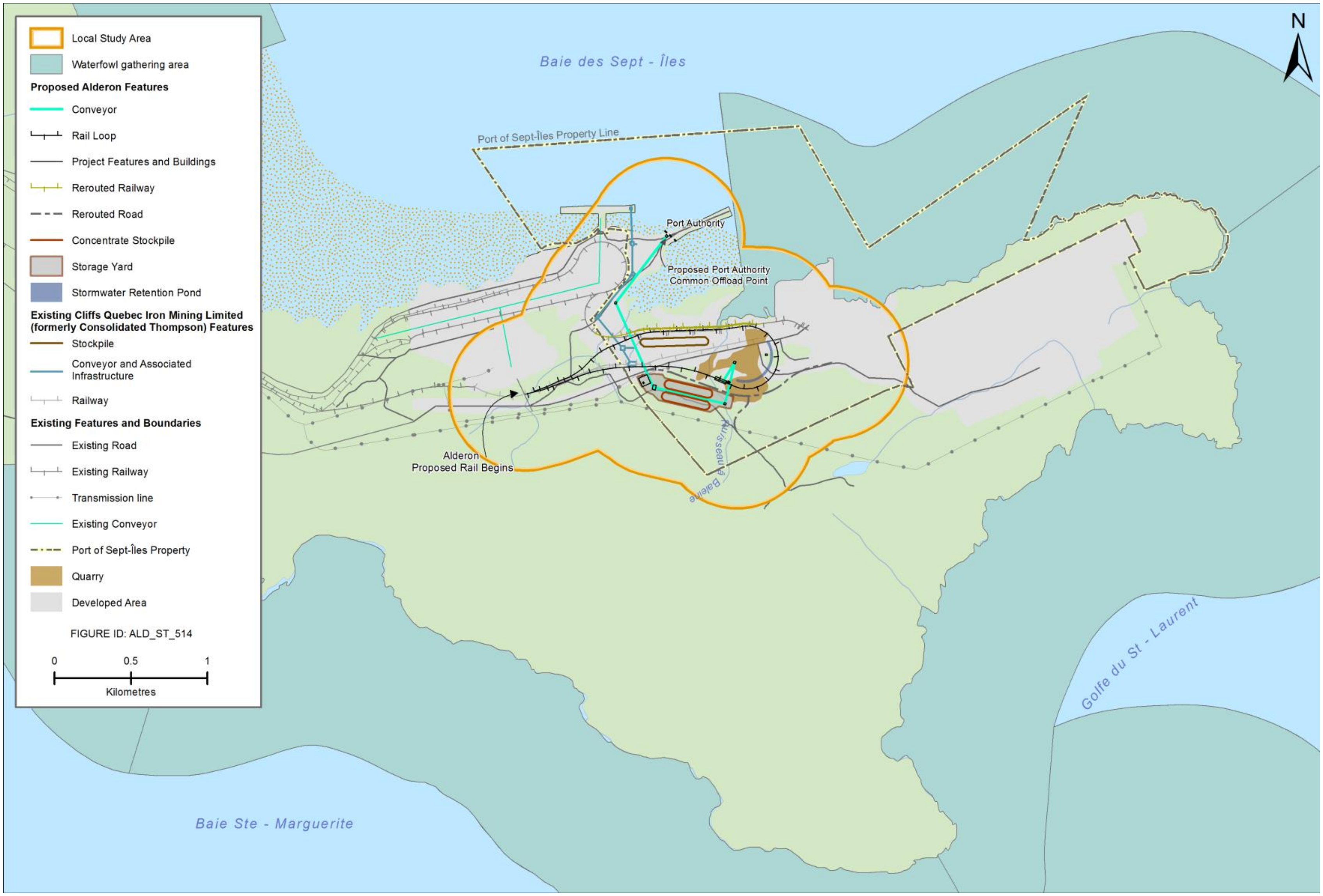


Figure 19.5 Waterfowl Gathering Areas

19.6 Assessment of Project-Related Environmental Effects

The remaining interactions brought forward for assessment that may have residual environmental effects that exceed acceptable levels without implementation of specific mitigation include the potential change in habitat, change in distribution and movement, change in mortality risk, and change in health due to the construction, specifically site preparation activities, including excavation, blasting, material haulage, grading, removal of overburden, and stockpiling.

19.6.1 Change in Habitat

Potential Environmental Effects

Site preparation will result in the loss or alteration of habitat for wildlife species, or the direct loss of individual animals (Section 19.6.3). Clearing and grubbing during site preparation will remove existing vegetation, whereas infilling of wetlands (if present) will cause permanent loss of wetland vegetation and habitat.

Change in habitat may result in adverse environmental effects on wildlife species. For example, the Kami Terminal has the potential to result in the loss of breeding, nesting, rearing, or other habitats for birds and other wildlife species. These species may be forced to move to other habitats and habitats of potentially lower quality if preferred habitats are limited. This could result in crowding and increased competition for resources.

In addition, a number of indirect effects may result from these site preparation activities. Forest clearing can change the quality of the habitat along the edge of the Kami Terminal footprint as a result of increased side lighting or drying of what was previously forest interior habitat. This may enable more light-tolerant and disturbance-tolerant species to penetrate into adjacent forest habitat. Vegetation located within the footprints of various Kami Terminal components will be removed during the construction phase.

Construction activities may also result in a change in habitat through fragmentation — i.e., discontinuity in preferred habitat — leading to the reduction or loss of freedom of movement between patches of habitat. Change in habitat through fragmentation is likely to be limited for species that are found in the vicinity of the Kami Terminal area and currently move through and within the Kami Terminal to access preferred habitat, given the proximity to existing disturbances.

Mitigation of Project Environmental Effects

Standard practices and general environmental protection measures for construction projects will address most outstanding issues likely to arise during the Kami Terminal, including site preparation. An EPP will also be developed for the Kami Terminal prior to start of the construction phase. Activities such as blasting are regulated by law and will comply with all applicable standards and regulations, guidelines and reference documents. Best practices for protecting Birds, Other Wildlife and their Habitats, and Protected Areas include the measures outlined below for each environmental effect.

The following mitigation measures are proposed to mitigate effects related to change in habitat during site preparation. Many of these mitigation measures would also address issues associated with other construction and operation effects:

- Apply standard and best practices and general environmental protection measures;
- Environmental monitoring during construction;
- Avoid clearing during the breeding bird season, where feasible;
- Flag boundaries of sensitive areas or buffers;
- Comprehensive and regular maintenance of vehicles;
- Site erosion protection and sediment control measures;
- Direct stormwater, wastewater or surface water away from wildlife habitat;
- Implement EPP; and,
- Provide employee training.

Characterization of Residual Project Environmental Effects

Based on available habitat maps, updated in part from available satellite imagery, there is a limited amount of natural forest habitat that will be lost due to construction activities. The majority of affected forest habitat is from the concentrate unloading, stacking, storage and reclaiming facilities, where 7.6 ha of forest will be removed (Table 19.10). In total, direct loss of approximately 14.5 ha of largely edge habitat will be lost, while over 43 percent of the PDA is on developed or otherwise disturbed land. Interior forest – defined as mature forest habitat more than 100 m from an edge and is a minimum of 10 ha in size — is not located within 100 m of the PDA, and will therefore not be affected. The terrestrial habitat loss will be permanent; however, the loss represents less than one percent of Marconi Peninsula, or approximately one percent of the terrestrial habitat excluding the developed or cleared lands. This represents a loss of two percent of the mature coniferous forest, which makes up 39 percent of Marconi Peninsula, and a loss of less than six percent of the young mixed forest, which makes up 13 percent of Marconi Peninsula.

Table 19.10 Kami Terminal Interactions with Habitats

Kami Terminal Component	Area Directly Affected by Habitat Type (ha)				
	Developed Land	Mature Coniferous Forest	Young Mixed forest	Early Successional	Total
Concentrate Unloading, Stacking, Storage and Reclaiming Facilities	0.618	4.15	3.45	--	8.218
Conveyor	2.89	0.646	0.498	--	4.034
Rail Loop	6.99	1.37	1.125	--	9.485

Kami Terminal Component	Area Directly Affected by Habitat Type (ha)				
	Developed Land	Mature Coniferous Forest	Young Mixed forest	Early Successional	Total
Road Re-alignment	0.112	1.48	--	1.566	3.158
Retention Pond and Building	0.58	0.19	--	--	0.77
Total	**11.19**	**7.84**	**5.07**	**1.57**	**25.67**

While the route of the stream diversion has not been identified, ruisseau à la Baleine, which is already piped for much of its length through the Port site before flowing to anse à Brochu (baie des Sept-Îles), stream is likely to be diverted to the east of the concentrate storage yard, before reconnecting to the piped portion downstream. This is unlikely to involve the loss of a substantive amount of wildlife habitat, as no sign of amphibians were noted during surveys. The realignment is expected to affect 500 m of the approximately 1.5 km watercourse, adjacent to its piped, downstream end. The watercourse drains a relatively small watershed approximately 1 km^2 in area. Small ephemeral pools measuring less than 10 m^2 are located near or within the PDA, in close proximity to or within areas clarified as developed land. These small pools are largely the result of past road construction, and an old, inactive beaver pond. The wildlife value of these habitats is considered low, with low potential for harbouring any substantive populations of amphibians or small mammals.

19.6.2 Change in Distribution and Movement

Potential Environmental Effects

Site preparation within the PDA has the potential to displace wildlife due to the direct loss of habitat, and displacement of individuals. Initial site preparation poses the greatest potential for leading to changes in the distribution and movement of wildlife: the remaining construction activities will also have an impact, but it will result from sensory disturbance from noise and dust.

Construction activities may also result in habitat fragmentation, leading to the reduction or loss of freedom of movement between habitat patches. This could be particularly problematic for species that are found in the vicinity of the PDA and currently move through and within the Kami Terminal to access preferred habitat. However, given the location and scale of the Kami Terminal, fragmentation will be minor and the movements of few, if any, species are expected to be disrupted in a substantive way.

Noise associated with construction and later, operation and maintenance activities may cause the displacement of individuals to less productive habitats, and may affect the flight patterns of migratory birds.

Mitigation of Project Environmental Effects

Standard practices and general environmental protection measures for construction projects will address most outstanding issues likely to arise during the Kami Terminal, including site preparation. An EPP will also be developed for the Kami Terminal prior to start of the construction phase. Activities such as blasting are regulated by law and will comply with all applicable standards and regulations, guidelines and reference documents. Best practices for wildlife within this VEC include the measures outlined below for each environmental effect.

The following mitigation measures are proposed to minimize effects related to change in distribution and movement during the construction phase:

- Apply standard and best practices and general environmental protection measures;
- Environmental monitoring during construction;
- Avoid clearing during the breeding bird season, where feasible;
- Develop an avifauna management plan;
- Flag boundaries of sensitive areas or buffers;
- Proper muffler installation;
- Survey area for presence of sensitive wildlife prior to blasting;
- No harassment of wildlife;
- Implement EPP; and,
- Provide employee training.

Characterization of Residual Project Environmental Effects

The construction activities will be occurring on a port site that is already a source of noise and dust. Adjacent wildlife is expected to largely have adapted to noise levels at the port, and the encroachment on the surrounding natural habitats that are already fragmented by roads a quarry and transmission lines is expected to be limited in extent.

Given the common species recorded and the common, fragmented habitats within the PDA, and the relatively small amount of undisturbed habitats that will be directly and indirectly affected by site preparation activities, the proportion of birds and other common wildlife that would be displaced by the Kami Terminal would be low, well below five percent of the populations in the greater landscape (i.e., the RSA).

Clearing and other activities, as well as noise associated with construction, will result in a change in the distribution and abundance of wildlife species. These activities will occur over the duration of construction. The effects of construction on change in distribution and abundance of wildlife species are predicted to be adverse. The magnitude of adverse effects during construction will be low because the estimated number of individuals potentially redistributed or lost due to construction and other activities following implementation of mitigation measures is expected to be less than 5 percent of the regional population. There is a high degree of confidence that the level of effect will not be greater than predicted.

19.6.3 Change in Mortality Risk

Potential Environmental Effects

Site preparation and other construction activities related to the Kami Terminal may result in the direct loss of individual animals. Direct mortality could occur mainly to small species such as herpetiles, small mammals, and the eggs or young of birds. Potential changes in forest edges associated with construction clearing activities may also result in increased predation on birds and small mammals.

Depending on the timing of these activities, direct mortality or disturbance to breeding wildlife, especially birds, can occur, in violation of the MBCA or Sections 16 and 17 of QARTVS. Most birds and mammals would leave the cleared and grubbed areas and would move to adjacent undisturbed habitats. Indirect mortality could occur to these animals if they are unable to find suitable unoccupied habitat.

Some wildlife species are attracted to open disturbed sites such as those created by clearing and grubbing. Birds such as common nighthawk and killdeer use habitats such as this for nesting. Subsequent construction of infrastructure on these sites can result in the destruction of the eggs and unfledged young of these species.

Mitigation of Project Environmental Effects

Standard practices and general environmental protection measures for construction projects will address most outstanding issues likely to arise during the Kami Terminal, including site preparation. An EPP will also be developed for the Kami Terminal prior to start of the construction phase. Activities such as blasting are regulated by law and will comply with all applicable standards and regulations, guidelines and reference documents. Best practices for wildlife in this VEC include the measures outlined below for each environmental effect.

The following mitigation measures are proposed to effects related to change in mortality risk during site preparation:

- Apply standard and best practices and general environmental protection measures;
- Environmental monitoring during construction;
- Avoid clearing during the breeding bird season, where feasible;
- Develop an avifauna management plan;
- Site erosion protection and sediment control measures;
- Survey area for presence of sensitive wildlife prior to blasting;
- Direct stormwater, wastewater or surface water away from wildlife habitat;

- No harassment of wildlife;
- Implement EPP; and,
- Provide employee training.

Characterization of Residual Project Environmental Effects

The residual environmental effects on bird mortality should be low with the application of mitigation, including avoidance of clearing activities during the breeding season of most birds, and development of an avifauna management.

There is a possibility of residual mortality of terrestrial wildlife during site preparation, construction of the concentrate unloading, stacking, storage and reclaiming facilities, and construction of the stream diversion. The residual mortality is expected to be low in magnitude, small in geographic extent, and short-term in duration. A low proportion (<5 percent) of the regional population of common wildlife species that are present within the RSA are likely to be affected by these construction activities.

19.6.4 Change in Health

Potential Environmental Effects

The key factor with potential for causing a change in health are airborne contaminates from site preparation and road construction that can cause physiological effects from contamination, potentially lowering fitness of breeding animals, affecting reproductive output and success.

Mitigation of Project Environmental Effects

Standard practices and general environmental protection measures for construction projects will address most outstanding issues likely to arise during the Kami Terminal, including site preparation. An EPP will also be developed for the Kami Terminal prior to start of the construction phase. Activities such as blasting are regulated by law and will comply with all applicable standards and regulations, guidelines and reference documents. Best practices for protecting Birds, Other Wildlife and their Habitats, and Protected Areas include the measures outlined below for each environmental effect.

The following mitigation measures are proposed to effects related to change in health during site preparation

- Apply standard and best practices and general environmental protection measures;
- Environmental monitoring during construction;
- Comprehensive and regular maintenance of vehicles;
- Site erosion protection and sediment control measures;
- Survey area for presence of sensitive wildlife prior to blasting;

- Direct stormwater, wastewater or surface water away from wildlife habitat;
- No harassment of wildlife;
- Provincial and federal regulations will be followed in the storage and handling of materials;
- Implement EPP;
- Product spill contingency planning up to the proposed Port authority common load-out point; and,
- Provide employee training.

Many of the measures used to mitigate potential effects on the health of Birds, Other Wildlife and their Habitat, and Protected Areas as identified above for the construction phase are also applicable to the operation and maintenance phase.

Characterization of Residual Project Environmental Effects

Given the limited extent of expected dust deposition or other airborne contaminates as a result of construction activities, the potential and extent of health effects such as reproductive output and success is expected to be low, in particular due to the short duration and expected limited extent of effects. The magnitude of adverse effects will be low, as the estimated number of wildlife species potentially affected by Kami Terminal activities following implementation of mitigation measures is expected to be less than 5 percent of the regional population.

19.6.5 Summary of Project Residual Effects

The residual environmental effects of the Kami Terminal on the Birds, Other Wildlife and Their Habitat, and Protected Areas are summarized in Table 19.11.

Table 19.11 Summary of Residual Environmental Effects of Kami Terminal: Birds, Other Wildlife and their Habitats, and Protected Areas

Kami Terminal Phase	Mitigation / Compensation Measures	Residual Environmental Effects Characteristics									Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental or Socio-Economic Context	Significance	Prediction Confidence	
Change in Habitat											
Construction	• Apply standard and best practices and general environmental protection measures. • Environmental monitoring during construction. • Avoid clearing during the breeding bird season, where feasible. • Develop an avifauna management plan. • Flag boundaries of sensitive areas or buffers. • Proper muffler installation. • Comprehensive and regular maintenance of vehicles. • Site erosion protection and sediment control measures. • Survey area for presence of sensitive wildlife prior to blasting. • Direct storm water, wastewater or surface water away from wildlife	A	L	S	ST	C	I	D	N	H	On-site monitoring for compliance with the EPP.

Kami Terminal Phase	Mitigation / Compensation Measures	Residual Environmental Effects Characteristics									Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental or Socio-Economic Context	Significance	Prediction Confidence	
	habitat. • No harassment of wildlife. • Provincial and federal regulations will be followed in the storage and handling of materials. • Implement EPP. • Implement forest fire prevention and response plan • Oil Spill Contingency planning. • Product spill contingency planning up to the proposed Port authority common load-out point. • Provide employee training.										
Change in Distribution and Movement											
Construction	Idem	A	L	L	ST	C	I	D	N	H	On-site monitoring for compliance with the EPP.
Change in Mortality Risk											
Construction	Idem	A	L	L	ST	C	I	D	N	H	On-site monitoring for compliance with the EPP.
Change in Health											
Construction	Idem	A	L	L	ST	C	I	D	N	H	On-site monitoring for compliance with the EPP.

Kami Terminal Phase	Mitigation / Compensation Measures	Residual Environmental Effects Characteristics									Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental or Socio-Economic Context	Significance	Prediction Confidence	

KEY

Direction:
- P Positive.
- A Adverse.

Magnitude:
- L Low: the residual Project (alteration / loss) are not expected to exceed 5% of the known population in the RSA. No measurable effect.
- M Moderate: the residual Project effects (alteration / loss) are expected to be greater than 5% and not exceed 25% of the known populations in the RSA. Effect can be measured.
- H High: the residual Project effects (alteration / loss) are expected to exceed 25% of the known population in the RSA.

Geographic Extent:
- S Site – including PDA.
- L Local: within the LSA.
- R Regional: within the RSA.

Duration:
- ST Short term - Effect occurs during the site-preparation or construction phase of the Project (i.e., 1 to 2 years).
- MT Medium term - Effect extends throughout the construction and operation phases of the Project (up to 15 years).
- LT Long term - Effect is greater than 15 years.
- P Permanent – will not change back to original condition.

Frequency:
- O Effect occurs occasionally, or once during the life of the Project (e.g., clearing).
- S Occurs sporadically at irregular intervals.
- R Occurs on a regular basis and at regular intervals.
- C Continuous.

Reversibility:
- R Reversible.
- I Irreversible.

Environmental or Socio-economic Context:
- U Undisturbed: Area relatively or not adversely affected by human activity.
- D Developed: Area has been substantially previously disturbed by human development or human development is still present.
- N/A Not Applicable.

Significance:
- S Significant.
- N Not Significant.

Prediction Confidence:
Based on scientific information and statistical analysis and effectiveness of mitigation or effects management measure.
- L Low level of confidence.
- M Moderate level of confidence.
- H High level of confidence.

19.7 Assessment of Cumulative Effects

In association with the Kami Terminal environmental effects discussed above, an assessment of the potential cumulative effects was conducted for other projects and activities that have potential to interact with the Kami Terminal. The potential for overlap between Kami Terminal activities and cumulative effects of other projects and activities conducted or to be conducted in the RSA is identified in Table 19.12.

Most of the northern part of the Marconi Peninsula has been cleared of vegetation as a result of industrial activities. Habitats available within the avifauna survey study area consist of patches of young mixed forest stands, which have resulted from either forest harvesting or excavation for roads, and mature coniferous stands. These habitats are interspersed, as they are small and present in patches, and are found both within and south percent of the Marconi Peninsula, while the dominant habitat is mature coniferous forest, representing 39 percent of the area.

Common bird and other wildlife species were recorded in the study area; 29 birds at least possibly breeding and 4 of the 10 herpetofauna species known from the region were recorded, all outside the PDA. Common small mammals are likely to inhabit the peninsula, which is not favourable for large mammals.

The only protected area identified within the LSA is a waterfowl gathering area located in baie des Sept-Îles, northeast of the PDA. Other nearby protected areas in the RSA include additional waterfowl gathering areas around the coast of Marconi Peninsula, and islands in baie des Sept-Îles. With the exception of the nearby waterfowl gathering areas near Pointe-Noire, other protected areas are unlikely to be directly affected by industrial activity in the RSA.

The residual environmental effects of the Kami Terminal on Birds, Other Wildlife and their Habitat, and Protected Areas are low in magnitude.

Of the total estimated area of the PDA (25.7 ha), over 43 percent is on developed or otherwise disturbed land. The majority of affected forest habitat is from the concentrate unloading, stacking, storage and reclaiming facilities, where 7.6 ha of forest will be removed. Interior forest (defined as mature forest habitat more than 100 m from an edge and that is a minimum of 10 ha in size) is not located within 100 m of the PDA, and will therefore not be affected. The terrestrial habitat loss will be permanent; however, the loss represents less than 1 percent of the Marconi Peninsula or approximately 1 percent of the terrestrial habitat excluding the developed or cleared lands.

Residual environmental effects on bird mortality should be low with the application of mitigation, including avoidance of clearing activities during the breeding season of most birds.

Given the common species recorded and the common, fragmented habitats within the PDA, and the relatively small amount of undisturbed habitats that will be directly and indirectly affected by site preparation activities, the proportion of birds and other common wildlife that would be displaced by the Kami Terminal would be low, well below 5 percent of the populations in the RSA. Given the limited extent of expected dust deposition or other airborne contaminants as a result of construction activities, the potential and extent of health effects such as reproductive output and success is expected to be low, in particular due to the short duration, and expected limited extent of effects.

There is no spatial or temporal overlap between the Kami Terminal and the Second Port-Cartier pellet plant (ArcelorMittal Mines Canada), as the pellet plant project is located approximately 30 km southeast of the Kami Terminal, and therefore does not overlap the RSA. The remaining projects will all affect land within the RSA, however they are expected to be constructed primarily on developed land or other disturbed or edge habitats. Cumulative losses of natural terrestrial habitat, either small or substantive, are not likely and direct effects on wildlife will be limited. One possible exception is the future expansion of the Aluminerie Alouette aluminum smelter. No information is currently available to determine what, if any, terrestrial habitat would be lost. However based on habitat maps adjacent the smelter, no interior forest is likely to be affected, and limited forest habitat may be lost. The remaining projects principally involve the erection of additional infrastructure within developed areas for additional rail traffic and ship loading. All development is expected to keep close to existing development, similar to the Kami Terminal, with no encroachment on interior forest habitat. There is also no or limited overlap with protected areas, with only waterfowl gathering areas holding any potential to be affected indirectly by sensory disturbance from other projects located near the coast which may overlap temporally with construction activities for the Kami Terminal (e.g. the Mine Arnaud dock and ship loader).

While direct construction effects on natural terrestrial habitat are likely to be limited, indirect effects of added noise, light, and dust are likely to increase locally with the project expansions.

The Kami Terminal will not contribute substantively to cumulative effects, because of the planned mitigation measures, which include:

- Applying standard and best management practices and general environmental protection measures;
- Implementing measures detailed in the EPP; and,
- Employee training.

The characterization of the potential cumulative effects and associated mechanisms, combined with the proposed mitigation / effects management measures demonstrate that the residual cumulative effect of change in population on Birds, Other Wildlife and their Habitats, and Protected Areas during all phases, is rated not significant. This determination has been made with a moderate level of confidence.

Table 19.12 Summary of Potential Cumulative Effects to Birds, Other Wildlife and their Habitats, and Protected Areas

<table>
<tr><td>Valued Ecosystem Component Existing Condition
(Past and Ongoing Activities)</td><td colspan="3">• Most of the northern part of the Marconi Peninsula has been cleared of vegetation owing to industrial activity. Existing vegetation on the peninsula as a whole is boreal coniferous and boreal mixed forest. Habitats available within the bird survey study area consist of patches of young mixed forest stands, which have resulted from either forest harvesting or excavation for roads, and mature coniferous stands. These habitats are interspersed, as they are small and present in patches, and are found both within and south of the proposed concentrate unloading, stacking, storage and reclaiming facilities. Developed areas make up 24 percent of the Marconi Peninsula, while the dominate habitat is mature coniferous forest at 39 percent.
• Common bird and other wildlife species were recorded in the study area; 29 birds at least possibly breeding and 4 of the 10 herpetofauna species known from the region were recorded, all outside the PDA. Common small mammals are likely to inhabit the peninsula, which is not favourable for large mammals.
• The only protected area identified within the LSA is a waterfowl gathering area located in baie des Sept-îles, northeast of the PDA.</td></tr>
<tr><td>Kami Terminal Residual Environmental Effects</td><td colspan="3">• Of the total estimated area of the PDA (25.7 ha), over 43 percent is on developed or otherwise disturbed land. The majority of affected forest habitat is from the concentrate unloading, stacking, storage and reclaiming facilities, where 7.6 ha of forest will be removed. Interior forest (defined as mature forest habitat more than 100 m from an edge and that is a minimum of 10 ha in size) is not located within 100 m of the PDA, and will therefore not be affected. The terrestrial habitat loss will be permanent; however, the loss represents less than 1 percent of the Marconi Peninsula, part of the RSA, or approximately 1 percent of the terrestrial habitat excluding the developed or cleared lands.
• Residual environmental effects on bird mortality should be low with the application of mitigation, including avoidance of clearing activities during the breeding season of most birds.
• Given the common species recorded and the common, fragmented habitats within the PDA, and the relatively small amount of undisturbed habitats that will be directly and indirectly affected by site preparation activities, the proportion of birds and other common wildlife that would be displaced by the Kami Terminal would be low, well below 5 percent of the populations in the greater landscape (i.e., the RSA). Given the limited extent of expected dust deposition or other airborne contaminates as a result of construction activities, the potential and extent of health effects such as reproductive output and success is expected to be low, in particular due to the short duration, and expected limited extent of effects.</td></tr>
<tr><td>Other Projects / Activities</td><td>Likely Effect Interaction (Y/N)</td><td>Rationale</td><td>Cumulative Effects</td></tr>
<tr><td>Pointe-Noire Port Expansion (Port of Sept-Îles)</td><td>Y</td><td>Will affect land within the RSA</td><td>• Limited cumulative effect on habitat, as expected to largely be constructed on developed land or other disturbed or edge habitats.</td></tr>
<tr><td>CFA and QNS&L</td><td>Y</td><td>Will affect land within the RSA</td><td>• Limited cumulative effect on habitat, as expected to largely be constructed on developed land or other disturbed or edge habitats.</td></tr>
</table>

Alouette Aluminum Smelter (Aluminerie Alouette)	Y	Will affect land within the RSA (Marconi Peninsula)	• Limited cumulative effect on habitat, as expected to largely be constructed on developed land or other disturbed or edge habitats. Some fragmented forest habitat may be affected.
Second Port-Cartier Pellet Plant (ArcelorMittal)	N	The Mount Wright Mine project is not located within the RSA.	• N/A
Bloom Pointe-Noire Terminal (Cliffs Resources)	Y	Will affect land within the RSA	• Limited cumulative effect on habitat, as expected to largely be constructed on developed land or other disturbed or edge habitats.
Arnaud Apatite-Magnetite mine (Mine Arnaud)	Y	Will affect land within the RSA	• Limited cumulative effect on terrestrial habitat, as expected to largely be constructed on developed land or other disturbed or edge habitats. • New port facilities to include a new dock and shiploader, constructed in the waterfowl gathering area, potentially resulting in cumulative effects if temporal overlap during construction.

Cumulative Effects Summary (Kami Terminal + All Relevant Projects / Effects)	**Direction**	**Magnitude**	**Geographic Extent**	**Duration**	**Frequency**	**Reversibility**	**Significance**	**Confidence**
	A	L	R	P	C	I	N	M

The overlapping projects will all affect land within the RSA however are expected to largely be constructed on developed land or other disturbed or edge habitats. There would therefore not likely be any or substantive cumulative losses of natural terrestrial habitat. One possible exception is the future expansion of Aluminerie Alouette Aluminum Smelter. No information is currently available to determine what, if any, terrestrial habitat would be lost, however based on habitat maps adjacent the smelter, no interior forest would likely be affected, and limited forest habitat may be lost. The remaining projects are largely the placement of additional infrastructure within developed areas for additional rail traffic and ship loading. All development is expected to keep close to existing development, similar to the Kami Terminal, with no encroachment on interior forest habitat. The Kami Terminal effects are unlikely to overlap with effects of construction of the planned Mine Arnaud dock and shiploader, located in a waterfowl gathering area in baie des Sept-Îles. It is not known if there will be temporal overlap of construction of the new dock and construction of the nearby rail loop of the Kami Terminal.

While direct construction effects on natural terrestrial habitat are likely to be limited, indirect effects of added noise, light and dust are likely to increase locally with the project expansions. The Kami Terminal will not contribute substantively to cumulative effects, because of the planned mitigation measures such as applying standard and best management practices and general environmental protection measures; implementing measures detailed in the EPP; and employee training.

The characterization of the potential cumulative effects and associated mechanisms, combined with the proposed mitigation / effects management measures demonstrate that the residual cumulative effect of change in population on Birds, Other Wildlife and their Habitats, and Protected Areas during all phases, is rated not significant. This determination has been made with a moderate level of confidence.

Note: Environmental effects descriptors and their definitions are as used in the assessment of environmental effects (See Table 19.11).

19.8 Assessment of Accidents and Malfunctions

Potential accident or malfunction scenarios that are unlikely to interact with Birds, Other Wildlife and their Habitats, and Protected Areas include stormwater retention pond breach, and train derailment.

The stormwater retention pond will to be placed within the developed land within the PDA and only developed lands and baie des Sept-Îles are located downgradient. This scenarios was ranked 0 in Table 19.2 because it would not likely be any or substantive consequences to Birds, Other Wildlife, and their Habitats.

Train derailment within the Pointe-Noire Terminal area is a highly unlikely scenario given the low speeds, and the limited amounts of hazardous materials that could be released (i.e., engine fuel and lubricants). The low speeds would also likely limit the damage to the environment should such an event occur, especially since it is largely located in disturbed land, and there would be relatively small amounts of terrestrial habitat that would have potential to be impacted. The mortality risk to wildlife would therefore be low. Standard mitigation includes:

- Provincial and federal regulations should be followed in the storage and handling of materials;
- Implement EPP during clean-up;
- Implement response plan and measures to recover lost product;
- Oil Spill Contingency planning;
- Product spill contingency planning up to the proposed Port authority common load-out point; and,
- Employee training.

Negligible environmental effects of a train derailment are anticipated due to the ecological context (i.e., landscape position, hydrology) of Birds, Other Wildlife and their Habitats, and Protected Areas. No follow-up and monitoring are likely required, assuming adequate clean-up can be achieved. It was ranked 1 in Table 19.2 and is not assessed further.

One potential accident or malfunction scenario could interact with Birds, Other Wildlife and their Habitats, and Protected Areas to a substantial degree: forest fire caused by the Kami Terminal. In the unlikely event of a forest fire, change in habitat, change in distribution and movement, change in mortality risk, and change in health could result. Forest fires are ranked as 2 and, therefore, are assessed in more detail below and summarized in Table 19.13.

Forest Fire

A forest fire caused by the Kami Terminal has the potential to burn forested habitat that provides a home to common wildlife including birds and mammals. Animals unable to mobilize during the fire would perish. Mortality would be particularly high during the breeding season, when young have not yet fledged. Wildlife could be injured due to smoke effects, potentially affecting future reproductive output and success. The significance of such an event depends largely on the extent of the fire, in consideration of the significance criteria, the seasonal timing and the size of the RSA. Standard mitigation includes:

- Implement EPP;
- Implement forest fire prevention and response plan; and,
- Employee training.

Access to forest land surrounding the PDA for firefighting efforts is fair, via the existing road along the transmission line, which heads south towards a communication tower and lac Brochu.

The residual environmental effects of accidents and malfunctions on Birds, Other Wildlife and their Habitats, and Protected Areas are summarized in Table 19.13.

Table 19.13 Summary of Residual Environmental Effects of Kami Terminal for Birds, Other Wildlife and their Habitats, and Protected Areas – Accidents and Malfunctions

Kami Terminal Phase	Mitigation / Compensation Measures	Residual Environmental Effects Characteristics									Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental or Socio-Economic Context	Significance	Prediction Confidence	
Forest Fire	• Implement EPP; • Implement forest fire prevention and response plan; • Provide employee training.	A	L	L/R	ST	S	R	D	S	H	None recommended.

KEY

Direction:
P Positive.
A Adverse.

Magnitude:
L Low: the residual Project (alteration / loss) are not expected to exceed 5% of the known population in the RSA. No measurable effect.
M Moderate: the residual Project effects (alteration / loss) are expected to be greater than 5% and not exceed 25% of the known populations in the RSA. Effect can be measured.
H High: the residual Project effects (alteration / loss) are expected to exceed 25% of the known population in the RSA.

Geographic Extent:
S Site – including PDA.
L Local: within the LSA.
R Regional: within the RSA.

Duration:
ST Short term - Effect occurs during the site-preparation or construction phase of the Project (i.e., 1 to 2 years).
MT Medium term - Effect extends throughout the construction and operation phases of the Project (up to 15 years).
LT Long term - Effect is greater than 15 years.
P Permanent – will not change back to original condition.

Frequency:
O Effect occurs occasionally, or once during the life of the Project (e.g., clearing).
S Occurs sporadically at irregular intervals.
R Occurs on a regular basis and at regular intervals.
C Continuous.

Reversibility:
R Reversible.
I Irreversible.

Environmental or Socio-economic Context:
U Undisturbed: Area relatively or not adversely affected by human activity.
D Developed: Area has been substantially previously disturbed by human development or human development is still present.

Significance:
S Significant.
N Not Significant.

Prediction Confidence:
Based on scientific information and statistical analysis and effectiveness of mitigation or effects management measure.
L Low level of confidence.
M Moderate level of confidence.
H High level of confidence.

19.9 Determination of Significance of Residual Adverse Environmental Effects

19.9.1 Determination of Significance of Project Effects

As described above, potential adverse residual effects of the Kami Terminal on Birds, Other Wildlife and their Habitats, and Protected Areas would occur primarily as a result of first-time ground disturbance during construction. Any such effects, if they did occur, would therefore be primarily restricted to the PDA and beyond the PDA depending on the wildlife species.

The Kami Terminal will interact with Birds, Other Wildlife and their Habitats, and Protected Areas in the PDA and LSA. The significance of potential residual environmental effects resulting from interactions between Kami Terminal activities and Birds, Other Wildlife and their Habitats, and Protected Areas can only be evaluated after taking into account any proposed mitigation and compensation associated with the Kami Terminal. Mitigation includes applying standard and best practices and general environmental protection measures, avoiding clearing during the breeding bird season (where feasible); employee training; as well as implementation of measures detailed in the EPP.

The PDA is largely located within an existing and active industrial site, with only the concentrate unloading, stacking, storage and reclaiming facilities requiring the disturbance of existing wildlife habitat that is not considered critical or important for any wildlife species identified in the area, given its largely fragmented and disturbed structure and proximity to an active industrial area. While it is likely used by birds and wildlife for breeding, the habitat is common and widespread in the RSA and beyond, and the species that use the area are also common and widespread.

With the proposed mitigation / effects management and environmental protection measures, the environmental effect of change in populations of Birds, Other Wildlife and their Habitats, and Protected Areas is likely to be not significant. Therefore the overall effect of the Kami Terminal on Birds, Other Wildlife and their Habitats, and Protected Areas is not significant. This determination was made with a high level of confidence based on the results of a literature review, field surveys and the application of appropriate mitigation measures and follow-up programs. The magnitude of the effect on Birds, Other Wildlife and their Habitats, and Protected Areas is low (i.e., not likely to exceed the thresholds in the significance definition).

19.9.2 Determination of Significance of Cumulative Effects

The Kami Terminal will not contribute substantively to cumulative effects, because of the planned mitigation measures such as applying standard and best management practices and general environmental protection measures; implementing measures detailed in the EPP; and employee training.

The characterization of the potential cumulative effects and associated mechanisms, combined with the proposed mitigation / effects management measures demonstrate that the residual cumulative effect of change in population on Birds, Other Wildlife and their Habitats, and Protected Areas as a result of past, present, and reasonably foreseeable projects and activities that have been or will be carried out, in combination with the environmental effects of the Kami

Terminal during all phases, is rated not significant. This determination has been made with a moderate level of confidence.

19.9.3 Determination of Significance of Accidents and Malfunctions

The residual adverse environmental effects of a forest fire caused by the Kami Terminal on Birds, Other Wildlife and their Habitats, and Protected Areas as a result of accidents and malfunctions are predicted to be significant. This is due to the potential high magnitude and potential regional geographic extent of the environmental effects. However, with implementation of provincial and federal regulation / guidelines; EPP's, forest fire prevention and emergency response plan, and employee training, these unplanned or unintended events are unlikely to occur and are likely to be contained to the Kami Terminal site.

19.9.4 Overall Residual Efffects Conclusion

In summary, given the planned mitigation, and the analyses presented in this assessment, the effects of the change in habitat, change in distribution and movement, change in mortality risk and change in health on the Birds, Other Wildlife and their Habitats, and Protected Areas as a result of the construction, operation and decommissioning of the Kami Terminal, including cumulative effects, are not likely to be significant. Whit the exception of a fire, the effects of accidents and malfunctions are likely to be not significant.

19.10 Follow-up and Monitoring

As outlined in the EIS Guidelines, follow-up is a process designed to verify environmental effects predictions, to assess the effectiveness of strategies implemented to optimize Kami Terminal outcomes and implement adaptive management measure where necessary. Monitoring also helps ensure compliance with any commitments made and for any unforeseen effects to be identified and addressed.

It is recognized that although no significant effects from Kami Terminal development are expected with mitigation, failure to follow proposed mitigation measures could lead to potentially adverse environmental effects on Birds, Other Wildlife and their Habitats, and Protected Areas. Alderon will conduct on-site monitoring for compliance with the EPP.

19.11 Next Steps

No additional surveys are required.

19.12 Summary

Birds, Other Wildlife and their Habitats, and Protected Areas are an important feature of the landscape, representing aspects of the natural and socio-economic environment that are valued because of their ecological, scientific, resource, socio-economic, cultural, health, aesthetic, or spiritual importance; or due to concerns about the vulnerability of Birds, Other Wildlife and their Habitats, and Protected Areas to potential effects. Through background and field research, Birds, Other Wildlife and their Habitats, and Protected Areas have been evaluated within the

LSA. No wildlife species of interest have been recorded near the LSA based on desktop assessments, the available habitat, and field observations. Interaction between the Kami Terminal and Birds, Other Wildlife and their Habitats, and Protected Areas is possible within the LSA, primarily during the construction phase resulting from clearing and ground disturbance activities.

Many potential negative effects can be mitigated through careful planning. Mitigation measures have been prescribed to minimize effects on the environment. The most important legislation considered in the effects assessment and mitigation recommendations for Birds, Other Wildlife and their Habitats, and Protected Areas included the CEAA, MBCA, the QARCDW, and Canada's *Wildlife Act*.

Even though the effects of the Kami Terminal on Birds, Other Wildlife and their Habitats, and Protected Areas may be present for the life of the Kami Terminal, residual effects are expected to be small, and unlikely to be measurable within the range of natural variation in the environments as discussed. Effects on Birds, Other Wildlife and their Habitats, and Protected Areas are manageable, provided that appropriate mitigation measures are adhered to.

Based on the results of the environmental assessment, it is concluded that the Kami Terminal is not likely to result in significant adverse environmental effects on Birds, Other Wildlife and their Habitats, and Protected Areas, particularly with application of standard mitigation measures where technically and economically feasible to apply. Similarly, significant adverse cumulative effects are not likely.

20.0 SPECIES AT RISK AND SPECIES OF CONSERVATION CONCERN

20.1 VEC Definition and Rationale for Selection

Species at Risk (SAR) and Species of Conservation Concern (SOCC) were selected as a VEC because of the potential for interactions between Kami Terminal activities and flora or fauna that are considered as SAR / SOCC. The federal SARA and *Québec Act Respecting Threatened or Vulnerable Species* (QARTVS) also provide protection to species at the national and provincial levels promoting the management and recovery of endangered and threatened species.

For this environmental assessment, SAR / SOCC were defined on the basis of meeting one or more of the following criteria:

- A species and/or its critical or primary habitat is of provincial, national, or international importance;
- A species and/or its critical habitat is afforded some level of protection under federal or provincial legislation (i.e., SARA or QARTVS), or has special designation by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC);
- A listed species and/or its critical habitat as referred to in Schedule 1 of SARA and includes species designated as extirpated, endangered, threatened, or of special concern;
- A species and/or its critical habitat that may be under consideration for such legislative protection (i.e., Schedule 2 and 3 of SARA) as assessed by COSEWIC; and,
- A species not protected under federal or provincial regulatory frameworks, but considered rare, disjunct, or at risk throughout its range in Québec and considered unique or unusual (e.g., regarding vegetation, all SU, S1, S2, or combinations thereof), either locally or regionally, as recorded by CDPNQ.

In consideration of the existing disturbances at the Port of Sept-Îles, the limited direct disturbance to natural habitats within the PDA, and the apparent low potential for SAR / SOCC, the Kami Terminal is unlikely to result in significant environmental effects on SAR / SOCC, with proper design and following standard and proven mitigation.

20.1.1 Approach to Assessment of Effects

The assessment considers the environmental effects of the Kami Terminal on SAR / SOCC identified in the PDA that cannot be reasonably avoided. Where the Kami Terminal disturbs SAR / SOCC, an assessment (including background research, field studies, and informant interviews), which includes consideration of the federal SARA and the QARTVS, was undertaken to determine the recommended technically and economically feasible mitigation measures or compensation (or both) to minimize the residual adverse residual environmental effects as required.

Information used to determine the known or likely presence of each identified SAR / SOCC in or near the PDA was derived from reviews of both historical records and baseline data sources, including:

- SARA, QARTVS, COSEWIC Status Reports, Recovery and Management Plans (if available);
- Government and non-governmental sources, [i.e., CDPNQ and Canadian Endangered Species Conservation Council (CESCC)];
- Published and unpublished literature by the Study Team and others, including peer-reviewed academic journals, research project reports, government publications;
- Regional floras [Gray's Manual of Botany (Fernald 1950), Flora of Canada (Scoggan 1978), and available volumes of the Flora of North America (1993, 1997, 2002, 2006, and 2007)]; and,
- Use of recent aerial photographs and topographical maps that could indicate the presence of potentially rare plant species or habitats.

A rare plant survey was completed at the site in July 2012. General habitat information is available from 2011 field surveys for avifauna and herpetofauna.

20.1.2 Issues

During engagement and consultation activities, the public and other stakeholders raised one issue related to SAR. Accordingly, this is included in the assessment of this VEC. Details on the issues raised by stakeholders are provided in Table 20.1.

Table 20.1 Issues Raised by Aboriginal Groups and Stakeholders

Issue	Community / Organization	Summary of comments raised during consultation and engagement activities	Response/Location in Environmental Impact Statement
Potential effects on Species at Risk	Sept-Îles	Resident raised issue of migratory birds and bird SAR	In response to concerns related to the presence of bird species, including migratory species, at the Kami Terminal site, field surveys were conducted to identify species presence. Although the Kami Terminal site does overlap with the geographic range of some bird species at risk, the field surveys did not identify any rare bird species in the vicinity of the Kami Terminal. Additional information on the distribution of bird species at risk, including migratory birds, is provided in **Section 20.5**.

20.2 Environmental Assessment Boundaries

20.2.1 Spatial Boundaries

The spatial boundaries for the environmental effects assessment of the SAR / SOCC VEC are defined below.

Local Study Area

The LSA is the maximum area within which environmental effects related to the Kami Terminal can be predicted or measured with a reasonable degree of accuracy and confidence. The LSA includes the PDA and any adjacent areas where environmental effects related to the Kami Terminal may reasonably be expected to occur. For the environmental assessment of SAR / SOCC, the LSA includes the PDA in its entirety, and adjacent areas land where environmental effects related to the Kami Terminal due to noise and dust may reasonably be expected to occur. For the purposes of the assessment, this is restricted to habitats within 500 m of the PDA. The LSA is illustrated in Figure 20.1.

Regional Study Area

The RSA is limited to and includes habitats within Marconi Peninsula extending west to rivière Sainte-Marguerite, and baie des Sept-Îles (Figure 20.2). The RSA is the area within which cumulative effects for the SAR / SOCC may occur, depending on physical and biological conditions and the type and location of other past, present, and reasonably foreseeable projects. The RSA is the area within which the significance of Kami Terminal effects is predicted.

20.2.2 Temporal Boundaries

The temporal boundaries are the Kami Terminal phases of construction (approximately two years), operation and maintenance (approximately 17 years), and decommissioning / reclamation (approximately one year after operations cease).

Figure 20.1 Local Study Area

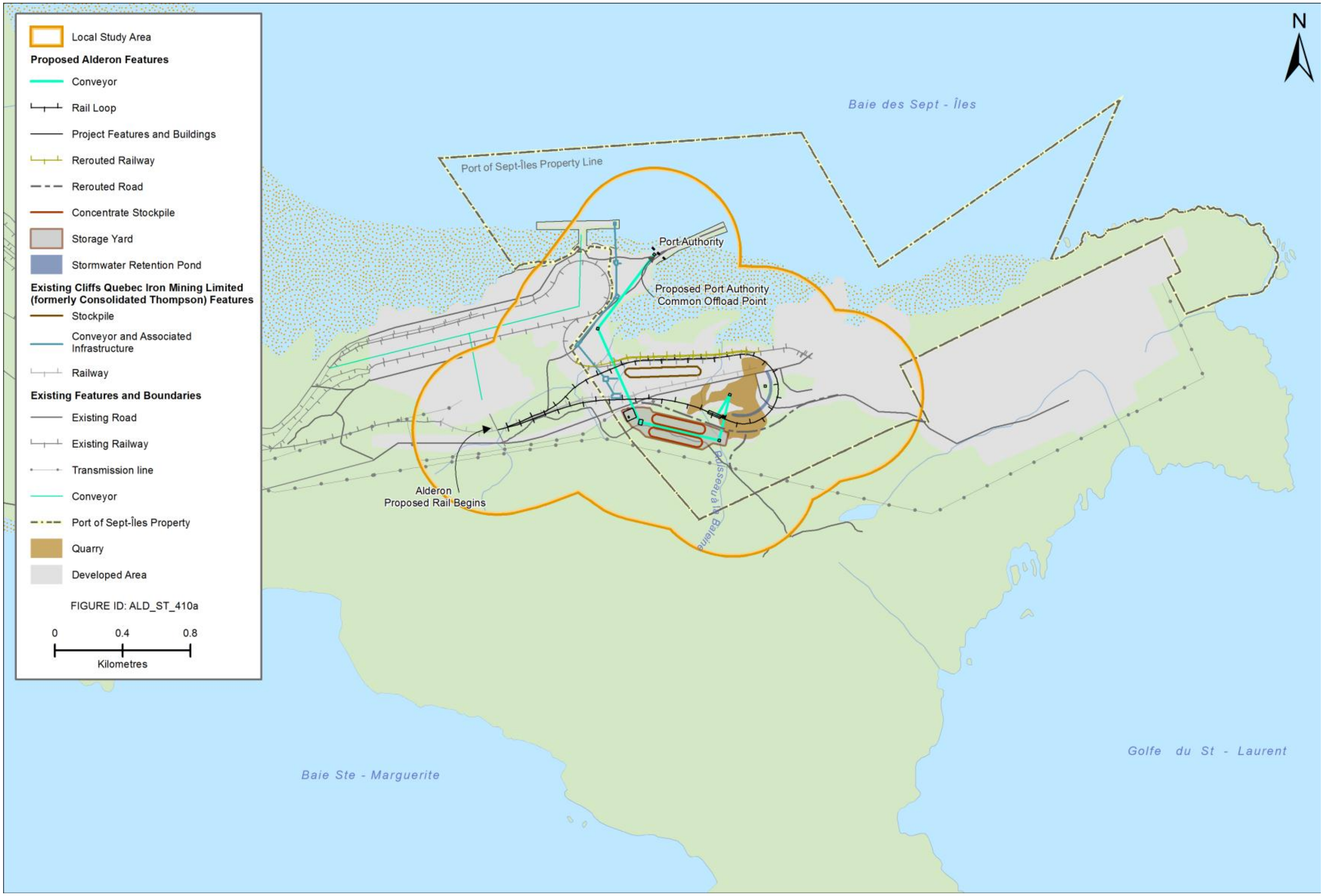
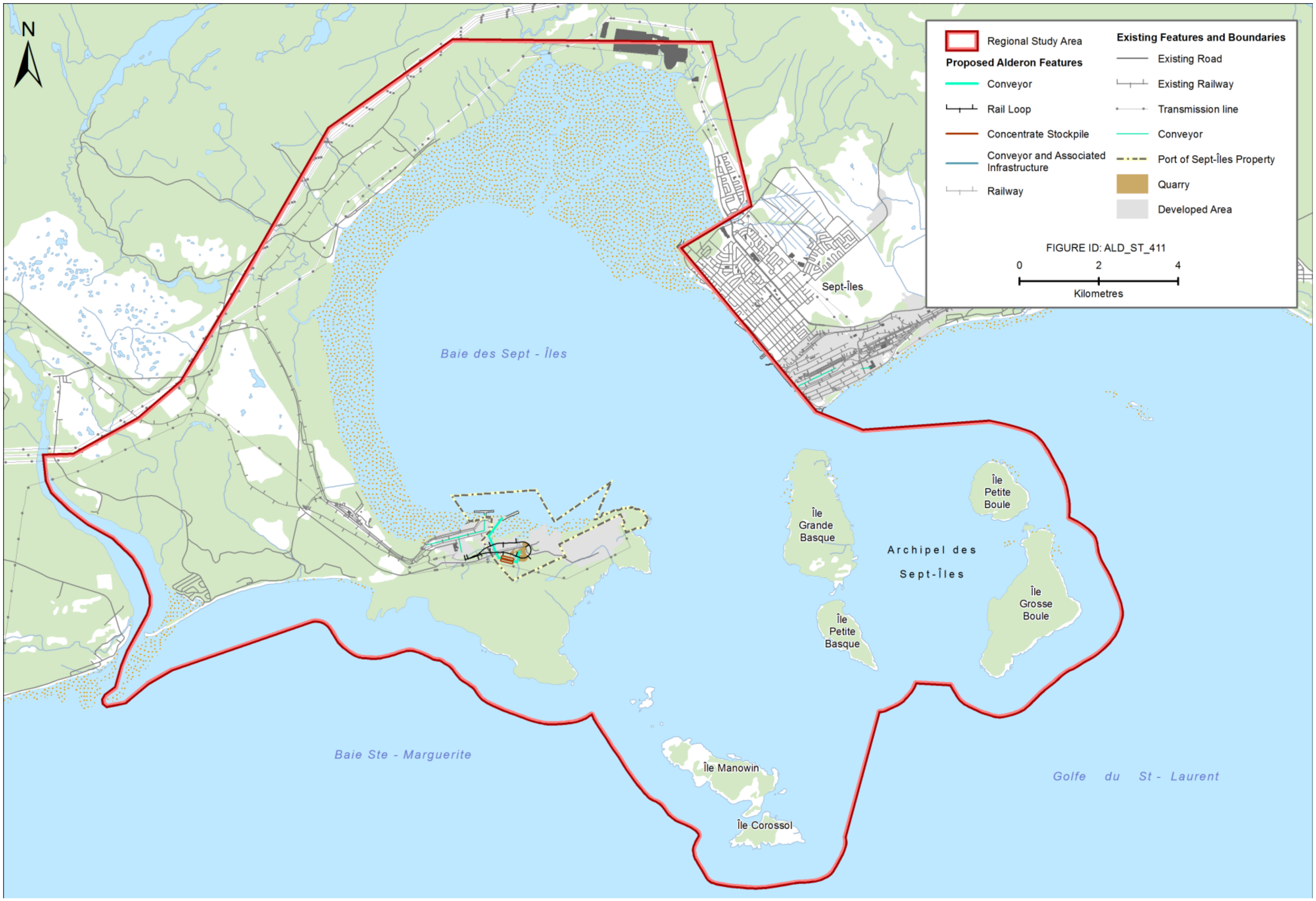


Figure 20.2 Regional Study Area



20.2.3 Administrative Boundaries

SAR / SOCC are protected under federal and provincial legislation, regulations, policies, and guidelines published by the governments of Québec and Canada. Therefore a thorough assessment of effects related to the Kami Terminal on SAR / SOCC, and their significance, is required under CEAA, and all appropriate mitigation measures will be identified. This VEC will be developed in accordance with applicable provincial and federal acts and associated regulations and may include the following:

- QARTVS;
- Québec Act Respecting the Conservation and Development of Wildlife (QARCDW);
- CEAA;
- SARA; and,
- Canada Wildlife Act.

In addition to regulatory requirements, the Kami Terminal will also be subject to the applicable federal, provincial, and non-governmental policy and guidelines:

- COSEWIC management and recovery plans;
- Accord for the Protection of SAR; and,
- CESCC general status ranks.

Other provincial and national programs that can incorporate SAR / SOCC VEC as the main feature include:

- CDPNQ status rankings; and,
- Assessment back to COSEWIC for further information or consideration.

20.2.3.1 Federal and Provincial Legislation

The federal and provincial legislation applicable to the SAR / SOCC VEC includes:

- SARA, c. 29 (Assented to December 12, 2002) of Canada; and
- QARTVS.

The federal SARA provides protection to species at the national level to prevent extinction and extirpation, facilitate the recovery of endangered and threatened species, and to promote the management of other species to prevent them from becoming at risk in the future. QARTVS provides protection for species considered to be endangered, threatened, or vulnerable within the province.

The following sections provide further details regarding protected species and communities within the LSA.

Canada

Canada's indigenous species, subspecies and distinct populations that are considered "at risk" are protected under the SARA. Proclaimed in 2003, SARA provides legal protection to species and the conservation of their biological diversity. The purposes of the Act are to prevent species from becoming extirpated or extinct, to provide for the recovery of endangered or threatened species, and encourage the management of other species to prevent them from becoming at risk. Designation under the Act follows recommendation and advice provided by the COSEWIC to the Government of Canada. COSEWIC is responsible under SARA for assessing the biological status of each rare species in Canada. Under SARA, the Governor in Council may accept the assessment and add the species to Schedule 1 of SARA, decide not to add the species to Schedule 1, or may refer to Subsection 79(1) of SARA that stipulates that every person who is required by or under an Act of Parliament to ensure that an assessment of the environmental effects of a project is conducted must, without delay, notify the competent minister or ministers in writing of the project if it is likely to affect a listed wildlife species or its critical habitat. Additionally, SARA Subsection 79(2) states that where a federal environmental assessment is being carried out in relation to a project that may affect a listed wildlife species or its critical habitat, the person responsible for ensuring the assessment is conducted must:

- Identify potential adverse effects on the listed wildlife species and its critical habitat; and,
- If the project is carried out:
  - ensure that measures are taken to avoid or lessen those adverse effects and to monitor them, and,
  - ensure that such measures are consistent with any applicable recovery strategy and action plans.

Under the SARA, there are three schedules; species officially protected are listed under Schedule 1 of SARA (Government of Canada 2011) and designated as "extinct, extirpated, endangered, threatened and special concern" by COSEWIC are protected by that Act. *SARA*-listed species designated as "special concern" are not protected by the prohibitions of Sections 32-36 of SARA; however; they do require that provincial or regional management plans be developed to protect the species. Table 20.2 shows the conservation status categories for the SARA and COSEWIC*.*

"Listed species" refers to species listed in Schedule 1 of SARA and includes species designated as extirpated, endangered, threatened, or of special concern. Listed species are identified on the Species at Risk Public Registry at www.sararegistry.gc.ca.

Table 20.2 Committee on the Status of Endangered Wildlife in Canada and Species at Risk Act Conservation Status Descriptions

Rank*	Description*
Extinct (X)	A wildlife species that no longer exists
Extirpated (XT)**	A wildlife species that no longer exists in the wild in Canada, but exists elsewhere in the wild
Endangered (E)**	A wildlife species that is facing imminent extirpation or extinction in Canada
Threatened (T)**	A wildlife species that is likely to become an endangered species if nothing is done to reverse the factors leading to its extirpation or extinction
Special Concern** (SC)	A wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats
Not At Risk (NAR)	A wildlife species that has been evaluated and found to be not at risk of extinction given the current circumstances.
Data Deficient (DD)	A category that applies when the available information is insufficient (a) to resolve a wildlife species' eligibility for assessment or (b) to permit an assessment of the wildlife species' risk of extinction
*COSEWIC 2011. http://www.speciesatrisk.gc.ca/legislation/default_e.cfm **denotes a COSEWIC risk category. Note Wildlife Species is “a species, subspecies, variety or geographically or genetically distinct population of animal, plant or other organism, other than a bacterium or virus, that is wild by nature and is either native to Canada or has extended its range into Canada without human intervention and has been present in Canada for at least 50 years” (COSEWIC 2011).	

Schedule 1 of SARA is the official list of wildlife SAR. Once a species is “listed”, the measures to protect and recover a listed wildlife species are implemented. Species that were designated at risk by the COSEWIC prior to the existence of the SARA require reassessment before being placed on Schedule 1. These species are listed on Schedule 2 if they were previously assessed by COSEWIC as endangered or threatened, and on Schedule 3 if they were previously assessed by COSEWIC as special concern. Both Schedules 2 and 3 are not provided with legal protection under the SARA. The differentiation by schedule under the SARA will be eliminated following all reassessments.

Following a species being listed (i.e., designated as extirpated, endangered, or threatened) and officially protected under the SARA, plans must be developed. SARA requires the federal government to create recovery strategies and one or more action plan(s) for species listed as “threatened” or “endangered”. These strategies must, where possible, identify critical habitat. For species of “special concern” a management plan is required. SARA also lays out timelines for developing recovery strategies and management plans. Species designated as “endangered” must have a strategy developed within one year, and for “threatened” or “extirpated species”, it must be developed within two years. Such recovery strategies define goals and objectives, identifies critical habitat, and describes the research and management activities required. Critical habitat by definition under the SARA, is defined as habitat that is required for the species’ survival or recovery. It may be an identified breeding site, nursery area, or feeding ground. For SAR, such habitats are of the utmost importance, and must be identified, where possible, and included in recovery strategies or action plans.

Québec

At the provincial level, special status species are protected by the Act respecting threatened or vulnerable species (R.S.Q., c. E-12.01). The purpose of this Act is to provide protection to endangered species and their habitats. A species is considered to be threatened when its disappearance is apprehended. It is considered vulnerable when its survival is precarious, even if its disappearance is not apprehended. Threatened or vulnerable animal species are under the jurisdiction of the *ministère des Ressources natuelles et de la Faune* (MRNF) while threatened or vulnerable plant species are under the jurisdiction of the *ministère du Développement durable, de l'Environnement et des Parcs* (MDDEP). Species designated as threatened or vulnerable wildlife species are listed in the Regulation respecting threatened or vulnerable wildlife species and their habitats (R.S.Q., c. E-12.01 r.2) and the Regulation respecting threatened or vulnerable plant species and their habitats (R.S.Q., c. E-12.01 r.3).

The MDDEP and the MRNF have established, under Section 9 of the Act respecting threatened or vulnerable species, a list of threatened or vulnerable vascular plant species which are likely to be so designated and the list of threatened or vulnerable wildlife species which are likely to be so designated in the Ministerial Order concerning the establishment of a list of threatened or vulnerable vascular plant species which are likely to be so designated, and a list of threatened or vulnerable wildlife species which are likely to be so designated (R.S.Q., c. E-12.01 r.4).

Québec makes use of a ranking system known as *The General Status of Species in Canada*. The *Wild Species* series on the general status of species in Canada is a requirement of the Accord for the Protection of SAR, an agreement-in-principle established in 1996 by provincial, territorial, and federal ministers responsible for wildlife. The goal of the Accord is to prevent species in Canada from becoming extinct or extirpated because of human impact (CESCC 2010). The *General Status of Species in Canada* presents the results of general status assessments for a broad cross-section of Canadian species.

Under this system, each species assessed in the *Wild Species* reports received a general status rank in each province, territory, or ocean region in which they are known to be present, as well as an overall Canada General Status Rank (Canada rank). The provincial General Status assessment process serves as a first alert tool for identifying species in the province that are potentially at risk. Under this process, populations of species that are native to the province are classified to be either "At Risk", "May be at Risk", "Sensitive" to human activities or natural events, "Secure", or "Undetermined" should there be insufficient data, information, or knowledge available to assess their status.

Although species listed under this process are not granted legislative protection, the presence of species whose populations are considered to be At Risk, May be at Risk, or Sensitive are an issue of concern for provincial regulators. They are different from status designations assigned after detailed assessments done by some provincial committees (i.e., SSAC) on SAR or by COSEWIC and this difference is reflected in the ranks' names and in their definition. Definitions of the General Status rankings are provided in Table 20.3.

Table 20.3 General Status of Wild Species in Canada

Rank	General Status Category	Description
0.2	Extinct	Species that are extirpated worldwide (i.e., they no longer exist anywhere)
0.1	Extirpated	Species that are no longer present in a given geographic area, but occur in other areas
1	At Risk	Species for which a formal, detailed risk assessment (COSEWIC status assessment or provincial or territorial equivalent) has been completed and that have been determined to be at risk of extirpation or extinction (i.e., Endangered or Threatened). A COSEWIC designation of Endangered or Threatened automatically results in a Canada General Status Rank (Canada rank) of At Risk. Where a provincial or territorial formal risk assessment finds a species to be Endangered or Threatened in that particular region, then, under the general status program, the species automatically receives a provincial or territorial general status rank of At Risk .
2	May Be At Risk	Species that may be at risk of extirpation or extinction and are therefore candidates for a detailed risk assessment by COSEWIC, or provincial or territorial equivalents
3	Sensitive	Species that are not believed to be at risk of immediate extirpation or extinction but may require special attention or protection to prevent them from becoming at risk
4	Secure	Species that are not believed to belong in the categories Extinct, Extirpated, At Risk, May Be At Risk, Sensitive, Accidental or Exotic. This category includes some species that show a trend of decline in numbers in Canada but remain relatively widespread or abundant
5	Undetermined	Species for which insufficient data, information, or knowledge are available with which to reliably evaluate their general status
6	Not Assessed	Species that are known or believed to be present regularly in the geographic area in Canada to which the rank applies, but have not yet been assessed by the general status program
7	Exotic	Species that have been moved beyond their natural range as a result of human activity. In this report, exotic species have been purposefully excluded from all other categories
8	Accidental	Species occurring infrequently and unpredictably, outside their usual range
Source 'Wild Species: The General Status of Wild Species in Canada' website Available at: http://www.wildspecies.ca/ranks.cfm?lang=e (CESCC 2012)		

The CDPNQ maintains a comprehensive list of vascular plant species which it considers to be rare (i.e., species of special conservation concern). The CDPNQ ranks species on the basis of their global (G), national (N), and provincial (S) status, a system developed by the Nature Conservancy and used by all conservation data centres and natural heritage programs throughout North America. These ranks are used to determine species protection and are assigned a numeric rank ranging from 1 (extremely rare) to 5 (demonstrably secure) for each species. This reflects the species' relative endangerment and is based on the number of occurrences of that species globally or within the province (ACCDC 2010). Plant species considered rare, uncommon, unique or unusual, either locally or regionally as recorded by the CDPNQ include all S1 and S2 species. A combined rank (e.g., S1/S2) is given for species whose status is uncertain; the first rank indicates the rarity status given current documentation, and the second rank indicates the rarity status that will most likely be assigned after all historical data and likely habitats have been checked. While S3 species are of concern from a provincial biodiversity perspective, they have not been included as their populations are considered less sensitive. CDPNQ status ranks for Québec were used to identify species of special conservation concern within the local study area and region. Definitions of the CDPNQ rankings are provided in Table 20.4.

Table 20.4 Definitions of the Centre de Données sur le Patrimoine Naturel du Québec S Rankings

Provincial Ranking	Frequency / Comments
S1	Extremely rare throughout its range in the province (typically five or fewer occurrences or very few remaining individuals). May be especially vulnerable to extirpation
S2	Rare throughout its range in the province (6 to 20 occurrences or few remaining individuals). May be vulnerable to extirpation due to rarity or other factors
S3	Uncommon throughout its range in the province, or found only in a restricted range, even if abundant in some locations (21 to 100 occurrences)
S4	Usually widespread, fairly common throughout its range in the province and apparently secure with many occurrences, but the species is of long-term concern (e.g., watch list) (100+ occurrences)
S5	Demonstrably widespread, abundant and secure throughout its range in the province, and essentially ineradicable under present conditions
S#/S#	Numeric range rank: A range between two consecutive numeric ranks. Denotes uncertainty about the exact rarity of the species (e.g., S1/S2)
?	Inexact or uncertain: for numeric ranks, denotes inexactness (e.g., SE? denotes uncertainty of exotic status) (The? Qualifies the character immediately preceding it in the S Rank)
SU	Unrankable: Possibly in peril, but status is uncertain - more information is needed
SR	Reported but without persuasive documentation (e.g., misidentified specimen)
SE	Exotic or introduced species
Hybrid	Hybrid of two similar species
Source: AC CDC 2010	

20.3 Establishing Standards or Thresholds for Determining the Significance of Environmental Effects

The likely effects of the Kami Terminal on SAR / SOCC are described using the following attributes, which are based on standard environmental assessment practice and the EIS Guidelines. Significance of environmental effects is assessed in accordance with CEA Agency guidelines. The following terms will be used to characterize residual environmental effects for SAR / SOCC: direction, magnitude, geographical extent, frequency, duration, reversibility, and ecological context. These descriptors, and definitions for each of their associated ratings, are defined below.

- **Direction:**
  - Positive – Beneficial or desirable change in the environment;
  - Neutral – No detectable or measureable change in the environment; or,
  - Adverse – Worsening or is undesirable change in the environment.
- ***Magnitude:***
  - Low - the residual Kami Terminal effects to SAR / SOCC (alteration / loss) are not expected to exceed 5 percent of the known population in the RSA. No measurable effect;
  - Moderate - the residual Kami Terminal effects to SAR / SOCC (alteration / loss) are expected to be greater than 5 percent and not exceed 25 percent of the known populations in the RSA. Effect can be measured; or,
  - High - the residual Kami Terminal effects to SAR / SOCC (alteration / loss) are expected to exceed 25 percent of the known population in the RSA. Effect can be easily observed, measured and described, and may be widespread.
- **Geographic Extent:**
  - Site-specific – Effect confined to the Kami Terminal footprint for all project components (i.e., PDA). Effects would be limited to directly affected environmental components;
  - Local – Effect extend beyond the Kami Terminal footprint into the surrounding areas within the LSA;
  - Regional – Effect extends beyond the LSA into RSA. Area where indirect or cumulative effects may occur; or,
  - Beyond Regional (provincial, national, and/or international areas) - Effect extends beyond the RSA. Area where indirect or cumulative effects may occur.
- **Frequency:**
  - Once - Effect occurs occasionally, or once during the life of the Kami Terminal (e.g., clearing);
  - Sporadic - Effect occurs sporadically, at irregular intervals, without any predictable pattern during the life of the Kami Terminal (e.g., hydrocarbon spills);
  - Regular - Effect occurs on a regular basis and at regular intervals during the life of the Kami Terminal; or,
  - Continuous - Effect occurs continuously.
- **Duration:**
  - Short term – Effect occurs during the site- preparation or construction phase of the Kami Terminal (i.e., 2 years);

- Medium term – Effect extends throughout the construction and operation phases of the Kami Terminal (i.e., approximately 17 years);
- Long term – Effect is greater than approximately 17 years; or,
- Permanent - Effect persists.

- **Reversibility:**
  - Reversible – Effect is reversible during the life of the Kami Terminal; or,
  - Irreversible – A long-term effect that is permanent (i.e., remains indefinitely as a residual effect).
- ***Ecological Context:***
  - Undisturbed - Area relatively or not adversely affected by human activity; or,
  - Disturbed or Developed - Area has been substantially previously disturbed by human development or human development is still present.

Note: Although there are no thresholds to assess the potential alteration / loss of individual listed plants or plant populations, an accepted guideline in the collection of vascular and non-vascular plant voucher specimens is that an immediate population can withstand the loss of 1 in 20 individuals or 5 percent of a population (Alberta Native Plant Council [ANPC] Native Plant Collection and Use Guidelines 2000). For the purposes of this assessment, 5 percent will be used as a benchmark to address the magnitude of effects on rare plant populations.

A significant adverse residual environmental effect for SAR is one that affects all flora or fauna listed federally under Schedule 1 of SARA as “Endangered” or “Threatened” or provincially under QARTVS as “Threatened” or “Vulnerable” and results in a non-permitted contravention of any of the prohibitions stated in Sections 32-36 of SARA, or in contravention of any of the prohibitions stated in Sections 16 and 17 of QARTVS.

A significant adverse residual environmental effect for Species of Conservation Concern (SOCC) is defined as an environmental effect related to the Kami Terminal on flora or fauna species not currently under the protection of SARA or the QARTVS (i.e., listed as “Special Concern” in Schedule 1 of SARA; listed in Schedule 2 or 3 of SARA); ranked as S1 or S2 by CDPNQ for vegetation; and/or ranked “May Be At Risk”, “Sensitive” or “Undetermined” by the CESCC, and is one that:

- Results in the direct mortality of individuals or communities such that the likelihood of the long-term survival of these rare or sensitive species within the RSA is substantially reduced; or,
- Results in the degradation, alteration or loss of critical or important habitat within the PDA, either physically, chemically, or biologically; in quality or extent, in such a way as to cause a change or decline in the distribution or abundance of a rare or sensitive species that is dependent upon that habitat, such that the likelihood of the long-term viability or survival of the population within the RSA is substantially reduced as a result.

An environmental effect that does not meet any of the above criteria is rated as not significant.

20.4 Potential Project-VEC Interactions

The environmental assessment of the SAR / SOCC VEC is focused on the following environmental effects for flora or fauna that may exist in the RSA:

- Change in habitat (critical or important primary habitat);
- Change in distribution and movement (movement relevant for fauna only);
- Change in mortality risk (wildlife only); and,
- Change in health.

Activities associated with Kami Terminal construction, operation and maintenance, decommissioning and reclamation have potential to affect SAR / SOCC in the LSA. Potential Kami Terminal interactions with SAR / SOCC are summarized in Table 20.5.

Table 20.5 lists each Kami Terminal activity and physical work for the Kami Terminal, and ranks each potential interaction as 0, 1, or 2 based on the following descriptions:

- 0 = Kami Terminal activity that will not interact with SAR / SOCC.
- 1 = Kami Terminal activity that may interact with SAR / SOCC; however, based on past experience, the interaction would not result in a residual environmental effect or is effectively mitigated through standard environmental protection practices.
- 2 = Kami Terminal activity that will interact with SAR / SOCC and may have residual environmental effects that exceed acceptable levels without implementation of specific mitigation.

Those interactions ranked as 0 or 1 are discussed in this section, whereas those that are ranked as 2 are further assessed in Section 20.6 or Section 20.8 for accidents and malfunctions. The following sections provide a detailed discussion on the nature or extent of the interaction, and provide rationale for activities that are determined to not result in an interaction with SAR / SOCC. The analysis provides a first order assessment of environmental effects of each phase or Kami Terminal activity on the SAR / SOCC VEC and serve to focus the remainder of the environmental effects assessment on those issues that may result in substantive interactions or have potential for significant residual environmental effects. All potential residual environmental effects that are ranked as 0 or 1 are considered to be not significant.

Table 20.5 Potential Environmental Effects of Kami Terminal to Species at Risk and Species of Conservation Concern

Kami Terminal Activities and Physical Works	Potential Environmental Effect			
	Change in Habitat	Change in Distribution and Movement	Change in Mortality Risk	Change in Health
Construction				
Site Preparation (clearing, excavation, blasting, material haulage, grading, removal of overburden and stockpiling)	2	2	2	2
Construction of Load-out Facilities (rail dumper building, rail car dumper and hopper, train positioner transfer houses, conveyors, dust collector, maintenance building, substation, sanitation system)	0	1	1	1
Construction of Railway Loop	0	1	0	1
Construction of Stream Diversion	0	1	1	1
Access Roads and Waterline Realignment	0	1	0	2
Onsite Vehicle/Equipment Operation	0	1	0	1
Waste Management	0	1	1	0
Transportation of Personnel and Goods to Site	0	1	1	0
Expenditures	0	0	0	0
Employment	0	0	0	0
Operation and Maintenance				
Rail Transport	0	1	1	0
Concentrate Handling and Stockpiling	0	1	1	1
Water Collection, Treatment and Discharge	0	1	0	1
Onsite Vehicle/Equipment Operation and Maintenance	0	1	1	1
Waste Management	0	1	0	0
Transportation of Personnel and Goods to Site	0	1	1	0
Expenditures	0	0	0	0
Employment	0	0	0	0
Decommissioning and Reclamation				
Site Clean-up	0	1	1	1
Accidents and Malfunction				
Forest Fire	2	2	2	2

Kami Terminal Activities and Physical Works	Potential Environmental Effect			
	Change in Habitat	Change in Distribution and Movement	Change in Mortality Risk	Change in Health
Stormwater Retention Pond Breach	0	0	0	0
Train Derailment	0	2	2	2

KEY

0 No interaction.

1 Interaction occurs; however, based on past experience, the resulting effect can be managed to acceptable levels through standard operating practices or through the application of best management or codified practices. No further assessment is warranted.

2 Interaction occurs, and resulting effect may exceed acceptable levels without implementation of specified mitigation. Further assessment is warranted.

Project-VEC Interactions Ranked as 0

No SAR or SOCC, or critical / important habitats for SAR / SOCC have been identified within the PDA or LSA; nonetheless, interactions are ranked according to the potential for interaction, if SOCC were present.

Construction of the concentrate unloading, stacking, storage, and reclaiming facilities, railway loop, stream diversion, and access road and waterline realignment will take place on land that will have already been cleared and prepped for construction, and or on previously disturbed areas of the industrial facility, and therefore there would be no further loss of important habitat of SAR / SOCC (if present), so there would be no effect on change in (potential) critical or important habitat. Change in distribution of SAR / SOCC through the direct loss of individuals will also be affected by initial clearing and site preparation, so no further interaction is anticipated.

Expenditures and employment are not physical works or activities that would interact with SAR / SOCC.

Onsite vehicle/equipment operation, waste management, and transportation of personnel and goods to the site, as well as the operation and maintenance activities of rail transport, concentrate handling and stockpiling, and water collection, treatment and discharge, will not have a direct physical effect on habitat and therefore there will not result in a change in habitat. As waste management does not involve emissions, it is unlikely to result in a change in health. Decommissioning and reclamation activities (e.g., site cleanup) will not result in a change in habitat.

Project-VEC Interactions Ranked as 1

Kami Terminal activities ranked as 1 may have effects on SAR / SOCC (e.g., introduction of dust or invasive species); however, based on past experience, the interaction will result in residual environmental effects that are effectively mitigated through standard environmental protection practices.

Environmental protection measures designed to manage these effects associated with all Kami Terminal phases will be detailed in a separate EPP, prepared in support of the EIS and compiled at a later date. The overall goal of the EPP is to ensure the fulfillment of Alderon's environmental commitments and responsibilities. The EPP describes the specific environmental protection and mitigation measures that will be applied throughout the life of the Kami Terminal to avoid or minimize potential effects on environmental resources as a result of the Kami Terminal. EPPs are considered 'living' documents, and it will be designed and managed in consultation and collaboration with the Government of Québec, Environment Canada, and stakeholders. Through the development of the EPP and other Kami Terminal management plans (e.g., Emergency Response, Spill Response, Contingency Planning), many of these generalized commitments will be developed into site-specific instructions to contractors and employees. Others will simply be incorporated into the final design of the Kami Terminal.

The potential effects of the Kami Terminal activities ranked as 1 are discussed below. The site preparation activity which initiates the construction phase is when the most substantive potential environmental effects will occur such as the initial loss of habitat (though not expected to be critical or important for any SAR or SOCC), and generation of noise and dust from clearing, grubbing, blasting, material haulage, grading, and removal and stockpiling of overburden, and therefore are ranked as 2 for all environmental effects. The five main construction activities following site preparation, including construction of the concentrate unloading, stacking, storage, and reclaiming facilities, railway loop, stream diversion, access roads and waterline re-alignment, and on-site vehicle / equipment operation are anticipated to have reduced potential environmental effects on SAR / SOCC (if present) in comparison. These activities will, through sensory disturbance, have a minor effect on distribution and movement of SAR / SOCC (if present), already displaced by site preparation. The activities will be occurring on a port site that is already a source of noise and dust. Adjacent wildlife SAR / SOCC, if present, is expected to largely have adapted to noise levels at the facility, and the encroachment on the surrounding natural habitats that are already fragmented by roads and the transmission lines is expected to be relatively minor. Kami Terminal design and standard construction mitigation to reduce noise and dust emissions are expected to reduce the potential residual environmental effects of change in distribution and movement.

Changes in mortality risk of wildlife SAR / SOCC, if present, would mostly be linked to direct mortality from collision with construction vehicles (i.e., onsite vehicle or equipment operation). However, this activity would mostly be taking part in disturbed areas of an active port site, by relatively slow-moving vehicles. The sensory disturbance that would be considered an adverse effect on distribution and movement, would serve as a benefit to reducing the mortality risk, by reducing the number of wildlife that would be on-site. The residual environmental effects on change of mortality risk would therefore be expected to be minimal. While disturbed (open) habitats are in fact the preferred habitat for some SAR / SOCC, including bird species such as Common Nighthawk, these species were not detected during bird surveys conducted in support of the EA, and are not likely to be present due to existing disturbances. Mortality could also result if active nests or dens of SAR / SOCC are abandoned due to sensory disturbance due to construction activities including construction of railway loop, construction of stream diversion, access roads and waterline realignment and on-site vehicle or equipment operation. No wildlife SAR / SOCC are likely to be present, and are therefore unlikely to be affected.

Changes in health (and, in part, change in mortality risk) are anticipated to be largely related to generation of dust. However, four of the five activities are expected to be local and/or short-term and dust generation is expected to be localized and, therefore, their effect on health of SAR / SOCC, if present, is expected to be managed to acceptable levels, given the limited extent and duration. Both site preparation and access roads and waterline realignment construction have a higher potential of generating dust (interactions ranked as 2) and are further assessed in Section 20.6.

During construction and operation and maintenance, waste management may have a minor interaction with change in distribution and movement, and change in mortality risk, as some wastes may attract some wildlife SAR / SOCC (if present), and, as a result, can lead to mortality from human interaction, but standard practices to contain and isolate waste should minimize this risk. Waste management will follow applicable laws, regulations, and standards for the safe use, handling, storage, and disposal will be followed, and will use existing facilities as feasible. An integrated waste management plan (WMP) will be developed and implemented, with the goal to minimize adverse effects on the environment. Given the industrial nature of the site, and the expected nature of the waste being generated during construction and operation and maintenance, and the implementation of standard practices, interactions will be minimal or easily mitigated, with a low likelihood of residual environmental effects.

Transportation of personnel and goods to site during construction, and operation and maintenance will occur on established roads and highways; the relative influence on a change in abundance and distribution and change in health compared to existing traffic is low. The potential for change in mortality risk is higher for this activity than on-site vehicle operation due to the higher travelling speeds; however, given the expected small incremental increase in traffic above background, the relative mortality risk is expected to be low.

The operation and maintenance activities of rail transport, concentrate handling and stockpiling, and onsite vehicle / equipment operation and maintenance all have the potential to interact with SAR / SOCC, resulting in a change in distribution and movement, and/or change in health through the generation of noise and dust, resulting in displacement of SAR / SOCC if present in adjacent natural habitats. Concentrate handling and stockpiling has the greatest potential for interaction with SAR / SOCC, if present in the LSA, due to the potential for dust emissions. However, with the expected technically feasible mitigation to reduce the potential and aerial extent of dust in the surrounding environments compared to the current dust levels from activities in the Port, the potential effect on SAR / SOCC that may be present is not expected to be substantive.

A review of dispersion modelling carried out in support of the indicates that the Project's estimated annual emissions of total particulate matter (TPM) during operation are approximately 1 percent of the National Pollutant Release Inventory (NPRI) data from the two most significant nearby industrial sources (Aluminerie Alouette aluminum smelter and the Cliffs iron pellet plant).

Potential dust sources including the car dumper and conveyor system will be enclosed, reducing the emissions. The stacker-reclaimer system (transport of concentrate to the storage pile) is expected to result in the highest hourly and annual emissions of TPM. Wind erosion from the concentrate pile is expected to be rare, with small emissions and low frequency of events, so was excluded from dispersion modelling. Dispersion modelling indicates that the cumulative concentration at all overland locations are under the TSP regulatory standard. The results of the dispersion modelling show that although there may be potential exceedances of regulatory standards at locations near the property line during adverse meteorological conditions for TPM and for 24 hours criteria only, with the background included. These higher values are limited to within about 100 m of the property line and it is unlikely that prolonged (human) exposure to air contaminant concentrations at these levels will occur. Therefore, as the predicted exceedances represent worst-case meteorological conditions, are limited in spatial extent, seasonal, and are short-term in duration, no substantive changes in air quality are expected on the local or regional scales due to emissions from the Kami Terminal. Although fugitive dust emissions will occur due to material handling, the majority of the fugitive dust will remain in the lowest 1 to 2 meters above ground level and settle within a few hundred meters. As such, while some dusting of vegetation may occur under certain meteorological conditions, they will be localized in extent and short-term in duration. Therefore, with the expected technically feasible mitigation to reduce the potential and aerial extent of dust in the surrounding environments, in consideration of the current dust levels from activities in the Port, the potential effect on SAR / SOCC, if present, is not expected to be substantive. The habitats in the LSA are common in the landscape, and are not considered primary or important habitat for wildlife.

Sound quality monitoring at the port indicate that the port is relatively noisy compared to the surrounding natural landscape, and that the noise effects extend beyond the disturbed areas of the port. As indicated in the Chapter 14, incremental noise levels from the Kami Terminal are not likely to increase substantively above background any more than several hundred metres beyond the PDA, limiting the extent of the change in distribution and movement of wildlife.

During operation and maintenance, rail transport, and on-site vehicle and equipment operation and maintenance, may result in a minor increase in mortality, since all these activities have potential to cause mortality through collisions or other direct effects; however, few birds or other wildlife are expected to be present during these activities due to previous displacement and ongoing sensory disturbance. Speed limits are in place at the port, and the likelihood of a collision due to excessive speed is low.

Onsite vehicle and equipment operation will occur on land disturbed during site preparation, and within an active industrial site, and are unlikely to result in substantive emissions or discharges to the local environment in consideration of their normal operation that would result in substantive interaction with SAR / SOCC that have limited potential to be found in adjacent habitats.

Water collection, treatment, and discharge, is expected to be occur in previously disturbed areas, and will avoid any identified locations of SAR / SOCC. Given the topography of the site and the proposed location of water treatment and discharge, this activity is unlikely to result in significant environmental effects (i.e., change in distribution and movement, and change in health) to SAR / SOCC.

The potential effects of introducing hazardous substances into watercourses / waterbodies will be mitigated through the use of spill prevention and containment measures, surface water containment, applicable best management practices, materials handling plans, and codified water treatment as identified in accidents and malfunctions. The Kami Terminal will meet or improve upon applicable regulations or standards with respect to effluent discharge. Wastewater or effluent discharge to the environment would be required to meet or exceed regulatory requirements prior to discharge.

Decommissioning and reclamation activities (site clean-up and transfer of equipment to the Port or to a third party) are ranked 1 for interactions with three of four potential environmental effects; there will be no change in habitat associated with this activity. When the Kami Terminal is decommissioned at some future date, Alderon is likely to perform necessary clean-up of the site as required, and then transferring equipment to the port or a third party. Therefore site rehabilitation is not planned. At the time of decommissioning, no effect on SAR / SOCC are anticipated to occur; as no further direct effects would likely occur, and with the cessation of Kami Terminal operation, indirect effects, if any, would no longer be attributable to the Kami Terminal.

Currently, there is little potential for Kami Terminal interactions with SAR / SOCC with regards to change in critical or important habitat and change in distribution and movement potential environmental effects in consideration of the location and configuration of the Kami Terminal, and the lack of critical or sensitive habitats and wildlife SAR / SOCC within the PDA or LSA. This is further supported in Section 20.5.

Thus, in consideration of the nature of the interactions and the planned implementation of known and proven mitigation, the potential environmental effects of all Kami Terminal activities and physical works that were ranked as 0 or 1 in Table 20.5 on SAR / SOCC during any phase of the Kami Terminal are rated not significant, and are not considered further in the assessment.

Project-VEC Interactions Ranked as 2

Site preparation is when the most substantive potential environmental effects will occur such as the initial change in habitat (though not expected to be critical or important for any SAR or SOCC) and change in distribution and movement. Generation of noise and dust from clearing, grubbing, blasting, material haulage, grading, and removal and stockpiling of overburden may cause a change in health for both plants and animals, and off-road vehicles may contribute to change in mortality risk. See Section 20.6 for a detailed assessment of these project-related environmental effects.

Selection of Environmental Effects and Measurable Parameters

Species of special status are limited in the Kami Terminal area. Information on the presence of individual species or populations was obtained from CDPNQ data requests, previous studies, and from field studies completed for the Kami Terminal.

The measurable parameters used for the assessment of the environmental effects of the Kami Terminal presented above and the rationale for their selection are provided in Table 20.6.

Table 20.6 Measurable Parameters for Species at Risk and Species of Conservation Concern

Environmental Effect	Measurable Parameter	Rationale for Selection
Change in Habitat	Primary or other sensitive or limiting habitat (ha or km^2) (physical change)	Habitat loss or alteration can lead to changes in wildlife abundance, behaviour and/or species mortality and breeding success. The Migratory Birds Convention Act, SARA and QARCDW afford protection to habitat for species of migratory birds and/or other wildlife, including species at risk. Loss or altered habitat is characterized as a proportion of habitat (ha) in the RSA. Critical habitat as identified in a recovery plan could also apply in this situation
Change in Distribution and Movement	Loss of plant SAR / SOCC and/or populations attributable to the Kami Terminal (loss of individuals is characterized as a proportion of the population in the RSA);	Listed rare species are afforded legal protection under the SARA and QARTVS. Populations of rare or sensitive flora and fauna may be vulnerable to the loss of individuals, sensitive to changes in their habitat(s), and are of conservation concern to the Province.
	Sound pressure levels (dBA) (sensory disturbance) Dust levels	• Sensory disturbance to wildlife behaviour can result in potential change of behaviour including feeding, breeding, migration and movement, with respect to: ○ Physical hazards and attractants for wildlife (e.g., roads, pits, and other structural features); ○ Chemical hazards and attractants for wildlife (e.g., identified contaminants of potential concern); and, ○ Sensory disturbance causing wildlife attraction or deterrence (e.g., noise, light, and human presence.
Change in Mortality Risk (wildlife)	Number (or proportion of population in the RSA) of mortalities	Direct mortality can occur through collision with trains or construction vehicles. Individuals could be killed through vehicle collisions or interaction with other equipment or activities such as clearing particularly for vegetation Desertion of dens, nests or young could lead to mortality

Environmental Effect	Measurable Parameter	Rationale for Selection
	Emissions and ambient concentrations of criteria air contaminants (CAC) and non-criteria air contaminants (Non-CAC) (µg/m³)	A change in mortality risk may occur as a result of contamination from emissions
Change in Health	Emissions and ambient concentrations of criteria air contaminants (CAC) and non-criteria air contaminants (Non-CAC) (µg/m³)	A change in health or condition of rare and/or sensitive species may occur as a result of contamination from emissions, including changes in air quality. Air quality is characterized by chemical and physical properties of the atmosphere, as affected by the release of combustion gases and particulate matter into the atmosphere (e.g., NOX, SO_2, and PM)

Measurable parameters have clear units of measurement and are indicative of species, communities, or groups that have been identified as rare, unique, sensitive, ecologically important, and/or regionally significant.

Species of special status are species that occur in small numbers, in Québec, in Canada, and/or globally. They contribute to overall species diversity in an area and in terms of vascular plant species are often found in unusual or uncommon habitats. Many rare plants therefore reflect the presence of rare habitats (e.g., calciphiles (calcium-loving species) occupying calcium-rich bedrock or soils). Therefore, recognition of rare plant species can help in the identification of those habitats requiring special attention. Changes in biotic factors, such as the introduction of non-native aggressive species, and changes in physical factors, such as alteration of hydrology, can directly and indirectly contribute to plant species rarity by altering the current habitat. Maintaining rare plants in a landscape is an important means of preserving biodiversity.

SARA establishes requirements that must be met before activities that may affect SARA-listed species are authorized. The Act underscores the importance of the mitigation sequence during project implementation. The preferred approach is to first adopt measures that would avoid the adverse effect, followed by measures that could minimize the effect. Ecological or habitat compensation is the least preferred option and should only be considered under certain circumstances.

All EAs conducted under federal legislation must identify any species at risk listed under SARA that is likely to be affected by a project. Important habitat, as identified in a recovery strategy or action plan, is also protected.

Loss of federally and/or provincially-listed plants or critical and/or important habitat(s) without the direct authority of the Minister may result in the contravention of federal (SARA) and/or provincial (QARTVS) legislation.

20.5 Existing Environment

A literature review and background information gathering was performed to determine the likelihood of presence for rare or sensitive species within the LSA and RSA. As part of this review, all records of species ranked as S1, S2, S3 or combinations thereof by the CDPNQ, and listed by the CESCC (2011) as At Risk, May be at Risk, or Sensitive to human activities or natural events, with potential to occur in the vicinity of the proposed Kami Terminal development were compiled by means of a CDPNQ data search, as well as a search of the Québec Breeding Bird Atlas (QBBA). The habitat requirements of these species which had been recorded within the Côte Nord region were then compared to the range of environmental conditions within the LSA to determine if suitable habitat was present for these taxa. In instances where appropriate habitat was present for a particular species, that taxon was considered to be potentially present in the PDA, and the habitat was identified as a target for field surveys. The phenology and ease of identification of each of the species potentially present in the PDA was also evaluated in order to determine when the rare or sensitive taxa would be best identified.

20.5.1 Vegetation

According to the CDPNQ database, no flora species with special status are reported near the LSA (Levasseur, personal communication July 2011).

The CDPNQ lists 54 plant species at risk to be present or potentially present in the Côte Nord region (CDPNQ 2008). A total of 31 of these species are calcareous (associated with limestone substrate). The presence of limestone substrate is unlikely in the Kami Terminal area as the bedrock consists of gabbro rocks. None of the 23 plant species that are not calcareous are considered as species at risk under the federal legislation. These species have been reviewed for their habitat preferences by a botanist who has visited the site; however, none are likely to be found in the habitats within the PDA or LSA.

20.5.2 Fauna

Wildlife surveys to date have not confirmed the presence of any fauna SAR. A bird survey was conducted by Stantec in June 2011 in the Kami Terminal area. A total of 131 birds representing 33 species were recorded during the survey. Of the birds observed, 122 birds of 29 species were at least possible breeding birds. The four remaining species were colonial species observed in flight over the site. Waterfowl gathering areas are present along the shores of Marconi Peninsula (MRNF 2011b), however, not in the vicinity of the western section of the marine port facility at Pointe-Noire (Figure 20.3). A portion of a waterfowl gathering area is close to a portion of the rail loop, however, given the location of the small cove, in close proximity to an active port, the area is not likely ideal habitat for gathering waterfowl. Species considered regionally rare by the QBBA and recorded during surveys include pine grosbeak and mourning warbler. While considered regionally rare for the purposes of the QBBA, these species are ranked S4 and S5B, respectively, by the CDPNQ and considered Secure in Québec (CESCC 2011).

In addition to the common garter snake, the only reptile potentially present in the Sept-Îles region, a total of nine herpetofauna species were recorded within an area covering 400 km² centered on the study area, according to the *Atlas des amphibiens et reptiles du Québec* database (AARQ 2011). Four of these species were recorded during a herpetofauna survey conducted in the Pointe-Noire study area between May 25 and May 27 in 2011: one salamander (blue-spotted salamander), and three anurans (American toad, northern spring peeper and wood frog). All recorded species are considered as common and widespread in the province of Québec.

Surveys specifically targeting mammals have not been conducted within the LSA, however incidental observations were noted during other field work conducted in support of the Kami Terminal. Habitats in the Marconi Peninsula are fragmented as the result of industrial activity at the Port (port operations, aluminum plant, railroads, access roads and transmission lines) and wood harvesting activities that occurred some 30 years ago. Habitat conditions are far from being optimal, especially considering present encroachments and high noise levels associated with industrial activities. Available habitats consist mainly of patches of mature coniferous forest stands and young mixed forest stands. Such conditions are not favorable to large mammals as they normally required large vital ranges. These habitats are more likely to be used by small mammals. Species observed during field work in the Kami Terminal area include the following species: beaver, snowshoe hare, red squirrel, American porcupine and southern red-backed vole.

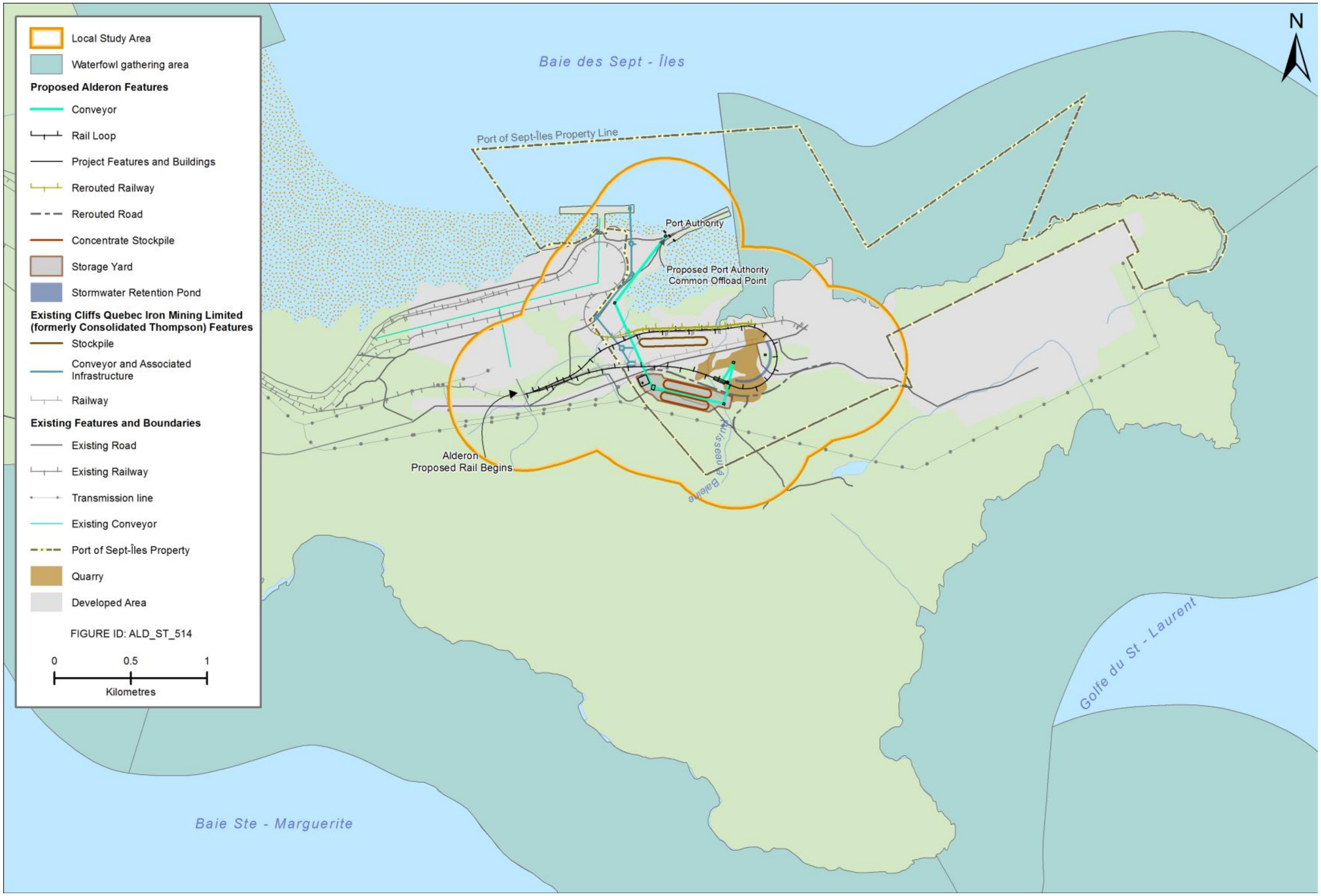
Aquatic habitats likely to be affected by Kami Terminal construction, operation, or decommissioning include ruisseau à la Baleine and an unnamed stream located on Port land, which flow north towards baie des Sept-Îles. No information is available on ruisseau à la Baleine, however, based on the prevalence of human activity (i.e., culverts, artificial channels) and on physical characteristics (i.e., slopes, natural barriers), it is anticipated that this stream is not fish bearing.

Fish habitat is present in the unnamed stream that will be crossed by the rail. This un-named watercourse is mapped as 775 m on the 1:20,000 topographical map.

A report by Bourque and Malouin (2009) on the ZIP de la MRC de Sept-Rivières was reviewed for information on waterfowl and other aquatic birds for a portion of the RSA, in the vicinity of the estuary of the rivière Sainte-Marguerite, which provides habitat for a variety of bird species. Information sources referenced in the report include:

- *Aires de concentrations d'oiseaux aquatiques* inventories dating back to 1999 (MRNF 2008 *in* Bourque and Malouin 2009);
- Canadian Wildlife Service surveys along the north shore from the mouth of the rivière Sainte-Marguerite west to the mouth of the rivière Brochu in 2004 (MRNF 2008 *in* Bourque and Malouin 2009); and,
- Inventory of aquatic birds, waterfowl and birds of prey in the estuary of the rivière Sainte-Marguerite conducted by Hydro-Québec in 1998 (Morneau 1998).

Figure 20.3 Waterfowl Gathering Areas



The mouth of the rivière Sainte-Marguerite is a migratory stop-over for waterfowl, including long-tailed duck (*Clangula hyemalis*), black scoter (*Melanitta nigra*), and red-breasted merganser (*Mergus serrator*) in spring and long-tailed duck, black scoter, red-breasted merganser, surf scoter (*Melanitta perspicillata*), and other ducks in fall.

CWS surveys from rivière Brochu to rivière Sainte-Marguerite reported the following species in abundance: surf scoter, black scoter, great black-backed gull (*Larus marinus*), common merganser (*Mergus merganser*), greater scaup (*Aythya marila*), and green-winged teal (*Anas crecca*), as well as Canada goose, mallard, herring gull, great blue heron, red-breasted merganser, long-tailed duck, Barrow's goldeneye, osprey, northern harrier, and American kestrel.

The Hydro-Québec study in 1998 recorded the following species in spring: common goldeneye, mallard, greater scaup, ring-necked duck, American black duck, and green-winged teal, as well as lesser scaup, red-breasted merganser, surf scoter, herring gull, great black-backed gull, common loon and double-crested cormorant. Summer species included common eider, common goldeneye and Canada goose.

20.5.3 Species at Risk

According to the CDPNQ database, the presence of special status species was not reported in the Kami Terminal area (Guérin, personal communication, March 2011).

The Canada warbler, a species designated as “Threatened” under SARA, was recorded within the QBBA square 19FR85 during the first atlas (1984 through 1989). This species frequents fairly open mixed forest with a dense undergrowth of shrubs. It is also found in mid-successional forests. This species was not observed during the bird field surveys conducted by Stantec in 2011, and is not expected to be present within the LSA.

Barrow’s goldeneye is a Special Concern species at the federal level (COSEWIC 2011) and as a vulnerable species at the provincial level as of 2009 (MNRF 2012), that has been recorded during migration in the estuary of rivière Sainte-Marguerite, as well as a nesting species in the reservoir situated behind the rivière Sainte-Marguerite-3 hydroelectric dam (Morneau 1998). Bald eagle, listed as “Vulnerable” under the QARTVS, has also been observed in the area.

According to their distribution range, five mammal species at risk or with provincial special status may be present in the Sept-Îles area. Of all the mammal species likely to be found in the Sept-Îles region, only one species, the woodland caribou (*Rangifer tarandus caribou*) is listed as a threatened species by the COSEWIC (Government of Canada 2011). On the provincial level, the woodland caribou forest-dwelling ecotype is listed as a vulnerable species.

The forest-dwelling woodland caribou is sedentary and inhabits homogeneous habitats with a preference for mature black spruce forest, peatlands and balsam fir forest and tends to avoid disturbed habitats (harvested areas, recent burns) (Courtois *et al.* 2003; Crête *et al.* 2004). It can also be found in open or semi-open habitat such as alpine tundra, upper subalpine, peatlands, islands, and shorelines where nutritious plants such as forbs and sedges are available (COSEWIC 2002). There is little overlap with preferred habitats of other large ungulates, likely to reduce the risk of predation (Equipe de rétablissement du caribou forestier du Québec 2008). The population density in the western sector of the Côte-Nord region is estimated at 1 caribou per 10 km^2 and even lower in the eastern sector of the region (FAPAQ 2001).

The forest-dwelling caribou populations have been in decline since the mid-20th century, likely due to excessive hunting, loss of habitat and wolf and bear predation. In 2003, woodland caribou dwelling in the boreal forest was attributed the status of threatened species by the Government of Canada. Since 2005, the forest-dwelling caribou is also considered as a vulnerable species at the provincial level (FAPAQ 2001). The presence of woodland caribou on the Marconi Peninsula is unlikely due to unfavorable habitat conditions including the types of vegetation and the proximity to human activity.

A total of four mammal species in the region are considered likely to be designated as threatened or vulnerable (MRNF 2011a). They are the least weasel (*Mustela nivalis*), the rock vole (*Microtus chrotorrhinus*), the southern bog lemming (*Synaptomys cooperi*), and the pygmy shrew (*Sorex [Microsorex] hoyi*). These species prefer humid or wetland areas with the exception of the rock vole that is associated with cliffs and bedrock near forest clearings in mountainous terrain. None of these species are suspected to be present in the Kami Terminal affected area due to unfavorable habitat conditions including the types of vegetation and the proximity to human activity.

Two of the fish species reported in baie des Sept-Îles are considered as species at risk, namely the American eel and Atlantic Cod Laurentian North population. Both species are likely to be designated threatened or vulnerable at the provincial level. They are designated as a species with special concern and endangered species respectively by the COSEWIC, but they do not have a status under SARA. Atlantic Cod reside in marine waters, which are unlikely to be affected by the Kami Terminal. American eel is unlikely to be present in either watercourse potentially affected by the Kami Terminal; American eel was not detected during electrofishing surveys conducted in June 2012.

20.5.4 Species of Conservation Concern

No mammal or bird SOCC have been identified or are likely to occur within the LSA. To date, no vascular plant or fauna SOCC have been recorded in the vicinity of the LSA however field surveys for vascular plants have not been completed.

The vascular plant SAR / SOCC that have some potential (although are unlikely) to occur in the LSA are listed in Table 20.7, based on their reported occurrences within a 400 km^2 area around the site (CDPNQ 2008). None of these 23 species are considered as species at risk under the federal legislation.

Plant SOCC were considered during a field survey conducted in July 2012. Timing coincided with the period when the probability of encountering both cool and warm season perennials is highest, and when rare or sensitive vascular plant taxa including diagnostic features are most identifiable and the detectability of the majority of species maximized. Preliminary results from these surveys indicated no SAR or SOCC were identified. The rarest species identified (*Empetrum eamesii* ssp. *atropurpureum*) is an S3S4 species, considered Secure in the Province.

Based on the wildlife surveys conducted and in consideration of the habitats potentially affected by the Kami Terminal, only vascular plant SOCC have some potential to be present within the PDA or LSA, and therefore could be affected by the Kami Terminal, if present.

Table 20.7 Species at Risk Potentially Present in the Kami Terminal Area

Scientific Name	Provincial Status	Habitat
Agoseris aurantiaca var. aurantiaca	LDTV	Palustrine, subalpine
Alchemilla filicaulis ssp. *filicaulis*	LDTV	Palustrine
Alchemilla glomerulans	LDTV	Palustrine
Antennaria rosea ssp. *confinis*	LDTV	Terrestrial: outcrops/exposed gravel or sand
Arethusa bulbosa	LDTV	Palustrine
Arnica chamissonis	LDTV	Palustrine
Athyrium alpestre ssp. *americanum*	Threatened	Palustrine, subalpine
Botrychium ascendens	LDTV	Terrestrial: outcrop/exposed gravel, meadow
Botrychium pallidum	LDTV	Terrestrial: deciduous forest, exposed sand, agricultural land
Gentianella propinqua ssp. *propinqua*	LDTV	Terrestrial: outcrops/exposed gravel or sand, arctic tundra
Gentianopsis detonsa ssp. *nesophila*	LDTV	Estuary, terrestrial: outcrops/exposed gravel
Geum macrophyllum var. *perincisum*	LDTV	Palustrine, terrestrial : coniferous and mixed forests
Halenia deflexa ssp. *brentoniana*	LDTV	Palustrine, terrestrial: outcrop/exposed gravel, arctic tundra
Hieracium robinsonii	LDTV	Palustrine
Hordeum brachyantherum ssp. *brachyantherum*	LDTV	Estuary
Hudsonia tomentosa	LDTV	Terrestrial: coniferous forest, exposed sand
Myriophyllum humile		Lacustrine
Omalotheca norvegica	LDTV	Palustrine, terrestrial: subalpine
Potamogeton pusillus ssp. *gemmiparus*	LDTV	Fluvial, lacustrine
Sagina nodosa ssp. *nodosa*	LDTV	Estuary, terrestrial: outcrop/exposed gravel
Sedum villosum	LDTV	Palustrine
Sparganium glomeratum	LDTV	Palustrine
Utricularia geminiscapa	LDTV	Lacustrine, palustrine

[1] According to "*Les plantes vasculaires menacées ou vulnérables du Québec, 3e édition*", CDPNQ, 2008 LDTV: likely to be designated threatened or vulnerable

20.6 Assessment of Project-related Environmental Effects

The interactions between the Kami Terminal and SAR / SOCC that are ranked 2 are assessed in this section. Although no wildlife or plant SAR / or SOCC is likely to be affected during construction, directly or indirectly, the assessment will consider the environmental effects of the Kami Terminal on SAR / SOCC should they be identified in the PDA and cannot be reasonably avoided. Where the Kami Terminal disturbs rare or sensitive plant species, an assessment will be undertaken to help determine the application of technically and economically feasible mitigation strategies or compensation (or both) to address any likely significant adverse residual environmental effects as required.

The potential residual environmental effects (although not expected to be significant) would be a change in critical or important (primary) habitat, change in distribution, change in mortality and change in health, due to a reduction or change in habitat and the incidental loss of plant SAR / SOCC, especially during site preparation, and as result of dust. A number of mitigation measures will be implemented to minimize environmental effects. These measures will be outlined in the Kami Terminal-specific EPP and include such mitigation as the minimizing of Kami Terminal footprint, minimizing the disturbance to environmentally sensitive areas, avoiding known locations of species having special status, and clearing of vegetation under frozen ground or winter conditions.

The assessment will consider the potential environmental effects of the Kami Terminal on SAR / SOCC; however, at the time of this assessment, no SAR / SOCC has been identified in the PDA, and there is a low likelihood of occurrence.

20.6.1 Change in Habitat

Potential Environmental Effects

Site preparation could affect plant SAR / SOCC, if present. Clearing and grubbing during site preparation will remove existing vegetation. In addition, a number of indirect effects can result from these site preparation activities. Clearing of forested areas can change the quality of the habitat along the edge of the Kami Terminal footprint as a result of increased side lighting or drying of what was previously forest interior habitat. This may enable more light-tolerant and disturbance-tolerant species to penetrate into adjacent forest habitat. Vegetation located within the footprints of various Kami Terminal components (concentrate unloading, stacking, storage, and reclaiming facilities, rail loop, stream diversion, access road and waterline realignment and other infrastructure such as security fencing and office and storage buildings) as required for the Kami Terminal will be removed during the construction phase of the Kami Terminal.

Mitigation of Project Environmental Effects

The timing, location, extent, type of proposed Kami Terminal activities and existing legislated mitigations will determine the level of restriction or mitigation that will be required to safeguard SAR / SOCC, should any be discovered in the area of the Kami Terminal. All potential project and cumulative effects to SOCC and their habitats must be assessed such that appropriate measures may be implemented to prevent such adverse effects resulting from the Kami Terminal. Effective planning, design, and the application of known and proven mitigation measures will be implemented as part of the Kami Terminal to avoid or minimize environmental effects on rare or sensitive species and/or their habitats, if present. Mitigation measures may include: 1) avoidance of rare or sensitive species and/or their habitats as a means of reducing the possible loss of SAR / SOCC, where practical; 2) where avoidance is not practical, limiting the degree or magnitude of the environmental effects mechanism will be considered through the development of protection measures and environmental management techniques based on site-specific conditions, with minimization of unavoidable effects the priority; 3) rectifying the effect by rehabilitating or restoring the affected environment; and 4) compensating for the effect by replacing or providing substitute resources or environments, including the use of such strategies as seed collection and sowing, direct transplantation or diaspore dispersal, for plant SAR / SOCC.

These mitigation measures can be applied to a variety of environmental effects but may not always be appropriate to mitigating potential adverse effects on individual species and/or rare populations. Rather, mitigation measures should be developed on a site-specific basis and in consultation with appropriate agencies. Under existing legislation, a project proponent has the responsibility of consulting with appropriate regulatory agencies on matters relating to Kami Terminal effects on SAR / SOCC.

For rare or sensitive plant species, effective mitigation options that can avoid or reduce adverse environmental effects may be limited. The use of more than one measure may be necessary depending upon the nature of the occurrence and the factors that contribute to the plant species having been identified as rare (e.g., unusual soils, microclimates, or water regimes). Each species and potentially individual occurrence must be evaluated to determine which mitigation method or methods will avoid or reduce effects that could be evaluated as significant to a less than significant level. Because the life history and ecological information needed to judge whether mitigation measures are adequate is often lacking, additional biological research may be necessary prior to mitigation design and/or implementation in order to determine which measures will be most appropriate.

Standard practices and general environmental protection measures for construction projects will address most outstanding issues likely to arise during the Kami Terminal. General measures to minimize the effects of such activities as clearing of the PDA, working in and around waterbodies, equipment maintenance, and work site cleanup will also be addressed through a series of environmental protection measures implemented in accordance with the potential effects identified through the EA process. A Kami Terminal-specific EPP will also be developed for the Kami Terminal prior to start of the construction phase. Activities such as handling and storage of fuel and other hazardous materials are regulated by law and will comply with all applicable standards and regulations, guidelines and reference documents.

The following mitigation measures are proposed to mitigate effects related to change in habitat during site preparation. Many of these mitigation measures would also address issues associated with other construction and operation effects:

  - Comply with existing legislated mitigation.
  - Avoid activities near or/at sensitive species and/or habitats, where possible.
  - Develop protection measures and environmental management techniques based on site-specific conditions.
  - Rehabilitate or restore affected environment.
  - Provide substitute resources or environments through seed collection / sowing, direct transplantation or diaspore dispersal.
  - Implement EPP.
- Provide employee training.

Characterization of Residual Project Environmental Effects

No critical or important habitat for SAR / SOCC has been identified within the PDA or LSA. The habitats within the LSA and the PDA in particular, are not considered high potential habitats for SAR or SOCC. The affected habitats are well represented in the RSA.

Based on available habitat maps, updated in part from available satellite imagery, there is a limited amount of natural forest habitat that will be lost due to Kami Terminal construction activities. The majority of affected forest habitat is from the Concentrate Storage and Load-out Facility, where 7.6 ha of forest will be removed (Table 20.8). In total, direct loss of approximately 14.5 ha of largely edge habitat will be lost, while over 43 percent of the PDA is on developed (or otherwise disturbed) land. The terrestrial habitat loss will be permanent; however, the loss represents less than one percent of the RSA, or approximately one percent of the terrestrial habitat excluding the developed or cleared lands, two percent of mature coniferous forest (which makes up 39 percent of the RSA), and less than six percent of the young mixed forest (which makes up 13 percent of the RSA).

Table 20.8 Kami Terminal Interactions with Habitats

Kami Terminal Component	Area Directly Affected by Habitat Type (ha)				
	Developed Land	Mature Coniferous Forest	Young Mixed forest	Early Successional	Total
Concentrate Storage and Load-out Facility	0.618	4.15	3.45	-	8.218
Conveyor	2.89	0.646	0.498	-	4.034
Rail Loop	6.99	1.37	1.125	-	9.485
Road Re-alignment	0.112	1.48	-	1.566	3.158
Retention Pond and Building	0.58	0.19	-	-	0.77
Kami Terminal Total	**11.19**	**7.84**	**5.07**	**1.57**	**25.67**

20.6.2 Change in Distribution and Movement

Potential Environmental Effects

Site preparation and construction activities including ground disturbance, clearing, grubbing, grading, infilling, and/or excavation, the removal of overburden, material haulage, and stockpiling, has the highest potential to result in the direct loss of individual or populations of wildlife and plant SAR / SOCC resulting in a change in distribution, and/or the displacement of wildlife species.. The remaining construction activities will also have an impact, but it will result from sensory disturbance from noise and dust.

Construction activities may also result in habitat fragmentation, leading to the reduction or loss of freedom of movement between habitat patches. This could be particularly problematic for wildlife SAR / SOCC if they were found in the vicinity of the PDA and move through and within the Kami Terminal area to access preferred habitat. However, given the location and scale of the Kami Terminal, fragmentation will be minor and the movements of few, if any, species are expected to be disrupted in a substantive way.

Noise associated with construction and later, operation and maintenance activities may cause the displacement of individuals to less productive habitats, and may affect the flight patterns of migratory birds.

Mitigation of Project Environmental Effects

The following mitigation measures are proposed to mitigate effects related to change in distribution and movement during site preparation. Many of these mitigation measures would also address issues associated with other construction and operation effects:

- Comply with existing legislated mitigation.
- Avoid activities near or/at sensitive species and/or habitats, where possible.
- Develop protection measures and environmental management techniques based on site-specific conditions.
- Rehabilitate or restore affected environment.
- Provide substitute resources or environments through seed collection / sowing, direct transplantation or diaspore dispersal.
- Provincial and federal regulations should be followed in the storage and handling of materials.
- Implement EPP.
- Implement forest fire prevention and response plan.
- Provide employee training.

Characterization of Residual Project Environmental Effects

No SAR / SOCC have been confirmed within the PDA or LSA. Site visits have been conducted for plants amphibians, fish, and birds, and the site has low potential for any mammal SAR / SOCC, given its location and the habitat types present.

20.6.3 Change in Mortality Risk

Potential Environmental Effects

Change in mortality risk refers to wildlife only, and as no wildlife SAR / SOCC have been recorded in the Kami Terminal area, it is unlikely that interaction with the Kami Terminal would occur. Note that if wildlife SAR / SOCC do occur in future, mitigation measures would be implemented.

Off-road vehicle activity during construction has the potential to disturb habitat and cause direct mortality of vascular plants or fauna (including SAR / SOCC if present).

Mitigation of Project Environmental Effects

The following mitigation measures are proposed to mitigate effects related to change in mortality during site preparation. Many of these mitigation measures would also address issues associated with other construction and operation effects:

- Comply with existing legislated mitigation.
- Avoid activities near or/at sensitive species and/or habitats, where possible.
- Develop protection measures and environmental management techniques based on site-specific conditions.
- Rehabilitate or restore affected environment.
- Provide substitute resources or environments through seed collection / sowing, direct transplantation or diaspore dispersal.
- Provincial and federal regulations should be followed in the storage and handling of materials.
- Implement EPP.
- Implement forest fire prevention and response plan.
- Provide employee training.

Characterization of Residual Project Environmental Effects

No SAR / SOCC have been confirmed within the PDA or LSA. Site visits have been conducted for amphibians, fish, and birds, and the site has low potential for any mammal SAR / SOCC, given its location and the habitat types present.

20.6.4 Change in Health

Potential Environmental Effects

The key factor with potential for causing a change in health are airborne contaminates from site preparation and access roads and waterline realignment construction that can cause physiological effects of both plants and animals from contamination, potentially lowering fitness of breeding animals, affecting reproductive output and success.

Mitigation of Project Environmental Effects

The following mitigation measures are proposed to mitigate effects related to change in health during site preparation. Many of these mitigation measures would also address issues associated with other construction and operation effects:

- Avoid activities near or/at sensitive species and/or habitats, where possible.
- Develop protection measures and environmental management techniques based on site-specific conditions.
- Provincial and federal regulations should be followed in the storage and handling of materials.
- Dust control measures.
- Implement EPP.
- Provide employee training.

Characterization of Residual Project Environmental Effects

No SAR / SOCC have been confirmed within the PDA or LSA. Site visits have been conducted for plants amphibians, fish, and birds, and the site has low potential for any mammal SAR / SOCC, given its location and the habitat types present.

20.6.5 Summary of Project Residual Effects

The residual environmental effects of the Kami Terminal on SAR / SOCC are summarized in Table 20.9. The residual environmental effects on SAR / SOCC for construction and operation of the Kami Terminal are characterized by the following descriptors: direction; magnitude; geographic extent; duration and frequency; reversibility; ecological/socio-economic context, significance, and prediction confidence.

Table 20.9 Summary of Residual Environmental Effects of Kami Terminal to Species at Risk and Species of Conservation Concern

Kami Terminal Phase	Mitigation/Compensation Measures	Residual Environmental Effects Characteristics									Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental or Socio-Economic Context	Significance	Prediction Confidence	
Change in Critical or Important Habitat											
Construction	• Comply with existing legislated mitigation. • Avoid activities near or/at sensitive species and/or habitats, where possible. • Develop protection measures and environmental management techniques based on site-specific conditions. • Rehabilitate or restore affected environment. • Provide substitute resources or environments through seed collection / sowing, direct transplantation or diaspore dispersal. • Provincial and federal regulations should be followed in the storage and handling of materials. • Dust control measures. • Implement EPP. • Provide employee training.	A	L	S	ST	C	I	D	N	H	• On-site monitoring for compliance with the EPP.

Kami Terminal Phase	Mitigation/Compensation Measures	Residual Environmental Effects Characteristics									Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental or Socio-Economic Context	Significance	Prediction Confidence	
Change in Distribution and Movement											
Construction	• Comply with existing legislated mitigation. • Avoid activities near or/at sensitive species and/or habitats, where possible. • Develop protection measures and environmental management techniques based on site-specific conditions. • Rehabilitate or restore affected environment. • Provide substitute resources or environments through seed collection / sowing, direct transplantation or diaspore dispersal. • Provincial and federal regulations should be followed in the storage and handling of materials. • Dust control measures. • Implement EPP. • Provide employee training.	A	L	S	ST	C	I	D	N	H	• On-site monitoring for compliance with the EPP.

Kami Terminal Phase	Mitigation/Compensation Measures	Residual Environmental Effects Characteristics									Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental or Socio-Economic Context	Significance	Prediction Confidence	
Change in Mortality Risk											
Construction	• Comply with existing legislated mitigation. • Avoid activities near or/at sensitive species and/or habitats, where possible. • Develop protection measures and environmental management techniques based on site-specific conditions. • Rehabilitate or restore affected environment. • Provide substitute resources or environments through seed collection / sowing, direct transplantation or diaspore dispersal. • Provincial and federal regulations should be followed in the storage and handling of materials. • Dust control measures. • Implement EPP. • Provide employee training.	A	L	S	ST	C	I	D	N	H	• On-site monitoring for compliance with the EPP.

Kami Terminal Phase	Mitigation/Compensation Measures	Residual Environmental Effects Characteristics									Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental or Socio-Economic Context	Significance	Prediction Confidence	
Change in Health											
Construction	• Comply with existing legislated mitigation. • Avoid activities near or/at sensitive species and/or habitats, where possible. • Develop protection measures and environmental management techniques based on site-specific conditions. • Rehabilitate or restore affected environment. • Provide substitute resources or environments through seed collection / sowing, direct transplantation or diaspore dispersal. • Provincial and federal regulations should be followed in the storage and handling of materials. • Dust control measures. • Implement EPP. • Provide employee training.	A	L	S	ST	C	I	D	N	H	• On-site monitoring for compliance with the EPP.

Kami Terminal Phase	Mitigation/Compensation Measures	Residual Environmental Effects Characteristics									Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental or Socio-Economic Context	Significance	Prediction Confidence	

KEY

Direction:
P Positive.
N Neutral.
A Adverse.

Magnitude:
L Low: the residual Kami Terminal effects to SAR / SOCC (alteration / loss) are not expected to exceed 5 percent of the known population in the RSA. No measurable effect.
M Moderate: the residual Kami Terminal effects to SAR / SOCC (alteration / loss) are expected to be greater than 5 percent and not exceed 25 percent of the known populations in the RSA. Effect can be measured.
H High: the residual Kami Terminal effects to SAR / SOCC (alteration / loss) are expected to exceed 25 percent of the known population in the RSA. Effect can be easily observed, measured and described, and may be widespread.

Geographic Extent:
S Site-specific: includes the PDA; effects limited to directly affected environmental components.
L Local: within the LSA.
R Regional: within the RSA; area where indirect or cumulative effects may occur.
BR Beyond Regional: extends beyond the RSA.

Duration:
ST Short term: effect occurs during the site-preparation or construction phase of the Kami Terminal (i.e., 1 to 2 years).
MT Medium term: effect extends throughout the construction and operation phases of the Kami Terminal (approximately 17 years).
LT Long term: effect is greater than 17 years.
P Permanent: effect persists and will not change back to original condition.

Frequency:
O Once: effect occurs occasionally, or once during the life of the Kami Terminal (e.g., clearing).
S Sporadic:- occurs sporadically at irregular intervals.
R Regular:- occurs on a regular basis and at regular intervals during the life of the Kami Terminal.
C Continuous.

Reversibility:
R Reversible.
I Irreversible.

Environmental or Socio-economic Context:
U Undisturbed: area relatively or not adversely affected by human activity.
D Disturbed or Developed: area has been substantially previously disturbed by human development or human development is still present.
N/A Not Applicable.

Significance:
S Significant.
N Not Significant.

Prediction Confidence:
Based on scientific information, statistical analysis, and effectiveness of mitigation or effects management measure.
L Low level of confidence.
M Moderate level of confidence.
H High level of confidence.

20.7 Assessment of Cumulative Effects

In association with the Kami Terminal environmental effects discussed above, an assessment of the potential cumulative effects was conducted for other projects and activities that have potential to interact with the Kami Terminal. Table 20.10 provides a summary of the cumulative effects assessment for SAR / SOCC.

Most of the northern part of the Marconi Peninsula has been cleared of vegetation owing to industrial activity. Existing vegetation on the peninsula as a whole is boreal coniferous and boreal mixed forest. Habitats available within the bird survey study area consist of patches of young mixed forest stands, which have resulted from either forest harvesting or excavation for roads, and mature coniferous stands. These habitats are interspersed, as they are small and present in patches, and are found both within and south of the proposed Kami Terminal. Developed areas make up 24 percent of the Marconi Peninsula, while the dominate habitat is mature coniferous forest at 39 percent. Preliminary results of plant surveys support the conclusion that the potential for encountering SAR / SOCC is low.

No SAR / SOCC have been identified within the PDA or LSA. No critical or important habitat for SAR or SOCC has been identified within the PDA, and the overall potential for SAR and SOCC is low.

Of the total estimated area of the PDA (25.7 ha), over 43 percent is on developed or otherwise disturbed land. The majority of affected forest habitat is from the Concentrate Storage and Load-out Facility, where 7.6 ha of forest will be removed. Interior forest (defined as mature forest habitat more than 100 m from an edge and that is a minimum of 10 ha in size) is not located within 100 m of the PDA, and will therefore not be affected. The terrestrial habitat loss will be permanent; however, the loss represents less than 1percent of the Marconi Peninsula, part of the RSA, or approximately 1percent of the terrestrial habitat excluding the developed or cleared lands.

There is no spatial or temporal overlap of the Second Port-Cartier pellet plant (ArcelorMittal Mines Canada) with the Kami Terminal, as the pellet plant project is located approximately 30 km southeast of the Kami Terminal, and therefore does not overlap the RSA.

The remaining projects all will affect land within the RSA, however are expected to largely be constructed on developed land or other disturbed or edge habitats, unlikely to harbour SAR or SOCC. There would therefore not likely be any or substantive cumulative losses of natural terrestrial habitat, and therefore limited direct effects on wildlife, including SAR and SOCC. One possible exception is the future expansion of Aluminerie Alouette Aluminum Smelter. No information is currently available to determine what, if any, terrestrial habitat would be lost, however based on habitat maps adjacent the smelter, no interior forest would likely be affected, and limited forest habitat may be lost. The remaining projects are largely the placement of additional infrastructure within developed areas for additional rail traffic and ship loading. All development is expected to keep close to existing development, similar to the Kami Terminal, with no encroachment on interior forest habitat.

While direct construction effects on natural terrestrial habitat are likely to be limited, indirect effects of added noise, light and dust are likely to increase locally with the project expansions.

The Kami Terminal will not contribute to cumulative effects, as no SAR / SOCC have been identified within the PDA or LSA.

The characterization of the potential cumulative effects and associated mechanisms, combined with the proposed mitigation / effects management measures demonstrate that the residual cumulative effect of change in population on SAR / SOCC as a result of past, present, and reasonably foreseeable projects and activities that have been or will be carried out, in combination with the environmental effects of the Kami Terminal during all phases, is rated not significant. This determination has been made with a high level of confidence.

Table 20.10 Summary of Potential Cumulative Effects to Species at Risk and Species of Conservation Concern

VEC Existing Condition (Past and Ongoing Activities)	• Most of the northern part of the Marconi Peninsula has been cleared of vegetation owing to industrial activity. Existing vegetation on the peninsula as a whole is boreal coniferous and boreal mixed forest. Habitats available within the bird survey study area consist of patches of young mixed forest stands, which have resulted from either forest harvesting or excavation for roads, and mature coniferous stands. These habitats are interspersed, as they are small and present in patches, and are found both within and south of the proposed concentrate unloading, stacking, storage, and reclaiming facilities. Developed areas make up 24% of the Marconi Peninsula, while the dominate habitat is mature coniferous forest at 39%. • Common bird and other wildlife species were recorded in the study area; 29 birds at least possibly breeding and 4 of the 10 herpetofauna known from the region were recorded, all outside the PDA. Common small mammals are likely to inhabit the peninsula, which is not favourable for large mammal SAR / SOCC. • Preliminary results of plant surveys support the conclusion that the potential for encountering SAR / SOCC is low.		
Kami Terminal Residual Environmental Effects	• No SAR / SOCC have been identified within the PDA or LSA. No critical or important habitat for SAR / SOCC has been identified within the PDA or LSA. • Of the total estimated area of the PDA (25.7 ha), over 43% is on developed or otherwise disturbed land. The majority of affected forest habitat is from the Concentrate Storage and Load-out Facility, where 7.6 ha of forest will be removed. Interior forest (defined as mature forest habitat more than 100 m from an edge and that is a minimum of 10 ha in size) is not located within 100 m of the PDA, and will therefore not be affected. The terrestrial habitat loss will be permanent; however, the loss represents less than 1% of the Marconi Peninsula, part of the RSA, or approximately 1% of the terrestrial habitat excluding the developed or cleared lands.		
Other Projects / Activities	**Likely Effect Interaction (Y/N)**	**Rationale**	**Cumulative Effects**
Pointe-Noire Port Expansion (Port of Sept-Îles)	Y	Will affect land within the RSA (Marconi Peninsula)	None
CFA and QNS&L	Y	Will affect land within the RSA (Marconi Peninsula)	None
Alouette Aluminum Smelter (Aluminerie Alouette)	Y	Will affect land within the RSA (Marconi Peninsula)	None
Second Port-Cartier Pellet Plant (ArcelorMittal)	N	The Mount Wright Mine project is not located within the RSA.	N/A

<table>
<tr><td>Bloom Pointe-Noire Terminal (Cliffs Resources)</td><td colspan="2">Y</td><td colspan="3">Will affect land within the RSA (Marconi Peninsula)</td><td colspan="3">None</td></tr>
<tr><td>Arnaud Apatite-Magnetite mine (Mine Arnaud)</td><td colspan="2">Y</td><td colspan="3">Will affect land within the RSA (Marconi Peninsula)</td><td colspan="3">To be completed based on information from the Arnaud Apatite-Magnetite mine EIA</td></tr>
<tr><td rowspan="2">Cumulative Effects Summary (The Kami Terminal + relevant other projects and activities)</td><td>Direction</td><td>Magnitude</td><td>Geographic Extent</td><td>Duration</td><td>Frequency</td><td>Reversibility</td><td>Significance</td><td>Confidence</td></tr>
<tr><td>A</td><td>L</td><td>R</td><td>P</td><td>C</td><td>I</td><td>N</td><td>H</td></tr>
<tr><td colspan="9">The overlapping projects will all affect land within the RSA (Marconi Peninsula), however are expected to largely be constructed on developed land or other disturbed or edge habitats. There would therefore not likely be any or substantive cumulative losses of natural terrestrial habitat. One possible exception is the future expansion of the Aluminerie Alouette Aluminum Smelter. No information is currently available to determine what, if any, terrestrial habitat would be lost, Or that there are any SAR / SOCC that may be lost. However based on habitat maps adjacent the smelter, no interior forest would likely be affected, and limited forest habitat may be lost. The remaining Projects are largely the placement of additional infrastructure within developed areas for additional rail traffic and ship loading. All development is expected to keep close to existing development, similar to the Kami Terminal, with no encroachment on interior forest habitat.
The Kami Terminal will not contribute to cumulative effects, as no SAR / SOCC have been identified within the PDA or LSA.
The characterization of the potential cumulative effects and associated mechanisms, combined with the proposed mitigation / effects management measures demonstrate that the residual cumulative effect of change in population on SAR / SOCC as a result of past, present, and reasonably foreseeable projects and activities that have been or will be carried out, in combination with the environmental effects of the Kami Terminal during all phases, is rated not significant. This determination has been made with a high level of confidence.
Note: Environmental effects descriptors and their definitions are as used in the assessment of environmental effects related to the Kami Terminal (See Table 20.9).</td></tr>
</table>

20.8 Assessment of Accidents and Malfunctions

Accident or malfunction scenarios that are unlikely to interact with SAR / SOCC include stormwater retention pond breach and spill of product during ship loading. No fauna SAR / SOCC or critical or important habitat for such species have been identified within the PDA or LSA, and are therefore unlikely to interact with either of these scenarios, due to the location and limited extent of the event. The stormwater retention pond is located on developed land within the PDA and only developed lands and baie des Sept-Îles are located downgradient. Therefore there would not likely be any consequences to SAR / SOCC, given the low potential for the presence of rare plants within the zone of influence.

Two potential accident or malfunction scenarios could interact with SAR / SOCC. These are:

- Forest fire caused by the Kami Terminal; and,
- Train derailment and consequent spill of materials or contaminants.

In the unlikely event of any of these scenarios, alteration or loss of SAR / SOCC could result. The potential interactions of these events are summarized in Table 20.5. The interactions ranked as 2 are assessed in more detail.

A forest fire caused by the Kami Terminal has the potential to burn forested habitat that has some potential to harbour rare plant species. A small isolated population of such plants, if present, could be lost as a result of such an event, depending on the species. The significance of such an event depends largely on the status, population size, range and extent of species, if present. Standard mitigation includes:

- Implement EPP;
- Implement forest fire prevention and response plan; and
- Employee training.

Access to forest land surrounding the PDA is fair, via the existing road along the transmission line, which heads south towards a communication tower and lac Brochu.

Table 20.11 presents the summary of residual environmental effects from accidents and malfunctions on SAR / SOCC.

Table 20.11 Summary of Residual Environmental Effects for Species at Risk and Species of Conservation Concern – Accidents and Malfunctions

Kami Terminal Phase	Mitigation/Compensation Measures	Residual Environmental Effects Characteristics									Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental or Socio-Economic Context	Significance	Prediction Confidence	
Change in Populations											
Forest Fire	• Implement EPP; • Implement forest fire prevention and response plan; and, • Employee training	A	H	L/R	ST	S	R	D	S	H	Negligible effects anticipated due to ecological context (i.e., landscape position, hydrology) of SAR / SOCC. No follow-up and monitoring likely required.
Train Derailment	• Provincial and federal regulations should be followed in the storage and handling of materials; • Implement EPP during clean-up; • Implement response plan and measures to recover lost product; • Oil spill contingency planning; and, • Employee training	A	L	L	MT	S	I	D	N	H	Remediate, reclaim and re-vegetate site

Kami Terminal Phase	Mitigation/Compensation Measures	Residual Environmental Effects Characteristics									Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental or Socio-Economic Context	Significance	Prediction Confidence	

KEY

Direction:

P Positive.
N Neutral.
A Adverse.

Magnitude:

L Low: the Kami Terminal residual effects (alteration or loss) are not expected to exceed 5% of the known population in the RSA. No measurable effect.
M Moderate: the Kami Terminal residual effects (alteration or loss) are expected to be greater than 5% and not exceed 25% of the known populations in the RSA. Effect can be measured.
H High: the Kami Terminal residual effects (alteration or loss) are expected to exceed 25% of the known population in the RSA. Effect can be easily observed, measured and described, and may be widespread.

Geographic Extent:

S Site-specific: includes the PDA; effects limited to directly affected environmental components.
L Local: within the LSA.
R Regional: within the RSA; area where indirect or cumulative effects may occur.
BR Beyond Regional: extends beyond the RSA.

Duration:

ST Short term: effect occurs during the site - preparation or construction phase of the Kami Terminal (approximately 2 years).
MT Medium term: effect extends throughout the construction and operation phases of the Kami Terminal (approximately 17years).
LT Long term: effect is greater than 17 years.
P Permanent: effect persists and will not change back to original condition.

Frequency:

O Once: effect occurs occasionally, or once during the life of the Kami Terminal (e.g., clearing).
S Sporadic: occurs sporadically at irregular intervals.
R Regular: occurs on a regular basis and at regular intervals during the life of the Kami Terminal.
C Continuous.

Reversibility:

R Reversible.
I Irreversible.

Environmental or Socio-economic Context:

U Undisturbed: area relatively or not adversely affected by human activity.
D Disturbed or Developed: area has been substantially previously disturbed by human development or human development is still present.
N/A Not Applicable.

Significance:

S Significant.
N Not Significant.

Prediction Confidence:

Based on scientific information, statistical analysis, and effectiveness of mitigation or effects management measure.
L Low level of confidence.
M Moderate level of confidence.
H High level of confidence.

Train derailment within the port is a highly unlikely scenario given the low speeds, and the limited amounts of hazardous materials that could be released (i.e., engine fuel and lubricants). The low speeds would also likely limit the damage to the environment should such an event occur. Standard mitigation includes:

- Provincial and federal regulations should be followed in the storage and handling of materials;
- Implement EPP during clean-up;
- Implement response plan and measures to recover lost product;
- Oil spill contingency planning; and,
- Provide employee training.

No SAR / SOCC have been reported and none are likely present in the vicinity of the proposed railway loop.

20.8.1 Summary

The residual environmental effects of accidents and malfunctions related to the Kami Terminal SAR / SOCC are summarized in Table 20.11.

20.9 Determination of Significance of Residual Adverse Environmental Effects

20.9.1 Determination of Significance of Residual Adverse Environmental Effects

As described above, potential adverse residual effects of the Kami Terminal on SAR / SOCC would occur primarily as a result of first-time ground disturbance during construction of the Kami Terminal. Any such effects, if they did occur, would therefore be primarily restricted to the PDA and beyond the PDA depending on the wildlife species.

The Kami Terminal has potential to interact with SAR / SOCC if present in the PDA or LSA. The significance of potential residual environmental effects resulting from interactions between Kami Terminal activities and SAR / SOCC can only be evaluated after taking into account any proposed mitigation and compensation associated with the Kami Terminal. Mitigation includes avoiding activities near or/at sensitive species and/or habitats, where possible., complying with existing legislated mitigation; employee training; as well as implementation of measures detailed in the EPP to address environmentally sensitive areas.

The PDA is largely located within an existing and active industrial site, with only the concentrate unloading, stacking, storage, and reclaiming facilities, access roads and waterline realignment, and stream diversion expected to require the disturbance of existing habitat that is not considered critical or important for any wildlife or plant SAR / SOCC, given its largely fragmented and disturbed structure and proximity to an active industrial area, and the lack of identified SAR / SOCC. While it is likely used by birds and wildlife for breeding, the habitat is common and widespread in the RSA and beyond, and the species that use the area are also common and widespread.

With the proposed mitigation, effects management and environmental protection measures, the environmental effect of change in populations of SAR / SOCC is likely to be not significant. Therefore the overall effect of the Kami Terminal on SAR / SOCC is not significant. This determination was made with a high level of confidence based on the results of a literature review, field surveys and the application of appropriate mitigation measures,. The magnitude of the effect on SAR / SOCC is low (i.e., not likely to exceed the thresholds in the significance definition).

20.9.2 Determination of Significance of Cumulative Effects

The Kami Terminal will not contribute to cumulative effects, given the lack of SAR / SOCC within the PDA and LSA.

The characterization of the potential cumulative effects and associated mechanisms, combined with the proposed mitigation / effects management measures demonstrate that the residual cumulative effects on SAR / SOCC as a result of past, present, and reasonably foreseeable projects and activities that have been or will be carried out, in combination with the environmental effects of the Kami Terminal during all phases, is rated not significant. This determination has been made with a high level of confidence.

20.9.3 Determination of Significance of Effects Resulting from Accidents and Malfunctions

The residual adverse environmental effects of a forest fire caused by the Kami Terminal on SAR / SOCC as a result of accidents and malfunctions could be significant. This is due to the potential high magnitude and potential regional geographic extent of the environmental effects. However, with implementation of provincial and federal regulation or guidelines; EPP's, emergency response plans and measures to recover lost product, contingency planning, and employee training, these unplanned or unintended events are unlikely to occur and are likely to be contained rapidly.

The residual adverse environmental effects of a train derailment within the Port site caused by the Kami Terminal on SAR / SOCC as a result of accidents and malfunctions are predicted to be not significant, due to disturbed nature of the environment immediately surrounding the rail loop, the limited magnitude and geographic extent of potential environmental effects, and the lack of known or potential SAR / SOCC in the PDA and LSA.

20.9.4 Overall Residual Effects Conclusion

In summary, given the planned mitigation, and the analyses presented in this assessment, the effects of changes in habitat, changes in distribution and movement, changes in mortality rates, and changes in health on the SAR / SOCC as a result of the construction, operation and decommissioning of the Kami Terminal, including cumulative effects, are not likely to be significant. The effects of accidents and malfunctions could be significant, but are unlikely to occur.

20.10 Follow-up and Monitoring

As outlined in the EIS Guidelines, follow-up is a process designed to verify environmental effects predictions, assess the effectiveness of strategies implemented to optimize Kami Terminal outcomes, and implement adaptive management measure where necessary. Monitoring also helps ensure compliance with any commitments made and for any unforeseen effects to be identified and addressed.

It is recognized that although no significant effects from the Kami Terminal are expected with mitigation, failure to follow proposed mitigation measures could lead to potentially adverse environmental effects on SAR / SOCC. To ensure that appropriate and effective environmental mitigation measures are employed during construction, Alderon will conduct on-site monitoring for compliance with the EPP.

Follow-up monitoring will also be required in the event of a serious accident or malfunction. Alderon will monitor and report the extent of these effects.

20.11 Next Steps

No additional data collection is needed.

20.12 Summary

SAR / SOCC are an important feature of the landscape, representing aspects of the natural and socio−economic environment that are valued because of their ecological, scientific, resource, socio−economic, cultural, health, aesthetic, or spiritual importance; or due to concerns about the vulnerability of SAR / SOCC to potential effects related to the Kami Terminal. Through background and field research, SAR / SOCC have been evaluated within the LSA. No wildlife species of interest have been recorded near the LSA based on desktop assessments, the available habitat, and field observations. While there is some potential for vascular plant SAR / SOCC to be located within the LSA, the overall potential given the habitats found within the LSA is low, and no SAR / SOCC were recorded during a vascular plant survey of the site. Interaction between the Kami Terminal and SAR / SOCC is possible within the LSA, primarily during the construction phase resulting from clearing and ground disturbance activities.

Many potential negative effects can be mitigated through careful planning of the Kami Terminal. Mitigation measures have been prescribed to minimize effects related to the Kami Terminal on the environment. The most important legislation considered in the effects assessment and mitigation recommendations for SAR / SOCC included the *Species at Risk Act*, the *Migratory Birds Convention Act*, and the *Québec Act Respecting the Conservation and Development of Wildlife*.

Even though the effects of the Kami Terminal on SAR / SOCC may be present for the life of the Kami Terminal, residual effects are expected to be small, and unlikely to be measurable within the range of natural variation in the environments as discussed. Effects on SAR / SOCC are manageable, provided that appropriate mitigation measures are adhered to.

Based on the results of the environmental assessment, it is concluded that the Kami Terminal is not likely to result in significant adverse environmental effects on SAR / SOCC, particularly with application of standard mitigation measures where technically and economically feasible to apply. Likewise significant adverse cumulative effects are not likely because of the lack of effects related to the Kami Terminal, and due to the limited amount of direct loss of natural habitats anticipated to be lost within the RSA as a result of these projects, and the limited overlap between the Kami Terminal footprint with the footprint of other projects or activities.

21.0 HISTORIC AND CULTURAL RESOURCES

21.1 VEC Definition and Rationale for Selection

Historic and Cultural Resources include sites, materials and, in certain instances, landscapes and places of historic, archaeological, cultural / spiritual, paleontological and architectural importance. Such resources can date to the very distant past or to the Pre-contact, Historic, or Contemporary periods and are valued for their cultural, spiritual, natural, and scientific importance.

Historic and Cultural Resources have been identified as a VEC because they can comprise the only physical information on Aboriginal lifestyles prior to the arrival of Europeans in North America and help us understand the history, land-use, fossil record, and architecture of a region. Moreover, they can provide insight into the interactions that took place between different cultural groups and the connections each had with the environment in which they lived.

In the province of Québec, Historic and Cultural Resources are currently protected under the provincial *Cultural Property Act* (2006) administered by the *ministère de la Culture, des Communications et de la Condition féminine* (MCCCF). In October 2012, this Act will be replaced by the *Cultural Heritage Act* sanctioned in 2011.

In Québec, archaeological and architectural resources are specifically protected under the *Cultural Property Act* (2006) and will continue to be covered by the *Cultural Heritage Act* (2011) once it is adopted. Palaeontological and cultural / spiritual resources are not explicitly protected under the *Cultural Property Act* (2006), though they may be covered implicitly under the *Cultural Heritage Act* (2011), depending on their ethnological or scientific value.

Nevertheless, consideration of paleontological and cultural / spiritual resources is specified within the Guidelines for this EIS (CEA Agency and DOEC 2012). Therefore, for the purpose of the EIS, Historic and Cultural Resources are considered to include four broad categories:

- Archaeological sites and materials (such as remains of campsites and / or stone tools more than 50-75 years old);
- Cultural / spiritual sites (such as Aboriginal and non-Aboriginal burial sites and other sacred places);
- Paleontological sites and materials (fossils); and,
- Architectural resources (such as historic buildings and properties).

Archaeological sites identified during field research in the Province of Québec are recorded, inventoried and assigned numbers under the Borden System (the Canadian registry for archaeological remains). As stated in Article 68 of the *Cultural Heritage Act* (2011), all archeological investigations require a permit from the MCCCF. Any sites or artifacts that are uncovered must be recorded and registered with the MCCCF. These finding are inventoried in the *Inventaire des sites archéologiques du Québec* (ISAQ).

Examples of contemporary cultural and spiritual sites include evidence of campsites, tilts, or remains suggestive of hunting, fishing or trapping locations, as well as burial sites and locations of religious and spiritual significance. Such sites may or may not be assigned numbers under the Borden System. There are linkages between Historic and Cultural Resources and the Current Use of Lands and Resources for Traditional Purposes by Aboriginal Persons (Chapter 22), and Other Current Use of Lands and Resources included in this EIS (Chapter 23). Through the consultations and literature review conducted for this assessment, no spiritual or cultural sites were identified in the Pointe-Noire industrial area.

A palaeontological resource is defined as a construct, structure, or work of nature consisting of or being evidence of prehistoric multicellular organisms and paleontological resources that are designated by regulation. These resources are important for their historic, cultural, spiritual, and scientific value. Only sedimentary rocks have potential for paleontological resources (i.e., fossils). Based on available surficial geology maps (Dredge 1983) and geology compilation maps for the Sept-Îles area (MRNF 2002), the bedrock in the PDA consists of gabbro, anorthosite and hypersthenes monozite with pitted, polished or striated surfaces. In the absence of sedimentary rocks, paleontological resources are not assessed in further detail in this EIS.

Structures or sites that are of architectural significance (*site patrimonial, immeuble patrimonial*) are protected under the Québec *Cultural Heritage Act* (2011). According to the *Répertoire du patrimoine culturel du Québec*, no architectural resources are located in the PDA, therefore, they are not assessed further in this EIS.

The CEA Agency requires consideration of the effect of any change in the environment caused by the project on physical and cultural heritage, as well as any structure, site or thing that is of historical, archaeological, paleontological or architectural significance (CEA Agency and DOEC 2012). In consideration of the Québec *Cultural Heritage Act* (2011), the CEAA (1992), and the EIS Guidelines, as well as existing knowledge of archaeological potential in the PDA, archaeological resources are the only type of historic and cultural resources assessed further in this EIS.

21.1.1 Approach to Assessment of Effects

21.1.1.1 Background Research

The process used to collect data on the Aboriginal presence in Sept-Îles and the Côte-Nord region was primarily based on archaeological and ethno-historical works pertaining to the study area and surrounding vicinity. Particular attention was paid to settlement and subsistence patterns and travel corridors associated with the populations in question. In addition, scientific literature was reviewed as well as directories including the *Inventaire des sites archéologiques du Québec,* which is managed by the MCCCF. Collected data was then used to identify the region's paleocultures. The review of the environmental characteristics of known sites guided the subsequent selection and mapping of areas of archaeological potential (Section 21.1.1.2).

Background research revealed no cultural/spiritual or architectural resources in the LSA. A review of the geology also precluded the presence of paleontological resources.

21.1.1.2 Archaeological Potential Mapping

Archaeological potential was mapped within the Pointe-Noire industrial area on the Marconi Peninsula. The purpose of this step of the methodology was to categorize the study area's geographic spaces and to identify spaces that might contain signs of historic or prehistoric human settlement.

The process assumes that the presence of an archaeological site in a given location is not due to chance. Rather, it is the result of a logical process stemming from a series of choices and decisions by individuals and cultural groups based on their perceptions of the environment and their response to various social, cultural, and economic factors. This research process also assumes that it is possible to delineate areas where the search for such evidence is both a rational and practical undertaking. It is understood that settlements and various human activities may have been present in the remainder of the territory, however the chance of discovering them is seen as slim and primarily a matter of chance.

The identification of areas of archaeological potential considered changes in the landscape and ecosystems that may have occurred since the last ice age and which may have caused human populations to adapt their methods of subsistence accordingly. The study of archaeological potential also considered the nomadic lifestyle of the human groups possibly present in the territory throughout most of prehistory. Their subsistence economies were founded on the opportunistic exploitation of environmental resources. These factors greatly influence the locations and kinds of archaeological sites that could be discovered. The study of topographic maps (1:50,000 and 1:250,000) provided the main means of understanding landscape organization or structure. Regional and local topology, sedimentology and hydrography were analyzed to identify areas that presented logical and strategic sites for settlement, gathering and travel.

Topographic criteria pertaining to the sites' morphological and topographic features were also assessed. Review of aerial photographs (1:15,000) served to identify further details of landforms with good qualities for settlement and any visible recent developments that may have affected real possibilities of finding ruins.

The mapping exercise was followed up by a survey of the 8 zones of archaeological potential was carried out in July, 2012. The field survey of the sites revealed no archaeological resources. The archaeological survey report is not yet published.

21.1.2 Issues

Alderon has engaged and consulted with a variety of stakeholders, Aboriginal groups, and members of the public throughout the EA process, and is committed to being responsive to questions and concerns that arise. No issues related to Historic and Cultural Resources were reported by stakeholders.

21.2 Environmental Assessment Boundaries

21.2.1 Spatial Boundaries

In addition to the PDA, spatial boundaries for the environmental effects assessment of Historic and Cultural Resources are defined below.

Local Study Area

The LSA is the maximum area within which environmental effects related to the Kami Terminal can be predicted or measured with a reasonable degree of accuracy and confidence. The LSA consists of the PDA, which will include the precise area to be affected by Kami Terminal activities and physical works, plus a 200 m buffer to account for offsite indirect effects (Figure 21.1). The LSA is the area within which archeological potential mapping was completed (see Figure 21.2).

Regional Study Area

Although Historic and Cultural Resources are stationary, and any immediate effects of the Kami Terminal on them would not extend beyond the PDA, their assessment nevertheless includes an RSA. The RSA takes into account the overall cultural history of the region in which the PDA is located and how any Historic and Cultural Resources that may be affected by the Kami Terminal relate to this larger regional context (Figure 21.3). The RSA is based on previously investigated locations in the general area of Sept-Îles. Review of data pertaining to the RSA enables prediction of the nature and extent of Historic and Cultural Resources which may be present within the PDA. Moreover, findings from the RSA provide a background and context within which the potential of the PDA as a whole for Historic and Cultural Resources may be assessed.

Figure 21.1 Local Study Area

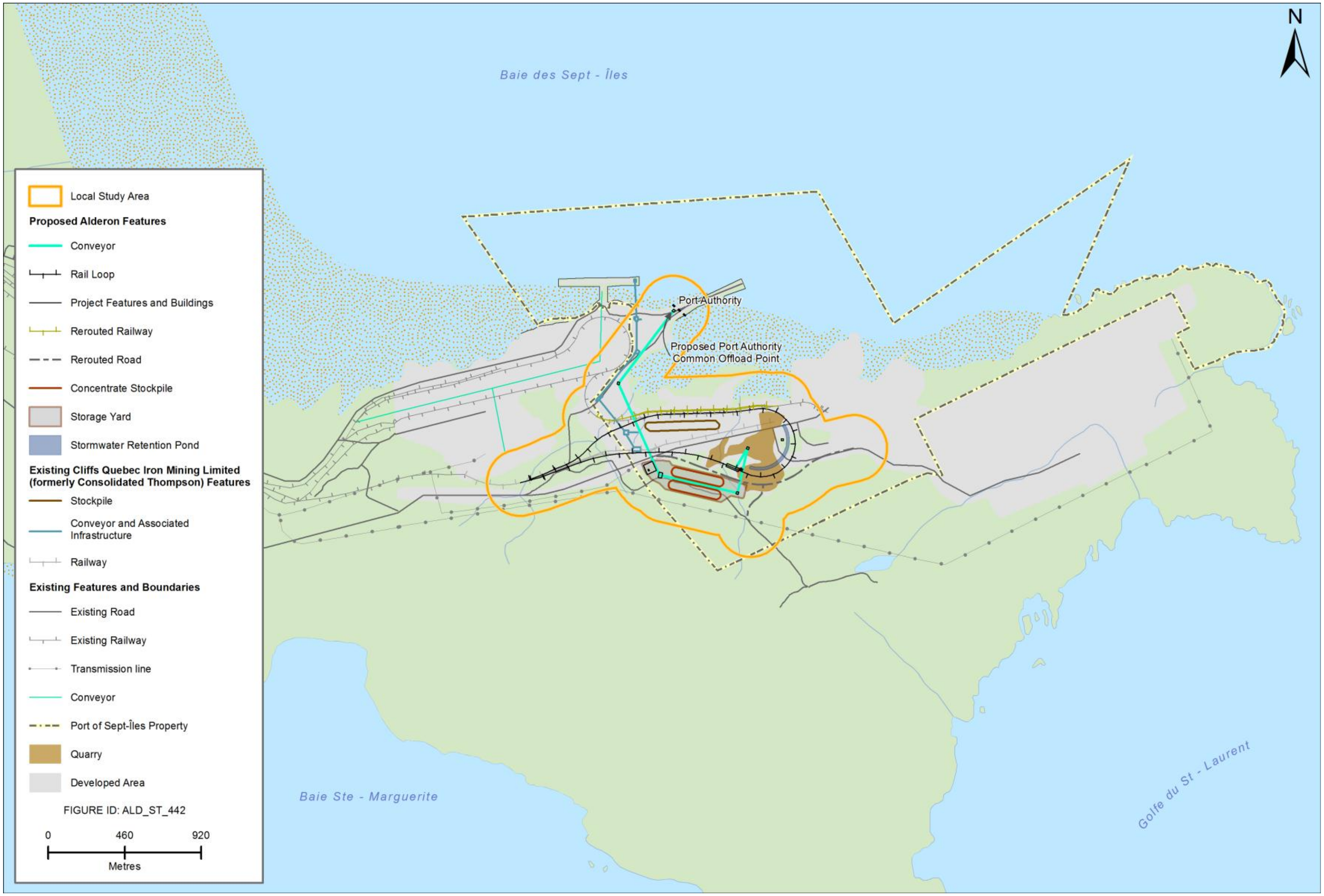


Figure 21.2 Zones of Archeological Potential

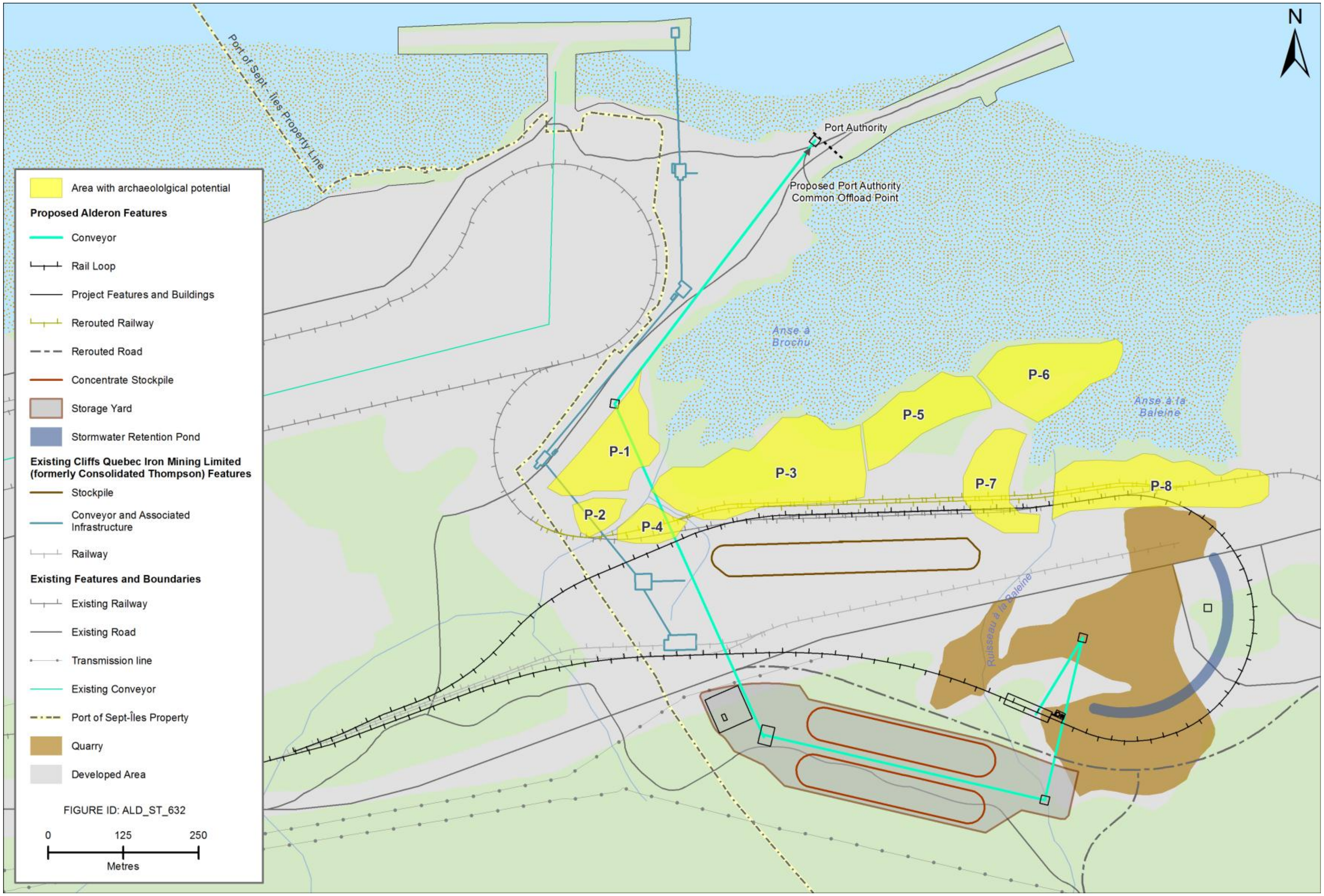
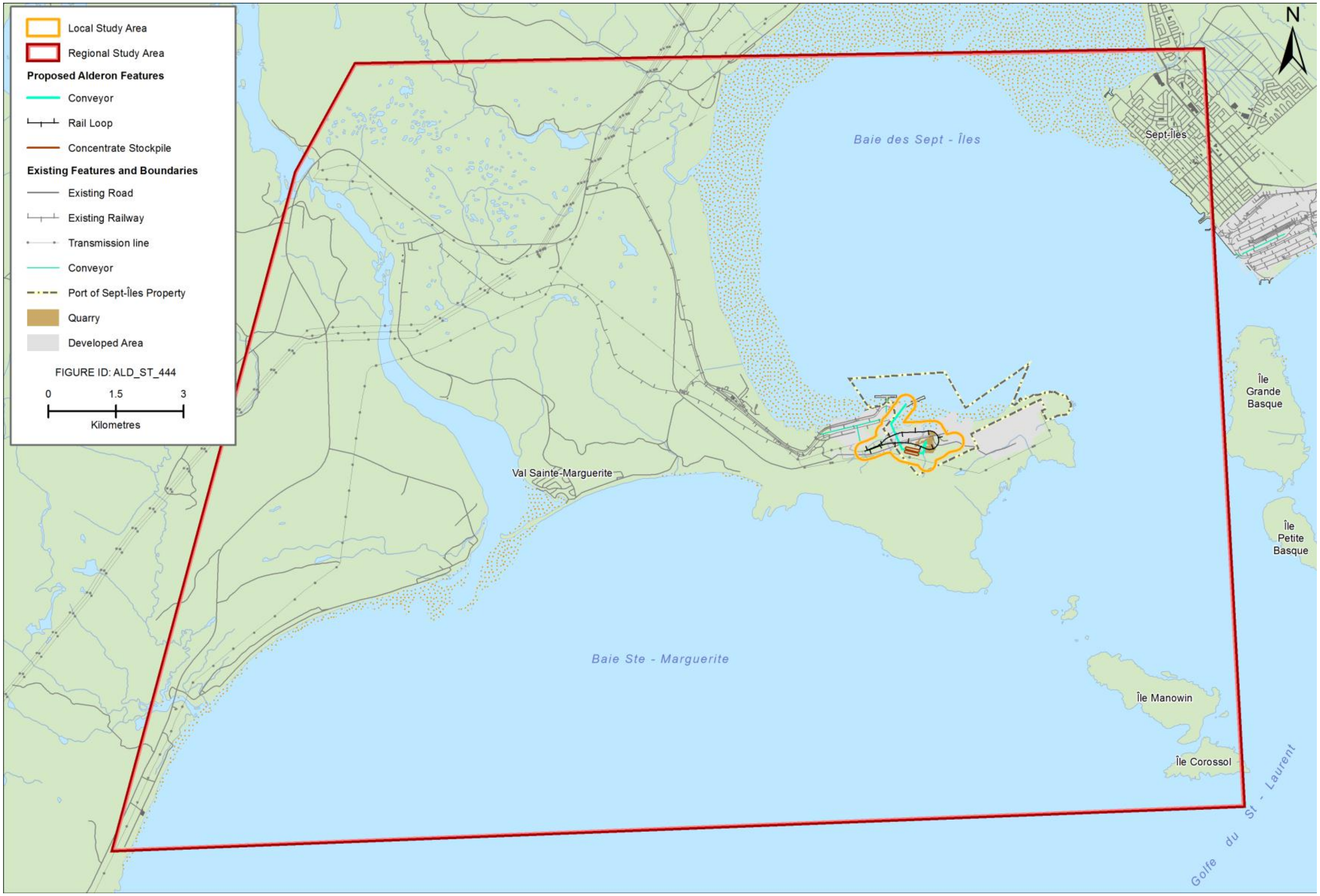


Figure 21.3 Regional Study Area



21.2.2 Temporal Boundaries

The temporal boundaries for the assessment of potential environmental effects of the Kami Terminal on Historic and Cultural Resources include the Kami Terminal phases of construction (approximately two years), operation and maintenance (approximately 17 years), and decommissioning / reclamation (approximately one year).

21.2.3 Administrative Boundaries

In the Province of Québec, Historic and Cultural Resources are currently protected under the provincial *Cultural Property Act* (2006) administered by the MCCCF. The *Cultural Property Act* defines Cultural Property as “a work of art, a historic property, a historic monument or site, an archaeological property or site or a cinematographic, audiovisual, photographic, radio or television work” (*Éditeur officiel du Québec* 2006, Ch. I, S. 1). In October 2012, this Act will be replaced by the *Cultural Heritage Act,* which was sanctioned in 2011. The new Act defines Cultural Heritage as resources consisting of “historic figures, sites and events, heritage documents, immovable, objects and sites, heritage cultural landscapes, and intangible heritage” (Québec Official Publisher 2010 Ch. I, S.1).

Archaeological resources in Québec are protected by the *Cultural Heritage Act (2011)*. The purpose of the Act is to ensure the preservation and enhancement of the most representative and best preserved heritage resources in Québec. The MCCCF is responsible for its enforcement. This Act provides for the protection of archaeological sites as well as other cultural resources. Under section 68 of the Act, a permit is required to perform archaeological assessment or excavation. Moreover, anyone who discovers an archaeological resource, whether during archaeological excavations, fortuitously or during construction work, must report the find to the Minister without delay (*Cultural Heritage Act* 2011, s. 74).

21.3 Establishing Standards or Thresholds for Determining the Significance of Environmental Effects

The likely effects of the Kami Terminal on Historic and Cultural Resources are described using the following attributes, which are based on standard environmental assessment practice and the EIS Guidelines. These descriptors and the definitions for each of the associated ratings are provided below.

- **Direction:**
  - Beneficial: discovery of a previously unrecorded Historic and Cultural Resource for research and information collection;
  - Neutral: no effect on Historic and Cultural Resources or on known site of cultural historical importance; or,
  - Adverse: loss or disturbance of Historic and Cultural Resources.

- **Magnitude:**
  - No Effect: no likely effect on Historic and Cultural Resources;
  - Low: disturbance of Historic and Cultural Resources but with prior retrieval of the resource and associated information, and with all necessary regulatory approvals;
  - Moderate: disturbance or loss of all or a portion of a Historic and Cultural Resource, with retrieval of a portion of the resource and its associated information, or a direct effect on a known Historic and Cultural Resource, which is of interest and concern to the associated community, but which does not reduce the overall integrity and cultural value of the site; or,
  - High: disturbance or loss of a Historic and Cultural Resource, with no retrieval of the resource and its associated information, or a direct effect on a Historic and Cultural Resource, which reduces the overall integrity and cultural value of the site.
- **Geographic Extent:**
  - Local: any effect will be limited to the LSA; or,
  - Regional: effects may extend beyond the LSA.
- **Frequency:**
  - Intermittent: effect will occur at various, intermittent times; or,
  - Continuous: effect will occur continuously.
- **Duration**
  - Temporary: effect will occur but measures are taken to salvage and retrieve information from the resources, and/or move / rehabilitate the site; or,
  - Permanent: effect will be permanent and irreversible.
- **Ecological Context:**
  - Undisturbed: Area relatively or not adversely affected by human activity; or,
  - Disturbed or Developed: Area has been substantially previously disturbed by human development or human development is still present.

The significance criteria described below are based on changes in measurable parameters which are described in Section 21.4.

A *significant adverse residual environmental effect* on Historic and Cultural Resources may be defined as an environmental effect related to the Kami Terminal that results in the loss or disturbance of a known Historic or Cultural Resource without the appropriate documentation, or salvage and retrieval of the material culture and the information it contains, and without prior approval from the regulatory agency.

An adverse environmental effect that does not meet the above definition is rated as not significant.

21.4 Potential Project-VEC Interactions

Each Kami Terminal activity and/or physical work is listed in Table 21.1. Each interaction is ranked as 0, 1, or 2 based on the level of interaction each activity or physical work could have with Historic and Cultural Resources.

Historic and Cultural Resources are terrestrial, being located on or immediately beneath the ground surface. Because these resources are static, finite, and do not self-replicate, any Kami Terminal interactions will be restricted to physical works that are associated with first-time ground disturbance. Kami Terminal activities on already-disturbed ground surfaces are unlikely to interact further with any Historic and Cultural Resources.

Interactions ranked as 2 in Table 21.1 are those associated with Kami Terminal activities that involve first-time ground disturbance and are primarily associated with the construction phase.

Kami Terminal activities with interactions ranked as 0 are those associated with subsequent operation and maintenance, or decommissioning and reclamation, which either involve no physical disturbance on the ground surface, or which occur on already-disturbed ground. In consideration of the nature of the interactions, the potential environmental effects of all Kami Terminal activities and physical works ranked as 0 are rated as not significant and are not considered further in the assessment.

Table 21.1 Potential Environmental Effects of Kami Terminal to the Historic and Cultural Resources

Kami Terminal Activities and Physical Works	Potential Environmental Effects
	Disturbance or Loss of Archaeological Sites or Materials
Construction	
Site Preparation (incl. clearing, excavation, blasting, material haulage, grading, removal of overburden and stockpiling)	2
Construction of Concentrate Unloading, Stacking, Storage, and Reclaiming Facilities (rail dumper building, rail car dumper and hopper, train positioner transfer houses, conveyors, dust collector, maintenance building, substation, security fencing, sanitation system)	2
Construction of Railway Loop	2
Access Roads and Waterline Realignment	2
Construction of Stream Diversion	2
Onsite Vehicle / Equipment Operation	0
Waste Management	0
Transportation of Personnel and Goods to Site	0
Expenditures	0
Employment	0

Kami Terminal Activities and Physical Works	Potential Environmental Effects: Disturbance or Loss of Archaeological Sites or Materials
Operation and Maintenance	
Rail Transport	0
Concentrate Handling and Stockpiling	0
Water Collection, Treatment and Discharge	0
Onsite Vehicle / Equipment Operation and Maintenance	0
Waste Management	0
Transportation of Personnel and Goods to Site	0
Expenditures	0
Employment	0
Decommissioning and Reclamation	
Site clean-up	0
Accidents and Malfunctions	
Train Derailment	2
Forest Fire	2
Stormwater Retention Pond Breach	2

KEY
0 No interaction
1 Interaction occurs; however, based on past experience, the resulting effect can be managed to acceptable levels through standard operating practices and/or through the application of best management or codified practices. No further assessment is warranted.
2 Interaction occurs, and resulting effect may exceed acceptable levels without implementation of specified mitigation. Further assessment is warranted.

Selection of Environmental Effects and Measurable Parameters

The environmental assessment of Historic and Cultural Resources is focused on the loss or disturbance of historic and cultural sites. The measurable parameter used for the assessment of this environmental effect and the rationale for its selection are both indicated in Table 21.2.

Table 21.2 Measurable Parameters for Historic and Cultural Resources

Environmental Effect	Measurable Parameter	Rationale for Selection of the Measurable Parameter
Loss or disturbance of historic and cultural sites.	Number of known historic and cultural sites that will be lost or disturbed.	Loss of known sites would be an adverse effect on Historic and Cultural Resources. The number of historic and cultural sites provides a measurable parameter that allows this environmental effect to be quantified.

21.5 Existing Environment

21.5.1 Human History of the Regional Study Area

Archaeological sites and materials have been identified throughout the majority of Québec, including the Côte-Nord region and Sept-Îles, especially along waterways and shorelines.

The first known incidences of Aboriginal settlement along Québec's North Shore took place around 8,200 BP (Pintal 1998). The occupation of the Côte-Nord can be broken down into four distinct periods (Chevrier 1977). These are: the Archaic (8,500 to 2,500 BP), the Paleo-Eskimo Interval (2,800 to 1,500 BP), the Woodland (3,000 to 400 BP) and the Historic Period (500 BP to 1950 AD).

The Archaic Period is characterized by the presence of Aboriginal groups that used lithic implements and followed a seasonal migration cycle ranging from the Strait of Belle Isle coast to Hamilton Inlet, Labrador. Newfoundland cherts and polished tools have been found in the lithic assemblages of this time. Around 6,500 BP, settlement increased along the Lower North Shore with more permanent sites being established. This period was marked by a milder climate. In the middle of this period, groups pushed deeper inland from the shores of the St. Lawrence and the Labrador Coast, reaching the Caniapiscau region and beyond. New lithic materials from Labrador and Newfoundland were introduced into the production of tools such as Ramah chert associated with the Rattler's Bight Complex. However, from 5,000 to 3,500 BP the area lost popularity as groups expanded their territories.

The short period from 2,800 to 1,500 BP is known as the Paleo-Eskimo Interval. Starting from 4,000 BP Pre-Dorset groups from the eastern Canadian Arctic and Greenland and moved down the Labrador and Newfoundland coasts eventually reaching the north shore of the St. Lawrence Estuary by 2,800 BP. The climate of the St. Lawrence estuary at this time was colder than it had been in a long time. Pre-Dorset populations were gradually replaced by Dorset groups around 2,200 BP who arrived from the Canadian Central Arctic and descended along the Labrador coast. Early Inuit peoples were not the only groups to inhabit the area: Aboriginals were still present, which may have given rise to competition between groups. It should be noted that Paleo-Eskimo sites are presently known only on the Lower North Shore. No sites of this period have yet been recorded as far west as Sept-Îles.

The departure of the Dorset peoples by 1,500 BP relieved some of the pressure felt by the Aboriginal populations of the Lower North Shore. This period is known as the Woodland Period. The most populous group at the time were likely the Algonquin though there is evidence that Iroquoian settlement expanded into the area from present-day New York State as far to the east as Île du Havre de Mingan where Iroquois sites have been uncovered along with ceramics dated to approximately 950 to 650 BP (Chapdelaine 1986). Similar ceramic artefacts have also been found on the North Shore of the St. Lawrence River between the rivières Escoumins and the Outardes as well as on the left bank of the rivière Manicouagan. The start of the historic period (*ca*. 500 BP to 1950 AD) began with the first contact between the Europeans and Native peoples. Though Basque fishermen were known to have had contact earlier, it was Jacques Cartier who produced the first written report on the presence of Aboriginals on the North Shore during his initial voyage in 1534.

Early settlement of the North Shore by Europeans was marked by the fur trade. In 1599, the first trading post in the region was set up at Tadoussac, which had long served as a meeting point for all Aborginal peoples. Fur trade activities penetrated eastward to the Sept-Îles region with the creation of the Sept-Îles trading post in 1661, followed by another along the rivière Moisie in 1679. These two posts were eventually rented to different fur traders, such as the Hudson Bay Company.

Increased contact with Euro-Canadian settlements led to changes in traditional life ways, as the need to hunt or trap for fur came into conflict with the need to hunt for subsistence. Hunting for fur took precedence over hunting for food. The fur trade generated household income thereby reducing the economic interdependence of multifamily groups. It also altered household dynamics and the division of labour within families as women and children came to depend on male heads of households. It also led to the replacement of traditional tools with European items, further boosting the trade's importance to the Aboriginal peoples. As a result of increased hunting and trapping activities, more permanent settlement among Aboriginal families and increasing colonization by Euro-Canadians, the territory stretching from the coast to the interior saw depletion of furbearing animals and later of fishing resources. The oral traditions of the Innu make reference to this slow depletion of their coastal resources and loss of their summer campgrounds, which companies, private clubs, and settlers increasingly occupied.

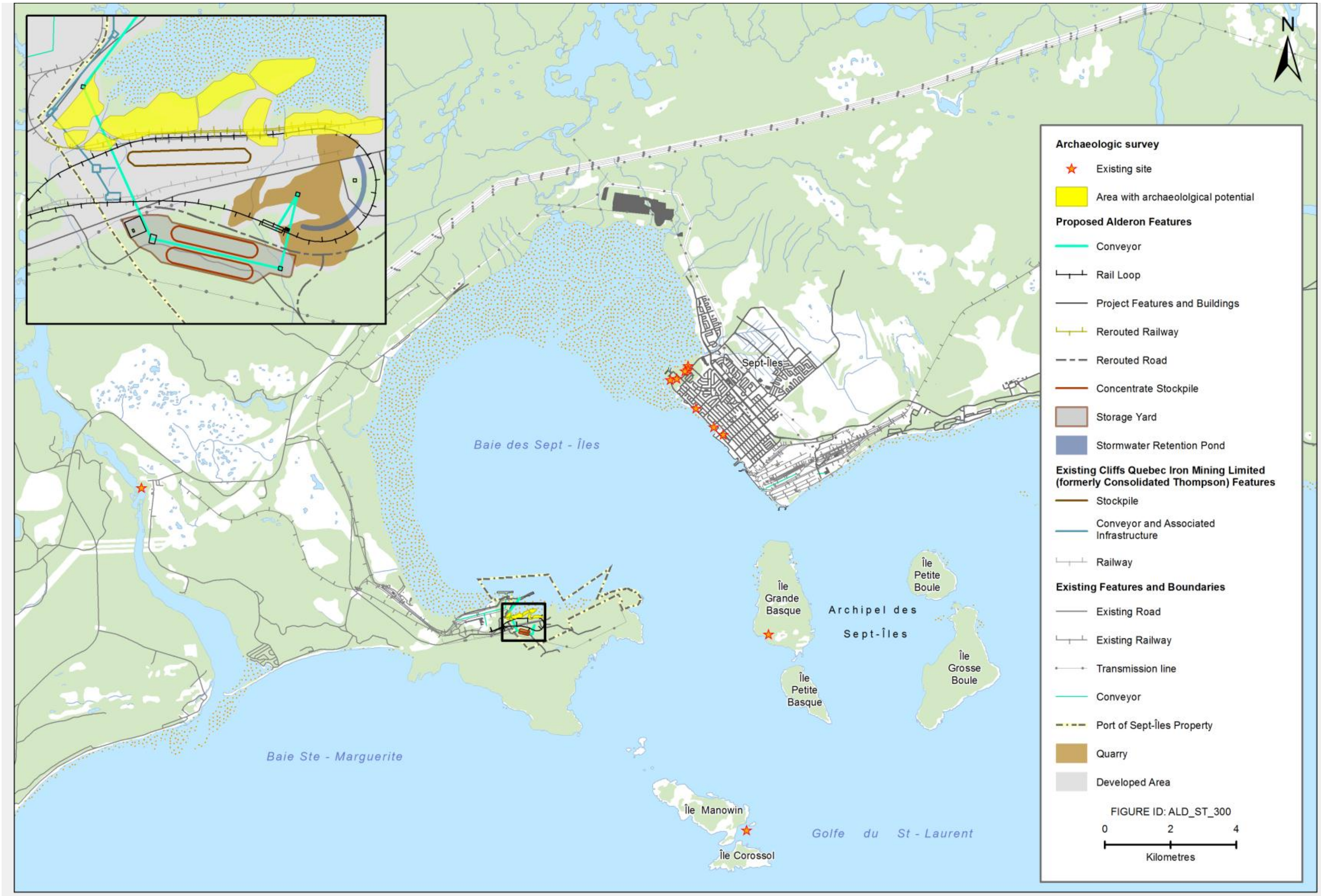
With the collapse of the fur trade by the mid-19th century, the Innu had few options to earn incomes. While some continued to pursue traditional hunting and trapping activities, others took work in the fisheries and in forestry. Opportunities of these types were few. The early 20th century saw the establishment of Indian Reserves in the area and consequently increasing of Aboriginal communities becoming sedentary. The Innu reserve of Uashat was established in 1906 followed by Mani-Utenam in 1949.

21.5.2 Archaeological Resources in the Regional Study Area

The *Inventaire des sites archéologiques du Québec* reports the existence of 14 sites of archaeological significance within the RSA (Figure 21.4). These sites are located on the other side of the baie des Sept-Îles from the PDA; along the coast, on Île Grand Basque; in the marine environment off the south east coast of Île Manowin; and along the rivière Sainte-Marguerite. Several of these sites are related to pre-Contact Aboriginal occupations of indeterminate date.

Vieux Poste, an old trading post and an ancient gathering place for various Aboriginal groups, including Pre-Contact Aboriginals and, Historic Naskapi / Innu communities (1500 to 1899). Euro-Canadian Historic and Cultural Resources dating between 1608 and 1950 have also been discovered there.

Figure 21.4 Archaeological Resources around Sept-Îles



Additional Euro-Canadian archaeological sites include:

- The Corossol shipwreck (1608-1759);
- Hudson Bay Company Post II (1880- 1899 and 1900-1950);
- Two unnamed Hudson Bay Company sites: (1800-1899 and 1900-1950) and (1900-1950);
- A Protestant cemetery (1800-1899);
- The Clarke City pulpwood factory (1900-1950); and,
- Two residential areas of Uashat Reserve (1608-1759 and 1900-1950, respectively).

21.5.3 Archaeological Resources in the Local Study Area

According to records in the *Inventaire des sites archéologiques du Québec*, there are currently no known archaeological sites in the LSA. Nonetheless, 8 zones of archeological potential exist within the Kami Terminal LSA (Figure 21.2). These eight sites of archeological potential may contain archaeological remains from the Pre-Contact or Historic periods. The archaeological potential of the sites is based upon the following conditions that are particular to the LSA:

- Presence of a coastal marine environment and freshwater streams;
- Location of the LSA within the landscape structure;
- Change in structure over time; and
- The level of habitability of the landform features.

The shape and surface integrity of these sites of archeological potential was assessed based on aerial photographs and Google Earth coverage from 2006. Sites P-1, P-2, P-3, and P-7 appear to contain forested sections and cleared strips that are undeveloped. Site P-4 is cleared or undeveloped and the soil may be disturbed. Sites P-5, P-6, and P-8 appear to be entirely covered in forest. Other human activities have previously disturbed the forest cover and ground on and near the site including the construction of the chemin de la Pointe-Noire, logging activities, and the establishment of a hydroelectric corridor. Industrial activities in and near the LSA include the existing Thompson Consolidated rail line, conveyor, and associated infrastructure and the Aluminerie Alouette aluminum smelter to the east of the site.

When archaeological potential mapping is correlated with the PDA, the areas of highest potential for archaeological resources are the portions of the Kami Terminal adjacent to the baie des Sept-Îles, namely the proposed conveyor line and rerouted rail loop. A survey of the 8 zones of archaeological potential carried out in July, 2012, revealed no archaeological resources in these zones.

21.6 Assessment of Project-related Environmental Effects

Any activities that disturb the existing ground cover may adversely affect Historic and Cultural Resources. Alterations to the landscape and increased human activity resulting from improved access to the area also increase the likelihood that environmental effects will occur. The Kami Terminal activities listed in Table 21.1 with interactions ranked as 2 have a potential environmental effect on Historic and Cultural Resources because of the possibility of loss or disturbance of sites.

21.6.1 Construction

The following activities and physical works during the construction phase of the Kami Terminal will cause ground disturbance, with the potential to result in the loss or disturbance of archaeological resources (Table 21.3):

- Site preparation (i.e., clearing, excavation, blasting, material haulage, grading, removal of overburden, and stockpiling);
- Construction of concentrate unloading, stacking, storage, and reclaiming facilities (i.e., rail dumper building, rail car dumper and hopper, train positioner transfer houses, conveyors, dust collector, maintenance building, substation, security fencing, sanitation system);
- Construction of railway loop;
- Access roads and waterline realignment; and,
- Construction of stream diversion.

Within the LSA, there are no archaeological sites registered with the MCCCF and no archaeological or cultural / spiritual sites have been identified through the field survey, research or consultation. Any additional and relevant information that is obtained through such consultation activities will be considered in on-going Kami Terminal planning, as it becomes available. Therefore, considering the above information, the construction of the Kami Terminal will not have an effect on, or physically disturb, any known sites of archeological importance.

Mitigation of Project Environmental Effects

Although no Historic and Cultural Resources have been identified within the LSA, measures will be taken to mitigate adverse environmental effects in the event of an unexpected discovery. Preparation and implementation of an EPP will take place, which will cover the procedures to follow in the event of accidental discovery of Historic and Cultural Resources. The orientation and training programs provided to construction personnel will include briefings related to Historic and Cultural Resources. In the event that undiscovered Historic and Cultural Resources are identified as a result of Kami Terminal activities, Alderon will inform the MCCCF without delay and implement an expert assessment in accordance with provincial guidelines. No further activity would proceed until an appropriate approach is approved by MCCCF.

21.6.2 Operations and Maintenance

Kami Terminal activities on already-disturbed ground surfaces are unlikely to interact further with any Historic and Cultural Resources. Activities associated with the Operations and Maintenance phase will take place on ground that will have been previously disturbed either during the Construction phase or by earlier projects on the site. Thus, no interaction is anticipated for the operations and maintenance phase.

Mitigation of Project Environmental Effects

Although no Historic and Cultural Resources have been identified within the LSA, measures will be taken to mitigate adverse environmental effects in the event of an unexpected discovery. Preparation and implementation of an EPP will take place, which will cover the procedures to follow in the event of accidental discovery of Historic and Cultural Resources.

21.6.3 Decommissioning and Reclamation

Kami Terminal activities on already-disturbed ground surfaces are unlikely to interact further with any Historic and Cultural Resources. At the end of operations at the Kami Terminal, the site facilities will be turned over to the Port of Sept-Îles for their use. Decommissioning activities will therefore be minimal and will likely occur on ground that has been previously disturbed. Thus, no interaction is anticipated for decommissioning and reclamation phase.

21.6.4 Summary of Project Residual Effects

The residual environmental effects of the Kami Terminal on Historic and Cultural Resources are summarized in Table 21.3. The residual environmental effects on Historic and Cultural Resources for construction and operation of the Kami Terminal are characterized by the following descriptors: direction; magnitude; geographic extent; duration and frequency; reversibility; ecological/socio-economic context, significance, and prediction confidence.

Table 21.3 Summary of Residual Environmental Effects of Kami Terminal to Historic and Cultural Resources

Kami Terminal Phase	Mitigation / Compensation Measures	Direction	Magnitude	Geographic Extent	Duration	Frequency	Environmental or Socio-Economic Context	Significance	Prediction Confidence	Recommended Follow-up and Monitoring
Disturbance or loss of archaeological sites or materials										
Construction	• Implement EPP in the event of an unexpected discovery.	A	N/L	S	P	S	U/D	N	H	• Adhere to all federal and provincial archaeological legislation. • On-site monitoring for compliance with the EPP.
Operation and Maintenance		A	N/L	S	P	S	U/D	N	H	
Decommissioning and Reclamation		A	N/L	S	P	S	U/D	N	H	

KEY

Direction:
- P Positive.
- A Adverse.

Magnitude:
- N No Effect:: no likely effect
- L Low: disturbance but with prior retrieval of the resource and associated information, and with all necessary regulatory approvals.
- M Moderate disturbance or loss of all or a portion, with retrieval of a portion of the resource and its associated information, or a direct effect on a known Historic and Cultural Resource, which is of interest and concern to the associated community, but which does not reduce the overall integrity and cultural value of the site.
- H High: disturbance or loss, with no retrieval of the resource and its associated information, or a direct effect on a Historic and Cultural Resource, which reduces the overall integrity and cultural value of the site.

Geographic Extent:
- S Site – including PDA and 200 m beyond.
- L Local: within the LSA.
- R Regional: within the RSA.

Duration:
- ST Short term.
- MT Medium term.
- LT Long term.
- P Permanent – will not change back to original condition.

Frequency:
- O Occasionally, once per month or less.
- S Occurs sporadically at irregular intervals.
- R Occurs on a regular basis and at regular intervals.
- C Continuous.

Environmental or Socio-economic Context:
- U Undisturbed: Area relatively or not adversely affected by human activity.
- D Developed: Area has been substantially previously disturbed by human development or human development is still present.
- N/A Not Applicable.

Significance:
- S Significant.
- N Not Significant.

Prediction Confidence:
Based on scientific information, statistical analysis, and effectiveness of mitigation or effects management measure.
- L Low level of confidence.
- M Moderate level of confidence.
- H High level of confidence.

21.7 Assessment of Cumulative Effects

Evidence suggests that the Sept-Îles region was inhabited relatively late compared to other stretches of the Quebec's north shore with the earliest evidence of human presence dated to around 8,200 BP. Following that, the region was inhabited by Pre-Dorset and Dorset peoples who eventually moved on, being replaced by groups of Algonquin and Iroquois peoples, who left behind evidence in the form of ceramic shards. The most detailed accounts of contact between Europeans and local Aboriginal groups occurred in the mid-16th century starting when Jacques Cartier met the Montagnais (Innu). Several archaeological sites in the Sept-Îles region such as the wreck of the Corossol sailing vessel and tools and buildings at the site of Vieux Poste attest to the increasing presence of European-Canadians in the area and the establishment of missions and fur-trading posts.

All known sites of archaeological interest in the Sept-Îles region are located outside the LSA, with a high concentration located in Uashat and Sept-Îles specifically (see Figure 21.4). Under current legislation, archeological resources that are discovered must be treated in accordance with MCCCF guidelines, which require the assessment and intervention of a recognized archaeologist and result in either the removal of the archaeological resource or the protection of the archaeological site to ensure the integrity of the resource (*Cultural Property Act* 2006). This legislation has been in place since 1982. Assuming any archaeological resources discovered after this date followed these guidelines, the resource may be considered to be in a healthy, stable condition. Potential resources that are yet undiscovered and have not yet been disturbed may also be considered to be in a healthy state. The introduction of the Kami Terminal and its residual environmental effects are unlikely to change the existing condition of any Historic and Cultural Resources in the region. This determination is based on the absence of any known archaeological resources within the LSA and the fact that much of the land within the LSA has been previously disturbed. Furthermore, as the Kami Terminal will conform to both the *Cultural Property Act* (2006) and the *Cultural Heritage Act* (2011), any archaeological resources that are fortuitously discovered in the LSA will be managed in such a way to preserve the integrity of the resource.

The cumulative effects assessment considers the combined effects of the Kami Terminal with those resulting from on-going and reasonably foreseeable future infrastructure and projects at the Port of Sept-Îles (as per Section 4.8 of the Guidelines) that are likely to overlap in space and time with the Kami Terminal.

Any potential for cumulative effects would be limited to instances where the physical zones of disturbance of the Kami Terminal would overlap directly with those of other projects and activities that affect Historic and Cultural Resources.

All development activities in the province are subject to the Québec *Cultural Property Act*, and if carried out after October 2012, to the *Cultural Heritage Act*. As such, any new or on-going projects will be governed by routine application of the legislation related to archaeological resources, which serve to minimize any potential adverse effects on Historic and Cultural Resources. If anything, the cumulative effects might be positive, if a series of resources are discovered, recorded, and protected, thereby increasing knowledge of heritage resources.

Since each project is subject to this law and assuming that each project will respect the law, the combined effect of each project and the Kami Terminal is expected to be nil. The overall cumulative effect is therefore also expected to be nil.

Given that a significant adverse residual environmental effect on Historic and Cultural Resources has been defined as one in which an environmental effect related to the Kami terminal results in the loss or disturbance of a known Historic or Cultural Resource without the appropriate documentation, or salvage and retrieval of the material culture and the information it contains, and without prior approval from the regulatory agency, the cumulative effects of the Kami Terminal in combination with other projects and activities that have been or will be carried out will therefore not be significant. Potential Cumulative Effects to Historic and Cultural Resources are summarized in Table 21.4.

Table 21.4 Summary of Potential Cumulative Effects to Historic and Cultural Resources

<table>
<tr><th>VEC Existing Condition (Past & On-Going Activities)</th><td colspan="8">There is no record of Historic or Cultural Resources within the LSA.
8 zones of archeological potential have been identified within the LSA. Of these, 1 zone is cleared with soil disturbance; 3 zones are entirely forested; and 4 zones are mostly forested with cleared, undeveloped strips.
Historic and Cultural Resources have been recorded in the Region mainly around the baie des Sept-Îles, on the islands and near Uashat Reserve.</td></tr>
<tr><th>Kami Terminal Residual Environmental Effects</th><td colspan="8">Loss or disturbance to Historic and cultural Resources is not likely to occur as a result of the Kami Terminal.
An Environmental Protection Plan (EPP) will be prepared, and will include procedures to follow in the event of an accidental discovery of Historic and Cultural Resources.
No cumulative effects are expected.</td></tr>
<tr><th>Other Projects / Activities</th><th>Likely Effect Interaction (Y/N)</th><th colspan="6">Rationale</th><th>Cumulative Effects</th></tr>
<tr><td>Pointe-Noire Port Expansion (Port of Sept-Îles)</td><td>N</td><td colspan="6">There is no overlap between this project and the physical footprint of the Kami Terminal.</td><td>N/A</td></tr>
<tr><td>CFA and QNS&L</td><td>N</td><td colspan="6">There is no overlap between this project and the physical footprint of the Kami Terminal.</td><td>N/A</td></tr>
<tr><td>Alouette Aluminum Smelter (Aluminerie Alouette)</td><td>N</td><td colspan="6">There is no overlap between this project and the physical footprint of the Kami Terminal.</td><td>N/A</td></tr>
<tr><td>Second Port-Cartier Pellet Plant (ArcelorMittal)</td><td>N</td><td colspan="6">There is no overlap between this project and the physical footprint of the Kami Terminal.</td><td>N/A</td></tr>
<tr><td>Bloom Pointe-Noire Terminal (Cliffs Resources)</td><td>N</td><td colspan="6">There is no overlap between this project and the physical footprint of the Kami Terminal.</td><td>N/A</td></tr>
<tr><td>Arnaud Apatite-Magnetite mine (Mine Arnaud)</td><td>N</td><td colspan="6">There is no overlap between this project and the physical footprint of the Kami Terminal.</td><td>N/A</td></tr>
<tr><th rowspan="2">Cumulative Effects Summary (Kami Terminal + All Relevant Projects / Effects)</th><th>Direction</th><th>Magnitude</th><th>Geographic Extent</th><th>Duration</th><th>Frequency</th><th>Reversibility</th><th>Significance</th><th>Confidence</th></tr>
<tr><td>N/A</td><td>N/A</td><td>N/A</td><td>N/A</td><td>N/A</td><td>N/A</td><td>NS</td><td>N/A</td></tr>
<tr><td colspan="9">Other projects will not overlap the physical footprint of the Kami Terminal. Therefore there will be no cumulative effects to Historic and Cultural Resources resulting from other projects and activities in combination with the Kami Terminal. Furthermore, each project is subject to the Cultural Heritage Act and must therefore make provisions for surveying zones of archeological potential and recuperating artifacts that may be found. The adverse cumulative effect is, therefore, not significant.
Note: Environmental effects descriptors and their definitions are as used in the assessment of environmental effects related to the Kami Terminal (See Table 21.3).</td></tr>
</table>

21.8 Assessment of Accidents and Malfunctions

There are three potential accident or malfunction scenarios that could interact with Historic and Cultural Resources. These are:

- Train Derailment;
- Forest fire caused by the Kami Terminal; and,
- Stormwater Retention Pond Breach or Overflow.

In the unlikely event of any of these scenarios, loss or disturbance of Historic and Cultural Resources could result. The potential impact of these events is summarized in Table 21.5. The interactions are ranked as 2 and therefore are assessed in more detail.

Train derailments may result in the sudden deposition of materials (e.g., ore concentrate) and/or contaminants such as fuel on the ground or in water at stream crossings along the railways and the rail loop and in the baie des Sept-Îles during the operations and maintenance phase. Based on experience with other train derailments on the QNS&L, the reasonable worst-case is the loss of 60 to 75 cars. Trains at the Port of Sept-Îles will operate at a maximum speed of 15 mph and it is reasonable to expect any derailment will involve no more than 75 cars per incident. Fuel will be transported by rail from the Sept-Îles area to the Kami Terminal site during the operations and maintenance phase. In a worst case scenario, six tanks of diesel fuel may be derailed, leading to 180,000 gallons of diesel fuel being released.

Deposition of contaminants may compromise the scientific value of archaeological deposits and features. Deposition of materials will likely only affect surface-visible Historic and Cultural Resources. However, unidentified sites may be discovered and adversely affected during subsequent clean-up operations involving earth-moving equipment and consequent ground impacts.

A forest fire may present a potential risk to Historic and Cultural Resources located outside the surveyed areas. Forest fires would have an adverse effect on Resources located in the upper soil horizon and leaf litter. Those resources buried deeper may be impacted by clean-up measures. Forest fires also have the potential to cover a large geographic extent, which could increase the likelihood of disturbing resources not found during the archeological survey of zones of archeological potential or during the construction phase of the project. The Kami Terminal is located next to a forest area. Although unlikely, Kami Terminal activities involving the use of heat or flame could result in a fire. The extent and duration of a resulting fire would be dependent on response efforts and meteorological conditions.

A stormwater retention pond will be created in order to collect red water generated from precipitation water runoff from the iron ore stockpiles. Red water from the pond will undergo treatment before it is released into the ruisseau à la Baleine. However, in the unlikely event of a breach or overflow at the retention pond, red water could be released to the downstream environment during the operations and maintenance phase. In such an event, it is expected that TSS levels would exceed TSS criteria of the CCME *Canadian Water Quality Guidelines*, but it is also anticipated that the baie des Sept-Îles could rapidly recover.

The stormwater retention pond will be equipped with a liner in order to prevent red water from leaking into the underlying soils and migrating to the groundwater. There is a small possibility of a leak forming.

Effects of Accidents and Malfunctions

These three accident / malfunction scenarios have potential to cause environmental effects, which may lead to the loss or disturbance of Historic and Cultural Resources. The residual environmental effects of accidents and malfunctions related to the Kami Terminal are summarized in Table 21.5. Any of these scenarios that lead to environmental effects on Historic and Cultural Resources would likely be rare but would be expected to be adverse, permanent, and irreversible if they occurred.

The effects of a train derailment, associated materials or fluids spill, and subsequent cleanup on Historic and Cultural Resources would be low in magnitude and in geographic extent and restricted to the site itself.. Were a derailment to occur, then the site will be assessed and monitored for Historic and Cultural Resources prior to and during removal of spilled materials or contaminated soils, in accordance with the protocol outlined in Section 21.7.4 and the EPP

The effects of a forest fire caused by the Kami Terminal could range from low to high in magnitude and could range from local to regional in geographic extent. The significance of the environmental effects on Historic and Cultural Resources would be particularly high if the geographic extent were regional. A forest fire could potentially be caused during any of the three phases of the Kami Terminal. However, the types of activities that will take place at the Kami Terminal are not considered to be associated with important fire hazards. Although the risk of an accidental fire is very low, it is still a possibility given the proximity of human activity to the forested areas adjacent to the PDA. Nonetheless, because of continuous human presence at the port, a forest fire would likely be rapidly controlled. Emergency response measures will be integrated into the existing emergency response plans for the Port of Sept-Îles, the City of Sept-Îles, and the Sopfeu. Although of very low probability, a forest fire could be the source of residual adverse significant effects to archaeological resources.

The effects of a stormwater retention pond breach on Historic and Cultural Resources would be low in magnitude and local in geographic extent. Mitigation measures to limit the effects of a breach or overflow include building the pond to withstand a 100-year storm, carrying out continuous monitoring of the water level, maintaining the pond at minimum levels, and regularly inspecting the containment structures. If a breach occurs, the site will be assessed to determine whether any previously unknown Historic and Cultural Resources have been exposed. If this is the case, further assessment will be undertaken in accordance with the protocol outlined in Section 21.7.4 and the EPP.

To minimize the risks of a leak in the stormwater retention pond, the structure will be designed with a liner.

Table 21.5 Summary of Residual Environmental Effects to Historic and Cultural Resources – Accidents and Malfunctions

Accident/Malfunction	Mitigation/Compensation Measures	Residual Environmental Effects Characteristics									Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental or Socio-Economic Context	Significance	Prediction Confidence	
Disturbance or loss of archaeological sites or materials											
Train Derailment	• Implement EPP in the event of an unexpected discovery. • On-site response.	A	L	S	P	S	I	U/D	N	H	• Adhere to all federal and provincial archaeological legislation. • On-site monitoring for compliance with EPP.
Forest Fire		A	H	S-R	P	S	I	U/D	S	H	
Stormwater Retention Pond Breach		A	L	L/S	P	S	I	U/D	N	H	

Accident/Malfunction	Mitigation/Compensation Measures	Residual Environmental Effects Characteristics									Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental or Socio-Economic Context	Significance	Prediction Confidence	

KEY

Direction:
- P Positive.
- A Adverse.

Magnitude:
- N No Effect: no likely effect.
- L Low: disturbance but with prior retrieval of the resource and associated information, and with all necessary regulatory approvals.
- M Moderate disturbance or loss of all or a portion, with retrieval of a portion of the resource and its associated information, or a direct effect on a known Historic and Cultural Resource, which is of interest and concern to the associated community, but which does not reduce the overall integrity and cultural value of the site.
- H High: disturbance or loss, with no retrieval of the resource and its associated information, or a direct effect on a Historic and Cultural Resource, which reduces the overall integrity and cultural value of the site.

Geographic Extent:
Author to use quantitative measure; or
- S Site – including PDA and 200 m beyond;
- L Local: within the LSA;
- R Regional: within the RSA.

Duration:
Author to use quantitative measure; or
- ST Short term;
- MT Medium term;
- LT Long term;
- P Permanent – will not change back to original condition.

Frequency:
Author to use quantitative measure; or
- O Occasionally, once per month or less;
- S Occurs sporadically at irregular intervals;
- R Occurs on a regular basis and at regular intervals;
- C Continuous.

Reversibility:
- R Reversible.
- I Irreversible.

Environmental or Socio-economic Context:
- U Undisturbed: Area relatively or not adversely affected by human activity.
- D Developed: Area has been substantially previously disturbed by human development or human development is still present.
- N/A Not Applicable.

Significance:
- S Significant.
- N Not Significant.

Prediction Confidence:
Based on scientific information, statistical analysis, and effectiveness of mitigation or effects management measure.
- L Low level of confidence.
- M Moderate level of confidence.
- H High level of confidence.

21.9 Determination of Significance of Residual Adverse Environmental Effects

21.9.1 Determination of Significance of Project Effects

As described in this chapter, any potential adverse effects of the Kami Terminal on Historic and Cultural Resources would occur primarily, if not exclusively, as a result of first-time ground disturbance during construction of the Kami Terminal. Any such effects, if they did occur, would therefore be restricted to the PDA.

With the proposed mitigation and environmental protection measures in the event of an unexpected discovery, the environmental effect of loss or disturbance of Historic and Cultural Resources is predicted to be not significant. This determination has been made with a high level of confidence based on the absence of archaeological sites as determined during the field survey of zones of archaeological potential in July, 2012. Furthermore, any fortuitous discoveries that may occur after the survey will be subject to the protocol defined in Section 21.7.4, which will ensure the preservation and limit the loss of Historic and Cultural Resources.

21.9.2 Determination of Significance of Cumulative Effects

The characterization of the potential cumulative effects of the six on-going and foreseeable projects in the area is rated not significant owing to the obligation for every project to comply with the Québec *Cultural Heritage Act*. Compliance ensures that measures will be taken to survey the site and take necessary measures to either salvage or excavate Historic and Cultural Resources discovered during the construction phase. This determination has been made with a high level of confidence.

21.9.3 Determination of Significance of Effects Resulting from Accidents and Malfunctions

The residual adverse environmental effects of a train derailment on Historic and Cultural Resources during operation and maintenance are predicted to be not significant because environmental effects would be of low magnitude and geographically restricted to the site. The geographic extent of the environmental effects will be local; however, they may overlap with zones of archeological potential. The likelihood of such a malfunction affecting archeological resources is low since field surveys indicated no archaeological sites in the LSA.

The residual adverse environmental effects of a forest fire caused by the Kami Terminal on Historic and Cultural Resources during construction, operation and maintenance, or decommissioning and reclamation could be significant, particularly due to the potential high magnitude and potential regional geographic extent of the environmental effects. . Though the types of activities that will take place at the Kami Terminal are not considered to be associated with important fire hazards, there is still a possibility for an accidental forest fire given the proximity of human activity to the forested areas adjacent to the PDA. Nonetheless, because of continuous human presence at the port, a forest fire would likely be rapidly controlled. Emergency response measures will be integrated into the existing emergency response plans for the Port of Sept-Îles, the City of Sept-Îles, and the Sopfeu. The risk of significant residual adverse effects of a forest fire on archaeological resources increases with geographical extent of a fire. Although of very low probability, a forest fire could be the source of residual adverse significant effects to archaeological resources.

The residual adverse environmental effects of the stormwater retention pond breach or leak on Historic and Cultural Resources during operation and maintenance are predicted to be not significant because environmental effects would be of low magnitude and restricted to the site or LSA. Effects are predicted to be largely or entirely limited to low-potential terrain.

In the event of materials spills resulting from train derailment or a stormwater retention pond breach, the principal environmental effect would consist of ground disturbance during clean-up operations, which may be managed by routine implementation of an EPP.

21.9.4 Overall Residual Effects Conclusion

In summary, given the planned mitigation, and the analyses presented in this assessment, the effects related to disturbance or loss of archaeological sites or materials on Historic and Cultural Resources as a result of the construction, operation, and decommissioning of the Kami Terminal, including cumulative effects, are not likely to be significant. The effects of accidents and malfunctions are not likely to be significant, with the exception of the unlikely event of an accidental forest fire, which may be significant.

21.10 Follow-up and Monitoring

As outlined in the EIS Guidelines, monitoring and follow-up is a process designed to verify environmental effects predictions, to assess the effectiveness of strategies implemented to optimize outcomes of the Kami Terminal project, and implement adaptive management measures where necessary. Monitoring also helps ensure compliance with any commitments made and for any unforeseen effects to be identified and addressed.

If Historic and Cultural Resources are discovered inadvertently during construction or operation and maintenance of the Kami Terminal, follow-up will be conducted to monitor the condition of any new sites or materials discovered in accordance with federal and provincial legislation. As a result of this initiative and the other mitigation measures identified in Section 21.6.4, no additional monitoring and follow-up activities are recommended or proposed for this VEC.

21.11 Next Steps

No additional field work is required or recommended in 2012 to assess effects of the Kami Terminal on Historic and Cultural Resources.

21.12 Summary

Historic and Cultural Resources include sites of archeological, cultural / spiritual, paleontological and architectural importance. The PDA for the Kami Terminal contains no sites of cultural / spiritual, paleontological or architectural importance, and stakeholders have not identified any cultural or spiritual sites. There are no known archeological sites within the LSA and no archaeological resources were discovered during survey of eight zones of archaeological potential. Background research determined that there was little or no potential for paleontological or architectural resources within the LSA.

Based on the results of the background research and field survey, and the application of standard mitigation measures and EPP, significant adverse residual effects on Historic and Cultural Resources are not likely to result from the Kami Terminal. Furthermore, significant adverse cumulative effects are not likely because all projects are subject to the same standards for mitigation.

22.0 CURRENT USE OF LAND AND RESOURCES FOR TRADITIONAL PURPOSES BY ABORIGINAL PERSONS

22.1 VEC Definition and Rationale for Selection

This VEC chapter focuses on the Current Use of Land and Resources for Traditional Purposes by Aboriginal Persons, and assesses and evaluates the potential effects of the Project on such activities.

Aboriginal traditional uses are often considered to refer to the practices, traditions and customs that distinguish the distinctive culture of an Aboriginal group and which were practiced prior to European contact. These can include, for example, hunting and fishing for food and for ceremonial purposes. Section 35 of the Canadian *Constitution Act* (1982) recognizes and affirms the existing Aboriginal and treaty rights of the Indian, Inuit, and Métis peoples of Canada, the nature, scope and existence of which have been further defined through various legal decisions as well as through Land Claims Agreements (treaties) between governments and particular Aboriginal groups in specific areas. A number of Aboriginal communities and organizations claim rights and / or title to areas of Québec and Labrador. The land claims of these groups are at varying stages of progress, negotiation and settlement.

The Current Use of Land and Resources for Traditional Purposes by Aboriginal Persons, and the potential effects of the project on these activities, are a key aspect of and consideration in the EA, given the overall importance of these elements of the socioeconomic environment. This is further reflected in the *CEAA* definition of "environmental effect", which specifically includes: "(a) any change that the project may cause in the environment, ….[and] (b) any effect of any change referred to in paragraph (a) on … (iii) the current use of lands and resources for traditional purposes by aboriginal persons...".

As reflected in the title of this VEC, the associated environmental effects assessment focuses upon the *current* (existing) use of land and resources by Aboriginal persons for traditional purposes, and the potential changes to these activities that may occur (either directly or indirectly) as a result of the Kami Terminal. This analysis has focused on, and provides relevant information related to, each of the Aboriginal communities and organizations that have identified that they have an interest in the Kami Terminal and/or surrounding area through Alderon's Aboriginal engagement activities.

Alderon has carried out this assessment with a view to addressing the requirements of the EA process and as part of its on-going engagement processes with relevant Aboriginal groups, in keeping with its desire to identify, assess and to attempt to address potential effects on Aboriginal communities and their traditional activities.

This VEC also overlaps with other components of the natural and socioeconomic environments, including several of the VECs considered elsewhere in this assessment. Potential effects to these activities may result from, for example, changes in air quality and noise levels in an area

(Chapter 14), in the availability and quality of vegetation, wildlife, water, fish resources and/or other components of the biophysical environment (Chapters 15-20), cultural areas and resources (Chapter 21), effects on viewscapes and other human activities (Chapter 23), and others. These potential relationships and interactions are considered integrally within the environmental effects assessment for this VEC.

22.1.1 Approach to Assessment of Effects

The assessment of potential Kami Terminal effects on this VEC included a general approach of "overlaying" the proposed Kami Terminal components and activities (Chapter 2) with what is known about the nature and distribution of current Aboriginal land and resource use activities, in order to identify potential interactions and resulting effects on this VEC. In doing so, any potential interactions between the Kami Terminal and the VEC were identified and analyzed, the need for mitigation considered, and the significance of any residual effects determined and evaluated.

22.1.1.1 Methodology for Assessment of Baseline Conditions

Again, this assessment has focused upon the current (existing) use of land and resources by Aboriginal persons for traditional purposes. For the purposes of this assessment, "current" is generally defined as those which have been occurring over the past several decades (generally between about 1990 and the present), although as illustrated in the following sections the focus and content of the description of current uses has been influenced strongly by the availability (and age) of the existing and available information. A variety of information sources were used to understand and describe current land and resource use activities by the various Aboriginal groups under consideration.

As described in Chapter 10, Alderon has been making significant efforts to consult with each of the relevant Aboriginal communities and organizations in Québec and Labrador. This has included the ongoing provision of Project information, as well as offers of consultation agreements and associated funding to gather and provide information on current land and resource use, Aboriginal knowledge and community issues and concerns regarding the Project and its potential environmental effects, for consideration and incorporation into the EIS. Where Aboriginal organizations have chosen to participate in such initiatives, the information and insights obtained through these processes have been extremely valuable and were considered and incorporated throughout the EA.

Some Aboriginal groups have declined to provide information on their activities or facilitate the collection of additional land and resource use information from their membership. In these cases, the EA was conducted on the basis of existing and publicly available information. Alderon respects the views and wishes of the communities in this regard, and has continued to be open to discussion and cooperation with these groups. The proponent also encourages these Aboriginal groups to provide any relevant input and information that they may have directly as part of the EA review process.

22.1.2 Issues

Alderon is committed to ensuring that relevant Aboriginal communities and organizations are engaged in relation to the Project. As described in Chapter 10, the proponent has proposed - and where possible and agreed, implemented - consultation mechanisms and forums with each of the Aboriginal groups that have identified that they have an interest in the Project. These processes have been intended to share information and views on the Project, in an attempt to better understand and seek to address any questions, issues or concerns on the part of these communities with regard to the Project and its potential effects.

These engagement activities have included a key focus on any questions or issues related to the potential implications of the Project for current Aboriginal traditional land and resource use activities and potential measures to avoid or reduce any such effects. These processes are on-going, and have been an important and integral input to Project planning and design, as well as having contributed greatly to the nature, focus and findings of this EA. A complete discussion of the issues raised in relation to Current Use of Land and Resources for Traditional Purposes by Aboriginal Persons is discussed in Volume 1, Chapter 10 and Chapter 22. Only one issue related to the interaction between the Kami Terminal and Current Use of Land and Resources for Traditional Purposes by Aboriginal Persons and is presented in Table 22.1 along with Alderon's response.

Table 22.1 Issues Raised by Stakeholders

Issue	Community	Summary of Comments Raised During Consultation and Engagement Activities	Response / Location in the EIS
Potential interaction with existing Aboriginal rights/title	Uashat	Uashat do not consider themselves Québec Innu and they want to be involved in the entire Project, and not only the Kami Terminal at the Port of Sept-Îles.	Alderon has been engaged with Aboriginal groups on an ongoing basis on the Project as a whole (mine site, port infrastructure). Alderon will continue to engage Aboriginal groups throughout the life of the Project. Information on Aboriginal engagement is provided in **Section 10.2**.

Potential issues and interactions related to this VEC that are identified in the EIS Guidelines include the possibility for Kami Terminal construction or operations activities to:

- Alter or destroy wildlife and fish habitat;
- Contaminate country food or drinking water supplies;
- Result in restricted access to the site; or,
- Modify any existing use of the Kami Terminal area as a result of diminished air quality, noise and other disturbances.

22.2 Environmental Assessment Boundaries

22.2.1 Spatial Boundaries

The following geographic areas were used to understand and describe the potential effects of the Kami Terminal on this VEC: the PDA, LSA, and RSA, each of which is further defined and described below (Figure 22.2).

22.2.1.1 Project Development Area

The PDA is the area represented by the physical footprint of the Kami Terminal area as defined in the Project Description (Chapter 2). The PDA for the Kami Terminal fully encompasses the proposed Concentrate Unloading, Stacking, Storage and Reclaiming Facility and associated rail infrastructure (Rail Loop), including the various activities associated with their construction and operations phases.

22.2.1.2 Local Study Area

The LSA is defined as a larger area, centered on the PDA, that encompasses all planned Kami Terminal components and activities, and the potential "zones of influence" of Kami Terminal-related disturbances (Figure 22.1)

22.2.1.3 Regional Study Area

The RSA for this VEC is generally defined as the overall geographic extent of current land and resource use activities by the various Aboriginal groups that are being considered in this assessment (Figure 22.1). The RSA is therefore somewhat "group-specific", although for general analytical purposes it has been defined to fully encompass the overall known distribution of these activities by the various groups under consideration in the EIS.

This larger area is intended to provide an appropriate, regional context to the assessment, thereby illustrating the overall relationship of the Kami Terminal and its possible effects / zone of influence to each group's overall current land and resource use activities throughout Québec and Labrador (including any preferred or alternative land and resource use areas). In doing so, this larger focus helps to evaluate whether, how and to what degree the Kami Terminal is likely to have an effect on the overall nature, intensity or value of these traditional activities by each group.

22.2.2 Temporal Boundaries

The temporal boundaries for the assessment of potential environmental effects of the Kami Terminal on this VEC include its construction, and operation and maintenance phases.

Figure 22.1 Local and Regional Study Areas

22.2.3 Administrative Boundaries

As indicated previously, a number of Aboriginal groups claim Aboriginal rights and/or title to, and undertake land and resource use activities in, areas of Québec and Labrador. The land claims of these groups are at varying stages of progress, negotiation and settlement, as described elsewhere in this EIS.

22.3 Establishing Standards or Thresholds for Determining the Significance of Environmental Effects

The potential effects of the Kami Terminal on the Current Use of Land and Resources for Traditional Purposes by Aboriginal Persons are described using the following descriptors, which are based on recent environmental assessment practice and the EIS Guidelines:

- **Direction:**
  - Neutral (or possibly, No Effect);
  - Adverse; or,
  - Positive.
- **Magnitude:**
  - Low (affects a small number of Aboriginal land and resource users);
  - Moderate (affects less than the majority of Aboriginal land and resource users, for one or more activities); or,
  - High (affects the majority of Aboriginal land and resource users across multiple activities).
- **Geographic Extent:**
  - Site (within the PDA);
  - Within the LSA; or,
  - Within the RSA.
- **Frequency:**
  - Not likely to occur;
  - Occurs once;
  - Occurs sporadically at irregular intervals;
  - Occurs on a regular basis and at regular intervals; or,
  - Occurs continuously.
- **Duration:**
  - Short Term (restricted to the construction phase(s));
  - Medium Term (continues into the operations and maintenance phase);

  - Long Term (16 to 50 years); or,
  - Permanent.
- **Reversibility:**
  - Reversible: the VEC can be returned to existing conditions; or,
  - Irreversible: the effect cannot be reversed.
- **Environmental or Socio-economic Context:**
  - Undisturbed: Area relatively or not adversely affected by human activity; or,
  - Disturbed: Area has been substantially previously disturbed by human development and/or human development is still present.

22.3.1.1 Threshold for Determining the Significance of Residual Environmental Effects

A significant adverse effect on the *Current Use of Land and Resources for Traditional Purposes by Aboriginal Persons* is defined as one which will result in a change in the current spatial and temporal distribution and/or an overall decrease in activity levels by those Aboriginal communities who currently undertake such activities within the RSA, resulting in a reduction in the overall cultural value of such activities for the community over the long-term.

22.4 Potential Project-VEC Interactions

Each of the Kami Terminal's main planned activities during its construction, operation and maintenance, and decommissioning and reclamation phases as well as possible accidental events and malfunctions, are listed in Table 22.1. The Table also indicates whether, and at what level, each will likely interact with the VEC (based on a ranking of 0, 1, or 2, which are defined at the bottom of the table). This approach has been taken in order to frame and focus the environmental effects assessment early and on the key potential issues and interactions of concern, including those for which standard mitigations and guidelines are not necessarily defined and applicable.

Table 22.2 Potential Environmental Effects of Kami Terminal to Current Use of Land and Resources for Traditional Purposes by Aboriginal Persons

Kami Terminal Activities and Physical Works	Potential Environmental Effects (Should any Current Use of Land and Resources for Traditional Purposes by Aboriginal Persons occur within the LSA)		
	Change in Activity Distribution (Location and/or Timing)	Change in Overall Activity Levels	Resulting Change in Overall Quality and Cultural Value of the Activity
Construction			
Site Preparation (incl. clearing, excavation, blasting, material haulage, grading, removal of overburden and stockpiling)	2	2	2

Kami Terminal Activities and Physical Works	Potential Environmental Effects (Should any Current Use of Land and Resources for Traditional Purposes by Aboriginal Persons occur within the LSA)		
	Change in Activity Distribution (Location and/or Timing)	**Change in Overall Activity Levels**	**Resulting Change in Overall Quality and Cultural Value of the Activity**
Construction of Load-out Facilities (rail dumper building, rail car dumper and hopper, train positioner transfer houses, conveyors, dust collector, maintenance building, substation, sanitation system)	2	2	2
Construction of Railway Loop	2	2	2
Construction of Stream Diversion	2	2	2
Access Roads and Waterline Realignment	2	2	2
Onsite Vehicle/Equipment Operation	2	2	2
Waste Management	0	0	0
Transportation of Personnel and Goods to Site	2	2	2
Expenditures	0	0	0
Employment	2	2	2
Operation and Maintenance			
Rail Transport	2	2	2
Concentrate Handling and Stockpiling	2	2	2
Water Collection, Treatment and Discharge	2	2	2
Onsite Vehicle/Equipment Operation and Maintenance	2	2	2
Waste Management	0	0	0
Transportation of Personnel and Goods to Site	2	2	2
Expenditures	0	0	0
Employment	2	2	2
Decommissioning and Reclamation			
Site clean-up	2	2	2
Accidents and Malfunctions			
Fire	2	2	2
Spill / Release of Hazardous Materials (through a leak or spill, train derailment, or breach of stormwater retention pond)	2	2	2

KEY

0 = No interaction.

1 = Interaction occurs; however, based on past experience and professional judgment, the resulting effect can be managed to acceptable levels through standard operating practices and/or through the application of best management or codified practices. No further assessment is warranted.

2 = Interaction occurs, and resulting effect may exceed acceptable levels without implementation of specified mitigation. Further assessment is warranted.

In general, any Kami Terminal components or activities that result in possible new or additional restricted access to an area, ground disturbance, interactions with waterbodies, possible emissions to the atmospheric, aquatic or terrestrial environments, or other disturbances (e.g., presence of workers and equipment; associated noise, dust, or visual intrusions) have the potential to directly or indirectly affect local land and resource use activities, were these to occur within or near the Kami Terminal.

As indicated, in many cases there are no general or generic regulatory standards that are designed to avoid or reduce the possible effects of these Kami Terminal components or activities on land and resource use, and therefore, the assessment is based (rather conservatively) on an initial assumption that most elements of the Kami Terminal may interact with these activities, should they currently occur in or near the Kami Terminal area. These possible interactions and effects have therefore brought forward into the VEC chapter for further analysis and assessment, including, initially, an evaluation of whether each identified group is (based on existing and available information) known to undertake such activities in the PDA and/or LSA, and if so, the nature and degree of any Kami Terminal-related effects to these current activities and the relationship of this to their overall land and resource use activities and patterns.

Selection of Environmental Effects and Measurable Parameters

The environmental effects assessment for the Current Use of Land and Resources for Traditional Purposes by Aboriginal Persons VEC is focused on the following environmental effects:

- Change in Activity Distribution (Location and/or Timing)
- Change in Overall Activity Levels; and,
- Resulting Change in Overall Quality and Cultural Value of the Activity

These potential effects are considered to be the primary potential outcomes which may result from the possible interaction of Kami Terminal components and activities with any Aboriginal land and resource use activities that currently occur within the PDA and/or LSA.

Any required (new) restrictions on access to an area during the construction and/or operation of a development project may, for example, have a direct effect on the use of certain lands and resources for such activities. The presence of structures and disturbances related to the Kami Terminal may also result in Aboriginal persons choosing not to use a larger area surrounding the project site, which may further contribute to a change in the spatial and/or temporal distribution of land and resource use activities, especially if alternate areas are not available for such uses. An associated decrease in the use of particular land areas and lack of suitable alternative locations, and/or other possible issues and restrictions on the sites or times available for such activities (such as due to increased involvement in the wage economy) may also affect the overall levels of traditional land and resource use by individuals or communities. Finally, any changes related to the Kami Terminal in the overall level, distribution (geographic or timing) and/or quality of current Aboriginal land and resource for traditional purposes may adversely affect the cultural value of these activities for the Aboriginal community or organization in question.

The analysis and assessment of Kami Terminal effects on this VEC was based on any information made available by relevant Aboriginal communities and organizations, including any applicable questions and issues raised during Alderon's Aboriginal engagement initiatives, as well as a review of existing and publically available information. The environmental effects assessment for this VEC focuses primarily upon the key potential effects identified above, with a series of Measureable Parameters then being defined which represent associated aspects of the VECs to which changes could possibly be detected / measured. Although some potential Kami Terminal effects may be indeed be "measured", for many potential social and cultural issues quantitative predictions are frequently neither possible nor particularly meaningful. In these cases, the identified Measureable Parameters are primarily used as key concepts upon which to focus the effects assessment, rather than to generate quantitative effects predictions.

The measurable parameters used for the assessment of the various potential environmental effects, and the rationale for their selection, are indicated in Table 22.3.

Table 22.3 Measurable Parameters for Current Use of Land and Resources for Traditional Purposes by Aboriginal Persons

Environmental Effect	Measurable Parameter	Rationale for Selection of the Measurable Parameter
Change in Activity Distribution (Location and/or Timing)	• Area available and used for traditional land and resource use activities by each group. • Timing, frequency and duration of traditional land and resource use activities by each group.	• Any changes to the areas and/or times used for such activities can be assessed and evaluated.
Change in Overall Activity Levels	• Community participation rates in traditional land and resource activities.	• Any changes to overall activity levels / participation rates can be assessed and evaluated.
Resulting Change in Overall Quality and Cultural Value of the Activity	• Degree of cultural value / fulfillment associated with traditional land and resource activities by a community.	• Any changes in the nature, distribution and/or quality of traditional land and resource use may diminish the overall value of a cultural activity.

22.5 Existing Environment

A number of Aboriginal communities and organizations claim rights and / or title to areas of Québec and undertake traditional land and resource use activities in the overall region. The land claims of these groups are at varying stages of progress, negotiation and settlement. A detailed overview of each of the Québec and Labrador Aboriginal groups that have identified an interest in the overall Kami Project (including the Kami Mine and Kami Terminal) was provided in Chapter 10 and EIS Volume 1, Chapter 10.

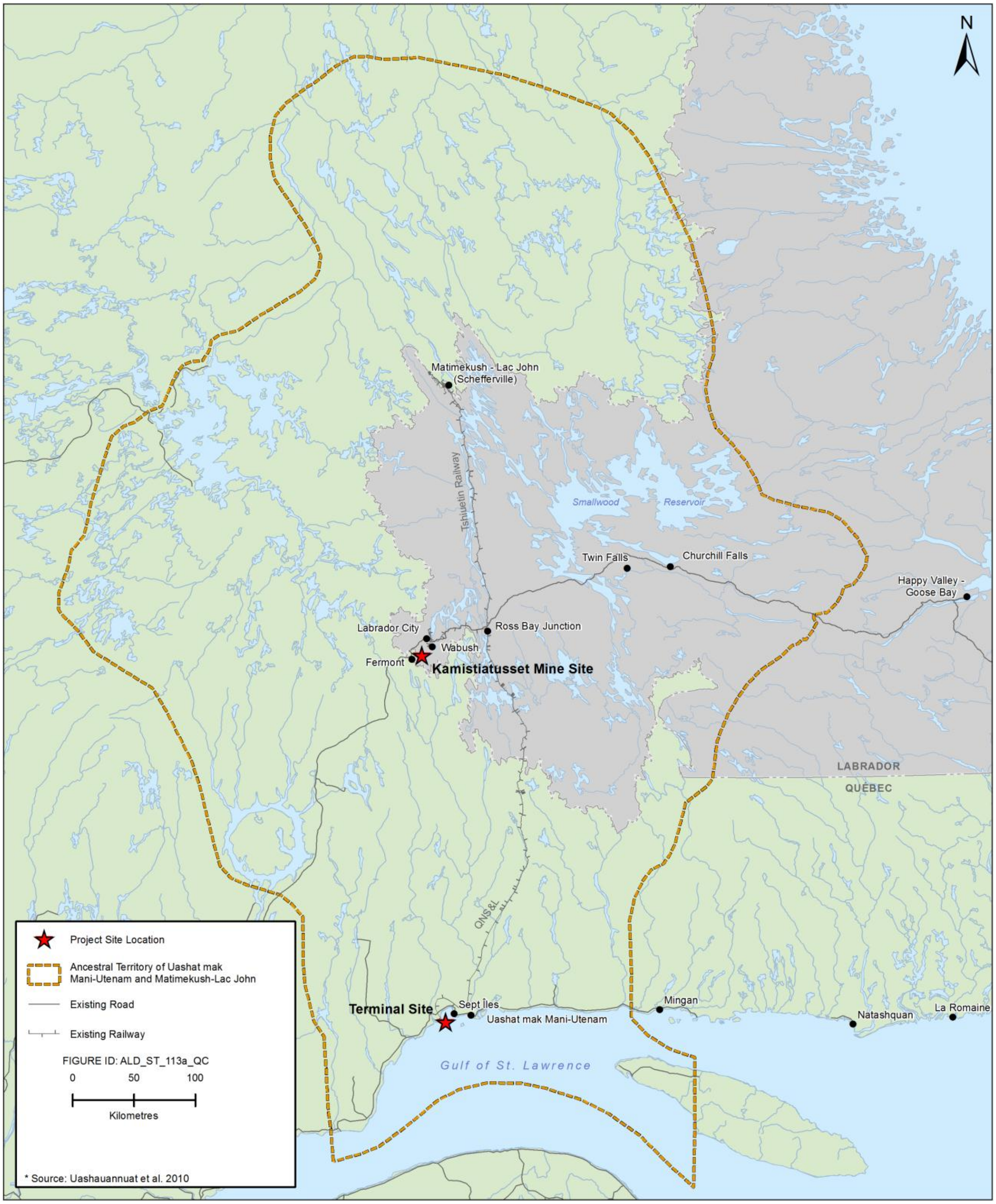
The following description focuses upon the Innu of Uashat mak Mani-Utenam, given their location in the Sept-Îles area, as well as the Innu of Matimekush-Lac John who share their traditional territory (Figure 22.2).

Innu of Uashat mak Mani-Utenam

The Innu of Uashat mak Mani-Utenam are the descendants of an Aboriginal population that has occupied parts of the Québec-Labrador interior for centuries. Their traditional territory extended along the rivers from the coast of Québec's Lower North Shore into the Québec-Labrador interior as far as lacs Petitsikapau, Caniapiscau and Michikamau (Hydro-Québec 2007).

Traditionally, this group was involved in nomadic hunting, fishing and gathering. After spending the winter in their hunting grounds in the interior, families would return to the coast in spring, notably via the rivières Sainte-Marguerite and Moisie. Spring also signaled the beginning of waterfowl hunting and was followed by salmon fishing in June and July. During certain times in summer large gatherings were held, consisting of festivities, religious practices and, during the Historic Period, fur-trading. In fall, the Innu prepared to return to interior hunting grounds.

Figure 22.2 Traditional Territory of the Innu of Uashat Mak Mani-Utenam and Matimekush-Lac John



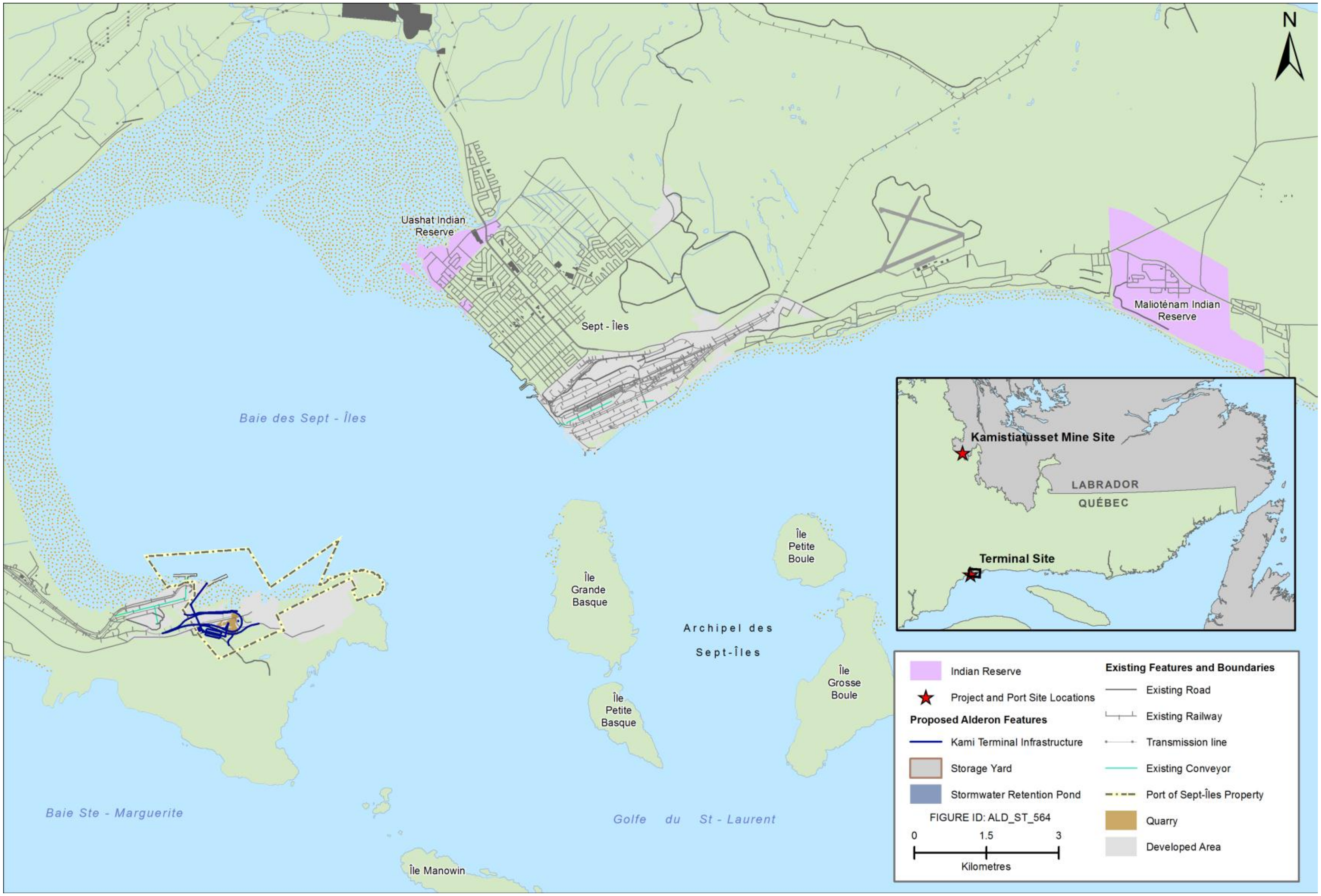
By the mid-1830s, the Innu became increasingly involved in commercial salmon fishing activities in a number of rivers along the Québec Lower North Shore, although over time they became progressively excluded from such activities by colonists who also placed increasing pressure on the various resources of the land and water upon which the Innu depended for subsistence and trade. By the late nineteenth century, this pushed many Innu families to begin to reside permanently on the coast (Castonguay, Dandenault *et Associés* 1999). In 1906, the Uashat Reserve was founded at the mouth of the Sainte-Marguerite and in 1949 the federal government created a second reserve, the Maliotenam Reserve, at the mouth of the rivière Moisie (Hydro-Québec 2007). Although some individuals moved to the new reserve, approximately 50 Innu families refused to abandon their traditional gathering just outside Sept-Îles. In 1952, families living in Moisie West were forced to move to make way for construction of a radar station. Some families relocated to the newly established Maliotenam Reserve, while others relocated to Schefferville (CERANE 1990 in Castonguay *et al.* 1999). In 1966, the Uashat Reserve was integrated into the Sept-Îles development plan (Corporation Ashuanipi 2010).

The Innu of Uashat mak Mani-Utenam share their ancestral territory with the Innu of Matimekush-Lac John (Figure 22.2), which stretches from the Québec Lower North Shore to north of Matimekush-Lac John, encompassing much of Western Labrador and Eastern Québec (Uashaunnuat *et al.* 2010). Again, the Innu of Uashat mak Mani-Utenam traditionally used the rivières Ste-Marguerite and Moisie in their annual movements between coastal camps and inland hunting and trapping areas. Starting in mid or late summer, families would follow the rivière Moisie to the rivière Nipissis and then on to lac Nipissis. They would then continue on to lac Matinipi and west to lacs Caophacho, Ashuanipi and Menihek, and disperse into smaller groups for hunting and trapping throughout the fall and winter (Castonguay *et al.* 1999). Following the goose hunt in spring, families would reunite at fixed locations and travel by canoe back to the coast.

The two Innu reserves of Uashat mak Mani-Utenam are located in the Sept-Îles area. Uashat is a 177 hectare reserve, located on the western outskirts of Sept-Îles, whereas the Mani-Utenam Reserve is located 16 km east of Sept-Îles and comprises an area of 527 hectares (Figure 22.3). The Uashat and Mani-Utenam Reserves constitute a single Band governed by ITUM (Castonguay, Dandenault *et Associés* 1996; Corporation Ashuanipi 2010). In 2005, the Corporation Ashuanipi was created to represent Uashat mak Mani-Utenam and Matimekush-Lac John in their land claims negotiations with the governments of Canada and Québec. Negotiations were suspended in 2008 and the Corporation Ashuanipi has been dissolved.

Although the Innu of Uashat mak Mani-Utenam are largely sedentarized, they maintain many aspects of their traditional culture and annual migrations. Fishing is also a cornerstone of their culture. In the summer, the Innu of Uashat mak Mani-Utenam traditionally gather along the coast and fish Atlantic salmon. Other species are also fished such as pike, turbot, brook trout, sea-run brook trout, and lake trout (Castonguay *et al.* 1999; 2006).

Figure 22.3 The Québec Innu Reserves of Uashat mak Mani-Utenam



As per the traditional cycle, in mid to late summer, families of hunters follow the rivière Moisie to rivers and lakes deep within the backcountry for hunting and trapping, which they would do throughout fall and winter (Castonguay *et al.* 1999). The Innu primarily hunt caribou and small game while also carrying out trapping, mainly beaver and marten (Castonguay *et al.* 1996; Castonguay *et al.* 2006; Armitage and Stopp 2003). In the spring, band members participate in the goose hunt and then return to the coast.

While the territory is still traveled today, some areas are more intensely used by the Innu of Uashat mak Mani-Utenam including areas along the coast (Uashaunnuat *et al.* 2010) and along the QNS&L Railway (Tanner and Armitage 1986), the Trans Labrador Highway (Armitage and Stopp 2003), logging roads and access roads to the Sainte-Marguerite-3 Complex (Castonguay *et al.* 1996).

Since 1996, the community established new snowmobile trails and some 200 new camps across the territory through compensation from Hydro-Québec for the construction of the Sainte-Marguerite-3 (Castonguay *et al.* 1996). The new camps have had the effect of increasing the frequency of trips to the backcountry for subsistence, social, recreational ends. The permanent camps have also made it more common for entire families to go out for short periods (Castonguay *et al.* 2006). A number of community camps have also been established west of the rivière Sainte-Marguerite and along the rivière Moisie (Castonguay *et al.* 2006), which are used for special ceremonies and trips to transmit traditional knowledge to community youths and to perform healing and rehabilitation therapy (Castonguay *et al.* 2006). The altar to Sainte Anne on lac Cousin in the lower rivière Sainte-Marguerite basin is another important site that is visited by some 100 to 150 community members per year (Castonguay *et al.* 1996).

In summary, a review of available information indicates that although this Aboriginal group partakes in land and resource use activities for traditional purposes in various parts of its traditional territory, these do not occur in or near the proposed Kami Terminal area. Alderon is likewise not aware of any future, planned land and resource uses that may occur within or near the Kami Terminal area and which may therefore be affected, particularly given the existing industrial designation of the lands within and surrounding the Kami Terminal site.

Innu of Matimekush-Lac John

The Québec Innu of Matimekush-Lac John reside on two reserves near Schefferville, Québec, several hundred kilometers north of the Kami Terminal area. The Matimekush Reserve is located on the shore of lac Pearce and has an area of approximately 0.68 km^2, whereas the Lac John Reserve covers an area of about 0.23 km^2 and is located approximately 3.5 km from Matimekush and from the center of Schefferville. Currently, the Matimekush Reserve and Lac John Reserve are jointly administered by CPNIMLJ. In 2005, the Corporation Ashuanipi was created to represent Uashat mak Mani-Utenam and Matimekush-Lac John in their land claims negotiations with the governments of Canada and Québec. Negotiations were suspended in 2008 and the Corporation Ashuanipi has been dissolved

The Innu of Matimekush–Lac John are likewise descendants of an Aboriginal population that has traditionally occupied much of the Québec-Labrador Peninsula. The group shares strong cultural and familial ties to the Innu of Uashat mak Mani-Utenam, and followed a similar pattern of land use and harvesting. Traditionally, these Innu traveled to summer camps at the mouth of the rivières Sainte-Marguerite and Moisie to fish, trade and gather. With the establishment of fur-trading posts, they would also travel to the coast to trade with Europeans and visit mission stations (Charron 1994). Because of the rarity of caribou in the interior and the closing of key trading posts in the interior in the late nineteenth century, many Innu moved seasonally to the coast and to the north. The late nineteenth century also signaled the expansion of mineral exploration activities in the Québec-Labrador interior, and eventually, the exploitation of vast iron reserves found in the area around Schefferville. In 1954, a railway connecting Schefferville and Sept-Îles was completed to transport ore to the coastal ports and in 1955 the Town of Schefferville was incorporated (Charron 1994).

Due to the difficulty of sustaining a livelihood through trapping and hunting at that time, many Innu from Maliotenam moved to Matimekush in the Schefferville area to work on the railway or in the mines (Charron 1994). In 1956, concerns about water pollution caused by the Innu settlement prompted the Minister of Indian Affairs to try to persuade the group at Matimekush to relocate to Lac John. Some families agreed to move to the new site and were joined by Naskapi. Those who stayed in Matimekush were pressured to return to Maliotenam, but only a few did, despite threats of cutting off aid and health services to the community (Charron 1994). In 1960, the Lac John Reserve was created by the Ministry of Indian Affairs and a reserve was established in Matimekush in 1968, albeit at a slightly different site. Houses were built on the new reserve in 1972 (Charron 1994). In 1973, the Minister of Indian Affairs recognized the Innu of Matimekush-Lac John as an autonomous band (Hydro-Québec 2010) whereas, prior to this, they had been considered part of the Innu of Uashat mak Mani-Utenam. The closing of the Schefferville mines in 1982 signaled the departure of most of the non-Aboriginal residents. In May 1998, land from the largely-abandoned town of Schefferville was reallocated to expand the size of the Matimekush Reserve.

The Innu of Matimekush-Lac John maintain many aspects of their traditional way of life and culture. Like many Aboriginal and other northern communities, hunting, fishing, trapping and other land and resource use activities form a key part of their food supply and overall culture. The ensemble of forest activities and traditions are called Innu Aitun (Hydro-Québec 2010). Along with the Innu of Uashat mak Mani-Utenam, the Matimekush-Lac John Innu claim ancestral use of the land indicated by Figure 22.2.

While the Innu of Matimekosh-Lac John share much of their ancestral territory with the Innu of Uashat mak Mani-Utenam, their traditional territory stretches more northward, reaching to the rivières au Bouleau, Sheldrake and Magpie in the North (Charron 1994) and parts of the Churchill and Hamilton river basins (Charron 1994). They rely on their territory to maintain cultural traditions and for subsistence through hunting, fishing and harvesting raw materials.

Most contemporary travel routes, camp sites, hunting and fishing areas and trap lines are today found near the Reserves (CAM 1983) and on lands accessible by the railway line (Tanner and Armitage 1986). These sites are located in both Québec and Labrador. In the fall, the Innu of Matimekosh-Lac John hunt geese and begin trapping activities. Trapping is focused on small animals such as hare, porcupine, partridge and beaver. Harvesting sites are most often accessed by plane in the fall and snowmobile in the winter. Areas along the railway were the main locations where the Innu of Matimekush-Lac John trapped (CAM 1983). In Labrador, trapping areas are located south of the Reserves, and west of Churchill Falls (CPNIMLJ 2011).

The fall is also a time for hunting caribou. The fall hunt is practiced by groups of hunters who usually travelled in the Schefferville area, along roads and their extensions. The George River caribou is present in the region north of Schefferville. The regions of the Iron Arm, Petitsikapau and Attikamegen lakes are areas that the hunters accessed by road and then by canoe to reach their hunting sites (CAM 1983). This hunt preceded the winter caribou hunt, which happened more intensively during the months of February and March.

Unlike the Innu of Uashat mak Mani-Utenam, fishing does not play as central a role in the subsistence and cultural activities of the Innu of Matimekush-Lac John.

In summary, a review of available information indicates that although this Aboriginal group partakes in land and resource use activities for traditional purposes in various parts of its traditional territory, these do not occur in or near the proposed Kami Terminal area. Alderon is likewise not aware of any future, planned land and resource uses that may occur within or near the Kami Terminal area and which may therefore be affected, particularly given the existing industrial designation of the lands within and surrounding the Kami Terminal site.

22.6 Assessment of Project-Related Environmental Effects

Land and resource use activities may be affected by development projects both directly and indirectly. Direct effects occur where established activities are disturbed or otherwise interfered with by project-related components or activities during their construction or operations phases (e.g., reduced access to harvesting areas; avoidance or reduced use of areas due to project–related disturbances such as increased human presence, noise, dust; increased competition for land and resources with other local residents, etc). Indirect effects to such activities can also occur when projects adversely affect vegetation, fish or wildlife, where such biophysical effects reduce the availability and/or quality of such resources and thus, their use and enjoyment for traditional purposes. In both cases, these direct and/or indirect effects may translate into a decrease in the overall quality and cultural value of these traditional activities by Aboriginal persons and communities.

The environmental effects assessment for the Current Use of Land and Resources for Traditional Purposes by Aboriginal Persons VEC is therefore focused on the following potential environmental effects:

- Change in activity distribution (location and/or timing);
- Change in overall activity levels; and,
- Resulting change in overall quality and cultural value of the activity.

22.6.1 Change in Activity Distribution (Location and/or Timing)

Traditional land and resource use activities have and continue to comprise an important and integral part in the lives and cultures of Québec and Labrador Aboriginal persons and communities. The settlement of Aboriginal peoples into communities and the beginning of a more sedentary lifestyle, along with past development activities within their traditional territories and increased road and railway access and the resulting concentration of much land and resource use along these, has considerably influenced the nature, intensity and distribution of traditional land and resource use activities by Aboriginal groups in recent decades. That being said, however, these Aboriginal people have continued to carry out such activities and to maintain and preserve these traditional pursuits as a vital aspect of their current societies and cultures, and continue to undertake these activities in various parts of their traditional territories in Québec and/or Labrador.

The construction and operations phases of the Kami Terminal will result in some degree of further alteration of the landscape following the development of the Kami Terminal components and associated activities within the project footprint as well as, potentially, within the larger zone of influence of the various disturbances (e.g., noise, dust, and visual intrusions) related to the Kami Terminal.

Construction

Construction activity for the Kami Terminal will occur over several years, and will include the following:

- Movement of equipment, materials and personnel to, within and from the site;
- Mobilization and installation of any required construction infrastructure;
- Site preparation (including vegetation clearing, grubbing and excavation as required);
- Establishing site buildings and other components and facilities;
- Installation of associated systems, equipment and utilities; and,
- Kami Terminal commissioning.

In addition to the direct footprint of the Kami Terminal and associated site access restrictions, the construction phase of the Kami Terminal will result in other types of disturbances, such as those associated with air emissions (including dust and construction equipment exhausts), noise, light, vibrations, possible sedimentation of watercourses, the visibility of Kami Terminal equipment and physical works, and other potential emissions and related disturbances. Detailed modeling and analysis of the nature, magnitude and spatial and temporal distribution of the potential air and water emissions, noise, vibration and light that may be associated with the Kami Terminal has been presented in other chapters. These analyses have indicated that these construction-related disturbances will occur intermittently and/or over a relatively short time period (construction phase), and will have a limited geographic zone of influence. The various environmental effects mitigation measures outlined in these other VEC chapters will further serve to avoid or reduce any disturbances or effects related to the Kami Terminal that could potentially have implications for land and resource use in the region.

The area upon which Alderon's proposed Kami Terminal at the Port of Sept-Îles will be constructed and operated has been the site of on-going industrial activity for several decades. The proposed Kami Terminal will be located wholly on the Port of Sept-Îles lands, located in the MRC de Sept-Rivières and within the municipality of Sept-Îles, Québec. The PDA is located in an industrial zone designated for large-scale Industry (Section 22.5), which covers the entire Marconi Peninsula, and is used extensively for these purposes at present. The proposed Kami Terminal will be located on the available land area that has been allocated to Alderon by the Port Authority, immediately within and adjacent to a number of existing industrial facilities and on-going activities, which is private property that is legally excluded from other uses.

As a result of this significant and long-standing industrial activity within the PDA and LSA, traditional land and resource use activities do not (and cannot) occur within the LSA itself (and particularly, within the PDA). There are no known sites of historical, cultural or spiritual importance to either group within the PDA or LSA. The potential implications of the Kami Terminal for vegetation, fish, wildlife and other resources have also been assessed in detail in other VEC sections, which concluded that the Kami Terminal will not likely cause significant adverse environmental effects on any aspect of the biophysical environment. This, in combination with the fact that key resources (such as caribou) are not found in the area and/or likely to be affected, as well as the resulting and above described lack of known Aboriginal land and resource use in the PDA and LSA at present, will mean that there is no potential for consequent effects on traditional use of these lands or resources.

As a result, and based on the information available to Alderon for use in this EA, the construction phase of the Kami Terminal is not likely to have any effect upon the distribution (location or timing) of the current use of land and resources for traditional purposes by Aboriginal persons.

Operation and Maintenance

Once the construction phase of the Kami Terminal is completed and its various components have been commissioned, the operations phase of the Kami Terminal will commence. The current Kami Terminal schedule indicates that this phase of the Kami Terminal will commence in late 2015 (pre-production), and extend to approximately 2033.

Although the operations phase of the Kami Terminal will not result in additional ground disturbance or infrastructure development from that which was completed during construction, Kami Terminal operations and maintenance activities will entail rail traffic and the on-going receipt, unloading, movement, storage and eventual shipping of iron ore from the facility. Kami Terminal areas will continue to have associated public access restrictions for safety and operational purposes, which will remain in place throughout the life of the Kami Terminal. The operations phase of the Kami Terminal will also result in other types of disturbances, such as those associated with air emissions (i.e., dust and exhausts), noise, light, vibrations, the visibility of Kami Terminal infrastructure and activities, and other potential emissions and related disturbances, for which detailed modeling and analysis have been presented in other sections of this EIS. These analyses have also indicated that these emissions and associated disturbances will have a limited geographic zone of influence, within an area of long-standing and on-going industrial activity.

Given the significant and long-standing industrial activity within and around the PSA (and the current zoning of the entire Marconi Peninsula as "Large-scale Industrial"), the resulting fact that the PDA and larger LSA are not currently used for traditional land and resource use activities by Aboriginal persons and do not contain known sites of historical, cultural or spiritual importance - as well as the relatively small size of the Kami Terminal area and its environmental zones of influence - the operations phase of the Kami Terminal is not likely to have any effect upon the location or timing of the current use of land and resources for traditional purposes by Aboriginal persons.

Decommissioning and Reclamation

There is currently no intention to close or decommission the proposed Kami Pointe-Noire Terminal facilities, given the clear value and utility of this infrastructure for future port operations and its likely adaptability to other existing or future users. It is therefore planned that, upon conclusion of Alderon operations, this infrastructure will be transferred to another owner and operator. The facility will be subject to regular maintenance, as required, and it is assumed that it would be operated on a permanent basis.

Effects Management / Mitigation Measures

The consideration of environmental issues from the earliest stages of project planning and design has been an integral part of Alderon's approach to its proposed Kami Terminal. This approach allows potential environmental issues and interactions to be identified early, so that they can be considered and addressed in a proactive manner through appropriate Kami Terminal planning and design. The objective is to attempt to avoid adverse environmental effects where possible and practical, or at least, to put in place mitigation measures to ensure that they are maintained at acceptable levels.

The following activities and considerations have been integrated into Kami Terminal planning and design to attempt to avoid or reduce the effects of the Kami Terminal on land and resource use:

- The design and siting of the Kami Terminal within an existing industrial area;
- Meetings, discussions and correspondence with Aboriginal communities and organizations (see Chapter 10), to provide information about the Kami Terminal and to seek to better understand any use of, and interest in, the Kami Terminal area;
- The offering (and implementation where accepted and agreed) of Aboriginal engagement processes with relevant groups in Québec and Labrador, including processes for the collection of information on current land and resource use, traditional knowledge and issues scoping (with associated funding and resources); and,

- The identification, review and analysis of existing and available information on Aboriginal land and resource use activities, in order to consider this early in and throughout Kami Terminal planning and design.

In addition, the various environmental effects mitigation measures outlined in these other VEC chapters will further serve to avoid or reduce any disturbances or effects related to the Kami Terminal that could potentially have implications for land and resource use in the region.

Characterization of Residual Effects

The Kami Terminal will not interact with or adversely affect the Current Use of Land and Resources for Traditional Purposes by Aboriginal Persons, including the overall distribution of such activities by an Aboriginal group.

22.6.2 Change in Overall Activity Levels

In addition to possible changes in the geographic and/or temporal distribution of land and resource use activities, development projects may also have the potential to affect overall levels of participation in such activities by Aboriginal persons and groups. This may result from a real or perceived decrease in the availability or quality of land and resource use opportunities, such as through changes in the land and resource base available for such activities (due to restricted access to preferred harvesting locations; reduced resource availability due to biophysical effects; increased competition for resources), or an associated increase in the cost, time or effort required to access alternative areas. It may also occur as a result of a decrease in the time available for people to partake in such traditional activities.

This section examines the potential effects of the Kami Terminal on overall levels of land and resource use by Aboriginal communities and organizations. Each of the Project’s phases are discussed here in a common section, given that relevant Kami Terminal elements and potential issues and interactions are quite similar between these. Any important differences are also highlighted as relevant.

Aboriginal persons currently do not undertake traditional land and resource use activities within or near the PDA, there are no known sites of historical, cultural or spiritual importance in the area, and the Kami Terminal is not likely to result in significant adverse effects to vegetation, fish or wildlife resources. As a result, and based on the information available to Alderon for use in this EA, the Kami Terminal is not likely to adversely affect the location or timing of the current use of land and resources for traditional purposes by Aboriginal persons, and is therefore also not expected to have any associated effect on the overall type and level of such activities by Aboriginal persons and groups.

In addition to these “spatial” considerations regarding the location and availability of land and resources for such activities and the geographic extent of disturbances related to the Kami Terminal, traditional activity levels may also be affected by any overall decrease in the amount of time available for undertaking these by Aboriginal persons and communities. Traditional land and resource use activities continue to comprise an important and integral part of the lives and cultures of Québec and Labrador Aboriginal persons and communities. Notwithstanding changes in the nature, location and timing of traditional land and resource use activities over recent decades, harvesting and other cultural activities continue to be undertaken during specific time periods of the year, such as the seasonal caribou hunts, in-country retreats, and others. The increasing participation of Aboriginal peoples in development projects and other aspects of the wage economy can, however, also at times affect their ability and availability to participate in certain traditional activities.

On the one hand, the work locations and times (schedules and/or rotations) that are often associated with the construction and operations phases of large-scale development projects can result in periods away from the community, during which work commitments may interference with traditional activities and other cultural pursuits. On the other, the employment income that is associated with project-related work can aid in the purchase of required equipment and supplies, and thus, help enhance one's participation in such activities (Hobart 1984; Myers and Forrest 2000; BHP 2012).

In its on-going and planned discussions with Aboriginal groups related to the Kami Terminal, Alderon will continue to assess any potential time-related issues which may affect the ability of Aboriginal employees to participate in traditional activities, as well as exploring possible measures to address this. This may include, for example, possible alternative work rotations and/or cultural leave provisions for Aboriginal workers during particular times of the year to allow for their participation in such activities. No changes in overall activity levels are therefore anticipated.

22.6.3 Resulting Change in Overall Quality and Cultural Value of the Activity

As indicated in the preceding analyses, the Kami Terminal is not likely to adversely affect the location or timing of the current use of land and resources for traditional purposes by Aboriginal persons, nor the overall level of participation in such activities by Aboriginal persons and groups. The various mitigation measures outlined above and throughout this EIS, in combination with Alderon's on-going engagement with Aboriginal groups, will serve to even further avoid or reduce the potential for any such adverse effects.

No associated and consequent decrease in the overall quality or underlying cultural value of the current use of land and resources for traditional purposes by Aboriginal persons is therefore anticipated during either phase of the Kami Terminal.

22.6.4 Summary of Project Residual Environmental Effects

The anticipated residual environmental effects of the Kami Terminal on the Current Use of Land and Resources for Traditional Purposes by Aboriginal Persons are summarized in Table 22.4. Again, given that the proposed PDA and surrounding LSA are not (and cannot be) used for such traditional land and resource use activities by Aboriginal persons at present, the Kami Terminal will not adversely affect this VEC, including each of the main potential issues that were identified and upon which the associated effects assessment has focused, namely:

- Change in Activity Distribution (Location and/or Timing);

- Change in Overall Activity Levels; or,
- Resulting Change in Overall Quality and Cultural Value of the Activity

The results of this assessment therefore indicate that there will not likely be a residual adverse effect upon this VEC as a result of the Kami Terminal.

Table 22.4 Summary of Residual Environmental Effects of Kami Terminal: Current Use of Land and Resources for Traditional Purposes by Aboriginal Persons

Kami Terminal Phase	Mitigation / Compensation Measures	Residual Environmental Effects Characteristics									Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Frequency	Duration	Reversibility	Environmental or Socio-Economic Context	Significance	Prediction Confidence	
Change in Activity Distribution (Location and/or Timing)											
Construction	• The design and siting of the Kami Terminal (concentrate unloading, stacking, storage, and reclaiming facilities and rail loop) within an existing industrial area. • On-going engagement with Aboriginal communities and organizations. • Possible work rotations / cultural leave provisions for Aboriginal employees	N	-	-	N	-	-	D	N	H	• Any follow-up and monitoring programs that have been identified and proposed for other VECs (particularly for the biophysical environment) will be indirectly applicable to land and resource use.
Operation and Maintenance		N	-	-	N	-	-	D	N	H	
Decommissioning and Reclamation		N	-	-	N	-	-	D	N	H	
Change in Overall Activity Levels											
Construction	• The design and siting of the Kami Terminal (concentrate unloading, stacking, storage, and reclaiming facilities and rail loop) within an existing industrial area. • On-going engagement with Aboriginal communities and organizations	N	-	-	N	-	-	D	N	H	• Any follow-up and monitoring programs that have been identified and proposed for other VECs (particularly for the biophysical environment) will be indirectly applicable to land and resource use.
Operation and Maintenance		N	-	-	N	-	-	D	N	H	

Kami Terminal Phase	Mitigation / Compensation Measures	Residual Environmental Effects Characteristics									Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Frequency	Duration	Reversibility	Environmental or Socio-Economic Context	Significance	Prediction Confidence	
Decommissioning and Reclamation	• Possible work rotations / cultural leave provisions for Aboriginal employees	N	-	-	N	-	-	D	N	H	
Resulting Change in Overall Quality and Cultural Value of the Activity											
Construction	• The design and siting of the Kami Terminal (concentrate unloading, stacking, storage, and reclaiming facilities and rail loop) within an existing industrial area. • On-going engagement with Aboriginal communities and organizations.	N	-	-	N	-	-	D	N	H	• Any follow-up and monitoring programs that have been identified and proposed for other VECs (particularly for the biophysical environment) will be indirectly applicable to land and resource use.
Operation and Maintenance		N	-	-	N	-	-	D	N	H	
Decommissioning and Reclamation		N	-	-	N	-	-	D	N	H	

Kami Terminal Phase	Mitigation / Compensation Measures	Residual Environmental Effects Characteristics									Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Frequency	Duration	Reversibility	Environmental or Socio-Economic Context	Significance	Prediction Confidence	

KEY

Direction:
P Positive.
A Adverse.
N Neutral (or No Effect).

Magnitude:
L Low: affects a small group of users.
M Moderate: affects less than the majority of users across multiple activities.
H High: affects the majority of land and resource users across multiple activities.

Geographic Extent:
S Site: includes PDA and 200 m beyond.
L Local: LSA.
R Regional: RSA.

Frequency:
N Not likely to occur.
O Once: Occurs once.
S Sporadic: occurs sporadically.
R Regular: occurs on a regular basis.
C Continuous.

Duration:
S Short term: construction phase only.
M Medium term: continues through operation and maintenance phase.
L Long term: continues beyond operation and maintenance.
P Permanent.

Reversibility:
R Reversible.
I Irreversible.

Environmental or Socio-economic Context:
U Undisturbed: Area relatively or not adversely affected by human activity.
D Developed: Area has been substantially previously disturbed by human development or human development is still present.

Significance:
S Significant.
N Not Significant.

Prediction Confidence:
Based on scientific information and statistical analysis, professional judgment and effectiveness of mitigation or effects management measure.

L Low level of confidence.
M Moderate level of confidence.
H High level of confidence.

N/A Not Applicable.

22.7 Assessment of Cumulative Effects

Traditional land and resource use activities have comprised an important and integral part of the lives and cultures of Québec and Labrador Aboriginal communities (Section 22.5). Although settlement of Aboriginal peoples into communities and the beginning of a more sedentary lifestyle, along with past development activities within their traditional territories and increased road and rail access has influenced the nature, intensity and distribution of these activities in recent decades, these Aboriginal people have continued to carry out such activities and to maintain and preserve these traditional pursuits as a vital aspect of their current societies.

As a result of its location within an existing industrial area which is not used for such activities at present, the Kami Terminal will not adversely affect the location or timing of the current use of land and resources for traditional purposes by Aboriginal persons, nor the overall type and level of such activities by Aboriginal persons or groups. No associated and consequent decrease in the overall quality or underlying cultural value of the current use of land and resources for traditional purposes by Aboriginal persons is therefore anticipated during either phase of the Kami Terminal. The various mitigation measures outlined above and throughout this EIS, will serve to even further avoid or reduce the potential for any such adverse effects. The proposed Kami Terminal would therefore not contribute to any cumulative effects to this VEC within the RSA.

The Kami Terminal will therefore not likely result in significant adverse cumulative effects in combination with other projects and activities that have been or will be carried out.

Table 22.5 Summary of Potential Cumulative Effects to Current Use of Land and Resources for Traditional Purposes by Aboriginal Persons

<table>
<tr><th>VEC Existing Condition
(Past & On-Going Activities)</th><td colspan="8">• The use of land and resources for traditional purposes by Aboriginal persons has been affected and influenced by various issues and factors in previous years (including settlement into permanent communities, past development projects, increased access), but overall it remains a very important and integral aspect of the cultures of these Labrador and Québec Aboriginal groups.</td></tr>
<tr><th>Kami Terminal
Residual Environmental Effects</th><td colspan="8">• The proposed Kami Terminal is not likely to interact with or affect the Current Use of Land and Resources for Traditional Purposes by Aboriginal Persons, given the nature, location and scale of the Kami Terminal and area affected, and because such activities do not currently occur within the PDA or LSA.</td></tr>
<tr><th>Other Projects / Activities</th><th colspan="2">Likely Effect Interaction (Y/N)</th><th colspan="3">Rationale</th><th colspan="3">Cumulative Effects</th></tr>
<tr><td>Pointe-Noire Port Expansion (Port of Sept-Îles)</td><td colspan="2">N</td><td colspan="3" rowspan="6">The Kami Terminal is not likely to affect this VEC, or therefore, to result in / contribute to any cumulative effects.</td><td colspan="3" rowspan="6">The Kami Terminal is not likely to affect this VEC, or therefore, to result in / contribute to any cumulative effects.</td></tr>
<tr><td>CFA and QNS&L</td><td colspan="2">N</td></tr>
<tr><td>Alouette Aluminum Smelter (Aluminerie Alouette)</td><td colspan="2">N</td></tr>
<tr><td>Second Port-Cartier Pellet Plant (ArcelorMittal)</td><td colspan="2">N</td></tr>
<tr><td>Bloom Pointe-Noire Terminal (Cliffs Resources)</td><td colspan="2">N</td></tr>
<tr><td>Arnaud Apatite-Magnetite Mine (Mine Arnaud)</td><td colspan="2">N</td></tr>
<tr><th rowspan="2">Cumulative Effects Summary
(Kami Terminal + All Relevant Projects / Effects)</th><th>Direction</th><th>Magnitude</th><th>Geographic Extent</th><th>Duration</th><th>Frequency</th><th>Reversibility</th><th>Significance</th><th>Confidence</th></tr>
<tr><td>N</td><td>-</td><td>-</td><td>-</td><td>N</td><td>-</td><td>-</td><td>H</td></tr>
<tr><td colspan="9">Summary: The proposed Kami Terminal is not likely to interact with or affect the Current Use of Land and Resources for Traditional Purposes by Aboriginal Persons, or therefore, to result in / contribute to any cumulative effects on this VEC.
Note: Environmental effects descriptors and their definitions are as used in the assessment of environmental effects related to the Kami Terminal (See previous Table).</td></tr>
</table>

22.8 Assessment of Accidents and Malfunctions

During the construction and operation of a development project, an accidental or other unplanned event is an unlikely, but unfortunately possible, outcome.

Some of the potential accidental events or malfunctions that may be associated with the Kami Terminal and which would be particularly relevant for EA purposes include:

- A fire at the Kami Terminal site, potentially extending into adjacent areas and communities; and,
- An accidental release of fuels, chemicals or other substances into the terrestrial and/or aquatic environments resulting from a train derailment or a breach of a stormwater retention pond.

A fire at the Kami Terminal site spreading into adjacent areas could adversely affect land areas and/or resources, rendering then unavailable or unsuitable for traditional land and resource use activities. Similarly, an accidental spill of deleterious substances or other materials into adjacent waterbodies, land areas or otherwise may prevent the use of these for certain (particularly consumptive) activities for particular periods of time. Either a train derailment or a breach of the stormwater retention pond could potentially occur during the Project's construction, operations and/or decommissioning and reclamation phases, the potential environmental effects of which would clearly depend upon the nature, magnitude, location and duration of the event.

Given that traditional land and resource use activities do not occur in or near the Kami Terminal area at present, no effects on the distribution, or levels, or value of such pursuits is anticipated.

Human health and safety and environmental protection have been paramount considerations by Alderon in the planning and design of the Kami Terminal, and these will continue to be key priorities during the construction, operation and eventual decommissioning of the Kami Terminal. As referenced previously and described in some detail elsewhere in this EIS, Alderon has and will develop and implement comprehensive EPPs and ERPs for the various phases of the Kami Terminal. These are being designed to avoid such events and their associated environmental outcomes, or as required, to effectively and efficiently respond to such an accidental event or malfunction should one occur.

The potential environmental effects of accidents and malfunctions related to the Kami Terminal on Current Use of Land and Resources for Traditional Purposes by Aboriginal Persons are summarized in Table 22.6.

Table 22.6 Summary of Residual Environmental Effects for Current Use of Land and Resources for Traditional Purposes by Aboriginal Persons – Accidents and Malfunctions

Accidental Event / Malfunction Scenario	Mitigation / Compensation Measures	Residual Environmental Effects Characteristics									Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental or Socio-Economic Context	Significance	Prediction Confidence	
Change in Activity Distribution (Location and/or Timing)											
Fire	• Siting of Kami Terminal components and activities within existing industrial area / zone • On-going engagement with Aboriginal communities and organizations • Development and implementation of the Kami Terminal EPP and ERP.	N	-	-	-	N	-	D	N	M	• On-going engagement with Aboriginal communities and organizations.
Spill / Release of Hazardous Materials (through a leak or spill, train derailment, or breach of stormwater retention pond, etc)		N	-	-	-	N	-	D	N	M	

Accidental Event / Malfunction Scenario	Mitigation / Compensation Measures	Residual Environmental Effects Characteristics									Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental or Socio-Economic Context	Significance	Prediction Confidence	
Change in Overall Activity Levels											
Fire	• Siting of Kami Terminal components and activities within existing industrial area / zone • On-going engagement with Aboriginal communities and organizations • Development and implementation of the Kami Terminal EPPand ERP.	N	-	-	-	N	-	D	N	M	• On-going engagement with Aboriginal communities and organizations.
Spill / Release of Hazardous Materials (through a leak or spill, train derailment, or breach of stormwater retention pond, etc)		N	-	-	-	N	-	D	N	M	
Resulting Change in Overall Quality and Cultural Value of the Activity											
Fire	• Siting of Kami Terminal components and activities within existing industrial area / zone • On-going engagement with Aboriginal communities and organizations • Development and implementation of the Kami Terminal EPP and ERP.	N	-	-	-	N	-	D	N	M	• On-going engagement with Aboriginal communities and organizations.
Spill / Release of Hazardous Materials (through a leak or spill, train derailment, or breach of stormwater retention pond, etc)		N	-	-		N	-	D	N	M	

Accidental Event / Malfunction Scenario	Mitigation / Compensation Measures	Residual Environmental Effects Characteristics									Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental or Socio-Economic Context	Significance	Prediction Confidence	

KEY

Direction:
- P Positive.
- A Adverse.
- N Neutral (or No Effect).

Magnitude:
- L Low: affects a small group of users.
- M Moderate: affects less than the majority of users across multiple activities.
- H High: affects the majority of land and resource users across multiple activities.

Geographic Extent:
- S Site: includes PDA and 200 m beyond.
- L Local: LSA.
- R Regional: RSA.

Frequency:
- N Not likely to occur.
- O Once: Occurs once.
- S Sporadic: occurs sporadically.
- R Regular: occurs on a regular basis.
- C Continuous.

Duration:
- S Short term: construction phase only.
- M Medium term: continues through operation and maintenance phase.
- L Long term: continues beyond operation and maintenance.
- P Permanent.

Reversibility:
- R Reversible.
- I Irreversible.

Environmental or Socio-economic Context:
- U Undisturbed: Area relatively or not adversely affected by human activity.
- D Developed: Area has been substantially previously disturbed by human development or human development is still present.

Significance:
- S Significant.
- N Not Significant.

Prediction Confidence:
Based on scientific information and statistical analysis, professional judgment and effectiveness of mitigation or effects management measure.
- L Low level of confidence.
- M Moderate level of confidence.
- H High level of confidence.

N/A Not Applicable.

22.9 Determination of Significance of Residual Adverse Environmental Effects

22.9.1 Determination of Significance of Project Effects

The Kami Terminal is not likely to interact with, or adversely affect the location or timing of, the current use of land and resources for traditional purposes by Aboriginal persons, nor the overall type and level of such activities by Aboriginal persons and groups. The various mitigation measures outlined above and throughout this EIS will serve to even further avoid or reduce the potential for any such adverse effects. No associated and consequent decrease in the overall quality or underlying cultural value of the current use of land and resources for traditional purposes by Aboriginal persons is therefore anticipated during either phase of the Kami Terminal.

22.9.2 Determination of Significance of Cumulative Effects

The proposed Kami Terminal is not likely to interact with or affect the Current Use of Land and Resources for Traditional Purposes by Aboriginal Persons, or therefore, to result in / contribute to any cumulative effects on this VEC.

22.9.3 Determination of Significance of Effects Resulting from Accidents and Malfunctions

Possible accidental events or malfunctions include a fire or the accidental release of fuels, chemicals or other substances into the environment (such as through a leak or accidental spill, breach of the tailings management facility stormwater retention pond, train derailment, etc.). Either of these events could potentially occur during the Project's construction, operations and/or decommissioning and reclamation phases, the potential environmental effects of which would clearly depend upon the nature, magnitude, location and duration of the event. Alderon has and will develop and implement comprehensive EPPs and ERPs for the various phases of the Kami Terminal. Given the highly industrial nature of the PDA at present, along with the lack of known Aboriginal land and resource use in the area at present, no changes in the overall distribution or levels of such pursuits or their cultural value is anticipated as a result of any such event.

22.9.4 Overall Residual Effects Conclusion

The Kami Terminal is not likely to result in any adverse effects on the Current Use of Land and Resources for Traditional Purposes by Aboriginal Persons.

In summary, given the planned mitigation, and the analyses presented in this assessment, the effects of change in activity distribution, change in overall activity levels, and resulting change in overall quality and cultural value of the activity on the Current Use of Land and Resources for Traditional Purposes by Aboriginal Persons as a result of the construction, operation and decommissioning of the Kami Terminal, including cumulative effects, are not likely to be significant. The effects of accidents and malfunctions are not likely to be significant.

22.10 Follow-up and Monitoring

Any follow-up and monitoring programs that have been identified and proposed for other VECs (particularly for the biophysical environment) will be indirectly applicable to land and resource use. No follow-up and monitoring activities specific to this VEC have been identified or proposed.

22.11 Next Steps

Alderon will continue to be open to and available for discussions with relevant Aboriginal communities and organizations to provide information on the Kami Terminal and updates on on-going and planned activities, as required and requested

22.12 Summary

The Kami Terminal is not likely to result in significant adverse effects on the Current Use of Land and Resources for Traditional Purposes by Aboriginal Persons, either in and of itself or in combination with other projects and activities.

23.0 OTHER CURRENT USE OF LANDS AND RESOURCES

23.1 VEC Definition and Rationale for Selection

Other Current Use of Lands and Resources is defined as use of lands and resources related to Port operations at Pointe-Noire Terminal, including industrial uses, within the Kami Terminal and along the right-of-way of associated infrastructure. It was selected as a VEC due to potential Kami Terminal interactions that could result from:

- The exclusion or promotion of industrial development at the site;
- Interactions with residential and recreational property in the vicinity of the site and associated infrastructure; or,
- Alteration of viewscapes of the Marconi Peninsula.

Other Current Use of Lands and Resources occurring within the LSA—where direct environmental effects from the Kami Terminal may result in changes in the VEC—include land uses in the Pointe-Noire industrial sector and Val Sainte-Marguerite. Land uses within the Pointe-Noire industrial area are exclusively industrial. The portion of Val Sainte-Marguerite contained within the LSA includes residential property, recreational property (campground), agriculture, and a small amount of forestry. No hunting, trapping, or outdoor recreational activities occur within the LSA and are therefore not considered in this assessment. The other uses of land and resources to be considered (i.e., residential and recreational property use and agriculture) are prohibited at the Port site. As such, industrial development is the only type of land or resource use for which the Kami Terminal may result in direct physical effects.

Residential and recreational property use is considered in this assessment because of potential indirect effects of Kami Terminal-related activities resulting from effects of the Kami Terminal on the Atmospheric Environment. These effects are considered in Chapter 14. Residential and recreational properties are considered to be sensitive receptors to such vectors as air emissions (dust), noise, vibration and light. Thus, further assessment is required, especially given that residential and recreational properties are the nearest other land use to the Kami Terminal and associated infrastructure. Agriculture and forestry are not considered to be sensitive receptors and are located several kilometres from the Kami Terminal site. The potential for the Kami Terminal to result in significant adverse environmental effects on agriculture and forestry through indirect effects such as dust emissions, noise, vibration and ambient light is considered very low or non-existent. No further assessment of agricultural or forestry uses within the LSA will be carried out in this EIS.

Viewscapes are included in this assessment as changes in the visual aesthetics of the Marconi Peninsula were raised as a concern during the engagement and consultation process. Burcher (2005, p.1) defines a viewscape as a "visual connection that occurs between a person and the spatial arrangement of urban and landscape features." Three components that make up a viewscape include the view subject, vantage points, and visual corridors.

23.1.1 Issues

During engagement activities, the public and other stakeholders raised the issue of the Kami Terminal's potential effect on visual aesthetics three times. Accordingly, this issue is included in the assessment of the VEC. Details on the issues raised by stakeholders are provided in Table 23.1. The number of times this issue was raised is shown in Figure 23.1.

Table 23.1 Issues Raised by Aboriginal Groups and Stakeholders

Issue	Community	Summary of comments raised during consultation and engagement activities	Response/Location in Environmental Impact Statement
Visual Aesthetics	Sept-Îles	Visual effects of the port facilities, including stockpile	No impacts on visual aesthetics (viewscapes) are anticipated for residential areas of Sept-Îles as they are located on the opposite side of the Bay from the Pointe-Noire Terminal, at a distance of approximately 7 km. They will represent a minimal visual change from other existing industrial port facilities. Additional information can be found in **Sections 23.4 and 23.6**

23.2 Environmental Assessment Boundaries

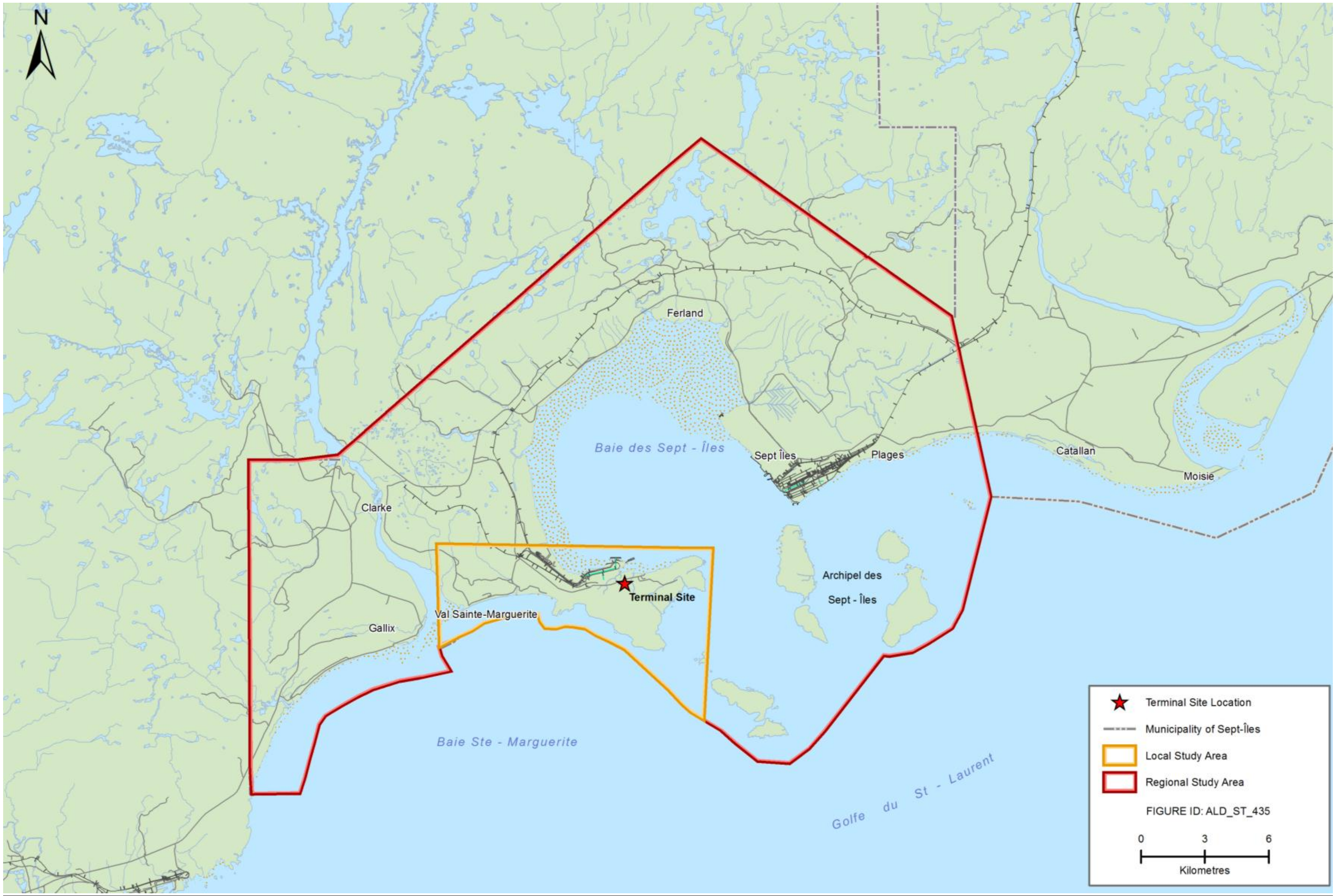
23.2.1 Spatial Boundaries

The spatial boundaries for the environmental effects assessment of the Other Current Use of Lands and Resources are defined below.

Local Study Area

For the environmental effects assessment of the Other Current Use of Land and Resources, the LSA includes the PDA related to the Kami Terminal in its entirety as well as the surrounding industrial development zones on the Marconi Peninsula. The LSA also includes the low density residential and recreational area of Val Sainte-Marguerite located at the mouth of the rivière Sainte-Marguerite some 1.5 km from the PDA, as well as the low density residential areas located close to the railway tracks around the baie des Sept-Îles (Figure 23.1).

Figure 23.1 Local and Regional Study Areas



Regional Study Area

The RSA, which takes into account the area of influence, is limited to the city of Sept-Îles, beyond which no interactions between the Kami Terminal and this VEC are anticipated (Figure 23.1).

23.2.2 Temporal Boundaries

The temporal boundaries for the assessment of the potential environmental effects of the Kami Terminal on Other Current Use of Lands and Resources include the Kami Terminal phases of construction (approximately 2 years), operation and maintenance (approximately 17 years), and decommissioning / reclamation (approximately 1 year).

23.2.3 Administrative Boundaries

The management of industrial development at the site falls under the purview of the Port of Sept-Îles Authority, of the City of Sept-Îles and of the MRC de Sept-Rivières. Residential and recreational property in the Val Sainte-Marguerite area, as well as the low density residential areas located close to the railway tracks around the baie des Sept-Îles, come under the responsibility of the City of Sept-Îles and of the MRC de Sept-Rivières. Viewscapes and visual corridors may be governed at the municipal level through planning regulations. Land-use bylaws of the City of Sept-Îles do not identify any protected visual corridors for the Kami Terminal site (de Champlain, personal communication, August 1, 2012).

23.3 Establishing Standards or Thresholds for Determining Significance of Environmental Effects

The likely effects of the Kami Terminal on Other Current Use of Lands and Resources are described using the following attributes, which are based on standard environmental practice and EIS guidelines:

- **Direction:**
  - Beneficial - condition of other current use of land and resources is improved in comparison to baseline conditions and trends;
  - Neutral - no change in the condition of other current use of land and resources compared to baseline conditions and trends; or,
  - Adverse - condition of other current use of land and resources is worsened in comparison to baseline conditions and trends.
- **Magnitude:**
  - Low: affects a small group of land and resource users;
  - Moderate: affects less than the majority of land and resource users across multiple activities; or,
  - High: affects the majority of land and resource users across multiple activities.

- **Geographical Extent:**
  - Site-specific: effect restricted to the Kami Terminal footprint within the LSA;
  - Local: effect restricted to the LSA; or,
  - Regional: effect extends beyond the LSA but is within the RSA.
- **Frequency:**
  - Intermittent - effect will occur at various, intermittent times; or,
  - Continuous - effect will occur continuously.
- **Duration:**
  - Short-term: effect occurs for less than three years;
  - Medium-term: effect occurs for the life of the Kami Terminal; or,
  - Long-term: effect persists beyond the life of the Kami Terminal.
- **Reversibility:**
  - Reversible: effect ceases when Kami Terminal operations cease; or,
  - Irreversible: effect continues after Kami Terminal operations cease.
- **Ecological and Socio-Economic Context:**
  - Undisturbed - Area relatively or not adversely affected by human activity; or,
  - Disturbed or Developed - Area has been substantially previously disturbed by human development or human development is still present.

The significance definition for potential environmental effects on Other Current Use of Lands and Resources is defined here as: an environmental effect resulting from the Kami Terminal and characterized by interruptions, disruptions or disturbances to current or future lands or resources by Kami Terminal activities such that land use activities are restricted and/or degraded and/or cannot continue at present levels. A significant adverse environmental effect may be defined as one resulting in an alteration or loss of current or future lands or resources.

23.4 Potential Project-VEC Interactions

The effects that are assessed for Other Current Use of Lands and Resources are:

- Change to industrial development;
- Change to residential and recreational activities; and,
- Changes to viewscapes.

The assessment of effects related to changes to industrial development in the Pointe-Noire Terminal Area is based upon an analysis of the compatibility of the Kami Terminal with the Land Use Plan of the City of Sept-Îles and with the Land Use Plan of the Port of Sept-Îles. It is also based upon an analysis of the Kami Terminal's compatibility with the Port of Sept-Îles

Authority's long-term staged expansion plan for its iron ore concentrate and bulk handling terminal facilities at Pointe-Noire.

The assessment of effects related to changes in residential and recreational property is based upon the potential increase in air emissions and noise levels related to Kami Terminal construction and operation and maintenance activities in the Pointe-Noire Terminal area and on the extent to which they may lead to disturbances to residential and recreational uses in the Val Sainte-Marguerite area and in low density residential areas located close to the railway tracks around the baie des Sept-Îles.

The assessment of effects on viewscapes of the Marconi Peninsula is based upon an analysis of maps and visits to vantage points around baie des Sept-Îles offering viewscapes of the Kami Terminal site.

Table 23.2 provides a list of Kami Terminal activities and physical works and an evaluation of the degree to which an interaction with the VEC is expected or not to occur. The interactions are ranked either as a 0 (no interaction occurs), 1 (interaction occurs, but the resulting effect can be managed through proven mitigation and codified practice), or as a 2 (an interaction occurs and has the potential to exceed regulatory standards and therefore requires further assessment). Those interactions ranked as 0 or 1 are discussed in this section; those ranked as 2 are further assessed in Section 23.6.

Table 23.2 Potential Environmental Effects of Kami Terminal on Other Current Use of Lands and Resources

Kami Terminal Activities and Physical Works	Potential Environmental Effects		
	Changes to Industrial Development	Changes to Residential and Recreational Uses	Changes to Viewscapes
Construction			
Site Preparation (incl. clearing, excavation, blasting, material haulage, grading, removal of overburden and stockpiling)	2	2	1
Construction of Load-out Facilities (rail dumper building, rail car dumper and hopper, train positioner transfer houses, conveyors, dust collector, maintenance building, substation, sanitation system)	2	2	1
Construction of Railway Loop	2	2	1
Construction of Stream Diversion	1	1	0
Onsite Vehicle/Equipment Operation	1	1	0
Waste Management	1	1	0
Transportation of Personnel and Goods to Site	1	1	0
Expenditures	0	0	0
Employment	0	0	0

Kami Terminal Activities and Physical Works	Potential Environmental Effects		
	Changes to Industrial Development	Changes to Residential and Recreational Uses	Changes to Viewscapes
Operation and Maintenance			
Rail Transport	1	2	1
Concentrate Handling and Stockpiling	1	1	1
Water Collection, Treatment and Discharge	0	0	0
Onsite Vehicle/Equipment Operation and Maintenance	0	0	0
Waste Management	0	0	0
Transportation of Personnel and Goods to Site	0	0	0
Expenditures	0	0	0
Employment	0	0	0
Decommissioning and Reclamation			
Site clean-up	1	1	0
Accidents and Malfunctions			
Forest Fire	0	0	0
Stormwater Retention Pond Breach	0	0	0
Train Derailment	1	1	0
KEY 0 = No interaction 1 = Interaction occurs; however, based on past experience, the resulting effect can be managed to acceptable levels through standard operating practices and/or through the application of best management or codified practices. No further assessment is warranted. 2 = Interaction occurs, and resulting effect may exceed acceptable levels without implementation of specified mitigation. Further assessment is warranted.			

Potential environmental effects on viewscapes are only anticipated for areas of Sept-Îles with a direct view on the Port site: Central, Ferland, and shore-front properties located along a segment on baie des Sept-Îles along Highway 138 leading from Pointe-Noire to Central Sept-Îles. Viewscapes connecting Sept-Îles and the Kami Terminal site on the Marconi Peninsula exist between several points along the shore of the baie des Sept-Îles, including properties located along the shoreline beside highway 138 and the Central sector in Sept-Îles some 7 km away.

Viewscapes do not exist between Val Sainte-Marguerite and the Port because a ridge along the Marconi Peninsula blocks any possible visual corridor. Photographs taken from Vieux Quai (Photo 23.1), located on rue Arnaud along the waterfront of Central Sept-Îles and Jardins de l'Anse (Photo 23.2), closer to the Ferland sector, show typical daytime viewscapes. The existing viewscapes include Pointe-Noire industrial development. Visible elements from the vantage point of Vieux-Quai include the Aluminerie Alouette building and silos, a communication tower, ships, port infrastructures, and the ridge of the Marconi Peninsula. The existing Consolidated Thompson rail loop is not visible.

Jardins de l'Anse is a municipal park with a lookout structure. The view of Pointe-Noire from this vantage point is partially obstructed by a spit of land, making only the top of the Aluminerie Alouette silos, communication tower, and some port infrastructures visible.

Potential Kami Terminal interactions with viewscape are ranked as "0" and "1". Potential environmental effects may result from the construction of the rail loop and other infrastructures as they will alter the elevation of the site and introduce new visual subjects to the view.

Photo 23.1 Viewscape of Pointe-Noire Taken from Vieux-Quai, Sept-Îles

Photo 23.2 Viewscape of Pointe-Noire Taken from Jardins de l'Anse, Sept-Îles

Nevertheless, these will have a near imperceptible effect on the viewscape as they will neither block the visual corridor to the forested ridge of the Marconi Peninsula nor will they be highly distinguishable from existing industrial development. Concentrate handling infrastructure and stockpiles may be visible, but will be hardly distinguishable from existing stockpiles and installations.

Nigh time viewscapes may be slightly changed as a result of changes the number of point sources of light used in the construction and operations and maintenance phases. These lights will be visible along with existing point sources of light at installations on the Pointe-Noire Terminal. With standard mitigation, the effects of these lights will be not significant.

The potential environmental effects on viewscapes are considered not significant and will not be treated further in this assessment.

Measurable parameters for the environmental effects analysis are selected when the VEC requires specific indicators for additional focus. Measurable parameters are not required for this VEC. As stated previously, the analysis of environmental effects related to changes to industrial development is based upon an analysis of the compatibility of the Kami Terminal with municipal and Port Land Use Plans and with the Port Authority's long-term staged expansion plan for its iron ore concentrate and bulk handling terminal facilities at Pointe-Noire. The analysis of environmental effects related to changes to residential and recreational property is based upon assessments of the results of an air quality and atmospheric dispersion study and of a noise and vibrations study carried out in April and May 2012 for the Kami Terminal.

23.5 Existing Environment

Current Industrial Lands and Resources Use in the PDA

Information on industrial expansion plans and current industrial uses within the boundaries of the Port of Sept-Îles Authority facilities on Pointe-Noire is presented below.

In accordance with the City of Sept-Îles Land Use Plan, the Kami Terminal site is located in an Industrial zone designated for Large-scale Industry (Ib). This zone covers all of the Marconi Peninsula and includes existing large-scale industrial uses such as the Aluminerie Alouette aluminum smelter. Municipal zoning for areas that extend beyond the Marconi Peninsula is for the most part designated as Extractive Industry (Ie), with the exception of the small Low density residential zone (Ha) of Val Sainte-Marguerite at the mouth of the rivière Sainte-Marguerite (refer to Figure 23.2).

In accordance with the Port of Sept-Îles Land Use Plan, the Kami Terminal site is located within an industrial port development area for the handling of iron ore that is adjacent to the existing Aluminerie Alouette aluminum smelter (see Figure 23.3). Currently, iron ore customers for the Port include Cliff's Natural Resources, Consolidated Thompson Iron Mines Ltd, Labrador Iron Mine Holdings Limited, Tata Steel Limited, New Millennium Iron Ore Corporation and the IOCC. These companies have plans for increased production and there are a number of projects in development.

Figure 23.2 City of Sept-Îles Land Use Plan – Pointe-Noire and Val Sainte-Marguerite Sectors

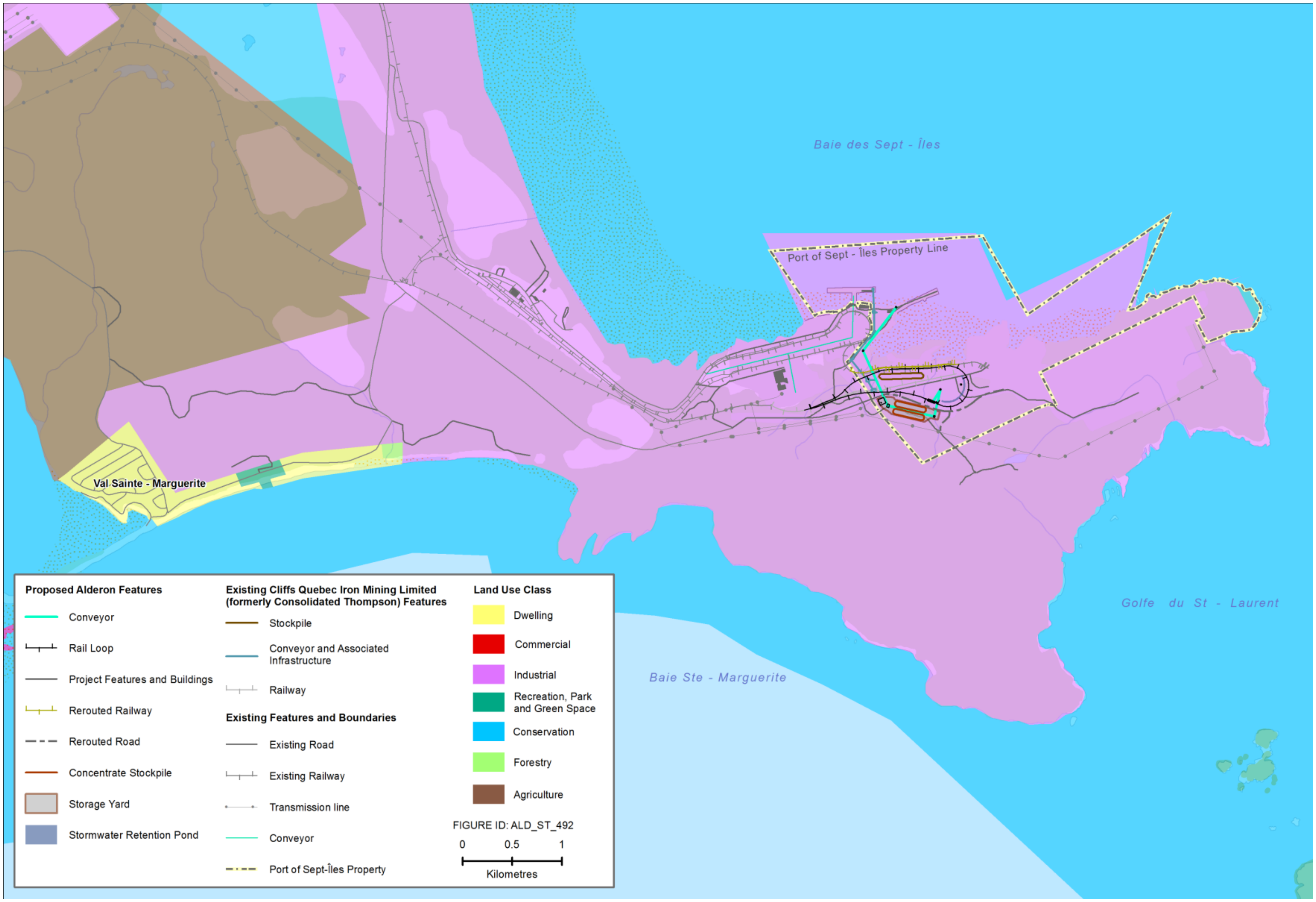
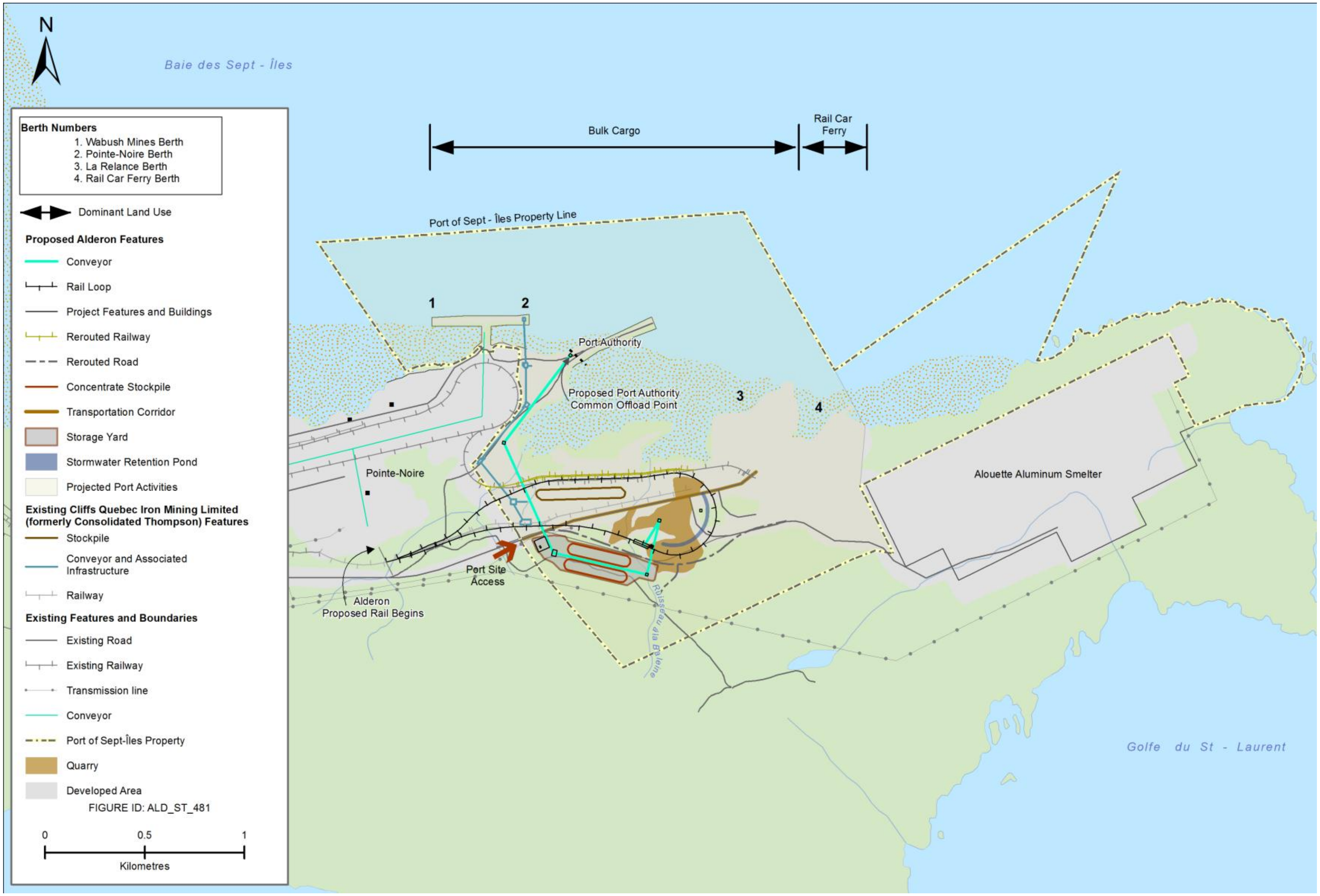


Figure 23.3 Port of Sept-Îles Land Use Plan – Pointe-Noire Sector



Alderon's concentrate unloading, stacking, storage, and reclaiming facilities are included in the Port's development plans, and the site location for the storage yard was determined by the Port Authority. The Alderon Terminal is planned to provide rail car unloading capability for additional future users, with regards to the Port's long-term expansion goals. Alderon's storage yard will be used exclusively by Alderon, although conveyor galleries will transport the ore to the common Port-owned ship loading facilities. Some Alderon conveyor lines will be located over areas leased by Consolidated Thompson, but will be at a sufficient clearance height and have supports at acceptable locations so as not to affect their operations.

Current Residential and Recreational Lands and Resources Use in the LSA

The closest residential and recreational land uses to the Kami Terminal site are in the low density residential and recreational Val Sainte-Marguerite area located at the mouth of the rivière Sainte-Marguerite (at a distance of about 1.5 km), followed by low density residential areas located around the baie des Sept-Îles (at a distance of about 7 km). Among the different residential buildings around the bay, the nearest is located at approximately 375 m from the railway that connects iron ore mines in Northeastern Québec and Labrador to the Pointe-Noire Terminal.

23.6 Assessment of Project-Related Environmental Effects

Each environmental effect on Other Current Use of Lands and Resources is assessed hereafter for each Kami Terminal phase. Table 23.3 provides an overview of Kami Terminal residual environmental effects for this VEC.

23.6.1 Construction

Changes to Industrial Development

The works required to prepare the site (clearing, excavation, blasting, material haulage, grading, removal of overburden and stockpiling, etc.), to build concentrate unloading, stacking, storage, and reclaiming facilities (rail dumper building, rail car dumper and hopper, train positioner transfer houses, conveyors, dust collector, maintenance building, substation, sanitation system) and a railway loop, will require the realignment of an access road and underground water main connecting to the Aluminerie Alouette aluminum smelter on the Marconi Peninsula. The proposed realignment has been agreed upon with the Port authorities (refer to Figure 23.4). Specific details related to the realignment of the access road and underground water main (such as the proposed capacity of the main) remain to be worked out with municipal authorities and management of the Aluminerie Alouette aluminum smelter.

Changes to Residential and Recreational Property

Anticipated increases in air emissions and noise levels related to Kami Terminal construction activities in the Pointe-Noire Terminal area may cause disturbances to residential and recreational uses in the Val Sainte-Marguerite area. This area is located at a distance of about 1.5 km at the mouth of the rivière Sainte-Marguerite, on the other side of the Marconi Peninsula.

According to the results of the Air Quality Dispersion Modelling Study (Stantec 2012a, Appendix G) conducted for the Kami Terminal, air emissions incurred during Kami Terminal construction are expected to be small and of a short duration, and are not expected to cause substantive changes in air quality in surrounding residential and recreational areas.

Drawing from the findings of the assessment of environmental effects related to the Kami Terminal on the acoustic environment, noise emissions from construction activities will be intermittent in nature over the course of the two-year period. The nearest dwelling to the site is over 1.5 km away and is unlikely to experience significant effects to the acoustic environment. Noise emissions during the Kami Terminal operation and maintenance phase are expected to be higher, more continuous and larger in geographical extent.

Results of the vibrations modelling study indicate the typical vibration pattern from machinery operation. Blasting activities associated with site preparation could be strong enough to cause structural damage to nearby houses; however blasting plans are typically designed to keep vibrations within a range that factor in the distance to the nearest houses to avoid structural damage. Residents may still feel a light vibration running through the ground. The overall effect of all these activities will not be intense as activities will not occur simultaneously and will be sporadic. The vibrations associated with these activities are expected to be imperceptible beyond a few tens of meters of the site; as such the residents of Central and Plage-Sainte-Marguerite, located at a distance from the PDA of 10 km and 5 km respectively, will not be disturbed.

The construction phase may cause changes in the ambient light quality. The bright powerful lights that will be used to illuminate the construction area will result in glare and vertically directed light, thereby degrading the night sky, which can be considered of considerable aesthetic value to residents and other people enjoying the recreational areas adjacent to the industrial zone.

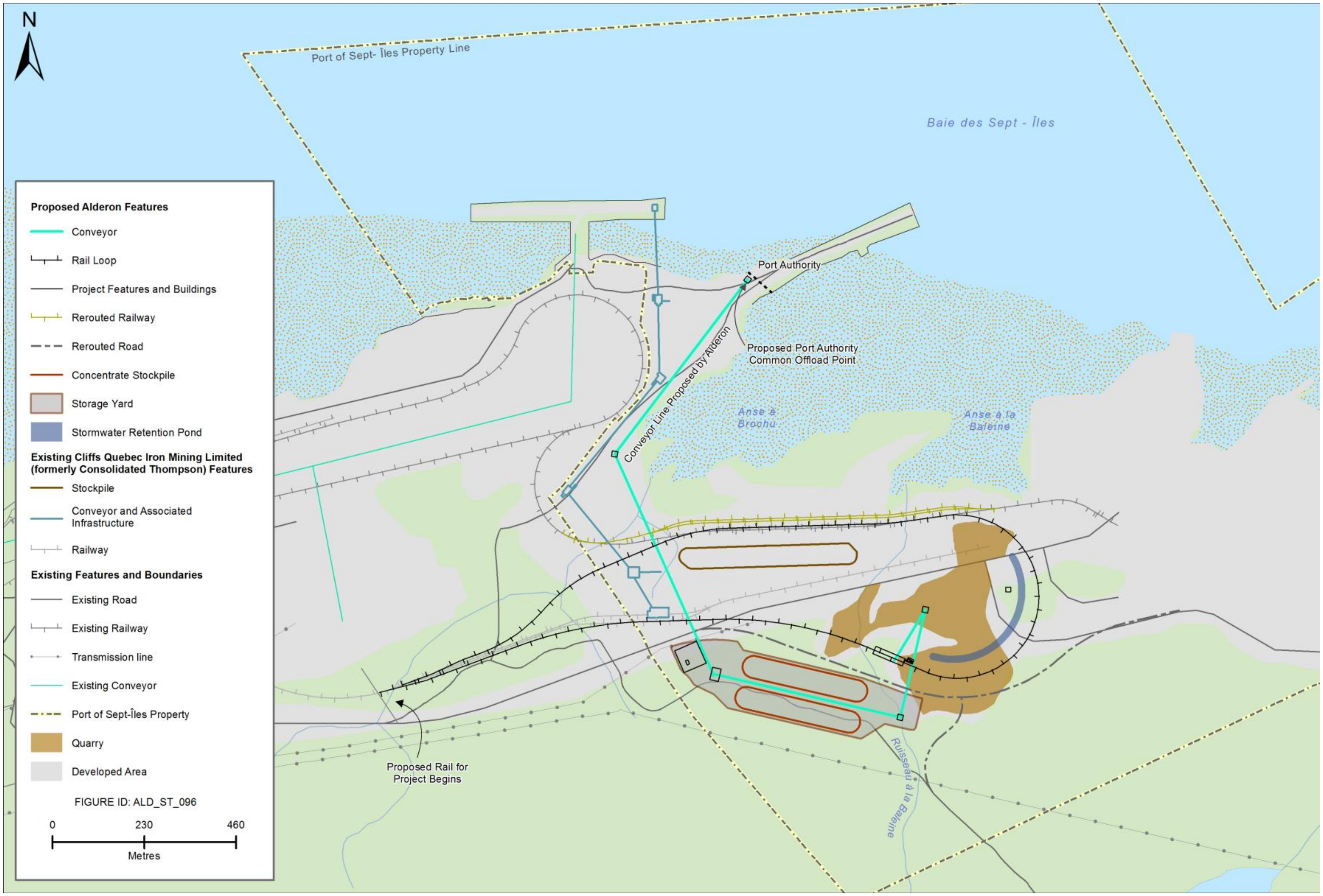
Mitigation of Project Environmental Effects

Realignment of the access road and water main and stockpile rocks within the PDA will be carried out in a manner that minimizes effects on the Aluminerie Alouette aluminum smelter. The stockpiling of rocks resulting from removal of overburden during construction will also be minimized through appropriate site planning.

On the basis of the results of the Air Quality Dispersion Modelling Study (Stantec 2012a, Appendix G), anticipated increases in air emissions related to Kami Terminal construction in the Pointe-Noire Terminal area are not expected to cause substantive changes in air quality in surrounding residential and recreational areas. Therefore, no specific mitigation measures are required.

Although noise associated with the construction phase is not expected to produce a significant adverse effect, various best practices will be implemented to reduce the level of nuisance. Mitigation of noise emissions from construction machinery will be achieved through proper muffler installation, regular maintenance and enforceable low-speed standards on-site.

Figure 23.4 Kami Terminal Layout in the Port of Sept-Îles



To mitigate potential effects of blasting activities, blast design plans will ensure that vibrations remain below the level that would cause structural damage to the nearest receptor outside the Kami Terminal site.

To manage the environmental effects to the ambient light, construction lighting will adhere to guidelines to be included in the EPP, including using only the amount of lighting that is required.

23.6.2 Operations and Maintenance

Changes to Industrial Development

No constraints will be imposed on other industrial activities by operations and maintenance activities within the boundaries of the Port Authority of Sept-Îles facilities on the Marconi Peninsula. The Pointe-Noire Terminal will be planned to provide rail car unloading capability for additional future users, in order to follow the Port's long-term expansion goals. Alderon's storage yard will be used exclusively by Alderon, although conveyor galleries will transport the ore to the common Port-owned ship loading facilities. Some Alderon conveyor lines will be located over areas leased by Consolidated Thompson, but will be at a sufficient clearance height and have supports at acceptable locations so as not to affect their operations.

Changes to Residential and Recreational Property

Rail transport activities during the Kami Terminal operations and maintenance phase have been determined to have a potential environmental effect on residential and recreational property inside the LSA. Anticipated increases in air emissions and in noise levels related to Kami Terminal operations and maintenance activities in the Pointe-Noire industrial area may lead to disturbances in low density residential areas located close to the railway tracks around the baie des Sept-Îles.

According to the results of the Air Quality Dispersion Modelling Study (Stantec 2012a, Appendix G) conducted for the Kami Terminal, exceedances of air emissions standards during the operations and maintenance phase are expected to be limited to within a perimeter of 100 m around the PDA and are not expected to cause substantive changes in air quality. Emissions from the diesel locomotive used for transporting the concentrate to Sept-Îles and along the bay are not expected to cause substantive changes in air quality as such emissions will be intermittent (two round trips per day) and short-term in duration. Overall, the modelling results show that the local and regional changes in air quality due to Kami Terminal-related emissions, including background, are not expected to be substantive.

Noise emissions are expected to occur during the entire duration of the operations and maintenance phase. Significant noise emissions are expected to occur at each transfer point as a result of the operation of the conveyors, locomotive engines, and railcars both leading up to the site and on-site on the rail loop. Off-site, the trains will pass the community of Ferland around the baie des Sept-Îles and arrive at the port site near Plage-Sainte-Marguerite. Quantitative modelling of on-site activities was carried out to assess the possible effects on several locations representing clusters of residences or recreational areas. It was found that operations at the port site and additional traffic along the railway will result in increased noise levels from the baseline levels; however the effects will not surpass the thresholds established by Health Canada for dwellings.

The level of vibrations during the operation and maintenance phase will depend on the rail type, train speed, vehicle parameters, track conditions and other variables. These design parameters are still under consideration, but the estimated vibration and ground-borne noise will meet the guidelines set out by Health Canada for locations at a distance of 80 m from the PDA and beyond. As the nearest residences/recreational areas are 700 m away, it is expected that there will be no perceptible effect resulting from rail-induced vibration.

Lighting used in the operations phase will have different effects on residential and recreational land uses, depending on the type of lighting. The type of permanent fixtures for the facilities and their location on the various buildings will result in minimal changes to the ambient light. However, the effect of lighting from the trains will be less easy to control, and such lighting is necessary for safety and efficient operation. Trains passing nearby residences in Ferland and Plage-Sainte-Marguerite may cause some disturbance.

Mitigation of Project Environmental Effects

On the basis of the results of the Air Quality Dispersion Modelling Study (Stantec 2012a, Appendix G), anticipated increases in air emissions and in levels of noise and vibrations related to Kami Terminal operations and maintenance activities in the Sept-Îles area are not expected to lead to disturbances to low density residential areas located close to the railway tracks around the baie des Sept-Îles. Therefore, no specific mitigation measures are required.

Mitigation of potential effects on the acoustic environment during operation and maintenance will include:

- Enclosing conveyors and conveyor transfer points;
- Creating or maintaining vegetation buffers by minimizing the disturbed area; and,
- Adhering to comprehensive vehicle and machinery maintenance programs to maximize efficiency and reliability.

Ambient light quality can be conserved through proper shielding of light fixtures at the facilities. Any lateral lighting will be located on the south side of the facility and pointed away from the baie des Sept-Îles. Also, maintaining a vegetation buffer as much as possible along the railway will shield nearby rural dwellings.

23.6.3 Decommissioning and Reclamation

Given the nature of the works required at the Pointe-Noire Terminal during the decommissioning phase, which are limited to site clean-up and the transfer of equipment to the Port or a third party, effects are anticipated to be not significant.

23.6.4 Summary of Project Residual Effects

The residual environmental effects of the Kami Terminal on Other Current Use of Land and Resources are summarized in Table 23.3. The residual environmental effects on Other Current Use of Land and Resources for construction and operation of the Kami Terminal are characterized by the following descriptors: direction; magnitude; geographic extent; duration and frequency; reversibility; ecological/socio-economic context, significance, and prediction confidence.

Table 23.3 Summary of Residual Environmental Effects of Kami Terminal: Other Current Use of Land and Resources

Kami Terminal Phase	Mitigation/Compensation Measures	Residual Environmental Effects Characteristics									Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental or Socio-Economic Context	Significance	Prediction Confidence	
Changes to Industrial Development											
Construction	• Realign access road and water main and stockpile rocks to minimize effects on the Aluminerie Alouette aluminum smelter.	A	L	S	ST	O	I	D	N	H	• No monitoring required.
Operation and Maintenance		A	L	S	LT	O	I	D	N	H	
Decommissioning and Reclamation		A	L	S	ST	O	I	D	N	H	
Changes to Residential and Recreational Property											
Construction	• Proper muffler installation. • Comprehensive vehicle and machinery maintenance program. • Enforceable low-speed standards on-site. • Blast design plans. • Use of full horizontal cut off light fixtures. • Locate lateral lighting fixtures on south side of facility. • Direct lateral lighting away from the baie des Sept-Îles. • Enclose conveyor transfer points. • Vegetation buffers.	A	L	L	ST	O	I	D	N	H	• Participate in air quality monitoring program initiated in Sept-Îles.
Operation and Maintenance		A	L	L	LT	S	I	D	N	H	
Decommissioning and Reclamation		A	L	S	ST	O	I	D	N	H	

Kami Terminal Phase	Mitigation/Compensation Measures	Residual Environmental Effects Characteristics									Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental or Socio-Economic Context	Significance	Prediction Confidence	

KEY

Direction:

B Beneficial - condition of other current use of land and resources is improved in comparison to baseline conditions and trends.

N Neutral - no change in the condition of other current use of land and resources compared to baseline conditions and trends.

A Adverse - condition of other current use of land and resources is worsened in comparison to baseline conditions and trends.

Magnitude:

L Low - affects a small group of land and resource users.

M Moderate - affects less than the majority of land and resource users across multiple activities.

H High - affects the majority of land and resource users across multiple activities.

Geographic Extent:

S Site-specific – effect restricted to the Kami Terminal footprint within the LSA.

L Local - effect restricted to within the LSA.

R Regional - effect extends beyond the LSA but is within the RSA.

Duration:

ST Short term – effect occurs for less than three years.

MT Medium term – effect occurs for the life of the Kami Terminal.

LT Long term – effect persists beyond the life of the Kami Terminal.

P Permanent – will not change back to original condition.

Frequency:

O Occasionally, once per month or less.

S Occurs sporadically at irregular intervals.

R Occurs on a regular basis and at regular intervals.

C Continuous.

Reversibility:

R Reversible – effect ceases when Kami Terminal operations cease.

I Irreversible – effect continues after Kami Terminal operations cease.

Environmental and Socio-economic Context:

U Undisturbed - Area relatively or not adversely affected by human activity.

D Developed - Area has been substantially previously disturbed by human development or human development is still present.

N/A Not Applicable.

Significance:

S Significant.

N Not Significant.

Prediction Confidence:

Based on scientific information and statistical analysis and effectiveness of mitigation or effects management measure.

L Low level of confidence.

M Moderate level of confidence.

H High level of confidence.

23.7 Assessment of Cumulative Effects

In association with the Kami Terminal environmental effects discussed above, an assessment of the potential cumulative effects has been conducted for other projects and activities that have potential to interact with the Kami Terminal. The potential for overlap between Kami Terminal activities and cumulative effects of other projects is identified in Table 23.4.

Assessing the cumulative effects of the Kami Terminal with other projects in the region of Sept-Îles is challenging given that the detailed characteristics of these other projects, including the timing and duration of each project and hence how they will overlap and otherwise interact, are unknown. Furthermore, the timing of planned projects is always open to question, and some may not proceed.

A number of major industrial and mining projects will be underway over the next few years in the region of Sept-Îles. These are likely to lead to additive cumulative interactions with the Kami Terminal, particularly with regards to changes to residential and recreational property. However, with proper mitigation, air, light and noise emissions related to all of the projects will amount to a negligible increase in cumulative emissions for nearby residential and recreational receptors, falling below current baseline measurements. The predicted residual cumulative effects of the projects under consideration on industrial development in the PDA are therefore considered with a moderate level of confidence to be not significant. The predicted residual cumulative effects of the projects under consideration on residential and recreational property in the LSA are also considered with a moderate level of confidence to be not significant.

Table 23.4 Potential Cumulative effects to Other Current Use of Land and Resources

VEC Existing Condition (Past and On-Going Activities)	• A number of industrial and mining development projects are currently planned in the Pointe-Noire Terminal area. These projects raise concerns regarding the interactions that could result from the exclusion / promotion of industrial development at the site. • Even if a 2010 air quality study conducted in the city of Sept-Îles by MDDEP was not able to provide conclusive evidence that local industries had a measurable effect on local air quality, background levels of air emissions and noise and vibrations related to industrial activity remain a concern in residential and recreational areas of Sept-Îles. These are related to large-scale mineral processing industries in the Sept-Îles/Port-Cartier area as well as to the transportation by rail of minerals from Northeastern Québec and Labrador and their export by sea through the Port of Sept-Îles. Such activities are currently undergoing a significant increase in scale in the Sept-Îles/Port-Cartier as a result of significant international demand for processed and unprocessed mineral products.		
Kami Terminal Residual Environmental Effects	• *Changes to industrial development:* The realignment of the access road and of the underground water main within the PDA will be carried out in a manner that minimizes effects on the Aluminerie Alouette aluminum smelter. Residual adverse environmental effects of construction activities on other industrial activities located in the vicinity are considered with a high level of confidence to be not significant. • *Changes to residential and recreational property:* Residual adverse environmental effects due to air emissions and noise and vibrations related to Kami Terminal construction and operation in the Port of Sept-Îles area on residential and recreational property located at a certain distance from the PDA are considered with a high level of confidence to be not significant. • *Mitigation and monitoring:* Where interactions between the Kami Terminal and these effects have been identified, the assessment has determined that they can be managed through proven mitigation and codified practice. Alderon will participate in an air quality monitoring program in Sept-Îles for the life of the Kami Terminal.		
Other Projects / Activities	**Likely Effect Interaction (Y/N)**	**Rationale**	**Cumulative Effects**
Pointe-Noire Port Expansion (Port of Sept-Îles)	Y	Located in Pointe-Noire Terminal close to Kami Terminal site. Planned expansion may lead to changes to Other Current Use of Land and Resources in Sept-Îles.	Cumulative interactions expected over lifetime of Kami Terminal: • No interaction with Changes to industrial development • Additive interaction with Changes to residential and recreational property. With mitigation, cumulative increases in air, light and noise emissions are anticipated to be negligible to nearby residential and recreational receptors, falling below current baseline measurements.

CFA and QNS&L	Y	Located close to the Kami Terminal site. Planned expansion may lead to changes to Other Current Use of Land and Resources in Sept-Îles.	Cumulative interactions expected over lifetime of Kami Terminal: • No interaction with Changes to industrial development • Additive interaction with Changes to residential and recreational property. With mitigation, cumulative increases in air, light and noise emissions are anticipated to be negligible to nearby residential and recreational receptors, falling below current baseline measurements.
Alouette Aluminum Smelter (Aluminerie Alouette)	Y	Located in Pointe-Noire Terminal close to the Kami Terminal site. Planned expansion may lead to changes to Other Current Use of Land and Resources in Sept-Îles.	Cumulative interactions expected over lifetime of Kami Terminal: • No interaction with Changes to industrial development • Additive interaction with Changes to residential and recreational property. With mitigation, cumulative increases in air, light and noise emissions are anticipated to be negligible to nearby residential and recreational receptors, falling below current baseline measurements.
Second Port-Cartier Pellet Plant (ArcelorMittal)	N	Second Port-Cartier Pellet Plant to be located about 30 km from the Kami Terminal site. Will not lead to changes to Other Current Use of Land and Resources in Sept-Îles.	None
Bloom Pointe-Noire Terminal (Cliffs Resources)	Y	Located in Pointe-Noire Terminal close to the Kami Terminal site. Planned expansion may lead to changes to Other Current Use of Land and Resources in Sept-Îles.	Cumulative interactions expected over lifetime of Kami Terminal: • No interaction with Changes to industrial development • Additive interaction with Changes to residential and recreational property. With mitigation, cumulative increases in air, light and noise emissions are anticipated to be negligible to nearby residential and recreational receptors, falling below current baseline measurements.

Arnaud Apatite-Magnetite mine (Mine Arnaud)	Y	Located near the Marconi Peninsula a few kilometers from the Kami Terminal site. Planned expansion may lead to changes to Other Current Use of Land and Resources in Sept-Îles.	Cumulative interactions expected over lifetime of Kami Terminal: • No interaction with *Changes to industrial* development • Additive interaction with Changes to residential and recreational property. With mitigation, cumulative increases in air, light and noise emissions are anticipated to be negligible to nearby residential and recreational receptors, falling below current baseline measurements.

Cumulative Effects Summary (Kami Terminal + All Relevant Projects / Effects)	**Direction**	**Magnitude**	**Geographic Extent**	**Duration**	**Frequency**	**Reversibility**	**Significance**	**Confidence**
	A	L	L	LT	S	I	N	M

A number of major industrial and mining projects will be underway over the next few years in the region of Sept-Îles. These are likely to lead to additive cumulative interactions with the Kami Terminal, particularly with regards to *Changes to residential and recreational property*. However, with proper mitigation, air, light and noise emissions related to all of these projects will amount to a negligible increase in cumulative emissions for nearby residential and recreational receptors, falling below current baseline measurements. The predicted residual cumulative effects of the projects under consideration on industrial development in the PDA are therefore considered with a moderate level of confidence to be not significant. The predicted residual cumulative effects of the projects under consideration on residential and recreational property in the LSA are also considered with a moderate level of confidence to be not significant.

Note: Environmental effects descriptors and their definitions are as used in the assessment of Kami Terminal-related environmental effects (See Table 23.3).

23.8 Assessment of Accidents and Malfunctions

Accidents and malfunctions that could interact with Other Current Use of Lands and Resources are listed in Table 23.2. Concerns in these cases are associated with rail transportation and iron ore transfer operations in the RSA and the LSA. The residual environmental effects of Kami Terminal-related accidents and malfunctions on Other Current Use of Lands and Resources are summarized in Table 23.5.

The most likely Kami Terminal accident or malfunction to have effects on this VEC would be a train derailment. This could lead to interruptions, disruptions or disturbances on other industrial activities located in the vicinity of the Kami Terminal site or to interruptions, disruptions or disturbances for residential and recreational uses located at a certain distance from the Kami Terminal site. The effects of Kami Terminal accidents such as a train derailment are expected to be of short duration and to be managed to acceptable levels through standard operating practices or through the application of best management or codified practices.

23.9 Determination of Significance of Residual Adverse Environmental Effects

The significance of each residual adverse environmental effect on Other Current Use of Lands and Resources is addressed below for each Kami Terminal phase.

23.9.1 Determination of Significance of Project Effects

Construction Phase

Changes to Industrial Development

The works to prepare the Kami Terminal site, to build concentrate unloading, stacking, storage, and reclaiming facilities and a railway loop will require the realignment of an access road and underground water main connecting to the Aluminerie Alouette aluminum smelter on the Marconi Peninsula. The proposed realignments have been agreed upon with the Port Authority of Sept-îl, but specific details (such as the proposed capacity of the water main) remain to be worked out with municipal authorities and the management of the Aluminerie Alouette aluminum smelter.

These realignments within the PDA will be carried out in a manner that minimizes effects on the Aluminerie Alouette aluminum smelter. The stockpiling of rocks resulting from removal of overburden during construction will also be minimized through appropriate site planning. As a result, no interruptions, disruptions or disturbances imposed by construction activities within the PDA are expected for other industrial activities located in the vicinity. The effects of Kami Terminal construction works will be managed to acceptable levels through standard operating practices or through the application of best management or codified practices. Residual adverse environmental effects of construction activities on other industrial activities located in the vicinity are expected to be of low magnitude, restricted to the Kami Terminal site, short-term, occasional, irreversible, and located in a developed area. They are therefore considered with a high level of confidence to be not significant.

Table 23.5 Summary of Residual Environmental Effects for Other Current Use of Land and Resources - Accidents and Malfunctions

Kami Terminal Phase	Mitigation/Compensation Measures	Residual Environmental Effects Characteristics									Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental or Socio-Economic Context	Significance	Prediction Confidence	
Changes to Industrial Development											
Train derailment	• In accordance with the EPP and ERP, immediate clean-up of site. • Soil will be remediated to meet regulatory standards and requirements.	A	L	S	LT	I	I	D	N	H	• Monitoring program to verify success of remediation.
Changes to Residential and Recreational Property											
Train derailment	• In accordance with the EPP and ERP, immediate clean-up of site. • Soil will be remediated to meet regulatory standards and requirements.	A	L	S	LT	I	I	D	N	H	• Monitoring program to verify success of remediation.

Kami Terminal Phase	Mitigation/Compensation Measures	Residual Environmental Effects Characteristics									Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental or Socio-Economic Context	Significance	Prediction Confidence	

KEY

Direction:
B Beneficial - condition of other current use of land and resources is improved in comparison to baseline conditions and trends.
N Neutral - no change in the condition of other current use of land and resources compared to baseline conditions and trends.
A Adverse - condition of other current use of land and resources is worsened in comparison to baseline conditions and trends.

Magnitude:
L Low - affects a small group of land and resource users.
M Moderate - affects less than the majority of land and resource users across multiple activities.
H High - affects the majority of land and resource users across multiple activities.

Geographic Extent:
S Site - effect restricted to the Kami Terminal footprint within the LSA.
L Local - effect restricted to within the LSA.
R Regional - effect extends beyond the LSA but is within the RSA.

Duration:
ST Short term - effect occurs for less than three years.
MT Medium term - effect occurs for the life of the Kami Terminal.
LT Long term - effect persists beyond the life of the Kami Terminal.

Frequency:
I Intermittent, effect will occur at various, intermittent times; or,
C Continuous, effect will occur continuously.

Reversibility:
R Reversible - effect ceases when Kami Terminal operations cease.
I Irreversible - effect continues after Kami Terminal operations cease.

Environmental and Socio-economic Context:
U Undisturbed - Area relatively or not adversely affected by human activity.
D Developed - Area has been substantially previously disturbed by human development or human development is still present.
N/A Not Applicable.

Significance:
S Significant.
N Not Significant.

Prediction Confidence:
Based on scientific information, statistical analysis, and effectiveness of mitigation or effects management measure.
L Low level of confidence.
M Moderate level of confidence.
H High level of confidence.

Changes to Residential and Recreational Property

Anticipated increases in air emissions and in levels of noise and vibrations related to Kami Terminal construction activities in the Port of Sept-Îles area may lead to disturbances to residential and recreational uses in the Val Sainte-Marguerite area.

According to the results of the Air Quality Dispersion Modelling Study (Stantec 2012a, Appendix G) conducted for the Kami Terminal, air emissions incurred during Kami Terminal construction are expected to be small and of a short duration, compared to those likely to occur during Kami Terminal operation and maintenance, and are not expected to cause substantive changes in air quality in surrounding residential and recreational areas.

Findings from the noise study indicate that effects on the acoustic environment resulting from the construction phase are likely to be not significant. The effects will be of low magnitude, highly localized, short-term, regular and reversible. Through proper planning, blasting is not likely to cause any structural damage to nearby buildings and will at most be perceptible to nearby residents and land users as a low rumbling vibration. Furthermore, the number of blasting events will be sporadic.

Lighting used during the construction phase could have different effects on residential and recreational land uses, depending on the type of lighting. However, with proper mitigation, these effects are predicted to be not significant. According to the analysis, the effects will be of low magnitude, reversible and local in their extent although they will persist throughout the operations phase in a continuous manner. The prediction confidence is high.

Residual adverse environmental effects of construction activities in the Port of Sept-Îles area on residential and recreational activities located at a certain distance from the PDA are expected to be of low magnitude, local, short-term, occasional, irreversible and in a developed area. They are therefore considered with a high level of confidence to be not significant.

Operations and Maintenance Phase

Changes to Industrial Development

No constraints will be imposed on other industrial activities by operations and maintenance activities within the boundaries of the Port of Sept-Îles Authority facilities at the Pointe-Noire Terminal. Alderon's storage yard will be used exclusively by Alderon, although conveyor galleries will transport the ore to the common Port-owned ship loading facilities. Some Alderon conveyors will have to be located over areas leased by Consolidated Thompson, but will be at a sufficient clearance height and have supports at acceptable locations so as not to affect their operations.

Changes to Residential and Recreational Property

Increases in air emissions and in levels of noise and vibrations related to rail transport activities in the Sept-Îles area during the Kami Terminal operations and maintenance phase may lead to disturbances to low density residential areas located close to the railway tracks around the baie des Sept-Îles.

Emissions from the diesel locomotive used for transporting the concentrate to Sept-Îles and along the bay are not expected to cause substantive changes in air quality as such emissions will be intermittent (two round trips per day) and short-term in duration. On an overall basis, the modelling results show that the local and regional changes in air quality due to Kami Terminal-related emissions, including background emissions, are not expected to be substantive.

Effects from operations and maintenance could potentially cause changes to the acoustic environment in terms of noise and vibrations. However with proper mitigation, these effects are predicted to be not significant. According to the analysis, the effects will be of low magnitude, reversible and local in their extent although they will persist throughout the operations phase in a continuous manner. The prediction confidence is high.

Lighting used in the operations phase could have different effects on residential and recreational land uses, depending on the type of lighting. However, with proper mitigation, these effects are predicted to be not significant. According to the analysis, the effects will be of low magnitude, reversible and local in their extent although they will persist throughout the operations phase in a continuous manner. The prediction confidence is high.

Residual adverse environmental effects of operations and maintenance activities in the Port of Sept-Îles area on residential and recreational activities are expected to be of low magnitude, local, long-term, sporadic, irreversible and in a developed area. They are therefore considered with a high level of confidence to be not significant.

Decommissioning and Reclamation Phase

Changes to Industrial Development

No constraints will be imposed on other industrial activities by decommissioning activities within the boundaries of the Port of Sept-Îles Authority facilities at the Pointe-Noire Terminal. Indeed, the Alderon Terminal will be planned to provide rail car unloading capability for additional future users, in order to follow the Port’s long term expansion goals.

Changes to Residential and Recreational Property

Considering the limited works required at the Pointe-Noire Terminal at the decommissioning phase, no environmental effects are anticipated on low density residential and recreational areas located at a certain distance from the PDA.

23.9.2 Determination of Significance of Cumulative Effects

Changes to Industrial Development

Cumulative adverse environmental effects of construction activities related to all of the projects under consideration in the Pointe-Noire Terminal Area on other industrial activities located in the PDA are considered with a moderate level of confidence to be not significant.

Changes to Residential and Recreational Property

Cumulative adverse environmental effects on residential and recreational property in the LSA due to air emissions and noise and vibrations related to construction and operation activities for all of the projects under consideration are considered with a moderate level of confidence to be not significant.

Where cumulative adverse environmental effects due to air emissions and noise and vibrations related to the Kami Terminal and the Mine Arnaud Project have been identified, mitigation and monitoring measures activities have been proposed. In particular, Alderon and Mines Arnaud will participate in an air quality monitoring program initiated in Sept-Îles. The planned introduction by the Government of Québec of new emissions standards for existing and future industries, the development of a regional air quality monitoring committee by the City of Sept-Îles, and the contribution of local industries to air quality monitoring activities should also contribute to minimizing cumulative effects on regional air quality. Noise monitoring will also be carried out by Alderon during all stages of the Kami Terminal.

Significance of Residual Cumulative Effects

The predicted residual cumulative effects of all the projects under consideration on other industrial activities located in the PDA are considered with a moderate level of confidence to be not significant. The predicted residual cumulative effects of all of the projects under consideration on residential and recreational property in the LSA are considered with a moderate level of confidence to be not significant.

23.9.3 Determination of Significance of Effects Resulting from Accidents and Malfunctions

The most likely interaction between an accident or malfunction linked to the Kami Terminal and this VEC would be a train derailment. The effects of Kami Terminal accidents such as a train derailment are expected to be of short duration and to be managed to acceptable levels through standard operating practices and/or through the application of best management or codified practices.

Residual adverse environmental effects of accidents or malfunctions related to train derailments in the Sept-Îles area on industrial activities in the PDA, or on residential and recreational activities in the LSA, are expected to be of low magnitude, local, short-term, occasional, irreversible and in a developed area. They are therefore considered with a high level of confidence to be not significant.

23.9.4 Overall Residual Effects Conclusion

In summary, given the planned mitigation, and the analyses presented in this assessment, the effects related to changes to industrial development in the Pointe-Noire industrial area and changes to residential and recreational property on Other Use of Lands and Resources as a result of the construction, operation and decommissioning of the Kami Terminal, including cumulative effects, are not likely to be significant. The effects of accidents and malfunctions are not likely to be significant.

23.10 Follow-Up and Monitoring

Where interactions between the Kami Terminal and effects on Other Current Use of Lands and Resources have been identified, the assessment has determined that they can be managed through proven mitigation and codified practice and do not require further monitoring measures or activities. Nevertheless, Alderon will participate in an air quality monitoring program initiated in Sept-Îles.

23.11 Next Steps

No additional data collection to be conducted prior to construction is determined necessary through the assessment.

23.12 Summary

Other current use of lands and resources is defined as use of lands and resources related to the Kami Terminal, including industrial uses, within the Kami terminal boundaries and along the right-of-way of associated infrastructure. It was selected as a VEC due to potential Kami Terminal-VEC interactions that could result from:

- The exclusion or promotion of industrial development at the site;
- Interactions with residential and recreational property in the vicinity of the site and associated infrastructure; or,
- Alteration of viewscapes of the Marconi Peninsula.

The assessment of effects related to changes to industrial development in the Pointe-Noire Terminal Area is based upon an analysis of the compatibility of the Kami Terminal with Land Use Plans for the City of Sept-Îles and the Port of Sept-Îles. It is also based upon an analysis of the Kami Terminal's compatibility with the Port Authority's long-term staged expansion plan for its iron ore concentrate and bulk handling terminal facilities at Pointe-Noire.

The assessment of effects related to changes to residential and recreational property is based upon the anticipated increases in air emissions and noise levels related to Kami Terminal construction and operation activities in the Pointe-Noire Terminal area and on the extent to which they may lead to disturbances to residential and recreational uses in the Val Sainte-Marguerite area and in low density residential areas located close to the railway tracks around the baie des Sept-Îles. The main issues raised during public consultations for the Kami Terminal in Sept-Îles were related to air emissions and air quality monitoring.

The assessment of effects on viewscapes of the Marconi Peninsula is based upon an analysis of maps and visits to vantage points around baie des Sept-Îles offering viewscapes of the Kami Terminal site. No effects on visual aesthetics are anticipated for residential areas of Sept-Îles located on the other side of the bay from the Marconi Peninsula given that the proposed works in the PDA will be located at a distance of about 7 km and will hardly be distinguishable from other existing industrial port facilities. As a result, the potential environmental effects on viewscapes were considered not significant.

The works required to prepare the Kami Terminal site, to build concentrate unloading, stacking, storage, and reclaiming facilities and a railway loop will require the realignment of an access road and underground water main connecting to the Aluminerie Alouette aluminum smelter on the Marconi Peninsula. The proposed realignment has been agreed upon with Port Authority and will be carried out in a manner that minimizes effects on the Aluminerie Alouette aluminum smelter. The stockpiling of rocks resulting from removal of overburden during construction will also be minimized through appropriate site planning. As a result, residual adverse environmental effects of construction activities on other industrial activities located in the vicinity are considered to be not significant.

No constraints will be imposed on other industrial activities by operations and maintenance activities within the boundaries of the Port Authority facilities on the Pointe-Noire Terminal. Alderon's storage yard will be used exclusively by Alderon, although conveyor galleries will transport the ore to the common Port-owned ship loading facilities. Some Alderon conveyor lines will be located over areas leased by Consolidated Thompson, but will be at a sufficient clearance height and have supports at acceptable locations so as not to affect their operations.

No constraints will be imposed on other industrial activities by decommissioning activities within the boundaries of the Port Authority of Sept-Îles facilities. Indeed, the Pointe-Noire Terminal will be planned to provide rail car unloading capability for additional future users, in order to follow the Port's long term expansion goals.

According to the results of the Air Quality Dispersion Modelling Study (Stantec 2012a, Appendix G) conducted for the Kami Terminal, air emissions incurred during Kami Terminal construction are expected to be small and of a short duration and are not expected to cause substantive changes in air quality in surrounding residential and recreational areas. Findings from the noise study suggest that effects on the acoustic environment resulting from the construction phase will be of low magnitude, highly localized, short-term, regular and reversible. Vibrations and ground-borne noise may result from construction activities, particularly the blasting associated with site preparation activities. The effects of blasting will be sporadic and of limited duration. With proper mitigation, the effects of lighting used in the construction phase are predicted to be not significant. Residual adverse environmental effects of construction activities on residential and recreational property located at a certain distance from the PDA are therefore considered with a high level of confidence to be not significant.

Anticipated increases in air emissions and in levels of noise and vibrations related to rail transport activities in the Sept-Îles area during the Kami Terminal operations and maintenance phase may lead to disturbances to low density residential areas located close to the railway tracks around the baie des Sept-Îles. Emissions from the diesel locomotive used for transporting the concentrate to Sept-Îles and along the bay are not expected to cause substantive changes in air quality as such emissions will be intermittent (two round trips per day) and short-term in duration. On an overall basis, the modelling results show that the local and regional changes in air quality due to Kami Terminal-related emissions, including background, are not expected to be substantive.

With proper mitigation, the residual environmental effects of operations and maintenance in the PDA on the acoustic environment will be of low magnitude, reversible and local in their extent although they will persist throughout the operations phase in a continuous manner. Based on the quantitative model of vibrations and ground-borne noise, the vibrations engendered by operations and maintenance activities will have no perceptible effect beyond 80 m of the site. With proper mitigation, the effects of lighting used in the operations phase are predicted to be not significant.

Residual adverse environmental effects of Kami Terminal operations and maintenance activities in the Port of Sept-Îles area on residential and recreational activities located at a certain distance from the PDA are therefore considered with a high level of confidence to be not significant.

Considering the limited works required at the Pointe-Noire Terminal at the decommissioning phase, no environmental effects are anticipated on low density residential and recreational areas located at a certain distance from the PDA.

Where interactions between the Kami Terminal and the selected effects for this VEC have been identified, the assessment has determined that they can be managed through proven mitigation and codified practice and do not require further mitigation or monitoring measures or activities. Alderon will participate in an air quality monitoring program initiated in Sept-Îles. Noise monitoring will also be carried out by Alderon during all stages of the Kami Terminal.

Residual adverse environmental effects of accidents or malfunctions related to train derailments in the Sept-Îles area on industrial activities in the PDA or on residential and recreational activities in the LSA are considered with a high level of confidence to be not significant.

The predicted residual cumulative effects of all the projects under consideration on other industrial activities located in the PDA are considered with a moderate level of confidence to be not significant. The predicted residual cumulative effects of all of the projects under consideration on residential and recreational property in the LSA are also considered with a moderate level of confidence to be not significant.

24.0 COMMUNITY SERVICES AND INFRASTRUCTURE

24.1 VEC Definition and Rationale for Selection

Community Services and Infrastructure includes: employment and social services; health services and social programs; training and education services and programs; safety and security; housing and accommodation (residential and tourist); municipal administrative capacity; municipal services and infrastructure; and transportation infrastructure. It was selected as a VEC due to potential Kami Terminal interactions that could result in: 1) reduced access to housing and 2) increased traffic congestion in the City of Sept-Îles and in the surrounding MRC de Sept-Rivières.

In addition to housing and road infrastructure (traffic), Community Services and Infrastructure may include local employment and social services, health services and social programs, training and education services and programs, public safety and security services, municipal administrative capacity, or municipal services and infrastructure. These factors are often assessed in EAs conducted for large scale projects offering large numbers of mid or long-term employment opportunities. As discussed in Chapter 2, the Kami Terminal will provide up to 300 jobs during the (2-year) construction phase, with far fewer permanent employment opportunities during the (17-year) operations and maintenance phase (an estimated 17 employees will be required for the operations and maintenance phase).

Experience suggests that construction workers and their families do not relocate where the potential employment period is finite and short-term such as in the present case. A large proportion of workers required for the Kami Terminal are therefore likely to come from the region. Therefore, it is considered unlikely that construction of the Kami Terminal would exert additional demand on local employment and social services, health services and social programs, training and education services and programs, public safety and security services, municipal administrative capacity, or municipal services and infrastructure.

24.1.1 Issues

The following issues were raised by the public and other stakeholders:

- Availability of housing for workers;
- Potential effects on community services; and,
- Cumulative effect on community services and infrastructure.

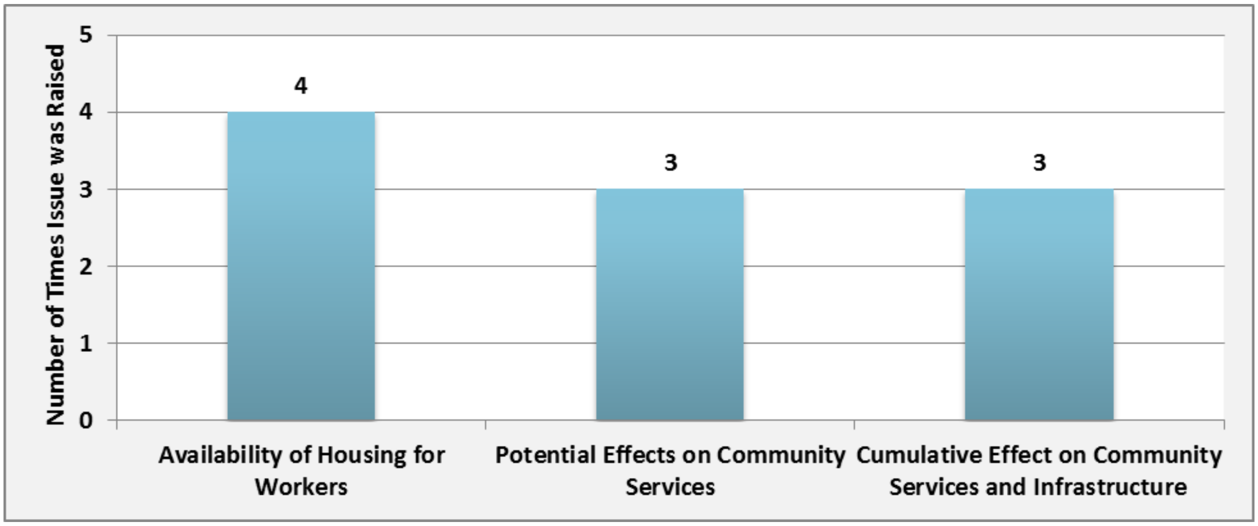
Accordingly, these issues are included in the assessment of the VEC. Details on the issues raised by stakeholders are provided in Table 24.1. The number of times each issue was raised is shown in Figure 24.1.

Table 24.1 Issues Raised by Stakeholders

Issue	Community / Organization	Summary of Comments Raised During Consultation and Engagement Activities	Response / Location in the EIS
Cumulative effect on Community Services and Infrastructure	CRE	Cumulative socio-economic effects	Construction activities resulting from various prospects in the area will require a workforce in the order of 2,000 to 3,000 workers over the next few years. The assessment of cumulative effects on Community Services and Infrastructure is provided in **Section 24.7**.
	CIM Conference	Aren't you concerned that the QNS&L railway is becoming over utilized?	The capacity of the QNS&L has been studied for many different potential future traffic volumes, both with and without the proposed Alderon traffic. Infrastructure improvement strategies have been identified from these studies that will maintain acceptable levels of service for all traffic on QNS&L and these strategies have been incorporated into the negotiations for a rail haulage contract.
Availability of Housing for Workers	Sept-Îles	Resident asked where people working on this project would be housed. Followed up with concerns about repercussions on housing in the community. Asked if accommodations will be built to lodge the workers.	In order to manage the impact of Kami Terminal construction activities on regional housing supply Alderon will engage with local authorities and other stakeholders to address issues related to community services and infrastructure as needed. The assessment of Kami Terminal effects on housing is available in **Section 24.6**.
		Noting that housing is an issue, a resident outlined a number of initiatives that have been completed or are being planned to deal with the increase in the housing demand.	
	CRE	Access to housing and service industry in Sept-Îles during construction of port facilities.	

Issue	Community / Organization	Summary of Comments Raised During Consultation and Engagement Activities	Response / Location in the EIS
Railway Traffic	Labrador City	The actual railway line and its railway are issues of concern. Has Alderon consulted with QNS&L about the projected total rail traffic in 2015-2020?	The capacity of the QNS&L has been studied for many different potential future traffic volumes, both with and without the proposed Alderon traffic. Infrastructure improvement strategies have been identified from these studies that will maintain acceptable levels of service for all traffic on QNS&L and these strategies have been incorporated into the negotiations for a rail haulage contract.
	M-LJ	Increased traffic from the Kami Terminal may slow down the passenger train and delivery of goods (food and fuel) from Sept-Îles to Schefferville.	
Community Services	Sept-Îles	Resident talked about issues with community services.	In order to manage the impact of Kami Terminal construction activities on regional housing supply Alderon will engage with local authorities and other stakeholders to address issues related to community services and infrastructure as needed. By virtue of the characteristics of the required workforce, it is considered unlikely that these workers would exert additional demand on local employment and social services, health services and social programs, training and education services and programs, public safety and security services, municipal administrative capacity, or municipal services and infrastructure. The assessment of Kami Terminal effects on community infrastructure and services is available in **Section 24.6**.
	CRE	Access to housing and service industry in Sept-Îles during construction of port facilities.	In order to manage the impact of Kami Terminal construction activities on regional housing supply Alderon will engage with local authorities and other stakeholders to address issues related to community services and infrastructure as needed. The assessment of Kami Terminal effects on housing is available in **Section 24.6**.

Figure 24.1 Frequency of Issue Raised Related to the Community Services and Infrastructure



24.2 Environmental Assessment Boundaries

24.2.1 Spatial Boundaries

The spatial boundaries for the environmental effects assessment of the VEC on Community Services and Infrastructure are defined below.

Local Study Area

The LSA, which includes the PDA related to Kami Terminal operations, encompasses the city of Sept-Îles as a whole (see Figure 24.2).

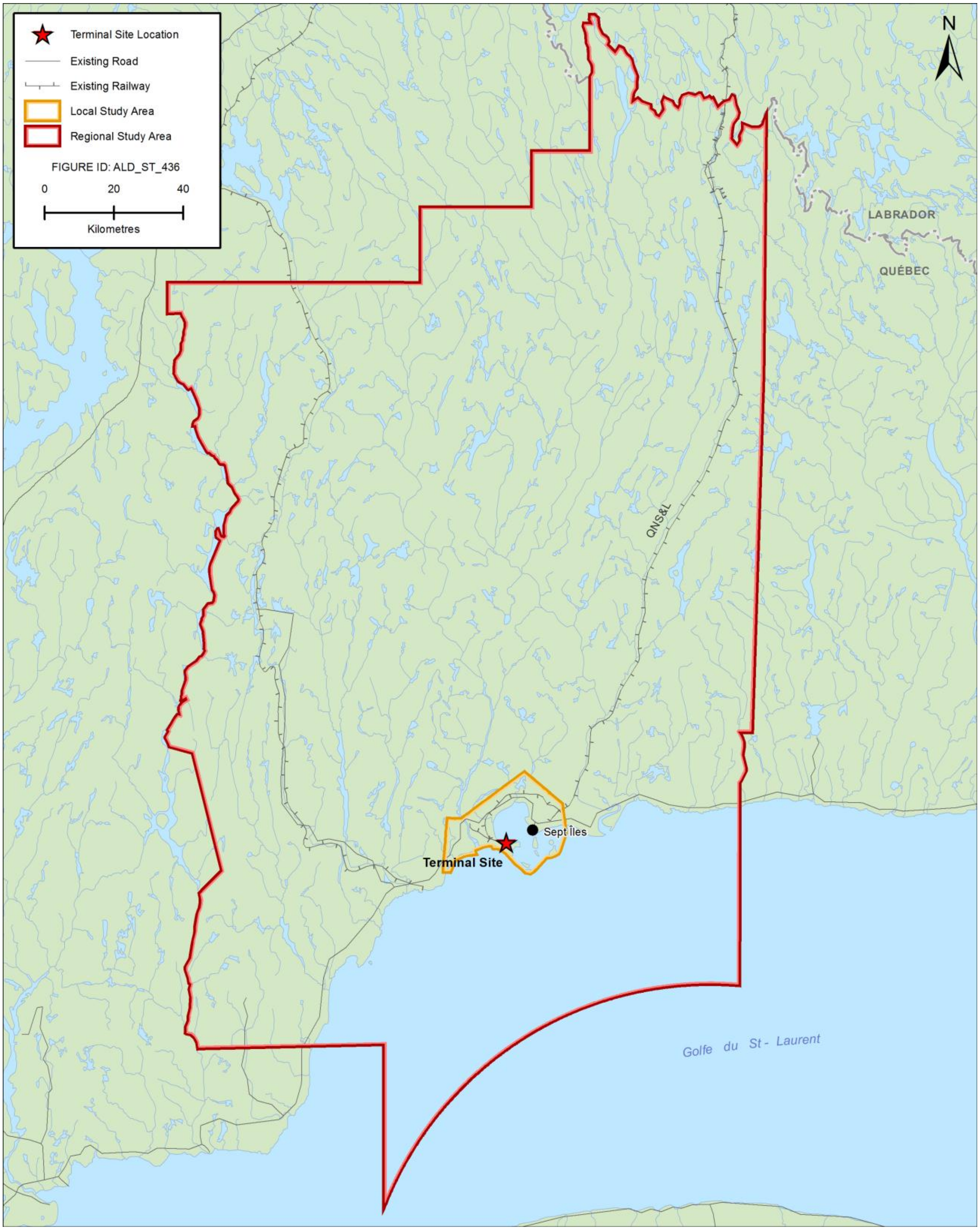
Regional Study Area

The RSA is limited to the MRC de Sept-Rivières, beyond which no interactions between the Kami Terminal and this VEC are anticipated (see Figure 24.2).

24.2.2 Temporal Boundaries

The temporal boundaries for the assessment of the potential environmental effects of the Kami Terminal on Community Services and Infrastructure include the Kami Terminal phases of construction (approximately two years), operation and maintenance (approximately 17 years), and decommissioning and reclamation (approximately one year).

Figure 24.2 Local and Regional Study Areas



24.2.3 Administrative Boundaries

Community services and infrastructure including housing fall under the purview of the City of Sept-Îles and of the MRC de Sept-Rivières. The management of health and social services is the responsibility of the *ministère de la Santé et des Services sociaux du Québec* and is delegated to regional services. The prevention and management of traffic congestion on Highway 138 in the Sept-Îles Region is the responsibility of the municipal police forces of Sept-Îles and Port-Cartier, of the *Sûreté du Québec*, and of the *ministère des Transports du Québec*.

24.3 Establishing Standards or Thresholds for Determining Significance of Environmental Effects

The likely effects of the Kami Terminal on this VEC are described using the following attributes, which are based on standard environmental practice and EIS guidelines:

- **Direction:**
  - Positive - housing supply and traffic conditions are improving in comparison to baseline conditions and trends;
  - Neutral - no change in housing supply and traffic conditions compared to baseline conditions and trends; or,
  - Adverse - housing supply and traffic conditions are worsening in comparison to baseline conditions and trends.
- **Magnitude:**
  - No effect - no adverse effect anticipated on housing supply and traffic conditions;
  - Low - effect occurs that is detectable on housing supply and traffic conditions, but is within normal variability of baseline conditions;
  - Moderate - effect occurs that would put additional stress on housing supply and traffic conditions with regard to baseline conditions, but would remain manageable; or,
  - High - effect occurs that would singly or as a substantial contribution in combination with other sources cause exceedances of municipal and regional capacity to provide housing and transportation services.
- **Geographical Extent:**
  - Local: effect restricted to the LSA; or
  - Regional: effect within the RSA.
- **Frequency:**
  - Intermittent - effect will occur at various, intermittent times; or,
  - Continuous - effect will occur continuously.

- **Duration:**
  - Short-term: effect occurs for less than three years;
  - Medium-term: effect occurs for the life of the Kami Terminal; or,
  - Long-term: effect persists beyond the life of the Kami Terminal.
- **Reversibility:**
  - Reversible: effect ceases when Kami Terminal operations cease; or,
  - Irreversible: effect continues after Kami Terminal operations cease.
- **Ecological and Socio-Economic Context:** the general characteristics of the area in which the Kami Terminal is located. For the socio-economic VECs in the Sept-Îles Region, these characteristics are not applicable.

The significance criteria described below are based on changes in measurable parameters, which are described in Section 24.4.1.

A *significant adverse residual effect* from the Kami Terminal is one when demands from the Kami Terminal exceed the existing capacity of the infrastructure component or the quality of the associated service on an ongoing and consistent basis during the life of the Kami Terminal.

A *significant positive residual effect* from the Kami Terminal occurs when system changes enhance the capacity of the infrastructure component or the quality of the associated service on an ongoing and consistent basis during the life of the Kami Terminal.

24.4 Potential Project-VEC Interactions

The effects that are assessed for Community Services and Infrastructure are: 1) changes to housing and accommodations and 2) changes in municipal services and infrastructure. Up to 300 workers will be required over the two-year Kami Terminal construction phase (staffing requirements for the Kami Terminal during the operations and maintenance phase are estimated to be in the order of 17 persons). An additional average of 50 workers per year will be required for the construction by CFA of rail infrastructure in association with the Kami Terminal.

Experience suggests that construction workers do not relocate when the potential employment period is finite and short-term. A large proportion of workers required for the Kami Terminal are therefore likely to come from the region. However, \ part of the workforce required for construction will have to be recruited from outside the region due to the limited availability of qualified workers in the Sept-Îles area. The arrival of a number of workers from outside the region is expected to contribute to the ongoing scarcity of available housing in the region and to increased traffic congestion along Highway 138 in Sept-Îles.

The assessment of effects related to changes in housing and accommodations and to changes in traffic conditions is based upon the potential effects of a limited influx of workers required for construction activities in the Pointe-Noire Terminal area. By virtue of the limited size and characteristics of the required workforce, it is considered unlikely that these workers would exert additional demand on local employment and social services, health services and social programs, training and education services and programs, public safety and security services, municipal administrative capacity, or municipal services and infrastructure.

Selection of Effects and Measurable Parameters

The environmental assessment of Community Services and Infrastructure is focused on the following effects:

- Change in housing and accommodations, and,
- Change in municipal services and infrastructure.

The measurable parameters used for the assessment of the change in Community Services and Infrastructure, and the rationale for their selection, are provided in Table 24.2.

Table 24.2 Measurable Parameters for Community Services and Infrastructure

Environmental Effect	Measurable Parameter	Rationale for Selection of the Measurable Parameter
Change in Housing and Accommodations	Accommodations and building lot availability	Kami Terminal activity related population and business growth may exceed the capacity of existing services and infrastructure
Change in Municipal Services and Infrastructure	Road and air transportation capacity	Kami Terminal traffic may contribute to traffic congestion
	Water / sewer capacity	Kami Terminal activity related population and business growth may exceed the capacity of existing services and infrastructure
	Power capacity	
	Landfill capacity	
	Health care facility and services capacity	
	School and training facility and services capacity	
	Police officer / population ratio	
	Municipal Administrative Capacity	
	Existing inventory of infrastructure for both men and women in the community	
	Recreational facility and services capacity	

Table 24.3 provides a list of Kami Terminal activities and physical works and an evaluation of the degree to which an interaction is expected or not to occur with each identified environmental effect for Community Services and Infrastructure. The interactions are ranked either as a 0, no interaction occurs; 1, interaction occurs however the resulting effect can be managed through proven mitigation and codified practice; or as a 2, an interaction occurs and has the potential to exceed regulatory standards and therefore requires further assessment.

Table 24.3 Potential Environmental Effects of Kami Terminal to Community Services and Infrastructure

Kami Terminal Activities and Physical Works	Potential Environmental Effects	
	Changes in Housing and Accommodations	Changes in Municipal Services and Infrastructure
Construction		
Site Preparation (incl. clearing, excavation, blasting, material haulage, grading, removal of overburden and stockpiling)	0	0
Construction of Concentrate Unloading, Stacking, Storage, and Reclaiming Facilities (rail dumper building, rail car dumper and hopper, train positioner transfer houses, conveyors, dust collector, maintenance building, substation, sanitation system)	0	0
Construction of Railway Loop	0	0
Construction of Stream Diversion	0	0
Onsite Vehicle/Equipment Operation	0	0
Waste Management	0	0
Transportation of Personnel and Goods to Site	0	2
Expenditures	0	0
Employment	2	0
Operation and Maintenance		
Rail Transport	0	0
Concentrate Handling and Stockpiling	0	0
Water Collection, Treatment and Discharge	0	0
Onsite Vehicle/Equipment Operation and Maintenance	0	0
Waste Management	0	0
Transportation of Personnel and Goods to Site	0	1
Expenditures	0	0
Employment	1	1
Decommissioning and Reclamation		
Site clean-up	0	0

Kami Terminal Activities and Physical Works	Potential Environmental Effects	
	Changes in Housing and Accommodations	Changes in Municipal Services and Infrastructure
Accidents and Malfunctions		
Forest Fire	0	0
Stormwater Retention Pond Breach	0	0
Train Derailment	0	0

KEY
0 No interaction
1 Interaction occurs; however, based on past experience, the resulting effect can be managed to acceptable levels through standard operating practices and/or through the application of best management or codified practices. No further assessment is warranted.
2 Interaction occurs, and resulting effect may exceed acceptable levels without implementation of specified mitigation. Further assessment is warranted.

24.5 Existing Environment

Information on regional community services and infrastructure as well as related development trends in the MRC de Sept-Rivières is presented hereafter.

Regional Employment Conditions and Trends in the Construction Sector

The construction industry accounted for only 5.2 percent of the labour force in Sept-Îles in 2006 (Statistics Canada 2012), however its importance to the local economy must not be discounted. Since 2010, the number of person-hours worked in the construction industry in the Côte-Nord region has increased considerably due to a number of new large-scale engineering and roadwork projects (Roche 2012). From 2006 to 2010, the number of residents of Sept-Îles employed in the construction industry rose from 2,688 to 3,533 people (Roche 2012). This represents a 31.4 percent increase over four years and translates to an increase in local capacity in terms of diversified trades and jobs in the construction industry.

Ongoing construction of Hydro-Québec's 1,500 MW La Romaine hydro-electric complex and the start-up of construction of new mining and mineral processing facilities as well as a new multi-user wharf at the Pointe-Noire Terminal facilities in Sept-Îles have led to lower levels of unemployment in the Sept-Îles region when compared to the provincial average (see Table 24.4). As a result, shortages of skilled and unskilled labour have been reported in Sept-Îles for the past two years.

Table 24.4 Evolution of Employment Indicators in the Côte-Nord and Nord-du-Québec Regions (2006-2010)

Indicators	2006	2007	2008	2009	2010
Activity rate (%)	62.5	60.1	61.4	59.2	63.8
Employment rate (%)	57.4	54.8	54.5	53.5	59.4

Indicators	2006	2007	2008	2009	2010
Unemployment rate (%)	8.2	8.7	11.2	9.8	6.9
Source: ISQ 2012					

Regional Housing Conditions and Trends

Housing has been identified as a major issue in Sept-Îles. The large number of development projects in the area and the growing global demand for natural resources put considerable pressure on the housing market. Over the past decade, there has been little in the way of new construction. Between 2006 and 2011, approximately 75.1 percent of new housing starts consisted of single family units, and apartments and rental units constituted 15 percent of the total (see Table 24.5).

Table 24.5 Evolution of Housing Starts by Type of Housing in Sept-Îles (2006-2011)

Type of Housing	2006	2007	2008	2009	2010	2011	Total
Single family units	30	52	44	41	43	52	262
Duplexes	2	16	8	0	6	2	34
Row houses	0	0	0	0	0	0	0
Apartments and others	0	18	3	0	6	26	53
Total	**32**	**86**	**55**	**41**	**55**	**80**	**349**
* Housing starts in 2011 are from January to September 2011 Source: CMHC 2012							

In 2008, the vacancy rate in Sept-Îles dropped below one percent, over two percentage points below the three percent threshold established by the Canadian Mortgage and Housing Corporation to measure the difference between a balanced housing market and a shortfall (Roche 2012). The vacancy rate has remained below one percent ever since. Vacancy rates for homes with three or more bedrooms are close to 0 percent. As the population has increased and the housing stock stayed relatively unchanged, house prices have risen. Between 2006 and 2011, the average price of a single family home in Sept-Îles rose 65 percent, while the rents also increased by some 15 percent on average (Roche 2012). At the end of 2011, the selling price of a single family home in Sept-Îles was $240,000 and the selling price for a mobile home was $130,000 (Lévesque 2012).

According to the Mayor of Sept-Îles, the number of new units needed to house both current residents and in-migrants associated with new projects is estimated to be in the order of 800. The Mayor of Port-Cartier estimates that 200 units are required in 2012 and another 400 will be required by 2016 (Lévesque 2012). To alleviate the situation, the City of Sept-Îles has developed a strategy to attract developers and contractors to the area. By selling parcels of land and helping to finance construction, the City aims to add an estimated 478 new units for sale and rent, as well as 200 new RV sites at the Parc Ferland. The City has recently acquired public land from the MRNF on which to pursue residential development (Lévesque 2012). The City is also considering ways to provide temporary housing for construction workers coming to the region for work. One of the alternatives proposed has been to house temporary workers in a cruise ship anchored in the baie des Sept-Îles (Roche 2012).

Below is a list of on-going and future residential development projects in Sept-Îles:

- Call for tenders for the sale of 7 parcels of land for the construction of 62 new accommodations at Comeau and Humphrey streets;
- Placement P. Noel Project to construct 54 new accommodations by 2013;
- Development of sector north of Rochette Street to open up 50 lots in 2011 and 100 lots in 2012;
- Sale of land in 2011 for the construction of 12 condominium units;
- Expansion of the Ferland mobile home park to include an additional 200 lots; and,
- Other possible private development projects in the Sept-Îles, Gallix, Ville de Grasse and Place de la Boule.

Because resource-based industries have traditionally been male dominated, there are fewer well paid employment opportunities for women than for men given the resource-based economy in the region. Women may also be more vulnerable to housing issues. A recent survey of 300 Sept-Îles renters revealed that half of them did not have leases in their name. Average rental costs are 45 percent higher than elsewhere in the province of Québec. Women in Sept-Îles pay a higher proportion of their salary for their rent, however, their salaries are lower than those of men and they are often single parents. As a result, they are more likely to live under the poverty level (*Conseil du statut de la femme* 2012).

Regional Public Services and Infrastructure

Educational Services

The region of Sept-Îles is well equipped in municipal services and infrastructure at all levels. Available educational services include (Ville de Sept-Îles 2012):

- 7 public French primary schools and one public English primary school;
- 5 public French secondary schools, one public English secondary school and one private French secondary school;
- One public French college (CEGEP) offering a few programs in English and in Innu; and,
- A branch of a public French university (Université du Québec à Chicoutimi).

Health and Social Services

Available health and social services in the City of Sept-Îles include:

- 1 regional health and social services center
- 5 private medical clinics;

- 1 center for palliative care;
- 1 rehabilitation center;
- 2 homes for elderly residents;
- 7 dental clinics; and,
- Multiple clinics specializing in chiropractic care, massage therapy and physiotherapy, etc.

The *Centre de santé et de services sociaux* (CSSS) *de Sept-Îles* constitutes the regional health and social services center for the Cote-Nord region. As such, it serves a population of 50,994 people. In 2008, the CSSS de Sept-Îles employed 23 family doctors and 33 specialists (*Association des pharmaciens des établissements de santé du Québec* 2010). The hospital center offers a wide range of services organized under 11 departments including anesthesia, medical biology, surgery, gynecology and obstetrics, general medicine, specialized medicine, pediatrics, pharmacy, psychiatry and radiology. In addition, the center provides community health and social services. In terms of physical capacity, the CSSS de Sept-Îles has 200 beds for short-term care patients and 100 beds for extended care services.

Other Community Services in Sept-Îles

Other services provided in Sept-Îles include a municipal library, two school libraries, two ski centers, a community recreational center, an outdoors cinema, a curling club, two museums, 23 parks equipped with playgrounds, two indoor arenas and several outdoor skating rinks, two indoor swimming pools, two running tracks, a bicycle path, a marina, three cinemas, two bowling alleys, four theatres, a baseball field, and an 18-hole golf course. There are also a variety of wildlife hunting and fishing activities nearby. Available religious services in the Sept-Îles include three catholic churches, a Christian center, a center for Jehovas' Witnesses, and two Baptist churches. Local news is covered by three local newspapers and three community radio stations. Close to 60 community organisations and associations are active in the city (Ville de Sept-Îles 2012).

Community Services in Innu Communities of Sept-Îles

Available community services in Uashat mak Mani-Utenam include:

- An Innu cultural center (the Shaputuan Museum in Uashat);
- A community center and indoor sports arena in Uashat;
- A primary school and a secondary school in Uashat and a primary school in Maliotenam;
- A catholic church in Uashat and a catholic church in Maliotenam;
- Community health and social services centers in Uashat and in Maliotenam; and,
- A community radio station in Maliotenam.

Other community facilities include a home for elderly residents, a youth center, a residence for mentally disabled persons, an open-air theatre, a playground, an outdoor swimming pool, and a camping area. The number of housing units in Uashat is 384 and the number of housing units in Maliotenam is 397 (Statistics Canada 2006).

The Innu of Uashat mak Mani-Utenam have their own police force. The community of Uashat relies on the City of Sept-Îles for its fire services while the community of Maliotenam has its own. Drinking water supply and wastewater treatment services are also provided by the City of Sept-Îles through a service sharing arrangement.

<u>Industrial Parks</u>

The City of Sept-Îles benefits from the presence of four industrial parks. These include the Municipal industrial park (190 ha), the Ferco Park (320 ha), and the Downtown Sector (37.4 ha), which are designated for light industry, as well as the Pointe-Noire Sector (3,420 ha), which is designated for heavy industry. All four of these parks are connected to Hydro-Québec's high to medium tension (735/315/161 kV) power distribution system through its regional Arnaud substation and are serviced with water and wastewater mains (Ville de Sept-Îles 2012).

<u>Water and Wastewater Infrastructure</u>

The City of Sept-Îles has an extensive water and wastewater infrastructure. The water supply is based on several sources. Groundwater is the source of water for some 699 people. The majority of Sept-Îles residents depend on lac Rapide for their water (MDDEP 2011).

<u>Transportation Infrastructure</u>

Transportation infrastructure has played an important role in the development of the region of Sept-Îles since the 1950s. The transportation system includes Highway 138, which links Sept-Îles to Québec City and Montreal to the west and to Havre-Saint-Pierre and Natashquan on the Lower North Shore to the east. Highway 138 is the only road of major significance and is the only road link to neighbouring regions. The access road to Pointe-Noire Terminal connects to Highway 138. In 2007, 5 500 vehicles used the Highway 138 near the Pointe-Noire Terminal access road per day in the summer and 4,600 used it per day in winter (Roche 2012). 8.4 percent of these vehicles were trucks (Roche 2012). These numbers underscore the traffic congestion that occurs between Sept-Îles town center and Pointe-Noire Terminal. Traffic is heaviest around the shift change at the Aluminerie Alouette smelter and the Cliffs Resources pelletizing plant. Several residents have already identified traffic as a major problem (Roche 2012).

Sept-Îles is also connected by rail through the CFA and QNS&L railways. The QNS&L railway links the city to Schefferville and is run by Transport Ferroviaire Tshinuetin, the first First Nations company to operate a railway service in Canada. The inauguration in 2008 of a rail transhipment center in the Port of Sept-Îles and the regular service offered by the Georges-Alexandre-Lebel ferry-rail service (over 30 trips in 2008) have enabled regional firms to be connected to the North American railway network (Ville de Sept-Îles 2012).

The maritime transportation system is based at Port of Sept-Îles. This deep water marine installation is located 650 km down-river from Québec City. It contains a vast basin with a depth of 80 m and is open to navigation year-round. The Port of Sept-Îles is the most important center for the shipment of iron ore in North America, serving the Québec and Labrador mining industry. The Pointe-Noire Terminal facilities are used by mining companies such as Wabush Mines, Bloom Lake, Rio Tinto IOCC and Cleveland Cliffs.

The regional transportation system is completed by the Sept-Îles Airport, which constitutes a hub for regional air service to communities in north-eastern Québec, western Labrador, the Lower North Shore and the South Shore of the Saint-Lawrence Seaway, Anticosti Island, Québec City and Montreal. The airport can service up to a million passengers per year. Several regional airlines and helicopter rental firms offer a variety of services at the airport (Ville de Sept-Îles 2012).

Local Traffic Conditions and Trends

Transportation infrastructure has played an important role in the development of the region of Sept-Îles since the 1950s. The backbone of the regional road transportation system is Highway 138, which links Sept-Îles to Québec City and Montreal to the west and to Havre-Saint-Pierre and Natashquan on the Lower North Shore to the east. Highway 138 is the only road of major significance in the region and is the only road link to neighbouring regions. The access road to Pointe-Noire Terminal connects to Highway 138, which is a two lane highway between the Sept-Îles city center and the Pointe-Noire Terminal (maximum speed of 90 km per hour).

In 2007, 5,500 vehicles per day used Highway 138 near the Pointe-Noire Terminal access road in the summer and 4,600 used it per day in winter (Roche 2012). It is estimated that 8.4 percent of these vehicles were trucks (Roche 2012). These numbers provide an indication of the traffic congestion that occurs between the Sept-Îles town center and Pointe-Noire Terminal. Traffic is heaviest around the shift change at the Aluminerie Alouette Aluminum Smelter and the Cliffs Resources Pelletizing Plant. Several city residents have already identified traffic congestion as a major problem (Roche 2012).

24.6 Assessment of Project-Related Environmental Effects

Both of the environmental effects on Community Services and Infrastructure are assessed hereafter for each Kami Terminal phase.

24.6.1 Construction

The current vacancy rate in the Sept-Îles area housing market is very low due to a recent increase in industrial and mining activity. If no mitigation measures are put into place, it is up to estimated 300 workers for a period of two years for the construction of the Kami Terminal, about 50 of whom will be required for the construction by CFA of rail infrastructure in association with the Kami Terminal. Experience suggests that construction workers do not relocate where the potential employment period is finite and short-term. A large proportion of workers required for the Kami Terminal are therefore likely to come from the region. However, it is considered likely that part of the workforce required for construction will have to be recruited from outside the region due to the limited availability of qualified workers in the Sept-Îles area.

If no mitigation measures are put into place, it is also anticipated that personnel transportation requirements related to an influx of an estimated average of 300 workers for a period of two years for the construction of the Kami Terminal could worsen traffic congestion on Highway 138 between the downtown area of Sept-Îles and Pointe-Noire Terminal.

Mitigation of Project Environmental Effects

There are a number of residential construction projects that are underway in the MRC de Sept-Rivières and local authorities are working with the region's major industrial and mining operators in order to find solutions to the current housing shortage.[1] In order to minimize the effects of Kami Terminal construction activities on regional housing supply and local traffic congestion, Alderon will engage with local authorities and other stakeholders to address issues related to community services and infrastructure as needed. In addition, Alderon will monitor local housing indicators (vacancy rates, rental prices, sale prices, etc.).

24.6.2 Operations and Maintenance

Given the small workforce required for the Kami Terminal operation and maintenance (estimated to be in the order of 17 persons), no significant interactions are anticipated on housing and accommodations or on municipal services and infrastructure.

24.6.3 Decommissioning and Reclamation

Considering the works required at the Kami Terminal during the decommissioning and reclamation phase, which are limited to site clean-up and transfer of equipment to the Port or a third party, no significant interactions are anticipated on housing and accommodations or on municipal services and infrastructure.

24.6.4 Summary of Project Residual Effects

The residual environmental effects of the Kami Terminal on Community Services and Infrastructure are summarized in Table 16.6. The residual environmental effects on Water Resources for construction and operation of the Kami Terminal are characterized by the following descriptors: direction; magnitude; geographic extent; duration and frequency; reversibility; ecological/socio-economic context, significance, and prediction confidence.

[1] A study has been recently carried out by Développement Économique Sept-Îles (DESI) on possible strategies for temporary housing of workers in the Sept-Îles area for various industrial and mining projects over the next few years (Roche 2012).

Table 24.6 Summary of Environmental Effects of Kami Terminal Residual: Community Services and Infrastructure

Kami Terminal Phase	Mitigation/Compensation Measures	Residual Environmental Effects Characteristics									Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental or Socio-Economic Context	Significance	Prediction Confidence	
Change to Housing Supply											
Construction	• Engage with local authorities and other stakeholders to address issues related to community services and infrastructure as needed.	A	L	R	ST	C	R	NA	N	H	• Monitor local housing indicators (vacancy rates, rental prices, sales prices, etc.)
Operation and Maintenance		A	L	R	LT	C	R	NA	N	H	
Decommissioning and Reclamation		A	L	R	ST	C	R	NA	N	H	
Change to Traffic Conditions											
Construction	• Engage with local authorities and other stakeholders to address issues related to community services and infrastructure as needed.	A	L	L	ST	C	R	NA	N	H	• No monitoring required.
Operation and Maintenance		A	L	L	LT	C	R	NA	N	H	
Decommissioning and Reclamation		A	L	L	LT	C	R	NA	N	H	

Kami Terminal Phase	Mitigation/Compensation Measures	Residual Environmental Effects Characteristics									Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental or Socio-Economic Context	Significance	Prediction Confidence	

KEY

Direction:
- P Positive.
- A Adverse.

Magnitude:
- L Low proportion of local or regional population that is affected.
- M Moderate proportion of local or regional population that is affected.
- H High proportion of local or regional population that is affected.

Geographic Extent:
- S Site – including PDA and 200 m beyond.
- L Local: within the LSA.
- R Regional: within the RSA.

Duration:
- ST Short term.
- MT Medium term.
- LT Long term.
- P Permanent – will not change back to original condition.

Frequency:
- O Occasionally, once per month or less.
- S Occurs sporadically at irregular intervals.
- R Occurs on a regular basis and at regular intervals.
- C Continuous.

Reversibility:
- R Reversible.
- I Irreversible.

Environmental Context:
- U Undisturbed: Area relatively or not adversely affected by human activity.
- D Developed: Area has been substantially previously disturbed by human development or human development is still present.
- N/A Not Applicable.

Significance:
- S Significant.
- N Not Significant.

Prediction Confidence:
Based on scientific information and statistical analysis and effectiveness of mitigation or effects management measure.
- L Low level of confidence.
- M Moderate level of confidence.
- H High level of confidence.

24.7 Assessment of Cumulative Effects

In association with the Kami Terminal environmental effects discussed above, an assessment of the potential cumulative effects has been conducted for other projects and activities that have potential to interact with the Kami Terminal. The potential for overlap between Kami Terminal activities and cumulative effects of other projects is identified in Table 24.7.

Assessing the cumulative effects of the Kami Terminal with other projects in the region of Sept-Îles is challenging given that the detailed labour requirements of these other projects, including the timing and duration of these requirements of the different project and hence how they will overlap and otherwise interact, are unknown. Furthermore, the timing of planned projects is always open to question, and some may not proceed. However, the identified projects will generally be competing for workers with many of the same skills as those required for the Kami Terminal, which are in short supply in the RSA.

Given the capacity constraints that already exist in the region of Sept-Îles, these cumulative demands will present challenges. These constraints presently include:

- A shortage of available and affordable housing and rental units, and limited temporary accommodation; and,
- Constrained traffic conditions near the Pointe-Noire Terminal.

However, there are a number of housing initiatives that are under way in the MRC de Sept-Rivières and local authorities are working with major industrial and mining operations to find solutions. Consequently, after mitigation, the predicted residual effects of the Kami Terminal and other projects under consideration on the housing market in the RSA are considered to be short-term and not significant. The predicted residual cumulative effects of the Kami Terminal and other projects under consideration on traffic congestion in the LSA are considered to be short-term and not significant. No effects are anticipated in the mid-term or the long-term.

Table 24.7 Potential Cumulative Effects to Community Services and Infrastructure

VEC Existing Condition (Past & On-Going Activities)	Key existing community services and infrastructure constraints due to ongoing industrial and mining development in the RSA: • Limited availability of accommodations and building lots; • High housing prices and rents; and, • Constrained traffic conditions near the Pointe-Noire Terminal.		
Kami Terminal Residual Environmental Effects	• Effect 1- Changes in Housing and Accommodations: Associated in-migration for direct employment will require new accommodations for a limited number of employees during Kami Terminal construction. This will place further demands on housing and accommodations. Alderon will engage with local authorities and other stakeholders to address issues related to community services and infrastructure as needed. Residual adverse environmental effects of construction activities on the regional housing market are considered to be not significant. • Effect 2 – Changes in Municipal Services and Infrastructure: Associated in-migration for direct employment will place further demands on traffic congestion close to the Pointe-Noire Terminal. Alderon will engage with local authorities and other stakeholders to address issues related to community services and infrastructure as needed. Residual adverse environmental effects of construction activities on local traffic congestion are considered to be not significant. • Mitigation and Monitoring: Many residential construction projects are underway in the RCA and local authorities are working with the region's major industrial and mining operators to find solutions to the regional housing shortage and to local traffic constraints along Highway 138. Alderon will monitor local housing indicators (vacancy rates, rental prices, sales prices, etc.).		
Other Projects and Activities	**Likely Effect Interaction (Y/N)**	**Rationale**	**Cumulative Effects**
Pointe-Noire Port Expansion (Port of Sept-Îles)	Y	Located in Pointe-Noire Terminal close to the Kami Terminal site. Planned expansion may increase demands on Community Services and Infrastructure.	Cumulative interactions with the Kami Terminal as manpower requirements for construction are expected to be about 1,000 workers over a two-year period: • Additive interaction with Effect 1 - Increased demands on housing and accommodations; and, • Additive interaction with Effect 2 – Increased traffic congestion near Pointe-Noire Terminal.

CFA and QNS&L	Y	Located close to the Kami Terminal site. Planned expansion may increase demands on Community Services and Infrastructure.	Cumulative interactions with the Kami Terminal as manpower requirements for construction are expected to be about 100 workers over a few years: • Additive interaction with Effect 1 - Increased demands on housing and accommodations; and, • No interaction with Effect 2.
Alouette Aluminum Smelter (Aluminerie Alouette)	Y	Located in Pointe-Noire industrial area close to the Kami Terminal site. Planned expansion may increase demands on Community Services and Infrastructure.	Cumulative interactions with the Kami Terminal as manpower requirements for construction are expected to be several hundreds of workers over many years: • Additive interaction with Effect 1 - Increased demands on housing and accommodations; and, • Additive interaction with Effect 2 – Increased traffic congestion near Pointe-Noire Terminal.
Second Port-Cartier Pellet Plant **(ArcelorMittal)**	Y	Second Port-Cartier Pellet Plant to be located about 30 km from the Kami Terminal site. Planned expansion may increase demands on Community Services and Infrastructure.	Cumulative interactions with Kami Terminal as manpower requirements for construction are expected to be several hundreds of workers over a few years: • Additive interaction with Effect 1 - Increased demands on housing and accommodations; and, • No interaction with Effect 2.
Bloom Pointe-Noire Terminal (Cliffs Resources)	Y	Located in Pointe-Noire Terminal close to the Kami Terminal site. Planned expansion may increase demands on Community Services and Infrastructure.	Cumulative interactions with Kami Terminal as manpower requirements for construction are expected to be in the order of 100 workers over a few years: • Additive interaction with Effect 1 - Increased demands on housing and accommodations; and, • Additive interaction with Effect 2 – Increased traffic congestion near Pointe-Noire Terminal.

Arnaud Apatite-Magnetite Mine (Mine Arnaud)	Y	Located a few km from the Kami Terminal site. Planned expansion may increase demands on Community Services and Infrastructure.			Cumulative interactions with the Kami Terminal as manpower requirements for construction are expected to be about 1,000 workers over a few years: • Additive interaction with Effect 1 - Increased demands on housing and accommodations. However, workers will be lodged in temporary housing on the outskirts of Sept-Îles; and, • Additive interaction with Effect 2 – Increased traffic congestion near Pointe-Noire Terminal.			
Cumulative Effects Summary (Kami Terminal + relevant other projects and activities	**Direction**	**Magnitude**	**Geographic Extent**	**Duration**	**Frequency**	**Reversibility**	**Significance**	**Confidence**
	A	L	R	ST	C	R	N	M
A number of major construction projects will be underway over the next few years in the region of Sept-Îles. These are likely to lead to additive cumulative interactions with the Kami Terminal as manpower requirements for construction are expected to be several thousands of workers over a few years. Current housing and traffic conditions in Sept-Îles are already severely constrained. However, after mitigation, the predicted residual cumulative effects of the projects under consideration on housing and accommodations in the RSA are therefore considered with a moderate level of confidence to be short-term and not significant. The predicted residual cumulative effects of the projects under consideration on traffic congestion in the LSA are also considered to be short-term and not significant. Note: Environmental effects descriptors and their definitions are as used in the assessment of Kami Terminal-related environmental effects (See Table 24.6).								

24.8 Assessment of Accidents and Malfunctions

As indicated in Table 24.3, there is little potential for interaction between a forest fire, train derailment, or stormwater retention pond breach with Community Services and Infrastructure. Given the distance between the Kami Terminal and the nearest residences and the city of Sept-Îles, forest fires, train derailments, and stormwater retention pond breaches are unlikely to interact with Community Services and Infrastructure. As such, the environmental effects of accidents and malfunctions on Community Services and Infrastructure are not further assessed in this EA.

24.9 Determination of Significance of Residual Adverse Environmental Effects

24.9.1 Determination of Significance of Project Effects

The significance of each residual adverse environmental effect will be addressed for each Kami Terminal phase.

Changes in Housing and Accommodations

The current vacancy rate in the Sept-Îles area housing market is very low due to a recent increase in industrial and mining activity. It is anticipated that without mitigation it could be affected by an influx of an up to 300 workers for a period of two years for the construction of the Kami Terminal, including 50 workers who will be required for the construction of rail infrastructure in association with the Kami Terminal. Experience suggests that construction workers and their families do not relocate when the potential employment period is finite and short-term. A large proportion of workers required for the Kami Terminal are therefore likely to come from the region. However, it is considered likely that part of the workforce required for construction will have to be recruited from outside the region due to the limited availability of qualified workers in the Sept-Îles area. The arrival of workers from outside the region is expected to place upward pressure on housing availability as well as housing prices and rents in the region.

There are a number of residential construction projects underway in the MRC de Sept-Rivières and local authorities are working with the region’s major industrial and mining operators in order to find solutions to the current housing shortage. To minimize the effects of Kami Terminal construction phase on the local housing supply, Alderon will engage with local authorities and other stakeholders to address issues related to community services and infrastructure as needed. As a result, the residual adverse environmental effects of construction activities on housing and accommodations are expected to be of low magnitude, regional, short-term, continuous, and reversible. They are therefore considered with a high level of confidence to be not significant.

Changes in Municipal Services and Infrastructure

It is also anticipated that without mitigation an influx of up to 300 workers for a period of two years for the construction of the Kami Terminal could increase traffic congestion on Highway 138 between the downtown area of Sept-Îles and Pointe-Noire industrial sector. Traffic is heaviest around the shift change at the Aluminerie Alouette aluminum smelter and the Cliffs Resources Pelletizing Plant.

In order to minimize the effects of Kami Terminal construction phase on local traffic conditions, Alderon will engage with local authorities and other stakeholders to address issues related to community services and infrastructure as needed. As a result, the residual adverse environmental effects of construction activities on municipal services and infrastructure are expected to be of low magnitude, local, short-term, continuous, and reversible. They are therefore considered with a high level of confidence to be not significant.

24.9.2 Determination of Significance of Cumulative Effects

Construction activities required for a number of large-scale industrial mining projects in the Sept-Îles area and for the expansion of the Port of Sept-Îles Port at Pointe-Noire Terminal will require an estimated 2,000 to 3,000 workers over the next few years. The predicted residual cumulative effects of the projects under consideration on housing and accommodations in the RSA are considered with a moderate level of confidence to be short-term and not significant. The predicted residual cumulative effects of the projects under consideration on municipal services and infrastructure in the LSA are considered with a moderate level of confidence to be short-term and not significant.

24.9.3 Determination of Significance of Effects Resulting from Accidents and Malfunctions

Given the distance between the Kami Terminal and the nearest residences and the city of Sept-Îles, forest fires, train derailments, and stormwater retention pond breaches are unlikely to interact with Community Services and Infrastructure.

24.9.4 Overall Residual Effects Conclusion

In summary, given the planned mitigation, and the analyses presented in this assessment, the effects of changes in housing and accommodations and changes in municipal services and infrastructure on Community Services and Infrastructure as a result of the construction, operation and decommissioning of the Kami Terminal, including cumulative effects, are not likely to be significant.

24.10 Follow-Up and Monitoring

Local housing indicators (vacancy rates, rental prices, sale prices, etc.) will be monitored by Alderon.

24.11 Next Steps

No additional data collection to be conducted prior to construction is determined necessary through the assessment.

24.12 Summary

Community Services and infrastructure includes: employment and social services; health services and social programs; training and education services and programs; public safety and security services; housing and accommodation (residential and tourist); municipal administrative capacity; municipal services and infrastructure; and transportation infrastructure. It was selected as a VEC due to potential Kami Terminal-VEC interactions that could result in: 1) reduced access to housing; and 2) increased traffic congestion in the City of Sept-Îles and in the surrounding MRC de Sept-Rivières.

The effects that have been assessed for this VEC are: 1) changes in housing and accommodations and 2) changes in municipal services and infrastructure. Potential Kami Terminal-VEC interactions for these effects are limited to the two-year Kami Terminal construction phase. Concerns have been raised during the public consultations conducted for the Kami Terminal in Sept-Îles regarding the potential repercussions of the Kami Terminal on housing in the community. Residents have asked whether accommodations will be built to lodge the workers. Residents have also expressed concerns about the quality of available community services in the region.

The assessment of effects related to changes in housing and accommodations and to changes in municipal services and infrastructure is based upon the potential effects of an influx of workers required for construction activities in the Pointe-Noire Terminal area. By virtue of the limited size and characteristics of the required workforce, it is considered unlikely that the anticipated influx of workers for the construction of the Kami Terminal would exert additional demand on local employment and social services, health services and social programs, training and education services and programs, public safety and security services, municipal administrative capacity, or municipal services and infrastructure.

The current vacancy rate in the Sept-Îles area housing market is very low due to a recent increase in industrial and mining activity. If no mitigation measures are put into place, it is anticipated that the housing supply could be further affected by an influx of up to 300 workers for a period of two years for the construction of the Kami Terminal, including the 50 workers required for the construction \ of rail infrastructure associated with the Kami Terminal.

Experience suggests that construction workers do not relocate where the potential employment period is finite and short-term. A large proportion of workers required for the Kami Terminal are therefore likely to come from the region. However, it is considered likely that part of the workforce required for construction will have to be recruited from outside the region due to the limited availability of qualified workers in the Sept-Îles area. The arrival of a number of workers from outside the region is expected to contribute to the ongoing scarcity of available housing and to put additional upward pressure on housing costs in the region.

There are a number of residential construction projects that are underway in the MRC de Sept-Rivières and local authorities are working with the region's major industrial and mining operators in order to find solutions to the current housing shortage. Alderon will engage with local authorities and other stakeholders to address issues related to community services and infrastructure as needed. Local housing indicators (vacancy rates, rental prices, sale prices, etc.) will also be monitored by Alderon. As a result, residual adverse environmental effects of Kami Terminal construction activities on housing and accommodations are considered with a high level of confidence to be not significant.

No major interactions are anticipated on housing and accommodations during the Kami Terminal operations and maintenance phase (staffing requirements for the Kami Terminal are estimated to be in the order of 17 persons). No major interactions are anticipated on housing and accommodations during the Kami Terminal decommissioning and reclamation phase, which is limited to site clean-up and transfer of equipment to the Port or a third party.

If no mitigation measures are put into place, it is also anticipated that personnel transportation requirements related to an influx of up to 300 workers for a period of two years for the construction of the Kami Terminal could increase traffic congestion on Highway 138 between the downtown area of Sept-Îles and Pointe-Noire Terminal.

Alderon will engage with local authorities and other stakeholders to address issues related to community services and infrastructure as needed. As a result, residual adverse environmental effects of Kami Terminal construction activities on municipal services and infrastructure are expected to be of low magnitude, local, short-term, continuous, and reversible. They are therefore considered with a high level of confidence to be not significant.

Given the distance between the Kami Terminal and the nearest residences and the city of Sept-Îles, forest fires, train derailments, and stormwater retention pond breaches are unlikely to interact with Community Services and Infrastructure.

Construction activities required for a number of large-scale industrial mining projects in the Sept-Îles area and for the related Port of Sept-Îles expansion at Pointe-Noire Terminal will require several thousands of workers over the next few years. The predicted residual cumulative effects of the projects under consideration on housing and accommodations and on municipal services and infrastructure are considered with a moderate level of confidence to be short-term and significant.

25.0 HEALTH AND COMMUNITY HEALTH

Health and Community Health are identified in the EIS guidelines in recognition of the fact that, changes that are brought about by projects in some instances may affect the health of individuals as well as community health and well-being at large.

In view of the characteristics of the Kami Terminal and its distance from the main population center in Sept-Îles, the atmospheric environment has been established as having the only possible vectors with possible consequences on health. These include dust generation, increased noise levels, and vibrations. Health issues associated with the atmospheric environment are assessed in detailed in Chapters 14. Chapter 14 also describes pertinent acts, guidelines, and directives regarding health and possible environmental effects. No further assessment is therefore warranted with regards to health as a consequence of Kami Terminal.

26.0 ECONOMY, EMPLOYMENT AND BUSINESS

26.1 VEC Definition and Rationale for Selection

Understanding the effects of the Kami Terminal on Economy, Employment, and Business is fundamental to assessing socio-economic implications for the wellbeing of residents and businesses. It was selected as a VEC due to potential Kami Terminal-VEC interactions that could result in improved economic conditions, increased levels of employment and increased business activity in the city of Sept-Îles, MRC de Sept-Rivières, Côte-Nord Administrative Region, and Province of Québec as a whole.

26.1.1 Issues

The following issues were raised by the public and other stakeholders:

- Cumulative effects to economy, employment and business;
- Apprenticeship and training;
- Availability of local workers;
- Local businesses; and,
- Potential effects on local economy.

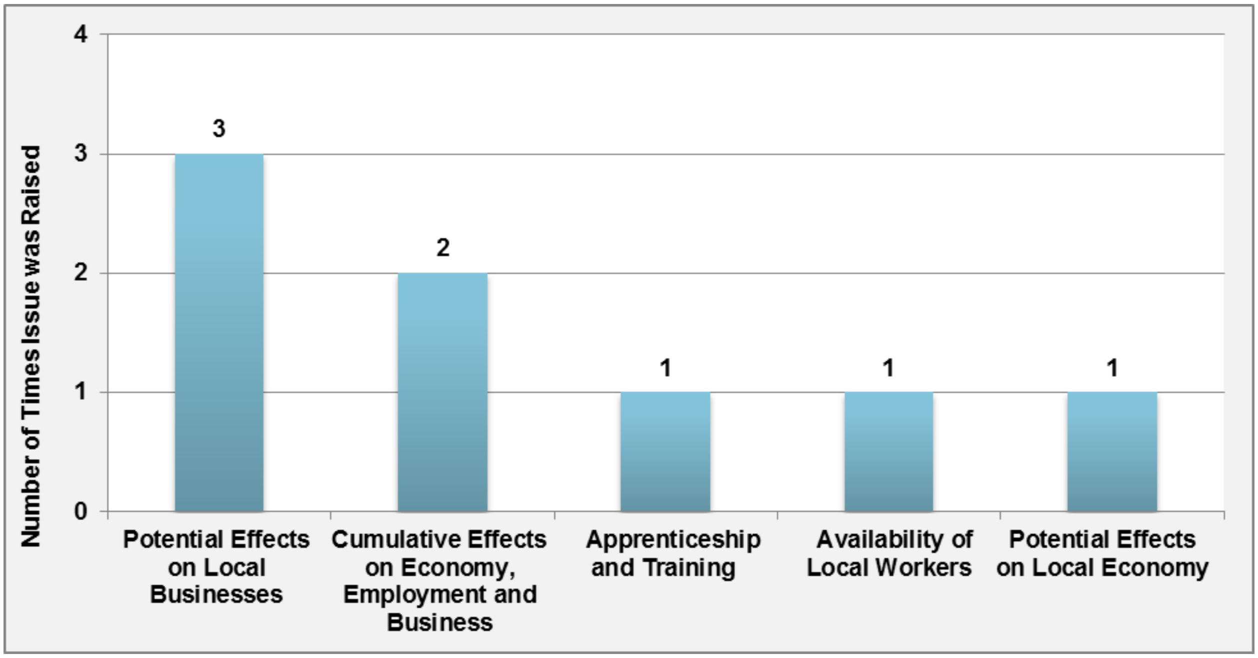
Accordingly, these issues are included in the assessment of the VEC. Details on the issues raised by stakeholders are provided in Table 26.1. The number of times each issue was raised is shown in Figure 26.1.

Table 26.1 Issues Raised by Stakeholders

Issue	Community / Organization	Summary of Comments Raised During Consultation and Engagement Activities	Response / Location in the EIS
Cumulative effects to economy, employment, and business	CRE	Cumulative socio-economic effects	Construction activities resulting from various projects in the area will require an overall workforce in the order of 2,000 to 3,000 workers over the next few years as well as hundreds of additional employees over the life of several projects. Regional businesses are likely to benefit from contracts for materials and services both in the short and long term. Additional information on cumulative effects to economy, employment and business is provided in **Section 26.7.**

Issue	Community / Organization	Summary of Comments Raised During Consultation and Engagement Activities	Response / Location in the EIS
Apprenticeship and Training		The Mayor suggested that Alderon contact the Education/Training institutions in the region	Alderon is committed to build and maintain a positive and long term relationship with stakeholders. Alderon will engage with all interested parties. Additional information on consultation completed to-date is provided in **Chapter 10**.
Availability of local workers		Are you going to use local workers for operations or go FIFO?	Alderon is committed to promoting regional subcontracting and employment, including local and Aboriginal opportunities. In addition, Alderon will collaborate with the regional economic forum to maximize local employment. **Section 26.6** contains the assessment of Kami Terminal effects on employment and business.
Local businesses	CIM Conference	Many indications of interest by regional suppliers and contractors. In this regards, I believe we should hold information forums in St. John's and Sept-Îles when our contracting strategy is firmed up.	Alderon is committed to promoting regional subcontracting and employment, including local and Aboriginal opportunities. In addition, Alderon will collaborate with the regional economic forum to maximize local employment. **Section 26.6** contains the assessment of Kami Terminal effects on employment and business.
	Sept-Îles	Involvement of the local communities and businesses in the procurement process for the construction and operation of the mine. State the company's intentions concerning local procurement	
	Sept-Îles	The Mayor suggested that Alderon contact the CLD which is an entity that supports small and medium size businesses. He also suggested Alderon contact the local Chamber of Commerce and offers to speak at one of their functions. He also recommended a meeting with the Sept-Îles Economic Development Agency that looks after major industries.	As outlined in its *Community Relations Policy*, Alderon is committed to build and maintain positive and long term relationship with stakeholders. Alderon will engage with all interested parties. Alderon will collaborate with the Regional economic forum. Additional information on consultation is provided in **Chapter 10**.
Potential effects on local economy		At the end of the predicted mine life, what are you going to do with your employees?	The workforce will be kept informed of Kami Terminal plans and, as with any other project, will be down-sized as the Kami Terminal plans warrant.

Figure 26.1 Frequency of Issues Raised Related to the Economy, Employment, and Business



26.2 Environmental Assessment Boundaries

26.2.1 Spatial Boundaries

The spatial boundaries for the environmental effects assessment of the VEC on Economy, Employment, and Business are defined below.

Local Study Area

For the environmental effects assessment of the VEC on Economy, Employment, and Business, the LSA includes the PDA and encompasses the MRC de Sept-Rivières in its entirety (Figure 26.2).

Regional Study Area

Although it is recognized that some of the economic benefits of the Kami Terminal may extend beyond the Province of Québec, the RSA takes into account the area of influence limited to the Province of Québec.

26.2.2 Temporal Boundaries

The temporal boundaries for the assessment of the potential environmental effects of the Kami Terminal on Economy, Employment, and Business include the Kami Terminal phases of construction (approximately 2 years), operations and maintenance (approximately 17 years), and decommissioning / reclamation (approximately 1 year).

Figure 26.2 Local and Regional Study Areas

26.2.3 Administrative Boundaries

The responsibility for maximizing local and regional economic, employment, and business benefits related to the Kami Terminal falls under the purview of the City of Sept-Îles, the MRC de Sept-Rivières, and the Côte-Nord Administrative Region.

26.3 Establishing Standards or Thresholds for Determining Significance of Environmental Effects

The likely effects of the Kami Terminal on Economy, Employment, and Business are described using the following attributes, which are based on standard environmental practice and EIS guidelines:

- **Direction:**
  - Beneficial – economic conditions are improving in comparison to baseline conditions and trends;
  - Neutral - no change in economic conditions compared to baseline conditions and trends; or,
  - Adverse - economic conditions are worsening in comparison to baseline conditions and trends.
- **Magnitude:**
  - No effect - no detectable effect anticipated on economic conditions;
  - Low - detectable effect occurs on economic activity, but is within normal variability of baseline conditions;
  - Moderate - effect occurs that represents a relative increase in economic activity with regard to baseline conditions; or,

    High - effect occurs that singly or as a substantial contribution in combination with other sources represents a significant increase in economic activity with regard to baseline conditions.
- **Geographical Extent:**
  - Local: effect restricted to the LSA; or,
  - Regional: effect within the RSA.
- **Frequency:**
  - Intermittent - effect will occur at various, intermittent times; or,
  - Continuous - effect will occur continuously.
- **Duration:**
  - Short-term: effect occurs for less than three years;
  - Medium-term: effect occurs for the life of the project; or,

- Long-term: effect persists beyond the life of the project.

- **Reversibility:** For this socio-economic VEC, these characteristics are not applicable.
- **Ecological and Socio-Economic Context:** For the socio-economic VECs in the Sept-Îles Region, these characteristics are not applicable.

The significance criteria described below are based on changes in measurable parameters which are described in Section 26.4.

A significant adverse residual environmental effect of the Kami Terminal on Economy, Employment, and Business will result if the Kami Terminal causes substantial decreases in the measurable parameters over the life of the Kami Terminal.

A significant positive environmental effect of the Kami Terminal on Economy, Employment, and Business will result if Kami Terminal expenditures cause substantial increases in the measurable parameters over the life of the Kami Terminal.

26.4 Potential Project-VEC Interactions

The effects that will be assessed for Economy, Employment, and Business are 1) changes to regional employment; and 2) changes to regional businesses. Up to 300 workers will be required by Alderon over the two-year construction phase, about 50 whom will be required for the construction by CFA of rail infrastructure in association with the Kami Terminal. Staffing requirements for the Kami Terminal during operations is estimated to be in the order of 17 persons. The most important interaction between the Kami Terminal and these effects is related to the disbursement of an estimated $56 million in salaries and $132 million in capital expenditures over the two-year Kami Terminal construction phase, as well as important but as yet unknown additional disbursements for goods and services during the approximately 17-year operations and maintenance phase.

Table 26.2 provides a list of Kami Terminal activities and physical works as well as an evaluation of the degree to which an interaction is expected or not to occur with each identified environmental effect for Economy, Employment, and Business. Interactions are ranked as a 0 where no interaction occurs. They are ranked as 1 where interaction occurs however the resulting effect can be managed through proven mitigation and codified practice. Finally, they are attributed a 2 when an interaction occurs and has the potential to be further enhanced with specific measures. Interactions ranked 2 require further assessment.

Table 26.2 Potential Environmental Effects of Kami Terminal to Economy, Employment, and Business

Kami Terminal Activities and Physical Works	Potential Environmental Effects	
	Changes to Regional Employment	Changes to Regional Businesses
Construction		
Site Preparation (incl. clearing, excavation, blasting, material haulage, grading, removal of overburden, and stockpiling)	0	0
Construction Unloading, Stacking, Storage, and Reclaiming Facilities (rail dumper building, rail car dumper and hopper, train positioner transfer houses, conveyors, dust collector, maintenance building, substation, sanitation system)	0	0
Construction of Railway Loop	0	0
Construction of Stream Diversion	0	0
Onsite Vehicle/Equipment Operation	0	0
Waste Management	0	0
Transportation of Personnel and Goods to Site	0	0
Expenditures	2	2
Employment	2	2
Operation and Maintenance		
Rail Transport	0	0
Concentrate Handling and Stockpiling	0	0
Water Collection, Treatment, and Discharge	0	0
Onsite Vehicle/Equipment Operation and Maintenance	0	0
Waste Management	0	0
Transportation of Personnel and Goods to Site	0	0
Expenditures	2	2
Employment	1	2
Decommissioning and Reclamation		
Site clean-up	1	1
Accidents and Malfunctions		
Forest Fire	0	0
Stormwater Retention Pond Breach	0	0
Train Derailment	1	1

Kami Terminal Activities and Physical Works	Potential Environmental Effects	
	Changes to Regional Employment	Changes to Regional Businesses
KEY 0 No interaction. 1 Interaction occurs; however, based on past experience, the resulting effect can be managed to acceptable levels through standard operating practices and/or through the application of best management or codified practices. No further assessment is warranted. 2 Interaction occurs, and resulting effect may exceed acceptable levels without implementation of specified mitigation. Further assessment is warranted.		

The effects of the Kami Terminal on Economy, Employment, and Business associated with employee recruitment during construction and operations, are grouped as “employment” in the previous table. Kami Terminal expenditures, including the procurement of goods and services and generation of revenue during operation are grouped as “expenditures”. As a result, the potential effects that are likely to interact significantly (ranking of 2) with this VEC are expenditures during the construction phase and the operations and maintenance phases and employment during the construction phase. These effects will be further assessed in the following sections.

Potential effects that are likely to interact at a reduced level (ranking of 1) with this VEC are employment during the operations and maintenance phase, Site clean-up during the decommissioning and reclamation phase as well as train derailment. Accordingly, they are not considered further in the assessment. None of the Kami Terminal activities or physical works will directly cause effects on Economy, Employment, and Business. All of them are accordingly rated as not significant (ranking of 0), and are not considered further in the assessment.

The assessment of the effects of the Kami Terminal on Economy, Employment, and Business is focused on each of these effects:

- Change in economy;
- Change in employment; and,
- Change in business.

The measurable parameters used for the assessment of these effects, and the rationale for their selection, are provided in Table 26.3.

Table 26.3 Measurable Parameters for Economy, Employment, and Business

Environmental Effect	Measurable Parameter	Rationale for Selection of the Measurable Parameter
Change in Economy	Income and taxes	• The effects of Kami Terminal expenditures, together with proponent business taxes, will contribute to provincial and municipal revenues.
Change in Employment	Employment in Province	• The effects of Kami Terminal employment will contribute to the local and regional economies.
	Employment persons of Aboriginal status	• The effects of the Kami Terminal on the employment of Aboriginals will contribute to the well-being of Aboriginal communities and address the concerns of Aboriginal groups related to the Kami Terminal.
Change in Business	Regional business capacity	• Kami Terminal work given to regional businesses will enhance their capacity and that of the regional economy.
	Aboriginal business capacity	• Kami Terminal work given to Aboriginal businesses will enhance their capacity and contribute to the well-being of Aboriginal communities.

26.5 Existing Environment

Information on regional employment, income and business conditions as well as on related development trends is presented hereafter for the Côte-Nord Administrative Region, the MRC de Sept-Rivières, the City of Sept-Îles, and the Innu communities of Sept-Îles.

Employment, Income and Businesses in Côte-Nord Administrative Region

With a population of approximately 96,000 in 2009, Québec's Côte-Nord Administrative Region accounted for 1.2 percent of the population of the province. The region's main resource processing centers, Baie-Comeau and Sept-Îles, account for a large share of the population. The region's principal resources include:

- Boreal forests, which cover close to three quarters of the region;
- Fisheries resources, which abound in the St. Lawrence River estuary and in a number of rivers and lakes;
- Mineral resources, which mainly include iron, but also ilmenite (titanium), graphite, and other potential resources; and,
- Recreation and tourism resources based upon outdoor activities.

The main sources of employment in the region are manufacturing, health care and social assistance, retail trade, public administration, education, accommodation and food services, and mining (see Table 26.4).

Table 26.4 Côte-Nord Region – Industrial Structure, Based on Jobs in Workplace (2006)

Industries	Côte-Nord Region		Québec
	Jobs (000)	%	%
Manufacturing	7.0	17.0	15.4
Health care and social assistance	5.1	12.4	12.2
Retail trade	4.9	11.9	12.8
Public administration	3.2	7.8	6.3
Education	3.1	7.7	7.3
Accommodation and food services	3.0	7.3	6.5
Mining	2.9	7.1	0.4
Other services	1.9	4.5	5.0
Transportation and warehousing	1.9	4.5	4.0
Utilities	1.3	3.1	0.9
Construction	1.1	2.6	2.9
Agriculture, forestry and fishing	0.9	2.3	2.2
Professional, scientific, and technical services	0.9	2.2	6.5
Wholesale trade	0.8	2.0	4.5
Finance and insurance	0.8	1.9	4.3
Administrative support and waste management services	0.7	1.8	2.8
Information and culture	0.5	1.3	2.6
Arts, entertainment, and recreation	0.5	1.3	1.8
Real estate and rental	0.5	1.2	1.5
Company management	0.0	0.1	0.1
Total - Industries	**41.0**	**100**	**100**
Source: Canada Economic Development (2012) and Statistics Canada (2006)			

Besides the region's hydro-electric complexes, which include some of the largest in Canada (Manic-Outardes complex, La Romaine complex under construction, etc.), the principal resource-based industries are associated with the extraction and processing of mineral and forestry resources (see Table 26.5). These include:

- Aluminum smelters, including two of the largest in Canada (Alcoa in Baie-Comeau and Aluminerie Alouette in Sept-Îles);
- Iron ore and ilmenite processing plants (IOCC and Cleveland Cliffs in Sept-Îles, ArcelorMittal in Port-Cartier, QIT Fer et Titane close to Havre-Saint-Pierre, etc.); and,
- Pulp and paper mills (including Abitibi-Bowater mills in Baie-Comeau).

Natural resource industries are highly cyclical. While the pulp and paper industry is currently in difficult times, the mineral extraction and processing industry is going through a period of rapid expansion. According to provincial statistics (ISQ 2011), this is reflected in increased employment among persons between the ages of 25 and 64 in the MRC de Sept-Rivières, which includes Sept-Îles and Port-Cartier. It saw an increase of 4.8 percent between 2009 and 2010.

Table 26.5 Côte-Nord and Nord-du-Québec Regions – Structure of the Manufacturing Sector, Based on Jobs in Workplace (2009)

Industries	Côte-Nord and Nord-du-Québec		Québec
	Jobs	%	%
Wood products	3,633	43.0	8.8
Primary metals	1,984	23.5	4.7
Food, beverage, and tobacco products	943	11.2	13.4
Paper	800	9.5	6.0
Metal products	545	6.4	10.2
Miscellaneous manufacturing	152	1.8	4.3
Non-metal mineral products	112	1.3	2.9
Furniture and related products	86	1.0	6.7
Printing and related support activities	55	0.7	4.7
Plastic and rubber products	27	0.3	6.5
Clothing, leather, and allied products	23	0.3	5.1
Transportation equipment	23	0.3	6.0
Machinery	22	0.3	6.9
Electrical equipment, appliances, and components	21	0.2	2.8
Chemicals	19	0.2	4.2
Textile product mills and textile products	8	0.1	2.3
Petroleum and coal products	2	0.0	0.8
Computer and electronic products	2	0.0	3.8
Total – Manufacturing industry	**8,457**	**100**	**100**
Source: Statistics Canada, Business Register (June 2009) compiled in CED (2012)			

The distribution of businesses by size in the Côte-Nord and Nord-du-Québec regions in 2009 was similar to the province of Québec as a whole. Each region had 44.5 small and medium enterprises (SMEs) per 1,000 residents in 2009 (CED 2012). The provincial average was 37.6 SMEs per 1,000 residents (CED 2012).

In 2007, the Côte-Nord and Nord-du-Québec regions had 30 exporting companies and the value of exports was $3,351.7 million, accounting for 4.7 percent of provincial exports (CED 2012). Over the period of 2004 to 2009, public investment in the Côte-Nord region declined at an average annual rate of 0.1 percent, compared with a 12.4 percent increase in the province of Québec (CED 2012). During the same time period, private investment in the Côte-Nord region declined at an average annual rate of 3.2 percent, compared with a 0.9 percent decrease in the province of Québec (CED 2012).

26.5.1 Employment, Income, and Businesses in Municipalité Régionale de Comté de Sept-Rivières and City of Sept-Îles

Between 2009 and 2010, the number of employed workers in the MRC de Sept-Rivières increased from 14,731 to 15,435, the employment ratio increased from 73.4 to 77.5 percent, and the median salary increased from $42,567 to $45,411 (ISQ 2011). Over the same period, provincial employment increased from 72.6 to 73.5 percent and the median salary increased from $36,304 to $37,173. This indicates a more favourable employment and income picture for the region of Sept-Îles than for the province of Québec as a whole.

In 2009, the City of Sept-Îles had a population aged 15 and over of 24,700. The labour force numbered 16,900 individuals of whom 15,500 were employed. The unemployment rate was 8.8 percent. The median salary for full-time male workers was estimated at $53,023 and the median salary for full-time female workers was estimated at $32,249 (Ville de Sept-Îles 2012). The labour force profile of Sept-Îles by sector in 2006 is provided in Table 26.6.

Table 26.6 City of Sept-Îles – Labour Force Profile by Sector (2006)

Sectors	Sept-Îles (%)	Québec (%)
Agriculture and other industry-related resources	7.9	3.7
Construction	5.2	5.2
Manufacturing	11.9	14.6
Wholesale trade	2.6	4.4
Retail trade	13.3	12.0
Finance and real estate	4.0	5.4
Health care and social assistance	12.5	11.2
Education	6.9	6.9
Commercial services	13.6	17.1
Other services	22.1	19.5
Source: Statistics Canada (2006) in Ville de Sept-Îles (2012)		

The service sector is the most important sector in the City of Sept-Îles in terms of employment and income. It is represented by a total of 862 companies employing 10,897 persons (Ville de Sept-Îles 2012). The most important service sector employers include retail (1,835 persons), regional health and social services (1,459 persons), the regional school board (1,136 persons), federal, provincial and municipal administrative offices (995 persons), and accommodation and food services (975 persons).

In line with the importance of mineral extraction and processing industries to the economy of the region, the mining sector plays an important role in employment and income in Sept-Îles. The main employers include IOCC with a total of 510 employees in 2008 and Cliffs Resources (Wabush Mines) with a total of 350 employees in 2009. The industrial sector also plays an important role, providing a total of 1,642 jobs in 2007 (Ville de Sept-Îles 2012). The main employer in the manufacturing sector is the Aluminerie Alouette aluminum smelter with a total of 970 employees. Fourteen other manufacturers have a total of 642 employees (see Table 26.7).

Table 26.7 City of Sept-Îles – Main Employers in the Manufacturing Sector, Based on Jobs in Workplace (2012)

Employers	Jobs
Aluminerie Alouette	970
Métallurgie Brasco	150
Groupe Tinor	120
Métal 7 inc.	85
UMEK	80
Soudo Technic. inc	40
Spécialité Hydraulique Côte-Nord	30
Poissonnerie Soucy	28
Imprimerie Rive-Nord médias	25
Poissonnerie Fortier et frères	20
Imprimerie B & E enr.	15
Industrie de soudure Le Mineur	15
Bouchard et Blanchette	12
Les Industries Mingan	11
HPC Hydraulique	11
Source: Développement économique Sept-Îles(2007) in Ville de Sept-Îles (2012)	

The construction industry accounted for only 5.2 percent of the labour force in Sept-Îles in 2006 (Statistics Canada 2012), however its importance to the local economy must not be discounted. Since 2010, the number of person-hours worked in the construction industry in the Cote-Nord region has increased considerably due to a number of new large-scale engineering and roadwork projects (Roche 2012). From 2006 to 2010, the number of residents of Sept-Îles employed in the construction industry rose from 2,688 to 3,533 people (Roche 2012). This represents a 31.4 percent increase over four years and translates to an increase in local capacity in terms of diversified trades and jobs in the construction industry.

26.5.2 Employment, Income and Businesses in Innu Communities of Sept-Îles

Traditional activities still play an important role in the communities of Uashat and Maliotenam. These include salmon fishing, fur trapping, and hunting (e.g. caribou and waterfowl). These activities are practiced by community members throughout the territory to the north and east of the region of Sept-Îles.

High unemployment rates are a significant concern in the two communities. According to federal census data, the activity rate for adults aged 20 and over in Uashat and Maliotenam was estimated at 53.5 percent in 2006. That same year, the employment rate was at 34.4 percent, while the unemployment rate reached 35.7 percent. Average income for employed community members was estimated at $19,517. Approximately 34 percent of this income was covered by government transfers (AANDC 2012).

The main employer in the Innu Takuaikan Uashat mak Mani-Utenam is the Band Council, providing jobs directly through the Band Office and its various departments (economic development, social services, employment and training, etc.) and indirectly through related service providers (health and social services, school board, etc.) and companies. Approximately 50 companies are active in the two communities, mostly operating in the areas of forestry, fishing, trapping, construction, outfitting, art and handiworks.

Service companies in which the Band Office has an interest include the *Galeries Montagnaises* shopping center on Highway 138, as well as a number of transportation and construction firms that have developed through work on such regional projects as Hydro-Québec's Sainte-Marguerite-3 hydro-electric dam. For example, experience on the hydro-electric project has enabled a local Innu firm to be contracted by the City of Sept-Îles for the collection of municipal domestic waste and recyclable materials.

One of the biggest challenges facing the community is ensuring that the younger generations have access to jobs in the region. A number of training programs have been put into place for community members in collaboration with the *Commission de la Construction du Québec* (CCQ) in order to enable them to acquire marketable skills in the construction sector in areas such as carpentry and heavy machinery operation.

26.6 Assessment of Project-Related Environmental Effects

Each environmental effect on Economy, Employment, and Business is assessed hereafter for each Kami Terminal phase.

26.6.1 Construction

Up to 300 workers will be required over the two-year Kami Terminal construction phase (staffing requirements for the Kami Terminal during the operations and maintenance phase are estimated to be in the order of 17 persons), including an average of 50 workers per year for the construction by CFA of rail infrastructure in association with the Kami Terminal (refer to following Table 26.8). The relative importance in terms of overall employment of each category of works during the Kami Terminal construction phase is as follows:

- Land Clearing (0.7 percent);
- Storage Yard Preparation (14.0 percent);
- Storage Yard Grading (3.6 percent);
- Road Relocation (5.1 percent);
- Underground Pipe Relocation (2.8 percent);
- Rail Loop (9.7 percent);

- Stacker-Reclaimer (13.3 percent);
- Stacker Foundations (1.7 percent);
- Belt Conveyors (12.6 percent);
- Train Car Dumper / Building (9.6 percent);
- Transfer Buildings (1.8 percent);
- Electrical Power and Controls (10.8 percent); and,
- Miscellaneous (14.2 percent).

Table 26.8 Kami Terminal Preliminary Construction Labour Requirements and Capital Costs

Description	OPC ($)	Est. % Labour	Person-hours	Task Duration (months)	Crew Size	Person-months
Land Clearing	840,000	50	7,000	3	15	44
Storage Yard Preparation	15,730,000	50	131,083	12	68	819
Storage Yard Grading	4,100,000	50	34,167	5	43	214
Road Relocation	5,760,000	50	48,000	8	38	300
Underground Pipe Relocation	3,120,000	50	26,000	6	27	163
Rail Loop	13,600,000	40	90,667	14	40	567
Other Rail Infrastructure (CFA)	29,000,000	40	193,333	14	86	1,208
Stacker-Reclaimer	30,000,000	25	125,000	12	65	781
Stacker Foundations	1,950,000	50	16,250	4	25	102
Belt Conveyors	47,130,000	15	117,825	12	61	736
Train Car Dumper / Building	21,600,000	25	90,000	10	56	563
Transfer Buildings	4,000,000	25	16,667	12	9	104
Electrical Power & Controls	24,310,000	25	101,292	12	53	633
Miscellaneous	16,000,000	50	133,333	24	35	833
Total (Excluding Other Rail Infrastructure - CFA)	**188,149,000**	**N/A**	**937,284**	**N/A**	**N/A**	**5,859**

Assumptions:
1. Scoping study line item data used, since current feasibility study data is not yet available
2. Labor and materials cost splits vary with line item, as indicated.
3. Labor cost assumed at $60 / hour.
4. Contingencies included, as per scoping studies.
5. Two year construction schedule assumed with level man-hour loading, single shift.
6. Task Duration as indicated (160 hrs per month).
7. Operations are based on 7 days/week.
8. Other Rail Infrastructure (CFA) is constructed by others in association with the Kami Terminal.

Total employment during the Kami Terminal construction phase represents 940,000 person-hours of work and an estimated $56 million in salaries. The types of construction works that appear to be the most accessible in terms of regional employment opportunities (land clearing, storage yard preparation, storage yard grading, road relocation, underground pipe relocation, rail loop, stacker foundations, train car dumper / building, transfer buildings, etc.) represent about 63 percent of total construction-related employment and salaries.

It is considered likely that part of the workforce required for construction will have to be recruited from outside the region due to the limited availability of qualified workers. Indeed, a number of large-scale industrial and mining projects in the Sept-Îles area are currently in the early implementation stages, with the result that few local specialized resources are available. However, the construction phase will offer employment opportunities for workers or young apprentices from the surrounding regions of Eastern Québec (Côte-Nord, Lac Saint-Jean, Gaspésie, etc.) and elsewhere that are affected by high levels of unemployment.

An estimated $132 million in capital expenditures will be required over a period of two years for the construction of the Kami Terminal. It is considered likely that it will be possible to source part of the materials and equipment required for construction from businesses located in the MRC de Sept-Rivières. However, the Kami Terminal construction phase will also offer business opportunities to contractors and suppliers from elsewhere in the Province of Québec and beyond.

The relative importance in terms of overall capital expenditures of each category of works involved during the construction phase is as follows:

- Land Clearing (0.4 percent);
- Storage Yard Preparation (8.4 percent);
- Storage Yard Grading (2.2 percent);
- Road Relocation (3.1 percent);
- Underground Pipe Relocation (1.7 percent);
- Rail Loop (7.2 percent);
- Stacker-Reclaimer (15.9 percent);
- Stacker Foundations (1.0 percent);
- Belt Conveyors (25.0 percent);
- Train Car Dumper / Building (11.5 percent);
- Transfer Buildings (2.1 percent);
- Electrical Power and Controls (12.9 percent); and,
- Miscellaneous (8.5 percent).

The types of works that appear to be the most accessible to regional businesses (land clearing, storage yard preparation, storage yard grading, road relocation, underground pipe relocation, rail loop, stacker foundations and train car dumper / building, transfer buildings, and miscellaneous) represent about 46 percent of total construction-related capital expenditures.

Enhancement/Effects Management

A regional economic forum (*Côte-Nord Économique*) has recently been set up by the authorities and business councils of the Côte-Nord Administrative Region in order to find ways to maximize the regional economic benefits of ongoing industrial and mining projects. Alderon will collaborate with this forum with the objective of identifying means of optimizing regional access to employment and business opportunities. Other benefits enhancement measures during the construction phase include promoting regional subcontracting for materials and services and opportunities for local and Aboriginal businesses and workers.

26.6.2 Operations and Maintenance

Staffing requirements for the Kami Terminal during the operations and maintenance phase are estimated to be in the order of 17 persons (see Table 26.9). Given this small workforce requirement (in 2009, the City of Sept-Îles had a population aged 15 and over of 24,700), no significant interactions are anticipated on regional employment.

However, while the level of expenditures for the operations and maintenance phase of the Project in the Pointe-Noire industrial area is currently unknown, it should also represent important potential sources of income for businesses located in the MRC de Sept-Rivières, in the surrounding regions of Eastern Québec or elsewhere in the Province of Québec.

Table 26.9 Kami Terminal Preliminary Operations and Maintenance Labour Requirements

Description	Shifts/Day	Staff
Train Operations	2	2
Rail Car Dumping Operations	1	2
Storage Yard	1	2
Ship Loading	1	2
System Control	1	2
Maintenance	1	2
Administration	1	2
Rail Maintenance	1	2
Total	**N/A**	**17**

From the rail side, at the terminal, the anticipated major contracts during normal operations are as follows:

1) Rail Transport: On the basis of a long-term contract, *Chemin de Fer Arnaud* – CFA, which is owned by Cliffs Natural Resources, will: a) provide all rail services and personnel; b) provide training to operations staff and track maintenance staff; c) require

fuel for locomotives (through a local fuel supplier); and d) likely utilize local delivery services to receive parts for track and rolling stock.

2) Rail Car Maintenance: This will be undertaken through a maintenance contractor to repair gondola cars with respect to Transport Canada guidelines and regulations through a multiple year contract (value of contract will increase as rail car fleet ages). The activity will likely be located at the CFA staging yard and may be awarded to CFA or a third party. It will employ mechanics and other skilled trades, will likely utilize local delivery services to receive parts, and will involve minor consumption of fuel for service vehicles (likely shared with other operations).

The anticipated major normal terminal operation contracts are as follows:

- Leasing Contract with the Port of Sept-Îles;
- Operating contract with Logistec or similar shipping entity;
- Maintenance contracts for mechanical and electrical systems;
- Spare parts contracts for major equipment;
- Electric power contract with Hydro-Québec;
- Wastewater treatment chemical supply contracts;
- Cleaning and custodial services contracts;
- Water supply contract with the City of Sept-Îles; and,
- Supply and maintenance of vehicles and mobile equipment.

Enhancement/Effects Management

A regional economic forum (*Côte-Nord Économique*) has recently been set up by the authorities and business councils of the Côte-Nord Administrative Region in order to find ways to maximize the regional economic benefits of ongoing industrial and mining projects. Alderon will collaborate with this forum with the objective of identifying means of optimizing regional access to employment and business opportunities. Other benefits enhancement measures during the construction phase include promoting regional subcontracting for materials and services and opportunities for local and Aboriginal businesses and workers.

26.6.3 Decommissioning and Reclamation

The works required at the Pointe-Noire Terminal during the decommissioning and reclamation phase are limited to site clean-up and transfer of equipment to the Port or a third party. Therefore, no significant interactions are anticipated on regional employment or businesses during this phase.

26.6.4 Summary of Project Residual Effects

The positive residual environmental effects of the Kami Terminal on Economy, Employment, and Business are summarized in Table 26.10. The positive residual environmental effects on Economy, Employment, and Business for construction and operation of the Kami Terminal are characterized by the following descriptors: direction; magnitude; geographic extent; duration and frequency; reversibility; ecological/socio-economic context, significance, and prediction confidence.

Table 26.10 Summary of Residual Environmental Effects of Kami Terminal: Economy, Employment, and Business

Kami Terminal Phase	Enhancement Measures	Residual Environmental Effects Characteristics									Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental or Socio-Economic Context	Significance	Prediction Confidence	
Change to Regional Employment											
Construction	• Collaborate with the Regional economic forum • Promote regional subcontracting for materials and services • Promote opportunities for local and Aboriginal businesses and workers	P	H	R	ST	C	N/A	N/A	S	H	• Promote opportunities for local and aboriginal businesses and workers.
Operation and Maintenance		P	L	R	LT	C	N/A	N/A	N	H	
Decommissioning and Reclamation		P	L	R	ST	C	N/A	N/A	N	H	
Change to Regional Businesses											
Construction	• Collaborate with the Regional economic forum • Promote regional subcontracting for materials and services • Promote opportunities for local and Aboriginal businesses and workers • Coordinate disruptions to utilities and infrastructure to minimize effects	P	H	R	ST	C	N/A	N/A	S	H	• Promote opportunities for local and aboriginal businesses and workers. • Promote regional subcontracting for materials and services.
Operation and Maintenance		P	H	R	LT	C	N/A	N/A	S	H	
Decommissioning and Reclamation		P	L	R	ST	C	N/A	N/A	N	H	

Kami Terminal Phase	Enhancement Measures	Residual Environmental Effects Characteristics									Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental or Socio-Economic Context	Significance	Prediction Confidence	

KEY

Direction:
P Positive.
A Adverse.

Magnitude:
No effect - no detectable effect anticipated on economic conditions.
L Low - detectable effect occurs on economic activity, but is within normal variability of baseline conditions.
M Moderate - effect occurs that represents a relative increase in economic activity with regard to baseline conditions.
H High - effect occurs that singly or as a substantial contribution in combination with other sources represents a significant increase in economic activity with regard to baseline conditions.

Geographic Extent:
S Site - including PDA and 200 m beyond.
L Local - within the LSA.
R Regional - within the RSA.

Duration:
ST Short term - effect occurs for less than three years.
MT Medium term - effect occurs for the life of the Kami Terminal.
LT Long term - effect persists beyond the life of the Kami Terminal.
P Permanent – will not change back to original condition.

Frequency:
O Occasionally, once per month or less.
S Occurs sporadically at irregular intervals.
R Occurs on a regular basis and at regular intervals.
C Continuous.

Reversibility:
R Reversible.
I Irreversible.
N/A Not Applicable.

Environmental Context:
U Undisturbed: Area relatively or not adversely affected by human activity.
D Developed: Area has been substantially previously disturbed by human development or human development is still present.
N/A Not Applicable.

Significance:
S Significant.
N Not Significant.

Prediction Confidence:
Based on scientific information, statistical analysis, and effectiveness of mitigation or effects management measure.
L Low level of confidence.
M Moderate level of confidence.
H High level of confidence.

26.7 Assessment of Cumulative Effects

In association with the Kami Terminal environmental effects discussed above, an assessment of the potential cumulative effects has been conducted for other projects and activities that have potential to interact with the Kami Terminal. The potential for overlap between Kami Terminal activities and cumulative effects of other projects is identified in Table 26.11.

Assessing the cumulative effects of the Kami Terminal with other projects in the region of Sept-Îles is challenging given that the detailed labour and expenditure requirements of these other projects, including the timing and duration of these requirements of the different projects and hence how they will overlap and otherwise interact, is unknown. Furthermore, the timing of planned projects is always open to question, and some may not proceed.

The Kami Terminal will further contribute to economic growth at the provincial, regional and local levels, by delivering taxes, employment and business opportunities. Construction activities required for a number of large-scale industrial mining projects in the Sept-Îles area and for the related Sept-Îles Port Expansion at Pointe-Noire will require a workforce of several thousands of workers over the next few years as well as hundreds of additional employees over the life of several of these projects. Regional and local businesses as well as local Aboriginal businesses are likely to benefit from contracts for materials and services both in the short-term and the long-term.

The effect of the creation of new taxes, royalties, employment and business by these other projects will be largely positive. However, the identified projects will generally be competing for workers with many of the same skills as those required for the Kami Terminal, which are in short-supply in the RSA. While it is recognized that the cumulative effects could be inflationary, as a result of aggregate demand exceeding the labour supply or business capacity, this is being addressed by the operators and proponents of all the projects, both individually and collaboratively. The latter includes cooperation with the regional economic forum (*Côte-Nord Économique*) that has recently been set up by the authorities and business councils of the Côte-Nord Administrative Region in order to find ways to maximize the regional economic benefits of ongoing industrial and mining projects.

The predicted residual positive cumulative effects of the projects under consideration on regional employment are considered with a moderate level of confidence to be positive, long-term, and significant. The predicted residual positive cumulative effects of the projects under consideration on regional businesses are also considered with a moderate level of confidence to be positive, long-term, and significant.

Table 26.11 Potential Cumulative Effects to Economy, Employment, and Business

VEC Existing Condition (Past & On-Going Activities)	• The mining and industrial sectors play an important role in regional employment and income. • Between 2009 and 2010, the number of employed workers in the MRC de Sept-Rivières increased from 14,731 to 15,435, the employment ratio increased from 73.4% to 77.5%, and the median salary increased from $42,567 to $45,411. Over the same period, provincial employment increased from 72.6 to 73.5 percent and the median salary increased from $36,304 to $37,173. This indicates more favourable employment and income characteristics for the region of Sept-Îles than for the province of Québec as a whole. • Shortages of skilled and unskilled labour have been reported in Sept-Îles for the past two years.		
Kami Terminal Residual Environmental Effects	• Effect 1- Changes to Regional Employment: Alderon will collaborate with the Regional economic forum, will promote regional subcontracting for materials and services, and will promote opportunities for local and Aboriginal businesses and workers. Residual positive environmental effects of construction activities on regional employment are considered with a high level of confidence to be significant. • Effect 2 – Changes to Regional Businesses: Alderon will collaborate with the Regional economic forum, will promote regional subcontracting for materials and services, and will promote opportunities for local and Aboriginal businesses and workers. Residual positive environmental effects of construction activities on regional businesses are considered with a high level of confidence to be significant. • Mitigation and Monitoring: A Regional economic forum (Côte-Nord Économique) has recently been set up by the authorities and business councils of the Côte-Nord Administrative Region in order to find ways to maximize the regional economic benefits of ongoing industrial and mining projects.		
Other Projects / Activities	**Likely Effect Interaction (Y/N)**	**Rationale**	**Cumulative Effects**
Pointe-Noire Port Expansion (Port of Sept-Îles)	Y	Located in Pointe-Noire Terminal close to the Kami Terminal site. Planned expansion is likely to lead to improved regional and local economic, employment and business conditions.	Cumulative interactions with the Kami Terminal related to manpower requirements and expenditures during Construction and Operations: • Additive interaction with Effect 1 - *Changes to Regional Employment* • Additive interaction with Effect 2 - *Changes to Regional Businesses*
CFA and QNS&L	Y	Located close to the Kami Terminal site. Planned expansion is likely to lead to improved regional and local economic, employment and business conditions.	Cumulative interactions with the Kami Terminal related to manpower requirements and expenditures during Construction and Operations: • Additive interaction with Effect 1 - *Changes to Regional Employment* • Additive interaction with Effect 2 - *Changes to Regional Businesses*

Alouette Aluminum Smelter (Aluminerie Alouette)	Y	Located in Pointe-Noire Terminal close to the Kami Terminal site. Planned expansion is likely to lead to improved regional and local economic, employment and business conditions.			Cumulative interactions with the Kami Terminal related to manpower requirements and expenditures during Construction and Operations: • Additive interaction with Effect 1 - *Changes to Regional Employment* • Additive interaction with Effect 2 - *Changes to Regional Businesses*			
Second Port-Cartier Pellet Plant (ArcelorMittal)	Y	Second Port-Cartier Pellet Plant to be located about 30 km from the Kami Terminal site. Planned expansion is likely to lead to improved regional and local economic, employment and business conditions.			Cumulative interactions with the Kami Terminal related to manpower requirements and expenditures during Construction and Operations: • Additive interaction with Effect 1 - *Changes to Regional Employment* • Additive interaction with Effect 2 - *Changes to Regional Businesses*			
Bloom Pointe-Noire Terminal (Cliffs Resources)	Y	Located in Pointe-Noire Terminal close to the Kami Terminal site. Planned expansion is likely to lead to improved regional and local economic, employment and business conditions.			Cumulative interactions with the Kami Terminal related to manpower requirements and expenditures during Construction and Operations: • Additive interaction with Effect 1 - *Changes to Regional Employment* • Additive interaction with Effect 2 - *Changes to Regional Businesses*			
Arnaud Apatite-Magnetite Mine (Mine Arnaud)	Y	Located near the Marconi Peninsula a few km from the Kami Terminal site. Planned expansion is likely to lead to improved regional and local economic, employment and business conditions.			Cumulative interactions with the Kami Terminal related to manpower requirements and expenditures during Construction and Operations: • Additive interaction with Effect 1 - *Changes to Regional Employment* • Additive interaction with Effect 2 - *Changes to Regional Businesses*			
Cumulative Effects Summary (Kami Terminal + All Relevant Projects / Effects)	**Direction**	**Magnitude**	**Geographic Extent**	**Duration**	**Frequency**	**Reversibility**	**Significance**	**Confidence**
	P	**H**	**R**	**LT**	**C**	**N/A**	**S**	**M**
A number of major construction projects will be underway over the next few years in the region of Sept-Îles. These are likely to lead to additive cumulative interactions with the Kami Terminal as manpower requirements for construction are expected to be several thousands of workers over a few years as well as hundreds of additional employees over the life of several of these projects. The predicted residual positive cumulative effects of the projects under consideration on regional employment are considered with a moderate level of confidence to be long-term and significant. The predicted residual positive cumulative effects of the projects under consideration on regional businesses are also considered with a moderate level of confidence to be long-term and significant. Note: Environmental effects descriptors and their definitions are as used in the assessment of Kami Terminal-related environmental effects (See Table 26.10).								

26.8 Assessment of Accidents and Malfunctions

Accidents and malfunctions that could interact are listed in Table 26.2. Concerns in these cases are associated with rail transportation and iron ore transfer operations in the LSA and the RSA. The residual environmental effects of Kami Terminal-related accidents and malfunctions on Economy, Employment, and Business are summarized in Table 26.12.

Accidents or malfunctions resulting from a forest fire or a stormwater retention pond breach would have little or no significant implication with regards to this VEC. The most likely interaction between an accident or malfunction linked to the Kami Terminal and this VEC would be a train derailment. This could lead to interruptions, disruptions or disturbances on other industrial activities located in the vicinity of the Kami Terminal site or to interruptions, disruptions or disturbances for commercial, residential and recreational uses located at a certain distance from the Kami Terminal site. To a lesser extent, a trail derailment could also generate employment and business associated with clean-up and repair. The effects of Kami Terminal accidents such as a train derailment are expected to be of short duration and to be managed to acceptable levels through standard operating practices and/or through the application of best management or codified practices.

Table 26.12 Summary of Residual Environmental Effects for Economy, Employment, and Business - Accidents and Malfunctions

Kami Terminal Phase	Mitigation/Compensation Measures	Residual Environmental Effects Characteristics									Recommended Follow-up and Monitoring
		Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental or Socio-Economic Context	Significance	Prediction Confidence	
Changes to Regional Employment											
Train derailment	• Coordinate disruptions to utilities and infrastructure to minimize effects on regional employment.	A/P	L	S	ST	S	N/A	N/A	N	H	No monitoring required.
Changes to Regional Businesses											
Train derailment	• Coordinate disruptions to utilities and infrastructure to minimize effects on regional businesses.	A/P	L	S	ST	S	N/A	N/A	N	H	No monitoring required.

KEY

Direction:
P Positive.
A Adverse.

Magnitude:
L Low proportion of local or regional population that is affected.
M Moderate proportion of local or regional population that is affected.
H High proportion of local or regional population that is affected.

Geographic Extent:
S Site – including PDA and 200 m beyond.
L Local: within the LSA.
R Regional: within the RSA.

Duration:
ST Short term.
MT Medium term.
LT Long term.
P Permanent – will not change back to original condition.

Frequency:
O Occasionally, once per month or less.
S Occurs sporadically at irregular intervals.
R Occurs on a regular basis and at regular intervals.
C Continuous.

Reversibility:
R Reversible.
I Irreversible.
N/A Not Applicable.

Environmental Context:
U Undisturbed: Area relatively or not adversely affected by human activity.
D Developed: Area has been substantially previously disturbed by human development or human development is still present.
N/A Not Applicable.

Significance:
S Significant.
N Not Significant.

Prediction Confidence:
Based on scientific information, statistical analysis, and effectiveness of mitigation or effects management measure.
L Low level of confidence.
M Moderate level of confidence.
H High level of confidence.

26.9 Determination of Significance of Residual Positive Environmental Effects

The significance of each residual positive environmental effect is addressed hereafter for each Kami Terminal phase.

26.9.1 Determination of Significance of Project Effects

Construction

Changes to Regional Employment

An estimated average of 300 workers will be required by Alderon over the two-year Kami Terminal construction phase, including an average of 50 workers per year for the construction by CFA of rail infrastructure in association with the Kami Terminal (staffing requirements for the Kami Terminal during the operations and maintenance phase are estimated to be in the order of 17 persons). Total employment during the Kami Terminal construction phase represents 940,000 person-hours of work and an estimated $56 million in salaries.

It is likely that part of the workforce required for construction will have to be recruited from outside the region due to the limited availability of qualified workers in the Sept-Îles area. Indeed, a number of large-scale industrial and mining projects in the Sept-Îles area are currently in the early implementation stages, with the result that few local specialized resources are available. However, the construction phase will offer employment opportunities for workers or young apprentices from the surrounding regions of Eastern Québec (Côte-Nord, Lac Saint-Jean, Gaspésie, etc.) and elsewhere that are affected by high levels of unemployment. Kami Terminal construction activities will lead to the disbursement of an estimated $56 million in salaries. Residual positive environmental effects of construction activities on regional employment are expected to be of high magnitude, regional, short-term, continuous and in a developed area. They are therefore considered to be significant with a high level of confidence.

Changes to Regional Businesses

An estimated amount of $132 million dollars in capital expenditures will be required over a period of two years for the construction of the Kami Terminal. It is considered likely that it will be possible to source part of the materials and equipment required for construction from businesses located in the MRC de Sept-Rivières. The construction phase will also offer potential business opportunities to contractors and suppliers from elsewhere in the province of Québec and beyond. Residual positive environmental effects of construction activities on regional businesses are expected to be of high magnitude, regional, short-term, continuous and in a developed area. They are therefore considered to be significant with a high level of confidence.

Enhancement Measures

Alderon will collaborate with a newly created Regional economic forum in view of finding the most appropriate approaches to optimizing regional employment and business opportunities Other benefits enhancement measures will include promoting regional subcontracting for materials and services and promoting opportunities for local and Aboriginal businesses and workers.

Operations and Maintenance Phase

Changes to Regional Employment

Staffing requirements for the Kami Terminal during the operations and maintenance phase are estimated to be in the order of 17 persons. Residual positive environmental effects of construction activities on regional employment are expected to be of low magnitude, regional, long-term, continuous and in a developed area. They are therefore considered with a high level of confidence to be not significant.

Changes to Regional Businesses

Even if the level of expenditures for the operations and maintenance phase of the Kami Terminal in the Pointe-Noire industrial area is unknown at the present time, it should also represent important potential sources of income for businesses located in the MRC de Sept-Rivières, surrounding regions of Eastern Québec, or elsewhere in the province of Québec. Residual positive environmental effects of operations and maintenance activities on regional businesses are expected to be of high magnitude, regional, long-term, continuous, and in a developed area. They are therefore considered to be significant with a high level of confidence.

Enhancement Measures

The enhancement measures proposed for the Kami Terminal construction phase will be pursued during the Kami Terminal operations and maintenance phase.

26.9.2 Determination of Significance of Cumulative Effects

Construction activities required for a number of large-scale industrial mining projects in the Sept-Îles area and for the related Sept-Îles Port Expansion at Pointe-Noire will require several thousands of workers over the next few years as well as hundreds of additional employees over the life of several of these projects. Regional businesses are likely to benefit from contracts for materials and services both in the short-term and the long-term. The predicted residual cumulative effects of the projects under consideration on regional employment are considered with a moderate level of confidence to be positive, short-term, and significant. The predicted residual cumulative effects of the projects under consideration on regional businesses are also considered with a moderate level of confidence to be positive, long-term, and significant.

26.9.3 Determination of Significance of Effects Resulting from Accidents and Malfunctions

The most likely accident or malfunction linked to the Kami Terminal and this VEC would be a train derailment. The effects of Kami Terminal accidents such as a train derailment are expected to be of short duration and to be managed to acceptable levels through the coordination of disruptions to utilities and infrastructure to minimize effects.

Residual adverse environmental effects of accidents or malfunctions related to train derailments in the Sept-Îles area on regional employment and on regional businesses are expected to be of low magnitude, local, short-term, occasional, irreversible, and in a developed area. They are therefore considered with a high level of confidence to be not significant.

26.9.4 Overall Residual Effects Conclusion

In summary, given the planned mitigation, and the analyses presented in this assessment, the effects of changes to regional employment and changes to regional businesses on the Economy, Employment, and Business as a result of the construction, operation and decommissioning of the Kami Terminal, including cumulative effects, are likely to be largely positive and significant. However, effects to regional employment during operations and maintenance activities will be not significant. The effects of accidents and malfunctions are not likely to be significant.

26.10 Follow-Up and Monitoring

No monitoring of effects for this VEC is deemed necessary.

26.11 Next Steps

No additional data collection to be conducted prior to construction is determined necessary through the assessment.

26.12 Summary

Understanding the Project's effects on Economy, Employment, and Business is fundamental to assessing socio-economic implications for the lives of residents and of revenues to governments. It was selected as a VEC due to potential Kami Terminal-VEC interactions that could result in improved economic conditions, increased levels of employment and increased business activity in the city of Sept-Îles, the MRC de Sept-Rivières, the Côte-Nord Administrative Region, and the Province of Québec as a whole.

The environmental effects that have been assessed for this VEC are 1) changes to regional employment; and 2) changes to regional businesses. Potential Kami Terminal-VEC interactions with regional employment are mainly limited to the two-year Kami Terminal construction phase. Potential Kami Terminal-VEC interactions with regional businesses are anticipated both during the construction phase and the operations and maintenance phase. Potential issues of concern raised during the public consultations conducted for the Kami Terminal in Sept-Îles include:

- Cumulative effects to Economy, Employment, and Business;
- Apprenticeship and training;
- Availability of local workers;
- Local businesses; and,
- Potential effects on local economy.

An estimated average of 300 workers will be required by Alderon over a period of two years for the construction of the Kami Terminal. Employment required for construction of the Kami Terminal represents an estimated 940,000 person/hours of work and an estimated amount of $56 million dollars paid out in salaries. It is considered likely that part of the workforce required for construction will have to be recruited from outside the region due to the limited availability of qualified workers in the Sept-Îles area. However, the construction phase will offer potential employment opportunities for unemployed workers or young apprentices from the surrounding regions of Eastern Québec (e.g., Côte-Nord, Lac Saint-Jean, and Gaspésie) and beyond that are affected by high levels of unemployment. As a result, the predicted residual positive effects of construction of the Kami Terminal on regional employment are considered to be significant with a high level of confidence.

An estimated amount of $132 million dollars in capital expenditures will be required for the construction of the Kami Terminal. It is considered likely that it will be possible to source part of the materials and equipment required for construction from businesses located in the Sept-Îles area or in the Côte-Nord Administrative Region. The predicted residual positive effects of construction of the Kami Terminal on regional businesses are therefore considered to be significant with a high level of confidence.

Staffing requirements for the Kami Terminal during the operations and maintenance phase are estimated to be in the order of 17 persons. Residual positive environmental effects of operations and maintenance activities on regional employment are therefore considered to be not significant with a high level of confidence.

Even if the level of expenditures for the operations and maintenance phase of the Kami Terminal in the Pointe-Noire industrial area is unknown at the present time, it should also represent important potential sources of income for businesses located in the MRC de Sept-Rivières, the surrounding regions of Eastern Québec, or elsewhere in the Province of Québec. Accordingly, the predicted residual positive effects of Kami Terminal operations and maintenance on regional businesses are considered to be significant with a high level of confidence.

Alderon will collaborate with the regional economic forum in view of finding the most appropriate approaches to optimizing regional employment and business opportunities. Other benefits enhancement measures will include promoting regional subcontracting for materials and services and promoting opportunities for local and Aboriginal businesses and workers.

Construction activities required for a number of large-scale industrial mining projects in the Sept-Îles area and for the related Sept-Îles Port Expansion at Pointe-Noire will require several thousands of workers over the next few years as well as hundreds of additional employees over the life of several of these projects. Regional businesses are likely to benefit from contracts for materials and services both in the short-term and the long-term. The predicted residual cumulative effects of the projects under consideration on regional employment are considered with a moderate level of confidence to be positive, long-term, and significant. The predicted residual cumulative effects of the projects under consideration on regional businesses are also considered with a moderate level of confidence to be positive, long-term, and significant.

27.0 COMMITMENTS MADE IN THE EIS

This section provides a list of all commitments made throughout the EIS, relating to environmental mitigation and effects management measures, and monitoring and follow-up. A summary of the commitments made in the EIS is provided in Table 27.1 and Table 27.2. Consistent with Alderon's *Environmental Policy*, the Kami Terminal will be constructed and operated in compliance with provincial, federal, and municipal legislation, permits, standards, and guidelines.

Table 27.1 Environmental Mitigation/Effects Management Commitments in EIS

VEC	Commitment	Section of EIS
Atmospheric Environment	• Use approved dust suppressant or road watering as needed. • Enforceable low speed standards on-site. • Use drilling machinery equipped with dust collector or water dust suppression. • Use CO monitors during blasting activities at nearby receptors. • Adjust blast surface as needed. • Proper muffler installation. • Comprehensive and regular maintenance of vehicles. • Use only as much light as is necessary. • Enclose car-dumping in building equipped with dust collector. • Use of full horizontal cut off light fixtures. • Enclosed conveyors. • Equip transfer points with dust collectors. • Design stacker to include adjustable height. • Routine inspections of dust collectors. • Use low CO_2 hydroelectricity for infrastructure operation. • Vegetation buffers. • Locate lateral lighting fixtures on south side of facility. • Direct lateral lighting away from the baie des Sept-Îles. • Retain tree cover. • Spraying water over ground surface to minimize wind erosion as needed.	15.6.1.1 15.6.1.2 15.6.1.3 15.6.1.5 15.6.2.1 15.6.2.2 15.6.2.3 15.6.2.5 15.6.3.1 15.6.3.2 15.6.3.3 15.6.3.5
Landforms, Soils, Snow, and Ice	• Erosion control measures.	16.0

VEC	Commitment	Section of EIS
Water Resources	• Apply standard and best practices and general environmental protection measures. • Use of silt fencing downstream of the work area and at the limits of the work zone to reduce the carriage of silt and fines in any water runoff from the area. • Avoid unnecessary encroachments in the riparian habitat on either side of streams. • No debris will be disposed in the aquatic environment and any debris introduced will be remove as soon as possible. • No earth-moving or excavation work will be carried out near streams during high water periods or heavy rains. • Use machinery that is in proper operating condition in order to avoid any oil or fuel leaks. • Clean, maintain and store work site machinery and vehicles on a site designated for this purpose at a distance of over 30 m from streams and ensure an on-site supply of absorbent materials in case of accidental spills as well as properly identified sealed recipients for collecting petroleum products and waste materials. • Stabilize slopes as soon as possible using recognized bioengineering techniques that take into account instability, sensitivity to erosion, slope and height of the embankment. • Concentrate storage area will contain a liner in conformance with Port requirements. • Stormwater collection in the concentrate storage area and drainage directed toward a retention pond with liner. • Water treatment before release to the environment to respect Directive 019 and ensure that receiving water will not exceed the CCME water quality guideline for the protection of aquatic life.	16.4 16.6.1 16.6.2
Wetlands	N/A	N/A
Fish, Fish Habitat, and Fisheries	N/A	N/A
Birds, Other Wildlife and Their Habitats, and Protected Areas	• Apply standard and best practices and general environmental protection measures. • Environmental monitoring during construction. • Avoid clearing during the breeding bird season, where feasible. • Develop an avifauna management plan. • Flag boundaries of sensitive areas or buffers. • Proper muffler installation. • Comprehensive and regular maintenance of vehicles. • Site erosion protection and sediment control measures. • Survey area for presence of sensitive wildlife prior to blasting. • Direct storm water, wastewater or surface water away from wildlife habitat. • No harassment of wildlife.	20.4 20.6.1 20.8.1

VEC	Commitment	Section of EIS
	• Provincial and federal regulations will be followed in the storage and handling of materials. • Implement EPP. • Implement forest fire prevention and response plan • Oil Spill Contingency planning. • Product spill contingency planning up to the proposed Port authority common load-out point. • Provide employee training.	
Species at Risk and Species of Conservation Concern	• Comply with existing legislated mitigation. • Avoid activities near or/at sensitive species and/or habitats, where possible. • Develop protection measures and environmental management techniques based on site-specific conditions. • Rehabilitate or restore affected environment. • Provide substitute resources or environments through seed collection / sowing, direct transplantation or diaspore dispersal. • Provincial and federal regulations should be followed in the storage and handling of materials. • Implement EPP. • Implement forest fire prevention and response plan. • Provide employee training.	21.6.1 21.6.2 21.8
Historic and Cultural Resources	• Implement EPP in the event of an unexpected discovery.	22.7.1.3
Current Use of Lands and Resources by Aboriginal Persons for Traditional Purposes	• The design and siting of the Quebec terminal facility (concentrate storage and loadout facility and rail loop) within an existing industrial area. • On-going engagement with Aboriginal communities and organizations.	23.6.1
Other Current Use of Lands and Resources	• Realign access road and water main and stockpile rocks to minimize effects on Alouette aluminum smelter. • Proper muffler installation. • Comprehensive vehicle and machinery maintenance program. • Enforceable low-speed standards on-site. • Blast design plans • Use of full horizontal cut off light fixtures. • Locate lateral lighting fixtures on south side of facility. • Direct lateral lighting away from the baie des Sept-Îles. • Enclose conveyor transfer points. • Vegetation buffers.	24.6.1 24.6.2 24.6.3 24.9.1
Community Services and Infrastructure	• Engage with local authorities and other stakeholders to address issues related to community services and infrastructure as needed.	25.6.1 25.6.3
Health and Community Health	N/A	N/A

VEC	Commitment	Section of EIS
Economy, Employment, and Business	• Collaborate with regional economic forum. • Promote regional subcontracting for materials and services. • Promote opportunities for local and aboriginal businesses and workers. • Coordinate disruptions to utilities and infrastructure to minimize effects.	27.6.4 27.8

Table 27.2 Monitoring and Follow-up Commitments in EIS

VEC	Commitment	Section of EIS
Atmospheric Environment	• Monitor CO emissions from blasting near project site with portable monitors. • Noise monitoring. • Participate in air quality monitoring program initiated in Sept-Îles.	15.10
Landforms, Soils, Snow, and Ice	N/A	N/A
Water Resources	• Monitoring of water quality of the stormwater retention pond discharge to ensure compliance with the MDDEP Directive 019 guidelines, CCME water quality requirements for the protection of aquatic life and Québec surface water criteria for the protection of aquatic life.	16.10
Wetlands	N/A	N/A
Fish, Fish Habitat, and Fisheries	N/A	N/A
Birds, Other Wildlife and Their Habitats, and Protected Areas	• On-site monitoring for compliance with the EPP.	20.10
Species at Risk and Species of Conservation Concern	• On-site monitoring for compliance with the EPP.	21.10
Historic and Cultural Resources	• Adhere to all federal and provincial archaeological legislation. • On-site monitoring for compliance with the EPP.	22.10
Current Use of Lands and Resources by Aboriginal Persons for Traditional Purposes	• Any follow-up and monitoring programs that have been identified and proposed for other VECs (particularly for the biophysical environment) will be indirectly applicable to land and resource use.	23.10
Other Current Use of Lands and Resources	• Participate in air quality monitoring program initiated in Sept-Îles	24.10
Community Services and Infrastructure	• Monitor local housing indicators (vacancy rates, rental prices, sale prices, etc.).	25.11
Health and Community Health	N/A	N/A
Economy, Employment, and Business	• Promote opportunities for local and aboriginal businesses and workers. • Promote regional subcontracting for materials and services.	27.11

28.0 REFERENCES

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28.2 PERSONAL COMMUNICATIONS

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29.0 GLOSSARY AND ACRONYM LIST

100–year storm – A storm whose intensity level has a one percent chance of occurring in any given year.

Aboriginal traditional knowledge – Includes, but is not limited to, the knowledge Aboriginal Peoples have accumulated about wildlife species and their environment.

Acid Base Accounting (ABA) – An analytical technique applied to mine wastes and geologic materials that determines the potential acidity from sulfur analysis versus the neutralization potential. It is used to predict the potential of that material to be acid producing or acid neutralizing. http://www.gardguide.com/index.php/Glossary.

Acoustic environment – The complete set of all objects and their respective physical properties having an influence on the sound field that surrounds a listener. http://keithyates.com/glossary. htm.

Acid Rock Drainage (ARD) – A low pH, metal–laden, sulfate–rich drainage that occurs during land disturbance where sulfur or metal sulfides are exposed to atmospheric conditions. It forms under natural conditions from the oxidation of sulfide minerals and where the acidity exceeds the alkalinity. Non–mining exposures, such as along highway road cuts, may produce similar drainage.

Archaeological potential – Refers to the probability of finding archaeological site within a specific geographic area.

Bedrock stratigraphy – The arrangement or sequencing of strata of the native consolidated rock underlying the surface and their interpretation in terms of mode of origin and geologic history.

CO_2eq – carbon dioxide equivalent – The result of the aggregation of greenhouse gases (GHG) which takes into account their respective global warming potentials.

Community knowledge – Information held by community members, such as farmers, hunters, fishers and naturalists, who are familiar with the environment in a specific geographic area.

Community health – The combination of sciences, skills, and beliefs directed towards the maintenance and improvement of the health of all the people in a community through collective or social actions.

Critical habitat – A habitat area essential to the conservation of a listed species.

Cumulative environmental effects – environmental effects likely to result from a project in combination with the environmental effects of other past, existing, and future projects or activities.

Cumulative impact assessment – The critical analysis and summary of potential / realized cumulative impacts on an environment.

Diversion ditches – A drainage depression or ditch built across the top of a slope to divert surface water from that slope.

Ecological Land Classification (ELC) – The division of land based on its ecological role in the environment.

Geographic extent – The geographic area within which an environmental effect of a defined magnitude occurs (e.g., site–specific, local, regional, provincial, national, international).

Glare – Phenomenon resulting from exposed and poorly directed lights such as the bright headlights in oncoming traffic. Paradoxically, glare, an excess of light, impairs vision in those impacted, with consequent impairment of safety and security, in addition to the degradation of aesthetics.

Light trespass – The light that is emitted by a facility and received at a property where it may disturb sleep by shining in windows, cause harsh and objectionable outdoor illumination, and potentially compromise security by imposing a light distribution that may negatively affect visibility.

Littoral habitat area – Aquatic habitat that is close to shore.

Load–out facilities – Area designed to receive concentrate after transportation.

Local Study Area (LSA) – The maximum area within which Project–related environmental effects can be predicted or measured with a reasonable degree of accuracy and confidence.

Metal Leaching (ML)– A process resulting from the exposure of sulfides present in rock following blasting or excavation that results in leachate entering groundwater or being discharded to surface water. This process has the potential to aleter water quality and sediment chemistry.

Processing – The process by which ore is worked into a concentrate and transported to a stockpile awaiting movement off–site.

Progressive rehabilitation – Rehabilitation done continually and sequentially within a reasonable time during the entire period that a project continues.

Rail loop – A section of railway that leaves the main track but re–joins it further down the line.

Rail spur – A short branch of track off of a main rail line.

Reasonable worst case scenario – The most negative outcome expected to occur within reason due to project activities.

Recurrence interval– The recurrence interval is based on the probability that a given event (for example flooding) will be equalled or exceeded in any given year.

Red water– Water which contains fine precipitated iron oxide or hydroxide.

Regional Study Area– The area within which cumulative environmental effects for the Water Resources may occur, depending on physical and biological conditions and the type and location of other past, present, and reasonably foreseeable projects.

Scarify – Creating cuts of scratches in a surface. For instance in soils, to break up and loosen to a shallow depth.

Settling ponds – A device used to treat turbidity in industrial wastewater.

Significance thresholds – A quantitative or qualitative standard, or set of criteria, pursuant to which the significance of a given environmental effect may be determined.

Sky glow – The illumination of night sky in urban areas.

Slope stability – Resistance of inclined surface to failure by sliding or collapsing.

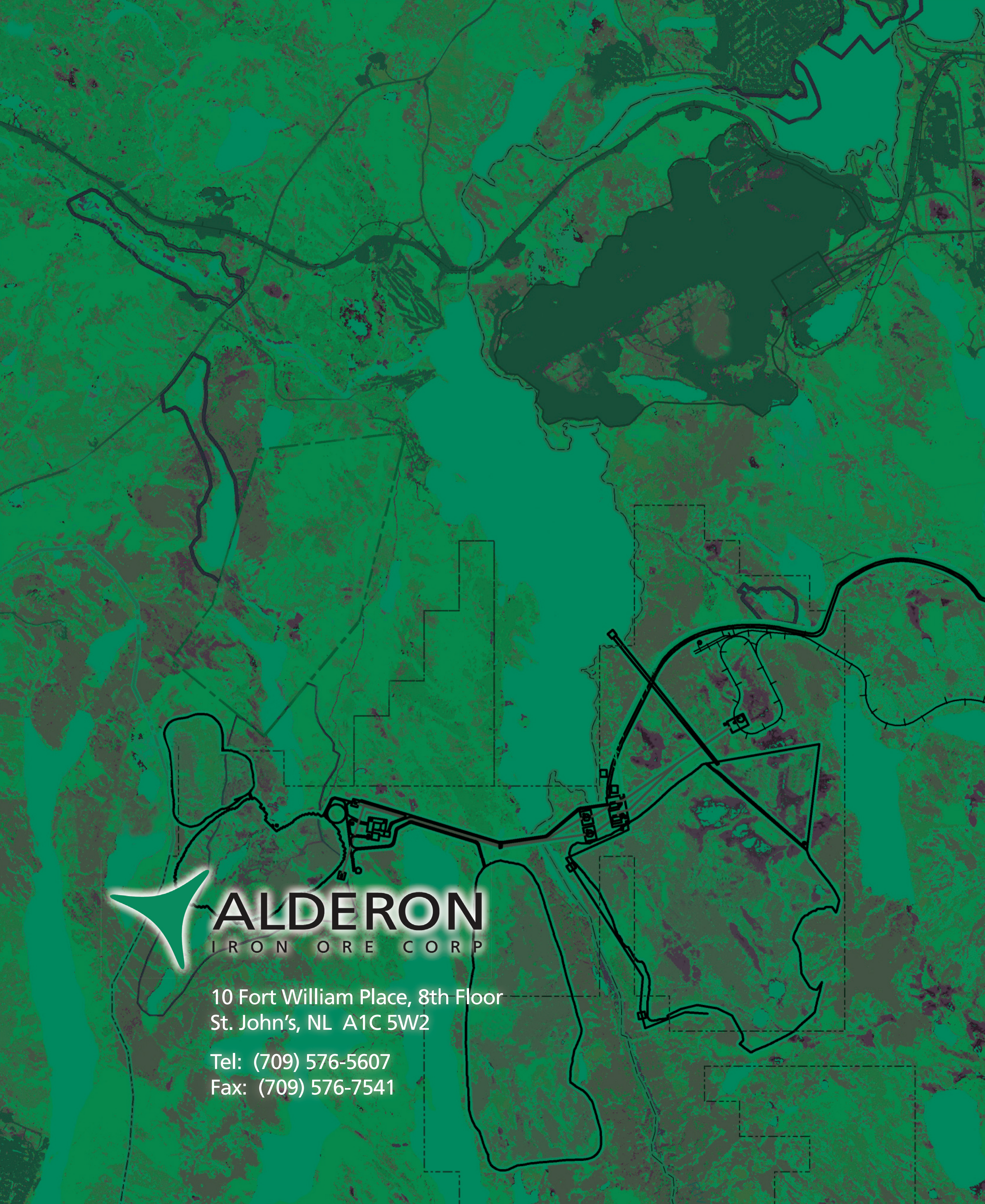
Temporal boundary – A restriction that is time dependent.

Watershed – An area or region drained by a river, river system, or other body of water.

AANDC .... Aboriginal Affairs and Northern Development Canada
AARQ .... *Atlas des amphibiens et reptiles du Québec*
ABA .... Acid base accounting
ACOA .... Atlantic Canada Opportunities Agency
AIP .... Agreement–in–Principle
AP .... Acid–generating potential
ARD/ML .... Acid rock drainage and metal leaching
AREMA .... American Railway Engineering and Maintenance of Way Association
BBS .... Breeding Bird Survey
CAC .... Criteria air contaminants
CAM .... *Conseil des Atikamekw et des Montagnais*
CadnaA .... Computer aided noise abatement
CCME .... Canadian Council of Ministers of the Environment
CCQ .... *Commission de la Construction du Québec*
CDPNQ .... *Centre de données sur le patrimoine naturel du Québec*
CEAA .... *Canadian Environmental Assessment Act*
CEA Agency .... Canadian Environmental Assessment Agency
CEPA .... *Canadian Environmental Protection Act*
CESCC .... Canadian Endangered Species Conservation Council
CFA .... *Chemin de Fer Arnaud*
CIE .... *Commission Internationale de L'Éclairage*
CIM .... Canadian Institute of Mining, Metallurgy and Petroleum
CLD .... *Centre local de dévéloppement*
COSEWIC .... Committee on the Status of Endangered Wildlife in Canada
CPNIMLJ .... *Conseil de la Première Nation des Innus de Matimekush–Lac John*
CRE .... *Conférence régionale des élus*
CRECN .... *Conseil régional de l'environnement de la Côte–Nord*
CROR .... *Canadian Rail Operating Rules*
CSP .... Corrugated steel pipe
CSSS .... *Centre de services de santé et sociaux*
CTA .... Canadian Transportation Agency
CWS .... Canada–wide Standards
DAES .... Department of Advanced Education and Skills
DFO .... Department of Fisheries and Oceans
DOEC .... Department of Environment and Conservation
DGSL .... Department of Government Services and Lands
DHCS .... Department of Health and Community Services
DIBRD .... Department of Innovation, Business and Rural Development
DOJ .... Department of Justice
DOMA .... Department of Municipal Affairs

DNR .... Department of Natural Resources
DTCR .... Department of Tourism, Culture and Recreation
EA .... Environmental assessment
EA Committee .... Environmental Assessment Committee
EDO .... Effluent discharge objectives
EIS .... Environmental impact statement
EMP .... Environmental management plan
ERP .... Emergency response plan
EPP .... Environmental protection plan
FEL .... Frequent effect level
GHG .... Greenhouse gases
GLC .... Ground–level concentrations
HA .... High annoyance
ICEM .... *Institut culturel et educatif Montagnais*
IGAA .... Intergovernmental and Aboriginal Affairs
IOCC .... Iron Ore Company of Canada
ISAQ .... *Inventaire des sites archéologiques du Québec*
ISQ .... *Institut de la Statistique du Québec*
ITUM .... Innu Takuaikan Uashat mak Mani–Utenam
LEED .... Leadership in Energy and Environmental Design
LSA .... Local study area
LSZ .... Lower St. Lawrence Seismic Zone
MBCA .... *Migratory Birds Convention Act*
MCCCF .... *Ministère de la Culture, des Communications, et de la Condition féminine*
MDDEP .... *Ministère du Développement durable, de l'Environnement, et des Parcs*
MMER .... *Metal Mining Effluent Regulations*
MNRF .... *Ministère des Ressources naturelles et de la Faune*
MOU .... Memorandum of understanding
MPMO .... Major Projects Management Office
MRC .... *Municipalité régionale de comté*
MSDS .... Material safety data sheet
NAAQO .... *National Ambient Air Quality Objectives*
NAPS .... National Air Pollution Surveillance
NCC .... NunatuKavut Community Council
NGO .... Non–governmental organization
NLEPA .... Newfoundland and Labrador *Environmental Protection Act*
NLOWE .... Newfoundland and Labrador Organization of Women Entrepreneurs
NNK .... Naskapi Nation of Kawawachikamach
NNP .... Net neutralization potential
NP .... Neutralization potential

NPAG .... Non–potentially acid generating
NPR .... Neutralization potential ratio
NPRI .... National Pollutant Release Inventory
NRCan .... Natural Resources Canada
OEL .... Occasional effect level
PAG .... Potentially acid generating
PDA .... Project development area
PEL .... Probable effect level
PLC .... Programmable logic controller
PPV .... Peak particle velocity
QARCDW .... Québec *Act Regulating the Conservation and Development of Wildlife*
QARTVS .... Québec *Act respecting Threatened or Vulnerable Species*
QBBA .... Québec Breeding Bird Atlas
QCAR .... Québec *Clean Air Regulation*
QEQA .... Québec *Environmental Quality Act*
QNS&L .... Québec North Shore and Labrador
RA .... Responsible authority
REL .... Rare effect level
RMS .... Root mean square
ROLES .... Restoration of Labrador exploration sites
RSA .... Regional study area
SAAA .... *Secrétariat aux affaires autochtones*
SAR .... Species at risk
SARA .... *Species at Risk Act*
SME .... Small and medium enterprises
SOCC .... Species of conservation concern
Sopfeu .... *Société de protection des forêts contre le feu*
SSAC .... Species Status Advisory Committee
STEAM .... Sound from trains environmental analysis method
TEL .... Threshold effect level
TDS .... Total dissolved solids
TPM .... Total particulate matter
TSR .... Track Safety Rules
TSS .... Total suspended solids
US EPA .... United States Environmental Protection Agency
VEC .... Valued ecosystem component
WCI .... Western Climate Initiative
WHO .... World Health Organization
WMP .... Waste management plan
ZEC .... *Zone d'exploitation controllée*



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