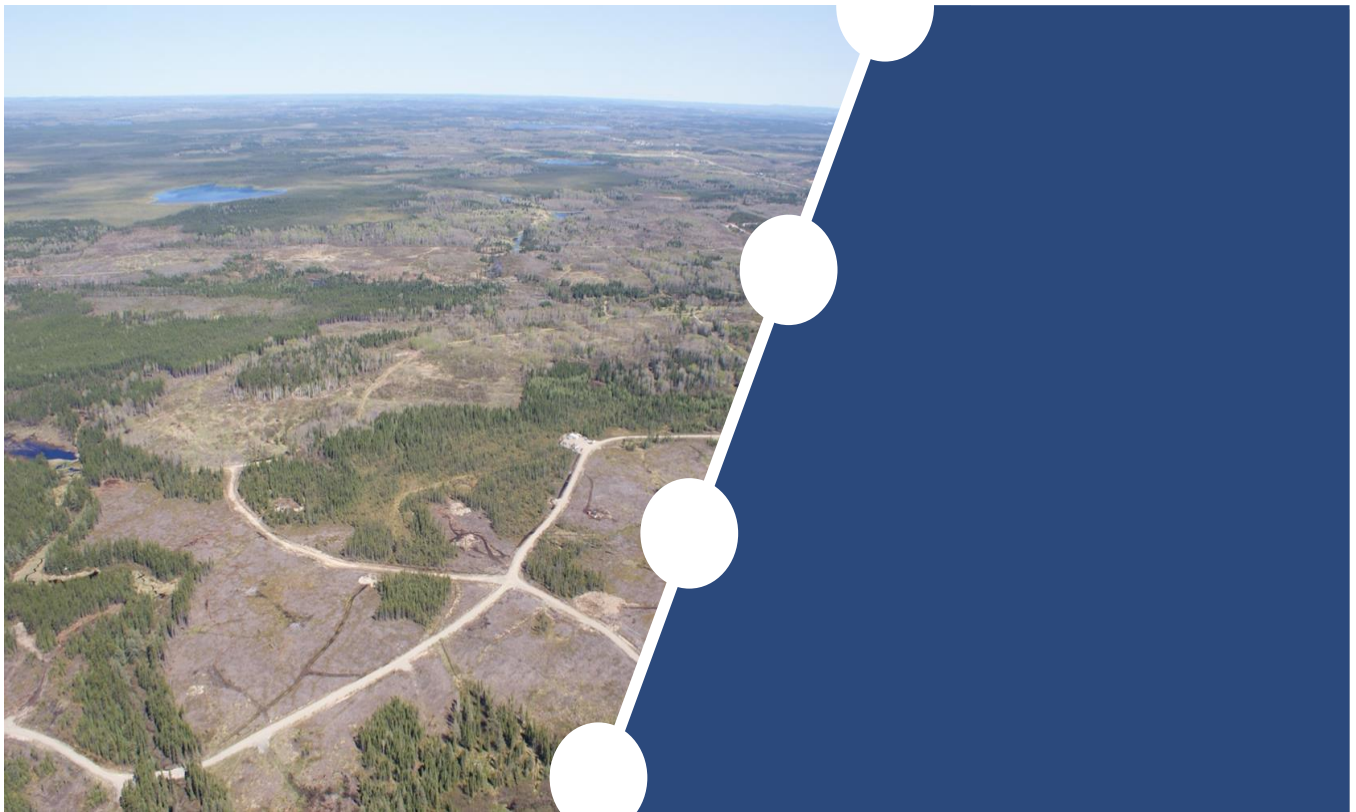




Dumont Nickel Mine Project

Comprehensive Study Report



May 2015

Cover photo by (Royal Nickel Corporation)

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This document has been issued in French under the title:
Projet de mine de nickel Dumont

Executive Summary

Royal Nickel Corporation is proposing the construction, operation and decommissioning of an open-pit nickel mine located 25 km northwest of Amos, Quebec. It plans to extract ore over a period of 19 years, to process the higher grade ore and to temporarily stockpile the low-grade ore for that period. At the end of the mining phase, the stockpiled low-grade ore will be used to feed the concentrator for another 12 years, at which time the mine complex will be closed after 33 years of operation. The ore processing facility will have an initial capacity of 52 000 tonnes/day, but will reach 105 000 tonnes/day by the fifth year of mining operations. The Project includes various related activities, such as the construction of access roads, an 8-km railroad link and diversion of tributaries of the Villemontel River.

A federal environment assessment is required under the former *Canadian Environmental Assessment Act* (S.C. 1992, c. 37) (the former Act) because Fisheries and Oceans Canada, Natural Resources Canada and the Governor in Council will likely have to make decisions in respect of the Project. The Project is subject to a comprehensive study environmental assessment, in accordance with paragraphs 16(a) and (b) of the *Comprehensive Study List Regulations* under the former Act.

The Project was also subject to an environmental assessment under Chapter I of the Quebec *Environment Quality Act*.

The Canadian Environmental Assessment Agency (the Agency) conducted the comprehensive study in collaboration with the Federal Environmental Assessment Committee, which consists of representatives of Fisheries and Oceans Canada, Natural Resources Canada, Environment Canada and Health Canada.

In its comprehensive study report, the Agency grouped the results of the analysis of the Project's effects to cover the following valued ecosystem components: air quality, water resources, fish and fish habitat, birds and their habitat, and current use of lands and resources for traditional purposes by Aboriginal peoples.

The Agency assessed the effects of the Project on the basis of information provided by the proponent in its impact statement and supporting documents, opinions provided by federal and provincial experts, as well as comments received from the public and the Abitibiwiinni First Nation.

The Abitibiwiinni First Nation and the public raised concerns about the following issues: surface and ground water, air quality, noise and vibrations, effects of the environmental, including climate change, on the Project, risk of accidents and malfunctions, and use of land for traditional purposes.

The proponent has committed to implement mitigation measures in order to reduce the Project's potential environmental effects. These measures include optimization of the general mine site layout to reduce the Project imprint on the environment, review of the water management plan to produce a single effluent, use of the pit for the disposal of part of the waste rock, and restriction of work periods to avoid effects on wildlife during sensitive periods. It has also proposed to implement an environmental emergency program to respond to accidents and spills, including the construction of a safety berm in the event of a tailings dike breach.

A follow-up program is required to verify the accuracy of the environmental assessment and to determine the effectiveness of certain proposed mitigation measures. Fisheries and Oceans Canada and Natural Resources

Canada, as the responsible authorities for the Project, will be responsible for ensuring the development and implementation of the follow-up program.

Taking into account the implementation of the proposed mitigation measures and follow-up program, the Agency concludes that the Project is not likely to cause significant adverse environmental effects.

The Minister of the Environment will consider this report and the comments received from the public and Aboriginal groups before preparing the environmental assessment decision statement. If the environmental assessment decision is favourable, Fisheries and Oceans Canada and Natural Resources Canada may go ahead with the decision to issue authorizations under section 37 of the former Act. The Governor in Council may also decide to add the water bodies to Schedule 2 of the *Metal Mining Effluent Regulations*.

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List of Acronyms and Abbreviations

Abbreviation/Acronym	Definition
Act	Canadian Environmental Assessment Act (2012)
Agency	Canadian Environmental Assessment Agency
Quebec government	Quebec Department of Sustainable Development, Environment and the Fight Against Climate Change
Federal Committee	Federal Environmental Assessment Committee
proponent	Royal Nickel Corporation
former Act	Canadian Environmental Assessment Act (2010)
Km	kilometre
km ²	square kilometre
m ²	square metre
m ³	cubic metre
PM _{2.5}	particulate matter under 2.5 microns

1 Introduction

1.1 Project Overview

Royal Nickel Corporation proposes to develop a nickel deposit on the Dumont mining property located in the regional county municipality of Abitibi in the administrative region of Abitibi-Témiscamingue. The deposit is located approximately 25 km west of the town of Amos.

The Dumont Nickel Mine Project (the Project) involves the development of the mine and local infrastructure, such as the open pit, ore processing plant, mine waste storage areas, a rail link and other related facilities. The estimated mine life is 33 years, with an ore processing rate of between 52 500 and 105 000 tonnes per day. According to the proponent's schedule, project construction is slated to begin in 2015.

1.2 Environmental Assessment Process

This project is subject to the former *Canadian Environmental Assessment Act* (S.C. 1992, c. 37) (the former Act) which was repealed and replaced on July 6, 2012, by the *Canadian Environmental Assessment Act, 2012* (the Act). The project assessment was conducted under the former Act, which applies to federal authorities contemplating certain actions or decisions required for implementation of a project, in whole or in part.

A federal environmental assessment is required because permits and authorizations identified in the *Law List Regulations* may have to be issued, specifically by Fisheries and Oceans Canada, under the *Fisheries Act*, and by Natural Resources Canada, under the *Explosives Act*. Fisheries and Oceans Canada and Natural Resources Canada are therefore responsible authorities for the environmental assessment. In addition, pursuant to paragraphs 36(5)(a) to (e) of the *Fisheries Act*, the Governor in Council could amend Schedule 2 of the *Metal Mining Effluent Regulations* to add one or more water bodies to the list of tailings impoundment areas.

The Project is subject to a comprehensive study type environmental assessment as it corresponds to the definitions set out in section 10 and paragraph 16(a) of the *Comprehensive Study List Regulations*, which read as follows:

- s. 10. The proposed construction, decommissioning or abandonment of a facility for the extraction of 200 000 m³/a or more of ground water;
- s. 16(a). The proposed construction, decommissioning, or abandonment of a metal mine, other than a gold mine, with an ore production capacity of 3000 tonnes/day or more.

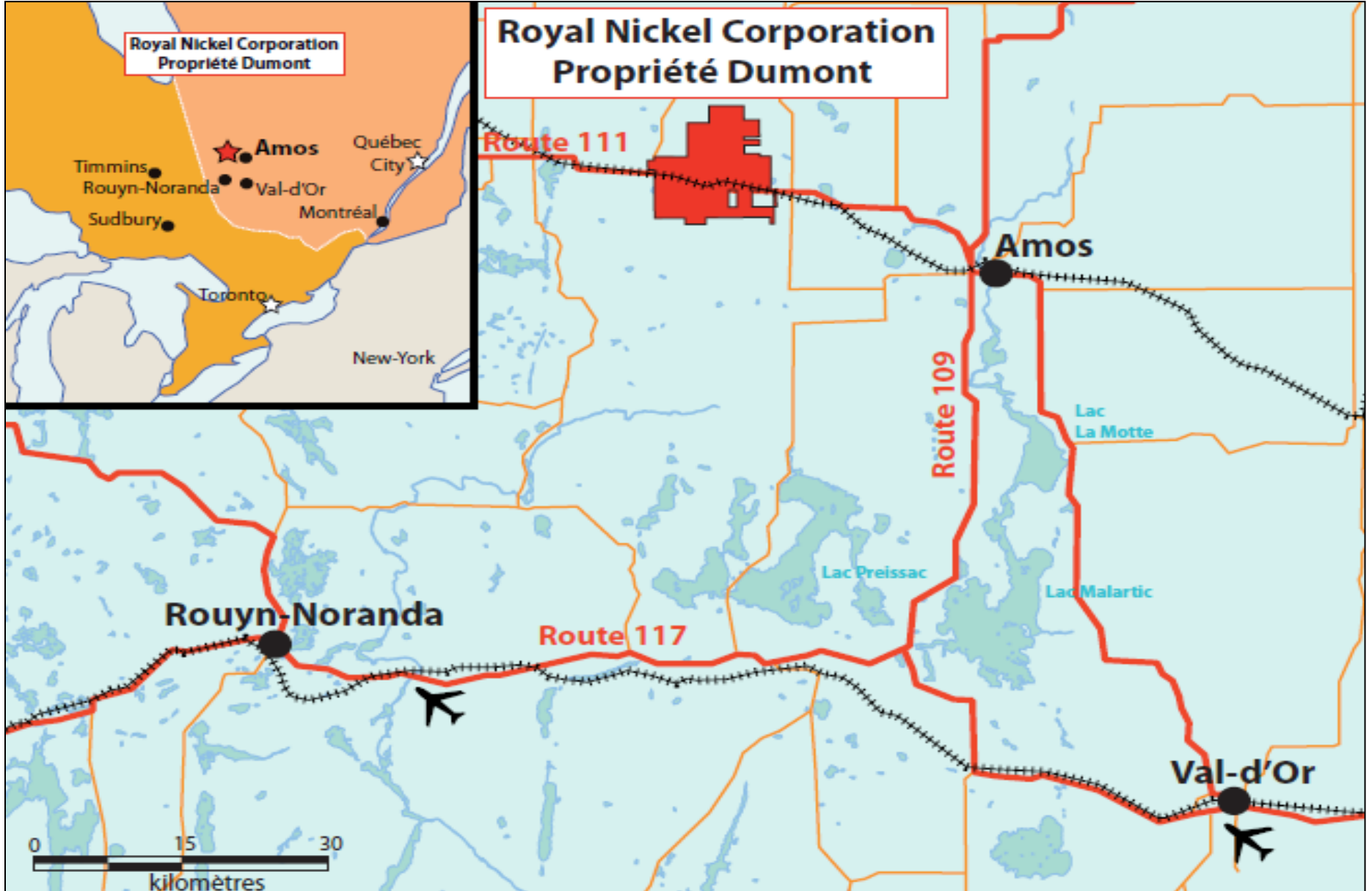
The Project is also subject to a provincial environmental review under Division IV.1 of the Quebec *Environment Quality Act*, administered by the Quebec Department of Sustainable Development, Environment and the Fight Against Climate Change (the Quebec government), and to the "Canada-Quebec Agreement on Environmental Assessment Cooperation".

1.3 Purpose of the Comprehensive Study Report

The purpose of this comprehensive study report is to provide a summary of the analysis conducted by the Agency to determine whether the Project is likely to cause significant adverse environmental effects. The Agency's conclusions are based on the proponent's environmental impact statement and related documents and on a review of comments received from the public and the Abitibiwinni First Nation on the Project. The Agency prepared this comprehensive study report in collaboration with the Federal Environmental Assessment Committee (the Federal Committee), comprised of representatives of Fisheries and Oceans Canada, Natural Resources Canada, Environment Canada and Health Canada.

The Minister of the Environment will consider this report and the comments received from the public and Aboriginal groups before making a decision on the significance of adverse environmental effects and preparing the environmental assessment decision statement. Before issuing the environmental assessment decision, the Minister may request supplemental information or request that additional measures be taken. If the Minister decides that the Project is not likely to result in significant adverse environmental effects, Fisheries and Oceans Canada and Natural Resources Canada may proceed with their decisions to issue authorizations under section 37 of the former Act. The Governor in Council may also decide to add water bodies to Schedule 2 of the *Metal Mining Effluent Regulations*.

Figure 1 Project Location



Source: Royal Nickel Corporation

2 Scope of the Project

The scope of the Project for the purposes of the federal environmental assessment includes the physical works and activities associated with the construction and development of the mine infrastructure and related facilities, the mining of the deposit, the operation and maintenance of infrastructure, and the closure and decommissioning of the mine, as described in the following sections.

2.1 Project Components

The Project as presented by the proponent in the implementation plan includes a mine and related facilities.

The mine includes the following:

- an open pit;
- two overburden stockpiles;
- a tailings storage facility;
- two waste rock stockpiles;
- two low grade ore stockpiles;
- a safety berm;
- retention dikes;
- a water reservoir in the southeast area of the pit;
- a water management system with two settling ponds;
- access roads and secondary roads.

The associated facilities are as follows:

- a nickel processing plant;
- an administrative and service complex;
- a garage;
- a crusher;
- a drinking water supply and treatment system;
- a domestic wastewater management and treatment system;
- a waste and hazardous materials management system;
- a fuel storage area with fueling station;
- explosives manufacturing and storage facilities;
- power transmission line.

Activities

The activities required to carry out the Project are described in Table 1 for each of the Project's three phases: construction, operation, and closure and site restoration.

Table 1 Project Activities

Construction	Operation	Closure and Restoration
<ul style="list-style-type: none"> • Site clearing and grading • Construction of the containment and storage areas (ore, waste rock, tailings, overburden) • Construction of roads and access roads • Installation of surface water and groundwater management system (ditches, culverts, pit pumping system, domestic and mine water treatment systems, etc.) • Fuel and hazardous materials storage and management • Extraction of overburden, waste rock and ore • Construction of buildings (concentrator, garage, etc.) • Construction of explosives manufacturing and storage facilities. 	<ul style="list-style-type: none"> • Ore extraction, handling and storage • Ore processing (crushing and concentration); • Water supply • Management of runoff, mine drainage, drinking, process and waste waters, etc. • Pit dewatering • Machinery and generator set use and maintenance • Hazardous materials storage and management • Explosives storage, manufacturing and handling • Use of explosives • Airstrip operation and maintenance • Progressive site restoration 	<ul style="list-style-type: none"> • Water management: runoff, pit flooding • Use and maintenance of equipment and generators • Decommissioning and site reclamation • Final site restoration and revegetation

2.2 Schedule

The proponent anticipates that the construction phase will begin in 2015 and last two years. Mining operations should begin in 2017 and will continue until 2050. Mine closure and site restoration will be carried out over five years starting in 2050. For this last activity, it should be noted that there progressive rehabilitation will be undertaken as areas will no longer be used.

3 Scope of the Environmental Assessment

The scope of the environmental assessment establishes the framework and limits of the analysis conducted by the Agency.

3.1 Factors Considered

Pursuant to subsections 16(1) and 16(2) of the former Act, the Agency has taken the following factors into consideration:

- the purpose of the Project;
- alternative means of carrying out the Project that are technically and economically feasible and the environmental effects of any such alternative means;
- the environmental effects of the Project, including the environmental effects of malfunctions or accidents that may occur in connection with the Project, and any cumulative environmental effects that are likely to result from the Project in combination with other projects or activities that have been or will be carried out;
- the capacity of renewable resources that are likely to be significantly affected by the Project to meet the needs of the present and those of the future;
- the significance of the environmental effects;
- comments received from the public in accordance with the Act and regulations;
- measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the Project;
- the need for, and the requirements of, any follow-up program in respect of the Project.

As provided for under paragraph 16(1)(e) of the former Act, the Agency also asked the proponent to describe the need for the Project and alternative means of carrying out the Project.

An environmental effect, as defined in the former Act, is any change that the Project may cause in the environment, including any change it may cause to a listed wildlife species, its critical habitat or the residences of individuals of that species, as those terms are defined in subsection 2(1) of the *Species at Risk Act*, any effect of any such change on health and socio-economic conditions, the current use of lands and resources for traditional purposes by Aboriginal persons, or any structure, site or thing that is of historical, archaeological, paleontological or architectural significance, as well as any change to the Project that may be caused by the environment.

This definition includes indirect economic and social changes that are caused by biophysical modifications of the environment. It does not include the direct economic and social effects of the Project. For example, the Agency may examine the economic effects of a decline in commercial fishing success that is related to a loss of fish habitat, but it will not examine economic effects related to the construction of a mine.

3.2 Spatial and Temporal Boundaries

As specified in the environmental impact statement guidelines prepared by the Agency, the proponent was required to include in its assessment all environmental sectors and components with which the Project would interact. Three study areas were defined (Figure 2) by the proponent to document the impacts of the Project and to meet the Agency's requirements:

- a local study area, of close to 98 km², covers part of the municipalities of Launay and Trécesson, as well as the municipality of Berry; a detailed inventory of the physical and biological components of this area was carried out, as this is where the majority of project impacts are concentrated;
- an expanded local study area that extends eastward (area of approximately 120 km²) to include the town of Villemontel, for certain components of the human environment (e.g., planning and land use);
- a regional study area was selected for the description of social and economic components of the receiving environment; it includes the regional county municipalities of Abitibi and Abitibi-Ouest. It covers an area of approximately 11 566 km².

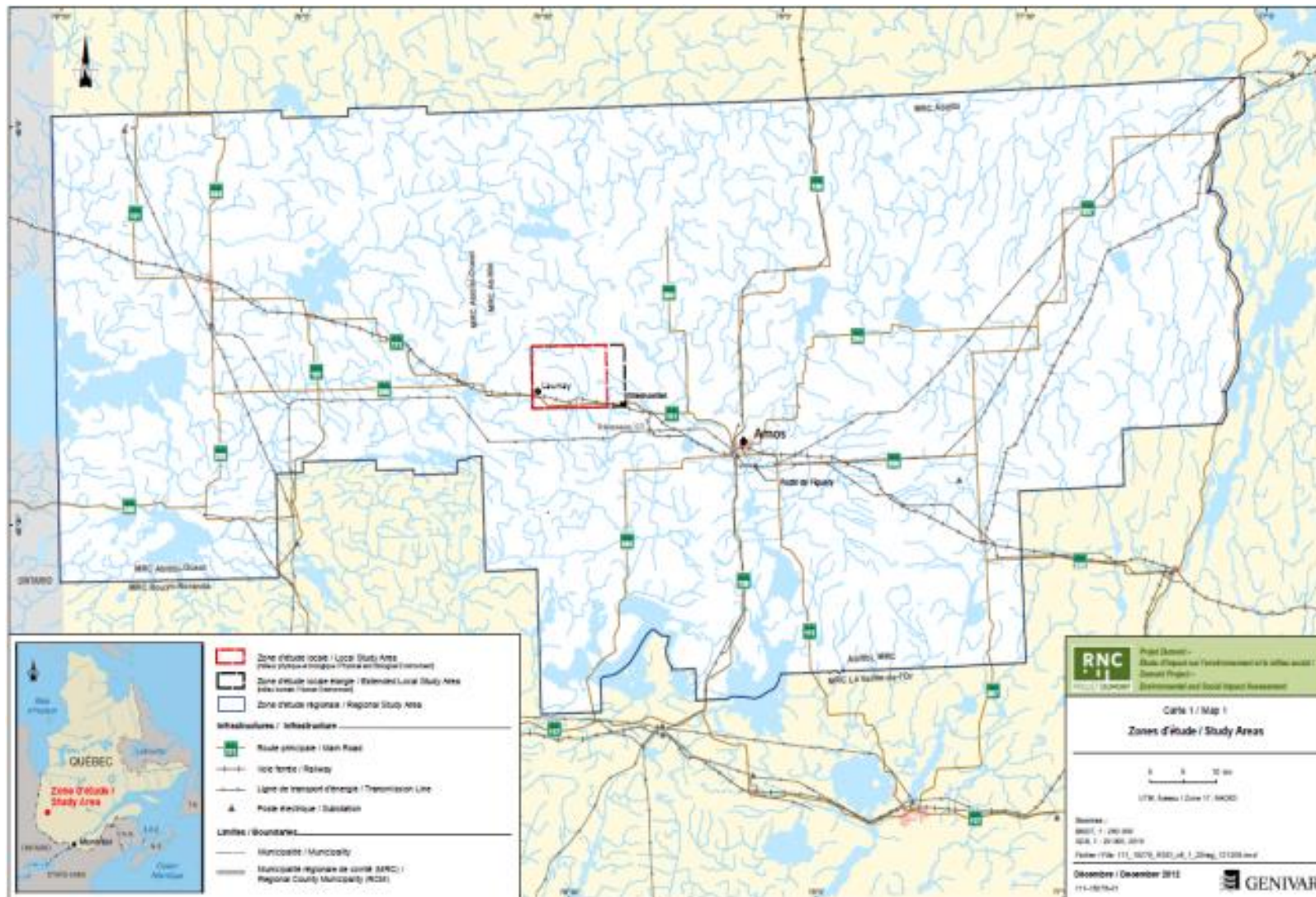
The temporal boundaries encompass the entire life of the Project, including site preparation, construction, infrastructure development, mining operations, as well as mine closure and reclamation.

3.3 Determination of Valued Ecosystem Components

The assessment of potential environmental effects conducted by the proponent focused on 15 aspects of the natural and human environment that have particular value or significance from a scientific, social, cultural, economic, historic, archaeological or aesthetic viewpoint, and are likely to be affected by the Project.

The Agency grouped the environmental factors around six valued components that were examined in the comprehensive study. These valued components and the reason for their selection are presented in Table 2. The table also indicates the study area for each valued component, specifying the areas in which the impact analysis was focused.

Figure 2 Dumont Study Area



Source: Genivar 2012

Table 2 Valued Components, Rationale and Spatial Boundaries

Valued Component	Rationale	Spatial Boundary
Air quality (suspended particulates (TSP, PM _{2.5}), nitrogen dioxide, sulfur dioxide and carbon oxide), greenhouses gases.	The Project is located near the municipality of Launay. Dust (in particular chrysotile asbestos) and atmospheric emissions generated by the Project in the construction and operation phases could affect residents of Launay and area users. Greenhouses gases emissions contribute to climate change, which has impacts on the environment and human health. Nitrogen oxide and sulfur dioxide emissions contribute to acid rain, which also has effects on the environment.	Local study area. In addition, the modelling of atmospheric dispersion was completed over an area of approximately 10 km by 14 km around the mine site. Greenhouses gases, nitrogen oxide and sulfur dioxide emissions were examined in a wider context because the effects of these gases on the environment are a concern provincially, nationally and globally.
Water resources: surface and ground water quality and water status.	The destruction of small streams for the development of mine facilities, and runoff from facilities represent significant changes to water quality and the hydrologic regime. Water quality must meet the federal regulatory requirements of the <i>Metal Mining Effluent Regulations</i> ¹ (including environmental effects monitoring) as well as the Quebec environmental discharge objectives and Directive 019. ¹	Local study area taking into account hydrogeological networks related to the Launay, Saint-Mathieu-Berry and unnamed eskers.
Fish and fish habitat: the water environment including aquatic and riparian vegetation and fish species.	Fish and fish habitats contribute to local fishing activities (including those for traditional purposes) and support ecological diversity. They are protected by <i>the Fisheries Act</i> .	Local study area in the Villemontel River and Boisvert Creek watersheds.
Birds and their habitat: waterfowl, water birds, forest birds, as well as critical aspects of their habitats, including terrestrial vegetation, wetlands and water bodies.	Protection of birds is governed by the Migratory Birds Convention Act, 1994. The Project is likely to destroy, disturb or harm the nesting of migratory birds, in particular three species at risks listed in Schedule 1 of the <i>Species at Risk Act</i> .	Local study area, including wetlands that cover 45 percent of the project's study area. Analysis of the availability of habitats factors in a regional scale.
Current use of lands and resources for traditional purposes, and sites and things of archaeological, heritage or historical significance.	The Project is likely to lead to effects on traditional land users and the resources they harvest, in particular for hunting moose and trapping.	Expanded local study area, especially for surrounding water bodies including Doyon Lake and Chicobi Lake.

¹ The *Metal Mining Effluent Regulations*, administered by Environment Canada prescribe limits for arsenic, copper, cyanide, lead, nickel, zinc, total suspended solids, radium-226, and pH in mine effluent. Directive 019 on the mining industry is the tool currently used to analyze mining projects that require the issuance of a certificate of authorization under the Quebec *Environment Quality Act*. It contains provisions designed to protect surface and ground water.

3.4 Purpose of and Need for the Project

The proponent indicated that the Project is part of a global economic context characterized by an anticipated increase in nickel consumption. This Project will contribute to supporting this growth for about 30 years. The proponent states that projects currently under construction will not be able to meet the market demand forecast by industry analysts, a factor that weighs in favour of the Project. The economic activity generated by the Project should contribute to improving the standard of living of the local and regional populations.

With a construction cost of 1.8 billion of dollars, the Project would be one of the largest capital investments in Abitibi-Témiscamingue. It would require the hiring of approximately 1000 workers for the mine complex construction phase and between 600 and 800 workers for the first 20 years of operation.

4 Alternatives to the Project and Assessment of Alternative Means²

The following sections outline the alternatives to the Project, the alternative means assessed, and the options selected by the proponent.

4.1 Alternatives to the Project

Alternatives to the Project are functionally different ways to meet the Project's need and purpose. The proponent had indicated that the alternatives to the Project are limited by the fact that the Project can only be carried out at sites where the resource exists. However, the proponent examined the status quo alternative, i.e., not carrying out the Project. The proponent believes that the status quo would have a significant adverse economic impact that would cause the loss of major investment in the region. Since the Project cannot be carried out at another location, the proponent analysed alternative means of carrying out the Project's components.

4.2 Assessment of Alternative Means

Under paragraph 16(2)(b) of the former Act, the proponent is required to assess alternative means of carrying out the Project that are technically and economically feasible and the environmental effects of any alternative means. The proponent considered several alternative methods for the main components of the Project, including ore concentration, mine waste management, selection of stockpile sites, industrial water supply, and transport and destination of ore concentrate. For each component, the proponent identified the best options from a technical, environmental, and socio-economic standpoint.

The proponent believes that the only reasonable option for mining the Dumont deposit is open-pit mining given that the deposit is located at the surface and is a large-tonnage, low-grade deposit. The cost of underground mining would be three to five times higher than that of open-pit mining, which would make the Project economically unfeasible. The location of the pit cannot be moved because it is based on the location of the deposit, as determined by resource modelling incorporating geomechanical, operational and economic parameters.

Figure 3 illustrates the entire mine complex.

Concentration of the ore

The methods that can be used to concentrate nickel are limited by the type of deposit at Dumont, i.e., hosted in ultrabasic rocks.

The processing plant and associated service facilities will process ore from the mine that is transported to the primary crushers, producing nickel concentrate and waste. The ore concentration process involves several

² In the French version of the text of the former Act, the term "solutions de rechange" is used to designate both alternatives to the Project (16(1)(e)) and alternative means of carrying out the project that are technically and economically feasible (16(2)(b)).

crushing and flotation stages, which result in a magnetic concentrate. The magnetic concentrate is then ground to produce a thickened ore concentrate and tailings.

According to the information provided by the proponent, the concentration of nickel in the Dumont deposit is not high enough to use other methods of ore concentration.

Ore concentration infrastructure

The Project was designed to obtain the optimal mine layout, with infrastructure grouped in such a way as to minimize the mine footprint and to prevent any encroachment on the James Bay watershed and nearby eskers.

The concentrator was located near the mine to reduce transportation distances, costs, and noise, dust and greenhouse gas emissions. A rocky outcrop provides ideal conditions for the location of the concentrator. Investigations by the proponent identified two optimal sites on the west side of the mine pit. The first concentrator site (1250 metres northwest of the pit) is appropriate for the installation of the crushing and milling process, with the grinding circuits located on the south side. The second site optimizes the configuration of the primary crushing stations, which will be located between the concentrator and the pit to minimize ore haul truck traffic. This site is located immediately west of the pit, in its northern section.

Management of mining waste (tailings, waste rock, overburden and low-grade ore)

To determine the optimal site for mine waste storage, the proponent conducted an assessment of alternatives using the method proposed by Environment Canada (Environment Canada, 2013).³ This assessment was required because the proponent had indicated its intention to dispose of mine waste considered to be a deleterious substance or to discharge water containing deleterious substances into natural water bodies frequented by fish. The designation of water bodies in Schedule 2 of the *Metal Mining Effluent Regulations* requires a regulatory amendment.

The proponent therefore conducted a multi-step alternative means assessment using a multi-criteria analysis approach. According to its assessment, aboveground tailings storage, which involves various beach and delta deposition techniques that permit water to flow to a settling pond, is the only option and the most economically, technically and environmentally advantageous (Appendix A). Toward the end of the ore extraction period (years 19 and 20), it is also proposed to use the pit to store approximately 114 million tonnes of waste rock.

Apart from the pit, the proponent had to determine the location of the following key infrastructure:

- a 1073-million tonnes waste rock stockpile;
- a 630- million tonnes tailings storage facility;
- 243- million tonnes overburden stockpiles;
- 510- million tonnes low-grade ore stockpiles.

³Guidelines for the Assessment of Alternatives for Mine Waste Disposal
<http://www.ec.gc.ca/pollution/default.asp?lang=En&n=125349F7-1&offset=1&toc=show>

The main parameters considered for the assessment of mine waste storage were distance to the industrial complex, the size of the tailings storage facilities, and the biophysical and socioeconomic characteristics associated with the sites assessed. For the purposes of the alternative means assessment for mine waste storage, a number of constraints were also taken into account, including:

- water bodies and streams (fish habitat);
- the divide between the James Bay and St. Lawrence River watersheds;
- biological refuges and designated or potential wildlife habitat;
- plant life and wetlands;
- public and private infrastructure: roads, rail, power lines;
- built environments and farmland;
- resort areas.

The proponent assessed a total of 11 scenarios (A to K, see Table 4-11, Volume 1, main report, Genivar 2012) for mine waste storage and management. Each of these scenarios involved a different mine waste management method, including a land-based management option with no encroachment on a water body frequented by fish. A few scenarios presented different sites for the storage of other types of mine waste (low grade ore, waste rock and overburden).

On the basis of the assessment conducted by the proponent, option K is considered the most favourable for all mine waste from a technical, economic, environmental and socio-economic perspective. This option has the smallest environmental footprint (Appendix A), poses the least risk to operations, decommissioning, reclamation and project follow-up, and minimizes both the distance over which overburden to be used for reclamation is transported and the number of final effluents to be monitored.

Option K consists of storing mine waste (low grade ore) in a natural water body frequented by fish (west branch of unnamed stream 1). This option will therefore require an amendment to the *Metal Mining Effluent Regulations* and the listing of the water body on Schedule 2.

Part of the mine infrastructure optimization associated with option K involved relocating the waste rock and overburden stockpiles to west of the pit. The stockpiles were thus moved closer to the pit, thereby reducing the project's footprint, reducing hauling distances and increasing the undisturbed area at the eastern edge of the property, near the boundary of the James Bay watershed. This optimization limits trucking, which is a source of greenhouse gases, and reduces the costs associated with the transportation of these materials.

The low grade ore will be processed in the concentrator once mining of the pit is completed (year 21), which weighs in favour of storing the material near the infrastructure to minimize ore transport, thus reducing dust dispersion and fuel consumption and so reducing greenhouse gases effect.

With respect to the storage of mine waste outside water bodies frequented by fish, the proponent presented and assessed the option of storing the various types of waste on the Saint-Mathieu-Berry esker. This option was not selected, because the esker is located approximately eight kilometres from the mine site, which would require a significant amount of transportation (dust dispersion and increased greenhouse gases emissions), and the eskers are very important to the local communities as a drinking water supply. The selection of the preferred

option will have to be validated by Environment Canada and approved during the regulatory process for designating watercourses and water bodies that will be added to Schedule 2 of the *Metal Mining Effluent Regulations*.

Water management and industrial water supply

The industrial water requirement of the Project is an important environmental issue. The operation of the concentrator requires approximately 80 000 m³/day, at the initial production rate of 52.5 kilotonne/day.

When the environmental impact statement was submitted, the proponent presented an initial approach that was optimized during the feasibility study to limit effects on the natural environment. The improvements made include: the recovery of mine wastewater, which will be redirected to one or two process water ponds and reused in a closed-loop system, which means the north reservoir initially required can be eliminated; the reduction of the capacity of the pit's southeast reservoir from 15 million cubic metres to 10 million cubic metres, thus reducing its footprint; and the elimination of the option to release non-contact water towards the east (i.e., towards Pandini Creek).

The water management plan optimized by the proponent to ensure the continuation of operations takes the following factors into consideration:

- avoidance of water withdrawals from the Villemontel River;
- reuse of contact water in the process and minimize effluent discharges;
- maximization of releases of water not used for industrial needs into the Villemontel River.

Runoff from the mine site will be recovered in ditches, sumps and ponds and will form the main water supply source for the ore processing operations. A large part of the water requirements will be met by recycling the water collected in Cell 1 of the tailings storage facility. The mine pit reservoir will be the main water supply source.

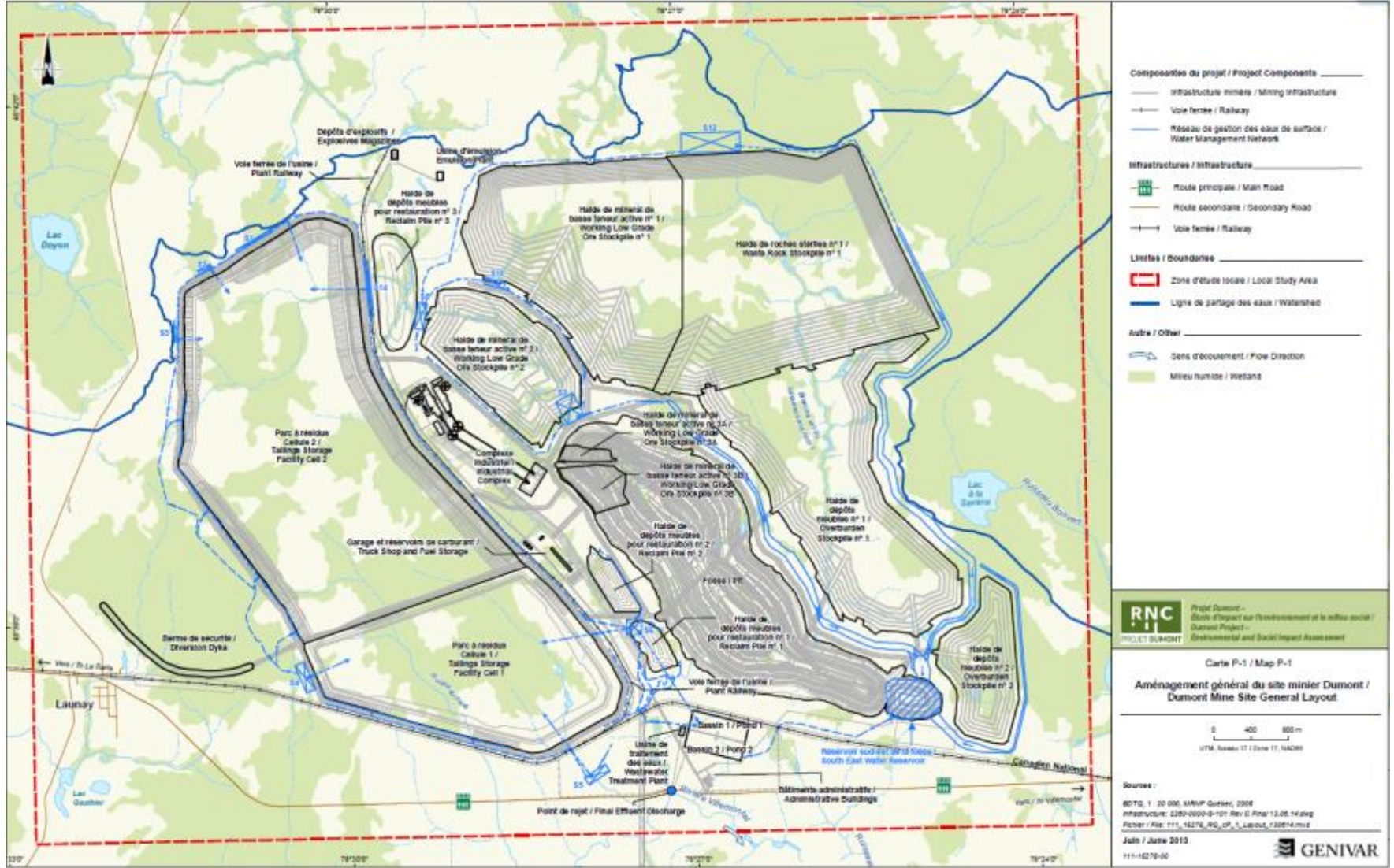
Excess water that cannot be collected in the pit reservoir will be directed to a settling pond. The water will then be treated to meet federal and provincial regulatory requirements prior to its discharge to the Villemontel River.

4.3 Conclusion of the Agency

The Agency considers the criteria selected and the alternative means assessment conducted by the proponent to be adequate. The proponent continued to optimize its Project throughout the process to reduce its environmental footprint, thereby reducing the adverse effects on the environment, including the aquatic environment. In this context, the alternative means selected are the options that have the least environmental effect, while meeting the technical and economic criteria of the Project.

The Agency notes that the proponent did not complete its assessment of alternative means to meet Environment Canada's *Metal Mining Effluent Regulations* requirements. The alternative means assessment may therefore show that an option other than that recommended in the environmental impact statement is more appropriate from an environmental, technical and socio-economic perspective.

Figure 3 Location of Mine Infrastructure



Source: Map P-1 (Genivar 2013)

5 Consultations

Public and Aboriginal consultation strengthens the quality and credibility of environmental assessments. The comments and concerns expressed through consultations help to clarify the potential effects of a project, beginning at the planning stage. For the Project, the Agency, in collaboration with the Federal Committee, organized several public and Aboriginal consultation activities.

The Agency administers a Participant Funding Program that supports individuals, non-profit organizations and Aboriginal groups interested in participating in federal environmental assessments. As part of this comprehensive study, the Agency allocated close to \$44 000. The recipients are the Abitibiwinni First Nation, the Société pour vaincre la pollution, the Société de l'eau souterraine Abitibi-Témiscamingue and a group represented by the Organisme de bassin versant du Témiscamingue and the Conseil régional de l'environnement de l'Abitibi-Témiscamingue.

5.1 Public Consultation Conducted by the Federal Government

The Agency's process allows for three formal public participation opportunities. The Agency announced the first two consultation periods and the Participant Funding Program via notices on the Canadian Environmental Assessment Registry website, in various local newspapers and on local radio stations. The relevant consultation documents were posted on the Canadian Environmental Assessment Registry website and made available at viewing locations in communities near the Project.

The first consultation held by the Agency took place from May 24 to June 26, 2012. The aim was to explain the comprehensive study process and to seek comments on the Project. At that first consultation, the Agency received comments from four participants and groups. Among them, the municipality of Amos expressed a number of concerns essentially related to effects of the demands on hydrology and groundwater on the Saint-Mathieu-Berry esker, which is the source of drinking water for this municipality.

The second consultation took place from May 19 to June 20, 2013, and gave interested parties an opportunity to comment on the potential environmental effects of the Project and the measures proposed to prevent or mitigate those effects. On May 23, 2013, the Agency held a meeting with elected representatives of the municipality of Launay, to give them an opportunity to learn about the Project and the proponent's environmental impact statement, as well as to share their comments and concerns. Representatives of the Agency, Fisheries and Oceans Canada, Natural Resources Canada and Environment Canada were present to explain their roles and answer questions. Written submissions were received from several organizations during that consultation period, namely the *Société pour vaincre la pollution*, the *Société de l'eau souterraine Abitibi-Témiscamingue* and the *Organisme de bassin versant du Témiscamingue*.

For the third consultation opportunity, the Agency invited the public to provide comments on the content, conclusions and recommendations of this comprehensive study report. The Agency will present the comments received to the Minister of the Environment to support the environmental assessment decision.

5.2 Aboriginal Consultation Conducted by the Federal Government

5.2.1 *Analysis of the need to consult*

The federal government regularly consults with Aboriginal groups for reasons of good governance in order to contribute to its objectives of sound management and informed decision making. Moreover, the federal government has a duty to consult with Aboriginal groups and, if appropriate, accommodate when it contemplates conduct that may have adverse impacts on established Aboriginal or treaty rights. In addition, the environmental assessment process requires that all federal environmental assessments consider the effects of any project-related change in the environment, as well as the effects of that change on the current use of lands and resources for traditional purposes by Aboriginal peoples. The assessment also requires consideration of the effect of any project-related change in the environment on physical and cultural heritage and on “any structure, site, or thing that is of historical or archaeological significance,” such as sites historically occupied by Aboriginal peoples.

In order to meet the government’s duty to consult and to facilitate a whole-of-government approach, the Agency, as Crown Consultation Coordinator for the environmental assessment of the Project, held consultations with the Abitibiwinni First Nation and the Cree Nation Government.

With respect to the Cree Nation Government, it is a signatory to the *James Bay and Northern Quebec Agreement*, a treaty protected under section 35 of the *Constitution Act, 1982*. The Project is located just outside territory covered by this agreement. The Cree Nation Government indicated that it was specifically concerned about the potential environmental effects of the Project on the Harricana River; its watershed is an important area for the Cree, who have expressed their desire to be consulted exclusively on any environmental effects or compensation measures involving this river.

Since 1988, the Algonquin of Quebec have filed a number of expressions of interest and land claims covering the project site. The Agency therefore invited all Quebec Algonquin communities and the Ontario community of Wahgoshig to participate in the environmental assessment. The Agency provided them with the project description, the guidelines for the proponent and the environmental impact statement. The Abitibiwinni First Nation was the only group to provide comments during the various consultation opportunities. The Abitibiwinni First Nation considers the project site to be part of its traditional territory and collective heritage. The community representatives voiced their concerns that the Project would cause degradation of significant cultural sites, would have an adverse effect on traditional resources harvested by community members and would negatively impact their auditory hunting techniques.

5.2.2 *Consultation activities*

The Agency agreed on a consultation plan with the Abitibiwinni First Nation and the Cree Nation Government setting out engagement activities during the various phases of the environmental assessment. At the end of the process, the Aboriginal groups will have had three formal consultation opportunities. The Agency informed the Aboriginal representatives of the three formal consultation opportunities in writing. The Agency communicated regularly with these groups throughout the comprehensive study process.

During the first consultation period seeking comments on the draft guidelines related for the preparation of the environmental impact statement, the Agency received general comments from the Abitibiwinni First Nation regarding details of the Project itself.

For the second consultation opportunity, Aboriginal communities, specifically the Abitibiwinni First Nation and the Cree Nation Government, were invited to provide comments on the potential environmental effects of the Project, its potential impacts on Aboriginal or Treaty rights, and the accuracy of the information provided by the proponent in the environmental impact statement. During this phase, the Abitibiwinni First Nation and the Cree Nation Government provided written submissions to the Agency. In addition, on May 22, the Agency held public workshops in Pikogan to hear the concerns and comments of community members, users of the area and employees of the Abitibiwinni First Nation.

For the third consultation period, the Agency invites Aboriginal groups to provide comments on the content, conclusions, and recommendations of the comprehensive study report. The Agency will present the comments received to the Minister of the Environment to support the environmental assessment decision. If the decision regarding the environmental assessment is favourable, Fisheries and Oceans Canada, Natural Resources Canada and Environment Canada may conduct other consultation activities, specifically on the authorizations to be issued for serious harm to fish and fish habitat and on the listing of water bodies on Schedule 2 of the *Metal Mining Effluent Regulations* for mine waste storage.

5.3 Consultation Activities Conducted by the Provincial Government

On March 21, 2014, the Quebec Government directed the *Bureau d'audiences publiques en environnement du Québec* (the BAPE) to establish a panel of inquiry and public hearings. On April 16, 2014, the BAPE held an information session in Launay, followed by two sets of public hearings. The first public hearing, held in Amos on May 13 and 14, 2014, was designed to inform the public about the Project. The second public hearing, held in Launay on June 10, 2014, was devoted exclusively to receiving written submissions, oral testimony and suggestions by residents, municipalities, organizations and groups interesting in making their views known to the panel.

The BAPE received a total of 53 written submissions from members of the public and various groups. No written submissions were filed by any of the Aboriginal communities as part of the provincial process.

5.4 Consultation Activities Conducted by the Proponent

The proponent conducted information and consultation initiatives during the preparation of its prefeasibility study (February 2011) and during the drafting of its environmental impact statement (2012). According to the proponent, these consultations were designed to provide interested parties with non-technical, transparent information, to provide an opportunity for review and optimization of various aspects of the Project and to allow for proactive follow-up of the participants' concerns, comments and suggestions.

The public consultations conducted by the proponent took various forms, such as advisory committees, public events that provided an opportunity for direct exchanges between experts and participants, and the distribution of information documents (non-technical fact sheets, presentations, etc.). The proponent has committed to continue the dialogue with the interested parties during the construction, operation and environmental follow-

up phases. On April 5, 2013, following submission of its environmental impact statement, the proponent signed a memorandum of understanding with the Abitibiwinni First Nation. It provides for the development of an agreement on the impacts and benefits of the Project on the Algonquin community, and consequently on the Mapachee family.

With respect to Aboriginal groups, the proponent implemented various consultation initiatives with the Abitibiwinni First Nation to ensure the community was informed of the Project and had an opportunity to raise and comment on its environmental and social effects. In particular, the proponent organized a visit to an active mine site, negotiated a pre-mine development agreement, held a public meeting, established an advisory committee and held a workshop. The proponent has committed to continue the dialogue with the Abitibiwinni First Nation during Project planning, construction, operation and environmental follow-up.

5.5 Concerns Raised

The Agency took the concerns and comments received from the public, Cree Nation Government and Abitibiwinni First Nation into account in its analysis (Chapter 7). The Agency also forwarded their concerns and comments to the proponent. The main issues raised by the participants are as follows.

- *Risk of water quality degradation in the region's eskers associated with groundwater contamination or pit dewatering:* The Société pour vaincre la pollution, the Organisme de bassin versant du Témiscamingue and the Société de l'eau souterraine d'Abitibi-Témiscamingue described the richness and importance of the region's eskers. They requested that the proponent present a detailed analysis of the risk of groundwater contamination. Moreover, the Société pour vaincre la pollution requested that the Saint-Mathieu-Berry esker be taken into account in the analysis.
- *Impact on watersheds:* The Organisme de bassin versant du Témiscamingue requested that the proponent not view the drainage divide as an impassable barrier. Mitigation and follow-up measures should be considered beyond this natural border.
- *Importance of wetlands:* Several organizations described the importance of protecting the wetlands, especially those that support species with designated status. These organizations requested that wetlands be considered in the cumulative effect assessment given their high ecological value and the presence of potential habitats for species with designated status.
- *Air quality:* The Abitibiwinni First Nation and the Société pour vaincre la pollution have concerns about adverse effects that may be caused by dust and other atmospheric contaminants on the environment, wildlife and human health. The Société pour vaincre la pollution is also concerned about the chrysotile asbestos content of the tailings and its effect on air quality. It requested that a study on the possible or probable release of asbestos fibres into the environment be conducted and that the proponent take the necessary control measures.
- *Disturbance of wildlife:* The Abitibiwinni First Nation is concerned that noise created by the mining operations will impact terrestrial and avian wildlife.
- *Degradation of cultural sites:* The Abitibiwinni First Nation is concerned that the Project will cause degradation of important community cultural sites, especially in the Chicobi Lake region.

- *Use of the area:* The Abitibiwinni First Nation believes that the Project is likely to adversely affect the auditory hunting techniques of the hunters in the area.

5.6 Accommodation and Agency Conclusion Regarding Impacts on Aboriginal Rights

The information provided to the Agency during the Aboriginal consultation process showed that the Project is not likely to cause significant adverse effects on the potential Aboriginal rights of the Abitibiwinni First Nation. The main anticipated effect is the loss of land area used for traditional purposes, in particular for hunting and trapping, in the western part of the area affected by the mine infrastructure. The Project is also likely to affect the water quality of the eskers and the Villemontel River.

The proponent and the Government of Canada identified mitigation measures to address the issues raised by the Aboriginal groups during the environmental assessment. The primary mitigation measure designed to reduce the environmental effects in the western part of the project site was to reduce the project's footprint and adopt a water management plan to reduce the effect on wetlands surrounding the project area. Specifically, the measures focus on human health, water resources, fish, wildlife, progressive site restoration and land use. They are described in Chapter 7 and Appendix B of this report. Responses to each of the concerns received from Aboriginal groups are also provided in Appendix F.

With respect to the concern about the Harricana River watershed, the Cree Nation Government and the Agency concluded the Project's potential environmental effect is very low.

On the basis of these measures, the Agency concludes that the Project's potential adverse effects on potential or established Aboriginal or Treaty rights will be avoided or adequately mitigated.

Reference to Appendix B - Proponent's Mitigation Measures

6 Environmental Setting

6.1 Biophysical Environment

The Dumont Mine Project is located in the Superior geological province, which encompasses the Abitibi greenstone belt, composed of volcanic and sedimentary rock. Several mining companies are active in the region, which is rich in minerals, including copper, gold, zinc and silver.

The landscape is a result of the last glacial period in North America. Overburden deposited by glaciers filled in the rock depressions, resulting in a uniform relief. The area now consists of a plain dotted with rocky hummocks of between 290 and 371 m in elevation. The area is also characterized by the presence of fluvio-glacial deposits that created the many eskers of Abitibi. There are two major eskers in the study area and surrounding region: the Launay esker and the Saint-Mathieu-Berry esker. A third, unnamed esker borders the southern part of the study area and is adjacent to the proposed pit. Due in part to the presence of the eskers, the region has abundant, high-quality groundwater resources.

The mine project is located in the humid continental climate region, which is characterized by large seasonal temperature contrasts. It affects the hydrologic system of the Villemontel River, which is part of the St. Lawrence watershed, as well as a portion of the hydrologic system that drains into the Harricana River, which empties into James Bay. More than half the study area consists of wetlands and aquatic environments, primarily of bogs and shrub swamps. Forest stands account for over a-third of the project area and are characteristic of the balsam fir—white birch bioclimatic domain, which occupies the southern portion of the boreal zone. The forest landscape there is dominated by balsam fir and white spruce stands, mixed with white birch in areas where the soil is mesic, and black spruce, jack pine and tamarack stands, accompanied by white birch or trembling aspen in areas of poorer soil.

The wetlands and terrestrial environments play a significant role in habitat diversification and contribute to the region's ecological value. Many species of mammals, birds, reptiles and amphibians occur in large numbers in the area and are dependent on the forests, lakes, rivers and wetlands for foraging and breeding.

The local study area likely supports a large diversity of mammals because it is located in a transition zone where southern and northern species co-occur. Moose and black bear are regularly found in the study area and are relatively abundant. Beavers are found throughout Abitibi-Témiscamingue. Favourable beaver habitat includes lakes and slow-moving streams with gently sloping banks and little wave action.

Relatively few waterfowl species or other aquatic or shorebird species occur in the study area. Although the study area has a large proportion of wetlands, there are few ponds or large water bodies, and therefore is more favourable to forest species and less favourable to aquatic species. Mallard duck and Canada goose are the most abundant waterfowl species. With respect to shorebirds, the greater yellowlegs was the most abundant species observed. It should be noted that nine sandhill cranes were observed in the study area.

The fish habitat affected by the mine project consists primarily of gently sloping streams with a sand and fine silt/clay substrate, dotted with beaver ponds. The primary fish species present in this type of environment are brook stickleback, blacknose dace, white sucker and various species of cyprinids. Other species, such as northern pike and walleye, are also present in the Villemontel River and the unnamed stream.

6.2 Human Environment

Abitibi-Témiscamingue is occupied by the Algonquin and Abitibi communities. The Dumont Mine Project is located entirely within the regional county municipalities of Abitibi and Abitibi-Ouest. It mainly affects the territory of the township municipality of Launay and, to a lesser extent, that of the municipality of Berry and the township municipality of Trécesson. The municipality of Amos, with a population of 12 671, is the hub of the regional county municipality of Abitibi and is located approximately 25 km from the Project. The Aboriginal community of Pikogan (near Amos) has a population of 900. The six other territories bordering the study area have populations ranging from 203 (Chicobi Lake) to 1138 (Trécesson).

There are no Aboriginal communities set apart as a reserve or settlement in the expanded local study area of the Dumont project. However, the study area lies within the traditional territory of the Aboriginal community of Pikogan (Abitibiwinni Algonquin Nation). Residents of this community who live near the Project are concentrated primarily around Chicobi Lake, roughly 15 km north of the local study area (see Figure 2).

The project study area consists primarily of public lands, some of which are intramunicipal lands managed by the Abitibi regional county municipality. Some of the public lands are subject to logging concessions or harvesting rights. The rest of the study area is private land.

In 2013, the overall employment rate in the communities of Abitibi-Témiscamingue was 62.4 percent. The primary sector accounts for a large proportion of the workforce in the region, by comparison with Quebec as a whole. Amos and Trécesson differ from the other areas in the study area in that a smaller proportion of their population works in the primary sector and a higher proportion works in the tertiary sector.

All municipalities and communities in the region are connected by a network of highways and roads. All communities are serviced with power, potable water, and sewage systems. Landfill and solid waste disposal and pick-up services are also provided in all the regional communities.

Eight leases of the Ministère de l'Énergie, des Ressources naturelles du Québec for rough shelters were inventoried on public land in the study area, and hunting camps and shelters were inventoried on private land. Little fishing is carried out in the study area, although occasional fishing is done in the Villemontel River and the beaver ponds scattered along its tributaries. Five registered public traplines are partially located within the study area.

7 Environmental Effects Assessment

7.1 Approach

The Agency, in collaboration with the Federal Environmental Assessment Committee, identified and assessed potential adverse environmental effects of the Project on the basis of the information provided in:

- the proponent's environmental impact statement, including the proponent's responses to questions and comments;
- the information obtained during public and Aboriginal consultations;
- the expert opinions obtained from the federal government departments.

This chapter provides a summary of the analysis of the project's environmental effects for each valued component identified in Chapter 3.3 of this report.

This summary includes a brief description of the baseline condition of the components prior to the Project and the assessment of the project's potential effects on it. Mitigation measures designed to reduce the potential effects have been proposed and many have been integrated into the project design. Comments from the government departments, the public and Aboriginal groups address the key issues associated with the component and were taken into account by the Agency in determining whether additional mitigation measures or a follow-up program are necessary.

To determine the significance of the residual effects, the Agency used the same method as the proponent based on the criteria of magnitude, extent, duration and likelihood of occurrence described in Appendix C. The matrix used for the significance determination is presented in Appendix D. It allows an overall judgment to be made on effect significance based on a five-point scale: very high, high, moderate, low and very low. Environmental effects at the very high and high levels are considered significant according to the Agency, while effects at the moderate, low or very low levels are considered insignificant. Appendix E summarizes the valued component, environmental effects, mitigation measures and the Agency's conclusions on the significance of the residual environmental effects. The focus of the follow-up program proposed by the proponent is presented in Chapter 8.

7.2 Air Quality

This section covers the main issues related to air quality, especially the dispersion of fine particulate matter in the air as well as contaminant and greenhouse gas emissions.

According to the proponent, the current air quality at the project site is very good. The area is rural (agroforestry) and there is little industrial activity. The closest plants are located more than 6 km from the Dumont project.

7.2.1 *Potential environmental effects*

The potential adverse environmental effects of the Dumont project on air quality come essentially from:

- increased airborne dust;

- contaminant and greenhouse gas emissions.

Sources of atmospheric emissions during the construction phase include site preparation, infrastructure construction and extraction of waste rock and ore. During this phase, the main sources of emissions would come from clearing, excavation of overburden, drilling and blasting activities at ground level and in the pit, loading and unloading of materials, transportation of various materials (hauling) and other activities. During the operation phase, emissions associated with ore processing would be added to those from the construction phase activities. The main sources of air emissions would then be ore crushing, ore handling, concentrate shipping (loading and transportation), and wind erosion of stockpiles and tailings dams. In the closure phase, air quality would be primarily affected by the various site restoration activities involving machinery movement and operation, as well as demolition of the mine infrastructure.

Emission of particulate matter, metals and gases

To assess the project's effects on air quality, the proponent performed several contaminant atmospheric dispersion modelling studies using the methodology proposed by the provincial guidelines (*Guide de modélisation de la dispersion atmosphérique*, MDDEP, 2005).

The proponent selected two modelling scenarios to assess the effects of mining activities on air quality, i.e., year 8, when activities will be carried out near Launay, and year 10, when the anticipated tonnage will be the highest (146.5 million tonnes/year).

The contaminants selected by the proponent for the modelling are suspended particulate matter (total particulate matter and fine particulate matter), carbon monoxide, nitrogen dioxide and sulfur dioxide. It also included 18 metals and metalloids present in the ore, waste rock, tailings, overburden and concentrate, 14 of which are subject to air quality standards under the Quebec *Clean Air Regulation*.

The model uses a 95 percent dust reduction rate from unpaved roads during hauling, the primary source of dust generated by the Project. The modelling results indicate that for fine particulate matter, the provincial air quality standards would be met at all times. However, exceedances of the provincial air quality standards are anticipated for total particulate matter under certain weather conditions. These exceedances would only occur a few times a year at sensitive receptors, i.e., the residences located south of the pit and more than 300 metres from the mine infrastructure.

The modelling also showed anticipated exceedances of the standards for nickel and crystalline silica. For nickel, the exceedances of 17 to 33 percent are anticipated and would be at the limit of the application radius of the *Clean Air Regulation*, i.e., at a distance of 300 metres around the mine infrastructure. For crystalline silica, the anticipated exceedances would occur infrequently at the sensitive receptor; modelled exceedances of the annual standard were only 4 percent.

The modelling performed by the proponent for nitrogen dioxide concentrations does not indicate any exceedances of provincial air quality standards when blasting is performed effectively.

Greenhouse gas emissions

The proponent estimates that the Project would generate 4.5 million tonnes of carbon dioxide equivalent over the total life of the Project (31 years estimation). The forecast emissions come essentially from fuel consumption

for the various mining activities, especially the use of vehicles and explosives. Average annual direct greenhouse gas emissions related to the Project are estimated at 127 974 tonnes of carbon dioxide equivalent/year, thus ranking this Project in the category of greenhouse gas emitters that should submit a report Environment Canada as part of the Greenhouse Gas Emissions Reporting Program. The Project would also be subject to mandatory reporting to the Quebec government, whose threshold is 10 000 tonnes of carbon dioxide equivalent/year. However, on the basis of a study conducted by Université du Québec en Abitibi-Témiscamingue on the Dumont deposit, the proponent states that the tailings would contribute to the partial sequestration of 137 000 to 194 000 tonnes of carbon dioxide equivalent over the life of the Project.

Chrysotile asbestos

The ore and waste rock from the Dumont deposit contain chrysotile asbestos, which is known to be a cause of health problems and which could be released into the air during mining activities. However, a study by the proponent concludes that there are no significant toxicological risks to human health posed by the atmospheric dispersion of chrysotile for the Dumont project. This conclusion takes into account such factors as the processing methods that the proponent plans to use and planned mitigation measures.

7.2.2 *Mitigation measures*

The proponent has committed to implement general mitigation measures to limit the effects of the Project on air quality (Appendix B). These measures were developed on the basis of an effects evaluation that uses a 95 percent dust reduction rate. The measures established include are spraying dry soil, using covered conveyors, rail cars and trucks, using granular materials free of chrysotile asbestos and crystalline silica for the construction of road surfaces, and maintaining the wet phase for certain stages of ore processing. To limit emissions from the tailings facility, the proponent will maintain a wet beach. Moreover, the proponent states that the phenomenon of tailings carbonation⁴ will also contribute to limiting wind erosion. The proponent will implement a tailings facility inspection program to ensure that the tailings disposal areas are always kept wet prior to carbonation and to adjust disposal operations accordingly.

The proponent plans to implement additional mitigation measures based on continuous and real-time monitoring of concentrations of total particulates in the ambient air during mine construction and operation. To prevent exceedances of Quebec's air quality standards, it will establish thresholds using the modelling results, which will then be reassessed during operation. Given that in certain weather conditions, exceedances of total particulate matter are forecast on the periphery of the mine site, a program containing specific measures was developed by the proponent. Monitoring will make it possible to define the conditions that are unfavourable to the inhabited areas southwest of the facilities and that will require the implementation of specific measures, such as reducing construction activities on the tailings storage facility by 50 percent and relocating other activities to an area north of the mine site. In addition, the waste rock extraction would be reduced by 65 percent when these same conditions were met.

⁴ Carbonation is a phenomenon that leads to the formation of a mineral crust on the surface of tailings, which helps reduce dust dispersion.

Subject to the availability of electrical power and the feasibility of implementing a trolley system, the proponent could use this type of system for the ascent of trucks from the pit and the main low-grade ore and waste rock stockpiles. This system could be implemented once the configuration of the pit is conducive and when the capacity of the concentrator reached 105 000 tonnes/day, i.e., potentially between years 5 and 20. This measure would reduce diesel fuel consumption by approximately 28 percent in the years during which this system would be in operation and thus reduce greenhouse gas emissions.

The proponent estimates that the application of general mitigation measures, continuous air quality monitoring and implementation of specific measures to control the dispersion of atmospheric contaminants would significantly reduce the project's effect on air quality.

7.2.3 *Government, public and Aboriginal comments*

Environment Canada, Health Canada and the *Conseil régional de l'environnement de l'Abitibi-Témiscamingue* expressed doubts regarding the proponent's dust dispersion scenario. Among other things, Environment Canada and Health Canada believe that it may be difficult to achieve a 95 percent reduction in the airborne dust load, which means that airborne contaminant concentrations could be underestimated. Given the numerous uncertainties, Environment Canada requested that a dust management plan be established and an air quality follow-up program be implemented.

Health Canada is of the view that an assessment of scenarios in which the planned mitigation measures do not achieve the expected effectiveness, especially in relation to the 95 percent dust reduction rate, would have helped qualify the conclusions regarding the potential effects of the deterioration of air quality on health. Given that hauling is the primary contributor of dust emissions, Health Canada recommends, in cases where the proposed mitigation measures are inadequate, that a speed limit that is sufficiently low to minimize the amount of dust created by vehicles on unpaved mining roads be imposed, so that the 95 percent dust reduction rate objective can be achieved.

To ensure that the anticipated dust reduction of 95 percent is achieved, the proponent will adopt an approach using continuous air quality monitoring on site. Moreover, the proponent will implement a dust accumulation and dispersion monitoring protocol, as well as a dust management plan. The plan will have to be submitted to the provincial government for approval. The proponent has also committed to send it to Environment Canada for comments.

The *Société pour vaincre la pollution* requested a study on the potential or probable release of chrysotile asbestos into the environment and asked that the proponent take the necessary control measures to prevent adverse effects on the environment or human health. Health Canada also expressed concerns, especially regarding these types of dust that could be generated by trucking. In response to these concerns, the proponent specified that chrysotile-free materials will be used in the construction of road surfaces.

The *Direction de la santé publique du Québec* and Health Canada believe that the toxicology study for chrysotile conducted by the proponent was based on a valid and accepted methodology.

Given the exceedances predicted by the atmospheric dispersion modelling and the uncertainty associated with to achievement of the objectives to reduce the expected effects though mitigation measures, Environment

Canada and Health Canada have suggested that all proposed measures, including the dust management plan and implementation of the follow-up program, be rigorously applied.

7.2.4 *Agency conclusions on significance of the residual environmental effects*

The Agency notes that the Quebec government requested additional modelling and mitigation measures, especially with respect to blasting conditions, so that the Project would be in compliance with provincial air quality regulations.

The Agency believes that if the option of using an electric trolley system for the ascent of trucks from the pit is implemented, it would help further reduce the project's greenhouse gas emissions.

In light of the Quebec government's requirements, the implementation of mitigation measures, the follow-up program and the integrated dust management plan, the Agency concludes that the Project is not likely to cause significant adverse environmental effects on air quality.

7.3 **Water Management**

This section covers groundwater and surface water, from the perspective of both quantity (hydrological regime) and quality (particulate, nutrient and contaminant loading). The Dumont project would mine the largest pit in Canada and would involve the use and pumping of considerable water resources in a region characterized by many eskers.

The main issues associated with the valued component are ensuring that the surface and ground water supplies remain sufficient for human consumption and that the surface water quality is adequate to support human consumption, aquatic life and wildlife consumption.

The Project is located within the watershed of the Villemontel River, a tributary of the Kinojévis River, which flows into the Ottawa River (Figure 4). The streams that make up the Villemontel watershed are fed by precipitation and groundwater discharge, to which the many eskers near the surface contribute. According to the proponent, deep aquifers typically have low hydraulic conductivity and therefore contribute little or nothing to the flow of the Villemontel River.

The surface water in the study area is generally slightly alkaline, moderately hard and rich in organic carbon. The water turbidity varies from turbid to very turbid. Total phosphorus concentrations can sometimes be very high, which is characteristic of eutrophic (nutrient-rich) aquatic environments. With respect to metals, natural aluminium and iron concentrations can be very high, regularly exceeding provincial criteria for the protection of aquatic life. There are also some exceedances of background concentrations of arsenic.

The quality of groundwater in the area is generally good due to the characteristics of overburden covering the rock.

7.3.1 *Potential environmental effects*

The potential environmental effects of the Dumont project on the water quantity and quality essentially concern the following:

- Alteration of surface and groundwater flow patterns;
- Potential nutrient and fine particulate matter loading in the Villemontel River watershed;
- Possible deterioration of water quality downstream from the final effluent discharge point;
- Risk of groundwater contamination.

Impact on water quality

Alteration of the surface hydrological flow regime is a major issue, in light of the destruction of the watershed of unnamed stream 1 by the mine infrastructure (waste rock, ore and overburden stockpiles, tailings storage facility, and surface water collection and diversion systems).

According to the proponent, pit dewatering would cause a drawdown of the water table of between 1 and 5 metres along Route 111, which could affect approximately 20 private wells. However, the water table drawdown would not affect the Launay or Saint-Mathieu-Berry eskers (Figure 5). The proponent states that the construction of the mining tailings storage facility would limit the extent of the drawdown in the direction of the Launay esker by increasing the hydraulic head in this area.

Pit dewatering combined with the alteration of the surface hydrological flow regime would cause maximum reduction of base flows at the end of the mine operation. The base flow is the flow of a stream during periods with no precipitation. The reduction would be 70 percent to 90 percent for unnamed stream 1, Sénécal Creek and Pandini Creek and approximately 20 percent for the Villemontel River. The effect on the Villemontel River would be felt over a distance of approximately 12 kilometres downstream from the mine complex.

Impact on water quality

The construction site, soil and pit stripping, dam and road construction, establishment of various stockpiles (overburden, waste rock, and ore) and the tailings storage facility could result in the transport of suspended solids and increased stream turbidity, especially in the Villemontel River, particularly during the initial weeks of construction. The construction work could also result in the release of deleterious substances into the watercourses. The magnitude of the effect associated with deleterious substances and sediment transport would depend on several variables, such as the sequence of work, strict application of mitigation measures, the period of work (winter vs. summer) and the rainfall conditions.

The water exiting the concentrator would contain suspended solids and dissolved metals. According to the analyses performed by the proponent, the concentrator process chemicals would be adsorbed on the surface of suspended solids, while the dissolved organic compounds would generally be volatilized or degraded in the course of processing. As a result, most of the chemicals and organic compounds would not be found in the final effluent. On the basis of the static and kinetic tests it performed, the proponent anticipates that treatment of water exiting the concentrator will make it possible to comply with the requirements of the *Metal Mining Effluent Regulations*, administered by Environment Canada, and Quebec's Directive 019, at the final discharge point in the Villemontel River.

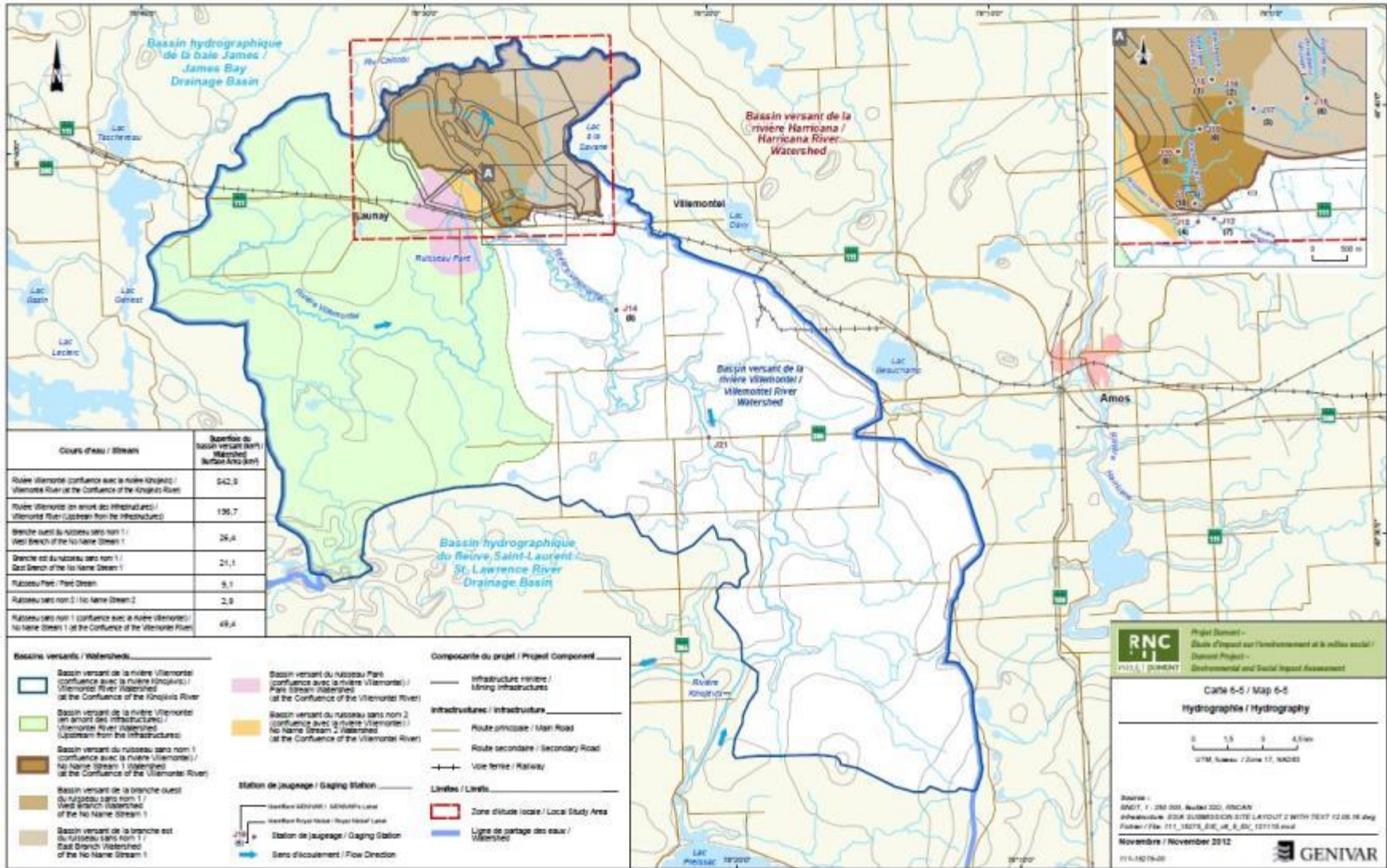
The treated domestic wastewater may contain residual phosphates and nitrates. The use of explosives could result in the release of nitrates into the pit water. The proponent plans to pump and direct this water toward the pond located near the concentrator, where it will be combined with water from other sources. Ultimately, the final effluent, after treatment, could also contain a level of nitrates that promotes aquatic plant growth and have harmful or toxic effects on aquatic wildlife.

Groundwater contamination could result from the leaching of materials from the tailings storage facility or the ore or waste rock stockpiles. According to the proponent, leaching of tailings or waste rock could generate copper, chromium or nickel. This potential contamination would be reduced by the presence of clay or silt deposits, till or exposed rock, all relatively impermeable, on almost all the planned sites for the tailings storage facility, waste rock stockpiles and ore stockpiles.

At the end of mine extraction, i.e., at the end of year 19, the proponent has planned that the tailings no longer be stockpiled but rather disposed of at the bottom of the pit. At the same time, pit dewatering will stop. The groundwater will then be in direct contact with the tailings, which could result in the solubilization of certain metals (e.g., copper, chromium and nickel).

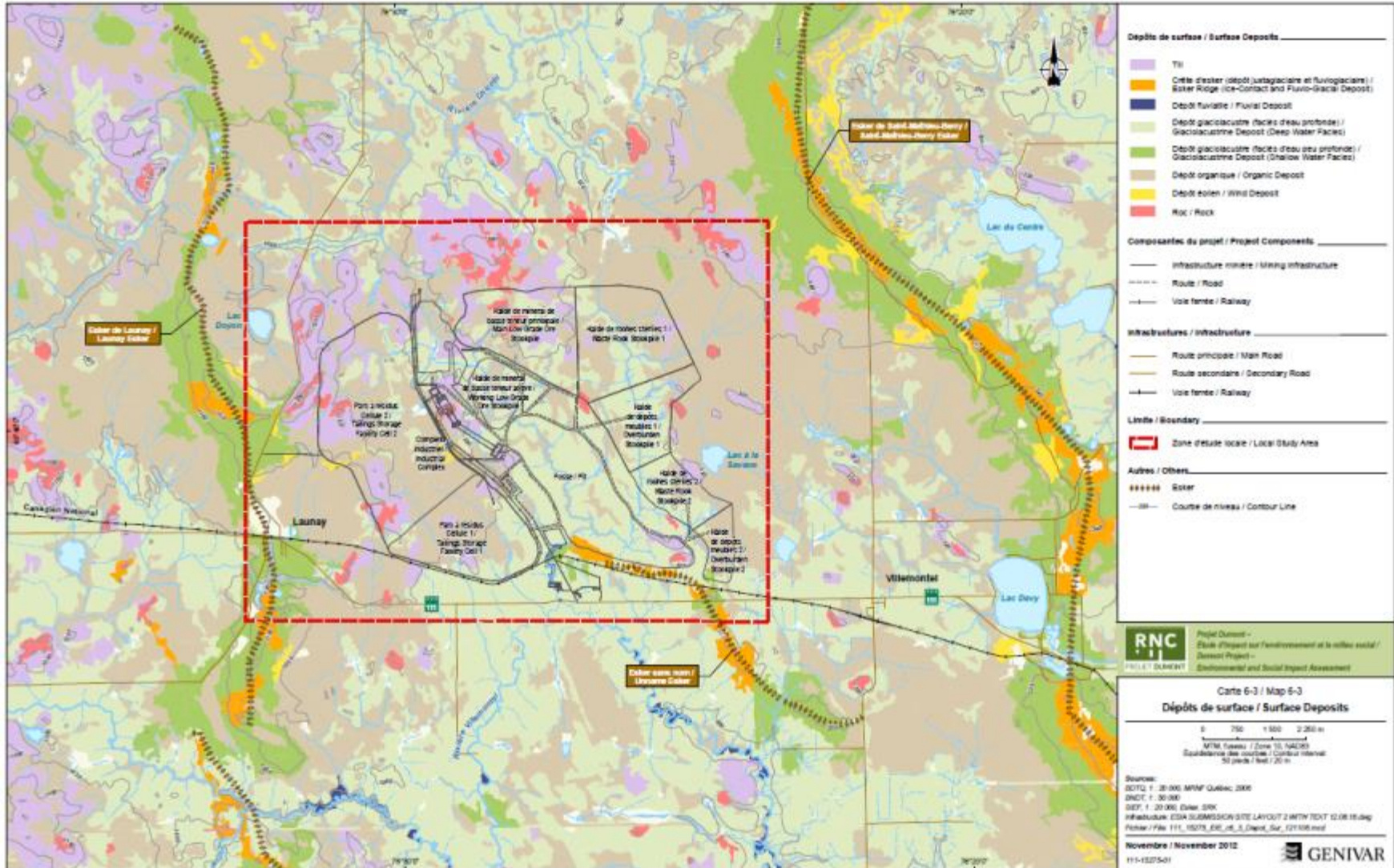
The proponent states that at the end of mine operations, equilibrium would be established between the surrounding water table and the water level in the pit. Water migration would then be in the direction of groundwater flow. This might result in potential effects on the Launay esker, the unnamed esker and private wells located along Route 111. However, kinetic test results show low metal leaching potential, and the various mine infrastructure components provide a relatively uniform impermeable base.

Figure 4 Watersheds Affected by the Project



Source: Map 6-5, Dumont Project Impact Statement, Genivar 2012

Figure 5 Location of Eskers Near the Project Study Area



Source: Map 6-3, Dumont Project Impact statement, Genivar 2012

7.3.2 Mitigation measures

The proponent has committed to implement mitigation measures to limit the project's effects on water quantity and quality (Appendix B), including the following:

- Implementation of a water management plan for all water at the mine site. The proponent plans to re-use most of the water from the tailings storage facility to supply the concentrator. This represents more than 80 percent of the concentrator water requirements.
- Implementation of sediment control measures and installation of a network of collection ditches that will direct runoff water from the site to the settling ponds and then to a treatment plant to reduce suspended solids and adjust the pH, if necessary, prior to discharge to the Villemontel River. The plant will be set up at the start of the Project to treat surplus water that could not be recycled to the concentrator, to ensure that the water quality meets the criteria of the *Metal Mining Effluent Regulations* standards prior to discharge to the Villemontel River and the province's Directive 019.
- Restriction of clearing to the bare minimum required to perform the work at the southeast of the pit in order to minimize the effects of clearing on groundwater quality and the surface water flow regime. The proponent will also install a 1-km buffer zone from the eastern surface boundary of the Launay esker in order to minimize effects.
- Implementation of an emergency response plan and appropriate measures to ensure a potable water supply in the event of problems with groundwater quality or quantity.
- Pumping and treatment of the process water supernatant above the tailings in the open pit upon decommissioning of the mine and discharge to the environment.
- Addition of a layer of clay to the more permeable areas of the tailings storage facility to limit seepage of water in contact with tailings.
- Implementation of measures (pumping wells, interception trench, etc.) to control groundwater migration in the event that groundwater quality is substantially different from what was predicted by the modelling.

Taking into account all of the mitigation measures and follow-up that would be implemented, the proponent considers the effect on surface and ground water quality in the operations phase to be insignificant.

7.3.3 Government, public and Aboriginal comments

The analysis of the proponent's environmental impact statement by the federal expert departments and by several organizations gave rise to concerns about the effects of the Project on surface and groundwater. For example, the *Organisme de bassin versant du Témiscamingue* and the *Société de l'eau souterraine Abitibi-Témiscamingue* raised concerns about the drawdown of the water table in the area of unnamed stream 1. In this regard, Natural Resources Canada asked many questions aimed at clarifying the groundwater flow model. Despite the many clarifications provided by the proponent, experts from Natural Resources Canada maintain that some uncertainties remain regarding the proponent's conclusions. The federal committee is of the view that the drawdown of the water table predicted by the model is optimistic and therefore that the effects on the

flow of Villemontel River might have been underestimated. The potential effects of water table drawdown on fish and fish habitat are described in section 7.4.

The *Société pour vaincre la pollution* believes that the volumes of contaminated, pumped and treated water could impact the eskers and private wells in the region. The federal committee also raised this issue.

To respond to the concerns about groundwater, the proponent developed a prevention and intervention procedure in the event of changes to the quality or quantity of water in private wells near the Project. Moreover, it provided for an additional 10 groundwater monitoring wells to monitor groundwater quality.

On the basis of the information provided by the proponent, Natural Resources Canada confirms that the risk of acid mine drainage is minimal for the Dumont project. However, there is risk of metal leaching to surface water that might come in contact with waste rock, especially for copper, chromium and nickel. Copper, chromium and nickel concentrations will be monitored by the proponent during mining and after mine closure to ensure that the final effluent from the mine meets the requirements of the *Metal Mining Effluent Regulations* and Directive 019.

Environment Canada raised the fact that the proponent's water quality modelling predicts potential aluminium concentrations in the environment at toxic levels to aquatic life, which is prohibited by the *Fisheries Act*. Since aluminium is not included in the *Metal Mining Effluent Regulations*, the proponent has committed to include aluminium in the follow-up of the mining effluent composition to ensure protection of aquatic life.

7.3.4 Agency conclusions on significance of the residual environmental effects

The surface water flow regime would be altered significantly by the mining activities. Although the effect would be permanent due to the deposit of mine waste on certain streams, the Agency considers the residual effect on the flow regime would be moderate, because it is local in scope and the streams affected (unnamed, Pandini and Sénécal), which flow into the Villemontel River, are of minor importance.

The Agency also considers that water table drawdown associated with pit dewatering would have a moderate residual effect because it would affect a limited number of private wells and should not affect the Launay and Saint-Mathieu eskers, located near the site. The effect of water table drawdown on inflows from the Villemontel River is covered in the next section (Fish and fish habitat).

Taking into account the mitigation, monitoring and follow-up measures that would be implemented by the proponent and the federal and provincial regulatory requirements with which it must comply, the Agency concludes that the Project should not cause any significant adverse environmental effects on water resources.

7.4 Fish and Fish Habitat

The vast majority of the local study area drains into the Villemontel River. The unnamed stream 1 (east and west sections), a tributary of the Villemontel River, is the main watercourse that would be affected by the project (Figure 4). The total surface area of the creeks located within the project boundaries is approximately 31 hectares. These creeks have a channel-type flow, with a gravel, sand, silt and clay substrate. They have a low gradient slope, an average width of approximately 3 metres and are marked by beaver ponds.

According to the inventories performed, 21 species of fish occur in these creeks. Brook stickleback, several cyprinid species, white sucker and trout-perch were the most prevalent in the sampled streams. Northern pike and walleye were caught in the downstream section of the unnamed stream 1. Northern pike, walleye, yellow perch and rock bass are found in the Villemontel River.

No fish species at risk listed in Schedule 1 of the *Species at Risk Act* occur in the water bodies in the study area.

7.4.1 *Potential environmental effects*

The main anticipated effects of the Project on fish and fish habitat would be caused by:

- encroachment of infrastructure on fish habitat and drying up of streams;
- fish mortality;
- increased sediment input to the Villemontel River; and
- reduction in water inflow to the Villemontel River.

Encroachment of infrastructure on fish habitat and drying up of streams

The total surface area of fish habitat that would be destroyed by mine infrastructure is estimated at 31 hectares. This includes a variety of habitats that enable the species present to complete their entire life cycle there, except for walleye, for which the downstream portion of the unnamed stream 1 might constitute a foraging habitat.

Fish mortality

The streams at the mine site would be diverted to collect their water in sumps and reservoirs, i.e., the reservoir southeast of the pit, the two settling ponds and cell 1 of the mine tailings area. Interruption of flow in a section of stream would result in mortality of the fish found there. The fish could also be drawn in the reservoirs, where they would not survive. Fish mortality would also occur during filling of streams beneath the stockpiles or during stripping of the pit.

Increased sediment input to the Villemontel River

The construction work and mining operations are likely to cause erosion and sediment transport into the drainage system of the Project site and could modify the quality of fish habitat, especially that found in the Villemontel River.

Reduction of inflows to the Villemontel River

The Project requires implementation of a site-wide water management plan. The plan would involve modifications to surface and groundwater flow patterns.

The proponent believes that the modifications to the surface water flow pattern would result in a decrease in the area of fish habitats available in the Villemontel River of roughly 4 hectares. This loss would affect spawning and feeding habitats of northern pike, walleye, yellow perch, rock bass, burbot and suckers.

7.4.2 Mitigation measures

The proponent plans to implement a set of measures (Appendix B) designed to prevent erosion and fine sediment input to fish habitat and to protect fish during mine construction and operation. These measures include:

- construction of collection ditches around the waste rock, low grade ore and overburden stockpiles, as well as around the mine tailings storage facility to capture and re-use of drainage water;
- use of methods that will allow fish to move away from the work site during filling of streams and beaver ponds.

The proponent has committed to carry out a compensation program to offset serious harm to fish that will be caused by the Project. This program will have to be developed with Fisheries and Oceans Canada, at the Project review phase provided for in the fisheries protection provisions of the *Fisheries Act*. As part of the regulatory amendment process for the designation of water bodies in Schedule 2 of the *Metal Mining Effluent Regulations*, a compensation plan to offset fish habitat losses related to mine waste disposal will have to be submitted to Environment Canada.

7.4.3 Government, public and Aboriginal comments

Given the scope of the Project, Fisheries and Oceans Canada is of the view that there are no measures that can prevent fish mortality caused by the filling, diversion and drying up of streams. To reduce the risk of mortality of recreational fish species likely to be present in the downstream portion of the unnamed stream 1, Fisheries and Oceans Canada requires that the work and activities planned in years 1 and 2 of the surface water management plan that have an effect on the unnamed stream 1 be carried out between June 15 and April 15.

Natural Resources Canada has indicated that there remains some uncertainty regarding the assumptions used in the modelling of the anticipated effects on the hydrogeological regime. Natural Resources Canada is of the view that a reduction of approximately 20 percent in the base flow of the Villemontel River could occur. This department believes that pit dewatering and the decline in watershed areas could result in a significant reduction in the flow of certain streams during the operational phase and following mine closure. Fisheries and Oceans Canada therefore believes that the predicted 4 hectares loss of fish habitat for the Villemontel River may have been underestimated. It will require additional information in order to determine the extent of the serious harm to fish that will be caused by the Project in the Villemontel River and to conclude the project review under the *Fisheries Act*. Compensation would be adjusted according to the extent of the serious harm.

On the basis of the recommendations of Natural Resources Canada, Fisheries and Oceans Canada requires that the proponent implement a water level and flow monitoring program for the Villemontel River and has indicated that measures could be required depending on the follow-up results.

The Abitibiwinni First Nation proposed a project to the proponent consisting of stocking the Octave River (north of Lake Chicobi) with lake sturgeon as a fish habitat compensation measure. The community highlighted the fact that the Octave River is used by its members and that lake sturgeon is part of their collective heritage and is the subject of much traditional knowledge.

In the event that some mine waste would be considered harmful within the framework of the *Metal Mining Effluent Regulations* process currently in force, the proponent will have to develop and implement a compensation plan to offset fish habitat losses related to the use of fish-bearing water bodies for mine waste disposal.

7.4.4 Agency conclusion on significance of the residual environmental effects

The Agency notes that the effects anticipated to the fish and fish habitat would be limited to the Villemontel River watershed and that all habitat losses would be compensated by the proponent. In light of all the proposed mitigation measures, including the Villemontel River water flow and level monitoring and the implementation of measures if necessary, the Agency believes that the Project is not likely to cause significant adverse environmental effects on fish and fish habitat.

7.5 Birds and their habitat

This component includes forest birds, waterfowl and aquatic birds as well as their habitats, i.e., forests, wetlands, open areas and water bodies. The forests and wetlands present in the study area are characteristic of the Abitibi-Témiscamingue region and are well represented in the local study area.

Wetlands are abundant in the Dumont Project area. They cover 5541 hectares, which represents 56.6 percent of the local study area (see Figure 3). These environments are important because they can provide shelter, food and nesting habitats for many bird species. Terrestrial environments represent 38.7 percent (3786 hectares) of the study area. They are dominated by conifer forests, but also include herbaceous old fields and recent clear-cuts. In addition, man-made environments characterized by fields and residential and industrial sectors cover 4.1 percent (399 hectares) of the local study area, while water bodies and streams cover 0.6 percent (59 hectares).

According to the *Étude des populations d'oiseaux du Québec* database, 112 bird species have been surveyed within the territory of the municipalities of Launay and Villemontel, 98 of which are breeding species. The 2008 and 2011 surveys counted a total of 77 species for which more than one breeding pair could be detected at the point-count stations. It should be noted that three species at risk listed in Schedule 1 of the *Species at Risk Act* have been confirmed in the area, i.e., two threatened species, the common nighthawk and olive-sided flycatcher, and one species of special concern, the rusty blackbird.

The impact statement states that the Nashville warbler and white-throated sparrow are the most common breeding birds in the study area, with average densities of 53.7 and 28.5 pairs/km², respectively. For all species and all habitats combined, the average density of breeding pairs is estimated at 329.1 pairs/km² for the entire study area. Forested areas composed of coniferous forest and shrubland as well as open bogs were the environments with the highest bird diversity, with 49, 40 and 39 species surveyed, respectively.

A dozen aquatic bird species were surveyed in the study area in 2011. Mallard duck and Canada goose were the most abundant waterfowl species. This limited abundance could be explained in part by the small number of large water bodies or ponds in the study area, which are the preferred habitat of these species.

7.5.1 *Potential environmental effects*

The proponent presented its data based on three categories of birds: waterfowl and aquatic birds, birds of prey and forest birds. The majority of these birds are migratory species.

The anticipated potential environmental effects of the Dumont Project on birds and their habitat concern mainly the following:

- habitat loss;
- disturbance and incidental take of migratory birds;
- contamination of aquatic birds using untreated ponds and waters.

Habitat losses

Table 3 shows the terrestrial and wetland losses estimated by the proponent relative to availability in the study area. The main environments affected would be bogs, swamps and conifer forests. On the basis of the proponent's estimates, these habitat losses could affect 12 780 breeding pairs of forest birds, 102 breeding pairs of waterfowl and 11 breeding pairs of aquatic birds.

Habitat losses could also affect the three species at risk likely to nest in the project area. The proponent estimates that there would be a potential loss of 1578 hectares of olive-sided flycatcher habitat, which corresponds to approximately 53 indicated breeding pairs. There would be a potential loss of 2851 hectares of rusty blackbird habitat, i.e., approximately two indicated breeding pairs. This habitat loss would probably be more pronounced in shrubland, where this species appears to be more abundant (2.27 pairs/km²). The proponent estimates that the project would affect approximately 1673 hectares of habitat likely to be used by the common nighthawk. Although this species was confirmed at the Project site, the proponent was unable to estimate the number of breeding pairs that might be affected by the Project given that it was not detected in the point-count surveys.

Table 3 Terrestrial and Wetland Losses Associated with Mine Infrastructure and Activities

Type of environment	Area of the study area (hectares)	Loss (hectares)
Terrestrial		
	3786	2190
Wetland		
Pond	58	15.6
Marsh		32.8
Swamp	2176	1247.3
Bogs	3307	1242.4
Wetlands subtotal	5541	2538
Total		
Terrestrial and wetlands	9327	4728

Source: Adapted from the environmental impact statement p. 6-75, Génivar 2012 and responses to questions from the Agency (Genivar, August 2013)

Disturbance and incidental take of migratory birds

There is a risk that a number of activities associated with the Project during the construction, operation and decommissioning phases could result in killing or harming migratory birds or destroying or disturbing their nests or eggs. Incidental take of migratory birds, their nests and their eggs is a violation of subsection 6(a) of the *Migratory Birds Regulations*, which prohibits disturbing, destroying or taking a nest or egg of a migratory bird. In addition to harming birds, nests or eggs, incidental take may have long-term consequences for migratory bird populations in Canada, particularly due to the cumulative effect of various different incidents. Among the activities that could have adverse effects on forest birds are the clearing and grubbing activities that would be required in the mine area during the construction phase, which could cause the destruction of many forest bird nests.

Earthworks along the banks of streams and edges of beaver ponds could also cause abandonment or destruction of ground-nesting waterfowl nests. Given that waterfowl density in the study area is relatively low, the proponent estimates that this effect would be limited to a few individuals.

Various work and activities related to mine construction and operation will generate noise likely to disturb breeding pairs near the site. Disturbance during the breeding season could potentially lead to nest abandonment and displacement of pairs to other sectors. Disturbance causes birds to abandon their nests more often, which can increase the probability of egg and chick predation, exposure of nests and eggs to inclement weather, insufficient feeding of chicks, premature fledging or departure from the nest and physiological stress.

Contamination of aquatic birds using untreated ponds and waters

The potential presence of deleterious substances, such as heavy metals, oils or hydrocarbons, in artificial water bodies (pools, treatment ponds, ponds, etc.) at the mine site could cause contamination-related adverse effects on birds, particularly aquatic birds that are likely to use such water bodies.

7.5.2 Mitigation measures

Through efforts by the proponent to optimize the infrastructure layout at the Dumont mine site, it was possible to reduce and even prevent encroachment into the wetlands of interest that may be used by both waterfowl and forest birds.

The proponent has committed to implement specific mitigation measures to limit the Project's adverse environmental effects on birds and their habitat (Appendix B). For example, to limit encroachment on sensitive environments, machinery movements will be restricted to work areas. Throughout the entire operational phase, the proponent would carry out progressive revegetation of its mine site.

With respect to wetlands, the proponent has committed to make some of the drainage ditches of the mine tailings storage facility and waste rock and overburden stockpiles watertight in order to reduce the drying out of nearby bogs. Moreover, the proponent developed a sequential wetlands compensation plan spread over the life of the Project. This approach would make it possible to conserve 234 hectares of wetlands and to create or restore 650 hectares of wetlands.

This compensation approach is divided into three phases of implementation:

- From the start of construction until year 3 of operation: projects aimed at the conservation of existing wetlands on private land (potential conservation of 234 hectares of wetlands);
- Years 3 to 19: development of a guide on restoration or creation of wetlands at mine sites and its implementation by a pilot project;
- Years 20 to decommissioning: restoration or creation of wetlands and water environments, in terms of locations freed up by temporary stockpiles (overburden and low grade ore) at the Dumont site (potential for creation or restoration of approximately 650 hectares of wetlands).

The approach selected to date by the proponent with the Quebec government relating to its compensation obligations takes account of the fact that wetland losses cannot be completely offset, as the region offers few opportunities for off-site compensation projects given the abundance of wetlands in the area.

7.5.3 Government, public and Aboriginal comments

Environment Canada requested a more detailed description and quantification of the effects related to habitat losses for migratory birds. The proponent updated the estimates of aquatic bird breeding pair densities in areas that will be directly affected by the mine infrastructure and quantified bird habitat losses associated with wetland losses. This enabled Environment Canada to provide an informed opinion on the anticipated effects of the Project on migratory birds.

Environment Canada would like to work with the proponent to ensure that the compensation objectives take into account the ecological functions that would promote the maintenance of the diversity and abundance of migratory birds present in the study area. It recommends that the proponent focus particular attention on the potential presence of common nighthawk nests and limit the risk of incidental take.

To respond to questions raised by Environment Canada regarding species at risk, especially the modification or loss of habitat in their nesting areas, the proponent would perform site clearing in a way that gives birds an opportunity to relocate. The proponent would perform clearing only where necessary, leaving strips of trees or vegetation and snags, especially in areas suitable for olive-sided flycatcher, and would maintain stream buffers and buffers along wetlands. The proponent has also committed to implement a follow-up program for species at risk during the construction and operation phases. This program would also cover wetlands on the edge of the mine infrastructure and the areas that would be subject to a compensation plan.

No comments specifically about migratory birds were received from the public or Aboriginal groups.

7.5.4 Agency conclusions on significance of the residual environmental effects

The Agency is of the view that the mitigation measures proposed by the proponent should prevent the destruction of bird nests and the disturbance of birds during the breeding season. In addition, given that the types of environments affected by the project exist elsewhere in the immediate region and that the majority of species surveyed in the project area are resilient, it is likely that bird populations that are disturbed would successfully become re-established nearby. Moreover, the wetlands compensation plan should permit the maintenance and enhancement of habitat functions for aquatic and migratory birds (shelter, food, nesting) and should potentially provide for the reconstruction of wetlands at the mine site. The Agency is therefore of the view that the estimated habitat losses for the birds are not likely to result in significant adverse effects for these populations.

Given the uncertainties raised by Environment Canada on the reasons for the decline in the three bird species at risk and the effects related to additional habitat losses or changes, the Agency believes that the proponent should implement a monitoring and follow-up program for the three bird species at risk.

Taking into account the mitigation measures proposed by the proponent and its commitments related to monitor the effects of the project and the compensation of wetlands, the Agency concludes that the project is not likely to cause significant adverse environmental effects on birds and their habitat, including bird species at risk.

7.6 Current use of lands and resources for traditional purposes, and structures, sites or things of archaeological significance

This section covers the Project's effects on the use of the land by the Abitibiwinni First Nation, particularly the land of the Mapachee family.

The local study area is located within the traditional territory of the Abitibiwinni First Nation. This community mainly uses the area near Chicobi Lake, which is approximately 20 km north of the Project. This territory is considered a site of interest for traditional activities, such as harvesting medicinal plants, fishing, hunting and

gathering berries. It is also used as an Aboriginal gathering place and contains archaeological and burial sites, as well as trapping camps. The extent of the Project's potential effects on use by the Abitibiwinni First Nation was considered beyond the local study area, to Chicobi Lake and the Chicobi River.

Through the many exchanges between the proponent, the Abitibiwinni First Nation and the Mapachee family, it was possible to identify the activities that are carried out and to locate the past and current camps. According to the information provided to the Agency by the Abitibiwinni First Nation, the Mapachee family traditionally uses an area of the community's territory in which the Dumont mine facilities would be located. Hunting, fishing and trapping are the primary activities carried out in the territory that could be affected by the Project. The local study area (Figure 3) contains snowshoe hare and beaver trapping sites and, in its northwest portion, a moose yard.

According to the proponent, a potential archaeological site is located where the Villemontel River crosses Route 111. The area was also used by a current member of the Mapachee family as it was a good area for beaver trapping and canoe trips.

Although no public lands in the study area overlap with land that is subject either to a specific agreement between governments and Aboriginal communities or to Aboriginal land claims, it is important to point out that the Abitibiwinni First Nation is participating on the Anishnabek O Takiwan committee, which plans to file a comprehensive land claim that covers the Project area.

7.6.1 Potential environmental effects

The construction of the required mine infrastructure will involve a 47 km² loss of land for users from the Abitibiwinni First Nation.

The loss of forest environments and noise and traffic associated with mine construction and operation activities would have effects on mammals, including causing them to move away from the area, but would not result in significant mortality. These effects would impact hunting and trapping activities in the local study area. Clearing will affect a small part of a moose yard. However, moose whose home range overlaps with the mine infrastructure should relocate to the surrounding area and no decline in the moose population is anticipated, such that hunting and trapping in these areas can continue.

According to information obtained by the proponent, potential snowshoe hare trapping sites are located in the northwest portion of the study area outside the area proposed for the mine infrastructure. They would therefore not be affected by the Project.

An investigation conducted by the proponent in the summer of 2013 found that Chicobi Lake is the most heavily used fishing location on the Mapachee family's land, with fishing being carried out nearly year round. No effects on this lake are anticipated, which means fishing activities can continue. In the area surrounding the Project site, fishing, gathering, hunting and trapping activities are carried out by a small number of users.

The inventories conducted in the potential archaeological areas confirm the absence of artefacts or objects of historical or prehistorical value. The proponent thus believes that, in all likelihood, the Project would not have any effect on archaeology.

7.6.2 *Mitigation measures*

The primary mitigation measure proposed by the proponent to mitigate the effects of the Project on the use of the area by the Abitibiwinni First Nation is the reduction of the Project's ecological footprint through optimization efforts. The required mine infrastructure was positioned in such a way as to avoid effects on the Harricana River and Chicobi Lake watershed. All infrastructures would therefore be located within the Villemontel River watershed.

A number of the mitigation measures (Appendix B) that the proponent has committed to implement regarding other valued components, particularly air quality, water quality, birds and aquatic species, would contribute to mitigating the effects of the Project on current uses of land and resources for traditional purposes. Examples of these measures would be performing the majority of clearing work in winter or leaving strips of vegetation where clearing is not required.

The establishment of a public follow-up committee on which a member of the Abitibiwinni First Nation would be invited to participate, an internal community relations group and an ongoing communications program would make it possible to maintain vigilance regarding the effects of the project and to make the necessary adjustments.

With respect to the harvesting of medicinal plants, particularly the slenderleaf sundew, the proponent has proposed to implement measures to limit drainage or contamination of the wetland located to the northeast of the site where this species occurs.

In compliance of the provisions of the Quebec *Cultural Property Act* (CQLR, c. B-4, s. 41 and 42), the proponent will focus particular attention on potential archaeological sites along the Villemontel River and the banks of watercourses. If archaeological sites are discovered, temporary protection measures will be taken, the site will be assessed and, if necessary, archaeological digs will be conducted.

7.6.3 *Government, public and Aboriginal comments*

In a written submission to the Agency, the Abitibiwinni First Nation expressed concerns about potential effects in the Chicobi Lake area. It was concerned that the water quality of the lake and its tributaries would be affected by dust emissions and contaminants from mine effluents and that increased use of the area, not exclusively by the Algonquin community, would affect the integrity and tranquility of the area. The community considers follow-up of the water quality of Chicobi Lake and Chicobi River to be important and indicated that it would like to review the methodology and all results of quality tests performed by Royal Nickel Inc. The Abitibiwinni First Nation is concerned about being able to continue its traditional activities.

In its written submission, the Abitibiwinni First Nation pointed out that noise from the mining operations could interfere with auditory hunting and indicated that it was concerned that the intergenerational transfer of knowledge in the area around the Project could be disrupted by noise from the mining operations. However, given the anticipated noise levels, the proponent considers that noise will have no significant effects on terrestrial wildlife and therefore will not affect auditory hunting.

In response to the concerns raised by the community, an environmental follow-up program would be implemented by the proponent for the water bodies in the Villemontel River area, as well as for Chicobi Lake

and the Chicobi River, to ensure that government's water quality criteria are met. Follow-up would also be conducted on dust dispersion on the ground and surrounding water bodies, including the Villemontel River, Chicobi Lake and the Chicobi River, until year 21 of the Project, i.e., the end of pit mining.

The proponent confirms that an adverse effect is anticipated due to encroachment by the Project on a small portion of the land used by the Mapachee family in the northwest section of the mine complex.

The proponent indicated that it is working with the Abitibiwinni First Nation to develop a memorandum of understanding and partnership agreement for its participation in the Project.

7.6.4 *Agency conclusions on significance of the residual environmental effects*

With respect to hunting in the northwest area of the Project, the Agency acknowledges that it would not be possible to avoid effects on hunting activities and on the transfer of knowledge. However, these losses of land use would not compromise the current use of land for traditional purposes and would have little effect on the continued existence of their way of life, since auditory hunting could be maintained, given the very large availability of land nearby.

Given the distance of approximately 20 km between the Project area and Chicobi Lake and given that no effect is anticipated on the watershed of Chicobi Lake, the Agency considers it unlikely that the Dumont Project could cause adverse effects on the water quality, air quality and noise that could impact the use of lands and resources for traditional purposes in this area.

7.7 Cumulative environmental effects

Cumulative environmental effects are defined as the effects on the environment that are likely to result from a project when a residual effect combines with the effects of other projects or human activities that have been or will be carried out. This assessment of cumulative effects is based on the Agency's Operational Policy Statement (2007), the Cumulative Effects Assessment Practitioners Guide (1999) and the proponent's analyses. The assessment of cumulative effects seeks to clarify the extent to which the residual environmental effects of the Project will combine with the effects of other physical activities that have been or will be carried out on a valued ecosystem component.

7.7.1 *Scope*

In the context of the Project, the proponent used the following methodology to assess the cumulative effects of the Project:

- Identification of highly valued components (in terms of quality, legal protection or ecological functions) and the spatial and temporal boundaries to be considered for each component;
- Identification of projects, actions and events likely to modify the valued components selected and the interactions they may have with these components;
- Description of the baseline status and historical trend of each valued component;
- Description of mitigation, compensation and follow-up measures that will be implemented and finally, identification of cumulative effects for each valued component.

The proponent assessed the Project's cumulative effects on three valued components: groundwater, wetlands and bird species at risk.

For groundwater, the spatial boundaries include the primary eskers present within the regional county municipalities of Abitibi and Abitibi-Ouest, including a buffer zone of 1 km on either side of the eskers, for a total area of approximately 930 square kilometres (km²). Of the eskers included in the analysis, the largest are the Launay, Saint-Mathieu-de-Berry, Barraute and Despinassy Lake eskers and the Harricana moraine, which is also considered an esker.

For the wetlands and species at risk, the spatial boundaries selected cover an area of 2189 km² and encompass the municipalities of Amos, Saint-Félix-de-Dalquier, Trécesson, Sainte-Gertrude-Manneville, Launay and Berry.

The temporal boundaries for the assessment of the cumulative effects of all VCs take into consideration the main projects that have been or will be carried out between 1956 and 2049. The lower boundary selected corresponds to the initial mining exploration work of the Dumont deposit and the upper boundary is the likely year of mine closure.

The proponent identified the following past, current or future projects and activities for the cumulative effect assessment:

- Quebec Lithium Mine Project
- surface minerals extraction (sandpit, etc.)
- forestry operations
- snowmobile and ATV trails
- vacation resort (holiday, resort)
- road, rail and air transportation network
- municipal development projects
- municipal water supply and private water intakes
- protected sites
- Legault Métal
- Eaux Vives Water Inc. plant
- hunting camps
- wildlife developments

More specifically for the birds species at risk, the proponent also considered forest fire fighting, the growth of intensive agriculture, large-scale insecticide use and U.S. blackbird control programs.

7.7.2 *Potential cumulative effects*

Groundwater

Groundwater is highly valued across the region because it is a high-quality, abundant resource, especially in the eskers. Among the aforementioned projects and activities, the proponent noted that the surface mineral extraction sites identified within the study area may have contributed to the degradation of groundwater quality. Sandpits, in particular, would pose a threat to the quality of aquifers associated with eskers, not only because the removal of granular material reduces the esker filtration capacity, but also because the thinning of the granular layer reduces the protection of the aquifer, making it more vulnerable to contamination.

Future mining operations in the region, such as the Quebec Lithium mine, could also involve the pumping of large volumes of water to keep pit bottoms dry. According to the proponent, this could create local areas of groundwater drawdown.

According to the modelling performed by the proponent, the main residual effect on groundwater would be the lowering of the groundwater levels within the distance from the Dumont pit due to pit dewatering. The proponent estimated that drawdown of between 1 and 5 metres could cover over two-thirds of the length of the unnamed esker. However, the modelling results showed that the limits of the drawdown should not affect the Launay and Saint-Mathieu-Berry eskers, which are the closest to the mine site.

New mine site developments could also increase pressure on the area's groundwater due to the various activities associated with them, such as the consumption of large volumes of groundwater for mining operations, the pumping of groundwater associated with dewatering of the pit, or the management of contact waters (contamination). The main effects of the Project, which could combine with the effects of other projects, actions or events, are the risks of contamination and modification of the groundwater flow regime.

In addition to the mitigation measures that would be implemented to mitigate the Project's effects on groundwater (Appendix B), the proponent would implement a program to monitor groundwater quality and quantity. Taking into account the measures that would be implemented, the proponent believes that the Dumont Project should not contribute significantly to a cumulative effect on groundwater across the regional county municipalities of Abitibi and Abitibi-Ouest.

Wetlands

The proponent believes that mining operations, surface mineral extraction activities, forest activities, including development of regional forestry roads, recreation/tourism activities, and the presence of infrastructure are the past, present or future activities that have the greatest potential effects on the wetlands in the regional study area. The proponent is of the view that logging operations can contribute to the creation of wetlands by favouring the growth of deciduous species preferred by beavers, which are known to modify their environment by creating wetlands.

The main effects of the Project, which could potentially combine with other projects, actions or events in the study area, are primarily associated with wetland alteration and loss.

The Dumont Mine infrastructure would lead to the loss of approximately 2538 hectares of wetlands, which represents 46 percent of the wetlands present in the local study area (5541 hectares). Although significant

wetland losses are anticipated at the local scale of the Project, the proponent is of the view that they are insignificant at the scale of the Abitibi regional county municipality as wetlands occupy 35 percent of the regional study area, i.e., 75 921 hectares. Wetland losses directly associated with the Project represent 3.3 percent of the wetlands losses compared to those at the regional level.

In planning the location of the project infrastructure, the proponent attempted to avoid a peat bog of very high ecological value. Moreover, the various proposed mitigation and compensation measures (Appendix B), including that of making part of the drainage ditches of cell 2 of the tailings storage facility, waste rock stockpile 1 and overburden stockpile 1 watertight, should make it possible to reduce the Project's direct effects on adjacent wetlands.

Despite the encroachment of the Project on wetlands, the implementation of a compensation project, combined with the presence of wetlands throughout the region and the low level of pressure from urban development, leads the proponent to believe that the cumulative effect is not significant.

Bird species at risk

Three species of birds at risk are likely to be affected by cumulative effects: the olive-sided flycatcher, rusty blackbird and common nighthawk. The additional projects, actions or events that are likely to affect or to have affected the bird species at risk in the past, present or future are forest harvesting, forest fire fighting, growth of intensive agriculture and large-scale insecticide use.

Given the uncertainty about the causes of the species' decline, it is clear that any additional habitat loss or alteration may affect the species. For example, the activities of the Project and the past, present and future projects, actions and events identified by the proponent may have cumulative effects on the species' breeding habitat (habitat alteration and loss) and on the species' breeding activities (disturbance due to the presence of the mine and its activities).

Taking into account the effects of the Project and type of activities likely to affect these populations, the planned mitigation measures (Appendix B), particularly the conservation and restoration of wetlands, the revegetation of the mine site, and the wide availability of suitable habitats for these species in the project area, the proponent considers the cumulative effect of the Project on the species at risk to be non-significant.

7.7.3 Mitigation measures

Given the mitigation measures proposed to mitigate the effects of the Project (Appendix B) and the low probability that the Project will lead to significant cumulative effects, no measures specifically addressing cumulative effects were deemed necessary.

7.7.4 Government, public and Aboriginal comments and proponent's response

Several organizations, including the *Société pour vaincre la Pollution* and the *Société de l'eau souterraine de l'Abitibi-Témiscamingue*, noted the importance of properly assessing the effects of the Project on groundwater, given the significant value of this resource at the regional level.

The *Conseil régional de l'environnement de l'Abitibi-Témiscamingue* and the *Organisme de bassin versant du Témiscamingue* noted the importance of protecting the wetlands and raised the need to analyze the cumulative

effects given the major ecological value of these environments and the presence of potential habitats of special status species, especially birds.

With respect to the three bird species at risk, Environment Canada recommended implementing additional measures, i.e., presenting a monitoring program that identifies the activities or operations that could affect species at risk. Measures should also be planned to ensure that the activities and operations do not harm or disturb birds, nests or eggs, particularly during the breeding season. By promoting this approach, Environment Canada believes that the effects on species at risk may, to some extent, offset the uncertainties related to the cumulative effects of the Dumont Project on bird species at risk.

7.7.5 Agency conclusions on significance of the cumulative environmental effects

The Agency notes that the effects of the Project on groundwater would be mostly local and that there would be no effect on eskers near the Project that are likely to be affected by the cumulative effects of other projects in the region.

With respect to wetlands, the Agency is of the view that given the extensive presence of wetlands across the region and the proponent's commitment to compensate for part of the wetland losses in compliance with Quebec regulations, significant cumulative effects due to the combined effect of other projects are unlikely.

On the basis of information available from the Committee on the Status of Endangered Wildlife in Canada and information submitted by the proponent, the Agency notes that the issues related to the status of bird species at risk would in part be linked to the availability of winter habitats beyond the project's area of influence. For species at risk, however, any additional habitat loss or alteration may have an effect on these species. To mitigate this uncertainty, the monitoring program will focus specifically on these three species, and a follow-up program will also be established during the life of the mine operations.

The Agency believes that the Project could cause cumulative adverse effects on groundwater, wetlands and bird species at risk. However, given that the extent of the effects of the Project on groundwater would be local, that there are a large number of wetlands in this region, and that monitoring and follow-up of species at risk would be carried out, the Agency concludes that the Project is not likely to cause significant cumulative environmental effects.

7.8 Effects of the environment on the project

7.8.1 Approach

Under the former Act, any change to the project caused by the environment must also be taken into account in the determination of environmental effects. The proponent examined the effects of the environment on the Project and proposed measures to reduce the effects, considering the mine construction, operation and closure phases.

7.8.2 Potential effects

Potential effects of the environment on the Project may result from extreme weather events (precipitation, temperature), earthquakes or forest fires.

According to the proponent, flooding is unlikely to affect the Project because it is located at the head of the watershed. However, during the construction phase, exceptional flood events could affect some structures, such as dikes and surface channels, before they are consolidated.

Forest fires are also likely to affect the project's mining infrastructure. However, according to the Atlas of Canada (Natural Resources Canada, 2009), there have been no forest fires covering more than 200 hectares in the study area since 1980.

The proponent states that earthquakes could also affect mining operations. In the past 30 years, 15 earthquakes have been recorded within a 100-km radius of the mine deposit, of magnitudes typically less than 3 (with two exceptions). Some natural disasters, such as landslides, were not taken into consideration by the proponent because they posed little risk in the local study area.

7.8.3 Mitigation measures

To minimize the effects of exceptional flood events and earthquakes, the proponent plans to design the Project's reservoir structures to withstand a 1000-year flood and to meet the applicable flood and earthquake resistance standards referred to in the Quebec *Dam Safety Act* and its regulations.

The proponent presented an emergency response plan that identifies the effects of the environment on the Project and the measures to be taken by personnel in the event of a disaster. The plan outlines, for example, the procedures to follow and specific equipment to use in the event of forest fires, as well as the roles, responsibilities and organization of the various responders and the resources available for responding to major environmental incidents.

7.8.4 Government, public and Aboriginal comments and proponent's response

At the request of the Federal Committee, the proponent assessed the sensitivity of the Project to variations in weather parameters in the context of climate change. Based on data from Environment Canada's Canadian Centre for Climate Modelling and Analysis and on the existing historical data for the Abitibi region, the proponent is of the view that the magnitude of the predicted variation over time in the weather parameters (e.g., precipitation, temperature) should remain imperceptible, and thus should have no effect on the components of the Project.

On the basis of thematic maps (Bobrowsky and Dominguez, 2012; EarthquakesCanada.nrcan.gc.ca), Natural Resources Canada confirmed that the probability of occurrence of major earthquakes or landslides in the Project region is low.

7.8.5 Agency conclusions on significance of the residual environmental effects

The Agency is satisfied that the proponent has adequately taken into account the effects of the environment in the design of its project, thus reducing the risks of potential effects of the environment on the Project. Taking into account the implementation of the proponent's environmental monitoring and emergency response program, the Agency concludes that the environmental conditions are not likely to cause significant adverse effects on the Project.

7.9 Effects of potential accidents or malfunctions

The environmental effects caused by accidents or malfunctions are factors to be examined under the Act. The proponent identified the activities most likely to cause accidents or malfunctions during the mine construction and operation phases, the potential adverse environmental effects as well as the planned emergency response measures.

7.9.1 *Potential effects*

Risks related to environmental aspects and to health and safety have been identified in order to develop a strategy designed to establish preventive and control measures aimed at minimizing both the occurrence of accidents and the effects of those accidents that cannot be avoided. The main risks of accidents associated with the construction, operation and decommissioning of the Project are as follows:

- petroleum product spills;
- hazardous materials spills or leaks;
- nickel concentrate spill;
- fire;
- explosion (including defective blasting);
- structure collapse or dam or dike failure;
- major accident in the pit;
- major accident in the mining complex.

For example, a breach of the tailings storage facility dike could cause a spill of deleterious substances into fish habitat.

7.9.2 *Mitigation measures*

The proponent had committed to implement a risk management plan and an emergency response plan for the construction and operation phases. Any event that could threaten or seriously affect components of the environment, workers or the public will trigger the emergency response plan of the Project.

The risk management plan details all measures designed to reduce the risk of accidents and malfunctions. The proponent has specifically committed to focus on high-level engineering criteria, installation of high-performance equipment, warning systems and the implementation of management rules to reduce the risk of incidents in all phases of the project. The proponent will apply the applicable regulations to minimize risks, including the Quebec *Regulation respecting hazardous materials*, the federal *Transportation of Dangerous Goods Regulations* (Transport Canada), and Quebec buildings legislation. The measures that will be put forward to reduce the risks of accidents include source reduction of hazardous materials, construction of double-walled reservoirs, and periodic inspection of handling equipment. The proponent also plans to decontaminate failed blast holes, which can be considered hazardous materials leaks.

The emergency response plan will detail the prevention and response measures to be taken in the event of accidental spills, leaks, fires, explosions or defective blasting at the mine site, as well as the procedures for

handling and storing of petroleum products and chemicals. The plan will also describe the roles, responsibilities and organization of responders, the availability of resources, coordination and response mechanisms, and training needs.

In developing its project design, the proponent considered the scenario of a dike failure on the west side of mine tailings cell 2, where Launay is located. The result of this analysis led the proponent to add a safety berm design to contain and divert a potential tailings spill to protect the residents of Launay and the infrastructure on the south side, i.e., the railway line and Route 111.

7.9.3 *Government, public and Aboriginal comments and proponent's response*

The *Société pour vaincre la pollution* as well as the provincial government requested additional mitigation measures to those proposed in the environmental impact statement to reduce risks of public exposure to nitrogen dioxide emissions in the event of defective blasting. Health Canada also shared its concerns about the potential risks to human health related to this type of deficiency. In response to these concerns, the proponent performed modelling of atmospheric dispersion during deficient blasting that shows that there would be no significant risk to the public in such circumstances. Despite these results, the proponent developed a blasting management plan to minimize risks of toxic cloud formation and has committed not to blast when the wind is blowing in the direction of the residences located to the south of the mine, along Route 111, between the urban centres of Launay and Trécesson and to reassess this measure on the basis of the results of air quality monitoring during blasting.

Environment Canada also recommended that the Proponent identifies specific measures for migratory birds in its emergency response plan, particularly for migratory bird species at risk, in the event of accidental spills, in the inadvertent exceedance of standards, migratory bird mortality or the observation of abnormal behaviour in birds present in the mine water pond (a component to include in the environmental monitoring program). If such events or situations were observed, the Proponent should make the necessary corrections. As necessary, the Proponent could contact the Canadian Wildlife Service for advice on appropriate actions.

The Federal Committee was of the view that the risk management plan designed by the proponent and its commitment to produce an environmental follow-up program will reduce the likelihood of accidents or malfunctions. Moreover, the Federal Committee considered that in the event of an accidental spill, the emergency measures and responses developed by the proponent will help reduce the effects on the environment.

7.9.4 *Agency conclusions on significance of the residual environmental effects*

The Agency is of the view that the proponent has identified and assessed the potential accidents and malfunctions associated with the Project. The Agency notes that the proponent took into account the risks of accidents and malfunctions in the design of the Project to prevent such scenarios and that, in the event of an accident, it has committed to implement the emergency contingency and response plans that have been developed. Overall, the Agency is of the view that accidents or malfunctions that could result in significant adverse residual environmental effects are not likely to occur.

7.10 Effects on renewable resources capacity

In accordance with the requirements of subsection 16(2) of the former Act, the Agency must take into account the capacity of renewable resources likely to be significantly affected by the project to meet the present needs without compromising the possibility for future generations to meet their needs.

The potential effects of the Project on renewable resources, water, terrestrial wildlife, birds and fish were the subject of a detailed assessment in the environmental impact statement.

The assessment of the effects of the Project on each of these resources was conducted in compliance with the scope of the Project assessment (see sections 7.2, 7.4, 7.5 and 7.6). An assessment of significance of residual effects was also conducted. It shows that the effects of the Project would not compromise the ecological integrity of these valued components and would not significantly or irreversibly modify their use. Therefore, the Project would not significantly reduce the capacity of current and future generations to secure a potable water supply or to harvest wildlife and would not compromise the viability of fisheries or the sustainability of ecosystems.

Taking into account the implementation of the proposed mitigation and compensation measures, the Agency concludes that the Project is not likely to cause significant adverse environmental effects on the capacity of renewable resources.

8 Follow-up Program under the Canadian Environmental Assessment Act

Under the former Act, every comprehensive study must consider the need for and requirements of a follow-up program to verify the accuracy of the conclusions of the environmental assessment and to determine the effectiveness of the measures implemented to mitigate the adverse environmental effects of a project. The results of a follow-up program may also support the implementation of corrective measures designed to mitigate unforeseen adverse environmental effects.

Fisheries and Oceans Canada and Natural Resources Canada, the responsible authorities, must ensure that a follow-up program is designed and implemented to their satisfaction with the support of expert federal authorities. Additional follow-up requirements may be set out in the authorizations that may be issued by the responsible authorities.

In its environmental impact statement, the proponent has committed to monitor mine effluent, surface and groundwater, terrestrial, avian and aquatic wildlife, noise, air quality and dike stability. It has also committed to establish a follow-up committee with the participation of public organizations and a representative of the Abitibiwinni First Nation.

This section of the report addresses the follow-up requirements specific to the powers of the federal authorities or that fall within areas of federal jurisdiction. The follow-up measures take into account the nature of the potential environmental effects of the project, uncertainties regarding predictions or effectiveness of mitigation measures and public and Aboriginal concerns. The proponent has committed to implement the follow-up measures described below.

8.1 Water resources

In compliance with the regulatory requirements of the *Metal Mining Effluent Regulations*, the proponent will have to conduct an environmental effect monitoring program designed to characterize the effluent and evaluate its effects on fish, fish habitat and use of fisheries resources.

In addition to the follow-up requirements set out in the *Metal Mining Effluent Regulations*, the proponent has committed to monitor total aluminium concentrations in treated effluents and the receiving environment in response to a recommendation by Environment Canada. This parameter was added because there is a risk that aluminium will be found in the environment at concentrations that can be harmful to aquatic life. The duration of this follow-up will be assessed on the basis of the results obtained and revised as needed.

8.2 Fish and fish habitat

Compensation program follow-up

Compensation program follow-up is designed to assess the effectiveness of all aspects of the program to ensure that the compensation objectives set have been attained and to implement adapted corrective measures based of the follow-up results. The details of this follow-up program will have to be developed in cooperation with

Fisheries and Oceans Canada (and Environment Canada for the mine waste storage areas that must be added to Schedule 2 of the *Metal Mining Effluent Regulations*).

Follow-up of the effects of reduced flow into the Villemontel River

Due to the uncertainties regarding the effects of reduced inflow, the flow and level of the Villemontel River must be monitored. The details of this follow-up program must be developed in cooperation with Fisheries and Oceans Canada. Measures could be required depending on the results of the follow-up carried out.

8.3 Birds and their habitat

During the project construction phase, the proponent will document, using the environmental monitoring reports, the presence of nests of migratory birds and species at risk, as well as the actions undertaken to ensure their protection. This measure will promote compliance with federal legislation, i.e., the *Migratory Birds Convention Act, 1994* and the *Migratory Birds Regulations*.

After performing the planned revegetation work throughout the life of the project, the proponent will conduct follow-up of migratory birds, particularly the previously identified three species at risk, to verify the effectiveness of site restoration.

8.4 Use of land for traditional purposes

Water quality in the Chicobi Lake area as well as hunting and trapping in the northwest part of the project are concerns considered important by the Abitibiwinni First Nation. The proponent will therefore have to keep the Aboriginal community informed of the results of the monitoring of contamination risks in water bodies through various communication channels, including the monitoring committee, the band councils, and the proponent's website.

The proponent has committed to conduct additional extensive monitoring of water quality associated with dust deposition on surrounding water bodies and soil and to correct any water quality problems associated with the mine's activities. The monitoring of the effect of dust dispersion will involve the installation of permanent dust deposition jars at several sensitive sites, including Launay, Villemontel, the Launay and Saint-Mathieu-Berry eskers, Chicobi Lake and the Chicobi River. A sampling station will also be installed in the bog complex north of Lac à la Savane. Monitoring will be performed on an annual basis until the end of mining activities around year 21.

The federal authorities will work with the proponent to develop the details of the follow-up program corresponding to their mandate and expertise. The program will take into account the terms and conditions of the federal and provincial authorizations and approvals required to carry out the Project, any changes in environmental conditions, and environmental effects that could occur during the Project implementation. The results of the follow-up program or indications of how to obtain results will be posted on the Canadian Environmental Assessment Registry (www.ceaa-acee.gc.ca / reference number: 66976).

Table 4 Federal Monitoring and Follow-up Program Elements

Valued component	Program components	Timeline and/or frequency
Water resources	In addition to the parameters already required under the <i>Metal Mining Effluent Regulations</i> , the monitoring of total aluminium concentrations in the effluent at the same sampling frequency as set out in sections 12 and 13 of the <i>Metal Mining Effluent Regulations</i> .	Throughout the operational life of the mine, and once the site is decommissioned and remediated.
Fish and fish habitat	Monitoring the effectiveness of compensation program components and achievement of compensation objectives for the serious harm to fish and, if applicable, for the deposit of deleterious substances into waters frequented by fish.	To be defined in the Fisheries and Oceans Canada authorization conditions
	Monitoring the water flow and level of the Villemontel River.	
Birds and their habitat	Monitoring of migratory birds, specifically the species at risk (common nighthawk, olive-sided flycatcher and rusty blackbird) to measure the effectiveness of mitigation measures.	From preconstruction, to the end of mining operations
	Production, during the project's construction phase, of environmental monitoring reports to document the presence of nests of migratory birds and species at risk and the actions taken to ensure their protection.	
Use of the land for traditional purposes	Monitoring of the water quality in Chicobi Lake and the Chicobi River, as well as in the Villemontel River and the Unnamed Creek.	Annual follow-up until decommissioning (year 21) supported by Environment Canada and Health Canada's expertise

9 Benefits of the Environmental Assessment

At the planning stage, the environmental assessment process provides for an opportunity to reflect on improving the environmental performance of a project and reducing its adverse environmental effects, while making it more socially acceptable. These benefits will be of value for both present and future generations.

The Agency assessed the potential effects of the Project on valued components in cooperation with the Federal Committee and considered input provided by the public and Aboriginal groups at consultations.

By examining alternative means of carrying out the Project, the Federal Committee can provide feedback that contributes to improving the Project design. For example, in the case of the Project, the proponent reviewed its layout plan for all mine waste storage sites to reduce the project's environmental footprint and to concentrate all stockpiles near the pit. On the basis of this layout, it was possible to review the water management plan and to limit discharges to a single effluent in the Villemontel River and to avoid the discharge of water into Pandini Creek.

The implementation of the mitigation measures and follow-up program developed during the environmental assessment by the proponent will prevent or reduce adverse environmental effects on several valued components. This is the case notably for the blasting management plan, which will reduce the risk of effects to human health associated with atmospheric emissions from the Project, in particular in the case of deficient blasting.

Following discussions with Natural Resources Canada and Fisheries and Oceans Canada, the proponent has committed to monitor the water level of the Villemontel River, which would allow for the implementation of additional measures if the anticipated effects on fish habitat are more significant. The proponent would develop a fish habitat compensation plan in cooperation with Fisheries and Oceans Canada. These measures would contribute to reduce significantly the effects of the project on fish and fish habitat.

10 Conclusion of the Agency

To reach a conclusion on the environmental effects of the Project, the Agency took the following elements into account:

- the documentation submitted by the proponent;
- the analysis and findings of this report;
- the opinions and comments received from the public, federal and provincial expert departments, and Aboriginal groups;
- the obligation to obtain an authorization under paragraph 35(2)(b) of the *Fisheries Act* for the carrying on of the work, undertaking or activity that will cause serious harm to fish, and for the disposal of mine waste in water frequented by fish, if required;
- the approval required under the *Explosives Act*

Taking into account the implementation of the proposed mitigation measures and commitments made by the proponent, the Agency concludes that the Project is not likely to cause significant adverse environmental effects. The proponent will also have to implement a follow-up program and share the results with the federal authorities, as well as with the Project follow-up committees that the proponent has committed to establish.

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12 Appendices

Analysis of Alternative Means for Mine Waste Management and Disposal Sites and Concentrate Location and Transportation Mode

Activity	Alternative	Criteria	Notes
Mine waste management	Subaerial storage	Technical	Requires full peripheral retaining structures
		Environmental	
		Social	
		Economic	
	Central discharge of thickened tailings (alternative selected)	Technical	The presence of chrysotile fibres, slurry and argillous particles would make tailings difficult to pump and pose technological challenges
		Environmental	Structures are smaller in size and area
		Social	
		Economic	The presence of chrysotile fibers, slurry and argillous particles would make tailings difficult to pump, which would increase costs
	Subaqueous deposition	Technical	It can be difficult to settle out fine particles
		Environmental	Increase in area of mine tailings Involves a larger quantity of water for plant management Remediation of stockpiles more difficult
		Social	
		Economic	
	Deposition into a mined-out pit (alternative selected, in final years of the Project)	Technical	Feasible at the end of mining of pit
Environmental		Reduction of on-site footprint	
Social			
Economic		Costs would be twice the Project funding if this option were selected for all waste. Costs become acceptable if this option is selected for the	

Activity	Alternative	Criteria	Notes
			final years only.
<p>Mine waste storage sites</p> <p>(the differences in the solutions assessed focused on: quantity of construction material, transportation distances; tailings and recirculated water pumping distances, proximity of receptors and sensitive elements of the environment)</p>	<p><u>Solution A</u> – Prefeasibility study, mine tailings storage facility north of pit</p>	Technical	Short distance for operation and management of water (3.3 km)
		Environmental	1 effluent, a single watershed affected (St. Lawrence River), lower risk of dike break
		Social	Lower risk in the event of a tailings dam failure (4.9 km from Launay)
		Economic	Average cost
	<p><u>Solution B</u> – Prefeasibility study, but tailings cells located more to the north in the James Bay watershed (2 watersheds)</p>	Technical	Average distance for operation and management of water (6.0 km)
		Environmental	2 effluents, 2 watersheds affected (St. Lawrence River and James Bay)
		Social	Lower level of risk in the event of a tailings dam failure (5.8 km from Launay)
		Economic	Average cost
	<p><u>Solution G</u> – Prefeasibility study, but mine tailings south of Route 111, St. Lawrence watershed only</p>	Technical	Average distance for operation and management of water (6.3 km)
		Environmental	2 effluents, 2 watersheds affected (St. Lawrence River and James Bay)
		Social	Higher level of risk in the event of a tailings dam failure (0.9 km from Launay)
		Economic	Average cost
	<p><u>Solution J</u> – Land-based mine tailings storage facility with no water bodies frequented by fish on the Saint-Mathieu-Berry esker, St. Lawrence watershed only</p>	Technical	Greater distance for operation and management of water (12.0 km)
		Environmental	2 effluents, 2 watersheds affected (St. Lawrence River and James Bay), no encroachment on fish habitat but largest total footprint (39 km ²)
		Social	Lower level of risk in the event of a tailings dam failure (3.5 km from Villemontel)
		Economic	Most costly option
<p><u>Solution K</u> – Feasibility study, mine tailings storage facility west of the pit, St. Lawrence watershed only</p>	Technical	Shorter distance for operation and management of water (2.1 km)	
	Environmental	1 effluent, a single watershed affected (St. Lawrence River), smaller footprint (32 km ²)	

Activity	Alternative	Criteria	Notes
	(Alternative selected)	Social	Higher level of risk in the event of a tailings dam failure (1.8 km from Launay)
		Economic	Least costly option (capitalization and operation)
Concentrate transportation mode	To Sudbury by train	Technical	
		Environmental	Significant greenhouse gas emissions
		Social	Does not increase noise and traffic on road
		Economic	Very costly
	To Sudbury by truck or multimodal	Technical	
		Environmental	Lower greenhouse gas emissions
		Social	Increased noise and traffic on road
		Economic	Acceptable cost
	To Port of Quebec City by train	Technical	
		Environmental	Lower greenhouse gas emissions
		Social	Does not increase noise and traffic on road
		Economic	Acceptable cost
	To Port of Quebec City by truck	Technical	
		Environmental	Significant greenhouse gas emissions
		Social	Increase of noise and traffic on the road
		Economic	Very costly

Appendix B **Mitigation measures**

This appendix presents the mitigation measures that the Canadian Environmental Assessment Agency considers necessary to mitigate the environmental effects of the Project on the valued components. These measures come from the proponent, from recommendations by the Federal Committee, and from consultations with the public and Aboriginal people. The following sections contain the same section titles as those in chapter 7 on the assessment of the effects of the Project. To avoid repetition, some mitigation measures from one section may also be applicable in the case of another section. It should be noted that all these mitigation measures were adopted by the Royal Nickel Canada executive, who has committed to implement and ensure compliance with them.

Air quality

- Set up a shuttle bus service from the main local urban centres for each shift to promote mass transit.
- Wet dry soils as necessary to maintain a damp surface to minimize dust generation during stripping and grading.
- Spray unpaved roads with water and, if necessary, dust suppressants, to limit dust dispersion.
- Implement a tailings storage facility inspection program to ensure wind erosion is effectively controlled by wetting and/or tailings cementation.
- Maintain a wet beach and spray dry surfaces of tailings deposition areas with water as often as required to keep the tailings surface wet until a mineral crust forms, which will control dust dispersion.
- Use closed conveyors to handle ore and concentrate, and closed rail cars and trucks to transport the concentrate, to minimize releases to the atmosphere.
- Install dust control systems around primary crushers to capture dust and fibres, if necessary. Spray the base of this equipment, as needed, during the summer and install tarps during the winter.
- Equip all drilling rigs with dust collection devices (filter bags).
- Install detectors around the pit to measure nitrogen oxide concentrations in real time during blasting.
- Implement an integrated atmospheric emissions management plan.
- Use only chrysotile fibres-free granular materials (gabbro and volcanic rock) for the surface of haul roads.
- Take specific measures to protect workers exposed to chrysotile fibres. For example, keep ore in the wet phase during certain stages of processing to avoid putting chrysotile fibres into suspension.
- Periodically analyze silt concentrations on roads to perform rigorous maintenance of driving surfaces so as to maintain very low fine particulate concentrations.
- Modify or temporarily suspend certain activities at the mine site when real time monitoring of ambient air dust shows concentrations trends toward an exceedance of air quality standards. For example, halting 50 percent of dike construction activities at the mine tailings storage facility or temporarily suspending hauling of roughly 65 percent of waste rock are effective measures for preventing exceedances in all weather conditions. In addition, postpone blasting if the wind is blowing in the direction of homes located to

the south of the mine, along Route 111, between Launay and Trécesson. This measure will be reassessed on the basis of the results of air quality monitoring.

- Use an electric trolley assist system to move trucks from the pit and main ore and waste rock stockpiles, when the pit configuration is conducive to the installation of such a system and when the concentrator capacity is expanded to 100 000 t/d (subject to the availability of a cost-effective source of electric power and to the demonstration of the economic viability of the project). This measure would make it possible to reduce diesel fuel consumption by approximately 28 percent over the life of the Project.

Water quality

- Locate machinery parking, washing and maintenance areas at least 60 m from any watercourse, including diversion channels.
- Refuel machinery under constant supervision, at least 30 m from any watercourse, including diversion channels.
- To minimize sediment inflow, interrupt road drainage ditches a few metres above the natural high water line of unnamed stream 1 or install riprap in the ditch for about 100 metres upstream of the road crossing and lay a membrane on the embankment at the crossing.
- Stabilize disturbed areas (e.g., embankment slopes and overburden stockpiles) as work progresses.
- Send used oils from machinery to a disposal site designated for that purpose.
- Treat domestic wastewater in a treatment plant to ensure that it meets standards for biological oxygen demand, coliforms, suspended solids and phosphorus.
- Install a mine wastewater treatment plant.
- Install collection ditches around waste rock, low grade ore and overburden stockpiles, as well as the mine tailings storage facility to control and recycle drainage water.
- Progressively stabilize disturbed areas, first with grasses, then by planting shrubs and trees of various species, to minimize erosion and favour the restoration of a natural ecosystem in areas that will not be used in future. Develop reverse-sloped terraces along the embankments to control runoff and avoid the development of gullies and crevasses, and thereby limit sediment transport on the slopes of overburden stockpiles.
- Encapsulate incompetent clays in the centre of piles and cover them with more stable granular materials (sand and gravel), to ensure the stability of overburden stockpiles and avoid erosion and sediment transport of clays.
- For the restoration of tailings cells, cap the cells with about 15 cm of soil composed of a mixture of brown clay, sand and gravel, and organic materials, which will have been set aside for that purpose at the beginning of the Project, to limit surface water infiltration and promote the rapid establishment of plant cover. Seed the materials put in place with a mixture of grasses and legumes.
- Use an emulsion composed of ammonium nitrate and fuel oil (ANFO) with low dissolution capacity in drill holes when blasting, to minimize the dissolution of nitrates and ammonia in the pit water.

- At the start of the construction period, develop a permanent retention basin upstream from the water treatment plant to collect runoff water and water from the unnamed stream 1. During operation, the water treatment plant will be operated, if required.
- Set up temporary ponds before construction of the permanent ponds is completed to manage runoff water. These ponds will be used to measure suspended solids concentrations and to perform primary treatment, when necessary, to prevent any increase of over 25 milligram/liter in suspended solids concentrations relative to the background levels in the Villemontel River. Install a mobile filtration unit at the edge of the ponds in order to meet this standard at all times.
- During stripping activities, implement effective erosion control systems so as to comply with water quality standards (suspended solids concentrations) in the Villemontel River. This system may include controlling surface water flow in work areas with temporary catch basins and pumping water to vegetated areas to filter suspended solids.
- Avoid water withdrawals from the Villemontel River, except under exceptional circumstances; if applicable, this activity could require a review by Fisheries and Oceans Canada.
- Plan machinery traffic so that ruts are perpendicular to the natural slope.
- At the start of the operations phase, the southeast section of the pit will already be mined, which means that it can be used to store a large part of the runoff from the mine site (10 Mm³ capacity). Part of the suspended solids will settle out in this pond. When the water level of the pond will require to be discharged, the overflow will be directed to settling pond No. 2 for treatment of suspended solids and pH adjustment, prior to release in the Villemontel River.
- The water management plan will allow for water from settling pond No. 2 to be directed to the water treatment plant for treatment, if necessary, prior to its release to the environment.
- Parking, washing and maintenance areas for machinery and salting equipment must be located at least 60 m from any stream and within the boundaries of the mine site.
- At the time of mine closure, pump process water supernatant present above the tailings in the open-pit mine out of the pit for treatment prior to release to the environment.
- The water treatment plant would be operational from the start-up of the concentrator, i.e. year 0 of the Project development.
- Implement a blasting management plan.
- To protect groundwater beneath the unnamed esker, limit clearing to the minimum required for conducting the work to the southeast of the pit.
- To prevent groundwater contamination, do not perform any machinery maintenance or refuelling outside designated areas. These areas must be located outside groundwater recharge zones (e.g., rocky outcrops) and outside the recharge area of the unnamed esker in the southeast part of the property. Refuelling points will be clearly identified.
- During work on the periphery of the southeast portion of the pit, protect soil and humus to avoid stripping and rutting outside the work area in order to protect the groundwater beneath the unnamed esker.

- To minimize the risks of groundwater contamination, design infrastructure and accumulation areas so as not to encroach on a 1-km buffer zone from the eastern surface boundary of the Launay esker.
- Cover the most permeable areas (approximately 0.6 km²) with a layer of clay to a depth of roughly 2 metres to reduce their hydraulic conductivity, thereby further minimizing the risk of groundwater contamination.
- Leave as much of the existing clay as possible in place in the footprint of the mine tailings storage facility to maintain the impermeable barrier it creates in order to protect the groundwater.
- Implement an emergency response plan and appropriate measures to maintain a potable water supply in the event that problems arise with respect to groundwater quality or quantity.
- Install monitoring wells to quickly identify any qualitative or quantitative changes to groundwater, particularly for users of drinking water wells. Immediately notify the public of changes that are likely to affect human consumption, and take appropriate measures to maintain the drinking water supply.
- Implement response measures (pumping wells, interception trench, etc.) to control groundwater migration in the event that groundwater quality is substantially different from what was predicted by the modelling.

Fish and fish habitat

- Implement a compensation plan to offset the serious harm that will have to be authorized under paragraph 35(2)(b) of the *Fisheries Act* and, if applicable, a compensation plan to compensate losses of fish habitat due to the discharge of mine waste into fish-bearing waters.
- Implement all measures identified by the proponent to prevent erosion and inputs of fine sediment to fish habitat during the mine construction and operation phases.
- Carry out the physical works and activities provided for in years 1 and 2 of the surface water management plan that have an effect on unnamed stream 1 between June 15 and April 15. In the case of intermittent streams, work can be done when dry.
- When filling watercourses and beaver ponds, favour methods that will allow the fish to move away from the work site.

Birds and their habitat

- Install a fence to define areas designated sensitive where machinery will not circulate.
- To avoid affecting the current year's hatchlings, perform clearing outside the bird breeding season (May 15 to August 30).
- Perform the majority of clearing work in winter. In the event clearing is required during the breeding season, conduct an ornithological survey beforehand to prevent nest destruction, according to Environment Canada terms.
- Leave strips of vegetation where clearing is not required, and leave snags where possible, especially in areas suitable for birds of prey and olive-sided flycatcher.
- Perform clearing work related to infrastructure construction sequentially based on project needs.
- Compensate for the loss of wetlands that provide functions for aquatic and migratory birds, and specifically the creation and protection of the preferred habitats of species at risk.

Current use of lands and resources

- Prior to any clearing work, award a trapping contract to capture as many fur-bearing animals as possible, especially less mobile species, such as beaver. Ensure management of beaver activities throughout the life of the Project.
- Ensure workers are aware that it is important not to feed animals and not to leave food lying around so as not to attract fur-bearing animals near the work areas. Awareness can be raised by means of posters and information sessions.
- Focus particular attention on sites of archaeological potential along the Villemontel River and along stream banks. In the event of a discovery of a site of archaeological potential, temporary protection measures will be implemented, the site will be evaluated and archaeological digs will be carried out where appropriate.

Appendix C Residual Effects Assessment Criteria

Assessment criterion	Degree of residual effect		
	Low	Moderate	High
Magnitude of effect	Low	Moderate	High
The significance related to outcomes attributable to altering an environmental component.	The effect imperceptibly changes the quality, use or integrity of the component	The effect leads to a reduction in the quality or use of the component but does not compromise its environmental integrity	The effect endangers the environmental integrity of the component or substantially and irreversibly changes the component or its use
Extent	Site-specific	Local	Regional
The spatial reach or scope of the effects on the valued component, and the proportion of a population that is affected	The impact affects only a very limited space within or near the project, or it is felt by only a small proportion of the population.	The impact affects a fairly limited space within, near or at a certain distance from the project's local study area, or it is felt by a limited proportion of the population.	The impact affects a vast space up to a great distance from the project site, or it is felt by a large proportion of its population.
Duration	Short-term	Medium-term	Long-term
The temporal dimension, in other words the length of time the effects will affect the valued component. This criterion factors in the intermittent nature of the effect(s).	The effect occurs temporarily, continuously or periodically, during the construction phase or for a few months after the start of the operation phase. The duration ranges from a few days to the entire construction period.	The effect occurs temporarily, continuously or periodically. The effect persists for several months after the end of the construction work but stops within five years.	The effect occurs continuously or periodically for more than five years. This is often a permanent and irreversible effect.
Likelihood of occurrence	Low	Moderate	High
The real probability that an effect could affect the valued component	The effect is unlikely to occur or will occur only in the event of an accident.	It is possible, but not definite, that an effect on the component will occur.	An effect on the component will definitely occur.

The significance of the effect encompasses the criteria of magnitude, extent, duration and likelihood of occurrence. The combinations used to determine the level of significance of the effect are predetermined. The relationships among these criteria, as presented in Appendix D, allow an overall judgment to be made on the significance of the effect on the basis of a five-point scale: very high, high, moderate, low and very low.

Effects at the very high and high levels are considered significant, while effects at the moderate, low and very low levels are considered not significant.

Appendix D Criteria for Determining Significance of the Effects

Magnitude	Extent	Duration	Likelihood of occurrence	Significance	Magnitude	Extent	Duration	Likelihood of occurrence	Significance	Magnitude	Extent	Duration	Likelihood of occurrence	Significance					
High	Regional	Long-term	High	Very high	Moderate	Regional	Long-term	High	High	Low	Regional	Long-term	High	Moderate					
			Moderate	Very high				Moderate	Moderate				Moderate	Low					
			Low	High				Low	Moderate				Low	Low					
		Medium-term	High	Very high				High	High				High	Moderate					
			Moderate	Very high				Moderate	Moderate				Moderate	Low					
			Low	High				Low	Moderate				Low	Low					
		Short-term	High	High				High	Moderate				High	Moderate					
			Moderate	High				Moderate	Moderate				Moderate	Low					
			Low	High				Low	Moderate				Low	Low					
	Local	Long-term	High	High			Local	Long-term	High			Moderate	Local	Long-term	High	Low	Medium-term	High	Low
			Moderate	High					Moderate			Moderate			Moderate	Low			
			Low	High					Low			Moderate			Low	Low			
		Medium-term	High	High					High			Moderate			High	Moderate		High	Low
			Moderate	High					Moderate			Moderate			Moderate	Low		Very Low	
			Low	Moderate					Low			Moderate			Low	Very Low			
		Short-term	High	High					High			Moderate			High	Moderate		High	Low
			Moderate	High					Moderate			Moderate			Moderate	Very Low			
			Low	Moderate					Low			Low			Low	Very Low			
	Site specific	Long-term	High	High			Site specific	Long-term	High			Moderate	Site specific	Long-term	High	Low	Medium-term	High	Low
			Moderate	High					Moderate			Moderate			Moderate	Low			
			Low	Moderate					Low			Low			Low	Very Low			
		Medium-term	High	High					High			Moderate			High	Moderate		High	Low
			Moderate	Moderate					Moderate			Moderate			Moderate	Very Low			
			Low	Moderate					Low			Low			Low	Very Low			
Short-term		High	High	High	Moderate	High			Moderate	High	Low								
		Moderate	Moderate	Moderate	Low	Moderate			Very Low										
		Low	Moderate	Low	Low	Low			Very Low										

*Only residual effects with high to very high significance showed a significant effect as defined in the *Canadian Environmental Assessment Act*.

Source: Genivar, November 2012, Appendix 16

Appendix E Summary of Residual Effects

Valued Component	Activities	Potential Effects	Summary of Mitigation Measures	Residual Effects	Degree of Severity of Residual Adverse Effect				Significance of Residual Effect
					Magnitude	Extent	Duration	Occurrence	
Air quality	<ul style="list-style-type: none"> Clearing and soil stripping Excavation and backfill Construction of mine facilities Pit (blasting) Overburden, low grade ore and waste rock stockpiles (erosion) Mine tailings storage facility Transportation and traffic 	<ul style="list-style-type: none"> Increased airborne dust 	<ul style="list-style-type: none"> Implement a dust management plan that will enable mitigation of 95 percent of dust, in particular: <ul style="list-style-type: none"> Spray down dried soils (water and dust suppressants, as needed); Use covered conveyors, rail cars and trucks; Maintain a wet beach at the mine tailings storage facility until a mineral crust forms; Use chrysotile fibres-free granular materials (road surfaces); maintain wet phase (ore processing) to prevent suspension of chrysotile fibres; When real time monitoring of dust concentrations indicates a trend toward exceedances of air quality standards, modify or interrupt certain activities at the mine site; 	<ul style="list-style-type: none"> Exceedances of the standards are anticipated for total particulates at sensitive receptors a few times a year, i.e., homes located south of the pit and located more than 300 m from the mine infrastructure. Exceedances of standards for chromium and nickel are predicted at a distance of 300 m from the mine infrastructure. Low wind erosion of the mine tailings site, because the environment will be kept damp. Low risk of chrysotile emissions and absence of toxicological risk. 	Low (if measures are applied properly)	Local (mine site and surrounding area)	Long-term (project life)	High (major transportation activity)	Low
	<ul style="list-style-type: none"> Transportation and traffic Machinery operation 	<ul style="list-style-type: none"> GHG emission 	<ul style="list-style-type: none"> Implement a public transit system for workers. 	<ul style="list-style-type: none"> GHG emissions are estimated at 4.5 million tonnes carbon dioxide equivalent, the bulk of which is linked to the use of fuel for mining activities and explosives. 	Low	Regional	Long-term	High (significant amount of transportation)	Moderate
	<ul style="list-style-type: none"> Pit (blasting) 	<ul style="list-style-type: none"> Risk of nitrogen dioxide formation 	<ul style="list-style-type: none"> Do not carry out blasting when the wind is blowing in the direction of the homes south of the pit (this measure will be revised based on 	<ul style="list-style-type: none"> Low risk of nitrogen dioxide emission toward the homes located south of the mine along Route 	Low	Ad hoc (homes along Route)	Long-term (project life)	Moderate (measures controlling the	Low

Valued Component	Activities	Potential Effects (thresholds for affecting health reached)	Summary of Mitigation Measures	Residual Effects	Degree of Severity of Residual Adverse Effect				Significance of Residual Effect
					Magnitude	Extent	Duration	Occurrence	
			<ul style="list-style-type: none"> follow-up results). 	111 between Launay and Trécesson		111 south of the mine)		blasting)	
Water management	<ul style="list-style-type: none"> Surface water collection systems Layout of various stockpiles Extraction - pit (dewatering) 	<ul style="list-style-type: none"> Alteration of surface and ground water flow patterns Loss of streams from filling 	<ul style="list-style-type: none"> Avoid water withdrawals from the Villemontel River, unless under exceptional circumstances. Recover effluent water from the water treatment unit for various uses (watering landscaped areas and roads, transfer to the concentrator pond, etc.) as well as water from the mine tailings storage facility for use in the concentrator. Install monitoring wells to monitor groundwater quality and level and implement the appropriate measures to maintain residents' potable water supply, if applicable. Perform corrective work at the proponent's cost if follow-up shows that the mine is affecting private wells (quality and flow). 	<ul style="list-style-type: none"> Lowering of groundwater levels combined with drying up of most of the watershed of unnamed stream 1 will cause a reduction of approximately 20 percent in the base flow of the Villemontel River. Decrease in surface flows will cause a reduction of approximately 20 percent in the base flow of the Villemontel River. 	Moderate	Local	Long-term	High	Moderate
	<ul style="list-style-type: none"> Clearing and site preparation Transportation and traffic Layout of various stockpiles 	<ul style="list-style-type: none"> Increased input of sediment into the watercourses (increase of water turbidity) 	<ul style="list-style-type: none"> Implement effective systems for controlling erosion and sediment transport, including a runoff collection ditch system, sediment ponds and a water treatment plant. Monitor the work closely to ensure effective runoff management. Progressively stabilize stockpiles and disturbed areas that will not be used in the future with grasses, followed by various species of shrubs and trees. 	<ul style="list-style-type: none"> Sediment transport in runoff during rainy periods. The effect will be felt primarily in the construction phase. The installation of sediment ponds, filtration plant and vegetative stabilization will reduce the effect, especially during periods of heavy precipitation. 	Low (mitigation measures combined with a turbid environment)	Local	Moderate (especially during the early years of operation)	Moderate (during heavy precipitation)	Low

Valued Component	Activities	Potential Effects	Summary of Mitigation Measures	Residual Effects	Degree of Severity of Residual Adverse Effect				Significance of Residual Effect
					Magnitude	Extent	Duration	Occurrence	
	<ul style="list-style-type: none"> Surface water collection systems Management of the site's domestic and mine water Pit (blasting) 	<ul style="list-style-type: none"> Contamination through leachate, wastewater or explosives 	<ul style="list-style-type: none"> Treat water that cannot be recycled at the concentrator to meet prescribed standards, especially for copper, chromium and nickel concentrations, prior to its discharge to the Villemontel River. Use explosives that have low water solubility. Treat domestic wastewater to ensure it meets the standards prior to discharge. 	<ul style="list-style-type: none"> Potential increase in organic load. Domestic and mine wastewater will contain residual phosphates and nitrates even after treatment. 	Low (alkaline property of Dumont deposit and mitigation measures)	Local (until confluence with Kinojévis River)	Long-term (physical-chemical change throughout the entire Project)	Moderate (with effective treatment of effluent)	Low
	<ul style="list-style-type: none"> Clearing Fuel storage site Transportation and traffic Mine tailings storage facility 	<ul style="list-style-type: none"> Risk of groundwater contamination 	<ul style="list-style-type: none"> Limit clearing southeast of pit to protect groundwater beneath the unnamed esker. Design and locate mine infrastructure outside a 1-km buffer zone from the eastern boundary of the Launay esker. Design the mine tailings storage facility on the basis of the prescribed impermeability standards for leachable tailings. Implement the emergency response plan in case of an accidental spill. 	<ul style="list-style-type: none"> Accidental spills or seepage of contaminants from stockpiles or mine tailings storage facilities (copper, chromium, nickel). 	Low (low potential for metal leaching, presence of a nearly impermeable base)	Local (drainage toward pit)	Long-term (entire project life)	Low	Low
Fish and fish habitat	<ul style="list-style-type: none"> Clearing Excavation and earthwork Alteration of drainage 	<ul style="list-style-type: none"> Sediment input into the Villemontel River 	<ul style="list-style-type: none"> Carry out the physical works and activities provided for in years 1 and 2 of the surface water management plan that have an effect on the unnamed stream 1 between June 15 and April 15. Use an effective method to prevent transport of fine sediment in the aquatic environment beyond the immediate work area. 	<ul style="list-style-type: none"> Mitigation measures will contribute to significantly reducing sediment input and effects on fish. 	Low	Local	Short-term	High	Low

Valued Component	Activities	Potential Effects	Summary of Mitigation Measures	Residual Effects	Degree of Severity of Residual Adverse Effect				Significance of Residual Effect
					Magnitude	Extent	Duration	Occurrence	
	<ul style="list-style-type: none"> Drying up and encroachment on streams 	<ul style="list-style-type: none"> Loss of fish habitat due to filling of unnamed stream 1 Fish mortality 	<ul style="list-style-type: none"> Implement a compensation plan for the serious harm to fish. 	<ul style="list-style-type: none"> 31 ha of fish habitat losses; losses will be compensated; Fish mortality is inevitable in all water bodies that dry up or are subject to encroachment. The compensation plan will mitigate these effects. 	Low (low habitat quality)	Local	Long-term (permanent change)	High (encroachment)	Low
	<ul style="list-style-type: none"> Pit dewatering Surface water collection systems 	<ul style="list-style-type: none"> Loss of fish habitat due to changes to flow in the Villemontel River 	<ul style="list-style-type: none"> Implement a compensation plan for the serious harm to fish. 	<ul style="list-style-type: none"> 4 ha of fish habitat losses; losses will be compensated. 	Low	Local	Long-term	High	Low
Birds and their habitat	<ul style="list-style-type: none"> Clearing Construction work 	<ul style="list-style-type: none"> Disturbance of breeding pairs by noise Loss of habitat for birds in general and for bird species at risk Incidental take 	<ul style="list-style-type: none"> Perform the majority of clearing work in winter and outside the bird breeding season (May 1 to August 15). Conduct an ornithological survey to prevent nest destruction when clearing is necessary during this period, in accordance with Environment Canada provisions. Leave vegetation in place where clearing is not required. Perform clearing in a sequential manner based on needs. 	<ul style="list-style-type: none"> Nest abandonment and displacement to other areas. 	Low (mitigation measures)	Ad hoc	Short-term	High	Low
	<ul style="list-style-type: none"> Clearing Mine complex 	<ul style="list-style-type: none"> Disturbance Loss of habitat (aquatic environments, wetlands) 	<ul style="list-style-type: none"> Make drainage ditches located near bogs of high ecological value impermeable to prevent their drainage. 	<ul style="list-style-type: none"> Loss of 4728 ha of aquatic environments, wetlands and forests would mean a potential loss of: 101.6 waterfowl pair equivalents; 	Low (mitigation measure that would limit the Project's)	Local	Long-term (habitat loss)	High	

Valued Component	Activities	Potential Effects	Summary of Mitigation Measures	Residual Effects	Degree of Severity of Residual Adverse Effect				Significance of Residual Effect
					Magnitude	Extent	Duration	Occurrence	
		<ul style="list-style-type: none"> and forests) Incidental take 		<ul style="list-style-type: none"> 11.1 pair equivalents of shorebirds and other aquatic birds. 	footprint)				
		<ul style="list-style-type: none"> Disturbance and loss of habitat for bird species at risk 	<ul style="list-style-type: none"> Same measures as for birds in general (above). Conserve snags where possible, especially in areas suitable for olive-sided flycatcher. 	<ul style="list-style-type: none"> Habitat loss: olive-sided flycatcher: 1578 ha (53 pair equivalents) rusty blackbird: 2851 ha (2 pair equivalents) common nighthawk: 1673 ha (number of pair equivalents not determined) 	Low (mitigation measure that would limit the project's footprint)	Local	Long-term (habitat loss)	High	
Current use of lands and resources	<ul style="list-style-type: none"> Construction work Transport, movement and operation of machinery 	<ul style="list-style-type: none"> Loss of land use (hunting, fishing, gathering) 	<ul style="list-style-type: none"> Optimize space required for mine infrastructure to limit effects on the Villemontel River watershed. 	<ul style="list-style-type: none"> Loss of land use (hunting, fishing, gathering). The western part of the mine complex will be partially located on the Mapachee family's land, which is used for observation and transmission of traditional knowledge. 	Moderate	Local	Long-term	Moderate	Moderate
		<ul style="list-style-type: none"> Water contamination at Chicobi Lake 		<ul style="list-style-type: none"> Given the distance between the Project and Chicobi Lake, no effects are anticipated. 	Low	Local	Short-term	Low	Low

Appendix F Concerns Raised by Aboriginal Groups

The table below summarizes the concerns raised by Aboriginal groups through consultations held in support of the environmental assessment under the former Act for the Project.

Abbreviations:

AFN: Abitibiwinni First Nation
 CNG: Cree Nation Government

#	Group	Topic	Comment/Concern	Summary of proponent's response	Agency's response
1	CNG	Water quality	<p>The CNG has concerns that the Project will have effects on the Harricana River watershed. This river has great cultural and environmental significance for the Washaw Sibi Cree Nation.</p> <p>As a precaution, the CNG suggested that the proponent include the rivers and lakes of the Harricana watershed in the reference area. This should enable the proponent and authorities to measure potential variations in the parameters mentioned over the life of the Project. The proponent could thus confirm its forecasts by the fact that the Harricana River watershed would not be affected by the Project.</p> <p>For the time being, the CNG concluded that the project is not likely to affect the Harricana River.</p>	<p>On the basis of the studies it produced, the proponent concluded that the activities related to its Project will have no effect on the Harricana River watershed.</p> <p>The proponent pointed out that all the mine infrastructure is located within a single watershed, i.e., the Villemontel River watershed.</p> <p>The proponent will not follow up with the Washaw Sibi Cree Nation, but it will conduct a follow-up to assess the effect on the water quality of Chicobi Lake and Chicobi River, which drain into the Harricana River. This follow-up will validate the absence of adverse effects in the Chicobi Lake watershed and thus on the Harricana River.</p>	<p>On the basis of the information received from the proponent and validated by Natural Resources Canada and Environment Canada experts, the Project will have no effect on the Harricana River watershed.</p> <p>In this context, the Agency believes that the proponent's response is acceptable.</p>

#	Group	Topic	Comment/Concern	Summary of proponent's response	Agency's response
2	AFN	Water quality	<p>The AFN raised concerns about the water quality of the Chicobi Lake, because this area is used by the community. They are concerned that the lake will be contaminated by mining activities.</p> <p>The AFN requested a follow-up of the water quality of the lake to be conducted and asked to review all results as well as the methodology of these tests.</p>	<p>To respond to this concern, the proponent will conduct a follow-up to assess the effects on water quality on the Chicobi Lake and Chicobi River. This follow-up will validate the absence of adverse effects on the Chicobi Lake watershed.</p>	<p>The potential effects on water quality (including the Chicobi Lake) caused by the project activities are subject to follow-up under the province's Directive 019. Under the directive, the proponent will have to take corrective actions if water quality problems arise. The Agency considers the proponent's approach to be acceptable.</p>

#	Group	Topic	Comment/Concern	Summary of proponent's response	Agency's response
3	AFN	Land use	<p>Noise from the mining activities that is heard beyond the study area will be detrimental to hunting techniques (which are auditory) and to the teaching of these techniques to young people and the intergenerational transfer of knowledge, which is largely based on the experience and life of previous generations.</p> <p>Snowshoe hare and beaver trapping sites and a moose yard are present in the project area. These habitats are at very high risk of being disturbed, even eradicated, which will have a direct effect on hunting and trapping for the Mapachee family.</p> <p>Moreover, the AFN is concerned that wildlife populations will decline (e.g., moose, bear, American marten, snowshoe hare) as a result of the disturbance described above.</p>	<p>With respect to issues related to hunting, specifically auditory hunting, the proponent confirmed that an adverse effect is anticipated in relation to encroachment by mine infrastructure located on part of the land used by the Mapachee family. However, on the basis of the anticipated noise levels, the proponent does not believe that the noise would have a significant effect on terrestrial wildlife.</p> <p>The moose yard will not be eradicated, but clearing and other construction activities will result in the permanent loss of approximately 47 km² of stands of interest and habitats used by moose (spruce, pine, mixed stands, hardwood, ponds, marshes and swamps).</p> <p>The hare trapping sites will not be affected by the mine infrastructure. A map produced during a consultation meeting situates the trapping sites mostly to the west of Guyenne Rd, an area that is not directly affected by the project activities. This map is not publicly available, but it was nevertheless submitted to the AFN.</p>	<p>The Agency recognizes that some effects on hunting activities and transfer of knowledge to this effect would not be avoided. However, given the large amounts of land suitable for hunting in this area, the Agency believes that the current use of land for traditional purposes, including auditory hunting, can be maintained.</p>

#	Group	Topic	Comment/Concern	<i>Summary of proponent's response</i>	Agency's response
4	AFN	Land use	<p>The AFN is concerned about the dust, vibrations and noise that could be generated by the Project and be felt beyond the project area (Chicobi Lake and land of the Mapachee family).</p>	<p>The modelling of air quality, vibrations and noise performed by the proponent found that, with the implementation of mitigation measures (including the use of dust suppressants, noise barriers and optimization of the blasting initiation sequence), there should be no noticeable effects beyond two km.</p> <p>With respect to Quebec's Directive 019, the proponent will also have to implement follow-up programs to ensure compliance with the provincial standards. In particular, follow-up will include the installation of permanent dust jars at several sensitive sites, including Launay, Villemontel, the Launay and Saint-Mathieu-Berry eskers, Chicobi Lake and Chicobi River.</p> <p>Moreover, the proponent plans to conduct continuous monitoring of fine particulates and nitrogen oxides at the project site. A sampling station will also be installed in the bog complex north of Lac à la Savane. This follow-up will be performed on an annual basis until the end of mining activities around year 21. The details of the follow-up program (e.g., proposed location for the sampling stations) will be submitted to the Quebec government in advance for comments and approval.</p>	<p>The Agency is satisfied with the proponent's response. On the basis of the provincial regulatory obligations (Directive 019) with which it must comply, the mitigation measures that will be implemented and the follow-up program to ensure the accuracy of these measures, it can be concluded that dust, vibrations and noise caused by mine construction or operations are not likely to cause adverse effects in the Chicobi Lake area and on the land of the Mapachee family.</p>

#	Group	Topic	Comment/Concern	Summary of proponent's response	Agency's response
5	AFN	Land use	<p>The Abitibiwinni First Nation raised concerns about the effects of the Dumont Project on Chicobi Lake and its surrounding area, which has always been a key region for this community from a cultural viewpoint.</p> <p>The AFN wants to preserve this site for the benefit of future generations. The community is considering establishing new cultural sites around the lake dedicated to the transfer of knowledge to this generation.</p>	<p>At a public meeting in Pikogan in April 2011 and at the meeting of the Advisory Committee with the Abitibiwinni First Nation in May 2012, the proponent had stated that the mine infrastructure would all be located within a single watershed, i.e., the Villemontel River watershed.</p> <p>The proponent nonetheless undertook to implement follow-up of water quality in the Chicobi Lake area, which drains into the Harricana River (see proponent's response 1).</p> <p>Finally, the proponent has committed to work with the AFN to limit the effects related to Chicobi Lake.</p>	<p>Given the distance (20 km) between the Project and Chicobi Lake and the follow-up that will be implemented by the proponent, the Agency believes that the proponent's conclusions are justified, such that it is unlikely that adverse effects from the Project would be felt around this lake.</p>
6	AFN	Land use	<p>The AFN is concerned that there will be significant human pressure on Chicobi Lake. The AFN wants its traditional sites along the shores of Chicobi Lake (medicinal plants, gathering places, archaeological and burial sites, trapping camps, ancestral camps) to remain serene and peaceful.</p> <p>For the people of Pikogan and the Mapachee family, the quality of the forest experience is inversely proportional to the number of people who visit the area around the Chicobi Lake and the trapping area of the family clan.</p>	<p>With respect to the concern about increased human pressure on the Chicobi Lake area, the proponent stated that the lake is currently very accessible by land and has the infrastructure required to facilitate its use (e.g., concrete boat landing and large parking lot). According to the proponent, implementation of the Project should not increase access to the lake, as it is already very accessible by the entire population of the region. According to the proponent's forecasts, the vast majority of workers at the Dumont mine will come from the region, so there should be no significant increase in the use of Chicobi Lake.</p>	<p>The Agency believes that the proponent has no authority or obligation to monitor access to Chicobi Lake. In this context, the Agency deems the information, clarifications and analysis it obtained from the proponent acceptable.</p>

#	Group	Topic	Comment/Concern	Summary of proponent's response	Agency's response
7	AFN	Decommissioning and restoration	<p>As a result of bad experiences with abandonment of contaminated sites by mining companies on ancestral land, there are concerns about the quality of the restoration plan that will be implemented and the future use of the site.</p> <p>The complete restoration of the ecological and social functions of the area, as well as the elimination of any residual ecotoxicity are thus inherent, mandatory obligations of this Project, designed to ensure that the various effects of mining activities on the quality of life of the AFN are negligible.</p>	<p>This Project is subject to the <i>Mining Act</i> (CQLR, c. M-13.1). The proponent will therefore be required to restore the mine property at the end of mining activities.</p> <p>A restoration plan will have to be developed, in compliance with the requirements of the <i>Guide et des modalités de préparation du plan et exigences générales en matière de restauration des sites miniers au Québec</i>. It will be submitted to the Quebec Department of Natural Resources and Wildlife prior to the start of operations and will be accompanied by a project schedule and financial guarantee in compliance with the requirements of the <i>Mining Act</i> for restoration of accumulation areas.</p>	<p>The decommissioning and remediation of the mine are legislated by the provincial government, which was not the case in the past. As part of its obligations to the province, the proponent must place 100 percent of the restoration costs in a remediation trust fund.</p>

#	Group	Topic	Comment/Concern	Summary of proponent's response	Agency's response
8	AFN	Fish habitat	The AFN proposed a project to the proponent consisting of stocking the Octave River with sturgeon to compensate for the loss of fish habitat. The AFN believes that this project would benefit the Abitibiwinni because the Octave River is heavily used by the community and lake sturgeon is a species likely to be designated as threatened or vulnerable.	<p>RNC addressed the requests for information regarding wildlife development and conservation projects to the Quebec Department of Natural Resources (MRN), the Quebec Department of Sustainable Development, Environment, Wildlife and Parks (MDDEFP), Fisheries and Oceans Canada, the Abitibi RCM, the <i>Organisme de bassin versant du Témiscamingue</i> (OBVT), the Abitibiwinni First Nation and a number of local organizations, such as <i>Refuge Pageau</i> and the <i>Club de pêche d'Amos</i>. From these consultations, a number of compensation projects proposed by the Abitibiwinni First Nation were initially selected, specifically the rehabilitation of a culvert on a tributary of the Octave River to improve lake sturgeon spawning and feeding conditions.</p> <p>However, the lake sturgeon stocking proposal was not retained.</p>	The proponent has taken the necessary steps to determine whether compensation projects could be carried out near the mine site. Two of the six compensation projects submitted to Fisheries and Oceans Canada by the proponent were proposed by a representative of the Abitibiwinni First Nation, i.e., the restoration of part of a lake sturgeon spawning ground in the Harricana River and the rehabilitation of a culvert on a tributary of the Octave River. None of the compensation projects submitted to Fisheries and Oceans Canada met all of the principles of the Fisheries Productivity Investment Policy. The proponent has committed to implement a compensation program to offset serious harm to fish that will be caused by the Project. The program will have to be developed in collaboration with Fisheries and Oceans Canada, at the project review stage provided for in the fisheries protection provisions of the <i>Fisheries Act</i> .

#	Group	Topic	Comment/Concern	Summary of proponent's response	Agency's response
9	AFN	Health	Due to past mining projects, land users no longer dare to eat the resources they harvest in some regions. Is there a risk of contamination of resources harvested by the AFN?	<p>The Agency asked the proponent to document the products harvested and consumed by the communities affected (e.g., products from trapping, hunting and fishing, small-scale agriculture products and personal harvesting, wild fruits and berries, etc.), the areas in which they are harvested, the species and the quantities consumed.</p> <p>The survey by the proponent of the heads of 12 families provides a good profile of the resources harvested in the project area up to Chicobi Lake. With respect to the potential contamination of food resources, the proponent is subject to provincial regulations and will have to implement follow-up programs for air quality and water quality, which are the potential vectors of contamination. In the event acceptable levels are exceeded, the proponent will have to adjust its activities to mitigate the adverse effects.</p>	The Agency believes that the study conducted by the proponent is satisfactory and that it provided more information on food habits relating to the harvesting of wild products (plants and animals). In addition, the provincial regulations on air quality and water quality with which the proponent must comply will keep the area around the Project safe for human health and for the environment.

#	Group	Topic	Comment/Concern	Summary of proponent's response	Agency's response
10	AFN	Land use	In the proponent's environmental impact statement, the AFN's question about harvesting medicinal plants was not addressed.	<p>The proponent conducted a survey of the heads of 12 AFN families on their eating habits. All respondents indicated that they had not gathered medicinal plants in the study area in the past five years. One respondent mentioned hearing about a plant that would treat the flu (slenderleaf sundew), which is found in the wetland area.</p> <p>The proponent revised the layout of its Project to avoid encroaching on important wetlands and it plans to implement measures limiting drainage to reduce effects in these environments where slenderleaf sundew occurs.</p>	In the Agency's view, the changes made by the proponent to limit the project's effects on wetlands reduce the adverse effects on wetlands that support slenderleaf sundew.
11	CNG	Land use	The CNG concluded that the Project was not likely to cause any effects on the Washaw Sibi traplines. However, the CNG wishes the proponent or government to inform it of any potential effect on these traplines.	Given the distance between the Project and the Washaw Sibi traplines, the proponent has no communication plan in place to inform the CNG.	On the basis of information provided by the proponent and the analyses conducted by the federal experts, the Agency believes that the Project should not cause adverse effects on the Washaw Sibi traplines.