

Saint-Honoré Niobec Mine Expansion Project

Summary



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Approved by



Luc Bouchard, Project Manager

SUMMARY

1. General information

The Saint-Honoré Niobec mine in the Saguenay–Lac-Saint-Jean region is the only underground niobium operation in the world and one of only three producers of niobium (Figure 1). The Niobec mine is currently studying an expansion project that would convert the current underground mining method to a block caving type operation, which would significantly increase the mine's production capacity. A number of new surface facilities are required to process the ore and store the additional volume of mine waste that will be generated.

Proponent information

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No regional environmental studies have been or are currently being conducted in the area where the project will be carried out.

2. Project information

Niobium is a high-value metal with unique properties, in strong demand for the production of a specialized high quality category of steel called high strength low alloy (HSLA) steel. Niobium demand has grown at a 10% compound annual growth rate over the last 10 years and it is forecast to increase steadily going forward.

The Niobec mine has been in operation for 34 years and 2012 production should reach 2.2 million tonnes. The results of an expansion pre-feasibility study have confirmed a 691% increase in probable reserves. IAMGOLD is currently studying the possibility of increasing production of the Niobec mine to 10 mega tons per year. The life expectancy of the mine would therefore surpass the 40 year mark with 10-hour day and night shifts. A production of 10 million tonnes per year would allow Niobec Mine to regain some of the market share it has lost in recent years and to ensure that it remains one of the main players in the niobium market, which is one of the primary objectives for the expansion.

Converting the mine to a block caving operation requires important changes (Figure 2).

New industrial complex: a new industrial complex will be constructed and will house services and ore processing activities: mine dry facilities, workshops, storage areas, laboratory, core sample storage facility, administrative offices and concentrator. A new gatehouse will be installed at the entrance.

Ore transport: the project includes the addition of two new access shafts (production and service).

Pumping system: the project includes the installation of a new pumping system to collect water seepage from the mine.

Ventilation stack: the project includes the installation of two new ventilation stacks equipped with fans.

Tailings pond: the project includes the construction of a new tailings pond to store mine waste. The dykes are composed of compacted tailings. The pond will have a capacity of 500 Mt for the estimated 46-year life of the mine. Three possible sites are currently being studied for the tailings pond.

Access road: the project includes the construction of a new access road for mine operations. Three options are currently being studied.

Electrical network: the project includes the installation of a new 161 KV electrical network with sub-stations.

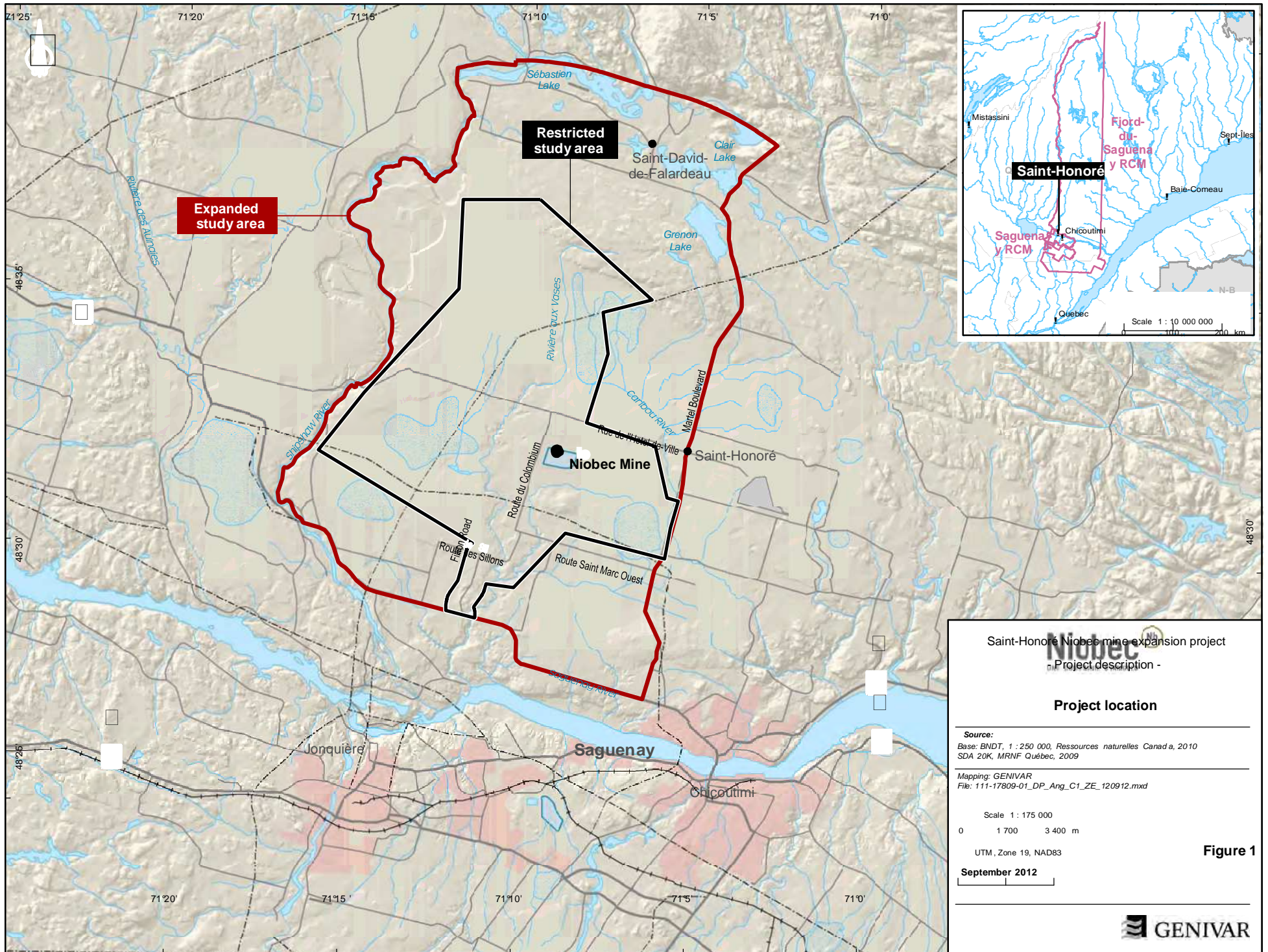
Concentrator: new installations will be required to treat the additional volume of mineral using the existing treatment procedure.

The provisions of the *Regulations Designating Physical Activities* that describe the project in whole or in part are as follows:

8. The construction, operation, decommissioning and abandonment of a facility for the extraction of 200 000 m³/a or more of ground water or an expansion of such a facility that would result in an increase in production capacity of more than 35%.

16. The expansion of:

- a) an existing metal mine, other than a gold mine, that would result in an increase in its ore production capacity of 50% or more, or 1 500 t/d or more, if the increase would raise the total ore production capacity to 3,000 t/d or more;
- b) an existing metal mill that would result in an increase in its ore input capacity of 50% or more, or 2,000 t/d or more, if the increase would raise the total ore input capacity to 4,000 t/d or more.



Saint-Honoré Niobec mine expansion project
 Project description -
 Project location

Source:
 Base: BNDT, 1:250 000, Ressources naturelles Canada, 2010
 SDA 20K, MRNF Québec, 2009

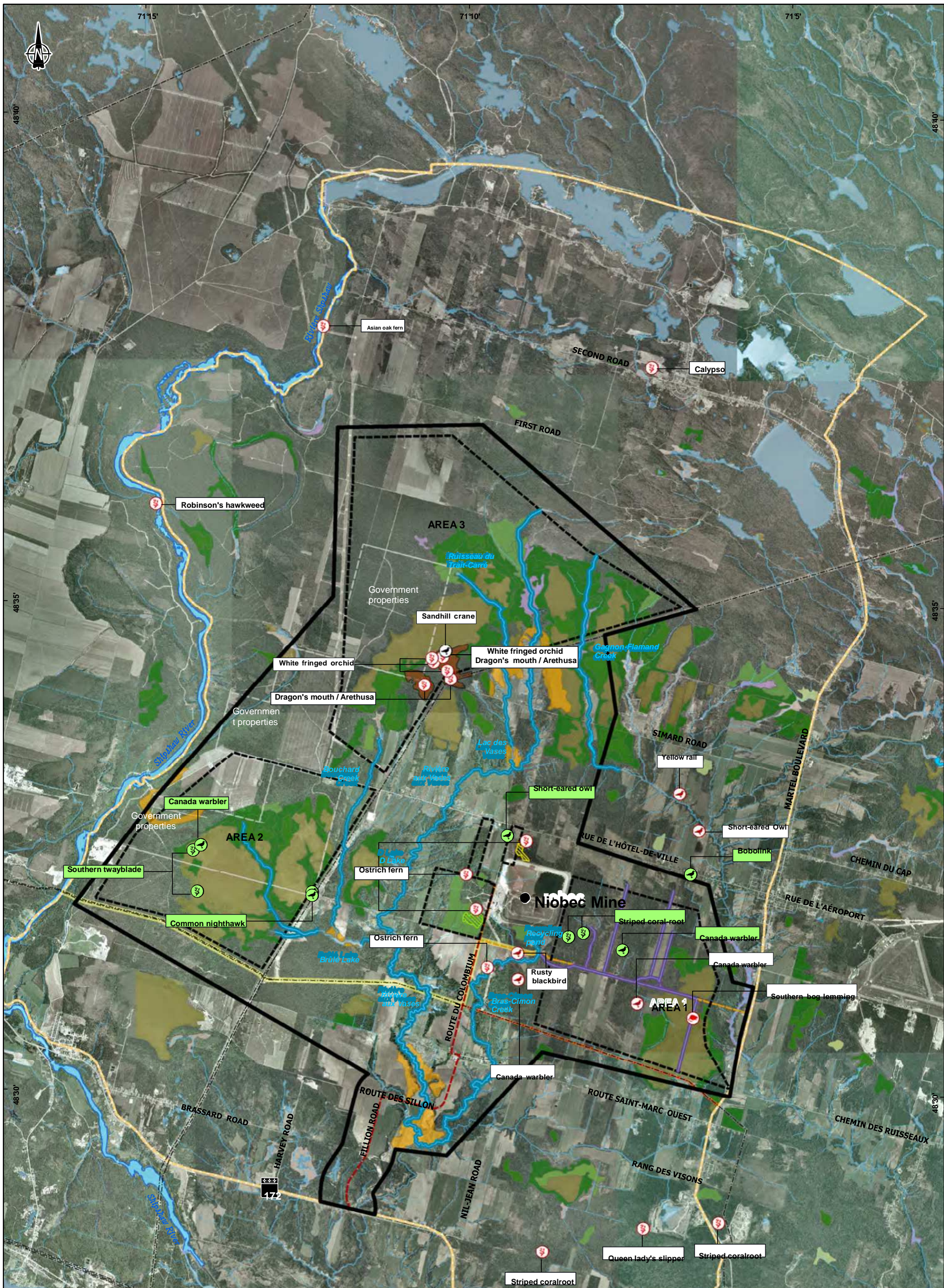
Mapping: GENIVAR
 File: 111-17809-01_DP_Ang_C1_ZE_120912.mxd

Scale 1: 175 000
 0 1 700 3 400 m

UTM, Zone 19, NAD83

September 2012

Figure 1



Project component

- Restricted study area
- Expanded study area
- Potential location of tailings pond
- Area of possible subsidence
- Access road (option 1)
- Access road (option 2)
- Access road (option 3)
- Water supply pipe and effluent discharge pipe
- Existing power transmission line

Biological environment

- Wetlands**
- Water
 - Shrub swamp
 - Flooded marsh
 - Poor treed fen
 - Rich treed fen
 - Forested fen
 - Bog
 - Iron-rich fen
 - Cedar stand

Particular habitats

- Sugar maple stand
- Vegetation**
- Plant species at risk, 2011 data
 - Plant species at risk, 2012 data
- Characterized**
- watercourses
 - Adjoining ditch
 - Fish habitat
- Non-characterized watercourse**

Mammals

- Mammal species at risk

Birds

- Bird species of interest
- Bird species at risk, 2011 data
- Bird species at risk, 2012 data

Human environment

- Archaeology**
- Potential archaeological zone



Saint-Honoré Niobec mine expansion project
- Project description -

Potential location of the mine infrastructure and components of the natural environment

Source:
- Cartes écoforestières (SIEF), 1 : 20 000, MRNF Québec
- SDA 20K, MRNF Québec, 2009
- Orthophotographie, 56 cm, 2007

Mapping: GENIVAR
File: 111-17809-01_DP_Ang_C2_121101.mxd
Scale 1 : 70 000
0 700 1400 m

October 2012

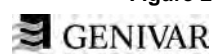


Figure 2

In addition to the federal requirements, the Niobec mine expansion project is also subject to the Quebec environmental impact assessment and review procedure and must obtain an certificate of authorization from the government before starting work on a project targeted under the *Regulation Respecting Environmental Impact Assessment and Review* (R.R.Q., c. Q-2, r. 9).

Various solids, liquids and gases will be generated during construction, operation and decommissioning of the mine. These products are listed in Table 1.

Table 1: Contaminant emission sources

Infrastructure / Activity	Waste			
	Solid	Liquid	Gas	Hazardous
Industrial complex				
Construction	<ul style="list-style-type: none"> Woody debris Waste (hazardous and non-hazardous) 	<ul style="list-style-type: none"> Rain water / runoff Wastewater from sanitary facilities 	<ul style="list-style-type: none"> Greenhouse gas emissions from machinery and explosives Particulate matter from machinery traffic 	<ul style="list-style-type: none"> Contaminated soil (spillage/leak) Used oils Lubricants
Operation	<ul style="list-style-type: none"> Soil contaminated by ore spill Mine waste Dust from stockpiles and conveyors Waste (hazardous and non-hazardous) Slag 	<ul style="list-style-type: none"> Rain water / runoff Wastewater from sanitary facilities Mine effluent Water runoff from the mine 	<ul style="list-style-type: none"> Greenhouse gas emissions from vehicles and heavy equipment Particulate matter from handling operations and use of machinery Process emissions (NO₂, CO, CO₂, MP10 and PM_{2.5}) 	<ul style="list-style-type: none"> Contaminated soil (spillage/leak) Used oils Lubricants Additives Propane Diesel Explosives Regular gas
Decommissioning	<ul style="list-style-type: none"> Waste (hazardous and non-hazardous) 	<ul style="list-style-type: none"> Rain water / runoff Water from recycling basins 	<ul style="list-style-type: none"> Greenhouse gas emissions from machinery and explosives Particulate matter from use of machinery 	<ul style="list-style-type: none"> Contaminated soil (spillage/leak) Used oils Lubricants
Mine waste disposal site				
Construction	<ul style="list-style-type: none"> Woody debris Waste (hazardous and non-hazardous) 	<ul style="list-style-type: none"> Rain water / runoff 	<ul style="list-style-type: none"> Greenhouse gas emissions from machinery and explosives Particulate matter from use of machinery 	<ul style="list-style-type: none"> Contaminated soil (spillage/leak) Used oils Lubricants
Operation	<ul style="list-style-type: none"> Soil contaminated by ore spill Mine waste 	<ul style="list-style-type: none"> Rain water / runoff Water from mine waste 	<ul style="list-style-type: none"> Greenhouse gas emissions from vehicles and heavy equipment Particulate matter from handling activities and use of machinery 	<ul style="list-style-type: none"> Contaminated soil (spillage/leak) Used oils Lubricants Diesel Regular gas
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3. Project location

The Niobec mine is located 20 km northwest of the municipality of Saguenay and 6 km west of the municipality of Saint-Honoré, which has a population of over 5,000. The property covers a total area of 2,422.6 hectares and includes two mining leases and 66 claims. The approximate geographical coordinates of the mine are 48°32'3.85" N latitude and 71°9'3.62" W longitude. The mine expansion project will be largely carried out on the existing mine site owned by the company. However, certain infrastructure, such as the tailings pond, could encroach onto private property or Quebec government public property located to the northwest and west of the mine site. According to the Commission de la construction du Québec, the Niobec mine is the only large-scale project listed in this study area.

The closest residences are located approximately 450 m from the northern boundary of the existing tailings pond and approximately 1,500 m from the mine facilities. Areas 2 and 3, which are targeted for the installation of the tailings pond, have potential for public development, including agricultural production (potatoes, blueberries and cranberries), and are also used for certain activities (hiking and ATV trails). Other than the presence of an ATV trail, Area 1 does not have any known potential for public use.

The project schedule provides for the submission of the study report in November 2012, the receipt of authorizations in December 2013, and site preparation and start-up of construction in 2014. Mining operations would begin in January 2016 and would continue for approximately 40 years, followed by site decommissioning and closure.

The main activities for each stage of the project are as follows:

- Site preparation: organizing the worksite, tree-clearing and disposing of woody debris, operating machinery and transporting material, excavating and backfilling the land, drilling and blasting, managing the worksite's runoff and sanitary water, managing residual material (hazardous and non-hazardous), purchasing goods and services, and managing the workforce.
- Construction: putting in place the buildings, developing the related permanent facilities/systems (access routes, wells, tailings sites, water-management structures [procurement and waste]), installing new production equipment, installing service networks (utilities), operating machinery and transporting material, drilling and blasting, managing the worksite's runoff and sanitary water, managing residual material (hazardous and non-hazardous), purchasing goods and services, managing the workforce, and closing down the worksite.
- Operation: presence, operation and maintenance of the buildings, related permanent facilities/systems and production equipment, following up on nuisances (air, water, noise, vibration, traffic, public health), managing process water, runoff and drainage water from buildings and waste snow, managing residual material (hazardous and non-hazardous), purchasing goods and services, and managing the workforce.

- Site closure: dismantling the new production infrastructures, equipment and related permanent facilities/systems, securing the site, managing residual material (hazardous and non-hazardous), restoring the site, following up on the closure, and managing the workforce.

4. Federal government participation

The federal government is not providing any financial assistance to this project. The project is not being carried out on federal lands and there are no federal lands in the vicinity.

At the federal level, this project shall be in accordance with the following acts, if required:

- Canadian Environmental Assessment Act, 2012
- Fisheries Act
- Navigable Waters Protection Act
- Canadian Environmental Protection Act
- Migratory Birds Convention Act, 1994
- Explosives Act
- Species at Risk Act
- Metal Mining Effluent Regulations
- Migratory Birds Regulations

5. Environmental effects

Environmental description

Physical Environment

The formation of the Saguenay Graben, which is characterized by the presence of faults, facilitated the ascent of magma, which cooled in the faults and formed the carbonatite intrusion which is being developed by Niobec for its niobium deposit. The deposit is composed of a series of crescent-shaped lenses of carbonatite, younging inwards. The deposit covers an area of approximately 15 km² and is nearly entirely covered by a layer of Trenton limestones of a maximum thickness of 70 m. The relief of the study area is relatively flat and consists of a large plain called Grand Coteau, located between Mount Vallin to the north and the Saguenay valley to the south.

The study area is located in the Saguenay River watershed, and Rivière des Vases is the primary river draining the area. It has its source in Lac des Vases, which is located at its northern end, and it flows approximately 25 km to the Saguenay River. The streams located in the project area are not considered secondary navigable

waters because they are shallow, narrow and winding and more importantly because of the frequent presence of natural barriers (primarily dikes, beaver dams, ice jams) that are obstructions to the passage of boats.

In the Saint-Honoré sector, there are two principal types of aquifers: bedrock aquifers and granular aquifers, composed of either deltaic sand and gravel or littoral sand. The principal water source for the municipality of Saint-Honoré is a granular aquifer located to the east of the Caribou River and approximately 6 km from the mine facilities. The surface water quality in the area met the guidelines for the protection of aquatic life.

The project will be carried out primarily on private lands owned by Niobec and in an area highly developed by existing industrial mining facilities. The noise environment is already affected by the mining operations, but also by road traffic (Hôtel-de-Ville Street and Martel Boulevard) and the many propeller planes around the Saint-Honoré airport located approximately 3 km from the sector.

Biological Environment

The vegetation in the study area belongs to the temperate northern zone (mixed forest sub-zone) and the balsam fir–yellow birch bioclimatic domain (eastern sub-domain). Marine deposits and the relatively mild climate have favoured agricultural development, which occupies a large portion of the study area. The dominant habitats are the young conifer and mixed stands, as well as regenerating stands. The wetlands in the study area are mostly peat bogs, riparian habitats (swamps and marshes) and a few shallow water areas. There are potentially 16 flower species with Quebec protection status in the study area. No vascular plant species currently listed on the federal species at risk list occur in the study area.

The study area is likely to be used by 188 bird species. No wildlife habitat recognized by the Quebec Department of Natural Resources and Wildlife (MRNF) is present within 4 km of the project. Forest habitats of the study area are used primarily by landbirds for nesting and during migration, when numbers can be greater for short periods of time. Natural habitats located near large rivers, such as the Saguenay River, can consist of resting and feeding sites for migratory birds. In disturbed areas, the various mine basins (sedimentation, recirculation and tailings pond) are used by many species of waterfowl for nesting and brood rearing. However, there are few natural aquatic habitats in the study area. The study area is likely to be used by 14 bird species that are considered at risk in Quebec. In terms of avian fauna, 15 species are designated threatened or special concern by COSEWIC or under the *Species at Risk Act*.

Three large wildlife species (moose, white-tailed deer and black bear), 17 fur-bearing species and 11 small mammals are likely to occur in the study area. Seven mammals species with at risk status in Quebec are likely to be observed in the study area.

The watercourses in the study area are generally small, less than 4 m wide and less than 1 m deep. The water flows mostly through channels and meanders (surface flow rate of less than 0.3 m/s). The substrate consists primarily of clay and silt. Due to the presence of active beaver populations, there are a number of beaver ponds that obstruct the free passage of fish. The presence of many species of fish has been

surveyed, including longnose dace, pearl dace, brook stickleback and brook trout. According to Garant (1983), the Rivière des Vases watershed likely supports the following species: American eel (*Anguilla rostrata*), walleye (*Sander vitreus*) and longnose sucker (*Catostomus catostomus*). The records of eel and walleye are probably limited to the downstream sector of the river. The American eel is designated a species of special concern by COSEWIC. It likely occurs in the downstream portion of the river and will not be affected by the project. However, this species does not currently appear on the list of species at risk under the *Species at Risk Act*.

Lake Brûlé, a small (5.7 hectares) relatively productive lake, is located in the study area. However, because of its small size, low oxygen concentration and the presence of a competing species, the potential of the lake for brook trout is significantly limited. Three other small (less than 2 hectares) productive lakes with little to no potential for brook trout are also found in the study area.

Human Environment

The Niobec property covers an area of 2,422.6 hectares and includes two mining leases and 66 claims totalling 2,293.2 hectares. Public land owned by the Quebec government is located to the northwest and west of the mine. Municipal lands (Saint-David-de-Falardeau, Saint-Honoré and the municipality of Saguenay) owned by the RCMs as well as private land are also found within the project sector. The largest land use of the RCM of Fjord-du-Saguenay is agriculture. The area of the Niobec mine is zoned for industrial use, but the part of the property further north is zoned for agriculture. The closest residences are located approximately 450 m from the northern boundary of the tailings pond and approximately 1,500 m from the mine facilities following Hotel-de-Ville Road.

The study area is generally flat, with altitude decreasing from north to south. The landscape consists primarily of woodlands, with agricultural fields located primarily along rural roads.

No classified or recognized archaeological sites are present in the study area. In general, the study area is located within an important network of navigable waterways which is known to have been used in prehistoric times, and may have been used much more recently for beaver trapping and fur trading. In total, four sectors with high archaeological potential have been identified.

Anticipated environmental impacts

Physical Environment

In terms of the physical environment, the main anticipated environmental impacts are as follows:

- Soil stability could be affected by drilling, blasting, tree clearing and the general developments (particularly the tailings pond). Mine operation using the block caving method could result in long-term subsidence of surface soil in a given sector.
- Soil quality could be adversely affected by the use of machinery (presence of fuel), the handling of waste and accidental spills of hazardous materials.

- Topographical modifications to the terrain and surface soils caused by the construction of the new facilities (e.g., tailings pond) and the new buildings could have an impact on the local hydrology, particularly affecting surface runoff and infiltration properties.
- Surface and groundwater quality could be adversely affected by various activities, clearing (woody debris), accidental spills, suspended matter, the presence of the tailings pond (leaching) and mining effluent.
- Increased transportation and vehicle traffic, transport of aggregates, operation of the tailings pond, as well as certain activities such as blasting, can increase dust emissions. As well, exhaust gases from vehicles will emit CO₂, CO, NO_x, VOCs and particulate matter. Atmospheric emissions will be more significant at the industrial complex due to ore processing activities.
- Noise levels will increase due to transportation and traffic, construction work and mine operations (e.g., mine ventilation, operation of the tailings pond).

Biological Environment

With respect to the biological environment, the main anticipated environmental impacts are as follows:

- The work will result in a loss of terrestrial habitats and wetlands.
- Construction activities, installation of infrastructure and mine operations will disturb bird species, including migratory birds, particularly breeding pairs.
- The project will result in habitat loss or fragmentation and in disturbances of terrestrial wildlife near the work.
- The project (primarily the construction of the new tailings pond and new access road) could result in fish habitat losses or disturbance. Mine effluent could modify the physico-chemical characteristics of receiving waters, which could affect aquatic communities downstream from the discharge point (Shipshaw River).

With respect to the biological environment, particular attention will be given to limiting adverse impacts on at-risk species during project planning.

Human Environment

With respect to the human environment, the main anticipated environmental impacts are as follows:

- In terms of property ownership, some of the project facilities could require the purchase of private property. As well, certain project components (notably the tailings pond) could encroach on public land owned by the Quebec government.
- Construction activities will cause an increase in vehicle traffic (trucks, machinery and employees) which could disrupt the use of existing road infrastructure.
- The work poses a risk of archaeological heritage loss.

- This project contributes to job creation and maintenance. Construction activities and mine operations will also increase the procurement of goods and services, which will have a positive impact on the local and regional economy.
- The area of subsidence associated with the underground block carving method will result in changes to the landscape. The visibility of the mine facilities and tailings pond will also have an impact on the landscape.

6. Consultation of Aboriginal groups

Three Aboriginal communities, all Innu, have land claims near or in the area of the Niobec mine project. They are the Pekuakamiulnuatsh First Nation, the Pessamit First Nation and the Essipit First Nation. Mashteuiatsh (Pekuakamiulnuatsh) is the only reserve located in the Saguenay–Lac-Saint-Jean region; the other two are located in the North Shore region.

The Niobec mine project is located within the Nitassinan of Mashteuiatsh. Pekuakamiulnuatsh Takuhikan is the political and administrative organization of the Pekuakamiulnuatsh First Nation. Based on findings that have emerged from preliminary discussions between Niobec representatives and Pekuakamiulnuatsh First Nation representatives, Niobec understands that the project's location is not considered Innu Assi (full ownership) territory, is not a heritage site, is not targeted for the establishment of an Innu park, and is not subject to traditional Innu territory management. Moreover, the area is not known to be used for any particular Aboriginal uses.

Niobec is committed to continue its consultation and open dialogue with the Pekuakamiulnuatsh First Nation to validate the potential impact of the project on the current use of lands and resources for traditional purposes. In line with this approach, even if the expansion project does not affect the interests of the Pekuakamiulnuatsh First Nation, Niobec is committed to working with Pekuakamiulnuatsh Takuhikan to maximize the benefits of its expansion in order to address those issues considered a priority by the community.

7. Public and other stakeholder consultation

As soon as the expansion project was announced, Niobec took a collaborative and participative approach with the citizens, local communities and organizations which could be affected by its activities. An initial consultation phase was held during the pre-feasibility study to hear the concerns and expectations of the local stakeholders on various aspects of the project, including the mining method, the infrastructure, construction, nuisance management and community liaison. The information gathered was used to determine which issues the participants wished to see covered in the environmental impact study. The concerns of representatives of the RCM of Fjord-du-Saguenay, the municipality of Saguenay and surrounding communities were also collected.

Niobec is currently initiating the second phase of information and consultation activities. A consultation on the impacts of the project will be held simultaneously with the impact study.

No consultations have been held with the federal authorities that will be involved in the project. However, an exercise was undertaken with the Quebec Department of Sustainable Development, Environment and Parks (MDDEP) in the spring of 2012 to verify whether the expansion project is subject to the environmental impact assessment and review procedure. Information gathered to date indicates that the project will be subject to that procedure. Official project notice was given in May 2012 and an official response including specific instructions was received in June 2012.

8. Reference

GENIVAR. 2012. *Saint-Honoré Niobec mine expansion project – Summary*. Report for Niobec Mine. 11 p. + Photographic appendix.

Photographic appendix

Saint-Honoré Niobec Mine Expansion Project: Photographic appendix



Photo 1: Current Niobec mine site.



Photo 4: Industrial landscape: mine water management facilities.



Photo 2: Agricultural landscape of Hôtel-de-Ville Street.



Photo 5: Agroforestry landscape, Lac des Vases.



Photo 3: Agroforestry landscape, Rivière aux Vases.



Photo 6: Bog landscape.



Photo 7: Wetlands landscape.