BLACKROCKMETALS

BlackRock Project

Iron ore exploitation at lac Doré geological complex

Summary

May 2013

BlackRock Metals Mining Project
Iron Ore Mine –
Lac Doré Geological Complex

Summary

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1 INTRODUCTION

The purpose of the BlackRock Metals mining project is to produce iron ore concentrate from the Lac Doré geological complex, some 30 km south of Chibougamau. The deposit will be mined by open pit and the iron ore will be concentrated using primarily mechanical methods. A final flotation stage will also be required to produce a concentrate that can be used to make high-grade steel. Mine operation is scheduled to begin in 2013 and continue until 2028.

The project also includes the construction of a rail line between the mine site and the existing Canadian National (CN) railway network, as the iron concentrate will be transported by train from the plant to the Port of Saguenay, and then shipped by boat to one or more steel plants in Asia.

By land, the mine site lies some 60 kilometres from Chibougamau via Route 167 going south, and then logging road 210. The entire project lies on mineral claims held by BlackRock and within the territory governed by the James Bay and Northern Quebec Agreement (JBNQA).

The pit, processing plant, garages and storage areas, tailings management facilities, waste rock piles, overburden stockpile and construction camp will all lie within the Chibougamau town limits. The project support infrastructure, including the access road, transmission line and rail line, will cross the Municipality of Baie-James and the town of Chibougamau. Hydro-Quebec is responsible for building the transmission line.

2 PRESENTATION OF THE PROPONENT AND THE STUDY AREA

2.1 Presentation of the Proponent

BlackRock Metals Inc. (Quebec entreprise number 1167390914) was created in 2008 to mine the Lac Doré Complex iron ore deposit in the Chibougamau region. The contact information for the person in charge of the project is as follows:

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Contact: Jacqueline Leroux, Regional Environmental Vice President
Email: jleroux@blackrockmetals.com

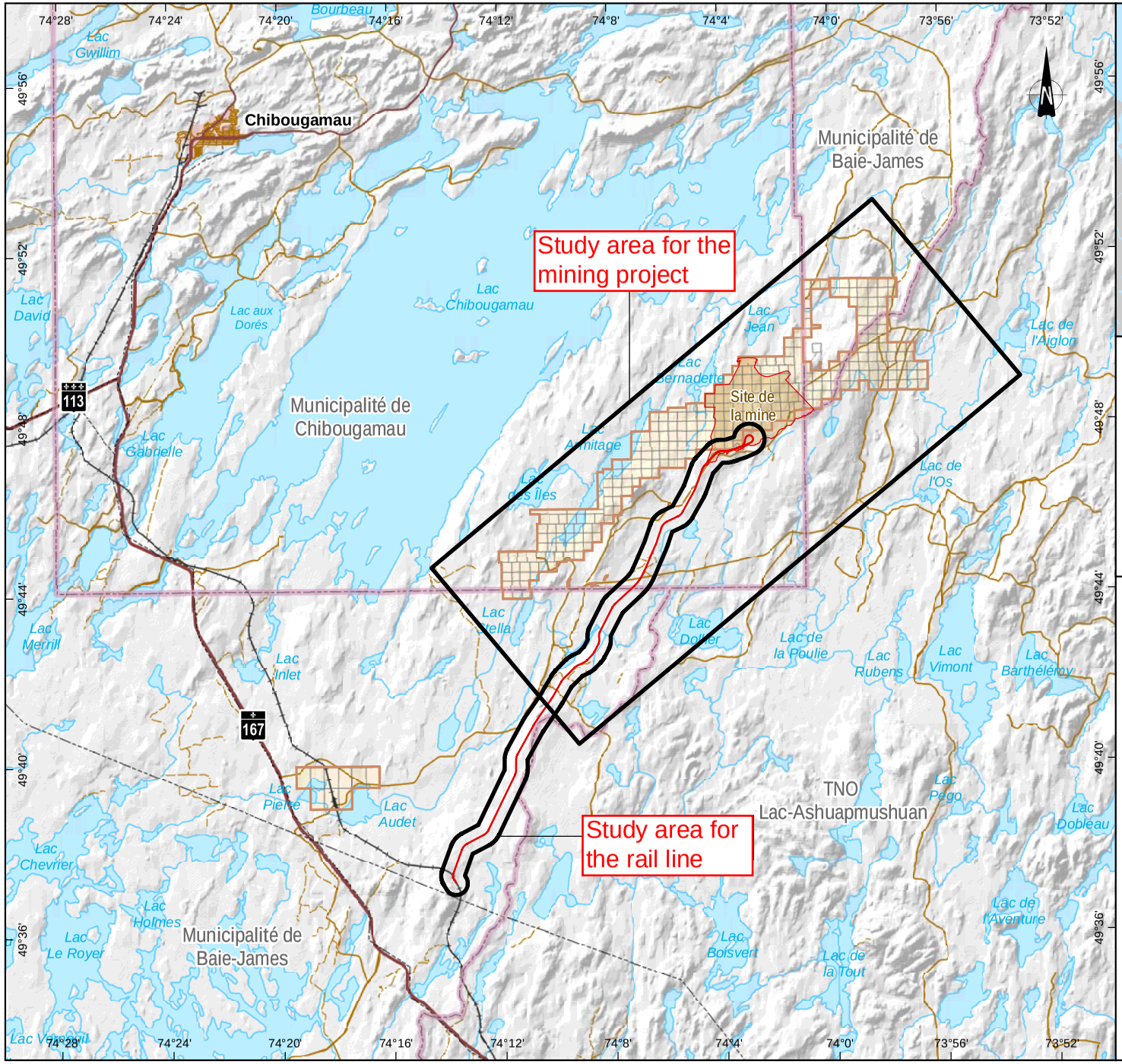
2.2 Study Areas

2.2.1 Regional Study Area

The regional study area for the mining project encompasses the town of Chibougamau, part of the Municipality of Baie-James and the County Regional Municipality (RCM) of Domaine-du-Roy, along with enclave towns (Chapais, Oujé-Bougoumou and Mistissini).

The regional study area for the rail line project includes the towns of Chibougamau and Chapais, the Municipality of Baie-James and the Cree communities of Oujé-Bougoumou and Mistissini.

Map 2-1 shows the regional study areas for the mine and the rail line. These areas are used to address the socio-economic aspects of the region's communities, human activities, transport networks and the significant components of the natural environment that could be affected, or conversely could have an effect on, components of the mining project.



Composantes du projet Métaux BlackRock

- Limite des claims actifs
- Claim minier actif
- Site de la mine
- Section de voie ferrée proposée

MÉTAUXBLACKROCK

Construction d'une nouvelle section de voie ferrée pour le projet de mine de Métaux BlackRock inc.

- Résumé fédéral -

Zones d'études régionales du projet minier et de la voie ferrée

Sources :
BDGA, 1/1 000 000, MRN Québec, 2002
SDA, 1/20 000, MRNF Québec, mai 2010
Données de projet :
S06428A-GR-CR-020-PLAN D'ENSEMBLE_ALIGN_V5G
CIMA, 14 août 2012
Cartographie : GENIVAR
Fichier : 111-16127-00_RF_C1_ZE_130528.mxd

Échelle 1 : 250 000

0 2,5 5 km

UTM, fuseau 18, NAD83

Carte 2-1

Mai 2013

GENIVAR

2.2.2 Local Study Area for the Mining Project

The local study area for the mining project covers an area of in the order of 700 km^2, including the area between Route 167 and northeaster Lac Chibougamau (Baie Girard). This area will be affected by iron ore mining and concentration activities (pit site, processing plant, garages, storage areas, waste rock piles, tailings management facilities, transmission line, etc.) and transportation activities (access road, rail line).

The local study area allowed all the environmental components affected by the project to be surveyed (soil, fish habitat, sensitive components, water and air quality, groundwater, archaeological potential, etc.) and the state of the environment prior to mining to be characterized.

2.2.3 Limited Study Area for the Rail Line

The limited study area encompasses the planned rail line from the mine site to the junction with the existing railway. It includes the components of the receiving environment most likely to be affected by the rail line construction project. For the components of the biophysical environment, this area extends 500 m on either side of the railway track, for on an area of approximately 26.6 km^2. For components of the human environment, however, it extends up to 1 km on either side of the railway line (53.2 km^2) to cover all human components present and likely to be affected by the project (land use, infrastructure, landscape, etc.).

3 PROJECT BACKGROUND

3.1 Iron Ore Market

In Quebec, iron ore mining is making a comeback, and multiple development projects have been announced. In the case of BlackRock Metals, metallurgical testing shows that the Lac Doré deposit can yield a concentrate containing at least 62% iron and 1% vanadium. A substantial portion of the concentrate to be produced has been pre-sold.

The Lac Doré geological complex presents BlackRock Metals with an opportunity to mine a high-value-added iron ore deposit containing titanium and vanadium. The unique nature of the deposit will afford BlackRock Metals several years of market stability not otherwise available in Quebec. The economic and social impact is largely positive and will enhance the region's popularity and international influence.

A region conducive to project development

The region's mining history eases the project's social acceptability. Chibougamau-area residents have a long mining tradition; mining was the economic driver and main source of jobs for the local and regional population for over half a century. After a number of years of decline, the regional mining industry will see a turnaround with the arrival of the BlackRock Metals project.

The project involves a total investment of in the order of $600 million (M). More than $400M will be spent on the construction of the processing plant and ancillary facilities, which covers 1.3 million man-hours that will mainly be worked by the region's residents. During mine operation, BlackRock Metals will directly employ some 160 workers. The project will also generate indirect employment that will stimulate general local and regional economic activity.

Integration of the project into the host environment

Land users and local authorities were involved in all phases of planning of the BlackRock Metals project, and decisions concerning project development were therefore made in light of their concerns.

The main issues for the project from a human perspective involve traditional activities and safe sharing of the road corridor from Route 167 to the mine site. Many mitigation measures are therefore planned for in this regard, along with other mitigation measures to offset the effects on traditional land users.

The hydrogeological study allowed the environment to be characterized and the best tailings disposal sites to be identified. Analytical results for the wastes produced by mining activities showed that they are neither acid-generating nor leachable. In addition, the surface water collection system will isolate the mine site and protect the wetlands and aquatic environments in the vicinity of the project area.

With regard to the biophysical environment, most of the fish habitats identified in the vicinity of the project are characterized by an overabundance of species tolerant of marginal living conditions and a very low representation of predatory species, which is indicative of the overall low quality of such habitats. Since the project will inevitably lead to loss of habitat, compensation measures for fish habitat and wetlands will be implemented on trapline O-59 to increase productivity, with the assistance of the tallyman.

3.2 Project Assessment Process

Following the filing of the project notice and receipt of provincial and federal directives, BlackRock Metals filed its environmental impact assessment statement in late November 2011.

In March 2012, BlackRock Metals announced the addition of the rail line segment linking the CN track to the future mine site.

In May 2012, BlackRock Metals filed a feasibility study that increased production from 2.5 to 3.0 million tonnes (Mt) per year.

Also in 2012, BlackRock Metals reassessed the location of the facilities and decided to swap the tailings and waste rock dump sites. There were a number of reasons for this change: a smaller environmental footprint, significantly lower construction costs, increased occupational safety at the plant, sufficient water for plant start-up and allowance for expanded capacity given the high mineral potential in the area.

In addition, based on questions from the various levels of government, BlackRock Metals conducted supplementary geochemistry tests on the waste rock and tailings and additional bird and plant surveys in 2012. Additional surface water quality analyses were also performed to determine baseline conditions.

Finally, BlackRock Metals expanded its consultations in 2012, holding meetings with residents of local communities.

Appendix 1 lists the different documents produced as part of the environmental impact assessment of the project.

3.3 Legal Framework

Federal

The federal framework requires compliance with the *Canadian Environmental Assessment Act* (CEAA). If the project affects fish habitat, it must comply with the *Fisheries Act* (c. F-14). The framework also includes the *Metal Mining Liquid Effluent Regulations* (CRC, c.819) and Fisheries and Oceans Canada's *Policy for the Management of Fish Habitat.*

Since iron ore mining will require on-site use and storage of explosives, the project must meet requirements set out by Natural Resources Canada (NRCan) under paragraph 7(1)a) of the *Explosives Act*.

Provincial

At the provincial level, the project is subject to the environmental and social impact assessment and review procedure under Chapter I, Section 22 of the *Environment Quality Act* (RSQ, c Q-2) and under Chapter II (Provisions Applicable to the James Bay and Northern Quebec Region) of the same Act. The project must also comply with *Ministère du Développement durable, de l'Environnement, de la Faune et des Parcs (*MDDEFP) Directive 019 relating to the mining industry.

Chapter 22 of the *James Bay and Northern Quebec Agreement* (JBNQA) and the *Agreement Concerning a New Relationship Between le Gouvernement du Québec and the Crees of Quebec* (commonly called *La Paix des Braves*, 2002) also apply to the project.

In addition to the impact assessment process, the project must comply with the *Ministère des Ressources Naturelles* (MRN) *Mining Act* (RSQ, c. M-13.1). When it begins mine development and construction, BlackRock Metals Inc. will have to officially apply for a mining lease from the MRN, under Sections 100 and 101 of the Act.

The proponent must also respect the *Soil Protection and Contaminated Sites Rehabilitation Policy* and meet criteria set out in the *Regulation respecting the quality of the atmosphere* with respect to common contaminants.

Finally, the proponent must comply with the following project-specific regulations, namely:

- Regulation respecting the water property in the public domain of the State (c. R-13, r. 1);
- Regulation respecting wildlife habitats (c. C-61.1, r. 18);
- Regulation respecting hazardous materials (c. Q-2, r. 32);
- Petroleum Products Regulation (c. P-30.01, r. 1);
- Transportation of Dangerous Goods Regulations (DORS/2008-34);
- Regulation respecting waste water disposal systems for isolated dwellings (c. Q-2, r. 22);
- Regulation respecting the quality of drinking water (c. Q-2, r. 40);
- Regulation respecting pits and quarries (c. Q-2, r. 7);
- Regulation respecting sanitary conditions in industrial or other camps (c. Q-2, r.11);
- Groundwater Catchment Regulation (c. Q-2, r.6);
- Forest Act (RSQ, c. F-4.1);
- Municipal by-laws.

4 PROJECT DESCRIPTION

This section presents the main components of the BlackRock Metals project, being the industrial activities and ancillary facilities (garages, storage areas, etc.), as well as the rail line that leaves from the processing plant. It describes the project phases, project components, mineral resource, mining facilities, mine waste management, site water management, support infrastructure and the related project (transmission line).

The plan in Appendix 2 shows the mine site in its natural setting. Appendix 3 shows the project at the end of open pit mining.

The mining facilities are as follows:

- Pit and all associated surface facilities;
- Concentrator and ancillary buildings;
- Covered ore stockpile;
- Fine tailings management facility, with a capacity of 28.8 Mm^3;
- Coarse tailings management facility, with a capacity of 42 Mm^3;
- Waste rock pile, with a capacity of 75.38 Mm^3;
- Industrial water treatment plant and associated facilities.

The supporting infrastructure is as follows:

- Existing access road;
- Rail line and ancillary facilities;
- Port facilities at Saguenay Port;
- Fuel depot and garages;
- Detonator and explosives magazine;
- Service-road network on site;
- Overburden accumulation area;
- Site power grid and substation;
- 500-room construction camp; and
- Other miscellaneous buildings and facilities.

4.1 Alternative Scenarios

4.1.1 Mining Project

Multiple alternatives were studied during the project design phase, with particular attention paid to the location of the production facilities, tailings management facilities and waste rock pile, process water intake, access road and workers' camp.

Because of their characteristics and function in the production process, some facilities must be must be located near the pit, for both financial and environmental reasons. The choice of the location of the mine infrastructure is also largely influenced by the concern of tallyman and his family not to encroach on the rich biological environment of the Lac Armitage area and by logging restrictions that the MRN and tallyman agreed to for the same area. Selection criteria for the choice of project sites also include minimal project footprint, minimal social impact and consideration of the carrying capacity of the soil and sensitive environments.

The pit location is fixed, as successive drilling and metallurgical testing programs by various mining companies in the past several decades have demonstrated the viability of the project based on the mining of the pit as outlined. The only other site that is sufficiently delineated for mining lies about two kilometres northeast of the current pit and is split among a variety of owners.

The crusher, concentrator and surrounding work sites must necessarily be located close to the pit and process water supply reservoir (Denis reservoir). Moreover, the large size and operating conditions of the facilities (constant vibrations and shocks) dictate their positioning based on stringent geotechnical criteria. In this regard, it should be mentioned that the north-south access road corridor ends at the processing plant. Four options close to the pit and around Lac Denis were considered.

In the preliminary study, eight sites were assessed as sources of surface water supply. The installation of a water intake in a lake, river or reservoir is, however, conditional on the amount of water withdrawn not exceeding 20% of the low flow value for seven consecutive days. Only the sites located at the confluence of Ruisseau Villefagnan and Rivière Armitage and Lac Armitage itself could meet the low-flow criterion. Given this, the option of building a dam to create a reservoir at Lac Denis was investigated.

Six alternatives were considered for the tailings and waste storage sites. Based on screening criteria, four of these were selected for detailed analysis using the methodology proposed by Environment Canada.[1] Of the four scenarios in the sensitivity analysis, the one that scored the highest was Option 6, shown on the plan

[1] Environment Canada. 2011. *Guidelines for the Assessment of Alternatives for Mine Waste Disposal.* Mining and Processing Division, 46 p.

in Appendix 2. This is therefore considered the most appropriate site for the location of new tailings management facilities for the BlackRock Metals project.

The workers' camp must be far enough away from the mine itself to ensure that workers can have downtime free of noise and dust while also ensuring their safety, which could be compromised by frequent back-and-forth trips by heavy trucks in the mining area. It must be large enough to provide for basic services like drinking water and septic systems. Two options were assessed: the site at the edge of the Lemoine road and the site at the intersection of logging road 210 and the Lac France road. Taking into account all the positive and negative points, the logging road 210 camp site was selected.

4.1.2 Rail Line

The initial option was to have a rail transfer point, with truck transport between the processing plant and a site some 27 km away and then train transport to a port (site adjoining the CN railway line). Following project optimization, this option was later rejected and construction of a rail line to the processing plant was selected.

A possible corridor for the new rail segment from the proposed mine to the existing CN railway line was first defined in 2011. More recently, in 2012, preliminary engineering was done on railway corridor design and optimization. Multiple routes were considered for the railway, with the optimised corridor taking the following environmental criteria into consideration

- Avoid certain streams;
- Avoid a zone of cedar-black spruce forest (Portage-Mackenzie rare forest);
- Cross streams where they are narrowest;
- Have a net-zero cut and fill profile.

After several modifications and versions, the version selected was based on its lower environmental sensitivity, which also coincided with lower construction costs.

4.2 Mining Project Overview

4.2.1 Mineral Resource

BlackRock Metals will mine an iron ore-vanadium mineral from a deposit located in the Lac Doré layered complex, south of Lac Chibougamau. The surface coordinates of the mineralized zones are: Latitude 49°39'14" N and Longitude 74°18'08" W

BlackRock Metals owns the rights to the deposit, in the form of 308 mineral claims covering 5,236 ha (52 km^2).

Deposit and Mineralization

The BlackRock Metals deposit is an Fe-Ti-V oxide deposit associated with a stratiform magmatic complex, also called a layered igneous complex, located in the Lac Doré Complex near Chibougamau.

The Lac Doré Complex extends northeast to southwest over a distance of about 24 km, 17 km of which belongs to BlackRock. Two main mineralized zones have been identified on the BlackRock Metals property: the Southwest zone and the Armitage zone, which cover vanadium-bearing ferrogabbro horizons of 2.5 km and 3.3 km, respectively. BlackRock Metals' current development efforts are focused on the Southwest zone, where the mineralized envelope varies in thickness from about 100 to 300 m.

The Southwest zone deposit contains reserves estimated at 152.2 million tonnes (Mt) of ore grading an average of 29.1% iron. BlackRock Metals plans to produce concentrate with an iron content of 62-65%.

4.2.2 Mining Facilities

Mining

The ore will be mined by open pit. The pit will be about 2.8 km long by a maximum of 450 wide and about 280 m deep. The pit will therefore cover a surface area of about 1.26 km^2.

At full capacity, BlackRock Metals expects to produce nearly 12.4 Mt of ore and 3 Mt of concentrate annually. At the end of the mine life, the mine will have produced 152 Mt of ore, 264 Mt of waste, 7.6 Mt of overburden and 38 Mt of concentrate. Mining and milling activities will take place 24 hours per day, 365 days per year.

Drilling and Blasting

Drilling will be done in the pit using 21.6-cm diameter equipment. A supplier will supply the explosives and will be responsible for on-site storage and management of the explosives. Blasting will be done using an emulsion with an average density of 1.25 g/cm^3.

Ore and Waste Haulage

The ore and waste in the pit will be loaded into trucks by electric-hydraulic shovels with an approximate capacity of 25-m^3 and hauled to surface by 220-tonne trucks.

Pit Dewatering

A system of pumps will keep the pit dry during mining. The pumping rate will vary according to pit depth and season. Mine water will consists primarily of precipitation, snow meltwater and groundwater, and will go from little water in the firsts years to an evaluated maximum of 585 m^3/h.

Ore Processing

The ore processing complex will consist of: primary, secondary and tertiary crushers, the ore stockpile and the concentrator building. Attached to the concentrator will be a service building housing offices, an assay laboratory, an infirmary, an electrical/instrumentation shop, a lunchroom, a shower room, an employee changeroom, a compressor room, a boiler room, a breaker room, a training room, a storage area and a mechanical shop.

The capacity of the concentrator corresponds to the capacity of the equipment to deliver the ore. Like the mining activities, the concentrator will operate 24 hours a day, 7 days a week, on two continuous 12-hour shifts.

4.2.3 Process Overview

Crushing

The crusher will be located in building nearest the pit to minimize haulage distance. The primary crusher, which is a 1.52 m x 2.26 m gyratory crusher that can crush up to 4,670 tph, will operate 65% of the time, or about 15.6 hours per day, 7 days per week.

Before being fed to the cone crusher, the ore will be screened, with pieces smaller than 50 mm sent directly to the ore stockpile. The coarse fraction from screening will be crushed to 80% minus 50 mm. The crushed ore will be sent to the ore stockpile, which will have a live capacity of 12.2 hours of plant production, for a volume of 8,972 m^3. This ore stockpile will be covered by a dome and accessible by equipment as needed.

Grinding

The ore will be reclaimed from the ore stockpile by three chain feeders and sent by conveyor to the 11 m x 5.25 m, 15,000 kW semi-autogenous grinding (SAG) mill. The SAG mill will have a capacity of 1,543 tph. At the SAG mill outlet, the ore will be screened (two stages) before being fed to the first stage of magnetic separation. The coarse fraction will be sent back to the 6.4 m x 10.7 m ball mill while the fine fraction will be fed to the second stage of magnetic separation. The final product will be 80% minus 75 microns.

Magnetic Separation

Once ground (SAG and ball mills), the ore will be sent to the magnetic separation units. Magnetic separation will take place in two stages, the first referred to as primary, with single-drum units, and the other secondary, with double-drum units. The magnetic separation feed is in an aqueous medium, meaning that the ore is mixed with water to a density of 40% solids. The primary unit will have a capacity of 1,686 tph solids (3,375 tph of slurry, i.e., ore and water). The unit will consist of eight 1.2 m x 3.2 m cylinders. The non-magnetic tailings will be collected from beneath the separators and will constitute the coarse tailings, which will be fed through hydrocyclones to remove as much water as possible before they exit the mill. The coarse tailings will be piled outside the concentrator by a conveyor before being trucked to the coarse tailings pile, while the fine tailings will be sent to the tailings thickener.

The feed for the secondary stage of magnetic separation will be the fine fraction from the hydrocyclones used with the ball mill. This section will consist of eight 1.2 m x 3.2 m double-drum units, and will have the capacity to receive 762 tph of solid ore, for an equivalent of 3,049 tph of slurry. This stage will separate out the non-magnetic material, which will be sent to the tailings thickener, while the magnetic fraction will be fed to the flotation cells (six cells in series). Reagents will be added to the concentrate in the first cell. The concentrated flotation product, which is the sulphide fraction, will be sent to the tailings thickener.

Concentrate Dewatering

The desulphured magnetite concentrate will be sent to a 27-m thickener located outside the plant, to be thickened to 65-70% solids.

Concentrate Drying

The thickened concentrate will then be sent to filtration stage and filtered using drum filters to a water content of 8.5%. An additional steam drying stage may be added as needed to reduce the water content to 5.5% when required, such as during winter cold spells.

The filtered material will be sent by conveyor to the rail cars, at a feed rate of up to 6,000 tph. An emergency storage area is available in case there is a problem with the train.

Concentrate Loading

Following filtration, the final concentrate is sent outside the concentrator into a storage bin of about 10,000 tonnes, equal to about one day’s production. An outdoor emergency storage area is available to provide for any production issues. If this area is used, the material must subsequently be fed back into the storage bin. A front-end loader is used to put the concentrate into a hopper, which feeds it onto the conveyor

that takes it to the storage bin. When the time comes to load the rail cars, the concentrate is sent to a 400-tonne loading bin.

4.2.4 Tailings Management

Geochemistry of the Tailings

The results of static and kinetic testing done on the tailings showed that they are neither leachable nor acid-generating.

Tailings Storage

The magnetite concentration process will produce two types of tailings: fine and coarse.

Coarse Tailings Management Facility

The coarse tailings are generated by primary separation, and will be more than 106 microns in diameter. The quantity of coarse tailings to be stored is estimated at 76 Mm^3.

The coarse tailings pile will be built to the west of the pit, and will be adjacent to the fine tailings pond. Because the coarse tailings are dry, they will be piled to an average height of 95 m. The pile will have a footprint of 1.66 Mm^2. A secondary area of 131,478 m^2 is also planned in case of emergency.

Fine Tailings Management Facility

The fine tailings are from the underflow of the thickener and will have a density of 50% solids. This slurry will be pumped to the fine tailings pond using two 250 HP pumps in series.

At the fine tailings pond, the water in the pond will consist of a mixture of process water, mine water and rainwater falling on the surface of the pond. This water will be transferred through a spillway into the polishing pond for a second round of settling. Water will be pumped from the polishing pond to the concentrator to be reused. This recycled water represents 10% of the process water requirements; the remainder will come from the thickener overflow.

The fine tailings pond will be located west of the pit. Dams will be built around most of the perimeter. The dams will have a maximum height of 27 m, and the maximum thickness of the tailings in the pond will be 22 m. About 40 Mt of wet tailings will be deposited for a total volume of 28.8 Mm^3 (water and solids). The tailings deposited in the pond will be flooded to eliminate a source of dust emissions. The aqueous phase on top of the tailings will be transferred to the polishing pond and then recycled to the concentrator or released into the environment through the treatment and monitoring pond, which will allow the standards for mining effluents to be met.

4.2.5 Waste Rock Management

Geochemistry of the Waste Rock

The acid generation potential of the waste rock was tested on 113 waste rock samples. The results showed that the waste rock will not generate acid when exposed to the elements.

Waste Rock Storage

Waste rock will be stored on a pile to be built east of the pit. The overall slope of the pile will be 22 degrees for a maximum elevation of 640 m, which means a maximum thickness of about 140 m of waste rock. The maximum footprint of this pile is about 160 ha for a maximum volume of approximately 250 Mt of stored waste rock.

4.2.6 Site Water Management

During the pre-construction phase, runoff will be directed to polishing pond, which will already have been built. The containment dams at Lac Denis will be built as soon as mine construction begins, raising the lake's capacity to 1.45 Mm^3. The lake will then become a holding pond and will no longer be considered a receiving environment.

Perimeter Ditch Network

The water from the tailings management facilities and waste rock piles or its resurgence will flow into the network of ditches surrounding the property. All the water will end up flowing to a monitoring point downstream from the property. The ditch network is shown on the plan in Appendix 2.

Domestic Wastewater

Two domestic wastewater treatment units will be installed, one for the concentrator and another for the mine garage. These treatment plants will be located close to target facility. The water will be treated using a membrane bioreactor, and the treated water will be discharged into a ditch to flow to Lac Denis via an insulated pipe. The treatment sludge will be collected on a regular basis by a specialist supplier.

Pit Water

The water drained from the pit, which will consist of groundwater and precipitation that falls on the footprint of the pit, will be pumped to the fine tailings pond. The amount of groundwater to be pumped will vary depending on pit depth.

Process Water

BlackRock Metals optimized water recirculation in an effort to minimize the quantity of fresh water pumped from the environment. Process water will mainly consist of water from the thickener overflows and the tailings pond. Aside from the recirculated water in the process water tank, the water required to meet processing needs will come from the polishing pond. This water will be pumped to Lac Denis before entering the processing plant. Process water requirements are estimated at 5,163 m³/ h.

Polishing Pond Water Treatment Unit

The treatment unit will be located upstream from the polishing pond and is sized to treat a flow of 20,000 m^3/d, thus treating water from peak flows during the spring thaw or heavy rains. The water will be transferred from the fine tailings pond to the polishing pond by pumping. The fine tailings pond, which will have a holding capacity of 28.8 m³, will also be linked to polishing pond through an emergency spillway. The polishing pond will also be equipped with an emergency spillway allowing the water to flow into the treatment and monitoring pond. The treatment unit is designed to precipitate the suspended solids through the addition of polymers and coagulants. Sludge from the treatment unit will be pumped as needed and sent to the fine tailings pond. Because this sludge consists of agglomerated fine particles, not metallic precipitates, no impact from the redissolution of metals or other parameters is anticipated.

Outlet

Before being released into the environment, groundwater from the pit and runoff from mine site accumulation areas will be treated to meet the water quality criteria of Directive 019 and, to the extent possible, the effluent discharge objectives (EDO) defined by the *Ministère du Développement durable, de l'Environnement, de la Faune et des Parcs* (MDDEFP). The treated water will be discharged into the stream bed upstream from Lac Jean. The flow rate will vary depending on the time of year, with less discharge in winter and during low flow periods.

During the construction years, this stream will be dry because the water from the polishing pond will be pumped to Lac Denis in preparation for plant start-up. There will therefore be no effluent during the construction years, and Lac Jean will be fed by other streams not affected by the project.

4.3 Rail Line Project Overview

BlackRock Metals will build a 26.6-km rail line segment from the mine site to the railway owned by the Canadian National Railway Company (CN), connecting Chibougamau to Lac-Saint-Jean.

The railway right-of-way will be about 18 km wide, for an area of about 48 ha. The grade of the route of the proposed railway generally ranges from 0.00% to 1.40%.

Given the relief along the planned railway route, a wye track will be installed at the future mine site, designed to maximize the surface of the wye. Appendix 4 shows the rail line corridor.

The rail line will be used to transport the iron ore concentrate from the future BlackRock Metals mine to the port of Saguenay, with one return trip per day, year-round. Each train will consist of four locomotives and 91 closed rail cars.

4.4 Supporting Infrastructure

4.4.1 Access Roads

Route 167 and logging road 210 will serve as the mine site access road. The only roads that need to be built are therefore the service roads on the mine site itself.

4.4.2 Port Facilities

BlackRock Metals will ship the iron ore concentrate by boat using various multi-user facilities at the Saguenay port (Grande-Anse Maritime Terminal). The main port facilities to be built at the Port of Saguenay are:

- automatic car unloader;
- conveyor with galleries (covered);
- bucket-wheel reclaimer;
- storage (covered and heated in winter);
- tubular or standard conveyor with galleries;
- cargo loader.

Note that the port facilities will be under the responsibility of Port Saguenay and they are not part of the environmental assessment (project scope).

4.4.3 Service Facilities

Fuel and Oil Storage and Distribution

The fuel storage areas will be located at least 75 m away from the other facilities. All tanks will be double-wall and equipped with a pump unit, piping and a fueling device. On-site fueling will be carried out by a vehicle with a storage capacity of 18,500 litres.

On-site fuel storage will be supplied by two horizontal, aboveground, ULC-S601 double-wall 40,000-litre tanks for gasoline and eight horizontal, aboveground, ULC-S601 double-wall 50,000-litre tanks for diesel fuel.

Each site will also have the materials needed to fill and drain trucks and any other required equipment. A computerized management system designed to provide automated control of proper fuel use will be installed to track fuel consumption.

Garages and Buildings

The garage where equipment will be maintained will occupy an area of approximately 4,400 m^2, and the adjacent 4,700 m^2 storage area. The building will include a mezzanine housing offices for engineering and mine production, meeting rooms, a cloakroom, bathrooms and a lunchroom. The ground floor will consist of a garage with six repair bays including one wash bay, as well as a machine and welding shop, an electrical shop, a tool storage area, 16 offices, a lunchroom, a change room and a room for daily mine production meetings. The fuel tanks will be located near the garage.

Hazardous waste will also be stored near the garage, as per applicable regulations, and will be transported by specialized firms to an approved treatment site for final disposal.

4.4.4 Overburden Accumulation Areas

Clearing and stripping of the mineralized zone is expected to generate about 7.2 Mt of overburden. The overburden and topsoil will be placed at the western end in the waste rock pile pending use in ongoing site rehabilitation work.

4.4.5 On-Site Power Grid and Substation

The main electrical substation will be located near the concentrator, where power requirements are highest due to the presence of the crusher and the SAG mill. A portable substation connected to a network of cables will be used for power supply in the pit.

4.4.6 Drinking Water Supply

The mine site drinking water will be supplied by an artesian well. Two separate drinking water treatment systems will be set up: one for the processing plant site (125 m^3/day) and the other for the garage site (200 m^3/day). The treatment process includes filtration, chlorination and UV sterilisation.

Drinking water from artesian wells will be stored in a tank and distributed for health needs in all housing units and service areas of the workers' camp.

4.4.7 Recovery, Recycling and Disposal Methods

Debris generated during the construction, operation and closure phases will be disposed of at an MDDEFP-approved site. Recycling and reuse of materials will be encouraged.

4.4.8 Construction Camp

The construction camp will be able to accommodate 500 workers in single rooms. The camp will also house a cafeteria, a medical clinic, a recreation hall and a laundry room. The camp will be equipped with a closed-loop fire protection system. It will be heated by a propane gas system, and electricity will be supplied by an 800-kW generator. The drinking water and wastewater treatment system and final waste disposal are similar to the mine site.

4.5 Related Project – Transmission Line

Project power requirements are estimated at about 49 MW. Power will be supplied by a new 22-km 161-kV line from line No. 1627 (Obalski/Otabogamau), which serves Chibougamau. Hydro-Québec is responsible for building the transmission line.

4.6 Project Phases

4.6.1 Construction Phase

The main construction activities are:

- Building of the construction camp;
- Construction of the polishing pond upstream dam to store the water required for operation;
- Building construction (concentrator, garage, tank installation);
- Rail line construction;
- Preparations for mining: stripping, blasting, separate topsoil and overburden storage;
- Service road construction and ditch development.

4.6.2 Operation Phase

The main production activities are:

- Mining of the ore;
- Concentration of the ore (crushing, grinding, magnetic separation and flotation);
- Deposition of the waste rock in the waste rock pile and of the tailings in the coarse and fine tailings management facilities;
- Equipment and building maintenance;
- Water treatment;
- Environmental monitoring.

4.6.3 Site Closure and Rehabilitation

The mine closure rehabilitation plan was filed with the environmental impact assessment statement issued in 2011. BlackRock Metals then filed a supplemental rehabilitation plan that includes the rail line segment between the mine site and the CN line.

4.7 Human Resources

4.7.1 Jobs

BlackRock Metals will have approximately 260 employees in seven departments: Mine, Concentrator, Maintenance, Engineering, Administration, Human Resources and Environment.

During mine operation, employees whose jobs involve rotating 12-hour shifts will work a 5/4 - 4/5 - 5/5 schedule. Employees with eight-hour-per-day jobs will work a 4/3 schedule.

Employees will be bused from meeting points in the communities of Oujé-Bougoumou, Chibougamau and Chapais to the mine site at the beginning of each shift, and from the mine site to the meeting points at the end of each shift.

4.7.2 Community Relations

BlackRock Metals is committed to interacting and cooperating with the communities in the vicinity of the project. To this end, BlackRock Metals undertook to set up discussion groups in the communities of Oujé-Bougoumou, Chibougamau, Chapais and Mistissini. These discussion groups work by theme, chosen by the participants. In the future, BlackRock Metals plans to develop these discussion groups into a regional group where stakeholders can gather to hear about BlackRock Metals' activities and express their concerns. Following the discussion groups, BlackRock held open house days in communities affected by the project. In all, 379 people came to tour the booths and meet the BlackRock Metals team.

BlackRock Metals has also presented the project to the Mashteuiatsh representatives and has committed to inform them about the project evolution and Employment opportunities.

BlackRock Metals is also currently working on an IBA (impacts and benefits agreement) with the Oujé-Bougoumou Cree Nation, the Grand Council of the Crees and the Cree Regional Authority. This agreement will primarily focus on training and employment, working conditions and operating policies, business opportunities, cultural and social considerations, environmental considerations and financial considerations. A summary of the non-confidential items of the agreement can be provided once the agreement has been signed.

4.8 Project Costs

4.8.1 Mine Site

The total capital cost is $609.3 million and includes the purchase and installation of electrical equipment for mining and offsite infrastructure, and the equipment required for grinding, stockpiling, the processing plant, water and waste management, and mining. It also covers indirect costs such as the owner's cost, engineering, construction and production start-up, as well as contingencies.

Annual operating costs are expected to be $188.9 million for the first seven years, and to then increase to $191.8 million annually from the eighth to the tenth year of operation and decrease to $174.1 million/year in subsequent years. Operating costs cover mining, processing, general and administrative expenses, handling and transport to the port.

4.8.2 Rail Line

In terms of railway construction, total project costs are estimated about $67 million, or about $2,500,000/km of track. It should be noted that project costs do not include a provision for the acquisition of rolling rail stock.

4.8.3 Rail Service at the Grande-Anse Marine Terminal

The total estimated cost for the facilities at the rail service and the Grande-Anse port, namely the multi-user facilities for unloading the train, storing the materials, conveying it to the port facilities and cargo loading, is approximately $100 million.

4.9 Project Schedule

4.9.1 Mining Project

Preliminary exploration-phase work is planned prior to issuance of the certificates of authorization. This work mainly involves the exploration camp and the installation of equipment for drinking water supply and drinking water and wastewater treatment.

Construction would begin Fall 2013 and go on for 18 to 24 months. End of exploitation is planned for 2028 and closure activities would be carried out from 2029 to 2034.

4.9.2 Rail Line Project

The preliminary project schedule allows about two years for the work (from 2013 to 2015). The various stages of construction are as follows:

- final design (final report and conceptual plans) completed and approved by BlackRock Metals;
- detailed engineering for the design and installation (three months);

- building permits obtained prior to the start of work;
- selection of a contractor for earthworks, drainage and structural work for a period of one year;
- selection of a contractor for rail works for a period of one year.

4.9.3 Rail Service at the Grande-Anse Maritime Terminal

The rail link to the Port of Saguenay rail access should be ready by December 31, 2013. The multi-user facilities for unloading trains, storing materials, conveying to the port facilities and ship loading should be in place by late summer 2014.

5 OVERVIEW OF THE HOST ENVIRONMENT

5.1 Physical Environment

The Chibougamau area is characterized by a subpolar, subhumid continental climate.

Physiography and Geology

Except for a few hills in the vicinity of the mine site, the study area is characterized by flat topography with a fairly continuous cover of surficial materials.

The average elevation is 420 m above sea level, while the deposit hill peaks at 533 m. The many lakes, streams, wetlands and waterholes attest to the gentle slope of the terrain and low surface permeability.

The bedrock straddles the Precambrian-age Superior structural province (mine site) and the Grenville structural province (Domaine-du-Roy RCM), and consists of metasedimentary and igneous rocks. The rock formations strike northeast-southwest.

5.1.1 Surficial Materials

Bedrock

The bedrock is composed of weakly metamorphosed volcano-sedimentary rocks of the Lac Doré Complex and igneous rocks of the Lac Chibougamau Complex.

These rocks are generally hard, massive, impermeable and relatively unaltered on surface. Outcrops are mostly found in the area of the mine site, and are much like the hills of the deposit.

Glacial Deposits

Most of the local study area is covered by glacial till lying directly on the bedrock. The till lacks bedding structure (ground moraine), and is made up of components of various sizes, with a potentially-high of fine particles (silt and clay). The till often has poor drainage, but has very good bearing capacity. The water table is often close to surface (1 m or less).

The glacial till includes drumlins, small elongated northeast-southwest hills up to a kilometre long and some 10 m high. These are coarse deposit (boulders, pebbles, sand and gravel), generally looser than the ground moraine till, with good drainage. The drumlins have steeply-sloping sides (10%) and flat tops. Drumlin till can be found throughout the area and is a suitable source of granular material.

Organic Deposits

Organic deposits are found in flat terrains and hollows often found at the edge of streams and lakes. They are made up of somewhat decomposed organic matter and are scattered throughout the study area, often overlying the till or alluvial deposits beside streams and lakes undergoing eutrophication.

The largest areas of organic deposits are found around Lac Jean and Lac Bernadette (mine site). The deposits are water-saturated and 1 to 3 metres thick, with high compressibility.

5.1.2 Hydrology and Hydrogeology

The study area is drained by two large river basins: the St. Lawrence River watershed to the east and the James Bay watershed to the west. The drainage divide coincides with the border between the Domaine-du-Roy RCM and the Municipality of Baie-James, and crosses the southwestern part of the town of Chibougamau.

Generally speaking, underground runoff is affected by the relatively steep topography around the mine site and the type of surficial material present, which is characterized by poor drainage and low permeability (glacial till). The bedrock surface under the surficial deposits is fissured.

5.1.3 Surface Water Quality

Surface water was characterized during the mining project impact assessment study. Three watersheds were characterized, namely Ruisseau Villefagnan, Lac Bernadette and Rivière Armitage (Ruisseau Wynne sub-watershed). Note that all the streams crossed by the route of the railway are intermittent, with the exception of Jules River.

The results for *in situ* physicochemical parameters in the mining project study indicate the presence of poorly-mineralised, bicarbonate-calcite-type lakes and streams. In addition, laboratory test results for the lakes and streams in the Ruisseau Villefagnan and Ruisseau Bernadette watersheds have higher conductivity, alkalinity, total inorganic carbon and calcium, magnesium and sodium concentrations than generally seen in the Canadian Shield (elsewhere in Quebec)

5.1.4 Ambient Air Quality

There are few human activities in the study area that result in air pollution (mine site and rail line corridor). Current emission sources are primarily the result of mineral exploration and logging activities and wind erosion. The quality of the ambient air in the vicinity of the proposed railway can therefore be described as good.

Mine site activities were modelled to ensure the achievement of air quality standards as defined by the *Clean Air Regulation* (CAR). Contaminants selected for modeling were suspended particulate matter or total particulate matter (PM_{tot}) and fine particulate matter ($PM_{2.5}$), as well as 14 metals and metalloids. Three gaseous

components, namely carbon monoxide (CO), nitrogen dioxide (NO_2) and sulphur dioxide (SO_2) were also modelled.

Three scenarios were modeled: Year 0, Year 1 and Year 5 of mine operation. No air quality standards are exceeded in Year 0. For years 1 and 5, the modeling results clearly indicated that air quality standards for fine particulate matter, carbon monoxide, nitrogen dioxide and sulfur dioxide are met at all times, but not the CAR standard for total particulate matter. However, this standard is only exceeded one or two days per year except in an area adjacent to the CAR application boundary northeast of the pit, where it is exceeded some ten times per year. All metals meet the air quality standards with the exception of chromium. Note, however, that modelling does not take into account the precipitation or deposition, which can reduce the concentration of airborne particles, particularly in terms of total particle deposition.

The rail line project involves the passage of a daily train, thus totalling some 365 return trips per year. Good railway usage practices provide for ways to reduce the pollution associated with air emissions from locomotives, such as technologies for idling mode, as it is recognized that idling trains contribute significantly to the emission of airborne contaminants.

5.2 Biological Environment

5.2.1 Vegetation

The entire study area is in the black spruce-moss forest bioclimatic domain, which is the largest bioclimatic domain in Quebec. The main species found are black spruce, fir, trembling aspen, balsam poplar, tamarack, jack pine, white birch and white spruce. Deciduous trees are often found as isolated patches and along roads, and tend to be trembling aspen and white birch.

The area's vegetative cover has been somewhat disturbed by logging over the years. Cutting has spread steadily since the 1950s, and is now the main cause of environmental disturbance.

5.2.2 Wetlands

The mining project and rail line construction entail activities that affect wetlands. Eight wetland categories were identified: ponds, marshes, open bogs, open fens, flooded swamps, shrub swamps, poor conifer swamps and rich conifer swamps.

Wetlands consisting mainly of marshes and poor conifer swamps account for 326.5 ha of the mine site, or 20.45% of the total property area. Marshes and poor conifer swamps are the main types of wetlands.

The railway study area comprises 797.6 ha of wetlands, representing 31% of its total area. Treed peatlands, bogs and shrub swamps are the main types of wetlands in the study area.

5.2.3 Wildlife

Mammals

Wildlife in the study area is composed of species commonly found in boreal forest. Mammals seen in the area are moose, wolf, red fox, black bear, porcupine, beaver, eastern chipmunk, groundhog, river otter, snowshoe hare and lynx.

Other mammal species likely to be encountered in the area and valued by traditional land users are the muskrat, American marten, American mink, fisher and ermine. The list of mammals also includes skunk, other small mammals (mouse, vole, shrew) and a few bat species.

Birds

The following species have been observed in the study area: spruce grouse, common raven, thrushes, ruffed grouse, black-capped chickadee, white-throated sparrow, Canada jay, common yellowthroat and northern flicker.

Birds of prey in the study area include the osprey, American kestrel, red-tailed hawk, bald eagle and golden eagle.

About 197 migratory bird species are listed for the region, of which 80 are confirmed to be present in the Chibougamau region. However, the data only shows 64 confirmed to breed in the region.

There are also many aquatic species, including 14 species of Anatidae (geese and ducks), whose habitat is closely associated with lakes and shores, as well as the common loon, great blue heron, spotted sandpiper, greater yellowlegs, Wilson's snipe and American bittern, which are also associated with aquatic environments (ponds, lakes, streams) and wetlands (marshes, grassy banks, etc.). Most of the other bird species are passerines (39 species), which are generally associated with woodlands.

Amphibians and Reptiles

The study area's numerous lakes and other wetlands constitute favourable habitats for a number of amphibian and reptile species. These include the northern two-lined salamander, American toad, northern spring peeper, green frog, mink frog, wood frog, leopard frog, eastern spotted newt and common garter snake.

Fish

There are several species of fish in the area of the mine site, the main ones being: northern pike, brook trout, white sucker, perch, burbot and fallfish. Several small species are also present, such as longnose dace, northern redbelly dace, pearl dace, trout-perch, brook stickleback and mottled sculpin.

Wildlife Habitats

Earlier wildlife habitats have been somewhat disturbed by intense logging in certain sectors, including the future mine site.

A number of moose winter habitats have been identified near the mine site. In wintertime, moose sometimes occupy some of the areas that will be affected by mining activities. Beavers have also built dams on most of the streams. A walleye spawning ground and a few small potential spawning grounds for brook trout are located in the vicinity of the future mine site.

It should be noted that the mining project is not located in a currently protected or ecologically important area.

5.2.4 Special-Status Species

Threatened and Vulnerable Vascular Plant Species

The sources consulted in a supplementary study on the biological environment in the study area point to the potential presence of 14 special status species in the study area. Of these, four are calcicolous plants, several occurrences are well removed from the study area, and some species have specific habitats that are uncommon in the study area. Of all the habitats encountered, cedar groves, peatlands (treed peatlands, fens and bogs), disturbed sandy sites, rock outcrops and lakes are most likely to host special status plants.

The *Centre des données sur le patrimoine naturel du Québec* (CDPNQ) mentions the presence of two vascular plants with special status within a 100-km radius of the study area, namely dragon's mouth (*Arethusa bulbosa*) and lavender bladderwort (*Utricularia resupinata*). In addition, the range of the ostrich fern (*Matteuccia struthiopteris*) in Quebec suggests that this plant may be present in or around the study area.

None of the vascular plant species on the Canadian Wildlife Species at Risk list have been observed in the study area.

Wildlife Species at Risk, Threatened, Vulnerable or Likely to be Designated as Such

Mammals

Overall, six at-risk species of mammals are likely to be found in or around the study area. Results of requests for information made in 2011 reveal that the rock vole and silver-haired bat have been reported within 10 km of the mine site. Based on the habitats present in the study area and knowledge of species biology, the species most likely to be present are the eastern red bat, hoary bat, silver-haired bat, southern bog lemming and rock vole.

Birds

Nine species at risk have been reported from the region surrounding the study area. Five of these were observed during the 2012 surveys and four potentially breed in the study area. Species at risk that were not observed are unlikely to be found in the study area, as their unique type of nesting habitat is not found in the study area.

The two most common and abundant species at risk in the study area are the olive-sided flycatcher and rusty blackbird.

5.3 Human Environment

5.3.1 Land Use

The territories of the Municipality of Baie-James and the town of Chibougamau lie on Category III land as defined in the JBNQA. The Crees' hunting and fishing rights on these lands are enshrined in the JBNQA. The mine and mining infrastructure lie on trapline O-59. The northeast edge of the mining area (Lac Laugon area) corresponds to trapline O-57/M-57, whose ownership is under discussion by the communities of Oujé-Bougoumou and Mistissini.

The project area is regularly used for blueberry picking, as well as for partridge, waterfowl, bear and moose hunting. Fishing takes place mainly on Lac Chibougamau, and to a lesser extent on Lac Armitage.

Members of the Wapachee family are the main users of the wildlife resources in the study area. Their moose hunting grounds are located east of Lac Armitage, near Lac Laugon. They trap many fur-bearing species and hunt Canada geese and several species of duck along Rivière Armitage and Ruisseau Villefagnan.

In the area of the proposed rail line, traplines O-59 and O-60 of the community of Oujé-Bougoumou occupy the entire local study area. Trapping in these two areas is reserved exclusively for Aboriginal peoples.

The rail line local study area is located in sports hunting zone 17 and partially overlaps zone 28. Note that caribou hunting is permitted in hunting zone 17, and Canada geese and several species of ducks are also hunted in the study area.

The other activities that take place in the two study areas are associated with forestry, mining and extensive tourism. There are no permanent residences near the proposed mine site or railway line. However, a lease to operate a commercial resort and the Wapachee family's main seasonal camp (Rabbit camp) are found west of the proposed rail line, but as the tallyman has agreed to relocate the Rabbit camp outside the mining project's area of influence, and the camp will not be considered a component of the built environment.

5.3.2 Archaeology

The only known archaeological site in the local study area (DkFn-1) is on the eastern shore of Lac Chibougamau, south of Île des Commissaires, about eight kilometres from the mine site.

The archaeological potential was assessed throughout the local study area to identify areas where traces of human occupation might be found. A survey of such areas was done in the summer of 2011. Some 550 pits were dug, but failed to produce anything.

5.3.3 Consultations

Meetings with the various local stakeholders were held within the scope of the Lac Doré Complex environmental impact assessment. BlackRock Metals and its representatives have had discussions with stakeholders since July 2010, mainly with First Nations including the tallyman of trapline O-59, the *Ministère des Ressources naturelles* (MRN), the MDDEFP, the Canadian Environmental Assessment Agency, the Department of Fisheries and Oceans Canada, Environment Canada, municipal governments including those of Chibougamau and the Municipality of Baie-James, and local and regional agencies. These meetings involved the mining project and its components, but did not cover the proposed railway project.

The goal of such meetings is to take stock of stakeholders' concerns and their knowledge of the environment so as to develop a project that allows for these elements to the greatest extent possible. BlackRock Metals intends to continue interacting with local stakeholders and the general public over the entire life of the project.

A number of communication and consultation meetings took place while the railway option was under study. These were held in the context of ongoing discussion committee meetings, interviews for the documentation of Cree traditional knowledge and open house days. BlackRock Metals is pursuing its regular practice of consulting and informing the communities.

All those who spoke and made comments at the "open house" days were in favour of the project. However, despite seeing positive aspects, some people mentioned concerns and expectations, most of which related to jobs, economic benefits, training and environmental impacts:

- Job creation and economic benefits;
- Training and hiring conditions;
- Project information;
- Impact on activities practiced by land users;
- Practice of traditional Cree activities in the area;
- Migration of local manpower toward the mine;
- Risk of pollution;

- Higher housing prices.

Job Creation and Economic Benefits

Many visitors wanted BlackRock Metals to allocate a significant portion of the construction and operating costs in the region, which would help create or maintain many jobs. The local entrepreneurs met with hope to get contracts for various activities. Participants said that they would like BlackRock Metals to give preference to local businesses and local hiring.

Training and Hiring Conditions

Many visitors were looking for information on jobs and training. The main information points were:

- Number of jobs available by category;
- Work schedule;
- Transportation offered by the company;
- Company internships;
- Mentoring;
- The most useful basic training for students;
- When the mine would open;
- Training provided by the company, particularly for truck driving and mechanical maintenance;
- Training for drilling and blasting;
- The potential for adjusting work schedules;
- Minimum education needed to work at the mine (e.g.: Secondary V).

Project Information

There were many questions on the construction period: number of jobs, work camp, construction timeframe, etc. Other information related to the project components: pit, equipment and machinery, processing plant and the process itself.

People also asked for information on the sale of the iron and vanadium produced: block sale to a single client, multiple clients, countries, companies, etc. In this regard, several participants stressed that they would prefer that secondary and tertiary transformation take place here in Quebec rather than in China.

Finally, concerns were expressed regarding the project's profitability and the possible impact of lower iron prices.

Impact on Activities Practiced by Land Users

Participants who practice sport hunting in the area where the project will be built said they believe the mine will certainly have an impact on game populations, which may be driven out of the area by the noise and activity of the mine. However, they felt that the harvesting potential would not change and that they would be able to continue to hunt in good conditions, despite the mine's presence. These land users indicated that the creation of some 260 jobs was more important than the changes, which overall were minor, to their hunting practices.

Pratice of Traditional Cree Activities in the Area

Philip Wapachee, tallyman for the trapline in the project area, stressed that it was important to maintain adequate space on his trapline for family members to continue their traditional hunting, fishing, gathering and trapping practices. In this regard, he identified the portion of his land that he wishes to exempt from any major development. It is located south of the project site, between Lac Chibougamau and Route 167.

Mr. Wapachee also indicated that ideally, efforts be made to raise awareness of people in the surrounding non-native communities and future mine workers with regard to the culture and practices of the Cree way of life.

Migration of Local Manpower toward the Mine

A few participants noted that attractive working conditions, particularly the pay, could lead to the migration of workers from local businesses to the BlackRock Metals mine. This movement might mainly be seen in the specialized trades needed by the mining company, but also in unskilled labour. This could exacerbate the worker shortage that currently exists in Chibougamau.

Risk of Pollution

Visitors asked for information on a range of environmental aspects and the possible risk of pollution. Some participants appreciated the explanations of the various project components, including ongoing rehabilitation of waste rock pile and coarse tailings facility from the outset of mining. Many people were also interested in the processing method, which uses few chemicals. There were also questions regarding the amount of water used.

Some participants asked about the closure plan and post-closure monitoring studies. The quality and strength of the dam membranes were also questioned by some visitors, and a few people highlighted the potential for contamination of the environment by mining activities. Questions also concerned the measures taken to ensure the protection of the lakes around the mine site. In this regard, some participants asked about the possibility of an emergency release, as well as the quality of the water that might be released.

Several participants welcomed the choice of train transportation. Some visitors asked for information on the methods used to ensure that train transport would not generate dust emissions.

Higher Housing Prices

A few visitors mentioned that the project might result in a rise in housing prices in Chibougamau and Chapais due to higher demand. They stressed that this increase could be seen as positive by owners looking to sell their house, but as negative by people looking to buy.

6 TECHNOLOGICAL RISKS

Risks related to health and safety and the environment were identified in order to devise a strategy to limit the occurrence of accidents and minimize the consequences of accidents that cannot be avoided, which then allowed the identification of potential technological accidents.

The significance of technological risk was assessed using the methodology commonly used to assess environmental risks for mining operations (Table 6-1). The significance of consequences depending on the type of incident is presented in Table 6-2. This assessment is limited to the environmental impact of failures and accidents.

Table 6-1 Methodology for Assessment of Technological Risk and Potential Consequences

Criteria	Scope	Reversibility	Importance for the public	Probability of occurrence
Definition	Extent of the physical area affected.	Speed at which the biophysical environment can recover with or without human assistance	Local and regional public perception of the incident.	Assessment of event frequency
Weighting (100%)	30%	10%	30%	30%
Significance of potential impact by criteria				
1	Isolated	Effects from the incident can be rectified within a month.	Event that can easily be managed by local resources.	Highly unlikely
2	Local	Can be restored within a year.	Event that will require the intervention of outside specialists.	Likely to occur once during the life of the mine and processing plant.
3	Regional	Will take more than one year to restore.	Event that should result in site closure.	Likely to occur more than once during the mine life.
Significance of potential impact				
Low	Weighted total between 0 and 1.5			
Medium	Weighted total between 1.6 and 1.9			
High	Weighted total between 2.0 and 3			

Table 6-2 Significance of Consequences of Potential Technological Accidents

Criteria	Scope	Reversibility	Importance for the public	Probability of occurrence	Impact significance*
Weighting	0.3	0.1	0.3	0.3	1 to 3
Accident					
Petroleum Products					
Oil spill during road construction	2	2	2	2	2.0
Spill during transport of petroleum products	2	2	2	2	2.0
Oil spill during the use of roads (transport trucks)	1	2	2	3	2.0
Major oil tank spill	2	2	2	1	1.7
Leak from oil tanks and ancillary equipment	1	1	2	3	1.9
Oil spill in garage or other workshop	1	1	1	3	1.6
Oil spill in the pit, or on haulage roads or stockpiles	1	1	1	3	1.6
Uncontrolled leachate during contaminated soil storage	1	1	2	2	1.6
Reagents					
Spill during reagent transport	2	2	2	2	2.0
Spill at the plant during reagent handling	1	1	1	3	1.6
Emission of uncontrolled explosive dust at the plant	1	1	2	3	1.9
Fire or explosion inside the plant or reagent warehouse	1	2	2	2	1.7
Reagent tank leak	1	2	2	2	1.7
Hazardous Waste					
Hazardous waste storage site spill	1	1	1	3	1.6
Hazardous waste storage site fire or explosion	1	1	2	2	1.6
Explosives					
Unexploded or partially exploded explosives left in the pit	1	1	1	3	1.6
Spill of raw materials used to manufacture explosives	1	1	1	3	1.6
Geotechnical Stability					
Discharge of liquids due to dam failure	3	2	2	2	2.3

Criteria	Scope	Reversibility	Importance for the public	Probability of occurrence	Impact significance*
Weighting	0.3	0.1	0.3	0.3	1 to 3
Accident					
Discharge of solids due to dam failure	2	2	2	1	1.7
Bench collapse: pit, waste rock or coarse tailings pile	1	2	2	1	1.4
Waste rock slide	1	1	2	2	1.6
Other					
Major fire or explosion at the plant	2	3	3	1	2.1
Spill of secondary chemical products: workshop and garage	1	1	1	3	1.6
Spill due to break in process water pipeline or ancillary equipment	1	1	1	3	1.6
Process water reservoir leak	1	1	1	1	1
Sewage spill	1	1	1	2	1.3
Spill due to break in fine tailings pipeline	1	1	1	3	1.6

***** Impact significance is the product of 'score per criterion' x 'weighting factor'

7 IMPACT AND MITIGATION MEASURES

The overall objective of the impact assessment is to determine, as objectively and accurately as possible, the significance of the residual impact of the project on the components of the physical, biological and human environment following the application of general or special mitigation measures. This assessment focuses on all types of effects, whether negative, positive or indeterminate.

Only the anticipated impact and benefits for the most sensitive components (for which the impact or benefit is moderate or higher) during the various project phases are presented below. Specific mitigation measures and enhancement measures to be implemented are also summarized. All the general mitigation measures that apply to the mining and rail line projects are shown in Appendix 5.

The global assessment of the environmental impact of the construction, operation and closure phases for the mine and the rail line segment on the physical, biological and human environments is presented in Chapter 10.

7.1 Methodology

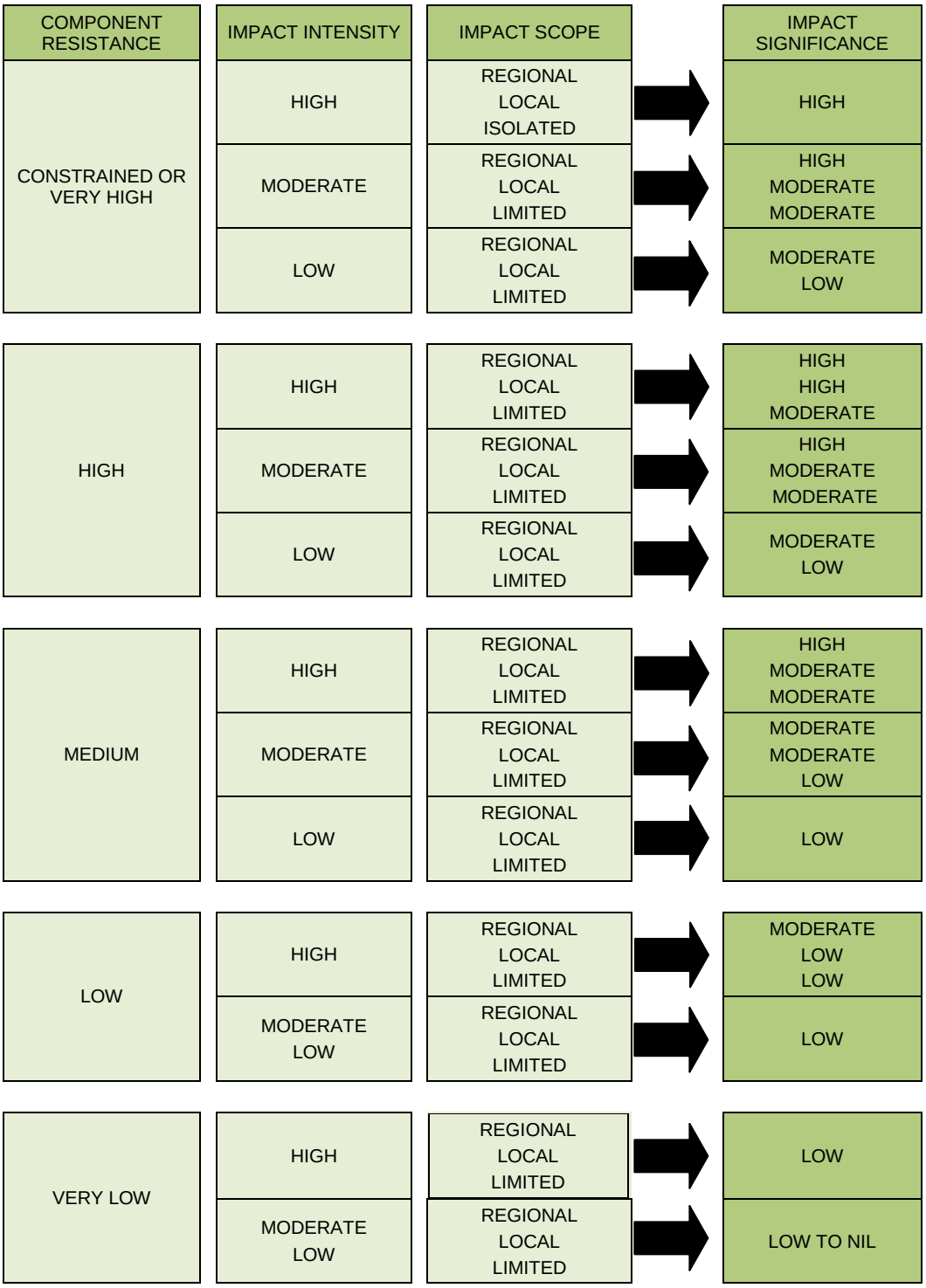
7.1.1 Mining Project

The impact assessment method used in the study consists of relating the project's components to components in the receiving environment that are likely to undergo an impact as a means of determining their significance. Impact assessment and determination is based on criteria of resistance to the project. According to the grid shown in Figure 7-1, the correlation between the indicators of intensity, scope and resistance indicates whether the significance of the impact on the natural and human environments is high, moderate or low. Duration was not used as a criterion for impact determination, but rather a qualitative element to help choose the appropriate mitigation measures.

7.1.2 Rail Line Project

The approach used for this study was to identify and assess the significance of the anticipated impact at the various stages of the project. Regardless of its significance, every effort is then made to develop measures aimed at mitigating the impact. The significance of an impact depends on the intensity of the effect (which in itself incorporates the notions of component value and degree of disturbance), and its extent, duration and probability of occurrence (Table 7-1).

Figure 7-1 Impact Significance Determination Matrix



Source: Entraco 2011

Table 7-1: Combination of Criteria for Determining the Significance of an Effect on an Environmental Component

Intensity	Extent	Duration	Probability of occurrence	Significance	Intensity	Extent	Duration	Probability of occurrence	Significance	Intensity	Extent	Duration	Probability of occurrence	Significance
High	Regional	Long	High	Very high	Moderate	Regional	Long	High	High	Low	Regional	Long	High	Moderate
			Moderate	Very high				Moderate	Moderate				Moderate	Low
			Low	High				Low	Moderate				Low	Low
		Moderate	High	Very high			Moderate	High	High			Moderate	High	Moderate
			Moderate	Very high				Moderate	Moderate				Moderate	Low
			Low	High				Low	Moderate				Low	Low
		Short	High	High			Short	High	Moderate			Short	High	Moderate
			Moderate	High				Moderate	Moderate				Moderate	Low
			Low	High				Low	Moderate				Low	Low
	Local	Long	High	High		Local	Long	High	Moderate		Local	Long	High	Low
			Moderate	High				Moderate	Moderate				Moderate	Low
			Low	High				Low	Moderate				Low	Low
		Moderate	High	High			Moderate	High	Moderate			Moderate	High	Low
			Moderate	High				Moderate	Moderate				Moderate	Low
			Low	Moderate				Low	Moderate				Low	Very Low
		Short	High	High			Short	High	Moderate			Short	High	Low
			Moderate	High				Moderate	Moderate				Moderate	Very Low
			Low	Moderate				Low	Low				Low	Very Low
	Point	Long	High	High		Point	Long	High	Moderate		Point	Long	High	Low
			Moderate	High				Moderate	Moderate				Moderate	Low
			Low	Moderate				Low	Low				Low	Very Low
		Moderate	High	High			Moderate	High	Moderate			Moderate	High	Low
			Moderate	Moderate				Moderate	Moderate				Moderate	Very Low
			Low	Moderate				Low	Low				Low	Very Low
		Short	High	High			Short	High	Moderate			Short	High	Low
			Moderate	Moderate				Moderate	Low				Moderate	Very Low
			Low	Moderate				Low	Low				Low	Very Low

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

Source: Genivar 2012

7.2 Impact on the Physical Environment and Mitigation Measures

The global assessment of the environmental impact of the construction, operation and closure phases for the mine and the rail line segment on the physical environment is presented in Chapter 10.

7.2.1 Construction Phase

During the construction phase, the general construction activities required to build the various project facilities are clearing, blasting, excavation and earthworks, stream crossings, and construction of access roads and other related structures. These activities are potential sources of direct impact on various components of the physical environment.

7.2.2 Operation Phase

During the operation phase, the main sources of impact likely to affect the physical environment are: mining activities in the pit, waste and tailings disposal, water and runoff management, management of wastewater and contaminants, transport, railway operation and maintenance and general processing plant and crusher operation.

However, once the various mitigation measures proposed within the scope of the studies on the mining complex and railway line are accounted for, the residual impact on the physical environment from the various project phases are all considered minor or low (Appendix 5).

7.3 Impact on the Biological Environment and Mitigation Measures

The global assessment of the environmental impact of the construction, operation and closure phases for the mine and the rail line segment on the biological environment is presented in Chapter 10.

7.3.1 Construction Phase

During the construction phase, the main sources of direct impact on the various components of the biological environment are the clearing work and general construction activities required for mine and rail line development.

7.3.2 Operation Phase

The main sources of direct impact during the operation phase are the mining activities, mine waste management and the presence of the production facilities and support infrastructure.

In addition, the water encroachment caused by the presence of the waste rock piles and tailings management facilities, stream diversion and the establishment of a

drainage system are sources of indirect impact that could affect wildlife, as are the presence of workers and the intensive use of the access road during the construction and operation phases.

The application of the many mitigation measures presented in Appendix 5 will greatly reduce the residual impact on the various components of the biological environment. The residual impact on the biological environment resulting from various phases of the mine and rail line projects are all considered minor or low.

7.4 Impact on the Human Environment and Mitigation Measures

The global assessment of the environmental impact of the construction, operation and closure phases for the mine and the rail line segment on the human environment is presented in Chapter 10.

7.4.1 Construction Phase

Negative Impact

The likely sources of negative impact on the various components of the human environment during the construction phase are the clearing, excavation, blasting, construction and development work, as well as increased traffic on logging road 210 and the mere presence of workers on the construction sites (mine and rail line).

In terms of the rail line, the anticipated sources of a residual impact of moderate significance are: the loss of 47 hectares of forest for trap line users, increased noise levels, increased wildlife harvesting by workers outside working hours, and the safety risk for Aboriginal users travelling to their camps and hunting and gathering sites due to increased traffic on the various logging roads.

The impact on cultural heritage will also be felt at the northern end of the railway, where a first moose kill site will be affected by railway construction.

The general mitigation measures that will be taken to minimize the impact on the human environment during rail line construction are shown in Appendix 5.

In addition, the following specific mitigation measures will be taken:

The following specific mitigation measures will also be applied:

Before the work starts:

- consult with the tallyman and his family regarding the appropriate mitigation measures, as requested during the consultations;
- relocate and rebuild the Rabbit camp;
- meet with the tallyman and give him a work schedule that includes a description of the nature of the activities (clearing, blasting, excavation, etc.).

During work:

- maintain communications between BlackRock Metals and the tallyman to avoid any issues with land users.

No residual impact (moderate or higher) on the human environment was identified for mine site construction.

Benefits

Sources of impact likely to positively affect the various components of the human environment during the construction phase are related to the acquisition of goods and services and the generation of tax revenues from employee and corporate earnings.

The anticipated residual benefits of moderate significance or higher relate to job creation and economic benefits for local and regional suppliers, which will support the local population and the regional economy. The following enhancement measures will be taken:

- BlackRock Metals and the local community will set up manpower training programs for aboriginals and non-aboriginals so as to meet manpower requirements;
- Establishment of a discussion group with members of the Oujé-Bougoumou Cree community, particularly for the discussion of socioeconomic issues. An impact and benefits agreement (IBA) is currently being prepared and will cover subjects such as: training, jobs and business opportunities for the Crees, culture and environment;
- Cooperation between BlackRock Metals and regional employment centres;
- Preferential hiring of manpower and contractors from Oujé-Bougoumou, Chibougamau and Chapais, followed by the neighbouring regions (Saguenay–Lac-Saint-Jean and Abitibi–Témiscamingue);
- Creation of a round table to develop and monitor the economic benefit optimization strategy.

7.4.2 Operation Phase

Negative Impact

Sources of impact likely to negatively affect the various components of the human environment during the operation phase are the track usage, maintenance and repair activities and the presence of permanent and ancillary facilities, as well as the production facilities at the mine site.

No significant residual impact (moderate or higher) on the human environment is anticipated during the operation phase for the mine site or the railway line.

Benefits

Sources of impact likely to positively affect the various components of the human environment during the operation phase are related to the acquisition of goods and services and the generation of tax revenues from employee and corporate earnings.

The anticipated residual benefits of moderate significance or higher relate to job creation and maintenance and economic benefits for local and regional suppliers, which will support the local population and the regional economy.

The following enhancement measure will be taken:

- Preferential hiring of local workers insofar as they have the required skills at the time of hiring.

7.4.3 Closure Phase

Negative Impact

Sources of impact likely to negatively affect the various components of the human environment during the closure phase arise primarily from the closure of the facilities and the end of railway use and maintenance.

The anticipated residual impact on the human environment of moderate significance or higher relates to the job losses and declining spending in the region that could affect the local population and regional economy. No mitigation measures are planned in this regard for the closure phase.

8 CUMULATIVE IMPACT

Assessment of the cumulative impact helps relate the project to the other anthropogenic alterations that characterize the host environment and have an impact on the people living there. This makes it possible to gain a better appreciation of the project's potential for insertion into a changing environmental and social context with a minimal risk of impact.

8.1 Methodology

The methodology used for the cumulative effects assessment includes the following broad steps:

- identification of Valued Environmental Components (VECs), determination of the spatial and temporal boundaries considered for each of them, and a description of the indicators used;
- identification of the projects, actions, events, etc. that may have affected the VECs, affect them now or will affect them in the future;
- description of the baseline condition of each VEC and its historical trend;
- identification of the cumulative effects for each VEC.

To be selected as a VEC, an environmental component must:

- be highly valued by the stakeholders or specialists;
- be likely to be disturbed or altered to a significant extent by the project.

Within the framework of the EIS (Entraco 2011), the following VECs were selected for cumulative effect assessment:

- lakes and streams;
- traditional land use;
- use of the area for the exploitation of other resources;
- jobs and the economy.

The following VECs were added to this assessment:

- birds;
- wetlands;
- at-risk species.

Aside from the BlackRock Metals 26-km railway project, the cumulative impact assessment also covers the 161 kV transmission line (HQ) and the Saguenay Port rail and marine facilities that will receive the iron ore concentrate.

The spatial boundaries for the cumulative impact assessment cover the greater Chibougamau region, including the traditional territory of the community of Oujé-Bougoumou. The timeframe stretches from the beginning of the second half of the 20th century until about 15 years after the end of the mining and railway activities.

8.2 Anthropogenic Alterations in the Chibougamau Region

8.2.1 Mining Industry

As seen above, the mining industry has played a central role in the development of the Chibougamau region. Some 30 mines have been operated there over the last 60 years. The oldest mining operations in the region date back to 1955.

These mines, which are now all closed, left considerable waste resulting from obsolete practices. Mine effluents and drainage water can contain organic contaminants and heavy metals likely to be found in the receiving environment when acid-generating minerals are present. However, mine site rehabilitation was not an obligation or even a concern for the mining industry prior to the late 1970s. The Troilus mine was the last mine to cease operations. It closed in 2010 after 15 years of operation.

Five old tailings ponds have been identified in the Chibougamau area: Copper Rand, Eaton Bay, Lemoine, Norbeau and Principal.

8.2.2 Power Infrastructure

Since Phase 1 of the La Grande complex went into service in the early 1980s, three Hydro-Québec substations have been built in the region: Chibougamau, Obalski and Obatogamau. The presence of these facilities leads to the risk of soil contamination by hydrocarbons and other hazardous products. Chapter 11, which deals with this risk, illustrates this reality quite clearly. The region also hosts more than 10 735-kV transmission lines, one 450-kV line, one 350-kV line and numerous 161-kV lines. These power transmission and distribution lines, while essential for the Quebec economy, contributed to territorial fragmentation.

8.2.3 Forestry

Since the early 1950s, forestry activities have played a role in altering the Chibougamau area's biophysical environment as a whole. Chantiers Chibougamau Inc. currently exploits the forestry resource north of Lac Chibougamau. To the east and south, large-scale logging has almost ended. Like mining, logging can lead to an increase in nutrients and particulate matter in lakes and streams. Disturbances of the forest cover are likely to cause higher levels of mercury methylation in bodies of

water. The dissolved organic carbon load disturbs the natural mercury cycle and leads to higher mercury levels in fish at the bottom of the food chain.

8.2.4 Landfill and Contaminated Sites

The region has two authorized landfill sites in operation, namely those of the towns of Chibougamau and Chapais. The former is located northeast of the town, on Chemin Merrill. The Chapais landfill site is beside the old Opémiska mine. The MDDEP's list of contaminated sites shows 17 sites in the Chibougamau area, primarily containing hydrocarbon-contaminated soils.

8.3 Environmental Components Subject to Cumulative Impact from the Project

8.3.1 Lakes and Streams

The mining project will affect part or all of many natural lakes and streams. However, the route of the railway line only crosses one permanent stream, with all the other streams crossed being intermittent. There are also other lakes and streams in the region affected by past, present or future mining activities (future projects often being the potential reopening of old projects). However, the effect is spread out over both time and space.

The railway will cross a few streams. However, the surveys conducted suggest that the free movement of fish will only be required at one crossing (Jules bridge), because the others do not have fish habitats.

The multi-user facilities at the marine terminal will not require work in a body of water.

The cumulative impact on lakes and streams will be limited, as the other past, present or future projects are spread out, both in space and in time. In addition, these projects are controlled by clear regulations that include the implementation of mitigation and compensation measures.

8.3.2 Traditional Land Use

While low intensity, a cumulative impact will be felt on the traditional activities practiced in the regional study area. BlackRock Metals has held numerous meetings with land users to ensure that the impact is minimal, and the users have even agreed to move and replace their current hunting camp (Rabbit camp).

8.3.3 Use of the Area for the Exploitation of Other Resources

The exploitation of other resources (mining, logging, fishing and hunting) could be affected by regional activities and the current mining and rail line project.

The mining of the iron ore deposit of the Lac Doré geological complex by BlackRock Metals will not directly affect other mining operations in the region, whether past, present or future.

The clearing required for the project will not affect logging activities, given the small area affected compared to the vast territory covered by forests.

Other local activities as well as those related to the project will not affect the current hunting and fishing activities in the region.

Daily use of a train (round trip) between the BlackRock Metals plant and the port of Saguenay will only have a low impact on the municipalities along the route, given that the pressure was higher in the past.

Activities and multi-user facilities at the Saguenay marine terminal will not affect the exploitation of other resources in the area.

Given that timber is a renewable resource, mines are operated over many decades and a vast territory, the mineral potential is very high and companies even plan to reuse old areas that have once again become economically viable, the cumulative impact of these projects remains low.

8.3.4 Jobs and the Economy

The various activities in the study area, both mining and other, are generally independent, and do not affect each other's economics. If future forestry activities are planned in the vicinity of the study area, proper planning will allow activities to be coordinated and any negative impact to be avoided.

Thus, the BlackRock Metals project (mine and railway) will have direct positive effects on jobs and local and regional economic benefits. The cumulative impact is expected to be positive, as it would be for any regional project.

8.3.5 Birds

The clearing required for the BlackRock Metals project (mine and railway), combined with other resource exploitation activities in the region, could have an impact on nesting birds and their habitats.

According to the various sources consulted and the surveys conducted, the study area and the surrounding region are likely to be frequented by 145 species of birds on an annual basis. Expected losses were assessed based on the various surveys and the habitats found in the railway study area: one breeding pair for waterfowl, none for birds of prey, 190 breeding pairs for land birds and one breeding pair for shorebirds.

At-Risk Bird Species

For all areas affected by the BlackRock Metals project (mine and railway), the olive-sided flycatcher and rusty blackbird are the two most frequent and most abundant at-risk species in the study area.

During field surveys for the proposed railway, a Canada warbler, two rusty blackbirds and olive-sided flycatcher were seen nearby. For the Canada warbler and rusty blackbird, it is estimated that between one and three couples could be affected by the project. In the case of olive-sided flycatcher, the loss is estimated at about two couples.

Considering the vast forest area that hosts the BlackRock Metals project (mine and railway), the cumulative effect for birds would be limited, as other past, present or future projects are spread out from each other in both space and time.

8.3.6 Wetlands

Construction of mining facilities will affect approximately 204 ha of wetlands (peatlands, swamps, marshes), representing about 0.03% of the study area chosen for the impact assessment (70,000 ha). For the railway, only 16.4 ha of wetlands would be affected. The main losses are in peatlands, which are also forest stands that support volumes of merchantable timber, or at any rate did so prior to logging.

The loss of wetlands may affect certain species of migratory birds. The route of the railway has been optimized to have the least possible impact on the natural environment, including wetlands. Precautionary measures have also been proposed to keep drainage as natural as possible.

Because wetlands are abundant in the Chibougamau area, the cumulative effect for wetlands would be limited because other past, present or future projects are spread out from each other, in both space and in time. The most recent projects have been optimized and take wetlands into consideration. In addition, wetland losses caused by the BlackRock Metals project (mine and railway) will eventually be the focus of an offset project, and an environmental monitoring program will be prepared and submitted to government agencies as necessary.

8.3.7 At-Risk Plant Species

There are two vascular plants with special status within a 100-km radius of the study area, namely dragon's mouth (*Arethusa bulbosa*) and lavender bladderwort (*Utricularia resupinata*). In addition, the range of the ostrich fern (*Matteuccia struthiopteris*) in Quebec suggests that this plant may be present in or around the study area. However, none of these three species was observed during the surveys performed in the study area in 2011 and 2012.

All mining projects in the region, whether existing or in development, can affect various endangered species. Furthermore, given the existing legislation, mine site

rehabilitation provides an opportunity to recreate potential habitats for at-risk species.

8.4 Summary of the Net Cumulative Impact

Historically, lakes and streams have been broadly used in connection with mining operations. The main lake affected is Lac Chibougamau. The BlackRock project does not involve any activities that might increase pressure on this lake. However, it will affect some small lakes that contribute to the regional ecological balance.

The BlackRock project also has effects in terms of cumulative impact on traditional land use. The intensive transportation linked to the mining project is also very significant for other users of the area. Users of primary resources and wildlife along road 210 will experience major pressure on this road corridor; the carrying capacity of this logging road is close to its limit.

In terms of jobs and the economy, the cumulative impact is overwhelmingly positive, especially since the region has seen a decline in economic activity over the last few years. It is also important to note that the Cree Nation's new approach to economic development supports the participation of all regional stakeholders, at every stage of new project development.

Table 8-1 summarizes the net cumulative impact on the selected VECs for the BlackRock Metals project (mine and railway).

In spite of everything, the BlackRock project cannot be viewed as an anthropogenic alteration of the environment as significant as those that characterized mining operations from the 1950s to the 1990s. Government regulations and BlackRock's own environmental management practices, including the rehabilitation plan, should allow the project to fit harmoniously into the environment.

Table 8-1: Net Cumulative Impact on the Selected Valued Environmental Components

Valued Environmental Component	Net Impact
Lakes and streams	Small negative
Traditional land use	Small negative
Use of the area for the exploitation of other resources	Small negative
Jobs and the economy	Moderate positive
Birds	Small negative
Wetlands	Small negative
At-risk floral species	Small negative

9 ENVIRONMENTAL MONITORING AND FOLLOW-UP

9.1 Monitoring Program

The environmental monitoring program is intended to ensure optimal integration of the project to the environment during construction and operation. The goal of the program is to monitor the implementation of the various prescribed mitigation measures and ensure their effectiveness.

The main issues to be considered by a monitoring program for the construction and operation phases are:

- management of mine wastes, including proper separation of fine and coarse tailings;
- identification of advanced warning signs of possible failure of mine waste management equipment and facilities;
- drainage water control and treatment;
- process water and final effluent quality control;
- atmospheric emissions (particulate matter and greenhouse gases);
- noise levels from project activities;
- sourcing and management of borrow materials;
- construction of haulage roads with low-silt materials;
- application of dust control agents on haulage and access roads;
- management of stripped mineral and organic soil;
- ongoing and final site rehabilitation;
- protection of streams, vegetation and wildlife habitats;
- environmental auditing of chemicals, hydrocarbon and waste management quality;
- protection against accidental spills;
- drinking water and wastewater quality control.

9.2 Follow-up Plan

The corporate environmental follow-up plan covers the operation and closure phases of the project, as well as post-closure. The goal of the environmental follow-up plan is to ensure the effectiveness of mitigation measures and the monitoring program in general, and to take corrective action as needed.

The environmental follow-up plan is also a way to assess the operational effectiveness of the technological risk management plan, at least as far as the environmental portion of the plan is concerned.

Environmental surveys and analyses conducted ahead of project implementation help constrain the sensitivity of the host environment and, to a certain extent, predict changes in the environment during and after operation. The main components to be monitored during environmental follow-up are as follows:

- Final effluents and quality control;
  - Final effluents – *Directive 019*
  - Final effluents – *Metal Mining Effluent Regulations* (MMER)
- Surface water - MMER
- Biological
  - Wildlife and birds;
  - Wetlands;
  - Aquatic fauna (Benthos and fish);
- Groundwater – *Directive 019*
- Noise and vibration
- Air quality
- Dam stability
- Industrial Depollution Attestation application
- Post operation and post rehabilitation monitoring – *Directive 019*
- Community relations

10 GLOBAL ASSESSMENT

The natural and human environments have sensitive components that require special attention before, during and after construction and operation. The environmental components affected by the project[2] and the planned mitigation measures for minimizing the negative effects are summarized in Table 10-1 for the proposed mine site and in Table 10-2 for the proposed rail line, while the affected areas are shown in Table 10-3.

Given the changes to and the new use of the host environment, the impact on the natural environment is generally negative. However, this can be mitigated in the short, medium and long-term, and the impact on the human environment is positive, particularly in terms of jobs and the economy.

The residual impact is the impact that persists on the environmental components despite the application of mitigation measures. In general, residual impact ranges from minor to nil.

In addition, the establishment of a risk management system for technological accidents and emergency response plans for occupational health and the environment will also help prevent and contain certain potential accidents associated with the project. Finally, environmental monitoring and follow-up and rehabilitation plans are other measures that will help reduce or eliminate the project's negative environmental impact.

[2] Tables 10-1 and 10-2 are summaries of the environment and social impact assessment statement prepared by ENTRACO Inc. in 2011 and the supplementary study on the building of a new rail segment for the BlackRock Metals mining project prepared by GENIVAR in 2012, respectively.

Table 10-1: Environmental Impact and Mitigation Measures for the Mining Project

Environment Affected	Component Affected	Description of Impact	Phase	Activity	Component Resistance	Impact			General Mitigation Measures[1]	Specific mitigation Measures[1]	Residual Impact
						Intensity	Scope	Significance			
Soil	**Surface materials**	• Alteration of the soil profile, erosion • Loss of original soil • Soil compaction • Risk of contamination through spills	Construction	• Clearing • Borrow pits • Excavation and earthworks • Access and mine roads • Transportation and traffic	Very low	Moderate	Limited	Minor	18 general mitigation measures	2 specific mitigation measures	Minor to nil
			Operation	• Mining – pit • Tailings deposition							
	Wetlands	• Loss of wetlands • Risk of contamination through spills	Construction and Operation	• Clearing • Excavation and earthworks, waste management facilities and dams • Water flow management	Very high	High	Limited	Major	60 general mitigation measures	2 specific mitigation measures	Minor
Water	**Lakes and streams**	• Alteration of run-off, infiltration and the flow network • Increased sediment flow in streams and wetlands • Loss of small lakes and streams • Loss of fish habitat • Risk of contamination through spills	Construction	• Clearing and site preparation • Blasting, excavation and earthworks • Access and mine roads	Very high	High	Local	Major	52 general mitigation measures	3 specific mitigation measures	Minor
			Operation	• Mining – pit • Water management • Tailings deposition • Transportation and traffic							
	Groundwater	• Risk of contamination through spills • Contamination by leachates and wastewater	Construction	• Transportation and traffic • Excavation and earthworks • Management of wastewater and contaminants	Moderate	Moderate	Limited	Minor	14 general mitigation measures	2 specific mitigation measures	Minor
			Operation	• Mining – pit • Tailings deposition • Management of wastewater and contaminants • Transportation and traffic							
Air	**Air quality**	• Deterioration of air quality by suspended particles and greenhouse gas (GHG) emissions	Construction	• Transportation and traffic • Excavation and earthworks	High	Low	Local	Intermediate	6 general mitigation measures	6 specific mitigation measures	Minor
			Operation	• Mining – pit • Plant and crusher • Transportation and traffic							
	Noise	• Increase in the noise levels and deterioration in the sound environment in the vicinity of the mine site and access road	Construction	• Transportation and traffic • Blasting, excavation and earthworks	High	High	Limited	Intermediate	2 general mitigation measures	10 specific mitigation measures	Minor (below the 40 dB(A) limit 250 m from the access road and 2 km from the mine site)
			Operation and maintenance	• Mining – pit • Plant and crusher • Transportation and traffic							

Table 10-1: Environmental Impact and Mitigation Measures for the Mining Project (Cont'd)

Environment Affected	Component Affected	Description of Impact	Phase	Activity	Component Resistance	Impact			General Mitigation Measures[1]	Specific mitigation Measures[1]	Residual Impact
						Intensity	Extent	Significance			
Plants	**Habitats and species**	• Elimination of vegetation • Loss of commercial timber space • Theoretical loss of threatened species or species likely to be designated as such	Construction Operation and maintenance	• Clearing • Excavation and earthworks • Access and mine roads • Mining - pit • Tailings deposition • Presence of production and support equipment	Low	Low	Limited	Minor	18 general mitigation measures	2 specific mitigation measures	Minor
Wildlife	**Habitats and species**	• Loss of habitat for certain animal species • Higher risk of collisions with animals • Increased fishing due to the presence of workers	Construction Operation and maintenance	• Labour • Clearing • Excavation and earthworks • Access and mine roads • Transportation and traffic • Labour • Mining – pit • Tailings deposition • Transportation and traffic	Moderate	Moderate	Local	Intermediate	11 general mitigation measures	6 specific mitigation measures	Minor
Human Environment	**Built environment**	• Heavy, intense, regular traffic at all times • Higher risk of road accidents • Deterioration of air quality and the sound environment due to traffic	Construction and operation	• Transportation and traffic	High	High	Limited	Intermediate	3 general mitigation measures	1 specific mitigation measures	Nil
	Land use	• Heavy, intense, regular traffic at all times • Restricted access to mine site areas • Conflicting land use by traditional, logging and mining activities • Higher risk of accidents with other users • Deterioration of air quality and the sound environment	Construction Operation and maintenance	• Transportation and traffic • Clearing • Excavation and earthworks • Access and mine roads • Transportation and traffic • Mining – pit • Plant and crusher • Tailings deposition • Transportation and traffic	High	High	Local	Major	66 general mitigation measures	4 specific mitigation measures	Minor
	Jobs and the economy	• Investment in the region • Increased activity in the region • Job creation for local and regional manpower and businesses • Economic stimulation	Construction and operation	• All activities	N/A	N/A	Regional	Positive	N/A	1 specific mitigation measures	Positive
	Landscape quality	• Introduction of anthropogenic components visible from Lac Chibougamau	Construction and operation	• Tailings management facilities	Moderate to high	Minor to nil	Low	Intermediate to minor	N/A	2 specific mitigation measures	Minor

[1] Source: Entraco Inc. (2011). *Environmental and Social Impact Assessment Statement – Iron Ore Mine, Volume 3 –Appendices.*

N/A : Not applicable

Table 10-2: Environmental Impact and Mitigation Measures for the Rail Line Project

Environment affected	Component affected	Description of the Impact	Phase	Activity	Current and specific mitigation measures[1]	Impact Assessment						Residual Impact
						Nature	Degree of disturbance	Intensity	Extent	Duration	Probability	
Soil	Soil quality	• Erosion • Modified nature of the soil of 48 ha • Rutting; modified soil cohesion • Risk of contamination through spills	Construction	• Clearing • Stripping and levelling • Excavation and earthworks • Transportation and traffic	9 general and 1 specific mitigation measures	Negative	Moderate	Low	Limited	Short to long	High	Low
			Operation	• Transportation and traffic • Presence and use of the railway track • Chemical weeding activities	3 general and 2 specific mitigation measures	Negative	Low	Low	Limited	Short to long	Low	Low to very low
		• Re-establishment of tree cover • Reduction in sensitivity to soil erosion	Closure	• Decommissioning • Rehabilitation • Contaminated site rehabilitation	Same as for construction	Positive	Moderate	Low	Limited	Long	High	Low
Water	Drainage network	• Disturbance of the natural flow regime • Modification of the local flow regime (increased runoff) • Temporary modification of the natural flow regime	Construction	• Clearing • Stripping and levelling • Water flow management	1 general mitigation measure	Negative	Low	Low	Local	Long	High	Low
	Surface water and groundwater quality	• Increase in the transportation of sediments into aquatic environments • Risk of contamination from spills	Construction	• Clearing • Stripping and levelling • Excavation and earthworks • Transportation and traffic • Stream crossings	11 general and 2 specific mitigation measures	Negative	Low	Moderate	Limited	Short	Moderate	Low
			Operation	• Maintenance activities • Presence and use of the railway track • Chemical weeding activities	4 general and 1 specific mitigation measures	Negative	Low	Moderate	Limited	Short to long	Low	Low to very low
			Closure	• Decommissioning	Same as for construction	Negative	Low	Moderate	Limited	Short	Moderate	Low

Table 10-2: Environmental Impact and Mitigation Measures for the Rail Line Project (Cont'd)

Environment affected	Component affected	Description of the Impact	Phase	Activity	Current and specific mitigation measures[1]	Impact Assessment						Residual Impact
						Nature	Degree of disturbance	Intensity	Extent	Duration	Probability	
Air	Air quality	• Dust and GHG emissions • Increased airborne dust concentrations	Construction	• Blasting, excavation and earthworks • Borrow pits • Transportation and traffic	5 general and 1 specific mitigation measures	Negative	Low	Low	Local	Short	Moderate	Very low
			Operation	• Transportation		Negative	Low	Low	Limited	Long	High	Low
			Closure	• Equipment use		Negative	Low	Low	Local	Short	Moderate	Very low
	Noise	• Increased noise levels and deterioration of the sound environment in the vicinity of the railway line	Construction	• All construction work	4 general mitigation measures	Negative	Low	Moderate	Limited	Short	Moderate	Low
			Operation	• Maintenance activities • Train transport		Negative	Low	Moderate	Limited	Long	Low	Low
			Closure	• Decommissioning	2 general mitigation measures	Negative	Low	Moderate	Limited	Short	Moderate	Low
Vegetation	Forests	• Loss of 47 ha of forest vegetation	Construction	• Clearing • Transportation and traffic	4 general and 2 specific mitigation measures	Negative	Low	Low	Limited	Long	High	Low
		• Rehabilitation of the right-of-way • Revegetation with indigenous species	Closure	• Rehabilitation	4 general and 2 specific mitigation measures	Positive	Low	Low	Limited	Long	High	Low
	Wetlands	• Loss of 17 ha of wetlands	Construction	• Clearing • Transportation and traffic	4 general and 4 specific mitigation measures	Negative	Low	Low	Limited	Long	High	Low
		• Re-establishment of the natural flow regime • Revegetation with indigenous species	Closure	• Rehabilitation	4 general and 1 specific mitigation measures	Positive	Low	Low	Limited	Long	High	Low
	Special status vascular plants	• Loss of certain special status vascular plants	Construction	• Clearing • Transportation and traffic	Same as for wetlands	Negative	Low	Moderate	Limited	Long	Low	Low

Table 10-2: Environmental Impact and Mitigation Measures for the Rail Line Project (Cont'd)

Environment affected	Component affected	Description of the Impact	Phase	Activity	Current and specific mitigation measures[1]	Impact Assessment						Residual Impact
						Nature	Degree of disturbance	Intensity	Extent	Duration	Probability	
Wildlife	Fish	• Disturbance of fish • Temporary disturbance of environmental quality • Temporary encroachment • 1,400 m^2 encroachment on fish habitat	Construction	• Clearing • Excavation and earthworks • Stream crossings	5 specific mitigation measures	Negative	Moderate	Moderate	Limited	Short	Moderate	Low
			Closure	• Decommissioning • Opening of culverts	Same as for construction	Negative	Low	Low	Limited	Short	Moderate	Very low
	Herpetofauna	• Loss 64 ha of habitat • Disturbance of herpetofauna	Construction	• Clearing • General construction activities	5 general and 1 specific mitigation measures	Negative	Low	Low	Limited	Long	High	Low
		• Rehabilitation of tree cover and habitats	Closure	• Rehabilitation	5 general and 2 specific mitigation measures	Positive	Low	Low	Limited	Long	High	Low
	Birds	• Disturbance of the sound environment • Loss of 64 ha of habitat • Loss of nesting grounds	Construction	• Clearing • General construction activities	3 general and 1 specific mitigation measures	Negative	Low	Low	Limited	Long	High	Low
		• Disturbance of birds	Operation	• Rail transport	None	Negative	Low	Low	Limited	Short	Low	Very low
		• Return to the initial sound environment • Revegetation of the railway corridor • Gradual return of herbaceous plants and trees	Closure	• Rehabilitation	3 general and 1 specific mitigation measures	Positive	Low	Low	Limited	Long	Moderate	Low
	Mammals	• Disturbance of the sound environment • Loss of 64 ha of habitat • Collision risk	Construction	• Clearing • General construction activities	5 general mitigation measures	Negative	Low	Low	Limited	Long	High	Low
		• Disturbance of wildlife	Operation	• Rail transport	None	Negative	Low	Low	Limited	Long	High	Low
		• Return to the initial sound environment • Revegetation of the railway corridor • Gradual return of herbaceous plants and trees	Closure	• Rehabilitation	5 general and 1 specific mitigation measures	Positive	Low	Low	Limited	Long	High	Low

Table 10-2: Environmental Impact and Mitigation Measures for the Rail Line Project (Cont'd)

Environment affected	Component affected		Description of the Impact	Phase	Activity	Current and specific mitigation measures[1]	Impact Assessment						Residual Impact
							Nature	Degree of disturbance	Intensity	Extent	Duration	Probability	
Human Environment	Land Use	Built environment	• Increased dust and noise levels • Disturbance of the commercial resort tenant	Construction	• All construction activities	2 general mitigation measures	Negative	Moderate	Low	Limited	Short	Moderate	Very low
				Operation	• Rail transport • Maintenance and repair activities	None	Negative	Low	Low	Limited	Long	High	Low
				Closure	• Decommissioning	1 current mitigation measure	Negative	Moderate	Low	Limited	Short	Moderate	Very low
		Road infrastructure	• Increased traffic on Route 167 and logging road 210 • Temporary suspension of rail traffic on the CN rail line	Construction	• Transportation and traffic • Work at the railway junction	4 general mitigation measures	Negative	Low	Low	Local	Short	Low	Very low
				Closure	• Decommissioning	2 general mitigation measures	Negative	Low	Low	Local	Short	Low	Very low
		Wildlife harvesting	• Increased dust and noise levels • Disturbance of land users • Safety risk for users • Disturbance of hunting activities for non-aboriginal users	Construction	• All construction activities	3 general mitigation measures	Negative	Low	Low	Limited	Short	High	Low
				Operation	• Rail transport • Maintenance and repair activities	None	Negative	Low	Low	Limited	Long	Low	Very low
				Closure	• Decommissioning	2 general mitigation measures	Negative	Low	Low	Limited	Short	Low	Very low
		Mining and logging	• Loss of 47 ha of productive forest • Increased logging road traffic	Construction	• Clearing • Transportation and traffic	3 general mitigation measures	Negative	Low	Low	Limited	Long	High	Low
				Closure	• Transportation and traffic	2 general mitigation measures	Negative	Low	Low	Limited	Short	Moderate	Very low

Table 10-2: Environmental Impact and Mitigation Measures for the Rail Line Project (Cont'd)

Environment affected	Component affected	Description of the Impact	Phase	Activity	Current and specific mitigation measures[1]	Impact Assessment						Residual Impact
						Nature	Degree of disturbance	Intensity	Extent	Duration	Probability	
Human Environment	Traditional land use	• Loss of 47 ha of forest for the trapline users • Disturbance of users' traditional activities • Migration of some wildlife species • Additional wildlife harvesting by workers • Safety risk for users • Loss of cultural heritage sites	Construction	• All construction activities	9 general mitigation measures	Negative	Moderate	Moderate	Local	Short	Moderate	Moderate
			Operation	• Rail transportation • Maintenance and repair activities	4 general mitigation measures	Negative	Low	Low	Local	Long	Moderate	Low
			Closure	• Decommissioning	2 general mitigation measures	Negative	Low	Low	Local	Short	Low	Very low
	Population and economy	• Investment in the region • Job creation for local and regional manpower and contractors • Economic stimulus	Construction	• All activities	5 general mitigation measures	Positive	Moderate	Moderate	Regional	Short	High	Moderate
			Operation	• Track maintenance and repair activities	1 general mitigation measure	Positive	Low	Low	Regional	Long	High	Moderate
		• Job losses	Closure	• Rail line closure	None	Negative	Low	Low	Regional	Long	High	Moderate
	Archeology	• Discovery of archeological remains	Construction	• All activities	None	Negative	Low	Low	Limited	Short	Low	Very low
	Landscape	• Unattractive views • Decrease in landscape quality • Modification of the visual field during construction and decommissioning	Construction	• All activities • Presence of construction sites	6 general mitigation measures	Negative	Low	Low	Limited	Long	High	Low
			Operation	• Presence of railway infrastructure	1 general mitigation measure	Negative	Low	Low	Limited	Long	Moderate	Low
			Closure	• Presence of the right-of-way	1 general mitigation measure	Negative	Low	Low	Limited	Long	Moderate	Low

[1]Source: GENIVAR 2012. *Project to Build a New Rail Line Segment for the BlackRock Metals Inc. Mining Project – Supplement to the Environmental Impact Assessment Statement*

Table 10-3: Environmental Components Affected by the Project

Habitat Type		Areas – Mine Site			Areas – Rail Line		
		Total (ha)	Loss (ha)	Loss (%)	Total (ha)	Loss (ha)	Loss (%)
Forest	Regenerating coniferous forest	9,345.21	579.12	6.19	901.50	18.35	2.04
	Closed mature coniferous forest	3,239.02	248.92	7.69	465.64	9.52	2.04
	Open mature coniferous forest	1,913.69	22.55	1.18	380.16	10.51	2.76
	Unproductive setting	137.23	37.90	27.62	29.14	0.06	0.21
	Mature mixed forest	196.41	37.25	18.97	52.48	0.19	0
	Regenerating mixed forest	2,769.22	31.20	1.13	116.48	5.95	5.11
	Deciduous forest	63.95	8.51	13.31	7.49	0.19	2.54
	Plantation	1,100.21	0.77	0	35.09	2.12	6.04
	Islands	36.48	0	0	0	0	0
	TOTAL	**18,801.41**	**966.23**	**5.14**	**1,987.97**	**46.89**	**2.36**
Wetlands	Marsh	1.88	1.88	100	0	0	0
	Shrubby swamp	46.79	27.93	59.69	32.94	0.72	2.19
	Treed swamp	26.07	3.92	15.04	22.92	0	0
	Disturbed treed swamp	41.79	11.74	28.09	0	0	0
	Treed peatland	164.29	107.27	65.29	389.87	11.44	2.93
	Disturbed treed peatland	0	0	0	87.39	2.03	2.32
	Fen	0	0	0	32.68	0.61	1.87
	Bog	117.39	51.38	43.77	111.48	1.65	1.48
	TOTAL	**398.21**	**204.12**	**51.26**	**677.29**	**16.44**	**2.43**
Drainage network		1,993,07	13.01	0.01	75.42	0.03	0

[1] The access road is built and in good repair over 90% of its length. The Lac France section to be built is 3.5 km long with a 10-m wide rolling surface.
[2] The surface area of the pit is the length of the deposit to be mined by 2028 (Phase 1 pit), or 2.8 km, times an estimated average width of 400 m.
[3] The area of the plant and crusher includes the area covered by the conveyor, concentrator, ore stockpile, electrical substation, being areas on the east, south and southeast sides of Lac Denis, as well as the workspace around the facilities.
[4] The area of the garage includes the rolling surface around the garage.
[5] The area of the fine tailings pond includes the polishing pond.
[6] The mining roads run from the pit to the crusher, tailings management facilities or garage; they are approximately 6 km long and up to 30 m wide.

Appendix 1:

Documents submitted for the Environmental Impact Assessment

Documents submitted for the BlackRock Project Environmental Impact Assessment

ENTRACO. Novembre 2011. *Étude d'impact sur l'environnement et le milieu social – Exploitation du gisement de fer – Complexe géologique du lac Doré,* pour Métaux BlackRock inc., volume 1, 250 pages.

ENTRACO. Novembre 2011. *Étude d'impact sur l'environnement et le milieu social – Exploitation du gisement de fer – Complexe géologique du lac Doré,* pour Métaux BlackRock inc., volume 2, 338 pages.

ENTRACO. Novembre 2011. *Étude d'impact sur l'environnement et le milieu social – Exploitation du gisement de fer – Complexe géologique du lac Doré,* pour Métaux BlackRock inc., volume 3, annexes, non paginé.

MÉTAUX BLACKROCK INC. Mars 2012. *Modifications à la description du projet*. 14 pages.

GENIVAR. Septembre 2012. *Projet minier de Métaux BlackRock – Exploitation du gisement de fer au complexe géologique du lac Doré – Réponses aux questions du COMEX*, pour Métaux BlackRock inc., volume 1, 74 pages.

GENIVAR. Septembre 2012. *Projet minier de Métaux BlackRock – Exploitation du gisement de fer au complexe géologique du lac Doré – Réponses aux questions du COMEX*, pour Métaux BlackRock inc., volume 2, annexes, non paginé.

MÉTAUX BLACKROCK INC. Septembre 2012. *Projet minier de Métaux BlackRock – Exploitation du gisement de fer au complexe géologique du lac Doré – Description du projet*, pour Métaux BlackRock inc., 31 pages et 4 annexes.

LAMONT INC. EXPERT-CONSEIL. Octobre 2012. *Caractérisation géochimique des résidus miniers, du minerai et des stériles du projet BlackRock*, pour Métaux BlackRock inc., 14 pages et 3 annexes.

JOURNAUX ASSOC. Octobre 2012. *Plan de restauration – Mine BlackRock, Chibougamau, Québec – Rapport no L-12-1513*, pour Métaux BlackRock inc., 75 pages et annexes.

GENIVAR. Novembre 2012. *Note technique – Projet minier BlackRock : Caractérisation des apports au lac Jean, en conditions actuelles et futures*, pour Métaux BlackRock inc., 21 pages et 6 annexes.

GENIVAR. Novembre 2012. *Note technique*, pour Métaux BlackRock inc., 17 pages.

GENIVAR. Novembre 2012. *Projet minier de Métaux BlackRock – Construction d'une nouvelle section de voie ferrée pour le projet de mine de Métaux BlackRock inc. – Complément à l'étude d'impact sur l'environnement,* pour Métaux BlackRock inc., non paginé avec annexes.

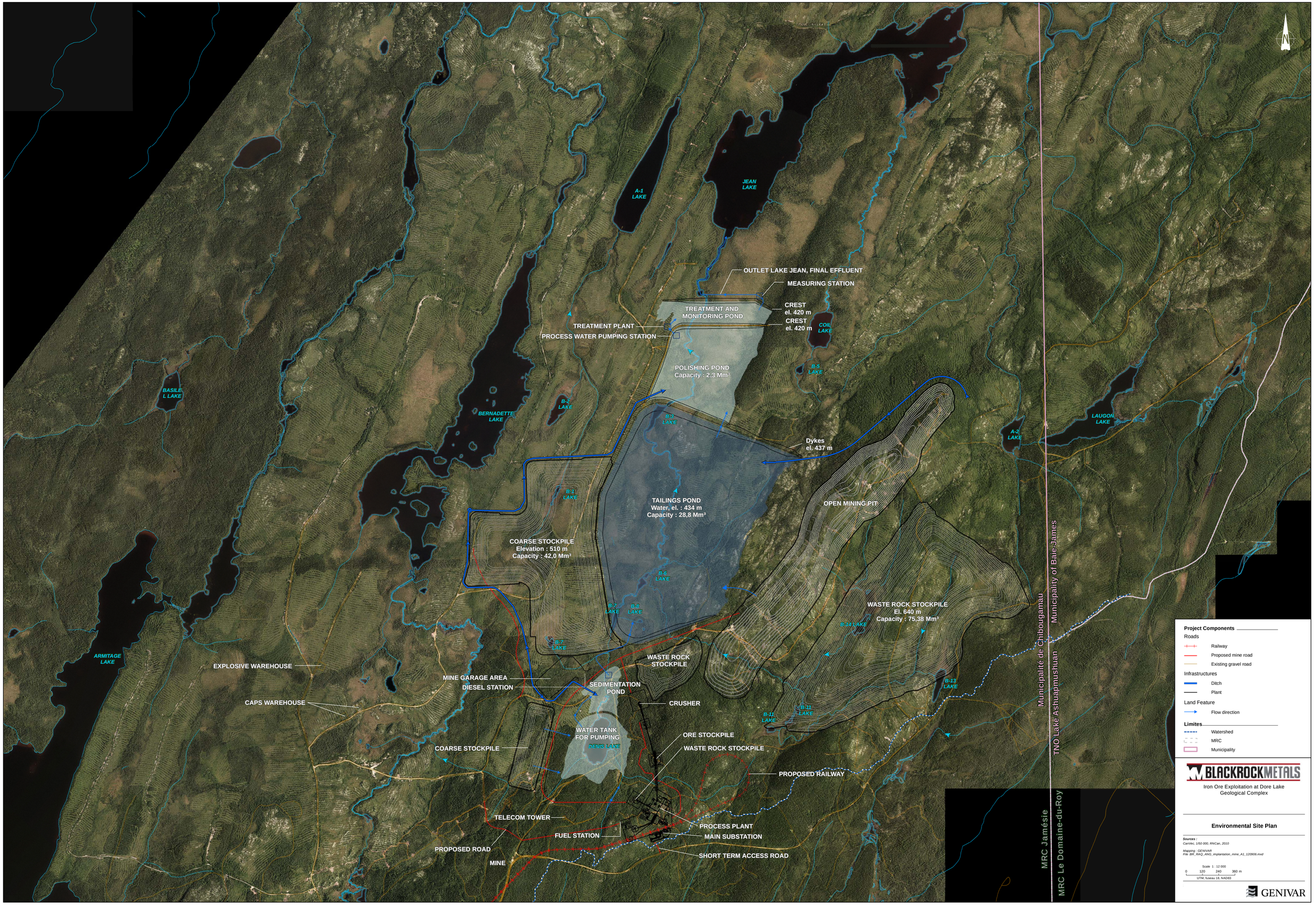
GENIVAR. Décembre 2012. *Projet minier de Métaux BlackRock – Exploitation du gisement de fer au complexe du lac Doré – Modélisation de la dispersion atmosphérique des composés particulaires et gazeux dans l'air ambiant*, pour Métaux BlackRock inc., 133 pages et annexe.

LAMONT INC. EXPERT-CONSEIL. Février 2013. *Mémo technique – Présentation des résultats des essais cinétiques sur deux échantillons de résidus miniers*, pour Métaux BlackRock inc., non paginé avec annexe.

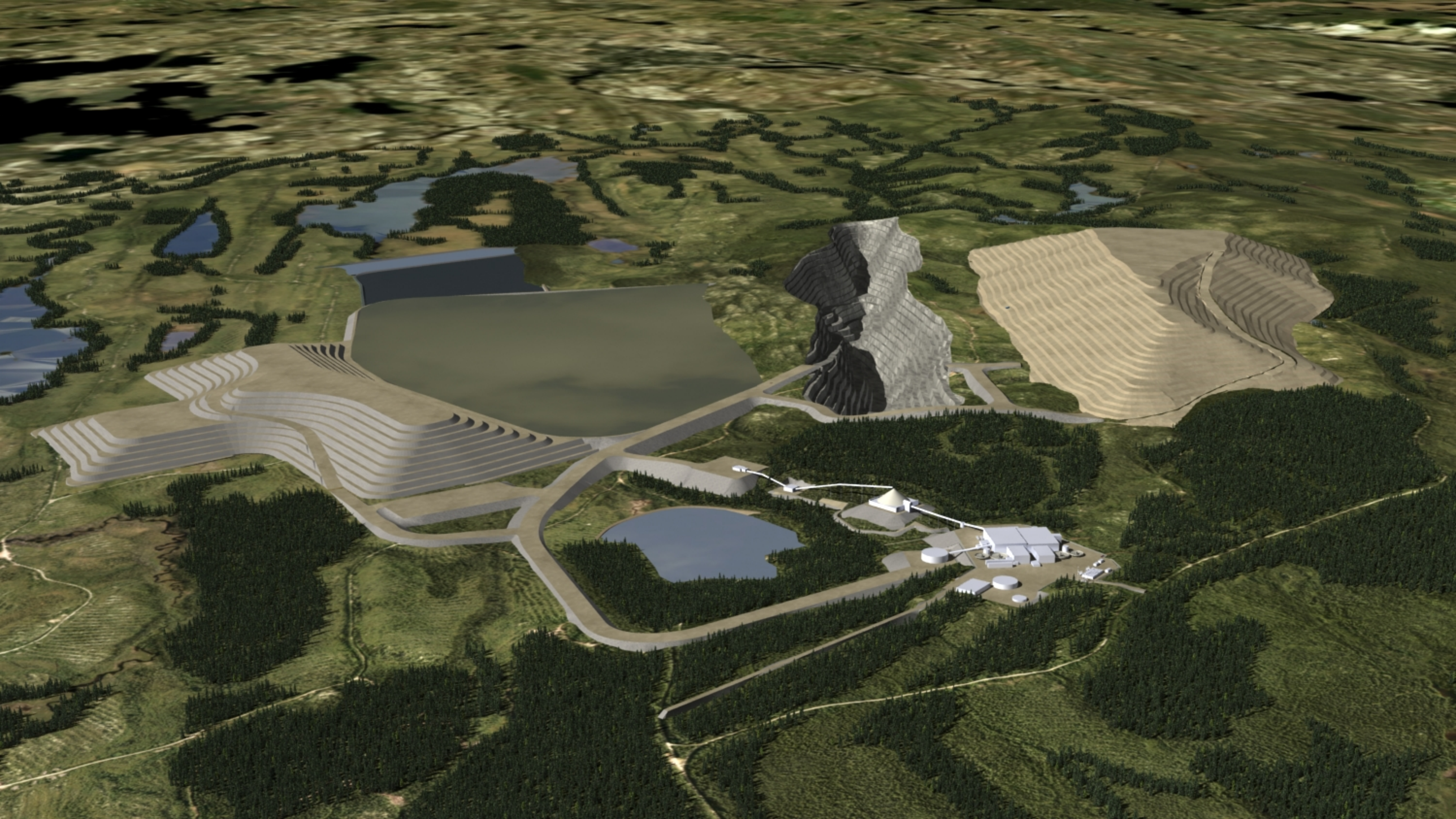
GENIVAR. Avril 2013. *Projet minier de Métaux BlackRock – Exploitation du gisement de fer au complexe géologique du lac Doré – Deuxième série de réponses aux questions du COMEX*, pour Métaux BlackRock inc., volume 1, 178 pages.

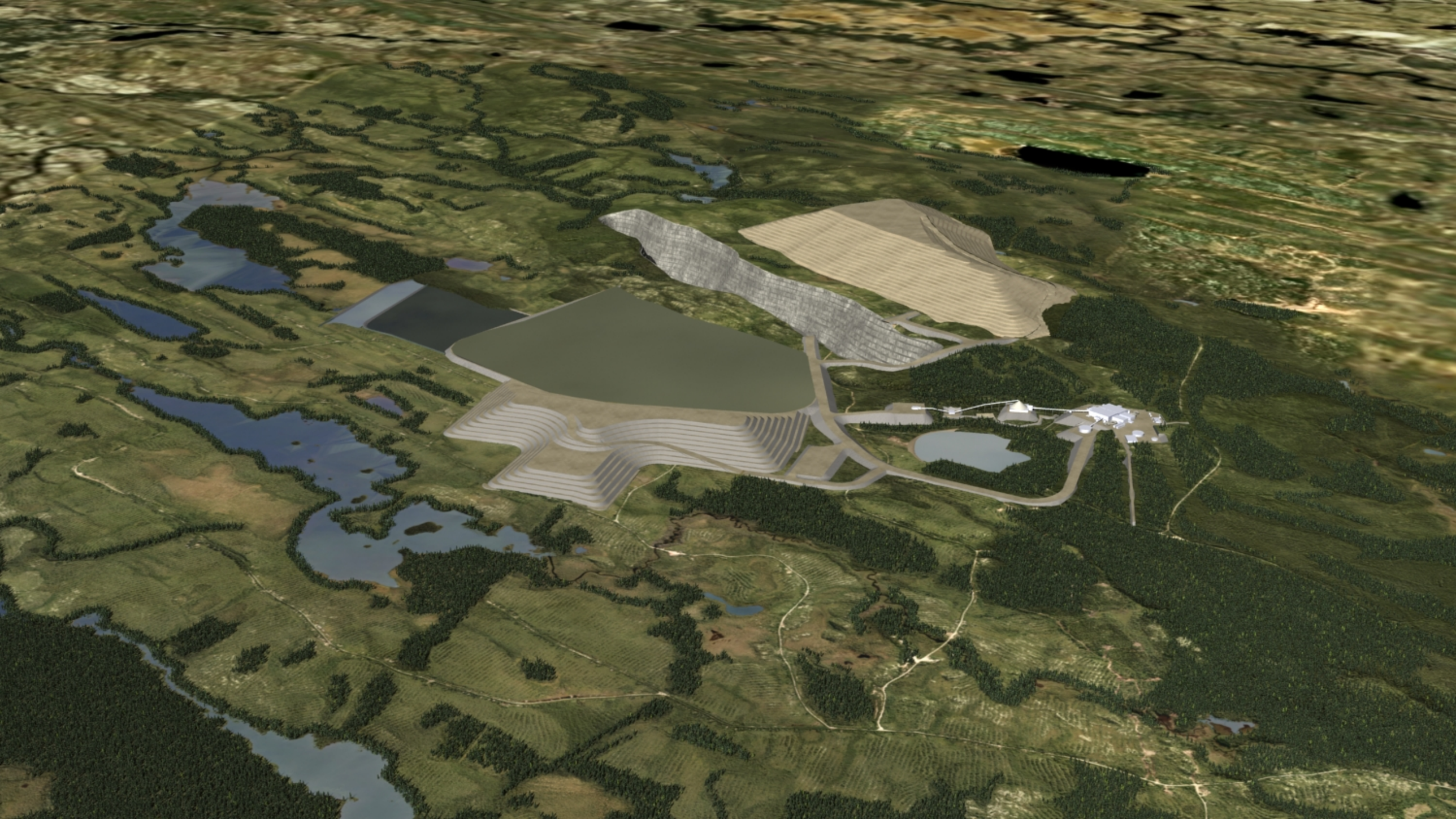
GENIVAR. Avril 2013. *Projet minier de Métaux BlackRock – Exploitation du gisement de fer au complexe géologique du lac Doré – Deuxième série de réponses aux questions du COMEX*, pour Métaux BlackRock inc., volume 2, annexes, non paginé.

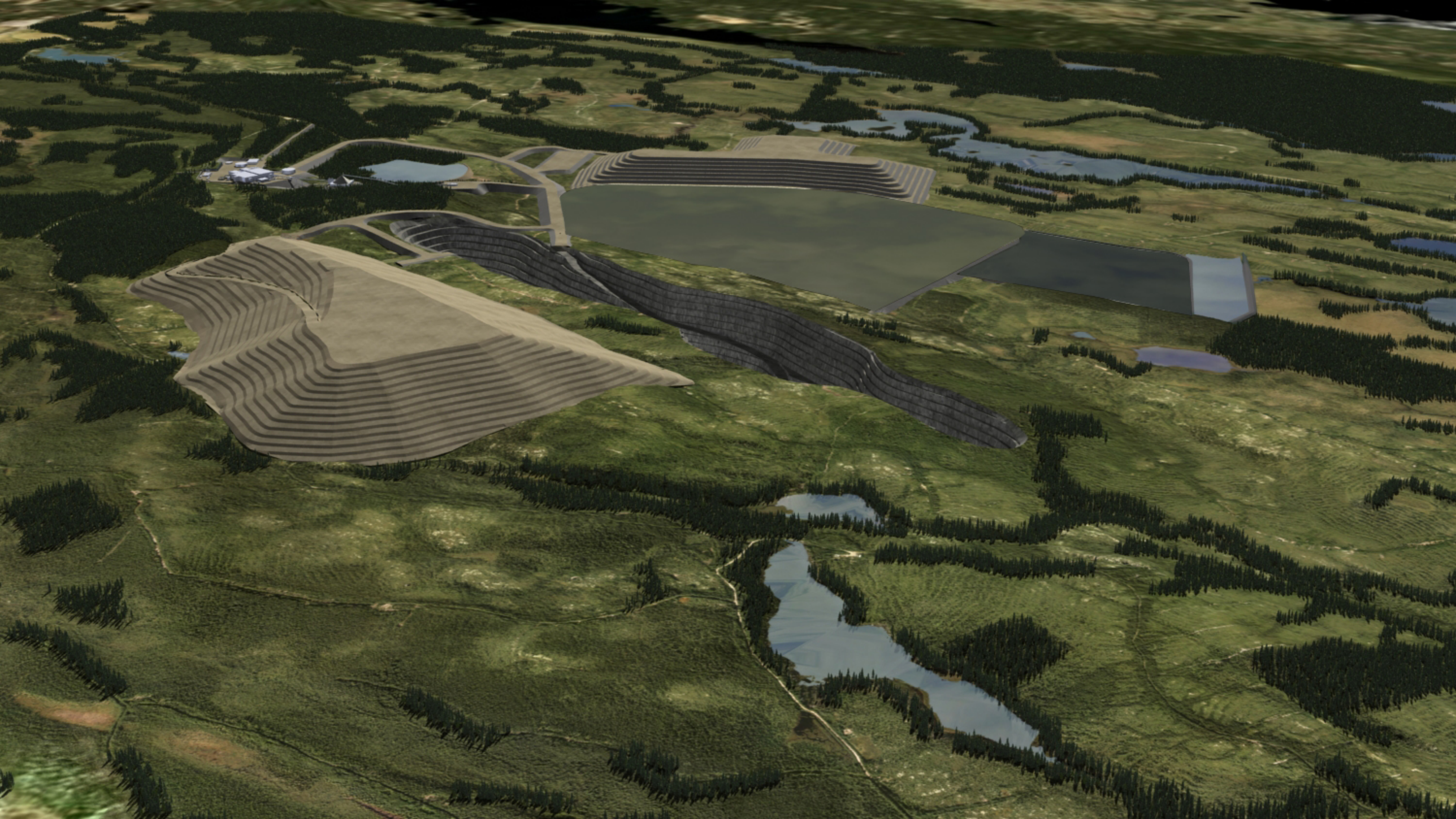
Appendix 2:
Mine Site Layout


A-1 LAKE
JEAN LAKE
OUTLET LAKE JEAN, FINAL EFFLUENT
MEASURING STATION
TREATMENT AND MONITORING POND
CREST el. 420 m
CREST el. 420 m
TREATMENT PLANT
PROCESS WATER PUMPING STATION
COIL LAKE
B-5 LAKE
POLISHING POND Capacity : 2,3 Mm³
BASILE L LAKE
BERNADETTE LAKE
B-2 LAKE
B-3 LAKE
Dykes el. 437 m
A-2 LAKE
LAUGON LAKE
B-1 LAKE
TAILINGS POND Water, el. : 434 m Capacity : 28,8 Mm³
OPEN MINING PIT
COARSE STOCKPILE Elevation : 510 m Capacity : 42,0 Mm³
B-6 LAKE
B-7 LAKE
B-8 LAKE
WASTE ROCK STOCKPILE El. 640 m Capacity : 75,38 Mm³
B-14 LAKE
B-13 LAKE
ARMITAGE LAKE
EXPLOSIVE WAREHOUSE
MINE GARAGE AREA
DIESEL STATION
CAPS WAREHOUSE
WASTE ROCK STOCKPILE
SEDIMENTATION POND
CRUSHER
B-11 LAKE
B-11 LAKE
WATER TANK FOR PUMPING
DENIS LAKE
ORE STOCKPILE
WASTE ROCK STOCKPILE
COARSE STOCKPILE
PROPOSED RAILWAY
TELECOM TOWER
PROCESS PLANT
FUEL STATION
MAIN SUBSTATION
PROPOSED ROAD
SHORT TERM ACCESS ROAD
MINE
Municipalité de Chibougamau
Municipality of Baie-James
TNO Lake Ashuapmushuan
MRC Jamésie
MRC Le Domaine-du-Roy
Project Components
Roads
Railway
Proposed mine road
Existing gravel road
Infrastructures
Ditch
Plant
Land Feature
Flow direction
Limites
Watershed
MRC
Municipality
BLACKROCKMETALS
Iron Ore Exploitation at Dore Lake Geological Complex
Environmental Site Plan
Sources :
Carrivec, 1/50 000, RNCan, 2010
Mapping : GENIVAR
File: BR_RAQ_ANG_implantation_mine_A1_120906.mxd
Scale 1 : 12 000
0 120 240 360 m
UTM, fuseau 18, NAD83
GENIVAR

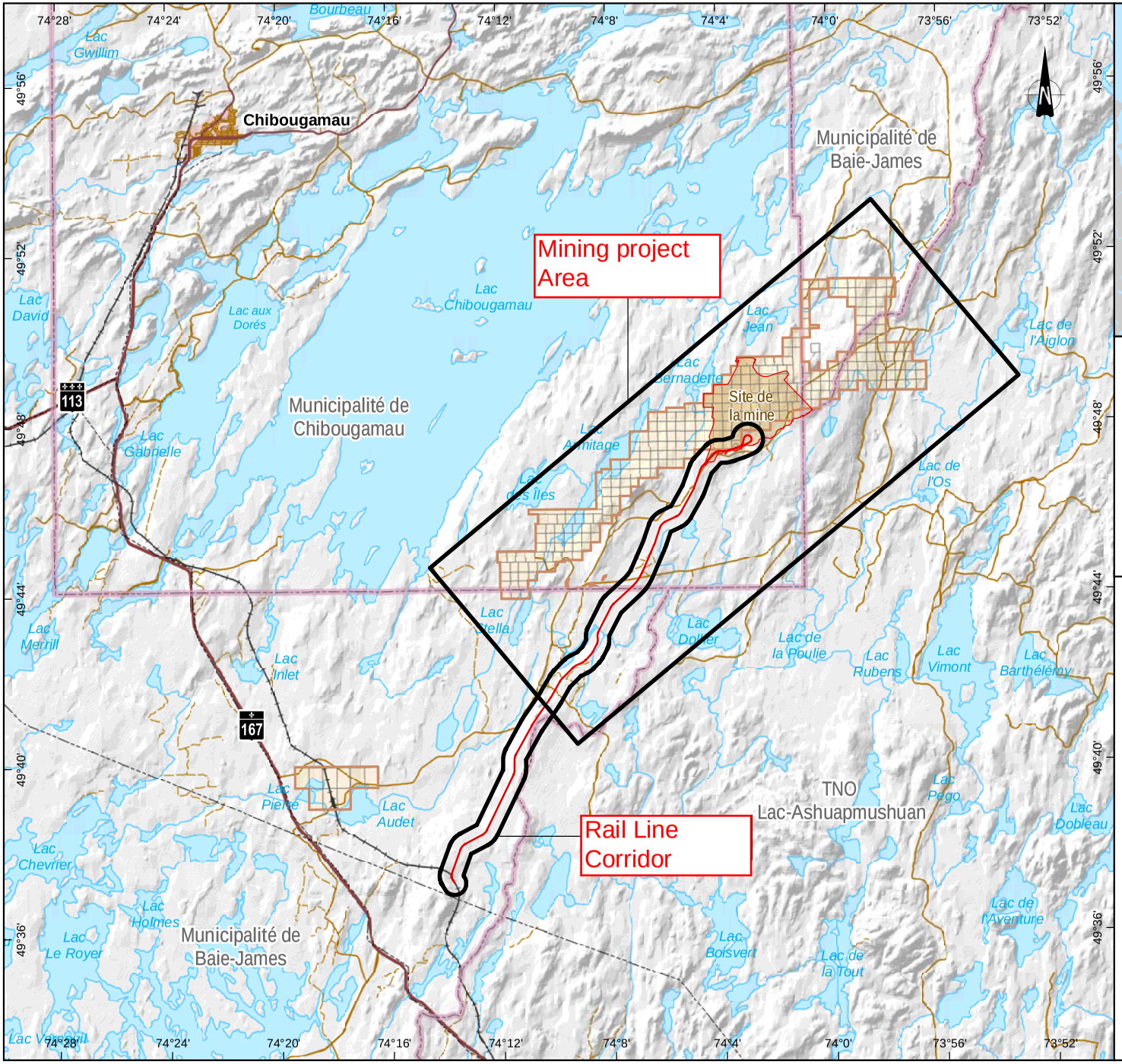
Appendix 3:
Project Simulations







Appendix 4:
Rail Line Corridor



Composantes du projet Métaux BlackRock

- Limite des claims actifs
- Claim minier actif
- Site de la mine
- Section de voie ferrée proposée

MÉTAUXBLACKROCK

Construction d'une nouvelle section de voie ferrée pour le projet de mine de Métaux BlackRock inc.

- Résumé fédéral -

Zones d'études régionales du projet minier et de la voie ferrée

Sources :
BDGA, 1/1 000 000, MRN Québec, 2002
SDA, 1/20 000, MRNF Québec, mai 2010
Données de projet :
S06428A-GR-CR-020-PLAN D'ENSEMBLE_ALIGN_V5G
CIMA, 14 août 2012
Cartographie : GENIVAR
Fichier : 111-16127-00_RF_C1_ZE_130528.mxd

Échelle 1 : 250 000

0 2,5 5 km

UTM, fuseau 18, NAD83

GENIVAR

Appendix 5:
General and Specific Mitigation Measures

General Mitigation Measures

The standard mitigation measures apply to all stages of the construction and operation to reduce or eliminate impacts on the environment.

Standard mitigation measures are initially grouped according to the project to which they apply. In a second step, as many general mitigation measures are indeed able to protect more than one element of the receiving environment (flora, fauna, wetlands, etc..) Measures are grouped according to different sources of impact related to construction and oStandperations. In a second step, the integration measures that apply to specific elements of the natural and human environments have also been grouped under each of these areas. Mitigation measures grouped by type of activity and type of media are complementary.

1 MINING PROJECT

1.1 GENERAL MEASURES OF MITIGATION BY TYPE OF ACTIVITY

Tree cutting and civil engineering works

1. Clearly identified in the field work areas and not limited. The brightly colored markers should be used. They must remain in place for the duration of construction. Use existing logging roads or those clearly identified to reach work areas. Near rivers, build roads perpendicular or diagonally to the slope, otherwise, at least 20 m from the river, build fences or digging ditches to channel runoff to vegetated areas.
2. No civil works shall be undertaken without prior deforestation. Commercial trees (> 10 cm DCH) must be recovered. Noncommercial stratum and residues can be burned, but preferably processed into chips for the purpose of redevelopment.
3. Take all precautions for refueling vehicles and machinery to prevent oil spills and fuel. Maintain vehicles and equipment in good condition to prevent leakage of oil, fuel or other contaminants and reduce air emissions and noise. Emergency recovery of petroleum products kits should be available in all work areas. The vehicles must be equipped with basic emergency kits.
4. Reduce the slope of work areas (cut and fill) to ensure their stability, if required, establish stabilization works (softening slopes, revegetation, rock cover). Keep separate the organic and mineral soil stripped to end redevelopment. As to measuring progress, restore soil slopes to prevent erosion.
5. Maintain a perimeter of protection of at least 60 m around sensitive areas (shores of lakes and rivers, wildlife habitats, steep and erodible slopes, and wetlands) for stacking wood fiber organic or mineral soil or the handling of hydrocarbons.
6. In case of risk to the surrounding environment, the use of mattresses blasting during construction for blasting.

Management of petroleum products

7. Integrate the plans and specifications for bidding and contract clauses regarding environmental management hydrocarbons.
8. Contractors are required to be able to bid to demonstrate that they hold pollution insurance. They must obtain prior work an inspection certificate confirming the proper operation of equipment for leaks and compliance with air emission standards. Vehicles whose condition is considered questionable will be denied access to the site. Regular visual inspections should be conducted to confirm the environmental safety of construction equipment.
9. Sign and seal the plans and specifications for storage of petroleum products by an engineer. The implementation must be performed by an accredited installer. Permanent tanks must be equipped with an automatic tank gauging and equipped with alarm systems in case of leakage.
10. Develop an emergency plan before the first transfer of petroleum products. The plan must include the transport activities, procurement, handling and distribution.
11. Establish and maintain regular separation systems to recover oil leaks in all work areas.
12. Restrict access to petroleum products to those employees trained and designated. Suppliers must notify immediately of any spill resulting from the transfer of petroleum products and signs of leakage.
13. Produce a monthly balance of petroleum products and make sealing water storage and distribution equipment tests annually.

Park management of residues and the polishing pond

14. Inspect the construction of dams, tailings and polishing pond to ensure compliance with plans and specifications. Have approved any deviation from the plans and specifications by the designers. Send reports weekly quality control to corporate authorities. Make available as-built plans for all managers responsible for the operation, safety, maintenance and environmental control facilities.
15. Establish roles, responsibility and actions to each person involved in the management system of tailings. Develop a contingency plan, specify the types of potential accidents, actions and responsibilities attached to it.
16. Establish a monitoring program for impoundment infrastructure to ensure that their performance matches the expectations. Integrate in the program followed by operators, security personnel and technology.
17. Conduct an annual inspection conducted by an engineer specializing in the design of dams and dikes. To complete the review of stability of structures every five years by an engineer specializing in dikes and dams.
18. Manage tailings as directed by the "Guide to the Management of Tailings Facilities" published by the Canadian Mineral (2002) Association. Reagent management, hazardous materials and fuels

Reagent management, hazardous materials and fuels

19. Establish procedures for storage of hazardous materials in accordance with the National Fire Code - 1995 Canada (NRC, 1995). Contain hazardous substances in work areas as limited as possible.

20. Install automated ventilation systems at all workstations where are handled stored and used reagents. Provide ventilation systems automatic alarms that come into play when there is an exceedance of the limit value (TLV).

21. Establish procedures for handling each chemical or hazardous material. Identify and disseminate specific risks for all workstations where are handled, stored and used reagents and hazardous products. Define personal protective equipment and tools used in these workstations. Establish for each list item of protective equipment and rescue in case of technological accident.

22. Confirm with each delivery of reagents and hazardous materials, the presence and visibility of safety data sheets. Check that the transporter has an emergency plan and that drivers are trained for it. Return to the supplier products whose packaging is broken and use or storage would be hazardous. Reagents supplier's contracts should include provisions for environmental responsibility.

23. During operations to ensure that MSDSs are affixed to containers of regulated products (French, English) and these sheets are also available in all computer terminals. Update Safety Data Sheets (MSDS) and distribute them. .

24. Identify various classes provided by Transport Canada All hazardous materials used, or used out of the work site:

    Class 1: Explosives
    Class 2: pressurized gas
    Class 3: Flammable and combustible liquids
    Class 4: Flammable solids
    Class 5: Oxidizing agents
    Class 6: Toxic and infectious substances
    Class 7: Radioactive Material
    Class 8: Corrosive substances
    Class 9 hazardous material varied.

25. Control inventory and the inputs and outputs of products and hazardous waste.

26. Make protective equipment available for the employees and place recovery kits at all handling areas and final disposal location of hazardous materials.

27. Training personnel to handle and use hazardous materials at the mill. Pay attention to aspects of toxicity, incompatibility and reactivity of hazardous products.

28. Establish arrangements for emergency services with fire service with the municipalities of Chibougamau and Chapais for emergency situations.

29. Use warehouses designed for the storage of reagents and dangerous material and clearly identify the products. These stores must be ventilated and kept under lock and key.

    Only authorized personnel may have access. Interim storage sites must be protected against vehicle impact and those containing liquid shall be equipped with a double wall or dike spill containment, which will remain empty and clean.

All enclosures and containment tanks must be inspected and regular maintenance.

30. The indoor storage of chemicals and fuels must be heated, ventilated and protected against fire and explosion and provided with emergency showers and eye washes. These spaces will be thermally insulated and maintained at a temperature of 15 º C. External storage of chemicals and fuels must be separated by a retaining dike or a fence. They must be fitted with appropriate warning signs. Restricting access to storage areas and handling of these products in specially designated and trained staff. Ensure the storages tanks have a capacity equal to 115% of the tank.
31. Inspect weekly storage areas for hazardous materials and supply and distribution systems.
32. Store chemicals in small containers inside buildings and protect the class 2 gas cylinders against mechanical damage.
33. Conduct an annual external audit of the management plan of hazardous materials and waste. Communicate results to senior management.

Waste and hazardous waste

34. Specify contractors and employees what types of industrial waste is recyclable. Place recycling containers in sufficient quantity in strategic locations. Dispose regularly in allowed sites.
35. Store hazardous waste in a separate building, heated, with a concrete floor resistant to chemicals. The building must have a watertight basin which may contain spill 25% of the total capacity of the stored content. Dispose regularly in authorized sites. Store in separate areas and containers of different color hazardous waste and the remove from the site on a regular basis by an authorized transporter.

Environmental emergencies and event reports

36. Define the criteria for intervention, response procedures and the location of emergency equipment at each site high risk, medium or low. Maintain the emergency plan in accordance to Effluent Regulations Metal Mining regulation and distribute to employees. Hold an annual briefing on the emergency plan for all employees.
37. Maintain inventory and location of emergency equipment. Emergency equipment should include absorbents, shovels and containers for collecting spilled on the ground, barriers for containment of spills in water, masks and other protective clothing and material reserved for the emergency construction.
38. Inspect regularly the areas most prone to soil contamination.
39. Pick-up contaminated soil immediately after the incident and contain contamination to prevent leaching. Characterize the result of the cleaning. Evacuate the contaminated soil by an authorized carrier.
40. In case of a spill, inform verbally without delay Urgence-Environnement Ministry of Sustainable Development, Environment, Wildlife and Parks (MDDEFP) and

Environment Canada if the incident affects habitat fish. Produce a report of the incident and send to government and stakeholders.

Environmental audit

41. Establish an audit program-to-three years of environmental compliance to ensure the implementation of laws and regulations, requirements engineering, standards of corporate environmental management. This audit will include integrating the annual review of the stability of tailings containment structures, as well as the annual review of the management plan of hazardous materials and waste. The results of the audit will be reported to management of BlackRock Metals.

1.2 MITIGATION MEASURES FOR THE PROTECTION OF RECEIVING ENVIRONMENT

Soil protection

42. Use first borrowing the implementation project area benches and existing borrow pits. Meet the criteria of location, operation and restoration of the Regulation respecting pits and quarries.
43. Keep the removed soil for restoration needs. This applies for the construction of roads, dams, sector of the pit, plant, crusher and garage. For tailings, removal of vegetation layer if required, should be done gradually so as not to leave the soil bare and cause erosion or infiltration. Topsoil must be separated from mineral soil.
44. During construction in areas of low bearing capacity, restricting the movement of construction equipment within the footprint. Leveling ruts due to the movement of heavy machinery after construction.
45. When rehabilitating, scarify compacted surfaces at least 15 inches deep for loosening, level surfaces, spread topsoil and seed with an appropriate mix and in the most sensitive areas, establish a herbaceous layer (seed) and covered shrub (plant) with the appropriate species.

Water protection

46. Do not extend the access road at the river crossing when it is large enough to withstand heavy traffic. According to the MNR classification of forest roads, the width of bridges on a forest road class 2 can be 4.3 meters.
47. Ensure ditches, culverts and streams receiver can absorb the volume of drainage water at all times, including periods of high water (1/25 year). When more than a culvert is required, place a culvert in a place lower than the other(s) from 15 to 30 cm to concentrate low flows.
48. Perform work outside the spawning periods. The upstream and downstream riffles culvert must be installed at least 15 inches below the natural bed of the stream, or to a depth corresponding to the fifth the diameter of the culvert; culverts should be long enough so that the fill material does not obstruct openings of sufficient diameter to not impede the natural flow. If a bypass channel is needed for the temporary diversion of streams, cover the bottom of the temporary structure with geotextiles and / or gravel.

49. Jobs requiring interventions in the bed of a river or diversion of streams must be done quickly and outside the spawning periods. Isolate the construction area in the river the rest of the rivers to work “dry” and avoid the suspension of sediments (using a cofferdam, a temporary bypass in a culvert or channel). In the case of the establishment of a cofferdam, use coarse uncontaminated material to avoid the increase of suspended solids.

50. Prohibit traffic less than 30 m of lakes and perennial streams and within 5 m of intermittent stream.

51. During the excavation, install temporary sediment traps or other devices in slopes reworked along the banks or in drainage ditches to prevent the flow of particles in the stream. Direct runoff and drainage water to vegetated areas using berms or diversion ditches.

52. Crossing a river or lake with construction equipment is prohibited under the Forest Act. Protect the banks of the river that could be damaged during construction, leaving in place the shrub and herbaceous layers as well as stumps. Ensure that the work never obstruct a stream and, if necessary, clean the river and remove any debris. Do not pile snow within 30 meters of a watercourse.

53. Seed and cover bare surfaces susceptible to erosion mulch, decomposed mesh to prevent soil loss and infiltration and particle transport due to runoff.

54. At the time of the construction of drainage ditches to prevent erosion, cover the sides and bottom of the ditch of granular materials, seed the surrounding area, install thresholds to dissipate energy at regular intervals and build trap sediment in the watercourse.

55. Have an intervention package for spills in all vehicles and heavy equipment.

56. At the end of mining activities, if contaminants (metals, hydrocarbons or other) are present, a water trap must be maintained in the mine, continuing to make the treatment of water, until it meets the quality criteria.

Protection of air quality

57. Use dust suppressants approved by the Ministry of Sustainable Development, Environment, Wildlife and Parks, including water, salt or salt solutions on any surface capable of generating dust. The salting equipment should be rinsed on the project site. The rinse water should be directed to a treatment pond or be placed on surfaces already treated.

58. Wherever possible, vehicle motor should not be put on idle when stopped, except for the winter type diesel engines.

Protection of the ambient noise

59. Meet the noise standards contained in the Regulation respecting pits and quarries (Q-2, r.2). Reduce noise at the source.

60. Regularly maintain all noisy equipment that is a source of noise pollution. Ensure that the silent machinery is in good condition.

Flora protection

61. Do not clear in places where vegetation does not interfere with activities. During construction, protect the trees that have been kept on the edge of the areas to be developed.

62. Keep vegetation around lakes, rivers and access roads. No vehicle or construction vehicle shall be operated in a 30 m strip around lakes and rivers.

63. Agree with the Ministry of Natural Resources and Wildlife and the holder of supply and forest management (CAAF) so that it can recover the market value wood. Never burn wood or pile waste wood within 60 m of a watercourse.

    Always allow paths free access from debris. Obtain municipal permits required for burning.

64. In the vicinity of rivers, lakes, on steep slopes and wetlands, keep the shrub, as well as stem and root systems of cut trees. Do not stack anything in those areas. Use equipment having low contact pressure on the ground and move in the same path previously defined. In these sensitive areas, manually cut the trees.

Wildlife protection

65. To avoid disturbing the movement of fish, the flow velocity within a culvert under 25 m in length shall not exceed 1.2 m/s and 0.9 m/s for a culvert longer than 25 m.

66. Workers wishing to indulge in fishing must have a fishing license in accordance with provincial regulations.

67. Establish a schedule of construction activities on the basis of spawning. It is recommended to carry out the work during the summer or in the winter when there is no spawning and the water is at its lowest level.

2 Rail Road

2.1 GENERAL MITIGATION MEASUREMENT BY TYPE OF ACTIVITY

Tree cutting

1. Identify a limit of tree cutting on construction plans and to the establishment of guidelines to protect woodlands and adjacent wetlands.

2. Identify and delineate areas of wood cutting, soil stripping and cutting areas at ground level.

3. Natural materials waste must be disposed in accordance with the policy of protecting shores and riverbanks and floodplains. It is forbidden to dispose of all waste material in natural wetlands.

4. Prohibit the burning of waste and woody debris on the job site.

5. Recover commercial trees (more than 10 cm in diameter at chest height). The commercial strata and residues will preferably be chipped.

Excavation and earthwork

6. Identify specific areas for the parking of workers. The construction trailers and storage machinery areas will be located in temporary work camp.
7. Stabilize soil erosion sites during work progression.
8. Arranging the steep slopes of ditches and stabilize the upper slope to minimize erosion.
9. Achieve rehabilitation places projects at the end of the work so as to limit the duration of inconvenience

Pit and Quarry

10. If required, use mattresses flak to avoid splashing pieces of stone dust and reduce noise during blasting.
11. Collect materials excavated and those resulting from blasting for use as backfill to prevent the storage of surplus equipment.

Transport and traffic

12. Contractors and subcontractors must use existing logging roads.
13. Confine the movement of machinery on preferred routes within the project area.
14. Prohibit the movement of machinery in aquatic and wetland areas.
15. Limit the movement of machinery in the right-of-way.
16. Ensure that the trucks that supply construction materials are always equipped with a tarp to prevent the escape of the ground or in the atmosphere aggregates, stone or other materials during transport.
17. Make sure the exhaust of vehicles and machinery used in the work system is in good condition to minimize emissions of air contaminants.
18. Avoid leaving unnecessary engines to reduce interference by the exhaust gas, smoke or other contaminants likely to come from machinery.
19. Observe speed limits on the road for maintenance vehicles.
20. Observe the permissible load limits on public roads.

Machinerie use

21. Inspect and clean machinery previously before use to prevent leakage of contaminants (oil, gasoline, grease, etc.)..
22. Perform full of fuel, lubrication equipment, cleaning and emptying oil machinery and construction vehicles in the areas provided for this purpose and more than 15 m of streams.
23. Prohibit washing machinery at the site of the railway construction site.
24. The contractor shall have permanently emergency kits recovery of petroleum products including sausages containment, absorbents and containers and

accessories essential to counter the roll spills and ensure the recovery, storage of contaminated material and soil management and contaminated material.

25. Make sure the position of emergency kits recovery of petroleum products is known to the staff involved and easily accessible at all times for a quick response.

Waste Management

26. Manage hazardous waste (waste oils, lubricants, etc.) in accordance with the regulations in force.

27. Remove all debris and unused materials.

Environmental emergencies and event reports

28. Implement the plan of emergency measures in the event of accidental spillage.

29. The contractor shall inform Environment Emergency accidents can disrupt the environment. A sign indicating the number of emergency environment and the names and phone numbers of those responsible for emergency measures must be placed in full view of workers on site (Emergency environment: phone 1 866 694-5454, 24 hours 24).

2.2 MITIGATION MEASURES FOR THE PROTECTION OF MEDIA RECEIVER

Water protection

30. Use culverts of correct type and size.

31. Promote the natural flow of rivers by removing culverts.

32. If necessary and if possible, restore and naturalize the banks of watercourses at the end of the work in accordance with the environmental specifications to be established.

33. The construction trailers, access roads, parking and storage areas must be located within 60 m of a permanent watercourse and more than 15 m of intermittent stream.

Soil protection

34. In erosion-prone areas, the contractor shall provide a plan to control erosion and sediment (silt fence, straw bales, filter rods and sediment traps) to capture suspended solids.

35. Quickly stabilize the slopes of the railway embankment.

Protection of air quality

36. Use dust control methods compatible with the receiving environment in problematic areas.

Wildlife protection

37. Educate workers on the importance of not feeding the animals and on the waste management on the construction site.

Road infrastructure

38. Use proper signalization approved by the MTQ to indicate access for construction suppliers on Route 167.
39. Use appropriate signs to indicate the area of work on forest roads.
40. Clean the roads and construction equipment regularly.
41. Meet the security standards, especially with regard to the design of road crossings (visibility angle cross, distance, etc.).
42. Notify CDPNDL timing of completion of the work near the CN rail line.

Land Use

43. Inform the public of the beginning and the nature of work.
44. Notify the beneficiary of the CAAF work period and the impact on road safety.
45. Provide appropriate signage and, if necessary, measures containment site.
46. Maintain communication between BlackRock Metals and tallyman to avoid problems with land users.
47. Maintain communication between BlackRock Metals and tenant lease.
48. Relocate and build the Rabbit Camp accordance with the laws and regulations in force outside the area of influence.
49. Before the work, meet the tallyman and tenant lease resort to give them the timetable for completion of the work including the description of the nature of these (clearing, blasting, excavation, etc.).

Landscape

50. Harmonize the approaches to the railway with the existing natural landscape softening slopes and proceeding as quickly as possible to the topsoil and seeding slopes gradually as the final race ends.
51. Seed the entire surface of the grip with native species.

Specific Mitigation Measures

1- SPECIFIC MITIGATION MEASURES – MINE PROJECT

Vegetation

Fl1 The gradual clearing work areas and also the gradual restoration of tailings sites will minimize erosion and promote the recovery of vegetation cover.

Fl2 Topsoil will be stripped and stored for gradual restoration needs. Inside the tailings, it is recommended to maintain the organic layer as a buffer zone between the release and the underlying soil.

Wildlife

Fa1 In collaboration with the tallyman, monitoring should focus on the quality of winter habitat replacement for moose in the trapline O-59. Compensatory work will either allow the potential to improve or at least facilitate the overall management of wildlife resources trapline O-59.

Fa2 During the first year, do not perform work within one kilometer of Lake Coil, mid-April to late August, periods of nesting, incubation and rearing young ospreys.

Fa3 A study should be conducted to identify nesting sites substitute for osprey and set up nesting platforms. This could also be beneficial to the bald eagle, which is present in the region of Lake Chibougamau.

Fa4 If possible, use the services of tallyman for taking fur animals in areas that will be affected by development. This also applies to trapping (November to March) and displacement of beavers (April to October).

This also applies during the operation for the beaver that culverts are indicative of first order to build a dam.

Fa5 BlackRock deny access to the industrial site for purposes other than work. Fishing activities within the boundaries of the property will be excluded.

Fa6 A program of compensation for the loss of fish habitat will be defined in detail. The sites that will be studied further are the Armitage River, Denis, Lake A-2 and the entire Villefagnan stream including its two main branches and the Wynne Creek and Audet stream. Study and implementation of the work will be carried out in consultation with the tallyman (lot O-59). Progress reports will be submitted to Fisheries and Oceans Canada, as well as Department of Natural Resources for comment and approval.

Soils –Surficial materials

S1 Do an Environmental Assessment (Phase 2) at the transfer site prior to construction.

S2 Depending on the quality of materials to be confirmed, use first the loan no bank 13 (drumlin, non-waterproof material), glacial till (waterproof material) below the borrowing No. 13 bench and benches borrowing already open and listed in GESTIM to reduce the footprint and visual impact of the project.

Wetlands

MH1 At the transfer site, use the priority areas already developed for industrial purposes. Use as a last resort areas characterized by wetlands and mature forest.

MH2 Identify with tallyman of trapline O-59 wetlands that could be a restoration plan, as well as those who might be wildlife management. Priorities identified will be subject to federal and provincial authorities before the implementation of improvements.

Lakes and streams

LC1 Local and partial diversion of watercourses and the modification of surface drainage in the area of the waste rock dump and tailings must be done during low flow periods.

LC2 A threshold of 1.5 meters will be established at the outlet of Lake Jean to maintain a water level for the survival of fish during low flow periods.

LC3 An energy sink basin will be located at the outlet of the lake water channeled Denis. From this point, a minimum of two thresholds will be set up along the route of the water prior to discharge into Lake B-1.

Underground Water

ES1 Upon detection of contamination, hydraulic trap will remain in the mine, continuing to make the treatment of water, until it meets the quality criteria.

ES2 During construction, ensure the proper operation of the treatment system and wastewater treatment camp workers and the principles of management of oil, chemicals and waste contained in Chapter 11.

Ambient Air Quality

A1 Limit traffic on the routing paths to authorized vehicles.

A2 Cover the routing paths of materials with very low silt content.

A3 During the summer season, regularly watering the roads according to the equation proposed by « Air pollution Engineering Manual » (Cowherd 1992):

$$C = 100 - (0,8*P*D*T/I)$$

Where :

C : average efficiency of regulation and control of emissions (%);

P : average hourly evaporation during the day (mm / hour);

D : Average hourly trucks on unpaved roads from the mine site (h-1) flow;

T : time between two successive irrigation (hours);

I : amount of water per unit area used for irrigation (litres/m^2).

A4 To ensure compliance with the standards and to monitor releases of special materials, operate from the beginning of the construction of the mine :

- a sampling station and measures the quality of the air that station must be installed in the area south-east of the mine site by the prevailing winds to measure and analyze continuously the concentrations of particles TSP, PM2 .5 and PM10;
- an automatic weather station at the mine site to measure the main meteorological parameters such as temperature and humidity, horizontal visibility, speed and direction of wind and precipitation

A5 Cover tailings under a water slide and put forward a program of gradual restoration. Retain as much as possible a bunch of woody vegetation around parks discharges to reduce the spread of dust.

Sound Environment

MS1 Check the noise climate at the mine site and along Route 210, once a year during the first three years, from 2012 to 2014. Thereafter, take an inventory of the sound environment every four years or when significant additional equipment added. Provide a compilation of noise levels at property boundaries of BlackRock Metals.

MS2 Include the acoustic power as a criterion for selection of the noisiest project equipment.

MS3 When applicable for different types of trucks, choose bins flexible coating.

MS4 Design modules camp to meet the criteria for acoustic comfort recognized. Plan the camp so as to move the most sensitive areas of local sources of noise or path 210 (bedrooms, dining rooms and recreational areas). Building a protective berm between the camp and the road to reduce the influence of heavy vehicles.

MS5 The noise monitoring should be performed at the camp immediately after its establishment and for a period of representational activity. Daytime and nighttime noise levels should not exceed 45 dB (A) on the outskirts of the dormitories. Measurements of noise levels at the camp should be taken on an annual basis.

MS6 Dosimetric measurements must be made to each of the workstations at least once a year. Daily doses of noise workers are obtained with the help of integrating dosimeters. The integrating dosimeter is a portable device installed in the worker's belt. The microphone connected to integrating dosimeter attaches to the shoulder of the worker. Noise levels are integrated to obtain the daily noise dose of worker wearing the device. The dosimetric measurements will be the first year of commencement of operations.

MS7 Employees workstations whose daily noise dose is greater than 90 dB (A) must wear hearing protectors comply with CSA Z94.2-1974. If applicable, corrective measures to reduce noise below the legal limit should be implemented, including the installation of noise barriers and noise. The use of absorbent materials on vibrating surfaces and, when required, soundproofing work space will also be made. Workstations with a daily dose of calculated noise is greater than the standard are those operators loader, bulldozer and the grader and operators hub.

MS8 The display port mandatory hearing protection equipment systematically at all locations where the noise level exceeds 90 dB (A) to also protect employees who do not have fixed positions, such as mechanics, electricians, etc.., who can work in a noisy place for the duration of their shift.

MS9 The use of screens / cabins acoustic workstations, the use of hearing protectors, alternating workstations are other measures to reduce the noise to be used.

Built Environment

MB1 Relocate the camp in a Wapachee family unaffected by traffic sector. Discussions are progressing positively on this subject between BlackRock and tallyman trapline O-59. The place favored by Wapachee family is at the Wynne Creek near Lake Stella. The Wynne Creek provides access to lakes Pillow, Stella, Armitage, the river of the same name and Lake Chibougamau. This measure will be implemented before the start of construction.

Land Use

US1 Notify tallyman, municipal authorities, other users and the general public of the construction period, impacts on land use and the impact on their safety.

US2 Develop signage for hazardous areas on the access road: eg, at km 200 of Route 167, at the intersections of other forest roads, camp workers at the plant and the mine site.

US3 In collaboration with the Regional Tourist Association and hoteliers, produce and distribute written materials for hunters and fishermen who use the area for walleye fishing and bear hunting. Promote alternative access to land and clear the dangers of tourism activities on the axis of Route 210 between the transfer site and the mine site.

US4 Suppliers, the tallyman and other operators using primary resources Route 210 must have the same radio as used by vehicles of concentrated communication equipment. All users of Route 210 directly or indirectly related to the mining project, including other operators of primary resources, must report their presence to other carriers upon arrival on Route 210 and turn to milestones prescribed.

Economy and employement

E1 Promote jobs for immediate family tallyman, especially regarding the environmental fate of its territory. This includes biological studies and monitoring the implementation of compensation measures for wildlife and wetlands as well as the general improvement of wildlife potential of trapline O-59.

Visual Environment

V1 Use for building a coating of a color that blends with the environment.

V2 The height of the piles of waste rock and coarse tailings must harmonize with neighboring peaks.

2- SPECIFIC MITIGATION MEASURES – RAILROAD

VF1 Restore the banks of streams that are disturbed by the installation work of culverts and bridges to reduce soil erosion.

VF2 With the exception of crossings points necessary for the excavation work and for the implementation of railway construction in wet ground, circulation of machinery in humid environment will be prohibited in wet ground.

VF3 Put in place appropriate type and size culverts to avoid draining or sinking of a wetland crossing.

VF4 The working methods should be defined in such a manner to limit the range of the work areas, to maintain them the farthest possible from the aquatic environment and that they represent less risk of disruption to the environment and if needed, temporary encroachment into the aquatic environment should be limited to the minimum.

VF5 Dykes on the shore or, if required cofferdams, will be built parallel to the shoreline in order to contain the working areas and to prevent materials (or other construction or natural debris) as well as sediment-laden runoff water to reach the aquatic environment of the watercourse (geomembranes should be used in order to seal these structures).

VF6 Remove culverts to facilitate the natural flow of water bodies, rehabilitation of the banks of streams disturbed by the installation of culverts and bridges.

VF7 Fishing activities by construction workers will be prohibited during the period of bridge construction.

VF8 If present, evaluate the possibility of recovering the lumber having commercial dimension.

VF9 If possible, for rail maintenance use a greasing product that is harmless for the environment, either of vegetal and biodegradable nature.

VF10 Use pesticides and application methods accepted by the MDDEFP in addition to complying with the Code de gestion des pesticides (Code of pesticide management).

VF11 Dormant and rails treated with P3 solution will not be stored in sensitive areas (wetlands, near a river or lake);

VF12 Natural material waste must be disposed of in accordance with the « Politique de protection des rives et du littoral et des plaines inondables ». In addition, it is prohibited to dispose of any waste material in natural wetlands such as ponds, marshes, swamps and bogs.

VF13 Restore the surroundings by seeding with native species; monitor the revegetation of the railway.

VF14 The banks of the water bodies, if required, and if possible, should be restored and renaturalized at the completion of work in accordance with the established environmental specifications.

VF15 Materials or debris from deforestation (trees, stumps, shrubs, branches, dead wood and other plant debris) shall be placed permanently at a distance of at least 60 m from the shore of a lake or a stream, or any floodplain, marsh, swamp or bog.

VF16 If necessary, temporary encroachment into the aquatic environment should be limited to the minimum.

VF17 Notify all users of the territory about the construction period and the impact on road safety.

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