BlackRock Project

Iron ore exploitation at lac Doré geological complex

Project description

October 2012

TABLE OF CONTENTS

Page

LIST OF TABLES

Page

LIST OF APPENDICES

1.0 INTRODUCTION

This document presents a description of the activities planned for the mine construction, operation and rehabilitation phases. It describes the mining and mineral processing methods and all related project components in terms of these three phases.

This new project description is pursuant to the update of the feasibility study of the iron vanadium mine by the BBA in May 2012, in which iron concentrate production increased to 3 Mt per year. This description also includes the rail line and choice of shipping port, making it a complete document that includes the additions made in recent months.

The project was also modified, most notably in terms of the location of the waste rock piles and coarse and fine tailings facilities, after a review of alternatives in light of the need to increase the amount of water available for plant commissioning.

1.1 Project Components

This section presents the main components of the BlackRock Metals project, which include industrial activities like mining, mineral processing, waste rock and tailings management, and all other related services, such as the garages and warehouses. It successively presents the phases of the project, project components, mineral resource inventory, mining installations, tailings management, site water management, support infrastructure (such as the access road, railway line and construction camp) and the related project (transmission line).

The map in Appendix 1 shows the location of the project installations superimposed on the host environment. Appendix 2 shows the project toward the end of the pit operation.

The mining facilities are as follows:

- Pit and associated surface infrastructure;
- Concentrator and associated buildings;
- Covered ore stockpile;
- 28.8 Mm^3 capacity fine tailings pond;
- 42 Mm^3 capacity coarse tailings pile (and additional small pile if needed);

- 75.38 Mm^3 (264 M-tonne) capacity waste rock pile, with additional small pile in case of emergencies; and
- Process water treatment plant and associated infrastructure.

The support infrastructure is as follows:

- Existing access road;
- Railway line and associated installations;
- Saguenay port facilities;
- Fuel storage and garages;
- Detonator and explosives magazine;
- On-site service road network;
- Overburden accumulation area;
- On-site substation and power distribution system;
- Construction camp with 500 single rooms plus a cafeteria, drinking water supply system and sewage treatment plant; and
- Miscellaneous other buildings and installations.

2.0 MINERAL RESOURCE INVENTORY

BlackRock Metals plans to mine iron-vanadium ore from a deposit located south of Lac Chibougamau, in the Lac Doré layered complex. The surface coordinates of the mineralized zones are as follows:

Latitude: 49°39'14" N
Longitude: 74°18'08" O

The rights to this deposit belong to BlackRock Metals, which owns 308 claims covering 5,236 ha (52 km^2). BlackRock Metals will soon file an application for the mining lease required for mine operation.

2.1 Deposit Type

The BlackRock Metals deposit is an Fe-Ti-V oxide deposit associated with a mafic layered intrusion. It is located in the Lac Doré mafic layered intrusion located approximately 20 km south of Chibougamau, at the southeast end of the Abitibi sub-province of the Superior geological province. The genesis of this deposit type is related to processes of fractional crystallization where layers rich in oxides (especially Fe and Ti) settle out by magmatic segregation in large mafic intrusions.

2.2 Mineralisation

The Lac Doré complex stretches northeast to southwest over a distance of about 24 km, with BlackRock Metals holding the rights to about 17 km. It is deformed by a large anticline and metamorphosed to the schist facies, as are the volcanic rocks that host it. The mineralized zone consists of gabbro rich in magnetite-ilmenite (vanadium-ferrogabbros) rhythmically layered with anorthosite beds.

Two main mineralized zones have been identified on the BlackRock Metals property: the Southwest Zone and the Armitage Zone, which cover 2.5 km and 3.3 km sections of vanadium-bearing ferrogabbro horizons, respectively. BlackRock Metals' current development efforts are focused on the Southwest Zone.

The oxide-rich layers of the Southwest Zone have been exposed in multiple trenches on surface and intersected in more than 60 diamond drill holes. The resulting mineralized envelope characterized by BlackRock Metals ranges in thickness from some 100 to 300 m. The geological sections are oriented at N130° and are 200 m apart in the southwest area (Sections 100 to 1400) and 100 m apart in the northeast area (Sections 1600 to 2600). On section, the holes generally dip 45° and strike N310°, with two holes per section in the southwest area and three holes per section in the northeast area. The stratification is characterized by an average dip of 75° (60° to 90°) and a N130° strike.

2.3 Exploration

BlackRock Metals has been exploring in the region since 2008. More specifically, it has done the following work:

- Airborne magnetic survey and digital terrain modelling covering the entire Southwest Zone (17 km x 1 km);
- Compilation of historical data;
- Mapping of the magnetite-ilmenite mineralisation (17 km x 500 m);
- Repairs to the road access network covering the Southwest Zone;
- Stripping (650 m, 3 trenches on the Southwest Zone);
- Mapping of trenches;
- Channel sampling;
- Diamond drilling (49 holes for 12,429 m of drilling);
- Mineralogical and metallurgical testing at COREM and SGS; and
- Resource estimation.

2.4 Mineral Resource Inventory

The Southwest Zone deposit contains proven and probable reserves of 152.2 million tonnes (Mt) of ore with an average iron content of 29.1%. BlackRock Metals plans to produce 3.0 Mt of concentrate per year with an iron content of in the range of 62-65%. Mine production will be 32,076 tonnes of ore per day to produce 8,220 tonnes of concentrate. The processing plant is expected to operate 24 hours a day, 365 days per year, at 90% availability. Average daily production is therefore expected to be 6,849 tonnes of concentrate as of mid-2015. The mineral resource statement for the project is shown in Table 1.

Table 1 Mineral Resource Statement for the BlackRock Metals Project

	Quantity	**Grade**	**Grade**	**Grade**	**Grade**	**Fe concentrate**
Classification	**Tonnage (Mt)**	**(%SAT)**	**(%Fe)**	**(%V_2O_5)**	**(%TiO_2)**	**(ounces)**
Measured resource	64.3	20.1	30.3	0.49	8.48	16.7
Indicated resource	87.9	17.8	28.2	0.45	7.77	20.2
Inferred resource	152.2	18.7	29.1	0.47	8.07	36.8

3.0 MINING INSTALLATIONS

3.1 Open Pit

3.1.1 Mining

As the deposit outcrops on surface, the ore will be mined by open pit. The pit will be oval and elongated in shape, about 2.8 kilometres long by a maximum of 450 m wide and about 280 m deep. The surface of the pit will therefore cover about 1.26 km^2. The roads in the pit will be 34 metres wide to allow the 220-tonne trucks to pass each other safely. The roads will have a maximum slope of 10%. Vehicles will exit the pit to the southwest, near the facilities.

At full capacity, BlackRock Metals plans to mine about 12.4 Mt of ore per year to produce 3 Mt of concentrate per year. At the end of operations, 152 Mt of ore, 264 Mt of waste rock and 7.6 Mt of overburden will have been extracted to produce 38 Mt of concentrate.

3.1.2 Drilling and Blasting

Production drilling in the pit will be carried out by 21.6-cm diameter equipment. The mineralized zone will be drilled on a 7m by 7m drill pattern. For the waste rock, the pattern will be increased to 7.5 m by 7.5 m. The holes will be 11.5 m deep.

A supplier will supply the explosives and will be responsible for on-site explosive storage and handling. An emulsion with an average density of 1.25 g/cm^3 will be used for blasting.

3.1.3 Ore and Waste Haulage

The ore and waste rock will be hauled to surface by 220-tonne trucks. Electric-hydraulic shovels with a bucket capacity of approximately 25 m^3 will be used to load the trucks.

3.1.4 Pit Dewatering

A pumping system will keep the pit dry during operations. The pumping rate will vary depending on both pit depth and season. The mine water will therefore consist of groundwater pumped to draw down the water table and precipitation that falls directly on the pit. The flow rate is expected to be 585 m^3/h when the pit reaches its final depth.

3.2 Concentrator

Concentrator capacity matches the capacity of the equipment in the pit to get the ore to surface. Like the mine, the concentrator will operate continuously, on two 12-hour shifts, 24 hours a day, seven days a week. The crushing equipment will operate about 15.6 hours per day, seven days a week, at a maximum feed rate of 4,700 tph.

Table 2 shows the plant design criteria.

Table 2 Concentrator Design Criteria

Parameter	Value
Magnetite concentrate production	3.0 M tpa
Ore processing rate	12.4 M tpa
Concentrator availability	90%

The ore processing plant comprises several facilities: the primary, secondary and tertiary crushers, the ore stockpile and the concentrator building housing the ore concentration equipment. There will be a service building attached to the concentrator that will house offices, an assay laboratory, an infirmary, an electrical / instrumentation shop, a lunchroom, showers and a change room for employees, a compressor room, a boiler room, a breaker room, a training room, a warehouse and a mechanical shop.

3.2.1 Process Description

Crushing

The ore will be hauled from the pit to the primary crusher by 220-tonne dump trucks. The crusher will be located in the building closest to the pit to minimize haulage distance, in a place where it can be safely operated. The primary crusher will operate 65% of the time. It will be a 1.52 m x 2.26 m gyratory crusher that can crush up to 4,670 tph. The ore exiting the gyratory crusher will be less than 300 mm in diameter, and will be fed by a 4,700-tph capacity conveyor to the secondary, 1,300 hp cone crusher. Lateral guides will seal the chute from the crusher to the conveyor to prevent fine particles from escaping and causing dust in the building, which is nevertheless equipped with a dust collector. In addition, the floors in the primary crusher building will be cleaned with water, and the sludge produced will flow to a low point (located in the basement) where the water will be pumped outdoors, into tanker trucks if needed, and sent to the tailings pond, as it will have been in contact with the ore. Water collected in the French drains outside will flow into a ditch and then to Lac Denis.

The ore is screened before entering the cone crusher, and particles smaller than 50 mm will be sent directly to the ore stockpile. The coarse fraction from the screen will be crushed to 80% minus 50 mm. Once crushed, the ore will be stored in the ore stockpile, which will have a live capacity of 12.2 hours of plant production, with a volume of 8,972 m^3. This ore stockpile will be covered with a dome, with sufficient inside space for equipment to enter, if required.

A conveyor washing system will be designed to keep the systems clean and efficient for the wet portion of the process, with the used water recirculated into the process. An air and scraper cleaning system will be used for the dry portion.

Grinding

The ore will be reclaimed from the ore stockpile by three chain feeders and then transferred by conveyor to the 11 m x 5.25 m, 15,000 kW semi-autogenous grinding mill (SAG mill). The grinding mill will have a 1,543 tph ore capacity and a ball charge of about 12%. The portion of the grinding circuit located in the concentrator building marks the start of wet processing at an average density of 70% solids. At the outlet of the SAG mill, the ore will be screened (two stages) before being sent the first stage of magnetic separation. The concentrate obtained in this stage feeds hydrocyclones for physical separation of the particles. The coarse particles are returned to a ball mill while the fine particles are fed to the second stage of magnetic separation. The ball mill will be 6.4 m x 10.7 m and contain a 35% ball charge. The final product will be 80% minus 75 microns. This grinding mill can process up to 762 tph of ore, and will be used in closed circuit with a battery of 84-cm hydrocyclones.

Magnetic Separation

After grinding (SAG and ball mill), the ore will be sent to the magnetic separation units. Separation will take place in two stages: primary with single-drum units and secondary with double drum units. The magnetic separation feed is wet, meaning that the ore is mixed with water to a ratio of 40% solids. The capacity of the primary unit will be 1,686 tph solids (3,375 tph pulp). The unit will consist of eight 1.2 m x 3.2 m cylinders. The non-magnetic tailings will be collected under the separators and will constitute the coarse tailings. The coarse tailings will be sent through hydrocyclones to remove the maximum amount of water before being sent outside the concentrator, where they will be piled before being trucked to the coarse tailings pile. The fines will be sent to the tailings thickener.

The fine fraction from the hydrocyclones used with the ball mill will be fed to the secondary magnetic separation stage. This section will consist of eight 1,2 m x 3,2 m double-drum units with a capacity to process 762 tph of solid ore, or the equivalent of 3,049 tph of pulp (water and ore). This stage will separate out the non-magnetic material, which will be sent to the tailings thickener, while the magnetic fraction recovered will be fed to the flotation cells. A flotation stage is required to meet the concentrate sulphur content criteria specified by the purchase contracts. The magnetite concentrate produced by the second stage of magnetic separation will therefore be fed through a flotation circuit consisting of six cells in series. Reagents will be added to the concentrate in the first cell. The concentrated flotation product, which will be the sulphide portion, will be sent to the tailings thickener.

Concentrate Thickening

The low-sulphur magnetite concentrate will be sent to a 27-m thickener located outside the plant, to be thickened to 65 to 75% solids.

Concentrate Drying

The thickened concentrate is then sent to filtration to be filtered by drum filters to a moisture content of 8.5%. An additional steam drying stage may be added if needed to reduce the moisture content to 5.5% when required (on cold winter days, for example).

Once the material has been filtered, it will be transported by conveyor to the rail cars. The concentrate feed can be up to 6,000 tph. There will be an emergency ore storage area that can be used in case there are any problems with the train.

Concentrate Loading

Once the final concentrate has finished the filtration stage, it is sent outside the concentrator into a storage bin of about 10,000 tonnes, equivalent to about one day's production. When it is time to fill the rail cars, the concentrate is fed into a 400-tonne loading bin. This allows optimal filling of the cars to the recommended weight. There is an outdoor emergency storage area to allow for production risks such as fluctuations in concentrate production or mishaps in the loading/haulage cycle. If this space is used, a front-end loader will be needed to return the material to the storage bin. The concentrate will be first dumped into a hopper, from which it goes onto a conveyor, into the storage bin and then into the loading bin.

The concentrate will be shipped to the port facilities once a day by train.

3.2.2 Laboratory

The laboratory building will be located on the second floor of the concentrator. It will house offices, space for archives and the laboratory equipment needed to monitor the operation.

The assay laboratory will be used for both the mine and concentrator:

- The rock samples from the mine will be sent to the laboratory for analysis to determine the iron and vanadium grades and thus guide the geologists and miners in production planning.

Samples from the concentrator will also be sent to the laboratory to determine the grade of the ore processed at various stages of processing, i.e., the concentrator head grade and the grade at the beginning and end of each stage in the process (grinding, magnetic separation, flotation and iron content of the tailings). These assays will measure process efficiency, as well as the total amount of iron and vanadium recovered.

Reagent Handling at the Laboratory and Concentrator

Three types of reagents will be used in the concentrator, including a frother and a collector in the flotation circuit and a flocculant at the thickeners to promote settling of suspended solids.

The frother and collector added to the flotation cells will separate the pyrrhotite from the concentrate. In metallurgical testing, 20 g/t of Unifroth U250C was used as a frother, 150 g/t of Potassium Amyl Xanthate (PAX) was used as a collector, and Magnafloc was used as a flocculant, in quantities of 15 g/t for the water from concentrate thickening and 25 g/t for the water from tailings thickening.

Table 3 describes the estimated consumption of products at the concentrator.

Table 3 Estimated Reagent Consumption at the Concentrator

Reagent	Delivery	Use	Annual consumption
Frother	By truck (barrels)	Promotes the formation of bubbles	60 tonnes
Collector	By truck (barrels)	Allows the sulphides to float to the surface	450 tonnes
Flocculant	By truck (bags)	Allows the agglomeration of particles to promote sedimentation	45 tonnes
Lime	In bulk; solid form	pH adjustment	5,000 tonnes

4.0 MINING WASTE MANAGEMENT

4.1 Mining Waste Management

4.1.1 Geochemistry of Mining Wastes

Kinetic tests are currently underway at SGS. The results will be compiled, and a full report on the geochemistry of the tailings and waste rock is currently being drafted. Based on the preliminary results, BlackRock Metals does not foresee any leaching issues.

4.1.2 Tailings Deposition

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

Coarse Tailings Facility

The coarse tailings are from primary magnetic separation and will be over 106 microns in diameter. The tailings will be deposited on a storage pad where a loader will load them into trucks (60-70t). The trucks will then haul the tailings to the coarse tailings pile, where they will be pushed by a tractor into 10-m high benches. The quantity of coarse tailings to be stored is estimated at about 76.1 Mt, which will occupy an estimated volume of 42 Mm^3.

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

Fine Tailings Facility

The fine tailings are from the thickener underflow, and will be 50% solids. The pulp will be pumped to the fine tailings facility by two 2500-hp pumps in series.

The water in the tailings pond will consist of a mixture of process water, mine water and the rainwater that falls within the footprint of the pond itself. This water will flow through a spillway into the polishing pond, which will give the suspended solids a second chance to settle. From the polishing pond, the water will be pumped to the concentrator to be reused. This recycled water will meet 10% of the plant water requirements, with the balance supplied by the thickener overflow.

The fine tailings facility will be located to the west of the pit. Dams will be built around most of the perimeter of the facility, which will cover an area of approximately 1.7 Mm^2. The dams will have a maximum height of 27 m, and the maximum thickness of the tailings in the facility will be 22 m. Nearly 40 M tonnes of wet tailings will be deposited, for a total volume of 23.2 Mm^3 (water and solids). The tailings deposited in the facility will be submerged, which will eliminate a source of dust emissions. The water on top of the tailings will flow into the polishing pond. From there, it will either be recycled to the concentrator or discharged into the environment following treatment to ensure that it meets the standards for mining effluents.

4.2 Waste Rock Management

4.2.1 Waste Rock Geochemistry

Acid-generating potential

Acid-generating potential testing was done on 113 waste rock samples. The results showed that only five of the 113 samples showed acidification potential, which is very low, and means that the pile as a whole will not generate acid when exposed to the elements.

Metal-leaching potential

Leaching tests using organic acid (TCLP) were done as required by Directive 019 for the mining industry. These tests are not representative of field conditions, even less so when the rocks are not acid-generating. In fact, the test is performed under acid pH conditions, which will not occur, as the rock is not acid-generating. However, Directive 019 requires that this test be carried out and that waste rock be classified based on the results.

The results will be compiled, and a full report on the geochemistry of the tailings and waste rock is currently being drafted. Based on the preliminary results, BlackRock Metals does not foresee any leaching issues.

4.2.2 Waste Rock Management

The waste rock will be stored in a pile to be built east of the pit. The pile will have an overall slope of 22 degrees and a maximum elevation of 640 m, for a maximum thickness of about 140 m of waste rock. The maximum footprint of this pile is about 1.6 Mm^2. A small waste rock pile is also planned if needed to the south of the fine tailings facility. If used, this pile will cover an area of 134,000 m^2.

5.0 MINE SITE WATER MANAGEMENT

Appendix 3 shows the water management flow chart. The mine site has been divided into three catchments with a total area of 4.31 Mm^2. A water collection system has been built for each catchment, namely the tailings pond, the polishing pond and Lac Denis (which will act as a settling pond and water reservoir for the plant). The pit will also act as a water intake facility. A final treatment pond has also been provided for as a safety measure.

It is assumed that all runoff will be directed to the polishing pond during the construction period. The containment dams at Lac Denis will be built at the start of mine construction. The capacity of the lake will thus be increased to 1.45 Mm^3 in order to store all the water required for plant commissioning.

5.1 Perimeter Ditch Network

The water from the tailings facilities and the waste rock piles or its resurgence will flow into the network of ditches that surround the property. All the water will flow to a monitoring point downstream of the property. The network of ditches is shown on the map in Appendix 1.

5.2 Sewage

There will be two sewage treatment units: one for the concentrator and the other for the mine garage. These treatment plants will be located near the facilities. Treatment will be based on a membrane bioreactor principle, and will produce a clean effluent that can be discharged into a ditch to flow toward Lac Denis via an insulated pipe. The treatment sludge will be collected on a regular basis by a specialised supplier.

5.3 Mine Water

The quantity of mine water is the combination of the groundwater pumped to keep the pit dry and the precipitation that falls directly on the pit. The amount of groundwater to be pumped will change fairly steadily as the pit gets deeper. The deeper the pit, the greater the flow will be. In general, during the winter months, the exposed rock face freezes, and less water enters the pit. It is difficult to predict the flow, and constant annual rates are therefore used.

The runoff flow to be pumped will vary daily depending on precipitation and weather conditions.

The water in the pit will be pumped to the fine tailings pond and flow through the circuit from there.

5.4 Process Water

Process water will consist of water from the thickener overflow and the fine tailings facility. BlackRock Metals has optimized water recirculation so as to minimize the pumping of fresh water from the environment. There are inevitably losses in the concentrate and tailings, and any missing water will primarily be drawn from the polishing pond.

Water requirements are estimated at 5,163 m^3/h. Process water is needed at various locations in the concentrator, including the SAG mill feed, the ball mill and flotation. Any water required in addition to the water recirculated from the process water tank will be drawn from Lac Denis and the polishing pond.

5.5 Polishing Pond Water Treatment Unit

The treatment unit will be located upstream from the polishing pond. It is designed to handle a maximum flow of 20,000 m^3/d to accommodate peak flows during the spring thaw and heavy rains. The tailings pond has a holding capacity of 28.8 m^3 and is connected to the polishing pond by an emergency spillway. The polishing pond is also equipped with an emergency spillway that will carry the water into the treatment and monitoring pond, which will contain the treated water. The water network is designed for a 100-year event. The treatment unit is designed to precipitate suspended solids through the addition of polymers and coagulants. The products used are listed in Table 4. The sludge from the treatment unit will be pumped as needed and sent to the fine tailings pond. As the sludge will consist of fine agglomerated particles, not metallic precipitate, no redissolution issues are anticipated for metals or other parameters.

Table 4 Estimated Product Consumption for the Water Treatment Plant

Reagent	Delivery	Use	Annual consumption
Flocculants (ferric sulphate and polymers)	By truck (solid form)	Allows the agglomeration of particles to promote sedimentation	As needed
Lime	By truck (solid form)	pH adjustment	3,000 tonnes

5.6 Discharge Point

Before being discharged into the environment, the water will flow through the polishing pond and then the treatment plant. The treated water will be stored in the treatment and monitoring pond, which has been set up as an extra safety measure. The treatment and monitoring pond is final water management facility before the final mining effluent is released into the stream upstream from Lac Jean. The water will be treated to meet water quality criteria stipulated in Directive 019. BlackRock Metals will also do everything it can to comply with the effluent discharge objectives (EDO) transmitted to it by the MDDEP. The water will be released into the stream bed that feeds Lac Jean to the north of the mine site, at the edge of the mining property.

During the construction period, the stream upstream from Lake Jean will be completely dry as the water sent to the polishing pond will be stored there and then pumped to Lac Denis in preparation for plant commissioning. Therefore, based on the schedule, during the construction period there will be no effluent and Lac Jean will be fed by streams untouched by the project. After that, the flow will fluctuate depending on the season, with the lowest discharge in winter and during low water periods.

The stream upstream from Lac Jean will be the receiving environment, and all of its flow will in fact consist of runoff from the mine site accumulation areas. A hydrological study is presently underway to better define the tributary discharge.

6.0 SUPPORT INFRASTRUCTURE

6.1 Access Roads

The access roads already exist: Route 167 is a provincial highway and Route 210 is a logging road. Both are public roads. The only roads that need to be built are the service roads on the mine site.

6.2 Railway Line

BlackRock Metals will build a section of railway between the mine site and the CN-owned railway line that connects Chibougamau to Lac St-Jean. It should be noted that there will be an addendum to present this project and its anticipated impacts.

Appendix 4 presents the route of the railway line.

6.3 Port Facilities

BlackRock Metals will use various facilities at the port in Saguenay (Grande-Anse sea terminal) to ship its ore. The main port facilities to be set up at the Saguenay port are the following:

- automatic car unloader;
- gallery conveyor (closed);
- bucket wheel reclaimer;
- warehouse (closed and heated in winter);
- tube conveyor or standard gallery conveyor;
- ship loader.

Appendix 5 presents the layout of the planned facilities from the railway line to the sea terminal.

The ore will be transported via the Saguenay port rail line to the automatic car unloader, located in an enclosed building with an operator control booth. Once unloaded, the concentrate will be sent to the warehouse via a gallery belt conveyor. The warehouse will be closed and heated in winter to keep the ore from freezing. The bucket wheel reclaimer will be used to reclaim the ore to be sent to the ship loader. The ore will then travel on a roughly 2-km-long tube conveyor to a ship loader with closed galleries that will load the concentrate into the ship's holds.

The concentrate handling circuit is a closed circuit designed for zero dust emissions for maximum environmental protection.

6.4 Service Facilities

6.4.1 Fuel and Oil Storage and Distribution

A site has been selected for fuel storage: the fuel farms will be located at least 75 m from any installations. All tanks will be double-walled and equipped with a pump unit, piping and a refuelling device. On-site refuelling will be done by a fuel vehicle with a storage capacity of 18,500 litres.

On-site fuel storage will be provided by:

- Gasoline: two ULC-S601-approved double walled 40,000-liter aboveground horizontal tanks; and

- Diesel: eight ULC-S601-approved double walled 50,000-liter aboveground horizontal tanks.

The site will also include the equipment needed to load and unload the trucks, a gas station, fences and other required equipment. An automated control system will be installed to monitor fuel consumption. The proposed system consists of hardware and software specifically designed to provide automated control of proper fuel use.

Table 5 shows the list of petroleum products and the distribution sites that will be used on site during construction and operation.

Table 5 List of Petroleum Products to be Used and Estimated Annual Consumption

Petroleum product	Use	Annual consumption	Storage
Gasoline	Pick-up trucks	0.1 M litres	Tanks near the plant
Diesel	Mining equipment	238 M litres	Tanks near the garage

6.4.2 Garages and Service Buildings

The equipment maintenance garage will occupy an area of about 4,400 m^2, being 47 m wide by 93 m long for the garage alone, or 193 m long including the adjacent warehouse. The building will include a 47-m wide by 44-m long mezzanine covering 2,068 m^2. The mezzanine will house the mine engineering and mine production offices, meeting rooms, a cloakroom, bathrooms and a lunchroom. The ground floor will consist of a garage with six repair bays including a wash bay, 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 garage will be equipped with 15-tonne capacity travelling cranes, as well as oil-water separators and lubrication systems readily available for heavy equipment maintenance. These buildings will be equipped with fire and intruder detection systems connected to the emergency vehicle building and gatehouse.

The fuel, diesel and gasoline tanks will also be located near the garage.

Hazardous Waste Management

Hazardous waste will be stored near the garage in accordance with the applicable regulations, and will be sent to an authorized treatment facility for final disposal.

6.5 Overburden Accumulation Areas

The ground will need to be cleared and stripped to access the mineralized zone. An anticipated volume of about 7.2 Mt of overburden will be deposited at the western end of the waste rock pile. The overburden and topsoil will be used for ongoing site rehabilitation. During the operation phase, perimeter ditches will be excavated to prevent erosion from the pile from carrying suspended solids into the environment. The ditches will direct the water to Lac Denis.

6.6 On-site Substation and Power Distribution System

Project power requirements are estimated at 45 MW. Power will be supplied by a new 22-km long, 161-kV power line starting from Line #1627 (Obalski/Otabogamau), which currently serves Chibougamau. Hydro-Québec is responsible for building the new line.

The main electrical substation will be located near the concentrator, which has the highest power requirements due to the presence of the SAG and ball mills. It will also supply electricity to the pit, primarily to power the shovels. A portable sub-station will be used, and the pit will be fed by a cable network.

Four generators will be installed to allow for power outages: two for the concentrator (1,200 kW and 800 kW), one for the crusher (800 kW) and one for the garage (1,200 kW).

6.7 Communications

The radio network will be operational for the construction and operation phases. The network will cover the entire site and the satellite office in Chibougamau. There is a telecommunications tower on the site to provide the required radio and telephone signals. This will also allow camera surveillance, a fire detection system and access controls (gate, doors, etc.).

Internet service will be available on site.

6.8 Construction Camp

The construction camp will be able to accommodate 500 people in 11 housing units of single rooms, with cafeteria service. The camp will also house a medical clinic, a recreation hall and a laundry room. It will be equipped with a loop network for fire protection and will be heated by a gas propane system. Electricity will be supplied by an 800 kW generator, with consumption expected to average 250 kWh on a 24-hour basis.

6.9 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 plant site (125 m^3/day) and the second for the garage site (200 m^3/day). The treatment process consists of filtration, chlorination and UV sterilization.

6.10 Recycling and Elimination Methods

Debris generated during the construction and operation phases (including site rehabilitation) will be removed to a site authorized by the MDDEP. The same will apply during the decommissioning phase (dismantling of the facilities). Recycling and reuse of materials will also be advocated.

7.0 RELATED PROJECT – TRANSMISSION LINE

Power requirements are estimated at 49 MW. Power will be supplied by a transmission line to be built by Hydro-Québec from existing line #1627 (Obalski/Otabogamau) to the mine site, a distance of approximately 22 km. The line will have a capacity of 161 kV. As the proponent, Hydro-Québec TransÉnergie will file a separate environmental assessment statement independent of the BlackRock Metals project.

The transmission line will be completed in 2014, and will require some changes to the Obalski/Otabogamau substations and construction of a substation at the mine site. The new line will be completed before production starts.

8.0 PROJECT PHASES

8.1 Construction Phase

The main activities during the construction phase are:

- development of a construction camp;
- construction of the dam upstream from the polishing pond to store the water needed for operation;
- building construction (concentrator, garage, tank installation);
- preparations for mining: stripping, blasting, moving of topsoil and overburden to separate storage areas;
- building of service roads and ditch excavation.

8.2 Operations Phase

The main activities during the operations phase are:

- mining of the ore;
- mineral processing (crushing, grinding, magnetic separation and flotation);
- deposition of the waste rock in the waste rock pile and of the tailings in the coarse tailings pile and fine tailings pond;
- equipment and building maintenance;
- water treatment;
- environmental monitoring.

8.3 Site Closure and Rehabilitation

A mine closure plan was filed with the impact study submitted to the authorities in 2011. For the moment, the proposed site rehabilitation measures still stand; however, BlackRock Metals is developing a new rehabilitation plan that will include the rail line segment between the mine site and the CN railway line.

8.4 Human Resources

8.4.1 Jobs

BlackRock Metals will have approximately 260 employees in seven departments: Mine, Concentrator, Maintenance, Engineering, Administration, Human Resources and Environment. These interrelated, interdependent departments will work together to achieve profitable production while assuring the well-being of the employees and partners and respect for the environment.

During the operations phase, employees with jobs involving alternating 12-hour shifts will work a 5/4-4/5-5/5 schedule. Jobs with an eight-hour daily work schedule, which are generally administrative positions, will work a 4/3 schedule.

At the start and end of each shift, employees will be shuttled by bus from meeting points in the communities of Oujé-Bougoumou, Chibougamau and Chapais to the operating site, and from the operating site to the meeting points.

8.4.2 Community Relations

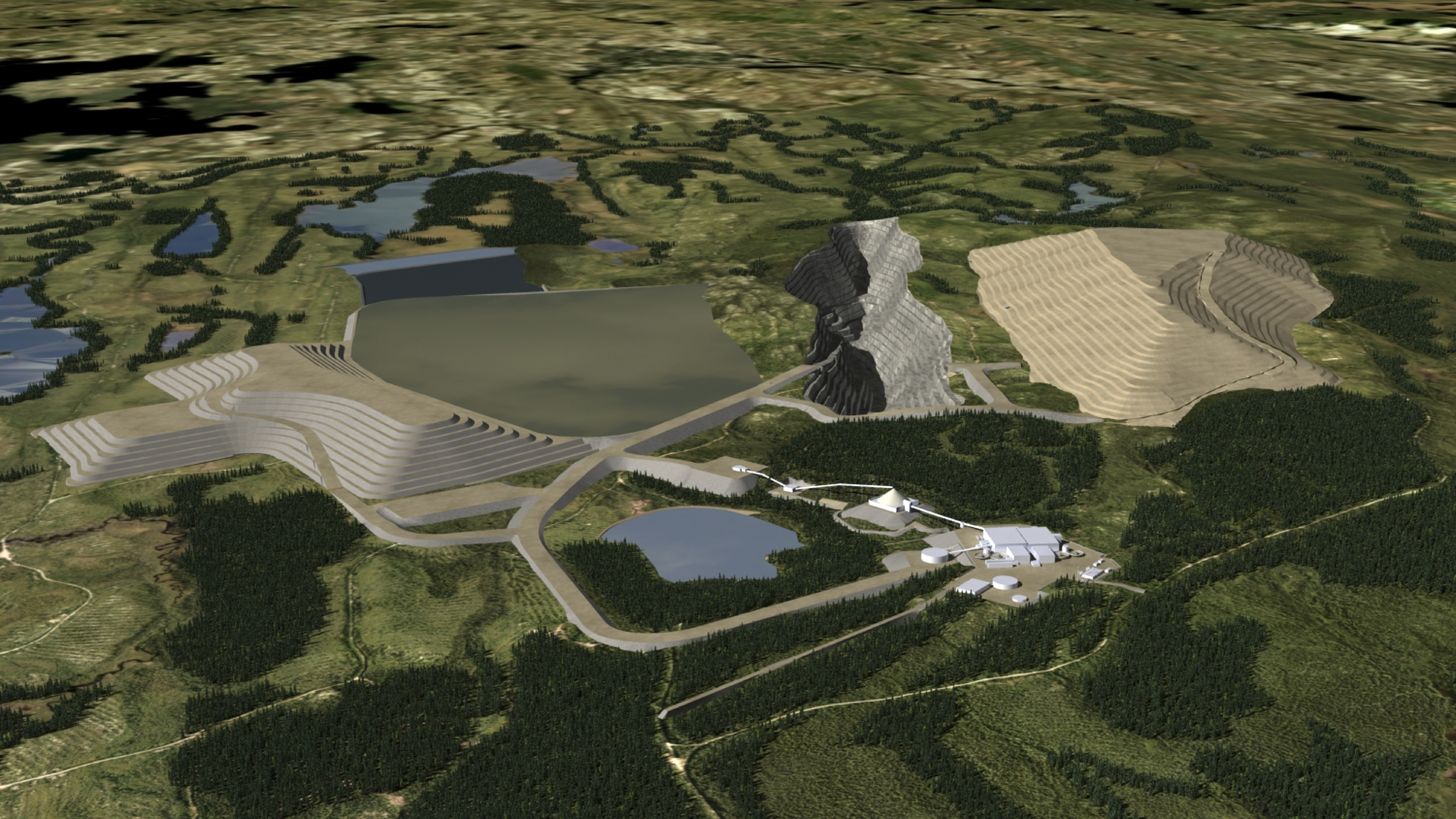
BlackRock Metals is committed to interacting and collaborating with communities local to the project. To this end, BlackRock Metals has undertaken to create discussion groups in the communities of Oujé-Bougoumou, Chibougamau, Chapais and Mistissini. These discussion groups operate by theme chosen by the participants. In the coming years, BlackRock Metals plans to develop these discussion groups into regional groups that will provide stakeholders with a forum to receive information from BlackRock Metals on how its activities are progressing and to voice their concerns.

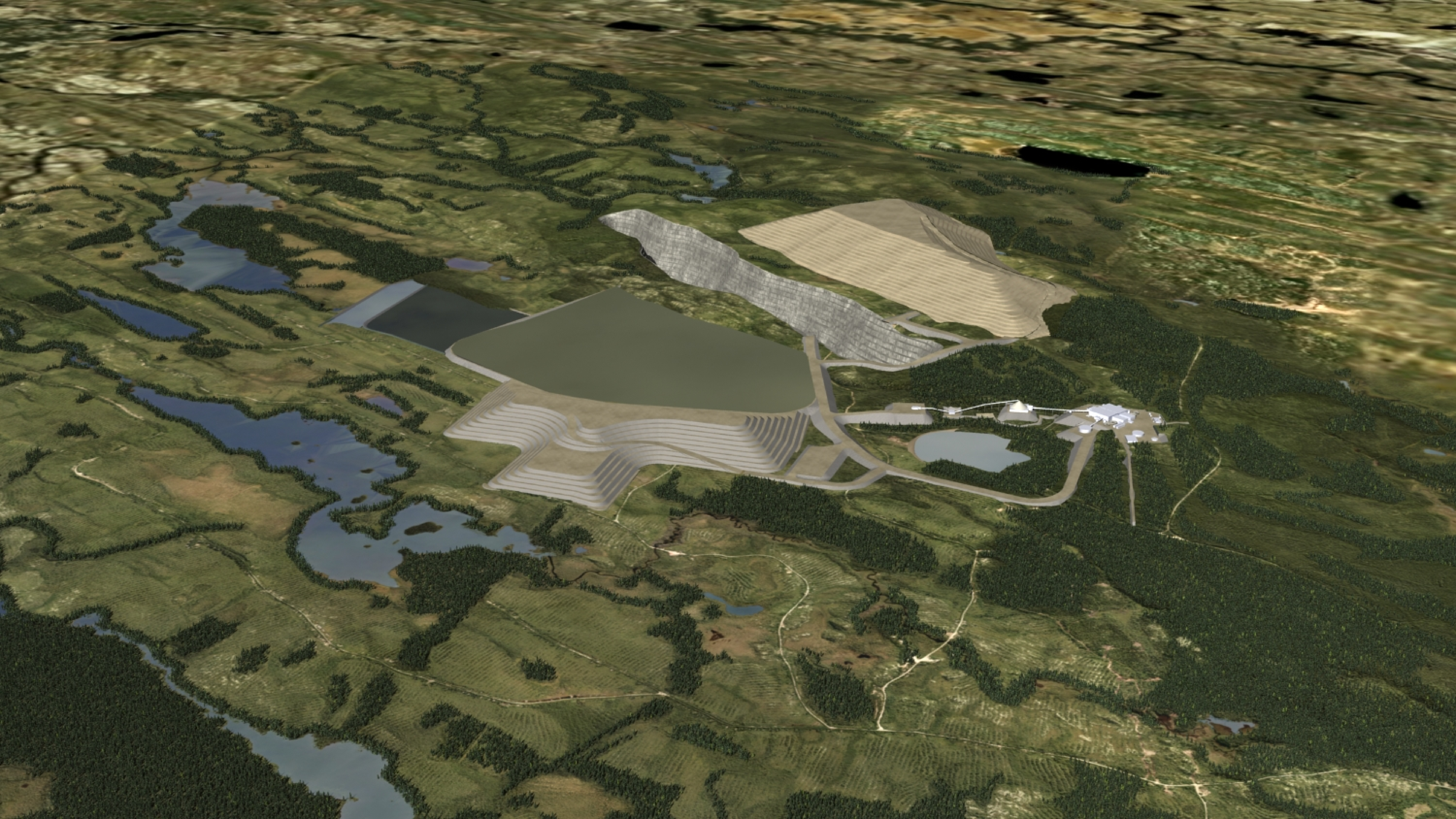
BlackRock Metals is also currently working on an IBA (impacts and benefits agreement) with the Cree Nation of Oujé-Bougoumou, the Grand Council of the Crees and Cree Regional Authority. This agreement will focus primarily on training and jobs, working conditions and operating policies, business opportunities,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

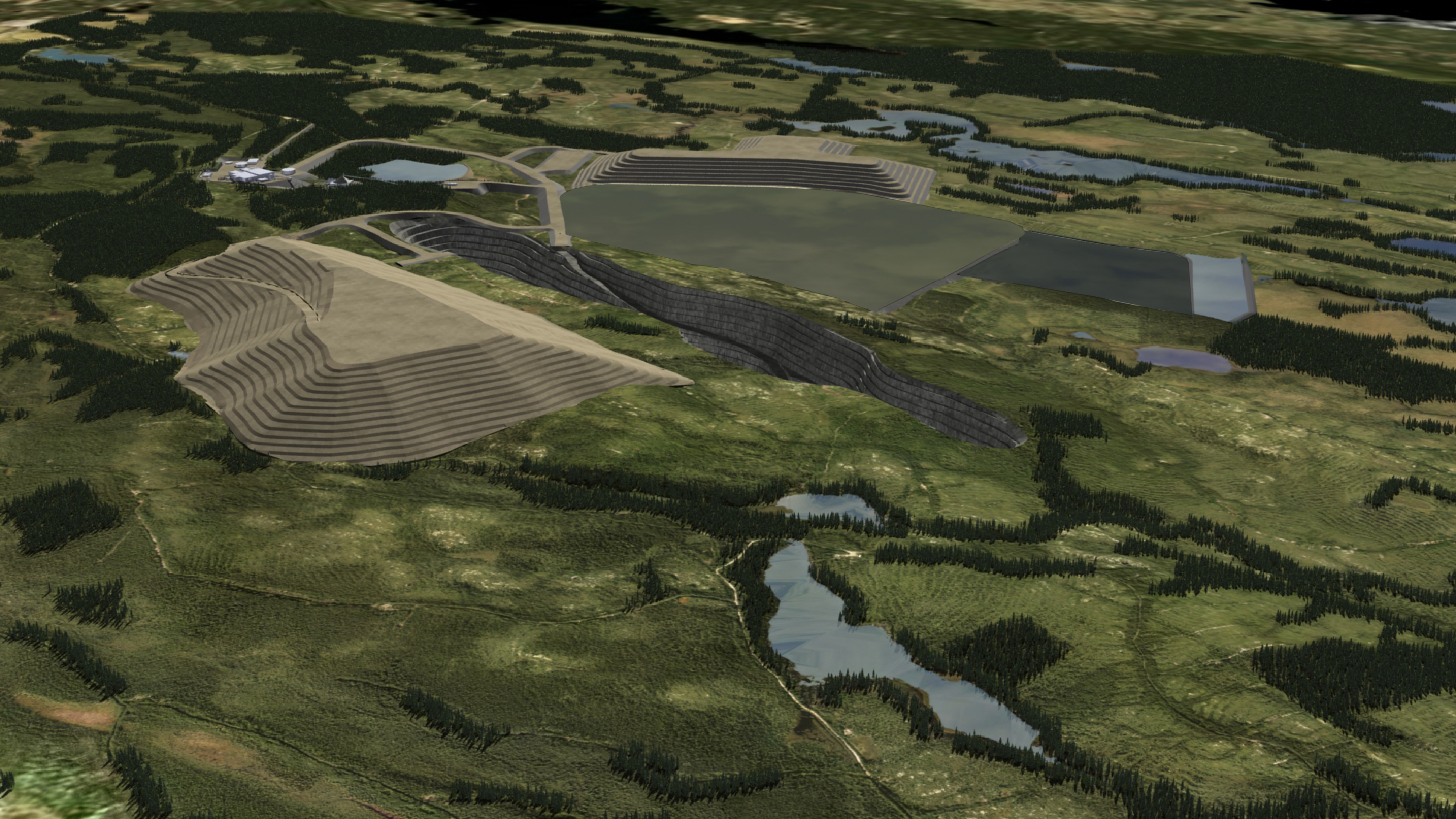
Appendix 1
Mine Site Layout


A-1 LAKE
JEAN LAKE
BASILE L LAKE
BERNADETTE LAKE
B-2 LAKE
COIL LAKE
B-5 LAKE
LAUGON LAKE
A-2 LAKE
ARMITAGE LAKE
B-13 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
POLISHING POND Capacity : 2,3 Mm^3
Dykes el. 437 m
TAILINGS POND Water, el. : 434 m Capacity : 28,8 Mm^3
OPEN MINING PIT
COARSE STOCKPILE Elevation : 510 m Capacity : 42,0 Mm^3
WASTE ROCK STOCKPILE El. 640 m Capacity : 75,38 Mm^3
EXPLOSIVE WAREHOUSE
MINE GARAGE AREA
DIESEL STATION
CAPS WAREHOUSE
WASTE ROCK STOCKPILE
SEDIMENTATION POND
CRUSHER
WATER TANK FOR PUMPING
ORE STOCKPILE
COARSE STOCKPILE
WASTE ROCK STOCKPILE
PROPOSED RAILWAY
TELECOM TOWER
FUEL STATION
PROCESS PLANT
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
- Comments from the Federal Committee (CEAA) -
Environmental Site Plan
Sources :
CanVec, 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
Annex 1
September 2012
GENIVAR

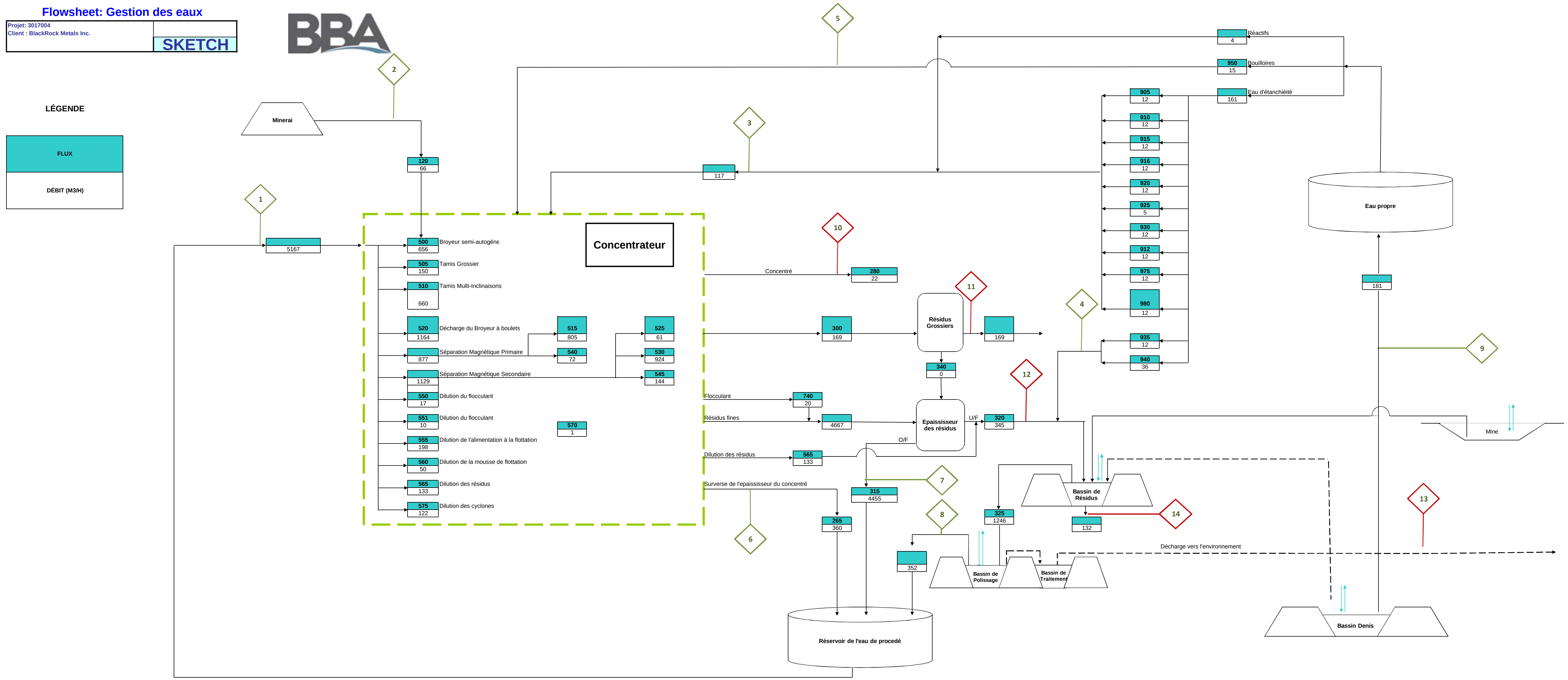
Appendix 2
Project Simulations







Appendix 3
Water Management Flow Chart



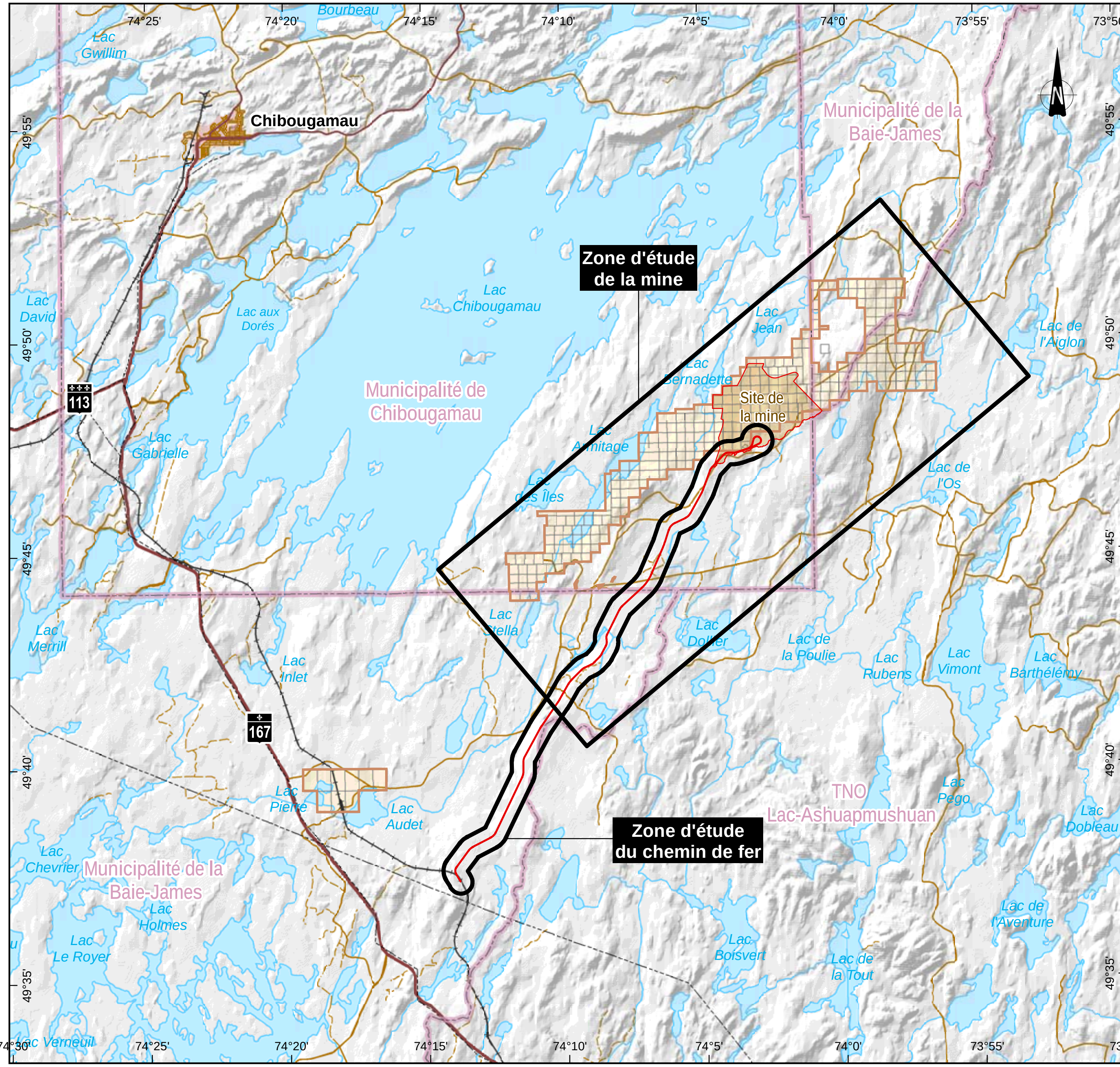
Intrants

Nom	Description	Débit (eau) m3/h	Provenance	Destination
1	Eau de procédé	5167	Réservoir d'eau de procédé	Concentrateur
2	Minerai concassé	66	Pile de stockage	Concentrateur
3	Eau fraiche	117	Réservoir d'eau fraiche	Concentrateur
4	Eau d'étanchéité	48	Réservoir d'eau fraiche	Pompes de résidus (tailings)
5	Eau d'alimentation des bouilloires	15	Réservoir d'eau fraiche	Bouilloires
6	Surverse de l'épaississeur du concentré	360	Épaississeur du concentré	Réservoir d'eau de procédé
7	Surverse de l'épaississeur des résidus	4455	Épaississeur des résidus	Réservoir d'eau de procédé
8	Eau supplémentaire (d'appoint)	352	Bassin de polissage	Réservoir d'eau de procédé
9	Eau fraiche	180	Bassin d'eau fraiche	Réservoir d'eau fraiche

Extrants

Nom	Description	Débit (eau) m3/h	Provenance	Destination
10	Eau dans le concentré	22	Concentrateur	Transport au port
11	Eau dans les "coarse tailings"	169	Concentrateur	Pile de stockage
12	Sousverse de l'épaississeur des résidus	345	Concentrateur	Parc de résidus (tailings)
13	Surverse vers l'environnement	voir tableau 1 et 2	Bassin de traitement	environnement
14	Eau perdu "piégé" dans les résidus	132	Résidus	Parc de résidus (tailings)

Appendix 4
Railway Line Route



Composantes du projet Métaux BlackRock

- Limite des claims actifs
- Claim minier actif
- Site de la mine
- Chemin de fer proposé

MÉTAUXBLACKROCK

Exploitation du gisement de fer
au complexe géologique du lac Doré

- Réponses aux questions
et commentaires du comité fédéral -

Tracé du chemin de fer proposé

Sources :

BDGA, 1/1 000 000, MRN Québec, 2002
SDA, 1 : 20 000, MRNF Québec, mai 2010

Données de projet: S06428A-GR-CR-17.DWG,
CIMA, 14 août 2012

Cartographie : GENIVAR
Fichier : BR_RAQ_C1_zone_Etude_120904.mxd

Échelle 1 : 250 000

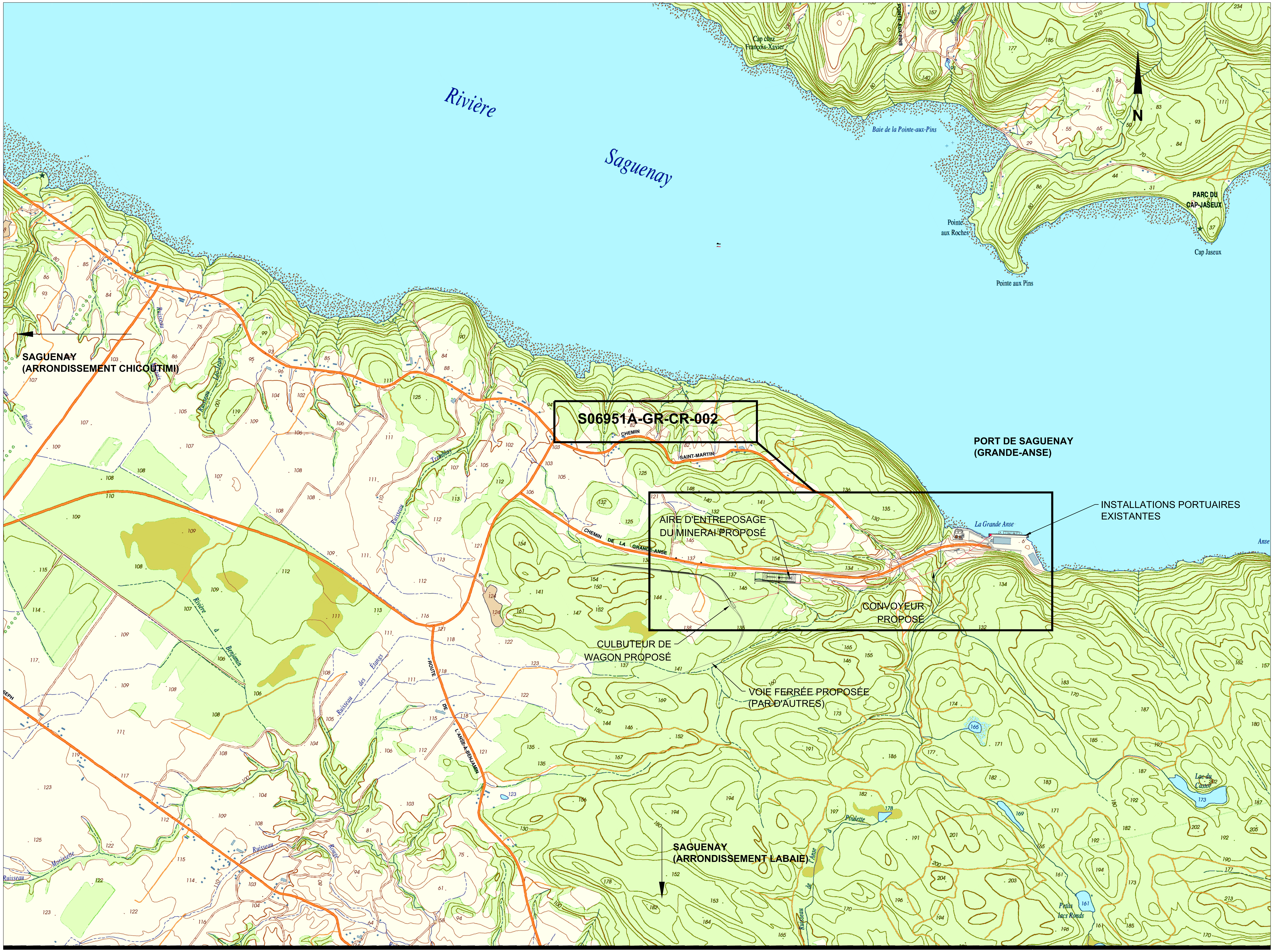
0 2.5 5 km

UTM, fuseau 18, NAD83

Septembre 2012

GENIVAR

Appendix 5
Port Facilities



LÉGENDE

FOSSÉ EXISTANT	
FOSSÉ PROPOSÉ	
BASSINS DE SÉDIMENTATION	
FOSSÉ EXISTANT À ABANDONNER	
CONDUITE PLUVIALE PROPOSÉE	P
PONCEAU EXISTANT	

Révision

no	date	émissions et révisions	par
AC	12–09–12	POUR INFORMATION	G.G.
AB	12–09–11	POUR INFORMATION	G.G.
AA	12–09–07	POUR INFORMATION	G.G.

Civil

CIMA+

ISO 9001

740, rue Notre-Dame Ouest, bureau 900
Montréal (Québec) H3C 3X6
Téléphone : (514) 337-2462
Télécopieur : (514) 281-1632
www.cima.ca

Sceau

Projet

BLACKROCK METALS

PORT DE SAGUENAY
(GRANDE–ANSE)

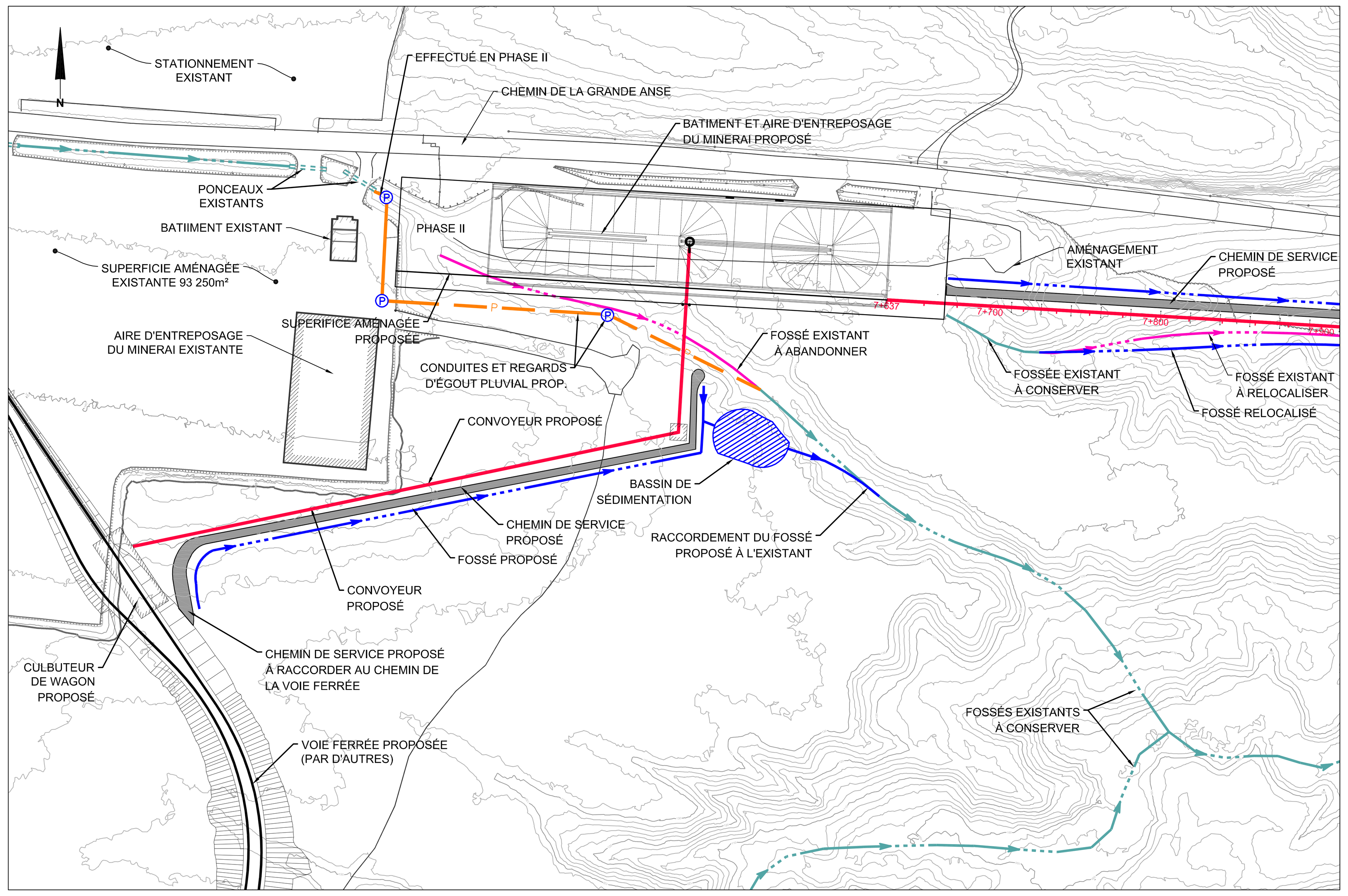
Titre

PLAN D'ENSEMBLE

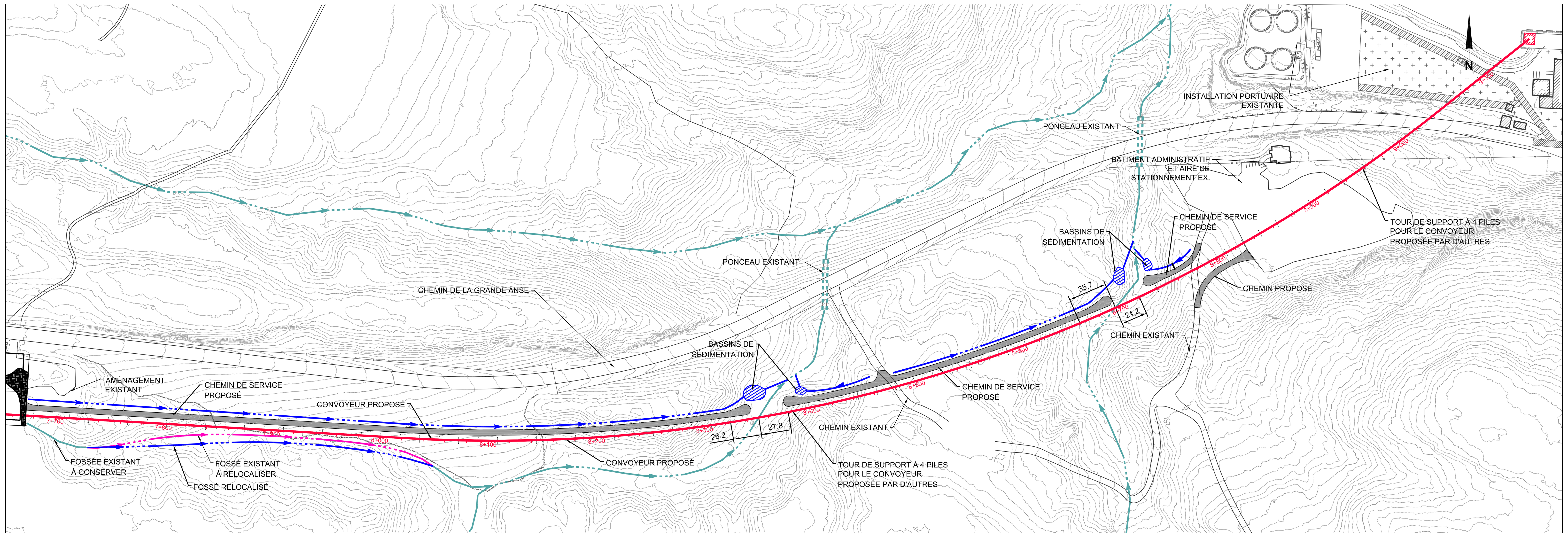
DEMANDE ENVIRONNEMENTALE

Dessiné	Stéphane Halary, dess.	Échelle	1 : 10 000
Projeté	Michaël Désormeaux, ing.	Date	7 Septembre 2012
Vérifié	Johanna Gagnon Delisle, ing.	Référence	BRM
Approuvé	Guy Gagnon, ing.		

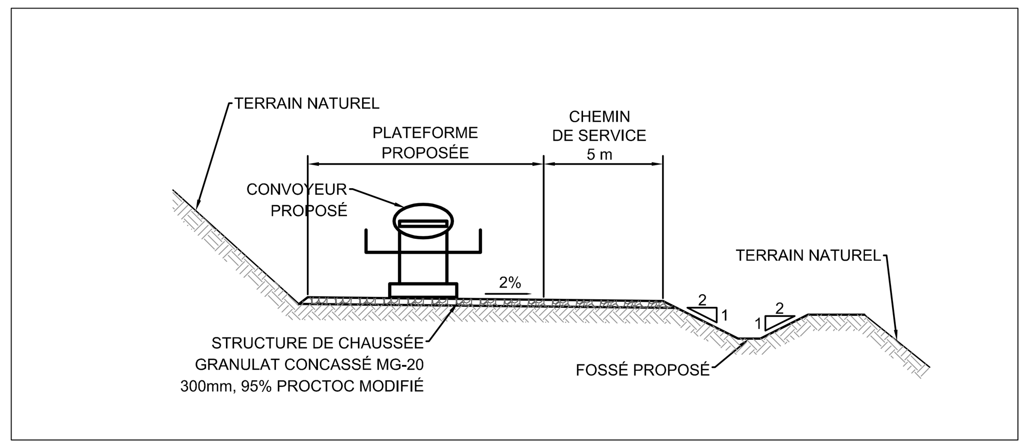
no. projet	département	série	feuille	rév.
S06951A	GR	CR	001	AC



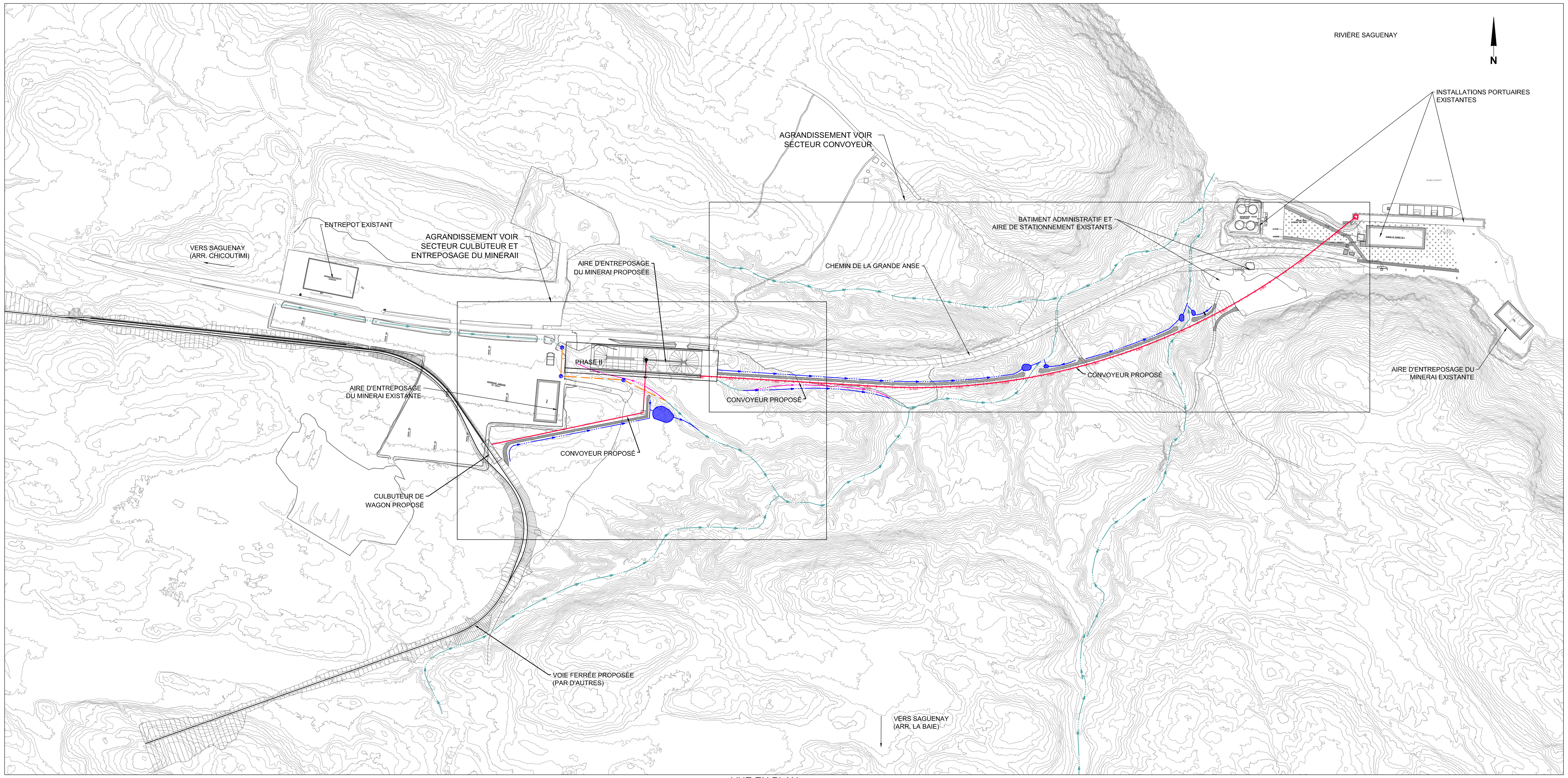
VUE EN PLAN
SECTEUR CULBUTEUR ET ENTREPOSAGE DU MINERAI
ÉCHELLE: 1:2000



VUE EN PLAN
SECTEUR DU CONVOYEUR
ÉCHELLE: 1:2000



VUE EN SECTION
CHEMIN DE SERVICE ET CONVOYEUR
ÉCHELLE: 1:200



VUE EN PLAN
AMÉNAGEMENT GÉNÉRAL
ÉCHELLE: 1:4000

LÉGENDE

FOSSÉ EXISTANT	
FOSSÉ PROPOSÉ	
BASSINS DE SÉDIMENTATION	
FOSSÉ EXISTANT À ABANDONNER	
CONDUITE PLUVIALE PROPOSÉE	
PONCEAU EXISTANT	

Révision

no	date	émissions et révisions	par
AC	12-09-12	POUR INFORMATION	G.G.
AB	12-09-11	POUR INFORMATION	G.G.
AA	12-09-07	POUR INFORMATION	G.G.

Civil

CIMA+
ISO 9001

740, rue Notre-Dame Ouest, bureau 900
Montréal (Québec) H3C 3X6
Téléphone : (514) 337-2462
Télécopieur : (514) 281-1632
www.cima.ca

Sceau

Projet

BLACKROCK METALS
PORT DE SAGUENAY
(GRANDE-ANSE)

Titre

PLAN DE DRAINAGE ET D'AMÉNAGEMENT PROPOSÉ POUR DEMANDE ENVIRONNEMENTALE

Dessiné	Stéphane Halary, dess.	Échelle	TELLE QU'INDIQUÉE
Projeté	Michaël Désormeaux, ing.	Date	7 Septembre 2012
Vérifié	Johanna Gagnon Delisle, ing.	Référence	BRM
Approuvé	Guy Gagnon, ing.		

S06951A GR CR002 AC
no. projet / département / série / feuille / rév.

DERNIÈRE SAUVEGARDE 9/13/2012 10:18 , IMPRIMER LE 9/13/2012 10:19 PAR: JOHANNA GAGNON DELISLE
S:\PROJETS\3700 BLACKROCK METALS\S06951A - TERMINAL PORT OF SAGUENAY PRE-FAISABILITY\G_R\400 - PLANS ET CROQUIS\CROQUIS\S06951A-GR-C002-ENVIRONNEMENT_AC-TOUR MODIFIÉ.DWG

BlackRock metals inc.
375, 3e rue - Chibougamau (Québec) G8P 1N4
Phone : 418-748-6326 - Fax : 418-748-6327