ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

WHABOUCHI PROJECT

SUMMARY (UPDATE)

O/Ref.: 107034.001

January 2015

NEMASKA LITHIUM

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1 Introduction

Nemaska Lithium is proposing the construction, operation and decommissioning of an open-pit mine for the production of a spodumene concentrate. The proposed project is located 30 km from Nemiscau and 280 km north of Chibougamau. As proposed, the project includes the operation of an open-pit mine, a waste rock and tailings pile, an ore concentrator, and administrative and maintenance buildings[1]. The mine would produce on average 2,775 tonnes per day of ore over a mine life of 26 years.

The Environmental and Social Impact Assessment (ESIA) for the Whabouchi mine project, along with the ESIA summary and related sectoral reports were initially submitted by Nemaska Lithium Inc. (Nemaska Lithium) to the Review Committee (COMEX), the Quebec-Cree bipartite agency charged with evaluating projects south of the 55th parallel, and the Canadian Environmental Assessment Agency (CEAA) in April 2013[2].

Since these documents were filed, the development of the Whabouchi project has continued. In response to comments made and concerns raised during the consultations held after the ESIA was filed, and following the completion of a feasibility study Nemaska Lithium revised and improved its project. The goal of such review was to optimize the project from a technical and economic as well as an environmental and social standpoint.

The feasibility study resulted in major changes to the technical characteristics of the Whabouchi project, which in turn influenced the extent of environmental and social impacts as well as the previous assessment of the significance of those impacts.

The purpose of this report is therefore to provide a straightforward summary of the changes made to the technical description of the project and the assessment of potential impacts on the natural and social environments.

[1] Note that the objective of the Whabouchi mine project is to produce a spodumene concentrate for a hydromet plant that will produce lithium hydroxide, the production of which is not part of the Whabouchi mine project. There are absolutely no plans to produce lithium hydroxide at the mine site or as part of this project.

[2] The main ESIA document and annexes filed in April 2013, are available at http://www.ceaa.gc.ca/050/document-fra.cfm?document=94869 and the complementary documents are at http://www.ceaa.gc.ca/050/document-fra.cfm?document=94870

2 Background

2.1 Project Location

The Whabouchi project is located 30 km east of the Cree community of Nemaska and 280 km north-north-west of the municipality of Chibougamau (see Map 2.1). The Whabouchi property is composed of a single block of 33 contiguous claims for a total surface area of just over 1,760 ha. The claims are 100% owned by Nemaska Lithium Inc.

The Whabouchi project is located entirely on Category III land as defined in the James Bay and Northern Quebec Agreement.

2.2 Project Proponent

The proponent of the Whabouchi project is Nemaska Lithium. This exploration and development company was founded in 2008, and is active essentially in the James Bay territory in Quebec. The company's main assets are the Whabouchi and Sirmac properties, both wholly owned by Nemaska Lithium.

As of the date of this report, the Cree community of Nemaska, owns 3.6% of the company's shares. Sichuan Tianqi Lithium Industries inc., a subsidiary of Chengdu Tianqi Industry Group Co. Ltd., is the largest manufacturer of battery-grade lithium products in the Asian market and holds approximately 19% of the shares in Nemaska Lithium. Major Quebec mining exploration funds jointly own approximately 15% of the company.

2.3 Purpose of the Project

This project is justified owing to the increasing worldwide demand for spodumene. Since the early 2000s, demand for lithium has shown sustained growth, mainly because of the increased use of lithium in the production of batteries. It is also still considered an industrial mineral used in the manufacture of glass, ceramics and lubricant greases among other products.

The Whabouchi deposit is the richest in North America and represents the second largest lithium deposit in the world after Greenbushes in Australia, the property of Talison Lithium.

2.4 Regulatory Context and Authorization Process

The Whabouchi project is located on James Bay territory and is therefore subject to a specific authorization process under the James Bay and Northern Québec Agreement (JBNQA). The JBNQA includes an environmental and social protection system (Chapter 22), which provides for mechanisms to assess the environmental and social impacts of development projects.

The project is subject to the provincial environmental and social impact assessment procedure under Quebec's *Environment Quality Act* (EQA). Therefore, the provincial environmental and social impact

assessment procedure, as established in the provisions of Chapter II of the EQA applicable to the Eeyou Istchee region, applies to the Whabouchi project.

The project is also subject to the federal environmental assessment process under the *Canadian Environmental Assessment Act* (CEAA (2012).

A number of federal, provincial and municipal authorizations will moreover be required.

2.5 Collaboration with the Crees

The involvement of the First Nation of Nemaska throughout the life of the project is a priority for Nemaska Lithium.

In August 2009, the financial arm of the Cree community, Nemaska Development Corporation, agreed to purchase shares in Nemaska Lithium for a total sum of $600,000, thereby obtaining 3,600,000 shares in the company.

In the fall 2009, discussions where held with Chief Josie Jimiken on negotiating and signing a *Memorandum of Understanding* between the community and Nemaska Lithium that recognized the respective rights and expectations of the parties, and particularly the need for the company to respect Cree culture and traditions in its activities on the territory. This *Memorandum of Understanding* was signed in August 2010.

The Crees have been actively involved in various aspects of the project, specifically the acquisition of reference data that were used to define existing environmental conditions. In addition, a Community Advisory Panel (CAP) was set up to provide a platform for exchanges between the proponent and the various stakeholders in the Nemaska community.

More recently, on November 7, 2014, Nemaska Lithium Inc., the Grand Council of the Crees (Eeyou Istchee), the Cree Nation Government and the Cree Nation of Nemaska signed the *Chinuchi Agreement*, on the impacts and benefits related to the development and operation of the Whabouchi project. The *Chinuchi Agreement* is a binding agreement that will govern the long-term working relationship between Nemaska Lithium and the Cree parties throughout the Whabouchi project. It provides for training, employment and business opportunities for the Crees during project construction, operation and closure, and sets out the principles of social, cultural and environmental respect under which the project will be managed. The *Chinuchi Agreement* also includes a mechanism by which the Cree parties will benefit financially from the success of the project on a long-term basis, consistent with the Mining Industry's best practices for First Nations engagement and the Cree Nation Mining Policy.

NEMASKA LITHIUM

Existing Infrastructures

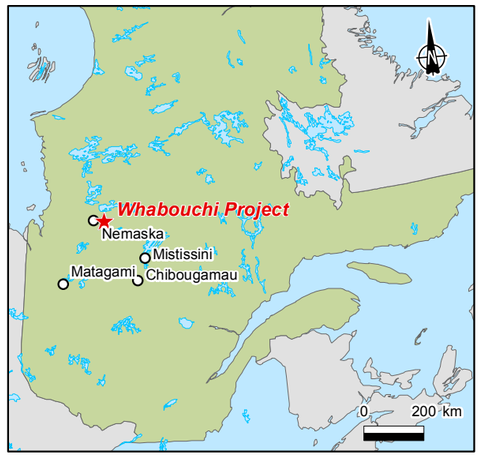
- Airport
- Main road
- Secondary road
- Local road
- Power line

Landuse and Communities

- First Nation Community / City

Hydrography

- River
- Lake



Whabouchi Spodumene Mine Project

Project Location

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Base cartographique: BNDT, Gouvernement du Canada, 2013

Map 2.1

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3 Stakeholder Information and Consultations

Early in the preliminary phases of development of the Whabouchi mine project, Nemaska Lithium devoted significant time and resources to ensure the concrete and constructive involvement of the various stakeholders, including the First Nation of Nemaska. Even before launching the environmental and social impact assessment (ESIA) process, the local authorities of the Nemaska Cree community took part in information and consultation activities.

Since 2009, various activities were undertaken to inform stakeholders about the project and take stock of their concerns relative to the project and its potential environmental and social impacts. During these information and consultation activities, various topics were discussed including open-pit mining procedures, the main infrastructure planned for the project and the life cycle of the mine.

In November 2011, Nemaska Lithium implemented its communication and consultation plan, which included various activities as follows:

- Meetings with the Nemaska Band council and the Chibougamau municipal council;
- Interviews with members of the Nemaska community and local organizations;
- Meetings with tallymen and other users of Cree territory;
- Discussion groups;
- Meetings with members of the Community Advisory Panel (CAP);
- Field visits;
- Hiring of a community liaison officer.

The comments, concerns, demands and suggestions expressed by stakeholders during the information and consultation activities were documented and compiled by topic. The main comments from the Nemaska Cree community prior to the filing of the ESIA focused on the following topics:

- Water quality: potential contamination of water bodies through runoff and measures to prevent contamination;
- Mining infrastructure and project design: particularly the location of the waste rock and tailings pile near Lac des Montagnes, the height of the waste rock pile and its visibility from the Bible Camp, the ore extraction process, planned infrastructure, blasting, mine effluent management, mine closure, and site reclamation;
- Hunting, fishing, trapping and recreational activities: disturbance of hunting and fishing activities and attendance at Bible Camp, disturbance to animals and their habitat (from dust and noise created by mining operations);
- Employment, training and economic spinoffs: specifically opportunities for youth through skills development and training, the type, number and percentage of jobs available for the Crees (especially Nemaska Crees), economic benefits for the community overall, life cycle of the project and use of waste rock as aggregates;
- Community well-being: appropriate awareness of the project and its social acceptance within the entire community, fair distribution of social benefits within the community, easier access to alcohol

and illegal substances in the camp and exacerbation of social problems and related criminal behaviours, and discrimination toward Cree employees at the mine;

- Safety issues associated with mining activities: physical health and safety of workers on the mine site, creation of safety zone around the project, impact of noise, impact of dust and air pollution on health, increase in damage and accidents on the Route du Nord (increased traffic, increased breakdowns road defects and dust production);
- ESIA procedures: consultation sessions, contents of ESIA, importance of contribution from territory users and tallymen, impacts on social and cultural plans, taking comments from community members into consideration in the ESIA findings, or for defining and applying appropriate mitigation measures and project startup.

Following the filing of the ESIA in April 2013, Nemaska Lithium and its consultants were actively involved in the public information and consultation sessions held in Nemaska by the Cree Nation Government's *Environment and Remedial Works Department* and the Canadian Environmental Assessment Agency (CEAA)[3].

The comments and concerns that emerged from these diverse consulting activities led Nemaska Lithium to re-assess the Whabouchi project and its components within the framework of a feasibility study (FS). To address people's apprehensions, the project was optimized and many project components that initially posed problems were significantly revised from a technical, economic, environmental and social standpoint, as indicated in Chapter 4.

[3] The committee charged with reviewing environmental and social impacts (COMEX) is slated to hold its own public consultations in February or March 2015 (date to be determined).

4 The Whabouchi Project : Technical Update

4.1 Analysis of Project Alternatives

The alternatives for the Whabouchi project were analyzed in two phases.

In the preliminary economic assessment (PEA) released in February 2013, a range of variants were considered by Nemaska Lithium, which were described in the ESIA filed in April 2013.

In light of the comments and concerns that emerged from the consultations held after the ESIA was filed, the project was subsequently re-assessed within the framework of the feasibility study (FS) with a view to optimizing it from a technical, economic, as well as an environmental and social standpoint. The alternatives examined in the feasibility study included the waste rock and tailings pile, and the location of the sedimentation ponds and related final effluents, i.e., the project components of greatest concern for Cree stakeholders.

In this new assessment, Nemaska Lithium considered it paramount to:

- ***Reduce*** the number of mine infrastructure to be built;
- ***Concentrate*** infrastructure near the ore deposit;
- ***Minimize*** the ecological footprint of the project.

In addition, the analysis of the options for the location of mine infrastructure was guided by a series of factors and criteria as noted below:

- Many of the ***planned infrastructures depend on the actual location of the ore deposit*** (which cannot be moved);
- The presence of many ***natural and physical constraints,*** such as Lac des Montagnes and Lac du Spodumène, the Route du Nord and the 735 kV power line;
- Many ***other constraints*** such as, the topography, surface deposits, hydrography, wetlands, wildlife habitats, use of the territory, water supply, resources and archeological potential areas, and certain health- and safety-related elements, etc.;
- ***Technical considerations*** such as the need for safe slopes in the pit design, and minimum safe distances from blasting areas.

To address these concerns, it was therefore decided to completely review the siting of all stockpiles, ponds and effluents to ensure they were located far from Lac des Montagnes. At the same time, other changes were made to the project so as to:

- Eliminate any encroachment on Creek F;
- Prevent the loss of wetlands previously associated with the overburden pile;
- Have only one final effluent as defined by Directive 019;
- Reduce the visual impact associated with the waste rock and tailings pile for Bible Camp users and neighbouring Cree camps;
- Locate the explosives magazine far from the mine water basin dyke;

- Avoid any deviation of the Route du Nord and hence maintain its current alignment;
- Reduce overall footprint of the project.

4.2 Overview of the Revised Project

In the feasibility study, a number of changes were made to the Whabouchi project as it had been presented in the ESIA, specifically as regards the life of mine operations, its method of operation as well as its footprint.

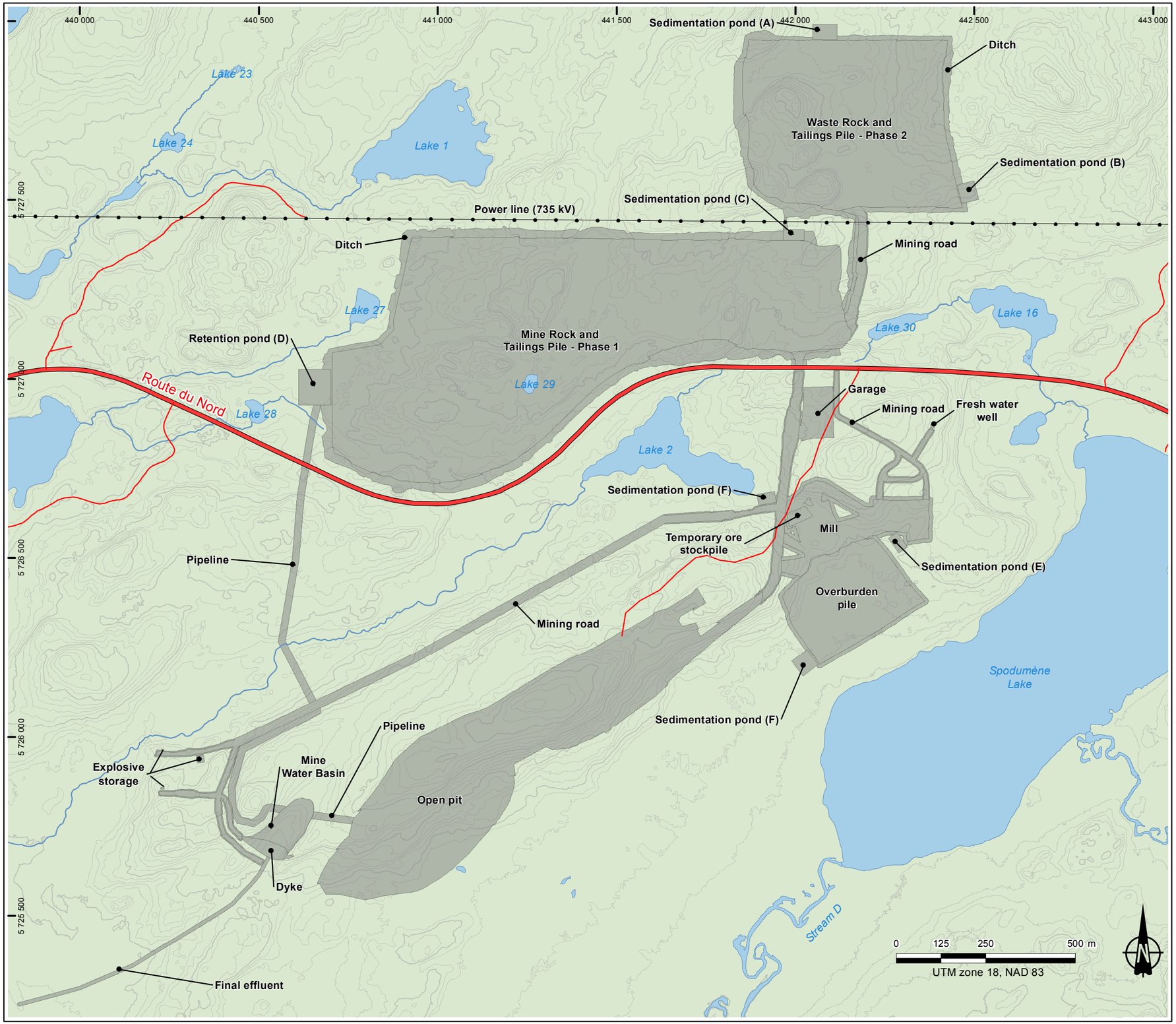
An overview is provided herein of the most significant changes, specifically those directly linked to the concerns expressed by the local populations in the various consultations held by the project proponent and the various government agencies (COMEX and CEAA) involved in the environmental assessment of the project. Those project components that remained unchanged or were subject to only minor changes are not described below.

The focus is therefore on the following elements:

- Ore extraction;
- Overburden management;
- Ore storage;
- Tailings and waste rock management;
- Concentrate transportation management;
- Water management plan.

4.2.1 Ore Extraction

The PEA and ESIA initially referred to an operating life for the mine of 19 years (excluding periods required for construction and site reclamation). With the update of the project carried out in the feasibility study, the mine plan henceforth includes operations over 26 years with open pit mining in the first 20 years then underground mining from year 21 to 26. The optimization efforts made by Nemaska Lithium and its consultants resulted in a reduced footprint for the project. The open pit area of 31.19 ha described in the ESIA was reduced to 27.75 ha (Map 4.1). This 11% reduction in pit footprint is essentially based on the fact that underground operations were recommended as of Year 21, and the infrastructure required for underground operations will be located entirely within the boundaries of the open pit.



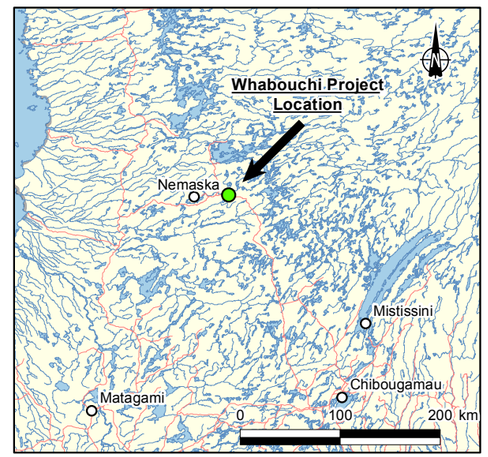
NEMASKA LITHIUM

Existing and Projected Infrastructures

- Route du Nord (Main road)
- Secondary road
- Projected infrastuctures

Hydrography

- River
- Lake



Whabouchi Spodumene Mine Project

Mining Infrastructures Layout (Feasibility Study)

ROCHE

Date: 2015-01-26
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Base cartographique: BNDT, Gouvernement du Canada, 2013

Map 4.1

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Blasting to extract ore from the mine will be carried out with bulk emulsion even though the bulk emulsion approach is 10% more costly. Compared with other types of explosives commonly used in the mining industry (i.e., ANFO), there are clear benefits to Orica Centra Gold 70 in relation to water management because it produces significantly less residual ammonia. In addition, unlike ANFO, bulk emulsion is essentially not water soluble, which makes it easier to recover unexploded explosives. The explosives magazine discussed in the ESIA will be relocated as indicated in the feasibility study to comply with minimum setback distances set out in tables supplied by Natural Resources Canada (NRCan).

In the feasibility study, for technical reasons it was decided that blasting will be done once weekly with a planned shutdown in the mine during the goose hunting season (Goose Break). Since Nemaska Lithium has some flexibility in this regard, the weekly blasting schedule will be discussed with the Nemaska Cree community and the Environment Committee set up under the *Chinuchi Agreement* and adapted to specific situations.

4.2.2 Overburden Management

The overburden stockpile covers an area of 7.94 ha (Map 4.1). By comparison, the area planned for this same stockpile in the PEA and hence the one specified in the ESIA filed in April 2013 was 10.81 ha. This 27% reduction in the footprint of the overburden pile was made possible by relocating it to an area with better geotechnical conditions. The pile will have a maximum height of 25.0 m.

4.2.3 Ore Storage

A temporary ore stockpile with a capacity of about 20,450 t will be set up near the concentrator (Map 4.1). Crushed ore will subsequently be stored in a 1,810-t capacity silo located halfway between the crushers and the concentrator. The temporary ore pile and crushed ore silo will provide the equivalent of seven days of processing, i.e., a sufficient amount of material to operate the concentrator during the first week of the Goose Break. Annual preventive maintenance will be scheduled for the concentrator in the second week of the shutdown.

4.2.4 Waste Rock and Tailings Management

The waste rock and tailings storage areas will consist of two cells corresponding to different phases in project development (Map 4.1).

The phase 1 cell will cover 58.11 ha and the phase 2 cell 25.75 ha. By comparison, the project area for this pile indicated in the PEA, and hence the area specified in the ESIA filed in April 2013, was 88.44 ha, which amounts to a reduction of some 5% in the pile footprint. The height of these piles will be 60.0 m for phase 1 and 40.0 m for phase 2.

4.2.5 Concentrate Transportation Management

The objective of the Whabouchi mine project is to produce a spodumene concentrate that will be transported to a hydrometallurgical plant in southern Quebec or sold abroad for the production of lithium hydroxide.

The option of using pipelines to transport the concentrate was eliminated from the outset since this concentrate will have a solid content greater than 95% and could not therefore be pumped. The only other options were truck or train transport. The mine site is adjacent to the Route du Nord, a provincial route that is already used for transporting goods and heavy machinery. The road, which is the only land route between this part of Northern Quebec and Chibougamau, joins Route 167 about 15 km north of Chibougamau. The railway line in Northern Quebec (CFILNQ) operated by Canadian National (CN) ends in Chibougamau.

To minimize the ecological footprint of the Whabouchi project, along with infrastructure costs and environmental and social impacts, it was decided to use existing infrastructure that is operational provided it has the capacity to meet project requirements. Building a rail line between Chibougamau and the mine site was quickly eliminated given the high construction costs along with the fact that the small quantity of material to be transported[4] would not justify the environmental and social impacts. It was therefore decided to transport the concentrate to Chibougamau by truck along the existing Route du Nord, without having to make any changes to the road.

Two options were considered regarding truck transport, specifically using 38-tonne semi-trailers that would make 16 trips per day, or 100-tonne trucks that would make 6 trips per day. To avoid increasing average daily traffic along with the percentage of heavy trucks on the Route du Nord, the decision was made to go with 100-tonne trucks.

Since this type of truck is not authorized to travel on Route 167[5], nor in urbanized areas of Chibougamau, the route proposed today is different from that specified in the ESIA filed in April 2013. The concentrate will be transported by truck along Route du Nord and then along forest road R-1009 to the vicinity of the Barrette-Chapais plant, located on Route 113 near the town of Chapais.

Unloading the trucks from the mine and loading Canadian National (CN)[6] railcars will be carried out at this site. Facilities such as those illustrated in Figure 4.1 will be installed with a storage capacity of 3,500 tonnes. A covered Megadome-type warehouse will be set up along the rail line. A siding and a shelter along with site facilities (access road and offices) are also included. The new rail link will be about 600 m long to accommodate full and empty rail cars (36 rail cars each about 13 m long). The shelter will be 45 m wide by 90 m long. The unloading site will have a footprint of about 15,000 m² (1.5 ha).

[4] The maximum ore extraction rate is 3,000 t/d, leading to the production of 595 t/d of spodumene concentrate that needs to be transported to southern Quebec.

[5] Under Order in Council 1189-2006 dated December 18, 2006.

[6] It is essential to note that discussions with the cities of Chibougamau and Chapais as well as other proponents are ongoing. As soon as the transfer site is identified, Nemaska Lithium will provide an update of the specific impacts of the project at the site and applicable mitigation and environmental and social management measures.

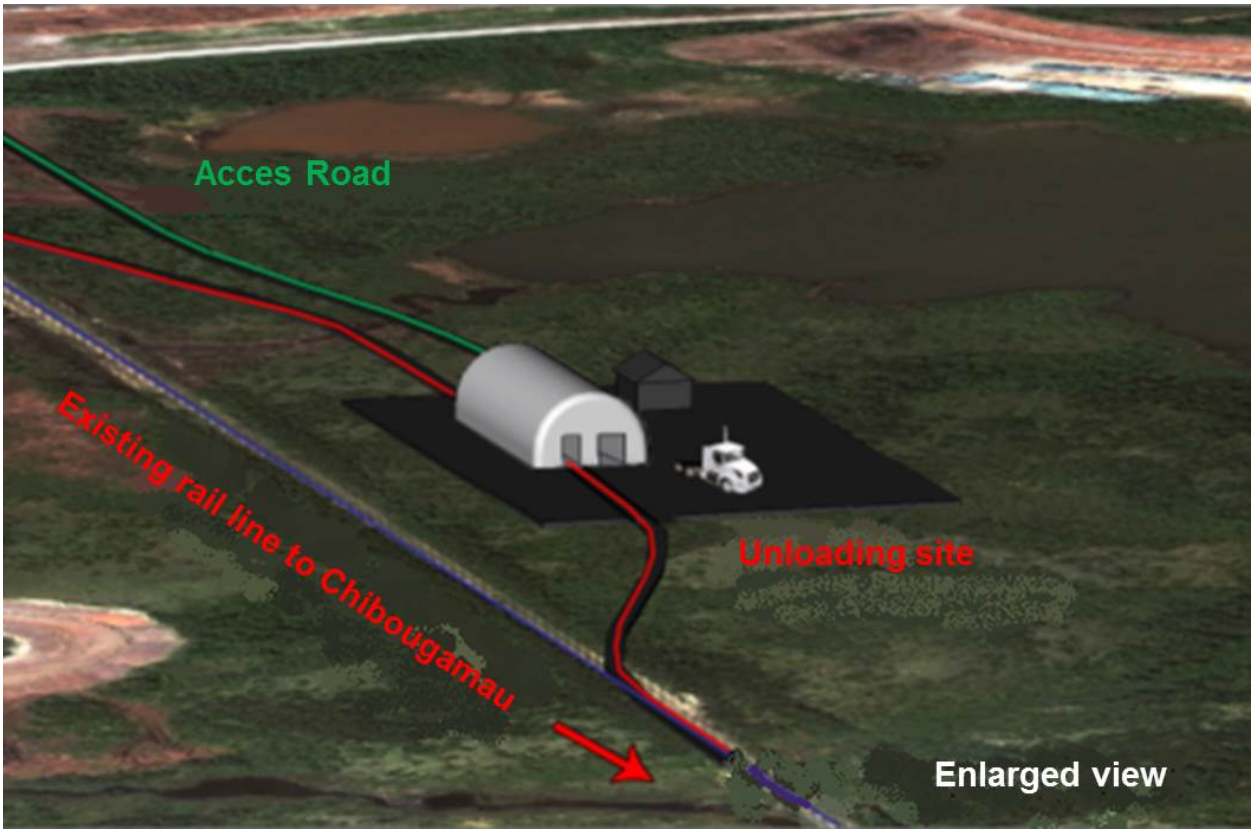


Figure 4.1 Visual simulation of planned facilities at the transfer site

4.2.6 Water Management Plan

The initial water management plan devised in the PEA and presented in the ESIA (April 2013) was significantly revised and optimized in the feasibility study (Map 4.2). This new version of the plan was developed with a view to preventing and minimizing potential impacts on surface and ground water quality and quantity in the project study area.

Among other changes, there will now be only one final effluent as per Directive 019 at the outlet of the mine water basin located southwest of the open pit. The water in this basin will be discharged into Lac des Montagnes via a subaqueous pipeline.

Seven sedimentation ponds will be set up in the main low points around the two waste rock and tailings cells (one per phase), as well as around the garage area, the plant, the temporary ore stockpile and the overburden pile. Runoff from these areas will be collected in ditches built around the periphery of the facilities. This runoff will ultimately be directed toward a final retention basin located southwest of the waste rock and tailings pile.

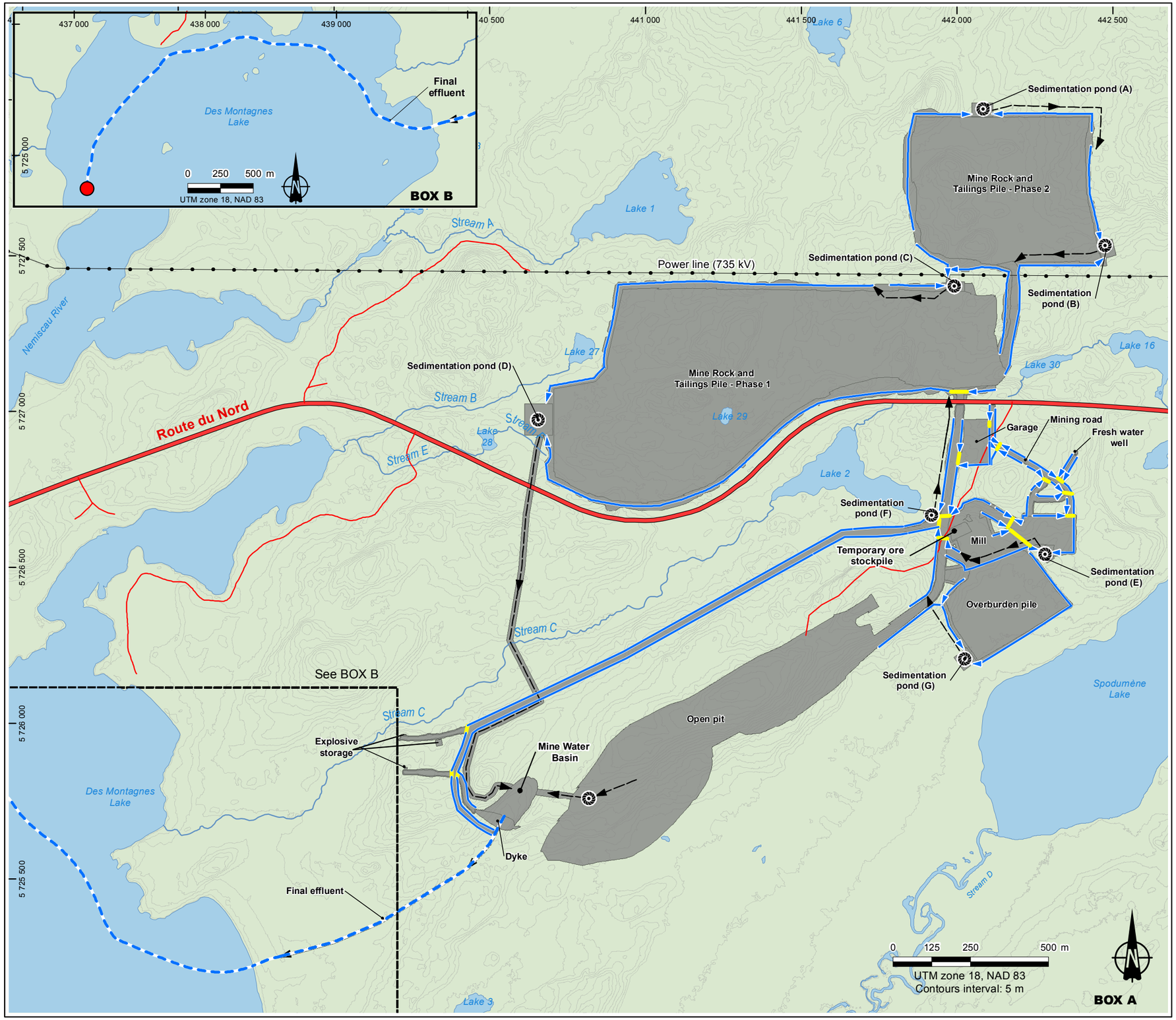
A pipeline will move water from the outflow of this retention basin to the mine water basin located southwest of the open pit. This basin will also collect water generated as part of pit dewatering activities, that is, groundwater that infiltrates the pit as well as waters running off the pit area. The final effluent from the mine water basin will be directed via a surface pipeline to Lac des Montagnes. To minimize the visual

impact of the pipeline for Lac des Montagnes users it will be buried as of about 100 m from the shoreline. The discharge point in the lake is near the mouth of the Nemaska River at a depth that will promote dispersion of the effluent. About 6.8 km of pipeline will be required. Modelling of the effluent plume was carried out in the fall 2014 to confirm the precise position of the discharge site and potential effluent dilution.

Process water will be entirely recycled or recirculated and therefore will not be released into the environment, primarily because of the recommended tailings management method which calls for the production of filtered dewatered tailings (9% moisture content). A back-up source of water (fresh water supply well; Map 4.2) will be required for the operation of the concentrator (mixing reagents and pump imperviousness). An estimated supply of 101.2 m^3/h will be required.

Runoff water from outside the mine site will be diverted to avoid any contact with mine installations. Runoff elsewhere on the mine site (roads) will be collected and discharged into sedimentation ponds for treatment of suspended matter before being released into the environment. The release of runoff will be carried out in compliance with the *Regulation respecting standards of forest management for forests in the public domain* (RNI), that is, it will be released into a local area of vegetation at least 20 m away from the nearest lake or river (at high water mark).

Design criteria set out in Directive 019 for the drainage network associated with accumulation areas that have no dykes shall be met in all cases. This means runoff collection networks (ditches and ponds) are designed for a 100-year flood event. A minimum 1-m freeboard shall also be maintained for all ponds.



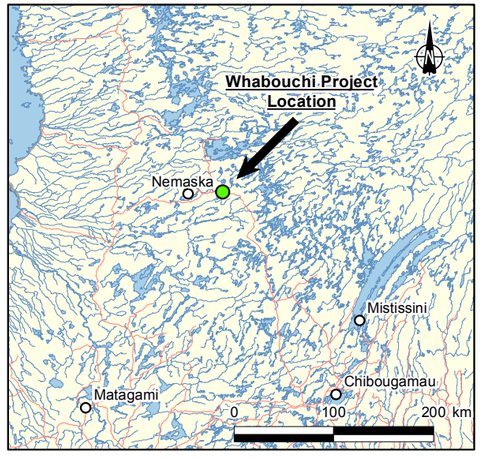
NEMASKA LITHIUM

Existing and Projected Infrastructures

- Route du Nord (Main road)
- Secondary road
- Projected Infrastructures
- Pump
- Pipeline
- Ditch
- Culvert
- Final effluent discharge point
- Final effluent pipeline

Hydrography

- River
- Lake



Whabouchi Spodumene Mine Project

Water Management Plan

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Base cartographique: BNDT, Gouvernement du Canada, 2013

Map 4.2

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5 Updated Impact Assessment and Mitigation Measures

Owing to the various changes made to the Whabouchi project in relation to what was presented in the ESIA, a re-assessment is now required of the project's impacts on some of the valued environmental and social components (VESCs) identified in the ESIA filed in April 2013. This section does not in any way replace the impact assessment presented in chapters 6 to 8 of the ESIA, but is meant to update some of the information provided therein. All the mitigation measures described in the impact assessment remain relevant. Table 5.1 provides a summary of the mitigation measures associated with the Whabouchi project, by components in the receiving environment.

5.1 Physical Environment

5.1.1 Air Quality

The changes made to the infrastructure layout plan resulted in significant changes in the results of the initial air quality modelling carried out for the Whabouchi project. It was therefore considered preferable to update the modelling taking into consideration the questions and comments from provincial and federal authorities (COMEX and CEAA). The main results of the new modelling are outlined below.

The impact of air emissions from the Whabouchi spodumene mine project was assessed by modelling the dispersion of contaminants in Year 7 and Year 16 of operations. These years were selected because activity at the mine site is expected to peak in those two years:

- In Year 7, the concentrator production rate will peak and the ore and waste rock extraction rates from the open pit will be higher than in any other year during the life of the mine. The pit area will almost be at a maximum, as will the area covered by the phase 1 cell. Revegetation work will commence at this point in the East sector of the same pile, which will involve moving and grading waste rock and tailings, as well as overburden;
- In Year 16, although the quantities of waste rock extracted from the pit will be lower than in Year 7, phase 2 cell will start being used at this point. Also, the concentrator will be working at full capacity and phase 1 cell will be completely revegetated.

Total particulates (TP), fine particles ($PM_{2.5}$), carbon monoxide (CO), nitrogen oxides (NO_X), sulfur dioxide (SO_2) and metals are the contaminants taken into consideration. The sources of contaminants are connected with the various operations at the mine such as vehicle traffic, truck loading and unloading operations, pit blasting operations, wind erosion, and vehicle and heavy equipment emissions.

The calculations included five years of weather data for the five contaminants and the two scenarios (production years 7 and 16), which required 50 modelling series. A grid of 1,600 receptors distributed on a 10 km x 10 km modelling domain centred on the mine site was used. There were also 23 special receptors to the west of the site at the various camps and Cree establishments and 95 within 300 m of the boundary of the site. Air quality standards apply offsite up to 300 m from site operations. The results were compiled for the measurement points at the boundary of or beyond the mining area.

To confirm compliance with ambient air standards, the values calculated for each contaminant at every calculation point were added to an initial concentration representative of the mine sector or specified in the *Clean Air Regulation.* The sum of calculated and initial concentrations must be less than the applicable standard. For this, the concentration calculated for the period to which the standard applied (1 h, 8 h, 24 h or annual) was used.

TSP Year 7 results exceeded the 120 µg/m³standards over the five-year period at a frequency of 0.025%. The exceedances occurred on 49 days from 2009 to 2013, or 2.8%. The exceedances were observed near the mine site at a maximum distance of about 500 m to the southeast. They occurred more frequently in winter. In most cases, only one exceedance per receptor was observed.

For $PM_{2.5}$ in Year 7, a few rare values exceeded the daily standard of 30 µg/m³, amounting to 0.0048% of all values calculated. The exceedances occurred on 26 different days during the five-year period, i.e., at a frequency of 3.26%. Again in most cases, only one exceedance per receptor was observed.

In Year 16, fewer exceedances were calculated than in Year 7 for the daily TSP standard over the five-year period, amounting to 0.006% of the values calculated. The exceedances occurred on 18 days over the five-year period, at a frequency of 1.03%. They were observed within about 500 m of the mining zone. Exceedances occurred more frequently in winter owing to poor dispersion conditions, as observed in Year 7.

For $PM_{2.5}$ in year 16, fewer exceedances from the daily standard were calculated than in Year 7 over the five-year period, amounting to 0.0013% of the total number of concentrations calculated. These exceedances occurred on seven days from 2009 to 2013, at a frequency of 0.4%. A majority of the exceedances were one-offs, and here too occurred mostly in winter when dispersion conditions are less favourable.

Given that most of the mine activities are considered in the model to occur simultaneously or more frequently than in reality (such as blasting in the pit), concentration and frequency values that exceed the norm are generally overestimated.

The results show that all standards applicable to gaseous contaminants (CO, NO_X, SO_2) are always met in the five-year modelling period for Year 7 and Year 16. There is also compliance with all metals-related standards.

No exceedance of a standard was determined for any of the contaminants (particulates, gases, metals) at the 23 special receptors (Cree camps and the Bible Camp).

Table 5.1 Summary of Impacts and Mitigation Measures for Nemaska Lithium's Whabouchi Project

	Social and Environmental Components	Projects Phases	Impacts	Mitigation Measures	Residual Effects
Physical Environment	Air Quality	Construction	• Increased wind erosion (dust generation) following forest clearing activities and during transport, excavation, stripping, filling and blasting activities • Increased emissions of gaseous contaminants during blasting activities • Increased emissions of greenhouse gas and gaseous contaminants caused by heavy machinery and vehicle use	• Ensure that heavy machinery, vehicles and equipment are in good working condition (proper maintenance) • Ensure that heavy machinery and vehicles' anti-pollution systems are efficient • Avoid any non-essential use of heavy machinery, vehicles or equipment (idling) • Use electrical equipment as much as possible • Favour energy efficiency and use green technologies whenever possible • Favour the use of diesel for road vehicles that respond to Environment Canada's standards • Use dust suppressants that are approved by the MDDELCC or water on service roads (including ramps) when required • Limit traffic speed to 30 km/h on the project site • Wherever possible, reduce the number of heavy machinery and vehicle transits as well as the distance traveled • Ensure a proper maintenance of service roads and ramps • Establish a dust managing program including, in particular, the appropriate use of dust suppressants	• Moderate intensity • Local extent • Moderate duration • Moderate residual impact significance
		Operation	• Same as construction phase • Increased gaseous contaminant emissions due to the use of generators in the pit and to blasting activities for ore extraction • Increased dust emissions during tailings and waste rock transportation towards and onto designated stockpiles • Increased dust emissions from crushing and ore processing activities • Increased dust emissions due to overburden disposal as part of progressive revegetation activities on the waste rock and tailings pile	• Same as construction phase when relevant • Install dust collectors at the air outlets of the buildings containing the crushers and the grinders as well as the concentrator • Progressively restore the waste rock and tailings pile	
		Closure	• Same as construction and operation phases when relevant • Increased dust and gaseous contaminant emissions due to infrastructures and building dismantling	• Same as construction and operation phases when relevant	
	Noise Level	Construction	• General increase of ambient noise level during site preparation, particularly due to heavy machinery use and traffic for site stripping, terrain levelling, stockpile development, basin construction, etc. The presence of workers on the site may constitute a source of noise	• Install efficient and functional silencers onto equipment, heavy machinery and vehicles and make sure to maintain them in good working conditions • Install noise reducing devices onto hydraulic and pneumatic hammers • Install white noise (multifrequency noise) reverse warning alarm onto trucks • Shutter or soundproof stationary motorised equipment (e.g. generators) • Locate equipment as far as possible from sensible receptors • Carry out regular maintenance of all equipment, including lubrication and replacement of defective parts, particularly exhaust systems • Limit traffic speed to 30 km/h on service roads • Limit vehicle traffic to predetermined service roads • Wherever possible, carry out the noisiest work during daytime • Wherever possible, avoid any non-essential use of motors or mororized equipment • Wherever possible, avoid the use of generators and favour the use of electrical equipment • Wherever possible, use equipment that have a low level of noise emission • Wherever possible, use building materials with high STC (sound transmission class) rates for the construction of infrastructures	• Low intensity • Local extent • Moderate duration • Moderate residual impact significance
		Operation	• General increase of ambient noise level during site preparation, particularly due to heavy machinery use and traffic on roads and stockpiles. The presence of workers on the site may constitute a source of noise • Increased noise level due to ore extraction (drilling and blasting) and crushing and grinding at the concentrator		
		Closure	• Same as operation phase when relevant • Increased noise level during infrastructures and building dismantling and due to heavy machinery use as part of site rehabilitation		
	Ambient Light	Construction	• Intensification of ambient light	• Direct lights toward the ground (working areas) instead than toward the sky or the horizon • Design lighting in order to obtain an optimal quantity of light, e.g. adequate lighting of sites and installations in the respect of applicable OSH standards, while avoiding excessive power • Illuminate only required areas and avoid all loss of light outside these areas • Turn off the lights when a site is unoccupied • Use timers or motion sensors in order to minimize all unnecessary lighting (e.g. to turn off the lights of an unoccupied area) • Minimize the use of "blue light" (wavelengths below 540 nm)	• Low intensity • Local extent • Moderate duration • Moderate residual impact significance
		Operation	• Modification of ambient light (presence of lights day and night on the mining site)	• Same as construction phase • Lower, wherever possible, lighting intensity during the evening	
		Closure	• Modification of ambient light only during day time	• Same as construction phase	
	Soils and Surface Deposits	Construction	• Increased soil vulnerability to erosion • Possible contamination of soils and watercourses • Modification of ground characteristics by the displacement of large volumes of granular materials • Increased soil compaction • Generation of fine particules	• Wherever possible, work over frozen or firm ground in order to minimize compaction and the creation of ruts • Avoid, wherever possible, to undertake excavation work during heavy rain in order to minimize erosion • Use heavy machinery and equipment that are adapted to ground conditions in order to minimize physical disturbances • When required, stabilize slopes of cuttings and embankments that are susceptible to erosion • Restrict heavy machinery and vehicle traffic to predetermined areas (e.g. service roads and working areas) in order to reduce disturbed soil surface area • Clearly identify the limits above which the traffic of heavy machinery and vehicles is forbidden • Limit traffic speed to 30 km/h on the project site in order to reduce erosion and dust generation • Favour, wherever possible, the use of abrasive materials instead of salts during the winter and use water as dust suppressant during the summer • Preserve the overburden in order to use it during the rehabilitation of disturbed areas • Plan for specific areas for the storage of heavy machinery, vehicles and equipment • Ensure that heavy machinery, vehicles and equipment are in good working condition (proper maintenance) • Carry out maintenance of heavy machinery and vehicles in areas designated for this purpose (garage) • Minimize the quantity of heavy machinery refuelling points • Plan for a containment system for storage areas in case of leaks or accidental spills • Elaborate a prevention and intervention plan in case of accidental spills or leaks of hazardous materials • Plan for a readily accessible emergency kit to clean a hydrocarbon product or hazardous material spill (absorbants and appropriate containers) in strategic locations on the site • Plan for staff training to ensure they can promptly, efficiently, and safely respond in case of accidental spills or of hydrocarbon petroleum or hazardous material leaks • Dispose of waste according to adequate procedures	• Low intensity • Site specific extent • Moderate duration • Low residual impact significance
		Operation	• Same as construction phase • Plant cover recovery following site progressive rehabilitation	• Same as construction phase • Plan for a regular maintenance of service roads and working areas • Plan for periodic maintenance and inspections of tanks and containers used for petroleum hydrocarbon and hazardous material storage in order to ensure that they are in good condition	
		Closure	• Same as construction phase • Plant cover recovery following site rehabilitation • Clearance of ground surface following infrastructure dismantling	• Same as construction phase • Use indigeneous plant species (e.g. black spruce or jack pine seedlings) for rehabilitation works on tailings, waste rock and overburden stockpiles, for examples • Flatten and stabilize slopes of cuttings and embankments • Spread organic soil over the site	

Table 5.1 Summary of Impacts and Mitigation Measures for Nemaska Lithium's Whabouchi Project

	Social and Environmental Components	Projects Phases	Impacts	Mitigation Measures	Residual Effects
Physical Environment	Hydrogeology and Groundwater Quality	Construction	• Increased infiltration rate in soils • Drawdown of the water table level due to the installation of a well for supplying freshwater to the concentrator • Very localized potential modification of the water table level due to the construction of roads and ditches • Possible groundwater contamination • Potential increase of groundwater salinity due to the use of dust control agents or de-icing salts	• Designate specific areas for the storage of heavy machinery, vehicles and equipment • Ensure that heavy machinery, vehicles and equipment are in good working condition (proper maintenance) • Carry out maintenance of heavy machinery and vehicles in areas designated for this purpose (garage) • Minimize the quantity of heavy machinery refuelling points and carry out refuelling in areas designated for this purpose • Plan for a containment system for storage areas in case of leaks or accidental spills • Design a prevention and intervention plan in case of accidental spills or leaks of hazardous materials • Plan for a readily accessible emergency kit to clean a hydrocarbon product or hazardous material spill (absorbants and appropriate containers) in strategic locations on the site • Dispose of waste according to adequate procedures	• Low intensity • Local extent • Long duration • Moderate residual impact significance
		Operation	• Same as construction phase • No impact is anticipated on groundwater quality due to the presence of waste rock and tailings piles • Drawdown of the water table level due to pumping activities required for maintaining the pit dry that could impact the surrounding hydrographic network and wetlands (Lake Spodumene peatland, stream C, lakes 2, 3 and 30) • Maximal groundwater seepage rate into pit and galleries will be around 2 300 m³/day when the excavation will be completed	• Same as construction phase • Establish collection and control measures allowing to collect and manage waters in contact with mine tailings, including mine waters and tailings and waste rock waters • Manage runoff waters from ore stockpile areas and related activities closed to the concentrator and the garage using a runoff water collection network, including drainage ditches and drains directing water towards sedimentation ponds • Restrict heavy machinery and vehicle traffic to service roads and working areas) • Use abrasive material instead of de-icing agents during the winter • Carry out maintenance of heavy machinery and vehicles in areas designated for this purpose • Design maintenance areas in order to avoid environmental contamination in case of accidental spills or leaks • Install, if required, a hydraulic trap once the pit is flooded • Establish groundwater monitoring network where hazardous infrastructures are present	
		Closure	• Changes to groundwater quality due to the potentially contaminated water infiltrating groundwater when the pit will be filled at the end of the project	• Same as construction phase	
	Hydrology	Construction	• Modification of mining site runoff coefficients • Modification of BV4 and BV5 watersheds • Modification of mining site hydrologic regime that could impact lakes 2, 27 and 28 and watercourses C and F	• Limit forest clearing activities and restore plant cover wherever possible • Allow free movement of water and prohibit the discharge of wastes and residuals in watercourses and water bodies • Carry out work in sensitive areas during the winter wherever possible • Limit work along watercourse and water body banks	• Low intensity • Site specific extent • Long duration • Low residual impact significance
		Operation	• Same as construction phase • Dewatering of lake 29	• Same as construction phase	
		Closure	• Modification of the hydraulic regime of areas surrounding the pit due to its flooding • Recovery of part of the watershed disturbance following the dismantling of ditches • Restoration of the infiltration and runoff potentials following the revegetation of affected areas	• Site rehabilitation works will allow for most of the water bodies and watercourses impacted by the project to recover their respective natural flow regime	
	Surface Water and Sediment Quality	Construction	• Potential increase of woody debris, suspended matters and other nutrients (e.g. phosphorus) in water courses and waterbodies • Potential increase of turbidity by suspended matters • Possible contamination of surface waters (potentially contaminated runoff waters, hazardous materials, etc.) • Potential increase of water salinity around areas where de-icing salt is used (winter)	• Collect and treat all contaminated waters prior to their discharge in the aquatic environment • Limit deforestation to a minimum and proceed, wherever possible, with the rehabilitation of disturbed areas • Proceed to the manual cutting of the vegetation on the banks of water bodies and watercourses • Prevent debris from entering water bodies and watercourses and, in the event they are present in the water, remove them as soon as possible • Stabilize banks • Avoid, to the extent possible, working in steep slope areas • Avoid, to the extent possible, major works near water bodies and watercourses in heavy rain periods • Install sediment barriers in areas where sediment may end up in water bodies and watercourses • Avoid installing petroleum refilling point nearby water bodies and watercourses • Store heavy machinery, vehicles and equipment in areas determined for this purpose • Ensure that the heavy machinery and vehicles are in good working condition • Forbid any heavy machinery from crossing watercouses • Establish a prevention and emergency response plan in case of a spill • Plan for a readily accessible emergency kit to clean a hydrocarbon product or hazardous material spill (absorbants and appropriate containers) in strategic locations on the site • Plan for staff training to ensure they can promptly, efficiently, and safely respond in case of accidental spills or hydrocarbon petroleum ou hazardous material leaks • Dispose of waste according to the appropriate procedures	• Moderate intensity • Local extent • Moderate duration • Moderate residual impact significance
		Operation	• Same as construction phase • Potential runoff of ammonia and nitrate caused by the use of explosives	• Same as construction phase • Carry out regular inspections of petroleum and hazardous product containers and tanks and, if necessary, take the appropriate corrective measures • Build drainage ditches in order to collect runoff water from waste rock, tailings and overburden stockpiles and from the pit and ensure that the water is flowing freely during the operation • Limit the erosion of stockpiles by ensuring the construction of stable structures • Carry out regular inspections of stockpiles in order to verify their physical stability	
		Closure	• Same as construction phase but potential quantities rejected in the environment will be smaller • Decreased mine water release in the environment • Creation of a new waterbody • Effluent discharge within the lac des Montagnes will stop following closure activities • Reduced erosion due to the presence of a new plant cover	• Same as construction phase • Carry out the environmental monitoring program • Reestablish the surface drainage	

Table 5.1 Summary of Impacts and Mitigation Measures for Nemaska Lithium's Whabouchi Project

	Social and Environmental Components	Projects Phases	Impacts	Mitigation Measures	Residual Effects
Biological Environment	Terrestrial Vegetation	Construction	• Permanent loss of 27.75 ha of terrestrial vegetation • Temporary loss of 120.14 ha of terrestrial vegetation • Potential modification of plant community and productivity around the mine site due to erosion (wind, precipitations) • Potential modification of photosynthetic capacity from dust emissions • Modification of vegetation due to all-terrain vehicle traffic	• Preferably use surface areas already disturbed by the exploration works for the traffic of heavy machinery and for the development of temporary storage areas for construction materials • Properly identify and delimit construction zones to reduce the surface areas of terrestrial vegetation impacted • Limit heavy machinery and vehicle traffic to predetermined areas (for exemple, service roads and working areas) to reduce the surface areas of terrestrial vegetation impacted • Limit traffic speed to 30 km/h on service roads in order to reduce the amount of dust generated by vehicles • Allow traffic of heavy machinery, to the extent possible, only on surface areas to be deforested • Prioritize, to the extend possible, the use of winter abrasives rathen than ice melters • In summer, use water to control dust emissions on service roads (including ramps) when necessary • Revegetate disturbed areas as soon as possible after the work is completed in order to recreate natural conditions; use indigenous plant species and, if need be, temporary protection materials for surface areas under revegetation • Forbid the use of herbicides to control plant growth but rather use mecanical and manual methods • Ensure that an emergency spill kit is readily available on site to control and clean up harmful substances (oils, gas, chemical products, etc.) and ensure that the staff is appropriately trained to use it • Comply to storage and handling standards for harmful substances and ensure appropriate staff training	• Moderate intensity • Site specific extent • Long duration • Moderate residual impact significance
		Operation	• Progressive rehabilitation of vegetation • Potential modification of photosynthetic capacity, plant productivity and soil chemical characteristics from dust emissions • Modification of the composition and productivity of plant communities caused by the change in the runoff flow pattern	• Same as construction phase when relevant • Use the superficial deposits in storage for the progressive rehabilitation of the waste rock and tailings stockpiles • Rehabilitate the waste rock and tailings stockpiles progressively (insofar as the operating conditions allow). • Develop an erosion and plant monitoring program in areas susceptible to be impacted and, if need be, apply corrective measures	
		Closure	• Same as construction and operation phases when relevant • Restauration of affected area to a natural state (dismantling, revegetation)	• Same as construction and operation phases when relevant	
	Wetlands	Construction	• Loss of wetlands (7.38 ha) • Potential modification of wetlands caused by the drawdown of the water table • Modification of the water supply of some wetlands • Possible contamination and erosion • Modification of wetlands caused by all-terrain vehicle traffic	• Promote the use of surface areas already disturbed by the exploration works for the traffic of heavy machinery and for the development of temporary storage areas for construction materials • Properly identify the limits above which the traffic of heavy machinery and vehicles is forbidden • Limit heavy machinery and vehicle traffic to predetermined areas (for exemple, service roads and working areas) to reduce the surface areas of impacted wetlands • Limit traffic speed to 30 km/h on service roads in order to reduce the amount of dust generated by traffic • Preferably use, to the extend possible, winter abrasives rathen than ice melters • In summer, use water to control for dust emissions on service roads (including ramps) when necessary • Plan for specific locations to store heavy machinery, vehicles and equipment • Ensure that heavy machinery, vehicles, and equipment are in good working conditions (appropriate maintenance) • Ensure to do heavy machinery and vehicle maintenance in areas designated for this purpose (garage) • Minimize the number of refilling points for the heavy machinery and vehicles • Develop a prevention and emergency response program in case of an accidental spill of leak of hazardous materials • Plan for staff training to ensure they can promptly, efficiently, and safely respond in case of accidental spills or of hydrocarbon petroleum ou hazardous material leaks • Dispose of waste according to the appropriate procedures • Use heavy machinery and equipment adapted to soil conditions in order to reduce physical disturbances • Carry out working activities nearby wetlands in winter when possible • Ensure that an emergency spill kit is readily available on site to control and clean up noxious substances (oils, gas, chemical products, etc.) and ensure that the staff is appropriately trained to use it • Comply with storage and handling standards for harmful substances and ensure appropriate staff training • Install culverts to ensure groundwater circulation for service roads crossing wetlands • Avoid overdigging of drainage ditches nearby wetlands to limit drawdown of the water table	• Low intensity • Site specific extent • Long duration • Low residual impact significance
		Operation	• Potential modification of wetlands surrounding the pit caused by the drawdown of the water table • Potential modification of the water supply of some wetlands	• Same as construction and operation phases when relevant • Take into account surface runoff and the water supply to wetlands while developing of the waste rock and tailings stockpile in order to prevent the drying up or flooding of wetlands	
		Closure	• Same as construction and Operation phases when relevant • Creation of new wetlands during site rehabilitation		
	Ichtyofauna and its Habitat	Construction	• Increased sediment load in watercourses (erosion, heavy rain, runoff water) affecting the quality of the water and, indirectly, the fish • Possible contamination of fish habitat • Potential increase of water turbidity in fish habitat • Potential increase of fishing pressure	• Carry out the installation work for the treated mining effluent duct in lac des Montagnes outside of work restriction periods in the aquatic environment • Prioritize the use of surface areas already disturbed by exploration works for the traffic of the heavy machinery and the development of the temporary storage areas for construction materials • Clearly identify and delimit traffic zones for the heavy machinery and vehicles • Preferably use, to the extent possible, winter abrasives rather than ice melters • In summer, use water to control for dust emissions on service roads (including ramps) when necessary • Revegetate disturbed areas as soon as the work is completed in order to limit erosion • Plan for a confinement system for storage areas in case of accidental leaks or spills • Design maintenance areas in order to prevent contamination of the environment in case of accidental leaks or spills • Minimize the number of refilling points for the heavy machinery and vehicles • Ensure appropriate maintenance of heavy machinery, vehicles and equipment • Develop a prevention and emergency response plan in case of an accidental spill or leak of hazardous materials • Plan for staff training to ensure they can promptly, efficiently, and safely respond in case of accidental spills or of hydrocarbon petroleum ou hazardous material leaks • Dispose of waste according to the appropriate procedures • Develop an awareness program on the impacts of sport fishing for staff members • Forbid fishing within the mining lease and land leases	• Moderate intensity • Site specific extent • Moderate duration • Moderate residual impact significance
		Operation	• Same as construction phase when relevant • Habitat loss between 3 769 m^2 (summer conditions) and 5 498 m^2 (winter conditions) caused by the lowering of the water level of some lakes and watercourses due to the combined effect of the reduction of the watershed surface area and of the drawdown of the water table • Modification of the runoff water quality (suspended matter) affecting the aquatic environment	• Same as construction phase when relevant • Collect all potentially contaminated waters and treat them if needed before discharge in the aquatic environment	
		Closure	• Same as construction and Operation phases when relevant	• Same as construction and operation phases when relevant	

Table 5.1 Summary of Impacts and Mitigation Measures for Nemaska Lithium's Whabouchi Project

	Social and Environmental Components	Projects Phases	Impacts	Mitigation Measures	Residual Effects
Biological Environment	Amphibians and Reptiles	Construction	• Loss of terrestrial habitats (127.89 ha) and wetlands (7.38 ha) • Destruction of lake 29 (0.16 ha) • Possible contamination of water and herpetofauna habitats • Potential modification of herpetofauna movement caused by the construction of service roads creating barriers (access to reproduction sites) • Potential herpetofauna mortality due to heavy machinery and vehicle traffic • Disturbance of anuran reproduction caused by noises interfering with nuptial songs	• Preferably use surface areas already disturbed by the exploration works for the traffic of heavy machinery and for the development of temporary storage areas for construction materials • Clearly identify the limits above which the traffic of heavy machinery and vehicles is forbidden • Limit heavy machinery and vehicle traffic to predetermined areas (for exemple, service roads and working areas) to reduce the surface areas of environments impacted • Limit traffic speed to 30 km/h on service roads located on the mining site • Preferably use, to the extent possible, winter abrasives rather than ice melters • In summer, use water to control for dust emissions on service roads (including ramps) when necessary • Revegetate disturbed areas as soon as possible after the work is completed in order to recreate natural conditions and limit erosion • Plan for a confinement system for storage areas in case of accidental leaks or spills • Design maintenance areas for heavy machinery and vehicles in order to prevent contamination of the environment in case of accidental leaks or spills • Develop a prevention and emergency response plan in case of an accidental spill or leak of hazardous materials • Maintain a riparian buffer strip of at least 30 m wide on the periphery of water bodies and watercourses (Directive 019) in order to protect the environment and to conserve a biological corridor allowing free movement of animals	• Low intensity • Site specific extent • Long duration • Low residual impact significance
		Operation	• Same as construction phase when relevant • Potential impacts on population dynamic by the creation of impassible barriers (infrastructures) • Potential modification of wetlands that are suitable to amphibian reproduction and hibernation caused by the drawdown of the water table	• Same as construction phase when relevant • Proceed with the progressive revegetation of the waste rock and tailings stockpiles in order to rapidly offer new environments for the herpetofauna	
		Closure	• Same as construction phase where appropriate	• Same as construction and operation phases when relevant	
	Large Mammals	Construction	• Habitat loss (from 15.9 to 155.3 ha, depending on the species considered) • Displacement of big game toward similar habitats available at the edges of the mining site • Disturbance of some behaviors (foraging, breeding, rearing) due to noise and artificial lighting • Potential increase of the number of accidents involving large mammals • Potential increase of the level of stress • Potential increase of hunting pressure	• Preferably use surface areas already disturbed by the exploration works for the traffic of heavy machinery and for the development of temporary storage areas for construction materials • Clearly identify the limits above which the traffic of heavy machinery and vehicles is forbidden • Limit heavy machinery and vehicle traffic to predetermined areas (for exemple, service roads and working areas) to reduce the terrestrial surface areas impacted • Allow traffic of heavy machinery only on surface areas to be deforested • Preferably use, to the extent possible, winter abrasives rather than ice melters • In summer, use water to control for dust emissions on service roads (including ramps) when necessary • Revegetate disturbed areas as soon as possible after the work is completed in order to recreate natural conditions • Limit traffic speed to 30 km/h on service roads located on the mining site • Develop procedures to properly manage waste on the mining site • Make staff aware not to feed animals and to not leave food on the site that can attract animals • Forbid hunting activities to the staff within the mining lease and land leases	• Moderate intensity • Local extent • Moderate duration • Moderate residual impact significance
		Operation	• Same as construction phase when relevant • Increased noise level (large mammals will leave the area)	• Identical to the construction phase when relevant • Proceed with the progressive rehabilitation of the waste rock and tailings stockpile as soon as possible	
		Closure	• Same as construction and operation phases when relevant • Habitat creation due to revegetation and infrastructure dismantling (120.14 ha)	• Identical to the construction and operation phases when relevant • Revegetate disturbed areas on the mining site using indigenous plant species (herbaceous, shrubs and trees) • Install a fence around the pit to limit the access to large mammals	
	Small Mammals	Construction	• Habitat loss (from 3.1 to 155.3 ha according to the species considered) • Potential increase of stress level due to traffic and noise (e.g. predation, energy source) • Avoidance of noisy areas • Potential increase of collisions with vehicles • Potential increase of hunting pressure • Wastes could attract some species	• Preferably use surface areas already disturbed by the exploration works for the traffic of heavy machinery and for the development of temporary storage areas for construction materials • Clearly identify the limits above which the traffic of heavy machinery and vehicles is forbidden • Limit heavy machinery and vehicle traffic to predetermined areas (for exemple, service roads and working areas) to reduce the terrestrial surface areas impacted • Allow traffic of heavy machinery only on surface areas to be deforested • Preferably use, to the extent possible, winter abrasives rather than ice melters • In summer, use water to control dust emissions on service roads (including ramps) when necessary • Revegetate disturbed areas as soon as possible after the work is completed in order to recreate natural conditions • Limit traffic speed to 30 km/h on service roads located on the mining site • Develop procedures to properly manage waste on the mining site • Educate workers about the importance of not feeding the animals and not to leave any food, so as not to attract them near work sites • Forbid hunting and trapping activities to the staff within the mining lease and land leases	• Moderate intensity • Site specific extent • Long duration • Moderate residual impact significance
		Operation	• Same as construction phase when relevant • Positive impact of revegetation	• Identical to the construction phase when relevant • Proceed with the progressive rehabilitation of the waste rock and tailings stockpiles as soon as possible	
		Closure	• Same as construction and operation phases • Impact caused by dismantling activities (traffic, heavy machinery, water management) • Positive impact of revegetation and infrastructure dismantling	• Identical to the construction and operation phases • Revegetate disturbed areas on the mining site using indigenous plant species (herbaceous, shrubs and trees)	
	Chiroptera	Construction	• Potential mortality of arboreal chiroptera species (e.g. hoary bats) caused by deforestation activities • Habitat loss (155.3 ha) • Disturbance of chiroptera activities (foraging, breeding, rearing) • Avoidance of noisy and bright areas (decrease of hunting efficiency, reduction of feeding areas, modification of flight paths, decrease of breeding success, increase of predaction rate)	• Preferably use surface areas already disturbed by the exploration works for the traffic of heavy machinery and for the development of temporary storage areas for construction materials • Clearly identify the limits above which the traffic of heavy machinery and vehicles is forbidden • Limit heavy machinery and vehicle traffic to predetermined areas (for exemple, service roads and working areas) to reduce the terrestrial surface areas impacted • Limit traffic speed to 30 km/h on service roads located on the mining site • Revegetate disturbed areas as soon as possible after the work is completed in order to recreate natural conditions and prevent erosion • Protect the plant community by limiting deforestation and land clearing to predetermined areas • Inform and make staff aware of the presence of a little brown myotis nursery located near the "Route du Nord"	• Moderate intensity • Local extent • Moderate duration • Moderate residual impact significance
		Operation	• Same as construction phase	• Identical to the construction phase when relevant • Proceed with the progressive rehabilitation of the waste rock and tailings stockpile as soon as possible	
		Closure	• Same as construction phase • Impact during dismantling activities • Positive impact of revegetation and infrastructure dismantling	• Identical to the construction and operation phases when relevant • Revegetate disturbed areas on the mining site using indigenous plant species (herbaceous, shrubs and trees)	

Table 5.1 Summary of Impacts and Mitigation Measures for Nemaska Lithium's Whabouchi Project

	Social and Environmental Components	Projects Phases	Impacts	Mitigation Measures	Residual Effects
Biological Environment	Micromammals	Construction	• Habitat loss (from 18.9 à 136.0 ha according to species considered) • Potential modification of feeding and breeding activities due to noise and dust • Potential mortality due to heavy machinery traffic	• Preferably use surface areas already disturbed by the exploration works for the traffic of heavy machinery and for the development of temporary storage areas for construction materials • Clearly identify the limits above which the traffic of heavy machinery and vehicles is forbidden • Limit heavy machinery and vehicle traffic to predetermined areas (for exemple, service roads and working areas) to reduce the surface areas of environments impacted • Limit traffic speed to 30 km/h on service roads located on the mining site • Preferably use, to the extent possible, winter abrasives rather than ice melters • In summer, use water to control for dust emissions on service roads (including ramps) when necessary • Revegetate disturbed areas as soon as possible after the work is completed in order to recreate natural conditions and limit erosion • Plan for a confinement system for storage areas in case of accidental leaks or spills • Design maintenance areas for heavy machinery and vehicles in order to prevent contamination of the environment in case of accidental leaks or spills • Develop a prevention and emergency response plan in case of an accidental spill or leak of hazardous materials	• Low intensity • Site specific extent • Long duration • Low residual impact significance
		Operation	• Same as construction phase when relevant • Creation of terrestrial habitats suitable to micromammals following progressive site rehabilitation	• Same as construction phase when relevant • Proceed with the progressive rehabilitation of the waste rock and tailings stockpiles in order to rapidly offer new environments for micromammals	
		Closure	• Same as construction and operation phase when relevant	• Same as the construction and operation phases when relevant • Revegetate disturbed areas on the mining site using indigenous plant species (herbaceous, shrubs and trees)	
	Avifauna	Construction	• Loss of 147.9 ha of terrestrial habitats (including 11.9 ha of disturbed areas), 4.4 ha of wetlands and 2.9 ha of riverine habitats potentially used by breeding birds • Habitat loss potentially affecting 471 breeding pairs of forest birds, 3 breeding pairs of shorebirds and 5 breeding pairs of raptors • Destruction of bird nests if work is carried out during the breeding period • Disturbance and disruption of birds and nests that could result in increased level of stress and avoidance of noisy and bright areas (interference with bird songs, foraging, breeding and rearing activities) • Increased hunting pressure on waterfowl	• Carry out site clearing, brushing and surfacing work outside the peak of the migratory bird breeding season, which extends from April 20 to the end of August for the sector (breeding area C6), as recommended by Environment Canada. However, remain vigilant during work carried out outside this period in order to detect the potential presence of active nest of species that are early or late breeders • Make workers aware of the potential presence of bird nests in working areas and especially to Common Nighthawk nests on the ground of barren areas • If nests containing eggs or young of migratory birds are located or discovered during construction work, disturbance in the nesting area will cease until nesting is completed (i.e., the young have permanently left the vicinity of the nest, which could range from a few days to a few weeks depending on the species and stage of development) • Any nest found should be protected with a buffer zone determined by a setback distance appropriate to the species, until the young have permanently left the vicinity of the nest • In all cases, the nest itself should never be marked using flagging tape or other similar material as this increases the risk of nest predation. If necessary, flagging tape can be placed at the limits of the buffer zone • Reduce project footprint in order to limit clearing, stripping and earthwork to the smallest area • Keep a 30 m wide riparian buffer strip intact (from the natural high water mark), between the infrastructures and a stream, a lake or a wetland, except where watercourse crossing points are planned. Clearly delineate the limits of the working area (orange tape or fence) • Stripped or naturally barren areas that are targetted for construction activities will be covered with a membrane if they are left unused during many days in order to avoid that Common Nighthawk pairs construct their nests within the working area. The Common Nighthawk nesting period normally extends from the last week of May to the end of July. Then, membranes will be installed over barrer areas located within the working areas as soon as the snow is melt. They could be removed at the end of July, when the probability that a Nighthawk constructs a new nest becomes very low • Carry out the installation of the treated mine effluent duct in the lake des Montagnes outside of the waterfowl migration and nesting periods • Limit heavy machinery and vehicle traffic to predetermined areas (for exemple, service roads and working areas) • Limit traffic speed to 30 km/h on service roads located on the mining site • Install efficient and functional silencers onto equipment, heavy machinery and vehicles and ensure to maintain them in good working conditions • Carry out the noisiest work during daytime • Shut down all motorized equipment that is not to be used for some time (e.g. lunch time) • Install noise reducing devices onto hydraulic and pneumatic hammers • Install white noise (multifrequency noise) reverse warning alarm onto trucks • Shutter or soundproof stationary motorised equipment (e.g. generators) • Localize equipment as far as possible from sensible receptors (e.g. the peatland located in the southern part of the study area) • Ensure that wastes are correctly collected and stored in order to avoid attracting opportunistic bird species, as Common Raven, American Crow, Gray Jay and Herring Gull • Forbid hunting activities to the staff within the mining lease and land leases	• Low intensity • Local extent • Long duration • Moderate residual impact significance
		Operation	• Gain of anthropized habitat for some species (bare areas, road sides, stockpiles and infrastructures) • Gain of habitat by the creation of new terrestrial habitat suitable to birds following progressive rehabilitation of sites (only from the 6th year of operation) • Potential destruction of forest bird nests present within bare areas and onto mining infrastructures • Disturbance and disruption of birds and nests that could result in increased level of stress and avoidance of noisy and bright areas (interference with bird songs, foraging, breeding and rearing activities) • Modification of habitat by the creation of water basins and by the release of the mining effluent in the lac des Montagnes • Increase of hunting pressure on waterfowl • Potential modification of wetlands caused by the drawdown of the water table	• Same as construction phase when relevant • Cease extraction work during the two weeks of the goose break taking place during the spring waterfowl migration period • Direct lights toward the ground (working areas) instead than towards the sky and the horizon • Design lighting in order to obtain an optimal quantity of light, e.g. adequate lighting of sites and installations in the respect of applicable OSH standards, while avoiding excessive power • Illuminate only required areas and avoid all loss of light outside these areas • Turn off the lights when a site is unoccupied • Use timers or motion sensors in order to minimize all unnecessary lighting (e.g. to turn off the lights of an unoccupied area) • Minimize the use of "blue light" (wavelengths below 540 nm)	
		Closure	• Same as construction and operation phases where appropriate • Habitat gain by the creation of terrestrial habitat suitable to birds following progressive and final rehabilitation of sites • Habitat gain of about 120 ha that could potentially be used by 301 breeding bird pairs	• Same as construction and operation phases when relevant • Carry out the dismantling of buildings before or after migratory bird breeding season that extend from April 20 to the end of August for the sector (breeding area C6), as recommanded by Environment Canada • Make workers aware of the possible presence of bird nests in revegetation working areas and especially of Common Nighthawk nests on the ground of barren areas • Remove the final effluent pipeline in the lac des Montagnes outside of the waterfowl migration and nesting periods	

Table 5.1 Summary of Impacts and Mitigation Measures for Nemaska Lithium's Whabouchi Project

	Social and Environmental Components	Projects Phases	Impacts	Mitigation Measures	Residual Effects
Human Environment	Land and resource use	Construction	Dirsruption of hunting, fishing and gathering activities in the surroundings of the mining site, diminution of trapping activities around the mining site, modification of access to the territory and of the use of the Bible Camp	• All mining extraction activities (blasting, rock stacking on stockpile, etc.) will cease during Goose Break in order to not disturb hunting activities • Cree land users will be kept informed regularly of the scheduled mining activities to allow easier management and, if need be, reorganization of their harvesting activities • Cree land users and community members will be kept informed of environmental monitoring results and will be regularly consulted to take note of their observations and recommendations relative to the use of the territory by species of interest • In collaboration with the R20 trapline tallyman, Mr James Wapachee, a beaver and black bear trapping program will be developed, if need be, before construction works begin • Deforestation products produced during all project phases will be handed back to Cree land users or to the Nemaska community • Protective measures will be taken to ensure the safety of Cree land users along snowmobile trails that could be hindered by mining activities. Proper signaling will be installed at any relevant intersections close to the mining site • Continue discussions concerning the Bible Camp as well as with Cree camp users for which activities at the camp will be affected by mining activities • If possible, design the waste rock and tailings stockpiles to limit noise propagation in the direction of Bible Camp • Forbid staff from hunting, trapping and fishing on the mining property	• Moderate intensity • Local extent • Moderate duration • Moderate residual impact significance
		Operation			
		Closure			
	Employment and Economy	Construction	Job creation (up to 375 during contruction and 120 during operation), business opportunities, increased demand for goods and services, risk of indebtedness, integration challenge of native and non-native workers	• Ensure that economic and employment clauses included in the Chinuchi Agreement are implemented throughout the project • Develop and implement an employee assistance program that will address, among other things, financial planning, the transition to the mine closure, as well as other challenges arising from the intercultural context • Raise awareness about the Cree culture to all staff members	• High intensity • Regional extent • Moderate duration • High residual impact significance
		Operation			
		Closure	Job creation (about 15), business opportunities, increased demand for goods and services, integration challenge of native and non-native workers, socio-economic consequences of mine closure		
	Community Well-Being	Construction	Potential increase in accessibility to illicit substances, improvement of the quality of life, reduction of community cohesion, feeling of loss of traditional lifestyle and of cultural identity	• Develop a prevention program on the use of alcohol and drugs in collaboration with the CBHSSJB and Nemaska's community wellness center • Adopt "tolerance zero" disciplinary measures for mine workers relative to the use of drugs and alcohol • Produce and distribute newsletters of mining activities for the Nemaska community	• Moderate intensity • Local extent • Moderate duration • Moderate residual impact significance
		Operation			
		Closure			
	Archaeological and Cultural Heritage	Construction	No impact is anticipated	• If archaeological remains were to be found during working activities, the archaeological sites discovered would be managed in compliance with the requirements of the Quebec's Cultural Property Act • If archaeological remains were to be found on the mining site, the worksite superintendent has the obligation to immediately inform the principle contractor, and, if need be, to stop working activities at the site in question until a complete assessment is carried out by archaeologists. In such case, Nemaska Lithium will inform, among others, the tallyman and the Cree authorities	No impact expected
		Operation			
		Closure			
	Landscape	Construction	Modification of the topography, addition of anthropic elements to natural landscape	• Progressive revegetation of the waste rock and tailings stockpile as well as rehabilitation of surface areas disturbed by project activities will be carried out as well as monitoring of their effectiveness. In order to maximise plant cover growth as well as the visual aspect of the waste rock and tailings stockpile, indigenous plant species will preferably be used for revegetation and the necessary measures will be taken so that the stockpile looks as natural as possible by giving material heaps a rounded shape • Throughout the planning, preferably use materials that will optimize visual harmonization of infrastructures within the landscape • If need be, install visual screens to cover infrastructures that do not visually fit in the landscape • Mitigation measures of the "Ambient light" component also apply to light pollution aspects	• High intensity • Local extent • Long duration • High residual impact significance
		Operation			
		Closure	Elimination of some anthropic elements from the landscape, rehabilitation of disturbed areas (improvement of the visual quality of the landscape)	• Revegetate disturbed areas on the mining site using indigenous plant species	
	Community Infrastructures	Construction	Increased pressure on Nemaska's social services, easier access to housing because of the creation of new jobs and of economic benefits within the community	• A nurse and trained first aid staff will always be present to treat mild cases on the mining site in order to minimize the number of patients using Nemaska's medical services • Identify and establish partnerships with key social and commnity services of the Nemaska community	• Low intensity • Local extent • Moderate duration • Moderate residual impact significance
		Operation			
		Closure			

It can therefore be concluded that outside the mine area and at the special receptors there will be no impact of atmospheric emissions of gaseous and metal contaminants. As regards particulates and fine particles, the air emissions impact is considered to be minimal since the number of days during which standards were exceeded is limited and more than likely overestimated, as noted above. The values that exceed the standards only occur near the mine area, where there is no sensitive receptor.

To minimize the impact of the project on air quality, the main mitigation measures are to:

- Ensure heavy machinery, vehicles and equipment are in proper working order (adequate maintenance);
- Enforce speed limit of 30 km/h on project site;
- Use MDDELCC-authorized dust-control agents or water on service roads (including ramps) as required;
- Gradually reclaim the waste rock and tailings pile.

Note that air quality will be monitored during the project operation phase.

5.1.2 Noise Level

The project site is located 30 km from the Nemaska Cree Community and 19 km from the Nemiscau airport. As noted earlier, the remote geographical location of the project site means that the noise environment consists primarily of traffic noise on the Route du Nord and air traffic. The noise level is generally characteristic of noise levels in nature, i.e., the sound of the wind and animal noises. The ambient noise levels at the site determined during fieldwork are 43.5 dB(A) during the day and 36.4 dB(A) at night. These values are below maximum noise levels authorized by the MDDELCC (55 dB(A) during the day and 50 dB(A) at night).

As was the case for the assessment of air quality impacts, changes to the infrastructure layout plan have the potential to significantly alter the initial noise modelling results for the Whabouchi project, especially since the waste rock and tailings pile was moved away from the sensitive receptors. It was therefore considered preferable to update the noise modelling and re-assess noise levels and anticipated impacts on sensitive areas near the mining areas for each phase of the project. The main conclusions from the new modelling are outlined below.

The study was performed in compliance with international standard *ISO 9613-2: Acoustics -- Attenuation of Sound during Propagation Outdoors -- Part 2: General Method of Calculation* using CadnaA simulation software developed by *DataKustik*.

Noise levels and impacts were assessed in accordance with the procedures set out in Directive 019 for the Mining Industry, which uses Instruction Memo 98-01 on Noise to establish a noise assessment method and limit values. The directive establishes excess air pressure values for blasting. An additional assessment was performed using the percentage of people highly annoyed by the noise according to the methodology outlined in ISO 1996-1: 2003. The modelling scenarios used for each mine operation phase

(pre-production, Phase 1, Phase 2 and closure) are considered the most critical in terms of noise levels emitted by mine operations.

The various simulations indicate that the operation of the Whabouchi mine will comply with current noise and air pressure standards. The most significant impacts are minimal and will affect only the receptors closest to the mine site. Operations at the Whabouchi mine site will therefore not result in any noise- related impact either in the construction, operation or closure phases.

As a result, no specific mitigation measures are recommended. In the interests of implementing best management practices in its operations, Nemaska Lithium will however apply certain mitigation measures, including an equipment maintenance plan to prevent equipment from deteriorating and increasing its noise levels, and undertaking noisy operations during daytime hours.

5.1.3 Hydrogeology

The initial hydrogeological modelling performed by Richelieu Hydrologie Inc. as presented in Annexe 6-5 of the ESIA was updated to reflect the changes made to the project in the updated feasibility study (Map 4.1).

The objective of this update to the hydrogeological model completed in April 2014 was to assess the impacts associated with dewatering the pit and underground galleries using technical information provided by Met-Chem Canada Inc.

The pumping required to keep the pit and underground galleries dry will lead to a drawdown in the water table, which could well impact the river system and wetlands in the area. The new simulations projected piezometric levels and drawdowns around the pit, as well as groundwater seepage that needs to be pumped to keep the excavation and galleries dry.

After 26 years of operation upon completion of the open pit and underground mining operations, the maximum drawdown is expected to reach a distance of 1,700 m along the longitudinal axis from the centre of the pit and 848 m along the transverse axis. Including the pit, the total surface area in the drawdown zone would be about 4.06 km², including approximately 0.75 km² under the wetland located southeast of the pit. Given that the presence of a hydraulic connection between this bog and the water table has not yet been demonstrated, on the basis of currently available data, no impact is anticipated. Additional surveys are planned for the summer 2015 to clarify this component.

The drawdown caused by the pit could affect Creek C as well as lakes 2 and 3 because theoretically they will no longer be fed by groundwater. In practice, it is however likely that the situation will occur because of the low permeability of the bedrock. It appears that the reduced inflows will be connected more to reduced surface water inflows caused by smaller sub-basins resulting from the implementation of the mine water management plan.

Creek C simulations show that average monthly flows will be lowest in February and March but less affected in the other months of the year. There will therefore be little impact on water level except in winter.

Once mining activities cease, the cessation of dewatering operations will create a lake in the pit with groundwater returning to initial levels. The lakes and watercourses impacted by the drawdown will gradually start to be fed by groundwater. The final groundwater level will depend on the hydraulic characteristics of the lakes, i.e., the tributary and effluent flows, and their equilibrium level. According to the modelling, an estimated 43 years will be required for the lakes to reach a state of equilibrium.

5.1.4 Hydrology

The changes made to the project as part of the feasibility study resulted in the need to update the assessment of the impacts of the site preparation and development work on local hydrology. This section provides a summary of the new impact assessment that replaces the assessment outlined in section 6.7.2 of the ESIA filed in April 2013.

The water management plan will be gradually implemented during the construction phase and will be completed and operational before the startup of mine operations (see section 4.2.6 and Map 4.2). This new water management plan for the Whabouchi mine site will result in changes to certain watershed limits (BV1 to BV5 inclusive) as well as runoff coefficients. In addition, the drawdown in the water table during the dewatering phase will also change groundwater inflows to rivers and lakes in the area (see section 5.1.3). Lakes 2, 27 and 28 as well as creeks C and F are all likely to be slightly affected, in terms of both outflow and water level.

The flooding of the pit at the end of mining operations will go a long way in mitigating the impact of the project on the hydrology in the sector. The end of mining operations will lead to the gradual restoration of hydraulic dynamics at the site to where they were prior to the project.

5.1.5 Surface Water and Sediment Quality

The changes made to the project as part of the feasibility study resulted in the need to update the assessment of the impacts of site preparation and development work on surface water and sediment quality.

The revised water management plan, as envisaged in the feasibility study, will be gradually implemented during the construction phase of the Whabouchi project and it will be entirely completed and operational prior to the startup of mine operations (see section 4.2.6 and Map 4.2).

Note that on Map 4.2, runoff flowing in the direction of mine infrastructure will be collected in ditches and then directed toward one of the seven sedimentation ponds on the mine site. It will therefore be impossible for runoff to come into contact with mine infrastructure. It should also be noted that runoff water once collected will be managed along with mine waste water and directed toward the mine water

basin to be discharged with the final effluent. Final effluent will be monitored in compliance with the MMER, Directive 019 and other requirements.

Modelling of the dispersion plume and effluent quality was carried out in the fall 2014 following a series of additional surveys performed throughout 2014. The main conclusions drawn were that the water management method selected for the Whabouchi project would significantly reduce concentrations of potential contaminants in final mine effluent. The predicted concentrations are in fact lower than final mine effluent discharge requirements, or the standards set in Directive 019 for the Mining Industry and the allowable limits under the MMER.

The dilution capacity at the final effluent discharge point in Lac des Montagnes, i.e., near the mouth of the Nemiscau River in the lake, is such that it is predicted that final effluent will meet all applicable criteria in this mixing zone and receiving environment. In fact, in compliance with the methodology recognized by the MDDELCC, modelling of the mine effluent dispersion plume at the site selected for releasing the effluent into the environment demonstrated that the mixing zone is adequate to ensure criteria applicable to the receiving environment will easily be met.

Monitoring measures consistent with Directive 019 and MMER requirements will be implemented as of the startup of mining operations so as to ensure there is no toxicity for aquatic and benthic organisms as well as resource users.

Following mine closure, the pumping of seepage water will stop and no new mine waste will be deposited on piles, which means the primary sources of potential contaminants associated with the Whabouchi project will no longer exist; consequently, post-closure, the Whabouchi mine site should no longer constitute a potential source of contamination for the surrounding environment.

5.2 Biological Environment

5.2.1 Vegetation and Wetlands

The changes made to the project as part of the feasibility study mean that the assessment of the impacts of the construction phase and site preparation and development phase on vegetation and wetlands needs to be updated. The information provided in this section partially replaces the information in section 7.2.4 of the ESIA.

The site preparation and development activities in the construction phase will result in a reduction in habitat area in the study area. The surface area of terrestrial habitats and wetlands that will be impacted by various mine developments and hence lost during the construction phase of the project will amount to 147.89 and 7.38 ha respectively. The vast majority, i.e., more than 80%, of the total impacted terrestrial area, is occupied by recent burns.

Changes made to the layout of mine infrastructure in the feasibility study made it possible to avoid the loss of 53.51 ha of terrestrial and wetland environments. The direct impact of the project on these environments was therefore reduced by 25%.

Given the abundance and regional character of the forest stands surveyed in the study area, the losses incurred will not have a significant impact on the specific richness of the local or regional vegetation.

In addition, a number of mitigation measures were selected to minimize the impact of the project on these environments, including fully delimiting those areas where mining activities are permitted and reducing site clearing operations. The entire site will be revegetated as part of mine closure so that habitats for native species will quickly be re-established on the site. To ensure the effectiveness of revegetation activities, an agronomic monitoring program will be put in place.

Finally, it is important to note that under the *Act Respecting Compensation Measures for the Carrying out of Projects Affecting Wetlands or Bodies of Water*, wetland losses associated with the Whabouchi project shall be compensated through a plan approved by the MDDELCC. Measures have in fact been taken to ensure this plan includes funding for a scientific research program aimed at acquiring knowledge on the ecological (environmental and social) value of the boreal peatlands in the James Bay Lowlands. In addition to biogeochemical and hydrological components, the research program will include a component on knowledge of traditional Cree practices with respect to such wetlands.

5.2.2 Fish and Fish Habitat

The changes made to the project as part of the feasibility study mean that henceforth no mine infrastructure will be located in a watercourse or lake that is considered to be a fish habitat. The work to optimize the project and reduce the mine footprint has meant that only Lake 29 will be destroyed by the development of the waste rock and tailings pile. It should also be noted that surveys conducted showed that this lake is not a fish habitat. The loss of an estimated 0.16 ha of water environment however will be compensated in a wetland and water body compensation program under Quebec's *Act Respecting Compensation Measures for the Carrying out of Projects Affecting Wetlands or Bodies of Water*.

The management of runoff and site drainage during the construction and operation phases is likely to result in localized and temporary changes to some lakes and rivers (and consequently the use of fish habitat). These impacts will be in addition to those caused by the dewatering of the open pit during the mine operation phase. The lakes and watercourses that are the most likely to be affected by the joint reduction in surface and groundwater inflows are lakes 2, 27 and 28, and creeks C and F. The decrease in surface water inflows will have more impact than the drawdown of the water table, which is considered to be limited. To determine the surface area of fish habitat that potentially dries out, additional surveys were carried out in the summer 2014. These data were also used in modelling the effluent dispersion plume in Lac des Montagnes.

It is therefore anticipated that the Whabouchi project could cause fish habitat losses along shorelines primarily in lakes 2, 27 and 28 and creeks C and F. The change in water levels is estimated to be limited and would fall within the natural drawdown zone in the lakes. Those fish habitats that may be affected by lower water levels hold water for only very short periods and are partially dry under natural conditions.

The total area of fish habitat that is likely to be dry (including lakes and watercourses) is an estimated 5,498 m^2 in winter and 3,769 m^2 in summer.

To offset fish habitat losses caused by the Whabouchi project, a preliminary habitat compensation program was developed. This program specifies proposed intervention measures (developing spawning grounds, and creating shelter and feeding areas), the habitat area to be developed, target species, and proposed sites, etc. The habitat compensation plan calls for offsetting the losses by creating more than 900 m^2 of spawning grounds for brook trout and walleye, at six separate sites. Developing spawning grounds will increase the productivity of the two target species, and will hence more than compensate for the loss of lesser quality habitats. This preliminary compensation program needs to be analyzed by and discussed with stakeholders so as to meet the requirements of government authorities and the objectives of the *Fisheries Act*.

The primary residual impact of the effluent released into the environment on fish is the avoidance factor. Some specialist fish species such as lake whitefish could well avoid the initial dilution zone of the plume. However, given the size of Lac des Montagnes, such an impact is considered to be of limited significance. Modelling of the effluent plume dispersion confirmed the limited potential impact of the effluent on water quality in this lake. In addition, to validate the impact assessment, a water quality monitoring program for the lake and the effluent is planned, in compliance with applicable provincial and federal standards.

5.2.3 Benthic Invertebrate Communities

As a result of the changes made to the project in the feasibility study, the impacts associated with site preparation and development work on benthic invertebrate communities were updated since henceforth only the aquatic habitat in Lake 29 will be destroyed when the lake is backfilled.

Lake 29 will be backfilled as the waste rock and tailings pile is created, resulting in the inevitable destruction of fish habitat used by benthic invertebrate. A total area of 0.16 ha will be destroyed, which is very small in relation to the total area of aquatic habitats in the study area.

Benthic invertebrate will be monitored during the Whabouchi project in compliance with Environment Canada's EEM program.

5.2.4 Reptiles and Amphibians

The assessment of the impacts of site preparation and development work on reptiles and amphibians was updated to account for modifications made to the project in the feasibility study.

During the construction phase, site preparation and development in the mine sector will lead to a loss of aquatic habitats (Lake 29), wetlands and terrestrial habitats following clearing, stripping, excavation, grading, infrastructure development and overburden storage operations. The anticipated losses will amount to 155.3 ha divided as follows: 125.5 ha of recent burns, 11.5 ha of forest stands, 7.4 ha of wetlands and 11.9 ha of disturbed sites.

With regard to wetlands which represent prime reproduction environments for amphibians particularly wood frogs about 3.7% of the wetlands in the study area will be destroyed.

In addition to the site preparation work in the construction phase, other activities that are projected to take place in the operation phase are likely to impact habitat use, specifically for amphibians. These activities and the effects they may have are described below:

- Runoff water and site drainage management during the construction and especially the operation phase. These activities are likely to lead to localized and temporary hydrology-related changes to certain lakes and watercourses, specifically lakes 2, 27 and 28. The anticipated slight drop in water level could reduce the shoreline area in lakes and change habitat use by amphibians. However since the anticipated drop in water levels is just a few centimetres, it will have little impact on the biological cycle of amphibians;
- The lowering of the water table resulting from pit dewatering operations could have repercussions on nearby wetlands, specifically the extensive peatlands (essentially a shrubby bog) located south of the pit. Peatlands are favourable environments for amphibian reproduction and hibernation. It has not however been demonstrated that the drawdown of the water table will have an impact on the peatland since it rests on a relatively impermeable clay substrate. Such ombotrophic bogs are not hydrologically connected with the underground aquifer and would therefore not be affected by groundwater drawdowns.

5.2.5 Small Mammals

The various small mammal species (furbearing animals, micromammals and chiropterans) in the study area frequent a broad range of habitats. If we combine all the species likely to be present in the study area, it is clear that they all frequent stands that are likely to be affected by the project during the construction phase.

The project is likely to destroy 155.3 ha of potential habitats for small mammals in the mine area, which represent about 15.7% of the habitats found in the study area. Potential habitat losses in the study area for each of these species vary between 2.3% and 18.0%.

5.2.6 Large Mammals

As a result of changes made to the project as part of the feasibility study, the assessment of impacts of site preparation and development work in the construction phase on large mammals (moose, caribou and black bear) was updated. The main conclusions of this re-assessment are outlined below.

Moose is a species that is likely to remain year round in the Whabouchi project study area. Moose in fact are found in a range of habitats with diverse functions, i.e., habitats that provide cover and food, which are present on the Whabouchi mine site. As a result when the site preparation and development work as well as infrastructure construction work is under way, it is quite likely that one or more moose will be found in the area. The study area has 143.5 ha of potential moose habitat, or less than 13.6% of its initial forested, wetland and water areas, that could be destroyed by the work in the construction phase. However, since the land areas are fairly homogeneous in the study area, individual specimens could relocate to other similar habitats at the edge of the mine site, in the study area or surrounding areas.

Migratory caribou do not occur in the study area in winter, but are found in the spruce-lichen forests and peatlands, their preferred winter habitat. The information gathered on this species shows that they have made limited use of the study area for a number of decades. Most of the Whabouchi project study area, i.e., 68% or 672.7 ha, consists of recent burns. During the construction phase about 15.3% or 140.5 ha of recent burns, peatlands and forest stands in the mine sector will be cleared and developed for the installation of various mining facilities. If the migratory caribou distribution and their migration pattern remain the same, the impact of the project during the construction phase will remain limited and will affect at most only a few specimens which could adapt by avoiding the project area and moving to replacement habitats on the periphery.

In the case of woodland caribou, large mature to old coniferous stands along with peatlands are of prime importance. Although the presence of woodland caribou in the study area has not been confirmed, its preferred habitats, i.e., forest stands and peatlands, are present in the study area and represent 8.4% and 16.7% respectively of the study area. During the construction phase, 15.9 ha of potential habitat will be affected by the project, or 6.4% of woodland caribou habitat present in the mine sector.

Black bears are an opportunistic species that occur in many types of habitats. The characteristics of the study area represent good potential habitat for this species. Clearing and other construction activities will lead to the potential loss of 155.3 ha, or 15.7% of habitats initially present in the project study area.

5.2.7 Avian Fauna

The initial assessment of the impacts of the Whabouchi project on avian fauna outlined in the ESIA was subject to an exhaustive update to consider first the questions raised by COMEX and the CEAA and second the various changes made to the project in the feasibility study.

The methodology used in the re-assessment of the impacts was similar to that used as part of the environmental and social impact assessment for the Renard project (Stornoway Diamond Corporation) and for the extension of Route 167 North to the Otish Mountains (Quebec Ministry of Transport), which were both certified as compliant by COMEX and the CEAA. The lists of the various nesting birds likely to frequent the study area (waterfowl and other aquatic birds, birds of prey, and forest and shore birds) were compiled from environmental studies conducted in the region as part of the Eastmain-1-A – Sarcelle – Rupert project (Hydro Québec).

The loss of habitat due to site preparation and development work is the main impact on birds. It is anticipated that 155.3 ha that could be used by nesting birds will be affected by clearing, slashing and stripping work in the Whabouchi project, that is, 6.3 ha less than what was initially predicted in the ESIA released in April 2013. The avian species that will be the most affected are those living in the “recent burn” biotope, which will lose the most surface area, i.e., 80% of all affected areas. Habitat losses will affect 471 breeding pairs of land birds, 1 to 3 pairs of shorebirds, at least one pair of waterfowl, and a few (≤ 5) pairs of birds of prey. The species that are potentially the most affected are the white-throated sparrow, the dark-eyed junco, and the Lincoln’s sparrow. The April 2013 ESIA estimated that

545 breeding couples of forest birds and seven to eight waterfowl broods would be affected by habitat loss anticipated at the time.

As for species at risk, the habitat areas potentially affected by the project amounts to 7.2 ha for the rusty blackbird, 143.4 ha for common nighthawk, 126.8 ha for olive-sided flycatcher, and 0.37 ha for short-eared owl. In the study area, the only potential short-eared owl habitat is the Lac du Spodumène peatland. Habitat losses for this species will be limited and the most significant impact will be associated with the disruption and disturbance caused by noise, vibration, artificial lighting and human presence.

Following the reclamation and revegetation of mine sites in the closure phase, the areas impacted during the construction phase will be revegetated, except for the pit which will be flooded (27.8 ha), thereby creating ideal habitats for birds. It is very likely that the conditions in the new forest will be similar to those currently observed in conifer stands in the region. In the end, about 301 forest bird breeding pairs may well thrive in the new forests established on site after the closure of the mine.

The list of mitigation measures initially proposed in the ESIA to minimize the impacts of the Whabouchi project on birds was also updated in terms of recommendations from Environment Canada and scientifically recognized sources. Measures have been proposed to limit the destruction of habitats, the disruption and disturbance of birds and nests by noise and lighting, as well as hunting pressure. Furthermore, to as much as possible avoid nests being destroyed, site clearing, slashing and grading will be carried out outside migratory bird breeding period, which extends from April 20 to late August in the area. Workers will in addition be sensitized to the potential presence of nests, more specifically common nighthawk nests on barren ground, on infrastructure and the mine site. Should an active nest be found in the work area, special protective measures will be applied, such as setting up a buffer zone around the nest the radius of which will vary depending on the species involved.

5.3 Human Environment

5.3.1 Land and Resource Use

The changes made to the project as part of the feasibility study, specifically relocating the waste rock and tailings pile, and moving other project components away from Lac des Montagnes, have led to a review of the assessment of the project's impacts on land and resource use by the Crees.

The majority of the impacts attributable to the Whabouchi project will be within trapline R20, and more specifically in the southwest sector of that trapline (which includes the northern part of Lac des Montagnes where the Bible Camp and a number of other Nemaska Cree camps are located). As for traplines R16, R18, R19 and R21, which are adjacent to R20, the assessment of the project and its potential impacts demonstrated that they should not be directly or indirectly affected by any nuisances and the impact such nuisances may have on the presence of wildlife, by any noise or by the presence of mine workers. Again, the relocation of the waste rock and tailings pile and some other project

components as indicated in the feasibility study essentially distances the main potential source of impacts on these four traplines.

To reduce the impacts of the project on land and resource use, various mitigation measures will be put in place including the following:

- To avoid disturbing the spring goose hunt, all extraction activities at the mine (blasting, and placing material on the tailings pile) will be suspended during the spring goose hunt, locally known as the Goose Break;
- Crees who use the land will be kept informed of the mine's schedule of activities to help them manage or reorganize their harvesting activities;
- Cree users of the territory and community members will be informed of environmental monitoring results and will be regularly consulted for their observations and recommendations regarding the presence of wildlife on the affected territory;
- Working with the R20 tallyman, a beaver and black bear trapping program will be put in place if necessary prior to the start of construction work;
- Clearing byproducts in every project phase will be made available to Cree users or to the community of Nemaska;
- Protection measures will be taken to ensure the safety of Cree users along snowmobile routes that may be affected by mine activities. Adequate signalling will be installed as needed at crossings near the mine site;
- Continue discussions regarding the Bible Camp and Cree camps whose use will be affected by mine activities;
- If possible, organize activities at the waste rock and tailings pile in such a way as to minimize noise at the Bible Camp;
- Prohibit mine employees from harvesting wildlife (hunting, fishing and trapping) on mine property.

Land and resource use will be monitored during the construction and operation phases of the Whabouchi project. In compliance with the *Chinuchi Agreement*, monitoring will focus on the use of trapline R20 and its resources by the tallymen and main trapline users.

5.3.2 Employment and the Economy

Following the update of the project in the feasibility study, the mine plan called for mine operations extending over 26 years instead of the 19 years initially predicted (PEA, ESIA). The operations include 20 years of open pit mining followed by underground mining from Year 21 to Year 26. This change to the project led to a re-assessment of the impacts on employment and the economy.

During the life of the project, specifically the construction and operation phases, various vocational training opportunities will be made available and jobs created for the members of the Nemaska community. The Whabouchi project will furthermore result in business opportunities for existing local and regional companies and for the development of new companies. Economic spinoffs are anticipated because the project will lead to increased local demand for goods and services.

The construction phase will require about 375 employees, while 101 individuals will be hired during mine operations , 67 to operate the concentrator and 17 administrative employees, totalling 185 positions over two shifts. An estimated 115 individuals will be on site at the mine at any given time.

During the 19 months of construction, Nemaska Lithium will invest about $190 million to set up the mine and the concentrator. The project will help support employment by suppliers and merchants who will see their business increase as a result of the ongoing or additional incomes received by direct and indirect workers. Annual operating costs at the Whabouchi mine will for their part range from $36.3 to $43.8 million during the open-pit mining operations (years 1 to 20), and from $44.0 to $53.8 million during the underground mining phase (years 21 to 26). In addition to these spinoffs are government and public revenues from personal income taxes, consumption taxes, corporate income taxes, mining company taxes paid to the governments of Quebec and Canada, and mining royalties. The economic benefits of the project in the operation phase represent a significant positive impact.

The main impact during the mine closure phase will be the loss of jobs created during the project and the slowdown in supply of various goods and services especially at the local level. For site closure, 15 employees will be required.

The *Chinuchi Agreement* on the impacts and benefits of the development and operation of the Whabouchi mine project recently signed by Nemaska Lithium Inc, the Grand Council of the Crees, the Cree Nation Government and the Cree Nation of Nemaska sets out a number of terms and conditions for maximizing spinoffs from the project for Nemaska as well as the other Eeyou Istchee Cree communities.

The *Partners Declaration* between Nemaska Lithium and the communities of Chibougamau and Chapais has set similar objectives for the Jamesian population affected by the project.

5.3.3 Community Well-Being

During the course of the project from construction to closure, living conditions could improve owing to project-related economic opportunities.

At the same time, the mining project could have adverse effects on social cohesion within the community since not all members of the community will benefit equally from the project. A feeling of the gradual loss of the traditional way of life and cultural identity could also occur from the development of the project. Local authorities are concerned that the possibility of an increase in access to illegal substances within the community could have an adverse impact on the community's well-being.

To mitigate the impacts of the project on the well-being of the community, various measures will be implemented including:

- Developing a drug and alcohol abuse prevention program in collaboration with the CBHSSJB and the Nemaska community wellness centre;
- Adopting strict zero-tolerance disciplinary measures concerning drugs and alcohol for mine workers;

- Producing and distributing the mine newsletter in the Nemaska community.

5.3.4 Landscape

Certain changes made to the project as part of the feasibility study led to a review of the type and scope of the impacts of the project on the landscape.

The location of the waste rock and tailings pile, the main irritant for Cree users regarding the integration of mine infrastructure into the landscape surrounding Lac des Montagnes, was reviewed following a re-assessment of the variants (Map 4.1).

Visual simulations and videos of the relocated waste rock and tailings pile showing that it would no longer be visible from the mouth of the Nemiscau River in Lac des Montagnes where the Cree camps and Bible Camp are located were presented to the main stakeholders in information-consultation sessions. The change was well received by stakeholders who had been generally dissatisfied with the previous location of the waste rock and tailings pile.

To limit the impacts of the project on the landscape, various measures will be applied as noted below:

- Revegetation of the waste rock and tailings pile and restoration of surfaces that have been altered over the life of the project;
- The use of native plant species will be favoured in the revegetation process;
- The piles of materials in the waste rock and tailings pile will be rounded;
- Maximum use will be made of materials that optimize the visual integration of installations with the landscape.

6 Cumulative Effects

The assessment of cumulative effects in the ESIA was reviewed and updated to take into consideration questions raised by the CEAA and the various changes made to the project in the feasibility study.

The list of valued components (VCs) established for this assessment was revised to include the following elements[7]:

- Air quality;
- Noise level;
- Water resources* (*note: this component includes hydrology as well as surface, ground water and sediment quality and quantity*);
- Wetlands*;
- Fish and fish habitat*;
- Woodland caribou;
- Avifauna (migratory birds and species at risk)*;
- Little brown bat* and northern long-eared bat*;
- Land use (hunting, fishing and trapping);
- Employment and the economy;
- Community well-being*;
- Cultural and archeological heritage*;
- Landscape*;
- Community infrastructure*.

The physical environment variables “air quality” and “noise levels” were considered in terms of the local environment (9.24 km^2) because of the adverse impacts felt in a limited area around the mine. The spatial boundaries for water-related VCs, i.e., “water resources”, “wetlands” and “fish and fish habitat”, cover the five watersheds affected by mine activities that drain into Lac des Montagnes (BV1 to BV5 for a total area of 103 km^2). Owing to the extensive distribution range of the other species and species groups selected, the regional study area (110,928 km^2) was considered in the cumulative effects assessment. Finally, for the human environment VCs, the regional study area was considered so as to cover a broader territory that would include communities and towns in the region as well as other projects (including mining, hydroelectric and road projects).

The temporal boundary used in the cumulative effects assessment for each VC extends over a period of 70 years, i.e., from the signing of the James Bay and Northern Québec Agreement (JBNQA) in 1975 to the end of the mine closure phase set for 2043.

[7] The VCs marked with an asterisk were added to the cumulative effects assessment in the re-assessment.

It should be noted that only those effects in connection with the power transmission line and the Route du Nord will be cumulative with the effects of the Whabouchi project in terms of the “air quality”, “noise levels”, “water resources”, “wetlands” and “fish and fish habitat” VCs.

In relation to the other VCs, the effects of the Whabouchi project will be cumulative with those of all relevant projects, activities and events, with a few exceptions. However, overall, few cumulative effects are anticipated in the local study area given that most mining projects are relatively far away from each other. As noted earlier, only the Route du Nord and a nearby power transmission line would present cumulative effects in conjunction with the effects of the Whabouchi project.

At the regional level, the assessment concluded that there was no residual cumulative environmental or social effect that was considered to have a significant adverse impact. This mean that no residual impact associated with the Whabouchi project, once combined with those of other local and regional projects, would be more significant that what it was assessed to be in the Whabouchi project alone. In short, the assessment of impacts performed within the framework of the Whabouchi project is not any different when other past, present and future projects in the region are taken into consideration.

In each VC case where an adverse impact of moderate or high significance has been determined, the environmental and social monitoring program proposed for the Whabouchi project will identify problem situations or issues and as needed establish and implement appropriate mitigation measures.

7 Environmental and Social Monitoring Program

The activities planned as part of Nemaska Lithium's Whabouchi project will require the implementation of an environmental and social monitoring program. Following discussions with stakeholders and provincial and federal authorities responsible for the environmental assessment procedure, the program presented in the ESIA filed in April 2013 was updated.

The objectives of the environmental monitoring program are to evaluate the effectiveness of mitigation and compensation measures set out in the ESIA, to track the development of certain valued environmental and social components, and to compare developments with pre-project conditions so as to identify trends or impacts arising from project activities or natural events.

The environmental and social monitoring program will be developed for the Whabouchi project in detail once the project has obtained the necessary provincial and federal authorizations. The program will target the physical, biological and social environments with the following components subject to monitoring:

- Integrity and physical stability of structures;
- Physical environment:
  - Weather and climate;
  - Ambient air quality and air emissions;
  - Groundwater quality and level;
  - Final effluent and surface water quality;
  - Vibrations and noise level.
- Biological environment:
  - Agronomic monitoring;
  - Wetlands;
  - Sediment quality, fish and benthic invertebrate communities;
  - Avifauna;
  - Mammals;
  - Chiropterans.
- Social environment:
  - Land and resource use;
  - Employment and economic spinoffs;
  - Community well-being;
  - Transportation on Route du Nord.

The environmental and social monitoring program will be implemented at the start of the construction phase and will continue for the life of the project. In compliance with the environmental management system (EMS) to be put in place, environmental monitoring will be carried out in each project phase (from construction to closure including reclamation) in compliance with applicable provincial and federal requirements. To ensure compliance with applicable standards and hence protect components in the receiving environment, corrective measures may also be proposed and implemented as part of the monitoring program.

The final program will describe how the results of monitoring will be used to adjust or modify project design and/or the implementation of mitigation measures to improve the project from an environmental perspective. This monitoring will allow Nemaska Lithium to be proactive in the event of a specific environmental issue and take swift, effective action.

Nemaska Lithium's environmental officer will be responsible for the implementation of the environmental and social monitoring program, and will keep the Environmental Committee established under the *Chinuchi Agreement* informed while ensuring that any recommendations or observations made by this committee are taken into consideration.

Finally, note that Nemaska Lithium is committed to ensuring that members of the Cree community of Nemaska and specifically the R20 tallyman take an active part in environmental and social monitoring activities. The nature and scope of Cree involvement in this work will be determined by the Environmental Committee.